JVA CONSULTING, LLC
partners in community and social change

Zero to Three
A Report for the Hemera Foundation

Report first published September 4, 2013

JVA CONSULTING, LLC
partners in community and social change

Since 1987, JVA has worked with social innovators to strengthen their communities. We have collaborated with public schools to launch innovative programs to attract and retain quality teachers; we have helped raise millions of dollars to support quality healthcare for the uninsured and underinsured; we have worked to expand the effectiveness and ability of hundreds of nonprofit organizations to provide needed human services; and we have convened community leaders and stakeholders to talk about a myriad of community issues and to find creative solutions.

Our success is the result of big ideas, the power of relationships, and the tenacity and courage to stop at nothing short of changing the world—one person, one group, and one dream at a time.

Learn more about JVA at www.jvaconsulting.com

Acknowledgements

Authors

Angie White Davlyn, Ph.D.

Laura I. Morales, M.A.

Annette Shtivelband Ph.D. *cand*

Becky Kester, M.Ed.

Meghan M. Camp, M.P.A.

Robert D. Jakubowski, Ph.D.

Janine Vanderburg, J.D.

JVA CONSULTING, LLC
partners in community and social change

TABLE OF CONTENTS

INTRODUCTION

Over the past 50 years, significant research has been conducted on the factors that influence the healthy development of children in the youngest months of life (including time in the womb) through their toddler years. This report focuses specifically on research and theory regarding children from conception up until their fourth birthday (a time period that will be referred to throughout this report as "zero to three"), for the purpose of better identifying the factors that influence (or inhibit) their growth, development and success, as well as programmatic and policy innovations that play an important role in impacting these years.

To better understand these factors, JVA Consulting (JVA) conducted extensive research on issues, trends and interventions focused on ages zero to three (and sometimes beyond). JVA also examined numerous programs and policies in the early childhood landscape in the state of Colorado and across the nation. In addition, JVA engaged leading experts in diverse fields—including child development, education, psychology, sociology, health, policy and economics—to share their opinions and knowledge about this important age. What follows is a report on zero to three that first describes in detail why these earliest years are so important (and why interventions during this time can be especially impactful) and then explores the current program and policy landscape in Colorado and across the nation. The report concludes by making recommendations for future research, programming, policy and funding.

METHODOLOGY

The Hemera Foundation expressed an interest in better understanding the research, programmatic, policy and funding environment surrounding early childhood development. To accomplish this, the Hemera Foundation engaged JVA to produce a report on zero to three that incorporated both research and practice (e.g., policies and programs). First, JVA conducted a thorough review of scholarly and empirical research on key issues and theories that are important to the zero to three population. Next, to ground research-based findings from the literature reviews in the best practices and lived experiences of practitioners in the field of early childhood development and programming, JVA gathered on-the-ground data about the factors driving policy and decision-making in both national and local (i.e., Colorado) contexts. Each of these processes is explained in more detail in this section.

Comprehensive Research on Scholarly Research on Zero to Three

To conduct the comprehensive literature review, JVA researchers mapped and reviewed a diverse spectrum of scholarly research on the zero to three population. In addition, JVA researchers conducted interviews with three leading scholars in the early childhood field (average interview length = 90 minutes), including a leading pediatric surgeon/social science researcher; a pediatrician/expert on early childhood research, services and policy; and a clinical psychologist/expert in early childhood policy and assessment. These three individuals were identified by the Hemera Foundation, and confirmed by JVA as having (a) a thorough understanding of both best practices and emerging trends within the zero to three landscape and (b) an alignment with the Hemera Foundation's initial research questions.

When first conceptualizing this literature review, JVA's original research questions focused almost exclusively on understanding zero to three in the context of the early language environment (e.g., stemming from the research conducted by Hart and Risley in their 1995 book *Meaningful Differences in the Everyday Experience of Young American Children* and the "30 million word gap" concept[1]). As such, JVA originally sought to determine the extent to which the "30 million word gap" was supported in empirical research and explore the factors—cultural, generational, economic and contextual—that might increase or lessen its impact on young children. JVA also sought to better understand key factors and research-supported best practices in zero to three interventions, including intervention targets (e.g., Is it more effective for programs to work directly with children or to provide training to parents that empowers them to care for their children?), type (e.g., Are home-based or center-based interventions more effective?), dosage (e.g., How many program visits are needed to maximize effectiveness?) and timing (e.g., Is zero to three really the best age to focus on?).

Throughout this process, the Hemera Foundation encouraged JVA to explore beyond initial research questions as trends emerged. Therefore, the ultimate direction of research was guided by findings from the literature and expert interviews, rather than deterministically directed by the early research questions alone. JVA approached this research by starting with the Hemera Foundation's initial questions, and let the research findings guide the future directions. With that in mind, the scope of the

---

[1] Note: Both of these programs are described in more detail later in this report

study was expanded based on two factors. First, findings reflected in existing research supported a "whole child" approach that highlights the interaction of a complex interplay of factors, rather than a narrow focus on the early language environment. Second, input from expert interviewees confirmed that a singular focus on language acquisition would not be the most beneficial strategy to pursue. JVA's team confirmed the new direction of research (e.g., focusing more broadly on the diverse trends in the zero to three landscape) with the Hemera Foundation's Rob Kaufold, who approved the expanded focus in light of the early trends in the data (e.g., a need for innovative research to make a significant and widespread impact on zero to three; the importance of helping parents empower themselves to optimize their child's development). As a result, while the comprehensive research reflected in this report is much more expansive than the focus proposed in the initial proposal and early discussions, JVA feels that it is a much better reflection of the best current and future directions for the Hemera Foundation to obtain the greatest impact possible in the zero to three population.

Data Collection on Practice and Policy in the Child Development Landscape

In addition to this extensive research, JVA was tasked with mapping the child development landscape to *ground findings from the scholarly literature in the realities of how practitioners actually utilize theories and findings in their everyday work*. To do this, JVA researched existing early childhood programs and policies (focusing on Colorado, as well as other important programs across the nation), utilizing a diverse spectrum of resources (including organizational information and reports, case studies, practitioner reports, state and federal policy guides, conference proceedings, empirical research and other data sources that were available). In addition, JVA interviewed 22 leading experts[2] in diverse fields—including child development, education, psychology, sociology, health, policy and economics—who shared their opinions and knowledge about the particular programs and policies that focus on zero to three (see Appendices A and B for a list of these experts and the expert interview protocol). These interviews lasted approximately 60 minutes each, and names were collected through referral sampling (also known as "snowball sampling," where early interviewees recommended names of others to interview) as well as through the recommendations of Hemera Foundation staff and JVA staff knowledgeable about those involved in policy settings and strategy with regard to the early childhood landscape in the state of Colorado. Major themes, and representative quotes discovered from these interviews, are shared throughout the report.

Data Analysis and Reporting

All collected data were analyzed to determine the most important historical and current trends within the zero to three child development landscape, and information collected during all phases of research is included in this report. The resulting document is grounded in scholarly literature and the lived experiences of practitioners, as well as the strategic opportunities available in Colorado to translate research to practice. In addition, JVA developed a "crosswalk" based on the findings of the most effective and/or prevalent programs, mapped by specific programmatic information (e.g., geographic location, age of children served, cost per child) and key features (e.g., family support, language

---

[2] Including the three expert interviews discussed above

acquisition, self regulation). This crosswalk is included later in this report. JVA hopes that this report and accompanying materials will assist the Hemera Foundation in building the foundation for future organizational pursuits that support the Hemera's mission and align its pursuits more closely with its desire to be a catalyst for significant change in how zero to three child development is approached.

WHY ZERO TO THREE?

We are all a product of our earliest experiences, and this means that our early experiences play an important role in who we become and how we contribute to society. –Zero to Three (2009)

A vital and productive society with a prosperous and sustainable future is built on a foundation of healthy child development. –Center on the Developing Child at Harvard University (2010)

Zero to three is a critical age in human development for many compelling reasons. A child's first three years of life are a time of incredible growth across all areas of development. Research shows that the human brain undergoes the most significant development during these years (Center on the Developing Child at Harvard University, 2011). As one study found, 700 new neural connections are formed *every second* during the first three years of life (Center on the Developing Child at Harvard University, 2007); as a result, this time represents the greatest opportunity for interventions to maximize their potential impact. In fact, researchers Leak, Duncan, Li, Magnuson, Schindler and Yoshikawa (2010) found that interventions implemented during the zero to three timeframe had the greatest impact (as measured by effect size) of all age groups.

> "Early childhood education is a more powerful tool for return on investment, and is very key to having a larger impact." –Interviewee

> "To me, it's the perfect storm now between a real moral and social-justice responsibility and a very compelling scientific challenge, plus a very common sense return on investment issue from a policy perspective. So for me it's a huge calling for people to understand how important the early years are." –Interviewee

In addition, programs and interventions that are successful at reaching the zero to three population not only have the potential to make a positive impact on young children, but also have significant potential to positively impact society at large. Economic cost-benefit research shows that interventions in the earliest years of life can have longer-term positive impacts later in life, including personal (e.g., improved self-regulation), educational (e.g., improved student retention, higher productivity in school), career (e.g., higher earnings, improved workforce quality), and family/community benefits (e.g., lower rates of crime and reduced teenage pregnancy rates and less dependence on government assistance) (Nurse–Family Partnership, 2008). As a result, investing in high-quality early childhood programming can provide a return on investment (ROI) ranging from $3.78 to over $17 for each dollar spent (Zero to Three Policy Center, 2007).

Colorado was home to 1,233,982 children under the age of 18 in 2011 (Colorado Children's Campaign, 2013a). Forty-one percent of children under age three in Colorado live in low-income families with an income of less than 200 percent of the Federal Poverty Level (FPL) and 20 percent live in families in poverty with an income of less than 100 percent of the FPL (National Center for Children in Poverty, 2013). To ensure that all children have a good start and a strong foundation for success later in life, it is imperative that parents, practitioners and policy makers alike focus in on this critical age. However, despite the fact that researchers now have a very complex understanding of how our youngest children develop, these research findings rarely translate into practice in the form of program and policy improvements. Because of the complexity of the early childhood field and the many touchpoints of care—including parents, families, childcare providers, social service providers and educators, to name just a few—the field "is often described as fragmented, with myriad actors working in disconnected ways and without alignment toward a shared goal" (Preskill, Jones & Tengue, 2013). In addition, despite the fact that "almost every social policy—from welfare reform to education to mental health—affects infants and toddlers, the impact of these policies on very young children is seldom sufficiently addressed" (Zero to Three, 2009, p. 1). Therefore, in order to mediate these disconnects, and because of this significant potential to positively impact young children—a rapidly growing and increasingly diverse population—and to make a difference in society, a focus on zero to three is critical.

> "Not only parents and educators should care about it [this issue]. [These] messages resonate more with business leaders [who say that] it's really about the bottom-line here. That the vulnerability of our nation be competitive with other nations in very black and white."
> –Interviewee

THE RESEARCH LANDSCAPE: KEY FACTORS IN EARLY CHILDHOOD DEVELOPMENT

> *The question is not whether early experiences matter. That question has been answered again and again—and the answer is "yes, absolutely." The important unanswered question is: How does experience make a difference? How does it get into the brain? How is it that everything about each and every one of us is the product of both our environment and our genetics? –Jack Shonkoff (2004)*

This section documents existing empirical research on zero to three, including: describing early research interventions in the mid-to-late 20th century; exploring the importance of a rich early language environment; making a case for comprehensive developmental frameworks; discussing neuroscience and its implications for zero to three; understanding the impact of stress; exploring the importance of parent–child interaction; and weighing the implications of waiting to intervene beyond the zero to three timeframe. Each segment will be explored in greater detail below.

Early Research on Zero to Three (and beyond)

Early research on zero to three (and beyond) was often focused on interventions tailored to socioeconomically disadvantaged children. Much of this research was initiated during President Lyndon B. Johnson's mid-1960s War on Poverty, a "confluence of cutting-edge social science and broad-based political activism…fueled by the conviction that intergenerational poverty could be eliminated by investments on multiple fronts" (e.g., early education, job training programs) that resulted in initiatives such as Head Start, Volunteers in Service to America (VISTA) and Community Action Programs (Shonkoff & Fisher, in press, p. 7).

During this time, a number of early childhood interventions were conducted that are still often discussed today. The two most well known and widely cited of these early interventions include The HighScope Perry Preschool Project (Berrueta-Clement, Schweinhart, & Barnett, Epstein, & Weikart, 1984), which targeted three and four year olds,[3] and the Carolina Abecedarian Project (Ramey & Campbell, 1984; Campbell, Helms et al., 1998), which targeted children from infancy through age five. Both of these interventions targeted low-income children, focused on utilizing long-term center-based programming as the intervention (e.g., a few years of high-quality preschool programming delivered by highly-qualified trained professionals using a modified standardized and structured curriculum) and implemented the intervention through a randomized clinical trial design (i.e., children were randomly assigned into early intervention treatment group or the non-intervention control group).

Moreover, these particular programs are remembered because of their outcomes: HighScope Perry Preschool tracked outcomes for 128 high-risk children[4] up to 40 years after the preschool intervention[5]

---

[3] Note: While the HighScope Perry Preschool Project did not focus on zero to three, it is one of the most important and often discussed early childhood interventions of this era. As such, we included it in this discussion as an important piece of history

[4] 64 children were randomly assigned to the intervention program and 64 were randomly assigned to the control

[5] Follow-up data was collected from participants at two different points of adulthood, ages 27 and 40

and found continued successes for the intervention group including a higher percentage of high school graduates [6] and lower rates of arrest for violent crime[7]; the Carolina Abecedarian Project tracked outcomes for 111 high-risk infants[8] for approximately 20 years after the intervention[9] and demonstrated high positive measures of academic performance and behavior; and both programs touted an impressive calculated cost-benefit ratio. These two programs, as well as other research conducted during the era, laid the foundation for the notion that interventions can, and do, make a significant (though often small) favorable impact on very young children across a range of short-, medium- and long-term outcomes.[10]

Poverty and Early Childhood Development

In addition to demonstrating that positive impact can be achieved through intervention, the enduring legacy of the initiatives founded during the War on Poverty, coupled with significant empirical research, have shown it to be abundantly clear that poverty—including both its material and psychosocial

manifestations—has a direct impact on children's early development (Bradley & Corwyn, 2002; Duncan & Brooks-Gunn, 2000; Noble, McCandliss, & Farah, 2007). As such, in the early years of zero to three research, many programs focused predominantly on serving "disadvantaged" children from families of lower socioeconomic status.

> *In Colorado:* More than one out of every six Colorado children lives in poverty, a total of approximately 217,000 children.
>
> – Colorado Children's Campaign (2013a)

However, as several researchers have pointed out, there are significant variances in children's home environments and in their impact on children's development among families at all income levels, including those who live in poverty (Ramey, 1994; Blair & Raver, 2012). In addition, child development, particularly a child's capacity for self-regulation,[11] is also linked to key factors such as parents'

---

[6] 66% in the intervention group vs. 45% in the controls

[7] 32% in the intervention group vs. 48% in the controls

[8] 57 children were randomly assigned to the intervention program and 54 were randomly assigned to the control group

[9] Follow-up data was collected from participants at three different points, ages 12, 15 and 21

[10] Note: While the HighScope Perry Preschool project is well known for its findings on academic learning, the findings of Dr. James Heckman, a Nobel Laureate in economics and researcher on what makes people successful, at the University of Chicago, are less well known. Heckman and his team began sorting through data collected in the 1960s and found additional data that had not been analyzed at the time. In the past, only academic factors had been considered when trying to ascertain if the program was successful. However, Heckman found other variables collected that had to do with personal behavior and social development. Heckman named these noncognitive skills and after careful analysis found that these skills were responsible for as much as two-thirds of the total benefit the HighScope Perry Preschool intervention gave its students. In other words, what people believed would help (e.g. academic boost for students) turned out to be less important than the noncognitive factors (e.g., curiosity, self-control and social fluidity).

[11] Self-regulation refers to the action children take to regulate their thoughts, emotions and behaviors as they process and translate information (Blair & Diamond, 2008).

education, language ability and intellectual functioning, as well as the culture of the family and the home environment (Ramey, 1994; Feldman, Maslha, & Alony, 2006; Duncan, Brooks-Gunn, & Klebanov, 1994).

As a result, despite an early scholarly focus on socioeconomic status (SES), more recent research has shifted away from simply studying low-income children and instead to more systematically examining the relationship between the physiological and emotional impacts that often accompany low SES populations and their cognitive outcomes (Dueker, Portko, & Zelinsky, 2011; Shonkoff, 2010). *Embodiment* is one term used to describe this theory, which describes the idea that the cognitive functioning of a child is informed by the entirety of the child's internal and external interactions, including his or her physical and emotional wellness, relationships with adults and the environmental conditions he or she experiences (Thelen, Schoner, Scheier & Smith, 2001).

Child poverty in Colorado. While research has shifted to taking a broader perspective, poverty is still a critical factor in the early childhood environment in the U.S., including in the state of Colorado. Colorado's child poverty rate is high, and growing. While Colorado's child poverty rate was only 10 percent in 2000, by 2011, it had reached 18 percent. While lower than the rate of poverty for the country as a whole (17 percent in 2000 and 23 percent in 2011), more than one in six Colorado children live in poverty (approximately 217,000 children), according to the most recent estimates (Colorado Children's Campaign, 2013a). Additionally, **over the past decade, Colorado had the second-fastest growing rate of children living in communities with concentrated poverty in the nation—a 360 percent jump** (Colorado Children's Campaign, 2013a).

Figure 1. Colorado Children Living in Communities With Concentrated Poverty[12]
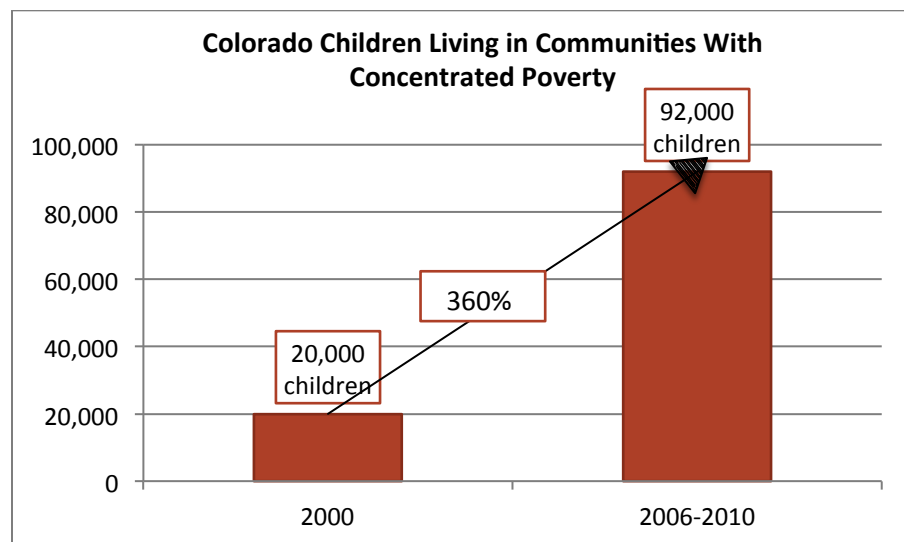
The achievement gap. Significant research on poverty in relation to the early childhood environment focuses on the achievement gap. The achievement gap describes the consistent lower performance of low-income youth, as compared to middle- and high-income youth, measured by factors

---

[12] Chart replicated from the Kids Count in Colorado and Colorado Children's Campaign (2013a) report

such as standardized tests, high school graduation rates and college entrance rates. As a result of this gap, low-income children are "ill-prepared to meet the challenges of today's workforce, which often forces them into low-skilled, low-paying jobs that will not help them escape poverty" (Ounce of Prevention, 2010, p. 1).

The gap emerges early in children's life—research demonstrates emergence as early as 18 months—and widens throughout early childhood (Shonkoff & Phillips, 2000). For example, at age four, children living below the poverty line test at approximately 18 months below their non-low-income peers. Before entering kindergarten, children from the lowest income bracket score over 66 percent lower on standardized language and early literacy skills than children from the highest income bracket (Lee & Burkam, 2002). By high school, teenagers living in families within the lowest income quintile were six times as likely to drop out of high school than children in families within the highest income quintile. (Ounce of Prevention, 2010). The gap is also persistent; one study found that the achievement gap for children who entered kindergarten with lower average achievement scores in math and reading was even wider by the time they entered third grade (U.S. Department of Education, 2004).

However, fortunately, interventions during the earliest years—zero to three—have the potential to close this gap. According to Cohen, Gebhard, Kirwan, & Lawrence (2009), "We know that high quality early learning experiences during the infant and toddler years are associated with early competence in language and cognitive development, cooperation with adults, and the ability to initiate and sustain positive exchanges with peers" (p. 2).

The Early Language Environment

Another significant trend in early childhood research highlights the importance of engaging young children in a rich early language environment. In 1995, Dr. Betty Hart and Dr. Todd Risley published *Meaningful Differences in the Everyday Experience of Young American Children*, which would become a groundbreaking piece in the early childhood puzzle. Focusing on 42 families of diverse SES,[13] Hart and Risley conducted research on the amount of talk occurring between parents and their toddler children. From these studies, they drew the conclusion that because children's talk typically mirrors the talk of their parents and caregivers,[14] the number of words that young children hear in their early environments is the most important factor in a child's early language experience. Specifically, their findings showed that children from "professional families" hear approximately 30 million words between ages zero to three, on average, while children in "working class families" hear only 20 million words, and children in "welfare families" (i.e., families receiving public assistance) hear only 10 million

---

[13] 13 families were of high-income SES, 10 families were of middle SES, 13 of low SES, and six families were on public assistance.

[14] Hart and Risley found that between 86 and 98 percent of the words that children use are derived from their parents vocabularies, and that children's speech patterns and conversational durations were strikingly similar to their parents and caregivers.

words.[15] This means that children in families receiving public assistance hear approximately 20 million *fewer* words than children from families in the upper socioeconomic stratum.[16]

This language exposure is critically important to a child's development, and also has implications for the achievement gap (discussed above). Hart and Risley (1995) mapped these early language environments onto children's vocabulary use, and found that by age three, children from "professional families" had a cumulative vocabulary of 120 percent more words than their "welfare family" counterparts.[17] Language exposure has also been linked to intelligence—children who are exposed to fewer words have been found to score significantly lower on the Stanford–Binet Intelligence Scale test at age three and ages nine to 10 (Hart & Risley, 1995). As a result, such statistics suggest that children from lower-SES families begin their lives at a disadvantage, in part, because of this significant difference in the early language environment.

The effect of this language disparity is further compounded when one considers the social, emotional and psychological influences that this disparity may have on children, as well as the direct and indirect costs to society. For example, some medium- and long-term benefits have been found with the application of early childhood intervention programs among low-income families in the form of reduced public expenditures (Barnett, 2000). Hart and Risley (1995) convincingly argued that language acquisition serves as a vehicle for cognitive functioning and development among children ages zero to three. However, in practice, researchers have found that interventions that strive to increase the vocabulary of low-income children may be inadequate to address this learning gap (Tough, 2012). Specifically, infants learn on a moment-to-moment basis and interventions that focus solely on building vocabulary (e.g., parents reading to their children) may not be sufficient. Furthermore, Hart and Risley (1995) expressed that, "the findings from the longitudinal data may be less applicable to families living in deteriorating neighborhoods in inner cities where crime is prevalent, to families with children whose language development is delayed or impaired, to bilingual families, and to families who live in rural poverty such as that experienced by migrant workers" (p. 195). Such families were not part of this study making it difficult to generalize to more diverse populations.

> *In Colorado:* "57 percent of parents or family members in Colorado read to their zero to five year old each day. The U.S. average is 48 percent. 68 percent of parents or family members tell stories and sing to their zero to five year old each day...the national average is 57 percent."
>
> –*Zero to Three* (2013)

---

[15] Note: Hart and Risley (1995) classified families into "welfare family," "working-class family" and "professional family" based on social economic status (SES) of parents inferred by occupation.

[16] Note: This research is often referred to as the "30 million word gap," which refers to the cumulative word difference during the first *four* years of a child's life.

[17] The cumulative vocabulary of each group of children was as follows: children from professional families, 1,100 words; children from working class families, 750 words; children from welfare families, 500 words.

Another researcher who has more recently studied the language disparity is Dr. Patricia Kuhl, Professor of Speech and Hearing Sciences at the Institute for Learning and Brain Sciences at the University of Washington. Kuhl has closely studied brain activity during language learning in children ages zero to 18 months using several noninvasive brain scan technologies that allow researchers to look at the various areas of language acquisition for the earliest learners. As with other aspects of learning, language learning is cumulative. Children learn phonetics—the sounds of speech—near the end of the first year; at ages 18 to 36 months children subsequently acquire syntactic knowledge—an understanding of sentence structure; and vocabulary development also takes off at 18 months. By studying how infants respond to consonants and vowels through their first year, Kuhl identified measures of phonetic learning that predicted later language and literacy skills for children up to age five.

The role of social interaction. Two of Kuhl's studies on speech perception and speech production demonstrated that language learning is not only a statistical process—that is, automatic and a product of daily interactions with the world—but also is best facilitated through social interaction. In fact, Kuhl found that, "exposure to a new language in a live social interaction situation induces remarkable learning in month old infants, but no learning when the same exact language material is presented to infants by a disembodied source" (e.g., an audiobook) (2007, p. 116). The assumption is that there are neural links, or "mirror neurons," that form between the self and others. Around nine months, children develop a shared perception through which they begin to recognize referential information, such as an eye gaze, that indicates another person's interest in an object; according to Kuhl, this coincides with word comprehension and is crucial to phonetic learning and ultimately language acquisition.

Another noteworthy researcher currently focused on language disparities is Dr. Dana Suskind, Associate Professor of Surgery and Pediatrics at the University of Chicago Medicine and an expert on pediatric diseases of the head and neck. Suskind recently expanded her research on sensorineural hearing loss[18] to include language development and the prevailing barriers to language learning. This research was driven by Suskind's realization that children with sensorineural hearing loss who had received cochlear implants[19] were less likely to successfully learn language if they were from low SES families (University of Chicago). Noting these differences, Suskind (2013) described,

> *You could implant two kids—same age, same potentials—and give them equal access to sound, and yet their ultimate outcome—spoken language—was so different. Being a surgeon, you think, "I operate. I fix everything. Why is this?" So I got interested in this whole world of health disparities research, which shows over and over that the major key to good health are your social determinants—basically the world you live in. For a child, the world they live in is their family.*

---

[18] Sensorineural hearing loss results from damage to the tiny hair cells in the cochlea (the auditory portion of the inner ear), preventing sound from reaching the auditory nerve (American Speech-Language-Hearing Association, 2013).

[19] Cochlear implants are devices "that provide direct electrical stimulation to the auditory (hearing) nerve in the inner ear. Children and adults with a severe to profound hearing loss who cannot be helped with hearing aids may be helped with cochlear implants." (American Speech-Language-Hearing Association, 2013).

As a result of these findings, Suskind designed the parent-directed pilot program Project ASPIRE (Achieving Superior Parental Involvement for Rehabilitative Excellence) to minimize learning barriers for patients with cochlear implants. Suskind soon recognized that the barriers she was seeing were not confined to these patients. Following the studies of Hart and Risley as well as the work of Dr. Susan Goldin-Meadow and Dr. Susan Levine, Suskind developed the 30 Million Words program, which aims to educate and engage parents of young children through interventions that ultimately improve child language outcomes (Harms, 2012). 30 Million Words is a 12-week program integrating a multimedia platform and using education and feedback as the main interventions (Lupe, 2011).

Research outcomes of the 30 Million Words project were measured through: parent knowledge of child language development (via a questionnaire), frequency of adult word count (AWC) and conversational turn count (CTC) (via LENA recordings[20]), as well as language usage during parent-child natural play (via video recordings). Though there were limits to the research, including a small sample size of 26 families and a short follow-up period, the results of the intervention proved favorable. Parents from the treatment group had a sustained increase in knowledge of child language development, the AWC and CTC were greater for the intervention group, and additionally, parents from the intervention group used more word types in their play interaction with their children (Suskind, et al., 2013).

Suskind's research continues to expand as she works to create a sustainable model that will have lasting outcomes for children. Though they present evidence for only one piece of the interdependent network of early child development, studies focused on language acquisition, like Suskind's and Kuhl's, may still provide insight into how we can continue to examine the broader scope of early learning.

Comprehensive Developmental Frameworks

Recognizing that disparities extend beyond language gaps, researchers today have set a strong foundation for promoting comprehensive developmental frameworks that focus on diverse developmental factors (e.g., relationships, including adult/parent–child interactions; social, emotional and physical development; language development; and learning). These factors work together to describe a "whole child" approach, which accounts for these diverse perspectives. This approach has been endorsed by many leading early childhood experts, including many interviewed for this research and particularly Dr. Jack Shonkoff (also recommended in his book *From Neurons to Neighborhoods: The Science of Early Childhood Development*; Shonkoff & Phillips, 2000).

To illustrate this approach, Zigler & Bishop-Josef (2006) gives the example of a whole child view on literacy:

---

[20] The Language ENvironment Analysis (LENA) is a recent innovative tool designed to increase quality language development in young children. The small (2 ounce) LENA device can be attached to a child's clothing and records, quantifies and analyzes audio data (with an intended focus on parent-child conversations), including adult and child word counts and number of turns, while filtering out background noise, non-speech sounds (e.g., cries) and even television or radio talk. The device is intended to be linked to a computer that processes the audio sounds and produces reports that can be used to help parents see their child's developmental age up to 36 months.

Consider what goes into literacy. It involves mastery of the alphabet, phonemes, and other basic word skills, for certain. But, a prerequisite to achieving literacy is good physical health. The child who is frequently absent from school because of illness or who has vision or hearing problems will have difficulty learning to read, as will children who suffer emotional problems such as depression or post-traumatic stress disorder. By the same token, a child who begins kindergarten knowing letters and sounds may be cognitively prepared, but if he or she does not understand how to listen, share, take turns, and get along with teachers and classmates, this lack of socialization will hinder further learning (Raver, 2002). To succeed in reading and at school, a child must receive appropriate education, of course, but he or she must also be physically and mentally healthy, have reasonable social skills, and have curiosity, confidence, and motivation to succeed. (p. 13)

In addition, this comprehensive approach is also situated within a broader contextual framework in which children interact (e.g., the family, educational systems or childcare settings, the broader community). Preskill, Jones, & Tengue (2013) explain that within each context, or "layer," there are actors who "have a role to play in supporting young children across the five domains of development" (Preskill, Jones, & Tengue, 2013, p. 8). Shonkoff and Fisher (in press) agree, and "underscore the extent to which life outcomes are influenced by a dynamic interplay between the cumulative burden of risk factors and the buffering effects of protective factors within the individual, family, community, and broader socioeconomic and cultural context" (p. 4).

Because of this "dynamic interplay," although language development from zero to three is critical to a child's future success, there are a multitude of other influencing factors on a child's healthy development in this age range. For example, factors such as stress and poverty have heavy implications on the brain development and social-emotional growth of children. For this reason, while language development is of great importance to early childhood development, it is not a silver bullet. As such, approaching the whole child and the whole of influencing factors at this stage in development has stronger support in research and practice than focusing singularly on strategies that aim to reduce or eliminate the word gap.

> "[We] really need to be looking at whole child. So, language development needs to be done in a way that's socially and emotionally beneficial to child and parent." –Interviewee

Neuroscience and Early Development

The third, and most recent, development in early childhood research is a focus on the importance of biological science (e.g., neuroscience, molecular biology, genomics, epigenetics) as a critical factor in early development. This perspective explores how the brain is quite literally shaped by genetic factors and early experiences (including environments and relationships). As Shonkoff and Fisher (in press) summarize, "genes provide the basic blueprint for brain architecture, environmental influences affect how neural circuits are built in a bottom-up sequence over time, ongoing reciprocal interactions among genetic predispositions and early experiences affect developmental trajectories" (p. 5).

Researchers now know a good deal about how the young brain develops, including the process known as *cerebral plasticity*, which describes the ability of a brain to reorganize its neural pathways in response to new information and experiences. Cerebral plasticity varies with age; however, there is a sensitive

period during the years of zero to three in which the cortical region is most susceptible to environmental conditions. While most of an infant's neurons are already in place at birth, during this sensitive period of cerebral plasticity those neurons are rapidly making connections. In fact, as noted above and as illustrated in Figure 1, below, during this time, a child's brain forms 700 new neural connections *each second* during a period of rapid connection proliferation (Center on the Developing Child at Harvard University, 2007). As such, children's earliest experiences have the greatest potential to dictate patterns of connectivity within a neural circuit (Knudsen, Heckman, Cameron, & Shonkoff, 2006).

Figure 1. The postnatal development of the human cerebral cortex (Image source: Corel, 1975)
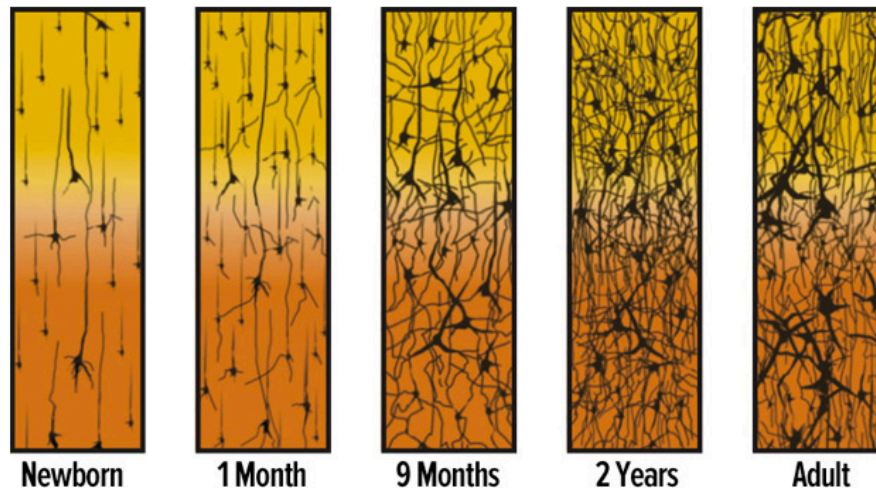
Directly after this highly active period of cerebral plasticity (i.e., zero to three), a "pruning" process begins where these connections are reduced in an effort to make the brain more efficient (Center on the Developing Child at Harvard University, 2007). As clinical researcher Dr. Stuart Brown explained, during this time "the fittest connections, the ones that work best, are the ones that survive" (2009, p. 41). Thus, the neural connections the brain establishes early in life continue to pave the way for connections later in life.

Because the brain is so receptive during the early childhood years, even before birth, it is incredibly susceptible to genetic and environmental factors. Not surprisingly, negative influences (e.g., trauma, adversity and stress, which is explored in greater detail below) during zero to three also affect the development of neural connections, as they "can disrupt neural circuits and other maturing biological systems in ways that undermine lifelong learning, behavior, and physical and mental health" (Shonkoff & Fisher, in press, p. 5). A highly stressful home environment, for example, which may be caused by a number of factors including poverty, neglect, abuse, or general household instability, has been linked to delayed developmental outcomes (Blair & Raver, 2012; Shonkoff, 2010). Similarly, infants born with other types of stress—such as premature birth, low birth weight or other health complications—are also at higher risk of poor development and low intellectual performance (Ramey, 1994). In addition, other genetic and environmental factors, such as the quality of prenatal care, caregiver education level and mental health, as well as adequate and appropriate nutrition, are all examples of early factors associated with a child's cognitive (as well as emotional) development (Ramey, 1994; Finello & Poulsen, 2011; Rose-Jacobs, et al., 2008). Hence, because they contribute to shaping how the brain grows and

develops, these early experiences—and especially the earliest experiences—set a foundation for all of later life.[21]

Stress

A normal and necessary part of life, stress is an intrinsic response that allows us to adapt to new, and in some cases, threatening situations. Physiological changes, including temporary increases in heart rate, blood pressure and hormone levels, occur in response to stressors. This is the adaptive response commonly known as "fight or flight." When environmental conditions cause these levels to stay high rather than return to the normal baseline, stress becomes harmful, both physiologically and psychologically, and this can have serious consequences for a developing child (Middlebrooks & Audage, 2008).

Research has identified three levels of stress that young children encounter: positive stress, tolerable stress and toxic stress (Shonkoff, 2010). First, *positive stress* occurs within a stable and healthy environment; it may be characterized by a moderate stressor, such as a new child care setting, and can actually help a child learn healthy adaptive responses. Second, *tolerable stress*, though also occurring within a stable, healthy environment, causes physiological reactions that may interfere with a child's brain architecture if left untreated. This type of stress occurs when stressors are more significant but generally short-lived and within the context of a healthy support system. Divorce, homelessness or death of a family member can all cause tolerable stress and may lead to long-term impacts, such as post-traumatic stress disorder (PTSD); however, if mediated by the influence of an adult support system, tolerable stress is usually overcome (Middlebrooks & Audage, 2008). Third, *toxic stress*, in contrast, is characterized by a *lack* of a strong adult support system and will often arise when more significant stressors are frequent or occur over a prolonged period. Maltreatment consisting of child abuse or neglect is a particularly devastating precursor to toxic stress and may impact memory and learning. Because toxic stress is characterized by its high frequency or duration, often due to lack of intervention, it is exponentially more harmful to the developing child than tolerable stress. For example, persistent poverty often leads to toxic stress because the child's stress response system is activated for a long period of time, which may cause permanent changes to the brain (Middlebrooks & Audage, 2008). To illustrate the difference in impact of these types of stress, Duncan, Brooks-Gunn and Klebanov (1994) conducted a six-year longitudinal study and found that *persistent*, or chronic, poverty (i.e., longer duration of stress) had nearly twice the impact on the intelligence of five year olds than did *transient* poverty (i.e., where the duration of poverty is shorter).

Because stress is so strongly linked to developmental outcomes, recent studies have investigated how stress interacts with poverty to impact both executive functions[22] and intelligence in early childhood

---

[21] It should be noted that some research does damper or contradict these findings. However, the scientific evidence for a critical period of neuropsychological growth is lacking in the literature (Fox, Leavitt, & Warhol, 1999; Shonkoff & Philips, 2001). Further, in a meta-analysis conducted by Protzko, Aronson, and Blair (2013), no evidence was found to support the notion that interventions conducted earlier in a child's life were more effective at boosting IQ than later in life; though other studies (including many cited in this report) disagree.

(Blair, Granger, Willoughby, Mills-Koonce, Cox, Greenberg, Kivlighan, Fortunato, 2011; Berry, Blair, Willoughby, & Granger, 2012). One example of a recent research study linking stress to executive functioning and intelligence is the *Family Life Project*, a longitudinal study of 1,292 infants and young children from predominantly low-income and nonurban communities. Project researchers found a correlation between elevated levels of stress in the earliest years (tested at seven, 15 and 24 months) and lower executive functioning and intelligence at age three, finding that higher stress led to lower executive functioning and intelligence (Blair, et al., 2011; Blair, & Raver, 2012). Family Life Project researchers also found correlations between the executive function abilities of children at age three and their later academic achievement[23] in pre-kindergarten (Berry et al., 2012). This is meaningful in that stress in early childhood, which is frequently linked to environments of poverty, may not only impact children's intelligence and ability to develop executive functions, but also have implications for their future academic success.

Parent-Child Interaction

Another area that is thought to affect children's development is the parent-child interaction. Dr. Allan Schore, a UCLA neuropsychology professor and researcher, found that *attunement*, or the synchronization of mother and child neural activity in the right cortex of the brain during the third and fourth months after the child is born, is critical for the child's later emotional self-regulation (Brown, 2009). Children who are abused or neglected—and whose parents, and in particular mothers, fail to form this meaningful bond—often have emotional problems and difficulty forming attachments later in life.

Parent-child interaction is arguably the most significant factor in healthy emotional and cognitive development during the first years of life, and the literature frequently stresses the importance of reciprocal child-adult interactions (Luria, 2002; Bodrova, Leong, Akhutina, 2011; Shonkoff, 2010). Parent-child interaction in low-income families may be more negative or occur less frequently due to parents longer working hours or other disruptive life issues such as parent depression or food insecurity; however, positive interactions with parents or other adult figures can alleviate some of the negative effects of poverty (Shonkoff, 2010). These interactions come in many forms, from "social mediation"

---

[22] Executive functions, as defined by Blair, et al. (2011), are "cognitive abilities associated with prefrontal cortex (PFC), including working memory, inhibitory control, and attention shifting or flexibility, that enable the organization of information in goal-directed activities" (p. 1). There are three dimensions that are typically discussed: working memory (e.g., storing and manipulating information for short periods of time, such as remembering a phone number long enough to dial it), inhibitory control (e.g., filtering thoughts and impulses to resist distraction and temptation, such as controlling emotions when frustrated), and cognitive flexibility (e.g., adjusting to changing priorities and perspectives or applying different rules in different settings, such as understanding appropriate behavior at home vs. in school) (Center on the Developing Child at Harvard University, 2011). As one example of executive functions in ages zero to three, between ages seven to 12 months, children develop working memory, during which they process and store information at the same time, which allows them to listen to a story or do a math problem (Anderson, 2002). Especially for this early population, these functions also are linked to self-regulation, early academic achievement and cognitive ability.

[23] To measure academic achievement, researchers used the Woodcock-Johnson Tests of Achievement, which measure quantitative and language ability as well as general scholastic achievement.

through the use of language, objects, signs, or symbols, to facial expressions and gestures, as described by the Center on the Developing Child at Harvard University in the "serve and return" interaction system (Bodrova, Leong, & Adhutina, 2011). The premise of these interactions is that the child is wired to initiate them from an early age, and the parents' level of support and guidance in their response has the capacity to either nurture or hinder the child's brain development.

These interactions cumulatively impact the brain, building from gestures and facial expressions to gradually more complex language. University of Pittsburgh psychology professor and researcher Dr. Jana Iverson (2010) explained, "In infancy, there are significant changes in the ways in which the body moves in and interacts with the environment; and these may in turn impact the development of skills and experiences that play a role in the emergence of communication and language" (p. 2).

> "The bedrock principle for zero to three is the relationship with the caregiver. It always is [and] always will be. [The caregiver is the] first person that the developing child learns self regulation from, whether it is sleep, feeding… this lays the foundation for everything else."
> –Interviewee

Lev Vygotsky's Theory of Cognitive Development described this cumulative process in which adults provide development support as "scaffolding." The scaffolding provides the framework for children to acquire and build new skills until they reach their Zone of Proximal Development (ZPD), the point at which they are able to make decisions and act independently (Kozulin, Gindis, Ageyev, & Miller, 2003). Because the ZPD advances over the development of the child and skills build upon one another throughout the development process, children cannot access higher mental functions without first gaining the foundation of more basic mental functions (Bodrova, Leong, Akhutina, 2011). Additionally, the hierarchical nature of brain development and the sensitive period during which neural circuits are most receptive to positive and negative influences mean that experiences and environment during the early years of childhood are critical to future social and cognitive success. Interactions with adults and either positive or negative environmental factors will begin to shape and collectively impact a child's emotional, social, linguistic and cognitive development as early as the prenatal period through the first few years of childhood (Bonnier, 2007; Knudsen, et al., 2006).

The impact of parenting on childhood poverty and stress. In addition to exploring the impact of stress on executive functioning, intelligence and academic success, the Family Life Project (described above) studied the impact of parenting on both childhood poverty and stress. Parenting sensitivity and behavior—for example, parents who were responsive to their child's needs—were found to mediate the effects of poverty on a child's cognitive ability at age three, in a sense, lessening the impact of poverty (Blair et al., 2012; Berry et al., 2011; Blair & Raver, 2012). Conversely, in unsupportive parenting environments, stress hormones remained elevated and prevented children from forming flexible forms of behavior and cognition (Blair et al., 2012). The findings from this study suggest that certain interventions and environments, including a stable and nurturing family system, have the potential to alleviate the negative impacts that poverty and stress may have on healthy brain development.

> "Most programs that focus on parents and/or young children do understand that connection between healthy homes and healthy developmental outcomes." –Interviewee

Parenting practices. According to Dr. Darcia Narvaez, professor of psychology and researcher at the University of Notre Dame, many common modern parenting practices could also have major consequences on child development. Narvaez recently reported several early parenting misconceptions and behaviors that are hindering life outcomes for American youth. According to Narvaez, there are numerous nurturing parenting practices that positively impact the developing brain, and modern American culture fails to support them. For example, breast-feeding, being responsive to crying, and having near constant touch all positively impact the developing brain. In modern American society, however, only about 15 percent of mothers are still breast-feeding their children at 12 months, and children are spending more time in strollers and carriers than in the past. Parents are also frequently encouraged to let their children "cry it out," when in fact, some studies have shown this to be detrimental to a child's social and emotional intelligence (Guibert, 2013; Hunziker & Barr, 1986; Middlemiss, et al., in press). Though a controversial issue, with arguments both for and against crying it out,[24] responsiveness and nurturance are daily parent practices that help the child form a fundamental bond with the parent, which is an essential part of healthy child development (outlined in attachment theory, which is discussed in the next section).

Attachment theory. Attachment, a deep and enduring bond between two people, is another component of the child-parent relationship that has been closely examined in the context of early childhood development. Attachment theory (Bolby, 1988; Ainsworth & Bolby, 1991; Main & Solomon, 1990) describes four patterns of attachment behavior that occur between infant and primary caregiver: (a) secure, (b) insecure/avoidant, (c) ambivalent/resistant, and (d) disorganized /disoriented. Caregivers who are described as warm, responsive and consistent result in secure attachment. Caregivers who are intrusive, controlling and excessively stimulating result in insecure/avoidant children. Caretakers who are unresponsive and under-involved tend to produce avoidant/resistant children. Lastly, caregivers who are abusive, intrusive, and negative, and who withdraw from their infants, often have infants with a disorganized/disoriented attachment style. To simplify matters, infant attachment is either secure (i.e., healthy) or insecure (i.e., unhealthy), but it is important to note that within these categories there may be varying degrees of security. In addition, early attachment experiences shape how infants perceive and conceptualize the world around them (Lewis, Feiring, & Rosenthal, 2000).

Secure attachment is important in the emotional, social and cognitive development of children (Cowan & Cowan, 2002). In fact, results from various longitudinal studies suggest that securely attached infants are more self-reliant, independent, more empathetic, less anxious and more socially competent than insecure infants (Sroufe, Duggal, Weinfield, & Carlson, 2000; Weinfield, Sroufe, & Egeland, 2000). One longitudinal study observed securely and insecurely attached infants, finding that securely attached infants were "more enthusiastic in their problem solving efforts as toddlers, more independent in their relationships with preschool teachers, and more effective in their relationships with peers as school-aged children" than the insecurely attached infants" (Dozier, Higley, et al., 2002).

---

[24] For more information on the debate regarding "crying it out" see Enayati's (2013) article
http://www.cnn.com/2013/01/24/health/child-sleep-debate-enayati

Conversely, insecure attachment styles have been linked with behavior problems in children at age three (Greenberg, 1999; Shaw & Vondra, 1995), and in preschool and school-aged children (Lyons-Ruth, Alpern, & Repacholi, 1993). Children with disorganized attachment were more likely to have mental health problems later in their lives as well (Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997). Furthermore, insecure attachment was linked with lower social and academic competence scores among high school students (Carlson et al., 1999). Clearly, the consequences of insecure attachment during infancy can negatively impact the emotional, cognitive and social development of children over time.

If secure attachment styles serve as a protective factor for infant development, how do researchers, practitioners and policy makers promote this type of attachment? Bretherton (1992) found that secure attachment is linked with maternal sensitivity. In other words, mothers who can identify the needs of their child and respond warmly are more likely to foster secure attachment in their children. Several reviews and meta-analyses (e.g., Beckwith, 2000; Egeland, Weinfield, Bosquet, & Cheng, 2000; Lagerberg, 2000; Mackleod & Nelson, 2000) support the effectiveness of interventions designed to enhance parental child-rearing attitudes and practices in promoting the socioemotional development of children.

However, early researchers (e.g., De Wolff & van Ijenzdoorn, 1997) found that the association between parental sensitivity interventions and attachment style is significant, albeit modest. Fortunately, recent findings support the benefit of sensitivity-focused interventions (Bakermans, van Ijzendoorn, & Juffer, 2013). In fact, findings from a meta-analysis conducted by Bakermans-Kranenburg, van IJzendoorn, and Juffer (2013) suggest that interventions that focus on parental sensitivity may be more effective than interventions that focus solely on infant attachment. In addition, while some researchers have found that children in low-SES households may be at greater risk for insecure attachment styles and be less likely to maintain secure attachment styles (Pinquart, FeuBner, & Ahnert, 2013), Bakermans-Kranenburg and colleagues (2013) found that SES did not influence the effectiveness of attachment or sensitivity interventions. Therefore, early childhood interventions that focus on parental sensitivity training may be more likely to promote secure attachment style of infants.

Further, Egeland and colleagues (2000) recommend that interventions should involve both mothers and fathers in their design as a means to strengthen early childhood programs, which may have important implications for future interventions. Research supporting this expansion of the traditional scope of primary caregivers (which have typically emphasized mothers) is less prevalent, although important, and quickly becoming a more common focus of research. This is particularly relevant because in some studies, fathers were found to supply infants with different sets of knowledge and experiences than mothers (Grossman et al., 2002; Hewlett, 1992; Lamb, 1997). For example, Grossman et al. (2002) found that fathers were more likely to contribute to their children's development by providing support during explorative play, while mothers were more likely to contribute by providing comfort in times of distress. This research could have implications for future studies or program design involving the developmental contributions of other primary caregivers such as grandparents, siblings or other legal guardians. As such, more research on the role of fathers, including their impact on children's creativity, should be conducted.

Parent education programs

Research conducted on improving parent–child interaction has included a focus on interventions that provide parents with education programs designed to influence their child's emotional, cognitive, social and motor skill development. Mahoney and colleagues (1999) describe parent education as, "The process of providing parents and other primary caregivers with specific knowledge and childrearing skills with the goal of promoting the development and competence of their children" (p. 131). Parents are commonly the recipients of early education treatment (Lundahl, Risser, & Lovejoy, 2006), and research has often focused on families of lower SES.

Historically, parent education has been widely implemented through a variety of early education interventions (Lundahl, Risser, & Lovejoy, 2006). In fact, this approach, in which caregivers are taught parenting skills, has been found to be effective for improving child outcomes (Kaminski, Valle, Filene, & Boyle, 2008). However, findings suggest that this approach may be less effective for low-income households (Thompson, Grow, Ruma, Daly, & Burke, 1993). Critics of parent education have emphasized how barriers to implementation (i.e., burden of implementation, parent role conflict, implicit blaming of parents) may impede the success of this approach (Mahoney et al., 1999).

Despite such limitations, mothers have expressed a need and desire for parent education activities in rearing their children (Mahoney, O'Sullivan, & Dennebaum, 1990). Indeed, in a review of 77 published evaluations of parent training programs, Kaminski et al. (2008) found that interventions that increased positive parent-child interactions and emotional communication skills, taught parents the use of time out and consistency in discipline, and required caregivers to practice their skills were far more effective in terms of child outcomes. Programs were also more effective among low-income households when caregivers received individually delivered training interventions rather than group delivery (Lundahl et al, 2006). Further, interventions that are goal-directed and focus on the child (i.e., parent education approach) are more effective than programs that only focus on parental support (Farran, 2000; Guralnick, 1998). Research also suggests that the impact of parent education can easily be measured, for example, using the table in Table 2, below, adopted from Mahoney and colleagues (1999) that describes ways to measure the impact of parent education.

Table 2. Measuring the Impact of Parent Education (adopted from Mahoney et al., 1999)

Content	Outcomes
Information about a child's current development and learning needs	Increased parent knowledge
General parenting strategies	Increased parent knowledge
General parent-child interaction strategies	Parent provides better child care
Targeted intervention strategies	Parent provides better child care
Specific discrete skills	Enhanced parent-child socio-emotional relationships

Content continued	Outcomes continued
Strategies for facilitating children's function in everyday contexts	Enhanced parent-child socio-emotional relationships
Management of problem behavior	Increased child and parent communication and positive social behavior
Strategies for direct teaching of specific skills	Increased child and parent communication and positive social behavior
Implementation of programmatic approaches to promote complex skills over time	Child acquisition of specific skills

Implications of Waiting to Intervene

The final segment in this section examines the impact of waiting to intervene *past* the zero to three timeframe. Research supports the notion that there is significant benefit to focusing on the earliest years of childhood. Though high-level stimulation can correct cognitive deficiencies later in life, remediation is much more difficult and far less successful, particularly in school-age programs and among at-risk children (Knudsen, et al., 2006). Not only are later interventions expensive, poor developmental outcomes are often difficult to address in the K–12 system due to the limitations in treating the mental and behavioral health issues that frequently accompany them (American Academy of Pediatrics, 2005). Early learning problems often manifest themselves after the sensitive period of development has passed. Kindergarten teachers, or in some cases, preschool teachers, may be the first to see the signs that a child is behind. Common indicators cited by teachers include poor social and academic skills, difficulty completing both group and independent work, and behavior problems (Rimm-Kaufman, Pianta, & Cox, 2000). High-quality early learning experiences as well as secure relationships with primary caregivers are linked to increased academic performance in school and lifelong impacts like lower delinquency rates and lower teen pregnancy rates (American Academy of Pediatrics, 2005; Schumacher & Hoffman, 2008).

Additional long-term individual and societal benefits that have been linked to early childhood interventions include (Zero to Three, 2013):

- Better math and language skills
- Better social skills
- Decreased need for special education programs
- Increased school retention
- Higher graduation rates
- Improved quality of workforce
- Lower welfare dependency
- Higher individual earnings
- Reduced crime
- Lower teen pregnancy rates

It is important to recognize that a lifetime of events and numerous outlying factors can impact long-term outcomes. As a result, research that employs controlled, longitudinal methodology to demonstrate improved outcomes based on interventions during the zero to three timeframe is costly and still relatively limited. However, substantial evidence—including the many studies cited in this report—have shown that development during ages zero to three should not be overlooked because growth during this time is both foundational and cumulative. As a result, a growing number of researchers are studying this critical age to better understand the prevalent issues and most successful interventions, and many are already supporting proactive and innovative approaches to school readiness and positive childhood outcomes, beginning during the prenatal stages. The next section of this report documents a number of the proactive and innovative best practices in programming that engage children during these earliest years.

THE CURRENT LANDSCAPE: PROGRAMMING THAT WORKS

"There is no excuse for our society not putting this scientific knowledge into practical use. We must remember—the first five years of life are not a rehearsal. This is the real show." –Irving Harris

As the previous section documents, a diverse body of research has determined some of the most effective ways to reach children and provide a fertile environment for them to flourish in their first three years. Several early childhood programs are putting these best practices to use. This section explores the results of a comprehensive scan of the birth-to-three landscape of the nation and Colorado and documents four research-based *best practices in programming*: (1) focusing on self-regulation; (2) utilizing home visitation; (3) building enriched learning environments and foregrounding play; and (4) engaging informal care networks. In addition, the section concludes by examining research-driven strategies for program dosage and timing.

Looking ahead, to complement this section's focus on programming, the next section of this report examines the laws and policies that shape the early childhood landscape in the state of Colorado and nationwide. It is intended that such a review will provide a deeper understanding of the early childhood prevention landscape—including both programming and policies—in the state and across the nation, and take a step toward minimizing the gap between research and practice in early childhood intervention (Dunst & Trivette, 2009).

Focusing on Self-Regulation

A first research-based best practice in programming is to focus on self-regulation in early childhood interventions. As described earlier, toxic stress early in life most affects the brain development in the prefrontal cortex, which is critical in emotional and cognitive *self-regulatory processes*. These processes help individuals control their emotions and behaviors. For example, children and adults alike use these processes to calm themselves down or cheer themselves up, tolerate being hungry or frustrated, or sit still and follow directions. Research shows that children who grow up in stressful environments find it harder to sit still, concentrate and follow directions.

Self-regulation has become a recent trend in early childhood intervention, and some programs have started addressing the lack of development in self-regulation by targeting self-regulatory processes in programming curricula. Perhaps the most recent program to focus on self-regulation in early childhood is **Tools of the Mind**, a pre-kindergarten and kindergarten curriculum aimed at teaching children impulse control, avoiding distractions and managing emotions.[25]

---

[25] Note: Despite the Tools of the Mind's national attention (see, Spiegel, 2008, Tough, 2009), some recent research has shown that the program evidences only "lackluster" results in experimental trials, showing outcomes no better than traditional early education programs, including in their focus of self-regulation (see, e.g., Sparks, 2012, for an overview; or Lonigan & Philips, 2012; Wilson & Farran, 2012 for recent empirical studies).

While Tools of the Mind does not start providing a curriculum until preschool, other programs offer infant and toddler methods for building self-regulation. Gillespie and Siebel (2006) offer several ways to begin teaching self-regulation at birth. The authors maintain that self-regulation begins with healthy relationships with the caregiver. For instance, from the moment a baby is born s/he will give cues when s/he is hungry. A caregiver must watch for those cues and respond appropriately and within a reasonable amount of time and predictability. A predictable response helps infants develop a healthy relationship with caregivers and begin developing self-regulation.

These strategies have implications for early childhood intervention, and have been utilized in some programming, including **Love and Logic**. Love and Logic is a well-known program created by Dr. Jim Fay that utilizes a curriculum based on the idea that every action has a consequence. The parent or caregiver's job is to both give the child choices and a sense of control over his/her own life, as well as create appropriate consequences when the child has made positive or negative choices. For instance, if a two year old decides to use a marker on a wall, the parent/caregiver does not raise his/her voice, but instead explains that now the child must help clean the marker off the wall. Over time the child will learn his/her actions have consequences and choose not to do them again. This choice is a form of self-regulation. Love and Logic has recently released a program for children with abusive or neglectful pasts, incorporating the tenants of Love and Logic with this population's specific needs in mind. Although created based on empirical research, and with an existing internal evaluation platform, there are limited empirical studies or evaluations available on the program.[26]

Also well known in the education realm, **Montessori** education also targets self-regulation. According to the American Montessori Society (2013), Montessori education is a child-centered approach grounded in the scientific observation of children from birth to adulthood. This approach consists of multi-age classrooms in which students learn through experience (i.e., smelling, touching, tasting, movement), and are provided freedom within limits. In a Montessori environment, trained Montessori teachers respect children's natural, psychological and social development. This type of education is highly individualized and provides children of all ages and socio-economic backgrounds an opportunity to shape their own learning.

Montessori educators tailor their programs around sensitive periods or "windows of opportunity" in which a classroom caters to the needs of children of a specific age group. For example, for children zero to three, this sensitive period involves acquisition of language, order, sensor refinement and social behavior. In the United States, there are over 5,000 schools that offer Montessori education programs and thousands more exist around the world.

The majority of research studies on the efficacy of Montessori education have focused on older cohorts of children (three years and older), and many of these studies support the effectiveness of Montessori

---

[26] According to Love and Logic's own website, "Although there has been limited empirical research conducted on these programs, the studies do show evidence that support using Love and Logic techniques…Love and Logic does not currently have any studies published in academic journals, however, it is a project that is currently under review" (Love and Logic, 2013).

education. Specifically, one study (using five- and 12-year-old children) found that children in Montessori programs performed significantly better on cognitive and social measures than children not in Montessori programs (Lillard, 2006). Another study produced mixed findings, including that Montessori students performed better at math compared to the control group, but worse in language arts achievement (Lopata, Wallace, & Finn, 2005). In Colorado, the Family Star Montessori program integrates Montessori curriculum with Early Head Start and Head Start. This collaboration has brought about robust evaluation efforts and longitudinal studies for younger children (Child Care and Early Education Research Connections, 2013). With these generally positive outcomes, and because Montessori engages many other best practices (e.g., focusing on self-regulation, creativity, learning generalizability, language acquisition, mastery motivation and early literacy), it is likely that Montessori education offers promise in early childhood education for children zero to three.

Utilizing Home Visitation

A second research-based best practice in programing is to utilize home visitation strategies. Data from the large national home visitation models (e.g., the **Nurse Family Partnership, Parents as Teachers**, **Healthy Families America**, **Early Head Start**, and **Home Instruction for Parents of Preschool Youngsters [HIPPY][27])**, demonstrate that somewhere between 400,000 and 500,000 young children in the United States receive intensive home visitation services each year (Ounce of Prevention, 2013a). Home visitation programs offer one-on-one experiences for the parent and child as well as the parent and educator, allowing parents to learn and educators to model relationship building and foster healthy attachment.

"There has been a shift to home visitation recently [in that] people are trying to reach parents with young kids as early as possible. It's got to be culturally appropriate, of course. Home visitation, though expensive, seems to be the way to go. You can have a measurable impact on the outcomes of the child and family." –Interviewee

Research supports this programmatic strategy, and various infant interventions have utilized a home visitation approach where a nurse, paraprofessional, graduate student, or similar individual visits the home of a family to provide parenting support and knowledge in raising infants (Shonkoff & Phillips, 2000). Home visitation interventions typically provide parents with a friendly liaison who can help caregivers form healthy bonds with their children, discipline them effectively, and offer advice about nutrition and health practices. Such visitation programs are widely used throughout the nation, and typically occur in the form of *parent education* (explained earlier in this report) or *family-centered care* (Mahoney et al., 1999).[28]

Results from various studies suggest that home visitation intervention programs can be effective in helping the emotional, developmental and cognitive needs of infants. For example, Olds et al., (1998) used a randomized research study in which nurses visited the homes of low-income mothers during

---

[27] Note: HIPPY focuses on ages three to five, so it is outside the scope of this paper's zero to three focus

[28] The goal of family-centered care is to empower parents as active partners in their child's development, while helping caregivers realize their dreams and responsibilities while raising their child (Turnbull et al., 2000; Mahoney & Wheeden, 1997).

pregnancy and up to two years after the birth of a child. These nurses provided services and guidance to at-risk mothers. This program increased the cognitive development of infants and in a 15-year follow-up study, mothers who were visited by nurses had children with significantly less criminal behavior, school suspension and substance use. In addition, findings from another meta-analysis suggest that home visitation programs may be more effective when they are staffed by professionals and graduate students rather than paraprofessionals (Olds & Kitzman, 1993). Furthermore, various home visitation intervention programs that focused on promoting healthy parent-child interactions were found to be effective in the home environment (Brooks-Gunn et al., 2000). Therefore, in using the home visitation approach, it may be important to make sure that the intervention is evidence-based, content-appropriate, tailored to the target population, utilizes effective measures for infants and is implemented correctly.

Home visitation is a model that is supported by both federal and local support systems, and is often incorporated into center-based programs for increased effectiveness (seen in Colorado's Clayton Early Learning Center) and in Colorado home visitation models (such as Bright Beginnings and Providers Advancing School Outcomes/PASO).

To address the growing number of home visitation programs in the U.S., the Home Visiting Evidence of Effectiveness (HomVEE) site was launched in 2009, to monitor and evaluate the research conducted on home visitation programs. Focusing on children ages zero to five, HomVEE and the Mathematica Policy Research team in Washington D.C. worked with the Department of Health and Human Services (DHHS) to rate and evaluate research on certain programs. The programs reviewed are being evaluated with support from the Maternal, Infant, and Early Childhood Home Visiting Program (established by the Patient Protection and Affordable Care Act), which allots $1.5 billion to states to develop home visiting models for at-risk women and children (to age five). The Nurse Family Partnership, Parents as Teachers, HIPPY, Healthy Families America and Early Head Start are all approved by DDHS on this rating system (U.S. Department of Health and Human Services, 2013).
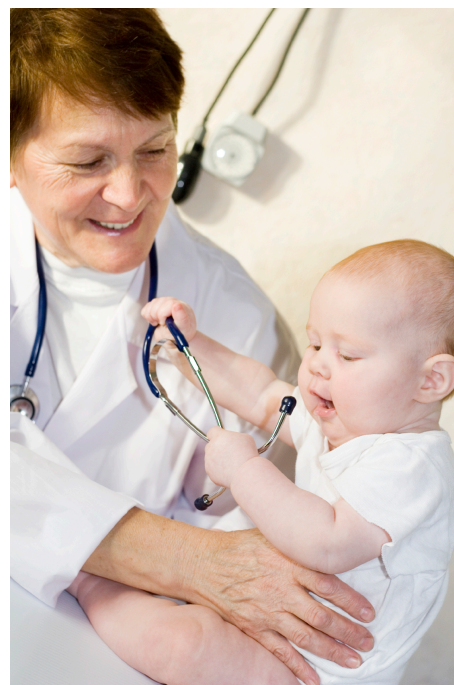
> "When we did home visits, you lose that energy of getting together, and we found that when we get parents together, there was a really powerful synergistic energy."
> –Interviewee

In addition to the above federally funded programs (which often combine state programs, funds and philanthropy), regional home visitation models have expanded, and innovation has grown in this model of childhood development programming. For example, the **Ounce of Prevention** program in Illinois uses home visitation to connect with teen moms and offer support (Ounce of Prevention, 2013b). Ounce of Prevention volunteers model positive parent-child interactions (Tough, 2012), help create safe and stimulating environments for the child by ensuring a positive and language-rich environment, and connect families to resources in the community (Ounce of Prevention, 2013c). Ounce

of Prevention was recently awarded funds from the Maternal, Infant, and Early Childhood Home Visiting Program to conduct longitudinal evaluation of the home visitation program, and is partnering with the University of Chicago's School of Social Service Administration to conduct the study (Ounce of Prevention, 2013c).

Another home visitation program, **Brazelton's Touchpoints** (described in more detail below) offers a map of behavioral and emotional milestones for birth to three. The Touchpoints map of milestones is intended to help parents and caregivers know what to expect during child development and how to avoid common digressions. Touchpoints also offers professional development for early childhood educators, health and social services providers, and early interventionists, to show them techniques to increase parent empowerment in their child's development. The Touchpoints model has been used by home visitation programs as well, and the results demonstrate better mother-child interaction, increased adherence to well-child checkups, improved developmental outcomes and better maternal mental health indicators (Brazelton Touchpoints, 2013).

> *Spotlight on Brazelton's Touchpoints*
>
> *Touchpoints was created in 1996 by Dr. T. Berry Brazelton, a pediatrician of more than six decades. Brazelton mapped predictable milestones (touchstones) in child development such as talking and walking, and created directed programming for parents, caregivers, pediatricians, and social workers to capitalize on child development. Brazelton's approach is asset-based, taking expected growth in infants and toddlers and educating those who interact with young children on the skills needed to encourage growth and prepare for future touchstones. Brazelton's Touchpoints hits on seven major contributors: attachment, family support, home visitation, parent engagement, parent-child interaction, parent socialization and poverty.*
>
> *Touchpoints training, which has reached over 10,000 individuals (and in turn served more than one million families) aims to help facilitate the transition from research to practice and policy creation. The Touchpoints method has been used in public health settings, tribal communities in home visitation with families, and by early childhood assessment and care professionals. Based on evidence-based research and evaluation, Brazelton's Touchpoints has found success in its training model, whether given to pediatricians, teachers, social workers, or home visitation families. However, the published evaluation results focus most on the growth of the caregivers and trainers rather than on child development indicators (Gudrais, 2012).*

Building Enriched Learning Environments

A third important practice in programming is to build enriched learning environments—or intellectually stimulating surroundings. In the scope of early childhood development, an "enriched" environment is an environment that engages a child's learning capacities through their various forms of intelligence. As such, enrichment is directly linked to the neuroscience studies discussed in the previous section.

It is difficult to study the impact of enriched learning environments on humans, and especially on young children, because of the difficulty in controlling outside variables (e.g., how well people sleep, what they eat, and what other experiences they engage in). As a way to overcome these issues, early studies on enrichment used rats instead of humans, examining the influence of different types of environments to

discern their impacts on neural activity (Rampoon et al., 2000). In a landmark research study, neuroscientist Dr. Marian Diamond found that rats raised in an enriched environment—which included other rats and toys—actually developed larger and more complex brains than rats placed in a solitary environment without toys (Brown, 2009). Even in experiments where the rats navigated mazes for reward within solitary environments, neural growth occurred only in one area of the brain, whereas in social environments, whole-brain growth occurred.

For humans, an enriched environment may include a number of elements that support healthy brain development in various areas of intelligence. Developmental psychologist and professor Dr. Howard Gardner developed the Multiple Intelligences theory and identified eight types of intelligence: verbal/linguistic, logical/mathematical, visual/spatial, musical/rhythmic, bodily/kinesthetic, naturalist, interpersonal and intrapersonal intelligence (Kagan & Kagan, 2005). Environments that support any of these areas of intelligence are considered to be "enriched."

For humans, an enriched environment is one that promotes elevated learning and engagement. To do this, it may include a number of elements that support healthy brain development in various areas of intelligence and along the indicators of development discussed in the previous section. Developmental psychologist and professor Dr. Howard Gardner developed the Multiple Intelligences theory and identified eight types of intelligence: verbal/linguistic, logical/mathematical, visual/spatial, musical/rhythmic, bodily/kinesthetic, naturalist, interpersonal and intrapersonal intelligence (Kagan & Kagan, 2005). As such, environments that support these areas of intelligence are considered to be "enriched," and early childhood programs commonly utilize these strategies.

The role of play. In particular, play is an integral part of an enriched environment and has a significant impact on brain development. Dr. Stuart Brown, a clinical researcher and founder of the National Institute for Play argues that "play seems to be one of the most advanced methods nature has invented to allow a complex brain to create itself" (2009, p. 40). In fact, the act of play actually stimulates the creation of new neural connections between disparate brain centers. Play is a "nonessential" activity, so the brain creates new circuits that are not currently needed but could be used in future novel situations. Thus, play allows the brain to adapt to a changing world.

Play has been studied in the prenatal environment, through parent-child interaction, and within the contexts of attachment and self-regulation. It is of particular importance during the early childhood years as its impacts are most effective when the brain is growing most rapidly (Brown, 2009). Even before birth, play can impact healthy brain development; an expectant mother's own play—which can include any activity that is "purposeless, fun, and pleasurable"—can lower her stress levels and promote a healthy pregnancy while supporting the mental outlook of her unborn child. Brown likens this to the oxygen mask: adults are always instructed to put the oxygen mask on themselves first, so they can then assist with the child's mask; the same goes for play. In addition, play has been studied in relation to parental sensitivity (explained above), regarding the degree to which the behavior of parents is "in tune" with that of their children (see, e.g., Spanglar, Schieche, Ilg, Maier, & Ackerman, 1994). In general, increased parental sensitivity improves play and positively benefits children in that sensitive parents

> *can perceive and accurately interpret the signs of over-excitement, undue tension, or incipient*
> *distress and [shift] the tempo or intensity before things have gone too far. Similarly, [sensitive*

parents are] unlikely to under-stimulate [a child], because [they] pick up and responds to the signals [a child] gives when he is bored or when he wants more interaction than has heretofore been forthcoming. (Ainsworth, 1969).

Thus, play becomes a responsibility of the parents, as the parent-child interactions that involve play are linked to healthy attachment and greater levels of self-regulation (Brown, 2009), and demonstrate another context where parental sensitivity can positively benefit children. After the child is born, parents can continue to support innovations in brain development by providing a home environment that incorporates playfulness.

The role of problem solving, curiosity and creativity. In addition to a focus on play, enriched learning environments often incorporate strategies to engage young children in problem solving or activities that build curiosity and creativity. Research supports this focus; for example, one study determined that early problem-solving abilities can be a key indicator of success later in life (Committee on Integrating the Science of Early Childhood Development, Youth, and Families Board on Children, & National Research Council, 2000).

Related, though not equated and less formally studied, are the components of creativity and curiosity in learning. These skills are also often framed as ways to best prepare young children for success later in life, and particularly in the context of the "unpredictable" world of tomorrow (Robinson, 2012). In a 2012 TEDTalk, Sir Ken Robinson, an internationally recognized leader in education, creativity and innovation, discussed the need to incorporate creativity into school from a young age in order to prepare today's children for future jobs. He explained,

It's education that's meant to take us into this future that we can't grasp. If you think of it, children starting school this year [2006] will be retiring in 2065. Nobody has a clue, despite the expertise that's been on parade for the past four days [at TEDTalks] what the world will look like in five years' time and yet we're meant to be educating them for it. So the unpredictability of it is extraordinary. And the third part is that we've all agreed, nonetheless, on the really extraordinary capacities that children have. Their capacities for innovation… My contention is that creativity is as important as literacy and we should treat it with the same status.

In a later TEDTalk (2013), Robinson asserted that "curiosity is the engine of achievement," an idea that was confirmed by Dr. James Heckman when he reanalyzed the noncognitive data from the HighScope Perry Project and found curiosity was one of the leading indicators of students' long-term success.

Programming utilizing enriched learning environments. Early childhood programs have seen successful outcomes, particularly for children of low SES, with interventions that utilized an enriched learning environment, including a focus on play, problem solving, curiosity and/or creativity. The most reliable data showing improved long-term outcomes among children of low-income families come from experiments where children were randomly assigned to early childhood enrichment programs, monitored during the programs, and later contacted at different points for follow-up data. Two of these programs were the **HighScope Perry Preschool Program** and the **Carolina Abecedarian Program** discussed earlier in this report. As noted above, in each longitudinal study, participants in the program group showed significantly higher outcomes in cognitive and non-cognitive ability, social functioning, academic achievement and job performance at adult checkpoints than participants in the control

environment years after the intervention ended (Knudsen, et al., 2006), though there were some important limitations with the data that are often noted in critiques of these studies (e.g., small sample size). Other outcomes included increases in amount of schooling completed, adult wages and home ownership.

A third program that utilizes enriched learning environments is **Clayton Early Learning.** Clayton Early Learning's *Play and Learn groups* focus on the importance of play for the purpose of preparing children for school success. The Play and Learn groups provide caregivers (and especially parents) with resources about child development and teach the idea that play is a child's "work." To encourage healthy play behaviors, the program coaches caregivers in activities that support children's learning and development, including singing, reading, writing and pretend play.

A fourth program that utilizes enriched learning environments is **Educare,** which (in addition to many other strategies) infuses creativity (through the arts) and problem solving into its school-based curriculum for early childhood**.** In Colorado, the Educare Denver school works in partnership with the Clayton Early Learning Center to invest in children aged zero to five years, engage parent involvement, build continuity of care, and foster partnerships between the public and private sectors (more details on Educare are discussed in the spotlight below) (Educare, 2013).

> *Spotlight on Educare*
>
> *Educare is a leading early childhood education program created to ensure high-risk children from birth to five year old are prepared for school. Educare forms partnerships with philanthropists, government and school officials to raise awareness of early learning needs and bring schools to communities across the nation. Educare currently has 18 campuses around the United States, including Clayton Early Learning Center in Denver, with four more in development (Educare, 2013).*
>
> *Educare focuses on a variety of early childhood development practices, including: attachment, center and home based care, child-focused care, integration of the arts, early literacy, family and community support, interpersonal skills, problem solving, and looping.[29] Research has shown that students who experience Educare for a full five years are on par with other children entering kindergarten, regardless of socioeconomic status. Educare's success highlights the importance of utilizing best practices (Educare, 2013).*

Hence, as these four programs evidence, providing an enriching environment to children at a young age can help build foundational skills in very young children. In addition, research demonstrates that these skills can be built even in spite of poor home environments and lack of resources.

---

[29] Looping is a practice that involves a teacher or teachers staying with the same class of students for at least three years in order to provide continuity in instruction and familiarity for students.

Engaging Informal Care Providers: The Family, Friend and Neighbor Community

If city officials are serious about curbing school dropout rates, narrowing the achievement gap and preparing all youth in their communities for college or employment, school readiness for all children—including those in informal care—must be part of the reform agenda. –Rucker (2010)

A final notable and research-supported best practice in programming is to engage informal care providers. This practice is particularly important in the state of Colorado, because of the high number of children who are not enrolled in formal (e.g., licensed) care. According to a recent report by the Colorado Family, Friend and Neighbor Community (2013), in the state of Colorado there is a large gap between the approximate 251,000 children who need supervision outside of the home and the 108,900 licensed daycare spots, *leaving 142,100 children without spots in licensed childcare facilities*. The remaining childcare needs are often filled by what is known as Family, Friend and Neighbor (FFN) care, or home-based care (in the caregiver's or child's home) provided on an informal basis by grandparents, aunts and uncles, older siblings, family friends, neighbors or other unlicensed care providers.

FFN care is the **most common form of non-parental care in the U.S.**, especially for children under the age of five with working parents (Maher & Joesch, 2005; Sonenstein, Gates, Schmidt, & Bolshun, 2002; Snyder, Dore, & Adelman, 2005). In fact, national studies report that nearly half of all children under the age of six spend time in FFN care (Boushey & Wright, 2004), which is used more frequently by immigrant and non-English speaking children, who are also more likely to use FFN care as their sole childcare source (as opposed to engaging home-based or center-based providers) (Rucker, 2010). The younger the child, the more hours they spend in FFN care: FFN care accounts for nearly half the time (46 percent) that children from birth through age two spend in nonparental care, and just over a quarter of the time (27 percent) that three to five year olds spend in nonparental care (Kreader & Lawrence, 2006).

Why do parents choose FFN care? Cost, in particular, is a key determinant in the use of FFN care, which is often provided at a lower cost than formal care (and often at no cost). Supporting this point, a recent study found that 25 percent of parents experience care-related economic hardships (e.g. being unable to afford child care or having to reduce child care hours) as a result of the economic downturn (Zero to Three, 2010). However, there are other important reasons (i.e., in addition to a lack of licensed care spots or economic hardships) for why parents choose to utilize FFN care for their children that are important to note, including a higher degree of trust in the care providers; more confidence that the providers share values, child rearing practices, culture, language and/or religion; easier access to care (e.g., no formal enrollment process or paperwork, close geographic proximity) and more flexible use of care (e.g., to cover late night work schedules), as compared to more structured licensed care (Rucker, 2010).

> "The majority of children [in Colorado] are being taken care of by FFN–not in formal childcare settings, but by a grandmother, neighbor, [or other] informal setting…We need a rich understanding of how to support those networks of providers [who are] caring and loving [but who are] not licensed or trained [and] might not have that information."   –Interviewee

Who provides FFN care? While there is no "typical" FFN provider, FFN providers differ in some consistent ways from other nonparent caregivers. As compared to licensed providers, FFN caregivers typically have lower levels of education (i.e., high school education compared to college education) and little training in early childhood education, but typically offer lower adult to child ratios of care and rate highly on degree of caregiver warmth and responsiveness (Susman-Stilman & Banghart, 2011). They are most commonly relatives (and most often grandmothers) of the children they provide care for (Susman-Stilman & Banghart, 2008).

Initiatives and programs involving the FFN network. In the past decade, FFN has received growing attention from early childhood experts, researchers, funders and policy makers. For example, more than 25 percent of all states now fund FFN-specific initiatives (Porter & Rivera, 2005). As a result, there have been increasing efforts to develop resource and education networks to support these caregivers, which most often emphasize school readiness (Porter, 2007)[30]. However, evidence about the impact of FFN care is limited, and "there have been no systematic efforts to understand the approaches that work for specific groups of [FFN] caregivers under specific conditions" and only very limited research has been conducted on the *outcomes* of children in FFN care (Porter, 2007, p. 7).

In 2007, Colorado organizations and councils—including the Denver Mayor's Office for Education and Children, the Denver Mayor's Early Childhood Education Commission, Mile High United Way, Making Connections-Denver—collaborated to initiate efforts to support FFN care in Denver.[31] As a result, two promising programs exist for FFN caregivers in Colorado.

First, **Clayton's Early Learning's Play and Learn groups**, described in the previous section, provide both English and Spanish-speaking caregivers with education and resources about child development, including how children learn through play, as an effort to prepare children for school success. There are currently three Play and Learn groups in Denver. In addition to play and child development, the Play and Learn groups assist families with navigating community resources to fulfill specific needs.

The second promising FFN program is the **Colorado Statewide Parent Coalition's Providers Advancing School Outcomes (PASO).** PASO provides intensive courses for providers to ultimately earn their Child Development Associate (CDA) credential. More on PASO can be found in the "Spotlight on PASO" section below.

---

[30] For an overview of the models and evaluation systems for assessing FFN care, see Porter (2007)

[31] Note: In conjunction with this initiative, the city also launched a Resource Facilitator Mentor (RFM) program to better meet the needs of small early childhood providers, including improving the quality of care and helping them become licensed. The RFM program provides bilingual "community-based technical assistance, mentoring, social network development, resources and health and safety training" to 21 FFN caregivers (Rucker, 2010). The program showed mixed evaluation results (Denver Mayor's Office for Education and Children).

Spotlight on PASO

The Colorado founded and based Providers Advancing School Outcomes (PASO) program is intended for "Latina Spanish-speaking child care providers who care for Latino children, birth to 5 years old, in their home and who have had little or no training in early childhood education." PASO targets Family, Friend and Neighbor (FFN) providers in their communities to ensure at-home care providers are educated in early childhood development. PASO offers the opportunity for providers to complete intensive training (130 hours over 15 months) and ultimately earn their Child Development Associate (CDA) credential. In addition to earning a CDA, each PASO participant receives in-home mentoring. Mentor "tias"(aunts) are sent into the community to ensure that child development progress is ongoing and supported within the homes of FFN care providers. This program does not yet have empirical research that has tracked progress of FFN providers and children; however, it is based on evidence that demonstrates that the achievement gap primarily affects the Latino population.

Ideal Dosage and Timing of Programs and Interventions

As a final piece of this section, JVA explored research-driven recommendations for the ideal dosage and timing of interventions and programming geared to children aged zero to three. In general, to improve parent and child outcomes, a number of researchers (e.g., Bakermans-Kraneburg, van IJzendoorn, & Juffer, 2003; Cerezo, Dasi, & Ruiz, 2013) suggest using a moderate to high dose of intervention. This would mean that parents would be involved in intervention programs that occur over time. For example, Cerezo and colleagues (2013) found that infants were more securely attached when their parents attended a moderate to high number of parent training sessions (i.e., at least three sessions). In this study, parent and child outcomes improved the more the parent attended the activities offered by the program. Also supporting this perspective, findings from a meta-analysis conducted by Bakermans-Kranenburg, van IJzendoorn and Juffer (2003) indicate that the most effective interventions used a moderate number of sessions to enhance parental sensitivity and infant attachment. In terms of dosage, quality of implementation appears to improve parent and child outcomes (Shonkoff & Phillips, 2000). However, few studies have examined the optimal timing of when to begin and end early childhood interventions (Egeland, Weinfield, Bosquet, & Cheng, 2000).

In meta-analysis conducted by Leak, Duncan, Li, Magnuson, Schindler, Yoshikawa (2010), researchers identified a set of characteristics that predicted the effectiveness of diverse early childhood education intervention programs.[32] First, a larger effect size (d = .39) was found for programs that began before the child reached the age of three compared to ages three to four (d = .20) and older than four years old (d = .28). Second, programs that were implemented for longer than two years produced the largest effect size (d = .42), followed by shorter than half a year (d = .30), between one and two years (d = .28), and between half a year and a year (d= .20). Third, studies in which participants were retained over time produced larger effect sizes than studies with high rates of participant attrition. This finding suggests

---

[32] These researchers examined a wide variety of early childhood programs including home visitation, Head Start and developmental screening programs. For the purpose of this meta-analysis, intervention programs represented various types of interventions.

that early childhood intervention programs may be more effective if they are designed to prevent early participant attrition.

Lastly, Leak and colleagues (2010) found that the measurement method utilized may not significantly influence effect size. The following measurement methods were assessed in this study: (1) observational rating, (2) performance test, (3) other measurement method, (4) data collector not blinded, (5) study not from peer-reviewed journal, (6) treatment on the treated, and (7) baseline covariate not included. These methods produced an effect size ranging from .25 to .27. Such findings indicate that the reliability of existing measures may be similar. Future researchers and practitioners may want to design programs that provide caregivers with a variety of intervention activities to increase dosage. Indeed, Ramey and colleagues (1992) found a positive association between participation in programs focused on primary prevention and child cognitive gains. They suggest that programs focused on exposing high-risk cognitively delayed children to adult-child transactional experiences lead to increased cognitive gains.

These transactional experiences include (1) encouragement of exploration; (2) mentoring in basic skills; (3) celebration of developmental advances; (4) guided rehearsal and extension of new skills; (5) protection from inappropriate disapproval, teasing, or punishment; (6) a rich and responsive language environment (Ramey & Ramey, 1992). While such findings may not be entirely conclusive, early childhood intervention programs may be strengthened if they last either less than six months and provide a high dose or greater than two years with a lower dose.

THE CURRENT LANDSCAPE: PUBLIC POLICY

> *In states that make it a priority to educate our youngest children…studies show students grow up more likely to read and do math at grade level, graduate high school, hold a job, form more stable families of their own. We know this works. So let's do what works and make sure none of our children start the race of life already behind. –President Barack Obama, State of the Union (2013)*

This section explores *public policy*, which is an essential tool to link early childhood development research to effective practices. Public policy may take the form of improved access to affordable childcare, enforcing the quality control of existing programs, and making individuals, organizations and the wider community accountable in the promotion of early childhood development. When linked to research and evidence-based programs, early childhood development policy can be a bipartisan effort that focuses on ensuring all children have access to quality early care and, ultimately, ensuring the strength of the future workforce. The results of JVA's landscape scan suggest that **now, more than ever, success in the policy arena is a possibility.**

This section outlines both specific *federal policies* that aid in establishing healthy early childhood development for all, and also particular *Colorado policies* that are working toward improving early childhood development locally. This section also offers perspectives on the future of early childhood development, in which policy plays a hand, both nationally and in Colorado.

Possibilities and Challenges

> *Early childhood is a time of great opportunity. For young children, it is a time when they will learn to walk and talk and build the foundations for future development. For policymakers, it is a time to improve the odds that young children receive the health care, positive early learning experiences, and nurturing parenting that will support their healthy development and school readiness. –Helene Stebbins & Jane Knitzer (2007)*

Public policy has an active role in promoting healthy development and school readiness for young children. Whether framed as "zero to three," "birth to eight" or other age continuums, the implications for early growth have the potential and importance to impact national and state policy (Zero to Three, 2013). Historically, federal and state policy for childhood development has focused on school-age children and public education policy. However, local initiatives and state-level policies have been working for decades to increase the capacity and education of those in early childhood care and education, both prior to K–12 as well as prior to pre-K. In JVA's extensive efforts to learn more about the zero to three literature and landscape, it was discovered that in the last decade, discussions have expanded from local and state policy into more vocal and widespread support of early childhood development (ranging from prenatal to pre-K). As such, policy makers and business leaders are now joining and impacting the discussion on early childhood development that was once limited to practitioners and educators.

While including early childhood development (particularly zero to three) in the greater policy debate is beneficial for the creation of impactful development policies, a few challenges arise. First, there is a new challenge in **ensuring that zero to three does not become disconnected from the continual growth of a child** (policy that only focuses on school/education or policy that alternately divides early development from school/education). Second, another challenge is **ensuring that policy reaches those who are caregivers for children zero to three**, which typically comprises parents and the wider informal network of Friends, Family and Neighbors (FFN, described earlier in this report). Policy focused on early childhood development is **only effective if it reaches those individuals who need it the most** (including families living in poverty, families living in rural areas, and individuals not connected to formal education or care provider settings).

A third challenge for state policy has been **concern over the sequester** (i.e., the federal budget cuts aimed to decrease the federal deficit that began in March 2013) and **overall budget constraints** at the state level. In the realm of early education and child care programs, only programs receiving discretionary funding streams—which make up half of the child care funding (the other half being mandatory funding streams)—are threatened. *Head Start* is one such early childhood discretionary program and therefore is subject to budget cuts (possibly $60 million) as a result of the sequester (The White House, 2013). Other cuts from the sequester will affect the Individuals with Disabilities Education Act (IDEA), Teacher Quality State Grants and Title I, among others (NAESP, 2013). These economic challenges, however, are pushing states to focus on innovative and sustainable funding sources (e.g., private-public partnerships, endowments) in efforts to ensure that all children have access to high-quality services and to keep public policy focused on effective, quality programs and services.

> "I think the idea of doing growth well [means] thinking about the investments we are making in a way that promotes quality and not just access… [This means] policy change around how do we get our kiddos in environments where there is an investment in getting rated, and incentives to improve based on quality ratings? That is promising, other states have done that." –Interviewee

Despite the challenges involved in effectively framing early childhood development, accessing informal care providers and finding sustainable funding sources, a positive result of this debate is that early childhood is now part of a wide and influential discussion. As a result, decision makers and policy makers across political divides now have an increased understanding of the importance of zero to three, which directly benefits the youngest and most vulnerable individuals in communities across the nation.

Early Childhood Development Discussion: Poised for Action

Because of this heightened policy discussion surrounding early childhood, and also because of increased research on young children, long-time advocates and practitioners of early childhood development are becoming increasingly connected to policy makers and school systems. As a result, there is an increased movement toward greater awareness and discussion on the topic of early childhood development, with the notion that the development of the whole child begins much earlier than preschool. One key example of this movement came from President Barack Obama, who has engaged multiple outlets to discuss its importance. For example, the 2013 "Preschool for All Proposal"/"Early Learning Challenge Fund" led to a proposed $15 billion (out of the $75 billion total that would emphasize preschool quality and access) to be funneled toward home visitation across 10 years. In addition, the 2010 Affordable Care Act (ACA) allocated $1.5 billion to home visitations in (Neufield, 2013). There is also movement in

President Obama's plan to launch a new Early Head Start–Child Care Partnership program specifically for children zero to three (The White House, Office of the Press Secretary, 2013). These initiatives reflect the importance of a multi-sector policy approach, as President Obama has shown by engaging early childhood development in education policy (e.g., Preschool For All and Early Head Start) and public health policy (e.g., the Affordable Care Act).

The Federal Landscape. Early childhood development is affected by many diverse factors, including public health, mental health, nutrition, education, family security (economic/ stability/ well-being) and childcare, to name only a few. While national policy affects all of these arenas in numerous contexts, this report will highlight some of the major policies that play a particular role in early childhood development. What follows is not meant to be an exhaustive list of these contexts, but will ideally be useful to illustrate the links between sectors.

Public health. First, public health is an important policy area that affects the early childhood time period. In the area of public health, the Affordable Care Act (ACA) works to ensure that families can receive comprehensive care and helps Medicaid-covered families by requiring states to raise their Medicaid fees to at least match Medicare fees by 2014. This matching requirement includes pediatric services and will help to improve children's access to care (Colorado Children's Campaign, 2013c). Thus, it is critical that the Affordable Care Act (ACA) be seen not only as a health policy, but also as one that will affect the early childhood development sector. In addition to the ACA, other notable public health policies at the national level that affect early childhood development include: the Infants and Toddlers with Disabilities and Individuals with Disabilities Act (IDEA) and the Children's Health Insurance Plan (CHIP).

Two other areas included in the public health context are mental health and nutrition. Mental health, while often associated with public health, focuses on social-emotional development in particular for early childhood. Public policies involving mental health in early childhood include IDEA part B and IDEA part C and Child Find.[33] In addition, nutrition, as it relates to early childhood development and public health, is addressed in national policy. Specifically, the Supplemental Nutrition Assistance Program (SNAP), Child and Adult Care Food Program (CACPF), and the Women, Infants, Children (WIC) program are three national programs that impact the early childhood time period. Ensuring nutrition is affordable and accessible for healthy prenatal care and early childhood growth is both a national and a state policy focus.

Education. Second, federal education policies directly impact the early childhood arena, and include Early Head Start, Head Start, the Quality Rating and Improvement System (QRIS), and IDEA (to name only a few). As mentioned earlier in this report, it is more difficult to reach adults caregivers of children when those children are outside of the formal school system (as is the case for most children aged zero to three). Childcare providers are often used as the answer to this struggle, and policies that aim to

---

[33] Child Find (2013) is "a continuous process of public awareness activities, screening and evaluation designed to *locate, identify, and refer as early as possible* all young children with disabilities and their families who are in need of Early Intervention Program (Part C) or Preschool Special Education (Part B/619) services of the IDEA."

reach this population include the Child Care Development Fund (CCDF), the Childcare and Development Block Grant (CDBG), and the Family and Medical Leave Act (FMLA). However, as this report reflects, the majority of Colorado children are not in formal childcare programs, so it is important for policies to make attempts to engage a broader care network.

Family security. Lastly, early childhood development is impacted by the overall security of parents and caregivers, including economic status, stability, safety and overall well-being. National programs that address this include: Nurse Family Partnership (NFP), Healthy Families America, Parent-Child Home Program; Parents as Teachers, Low-income Energy Assistance Program (LEAP), Temporary Assistance for Needy Families (TANF), the Earned Income Tax Credit (EITC), child/dependent care tax credits and Promise Neighborhoods (proposed).

The Colorado Landscape.
In addition to these federal programs and policies, state-level policy is particularly important in the early childhood development sector. Specifically, state-level policy is critical to ensuring that needs are being met at a local level and for establishing thriving communities that support the early childhood time. Over the past 20 years, Colorado has made significant progress toward ensuring that state-level public policy addresses the needs of early childhood development. Recently, a positive combination of an engaged political landscape and an increased ability of policy makers to reach across partisan lines on behalf of children is helping to ensure that the discussion on early childhood will grow and continue to include diverse voices. The specific state-level policy contexts that impact the early childhood arena in the state of Colorado are included below.

Public health. The Health Benefit Exchange (Senate Bill 11-200) is the largest adjustment to public health policy in Colorado affecting early childhood development. The Health Benefit Exchange created a marketplace for Coloradans to purchase health insurance with transparent information on prices and benefits, and will be accessible in late 2013. Like the ACA, the Health Benefit Exchange "will expand the opportunity for uninsured and underinsured families to purchase adequate coverage for their children," which, in turn, will help Colorado children have a greater chance for healthy development (Colorado Children's Campaign, 2013a).

Other recent public health policies impacting early childhood development include: House Bill 10-1021 "Required Coverage for Reproductive Services" (which requires individual health insurance policies to cover pregnancy and delivery), Senate Bill 11-250 "Supporting Healthy Beginnings" (which helps more low-income mothers gain Medicaid coverage), and Senate Bill 13-242 "Adult Dental Medicaid Benefit" (which creates a new dental health benefit that will positively impact pregnant women and their babies).

> "Policy-wise we need to leave flexibility for the local context to be very much present in early childhood programs. You could take hypotheticals, if you are not in the present and environment, you lose a critical piece of setting up that desire to learn [among children]." –Interviewee

Regarding early childhood nutrition, WIC and SNAP ensure that nutrition is accessible for prenatal and early childhood care. Also, House Bill 10-1022, *Combating Childhood Hunger*, is a nutrition-focused policy that requires the Department of Human Services to develop a state outreach plan to raise awareness of federal food benefit programs to low-income families. Furthermore, the Colorado Quit

Line, Baby and Me Tobacco Free, and Cavity Free at Three are examples of successful programs that align public health with early childhood development (including prenatal care and early care).

Education. Education policies that affect the early childhood development arena in Colorado have mostly been focused on Pre-K and K-12, but there have been unique movements on local and state levels to ensure high quality and effective care is provided to young children prior to school. One recent policy impacting early childhood development in Colorado is the House Bill 09-1343, Early Childhood and School Readiness Legislative Commission Act, which created an Early Childhood and School Readiness Legislative Commission to improve state policies on school readiness. Colorado's current Colorado Quality Rating System (CQRS or Qualistar Rating) is a system to rate childcare programs, however it is voluntary. At present, it rates 431 centers or preschools and 62 family homes, thus reaching a total of only 14 percent licensed childcare programs. Early Head Start[34], Colorado Preschool Program and Colorado READS are three other examples of successful early childhood development policies on a Colorado state level.

Childcare. Clearly, children zero to three need access to quality childcare as they develop and grow, and Colorado provides a number of programs through licensed and unlicensed providers. However, the average cost of licensed ($12,621) and non-licensed ($8,518) childcare in 2011 was quite expensive (Zero to Three, 2013). In Colorado, the cost of child care for an infant is nearly half[35] of a single mother's median income and 15 percent of the median income of a two-parent family (Zero to Three, 2013), not including other child expenses such as food or health insurance. To offset this high costs, programs such as the Child Care Assistance Program (CCCAP) have lessened the burden for thousands of families in the state of Colorado. However, the need for such subsidies exceeds the availability of such programs. Therefore, policies that strengthen access to child care and supplement costs for low-income families may be one strategy to help all zero to three children access quality child care.

Next, considering access to childcare in Colorado and as is described earlier in this report, the Colorado Children's Campaign (2013b) reports that there is only capacity for 43 percent of Colorado infants and toddlers to participate in formal child care. This means that even if sufficient subsidies were available for families in need of childcare, there would be a significant shortage of licensed childcare facilities, family care homes and preschools in the state. As such, Colorado policies may need to focus on building capacity for infant and childcare. FFN care may be a viable option in terms of building the capacity that is needed in this domain. In fact, as noted above, Colorado provides certain programs (e.g., PASO) to train family, friends and neighbors in how to provide care to this vulnerable age group. Unfortunately, many of these programs have limited capacity to provide their services.

Another third that may shape the Colorado childcare landscape is to improve the process of child care licensing. Research using Qualistar Colorado shows that when child care facilities are licensed, both the quality of care that children receive as well as the subsequent development of children improve. In

---

[34] In Colorado, 2,132 infants and toddlers and 206 pregnant women participat[ed in... (Zero] to Three, 2013).
[35] 46 percent

"Qualistar is doing a good job of rating centers, which includes infants...but only 20 percent are rated, so we have a long way to go in that arena." Interviewee

Colorado, caregivers are required to take a minimum number of college-level courses that focus on early childhood education and pass a background check before they receive a license. In addition, licensing inspections are administered every two years. However, some organizations find these regulations inadequate; for example, the Child Care Aware of America program (CCAA) recommends that such inspections be performed four times a year. In fact, Colorado ranks relatively low—35th in the nation—on CCAA's ranking for state and child care center regulation and oversight.

Family security. Lastly, in addition to the national policies listed in the above section, the state of Colorado administers policies that recognize the linkages between financial and family stability on the development of healthy families. One recent policy example, Senate Bill 12-022 "Maintaining Child Care Assistance for Working Families," created a pilot program that extended CCCAP assistance in 10 counties to families for two years, allowing them to gradually work toward self-sustainability (Colorado Children's Campaign, 2013b).

Colorado Collaboration

> *The concept of "collaborative governance" offers a model for inclusive, deliberative, and consensus-oriented approaches to issues and solutions that involve multiple service sectors and systems." –Framework in Action State Plan, 2010–2012*

Both state-level and local-level coordination have been improving in Colorado for early childhood development practitioners and policy makers. As the sectors just highlighted in the policy landscape section are interdependent, and as development is cumulative, there is a need for "comprehensive and coordinated policies" to address early childhood development (Zero to Three, 2009), and Colorado has taken steps to coordinate policy across multiple sectors. The following section highlights the major developments in political coordination during the years of 2008 to 2012.[36]

> "I think from the policy point of view, the biggest trend is more cohesion around coordination and collaboration across the various domains of early childhood education." –Interviewee

The Early Childhood Colorado Framework. In 2008, the *Early Childhood Colorado Framework* was created to serve as a resource of logic models, strategic plans and outlines for systems across Colorado. In response to its creation, in 2009, over 100 "partners" met to develop the *Framework in Action State Plan 2010–2012* to determine the best next steps for cross-sector early childhood progress in Colorado. One year later, in 2010, the Early Childhood Colorado Information Clearinghouse (ECCIC) was created to help coordinate a single location of information. These resources and the Early Childhood Colorado Framework are still used and referenced today, and are seen in the work of the Early Childhood Leadership Commission (ECLC).

---

[36] Note: There have been other local policies in Colorado, such as the Denver Preschool Program approved in 2006 (which was funded by a Denver sales tax increase), which are discussed later in this report.

In particular, the Colorado Framework has been useful to identify needs and strategize planning and decision-making in Colorado. According to the ECLC's Community Needs Assessment in 2010, four out of five early childhood professionals stated they were either "aware" or "very aware" of the Early Childhood Colorado Framework.[37] In addition, when asked to rank the most important components of the framework, the top three reported areas were: 1) recognizing the need of the whole child and family; 2) communicating the vision for comprehensive early childhood work; and 3) emphasizing multi-agency/organization ownership and leadership (Early Childhood Leadership Commission, 2011).

> *When the various organizations and agencies administering these programs work in a concerted approach, the result is more effective and efficient service delivery for children and families." –Framework in Action State Plan, 2010–2012*

Colorado Early Childhood Leadership Commission. In order to help put the Framework into action across Colorado, the Colorado Early Childhood Leadership Commission (ECLC) was established in 2010 by Executive Order of Governor Ritter. The ECLC was created to improve outcomes for children from birth to age eight, and their families, by focusing on the "alignment, coordination, and efficiency of programs and services" (Early Childhood Leadership Commission, 2011). Later, as a requirement from funding by the U.S. Department of Health and Human Services, the ECLC partnered with the Colorado Department of Public Health and Environment (CDPHE) and an assessment to determine the specific needs of this population (Early Childhood Leadership Commission, 2011).

State Advisory Councils. As part of the 2010 ECLC, the State Advisory Councils for Early Childhood Care and Education were established throughout Colorado. The Advisory Councils aim to bring local area leaders together to ensure coordinated policy and practice on early childhood development. The councils provide the local infrastructure to coordinate cross-sector work to improve childhood outcomes. Currently, there are 31 councils in Colorado (e.g., the Denver Early Childhood Council, the Teller/Park Early Childhood Council and the Morgan County Early Childhood Council), all which united by the same goals and instituted to address the needs of local children from birth to eight years. To assist with council coordination, the Early Childhood Councils Advisory Team (ECCAT) was created as a formalized structure to support the local councils and work closely with the ECLC. In addition, the Early Childhood Councils Leadership Alliance was created to work on how local council coordinators can learn and grow by coordinating strategies, sharing knowledge and identifying common barriers to progress.

Other coordinated information sources include the *Early Learning and Development Guidelines,* created by the CDE, the ECLC and Colorado Head Start, in order to facilitate statewide coordination of knowledge. Also, in November 2012, the ECLC launched the *Colorado Early Investment Model* as a free and publicly available online tool[38] with program enrollment and cost data. The tool also allows users to better understand the connections between cost, quality, enrollment and return on investment of Colorado's early childhood programs.

---

[37] A total of 351 individuals were surveyed.
[38] Tool available at http://www.coearlyinvestmentmodel.org/

Office of Early Childhood. The various programs, councils and advisory teams represent the collaborating bodies involved in Colorado early childhood policy. However, until last year, there were still disparate organizations and departments across sectors (e.g., health, education and economics) that needed a better way to unite over the issue of early childhood education. For this reason, Governor John Hickenlooper created the Office of Early Childhood (OEC) in 2012 to consolidate early childhood programs in Colorado and to better support families via coordinated state-level systems. The OEC unites seven programs (originally separated in four divisions within the Colorado Department of Human Services [CDHS]) including: Child Care Licensing, Child Care Quality Initiatives, Colorado Child Care Assistance Program, Early Childhood Councils, Early Childhood Mental Health Consultation, Early Intervention Colorado Program (Part C/Early Intervention), and Promoting Safe and Stable Families.

> *Colorado families and children deserve the opportunity for a fair start...This change will create a high-quality early childhood system that streamlines early childhood services to help ensure all children are healthy, valued and thriving." –Governor John Hickenlooper*

Race to the Top—Early Learning Challenge Fund grant. In December 2012, Colorado won a $29.9 million Race to the Top–Early Learning Challenge Fund grant. The Colorado Department of Human Services (CDHS) was the lead applicant for this competitive grant, with the Colorado Department of Education (CDE) as primary partner. This grant supports the development and promotion of the Quality Rating and Improvement System (QRIS) for early learning and early childhood care programs and implementation of a school readiness assessment system in preschool and kindergarten. It also supports outreach about *Colorado's Early Learning and Development Guidelines* (described above) and expansion of Results Matter[39] into child care settings, and creates a stronger professional development system focused on data, competency frameworks, credentialing and incentives (Colorado Department of Education, Office of Early Learning and School Readiness, 2012).

In July of 2013, Colorado received an additional $15 million Early Learning Challenge Fund "bonus." The aim of this bonus was to improve program quality for all licensed early childhood programs, support parents, and to "help educate and empower families so they can best promote the optimal development of their children" (Colorado Reads, 2013).

Future Implications

In general, public policy that affects early childhood development, both nationally and in Colorado, is on a positive upward path of increased focus, access and quality. However, despite the positive trends, there are a number of issues that must not be ignored and which deserve review. These issues, as well as other future implications, are explained in this section.

---

[39] Results Matter is a data collection system for Colorado managed by the Colorado Department of Education. The data obtained is used to describe child progress across specific developmental and educational sectors and national and global outcomes. See more at: http://www.cde.state.co.us/resultsmatter/#sthash.AnrwxOpQ.dpuf

First, evidence-based policy and programs are increasingly important. In order to engage diverse sectors and community members (e.g., political leaders, business leaders and voters), it is critical to utilize programs that are based in effective, research-proven results. Second, there is a growing focus on the best practices involved in (a) integrating families into the early childhood arena; (b) ensuring that FFN care providers are given accurate, quality data; and (c) empowering parents to take charge of development in prenatal, infant and toddler stages. Collaborations with local councils are one positive example of this, as local councils represent the varying needs across communities and regions. In particular, policy that can reach into FFN care in Colorado and intentionally work to spread quality, access and education across FFN provider networks is much needed.

In addition to these things, Colorado is also keeping watch on a few issues on the public policy horizon. The first is Initiative 22, known as "Colorado Commits to Kids." Over 160,000 signatures have been collected on a petition for this initiative, which proposes to raise individual income tax rates to pay for Senate Bill 13-213 (i.e., the overhaul of Colorado's school funding system). The proposed tax increase would generate $950 million a year to focus on the creation of a new system of pre-K through 12 education (Engdahl, 2013). The Denver Preschool Project is one example of how this was accomplished in 2007 on a local level.

The second issue is "Colorado's Next Generation QRIS." The draft plan of the Next Generation QRIS was publicized in July 2013 by the Colorado Department of Human Services and the Office of Early Childhood (OEC), and provides plans for how childcare centers will be held to accountability and monitoring standards. The Race to the Top Early Learning Challenge Fund grant helped OEC launch the improved QRIS system. QRIS will help improve and better communicate the quality levels in early education and care for Colorado licensed providers. The QRIS planning phase will run through the remainder of 2013, with implementation slated to begin in July 2014 (Office of Early Childhood 2013) and (Colorado Department of Education, 2013).

Third, it is essential to recognize that Colorado is a "local control" state. As such, local government issues must be handled *first* at a city or county level. Thus, for early childhood development to be fully integrated state wide, strong leadership and a unified message are essential. In addition, for policy to initiate change in Colorado, the state oversight responsibility and local control must be balanced (Baker, 2013).

Finally, in Colorado, with the sequester's estimated 5.1 percent cut in nondefense, discretionary programs and the 5.3 percent cut to nonexempt, nondefense mandatory programs, education will be affected. The chart in Appendix C contains an estimate of the cuts to Colorado spending.[40] Although the financial implications of the sequester are yet to be fully seen, it is clear that a focus on high quality, evidence based and accountability-centered programs and services should be an ongoing priority in Colorado. With sustainable funding for services that is flexible enough to adjust to other funding sources and diverse partnerships, the momentum gained now can be harnessed for future success (Cohen, Gebhard, Kirwan, & Lawrence, 2009). Additionally, with a focus on comprehensive services that span multiple sectors of health and education policy—beginning with prenatal development and parent-child relationships during early care—public policy can be the key to ensuring that what is currently positive growth becomes lasting change.

---

[40] See also The Washington Post's online chart at http://www.washingtonpost.com/wp-srv/special/politics/sequestration-state-impact/ or the White House's Colorado state fact sheet at http://www.whitehouse.gov/sites/default/files/docs/sequester-factsheets/Colorado.pdf

PART 3: WHERE DO WE GO FROM HERE?

Recommendations for the Future

Moving forward, there are a number of directions that future researchers, practitioners, funders and policy makers may wish to pursue to improve outcomes and optimize the development of children zero to three. Results from a thorough review of scholarly and practitioner literature, interviews with subject matter experts, and the evaluation of different early childhood intervention programs in Colorado and beyond all resoundingly support the critical importance of zero to three. These results have also identified ways to improve outcomes during this time, typically focusing on overcoming negative influences or improving deficits for specific populations with historically lower outcomes (e.g., the achievement gap; the 30 million word gap).

In particular, to better understand the achievement gap, including how early childhood language acquisition might influence this learning disparity, researchers have pursued a number of promising directions (e.g., literacy enhancement, cognitive development, parent trainings); practitioners have developed and tested various interventions and programs (e.g., Bright Beginnings, 1995; Nurse Family Partnership, 1996, Parents as Teachers, 1981); and policy makers in Colorado have passed a variety of laws to ease the economic burden of low-income households. However, much less research has explored the types of interventions, programs and innovations that might best optimize positive outcomes and make a significant and wide-reaching positive impact for all children. As a result, as a nation, we are better at fixing deficits (e.g., moving from below average to average) than we are at maximizing successes in a significant way (e.g., moving from average to above average). As Halfon (2013) explained,

> When 30 percent or more of our children are starting kindergarten already vulnerable to failure, the solution will only come through a shift in the curve for the entire population and not from a focus on the "bad apples" on the low tail of a skewed distribution. We must provide all children with the social scaffolding they need to remove them from harm's way and provide them with the best chance of success. (p. 1)

In this section, a number of strategic recommendations are provided that synthesize key findings into actionable recommendations and identify current gaps in the literature. Each recommendation is meant to stand alone, as each is a substantial task. In addition, some elements within different recommendations may seem contradictory (e.g., the focus on supporting existing programs in recommendation one and the call for increased research and development in recommendation six) and may recommend different priorities to pursue.

As a collective set of recommendations—whether approached holistically or individually, or by a few organizations or many—these six strategies may guide the development and dissemination of effective and lasting interventions for children ages zero to three, and thus have the potential to substantially maximize zero to three success. Further, these recommendations focus on best practices regarding programming, innovation, evaluation, dissemination and sustainability, and include: (1) supporting quality programs and care for zero to three; (2) strengthening and developing early childhood networks and infrastructure; (3) optimizing delivery methods and approaches; (4) evaluating and measuring

program effectiveness and success; (5) facilitating program sustainability and community capacity; and (6) promoting research and development innovation. Each recommendation is explored in greater detail below.

1. Support quality programs and care for zero to three

Despite the prevalence of a deficit focus in research on zero to three, in the state of Colorado, as this report and the crosswalk below illustrate, there are many diverse early childhood initiatives and programs that have demonstrated varying degrees of success, empirical effectiveness and funder support (see Appendix D for descriptions of these programs). As a first recommendation, nearly all interviewees stressed the critical importance of supporting quality programs and care through funding, policy and research. As one interviewee explained, "The research is teaching all of us more and more of what quality looks like. It is very exciting that we have [this kind of] research. *We know what works, now just a matter of implementing*."

It is important to note that program quality, in particular, was a key focus for interviewees. For example, one interviewee explained, "The quality issue is consistent–[we] need quality over everything else." To best do this, it may be necessary to engage in improving the evaluation and measurement of programs, noted in recommendation four, below.

As noted in recommendation one, many interviewees stressed the importance of focusing on the quality of early childhood programming, stating:

> *In 2003 virtually no quality-rated programs in Denver County. There were 7 nationally accredited programs. Now we have over 240 quality-rated programs and that ranges from 0-4 stars - a huge variation there. Improve the quality of programs children are in; make people aware of the difference between a 4 star and 0 star program.*

> *[We need to] improve the quality of the implementation of everything we do. Stop putting money into poor-quality programs. Build systems of quality care*

To provide a way to compare and contrast these programs, Table 3, on the next pages, illustrates 10 programs that are important to the early childhood landscape in Colorado. The chart functions as a "crosswalk" in that it cross-references each program by the particular early childhood educational strategies (e.g., home visitation; parent–child engagement) employed.

Table 3. Early Childhood Programs in Colorado by Key Characteristics and Area of Focus

	Brazelton's Touchpoints Center	Bright Beginnings	Clayton Early Learning	Early Head Start	Educare	ESSS Save the Children	Family Star Montessori	Healthy Families America	HIPPY	How to Read to Your Baby
Founded in	1996	1995	1910 (approx.)	1994	2003	2006	1991	1992	1984 in U.S.	1991
Age group of kids served	prenatal to eight years	prenatal to three	prenatal to five years	prenatal to three years	birth to five	prenatal to five	prenatal to six years	prenatal to five	ages 3-5	infants/ toddlers
Total number served	greater than 10,000 individuals trained*, 1 million families served worldwide	18,000 families in Colorado	400+ (in Educare), 256 (in Early Head Start), 2,000 families trained in Denver	904,153 children (in 2009) nationwide	2,000 (in 2011); Each school at 140-200 students nationwide	5,000 children; 3,500 parents nationwide (in 2010-2011)	300 children served annually in Denver	75,000 annually in 40 states	currently serving over 15,000 families nationwide	unable to determine at time of research
Cost of the program	$1,200 per person for individual training; $500 per person for seminar training	$25 per visit/kit	education/care monthly full tuition (without assistance): $1,375 per child for full day care; Play and Learn groups free	$7,600 per child (in 2009) (cost per child to program, not to family)	$18,000 per child (in 2011) (cost to program, not to family)	$1,600 per child per year	$1,500/ month full-day 2-14 month-olds; $1,750/month extended-day 2-14 month-olds; $1,250/month full-day toddlers; $1,400/month extended-day toddlers	$3,348 per family per year	$1,250 per child per year	Emotional Beginnings program costs: $10-$1300 for materials; $150-$250 for trainings
Services in Colorado	X	X	X	X	X	X	X	X	X	X
Geographic location	Colorado: statewide plus global/national training	Colorado: statewide via regional affiliates	Colorado: Denver	Colorado: statewide	Colorado: Denver; schools nationwide	Rural communities	Colorado: Denver	Colorado and nationwide	Colorado: 7 locations	Colorado based: national training model
Major funders 2010–2013	Dalio Foundation (CT)	Colorado Health Foundation, Daniels Fund, The Denver Foundation, Kaiser Permanente, Helen K. Arthur E. Johnson Foundation (CO),Temple Hoyne Buell (CO), Cohen Foundation (MD), Community Foundation for the National Capital Region (DC) and more	Early Head Start, Head Start, Educare, Temple Hoyne Buell (CO), Chambers Family Fund (CO), Gates Family Foundation (CO), Rose Community Foundation (CO)	Federally funded	Buffet Early Childhood Fund, W.K. Kellogg Foundation, George Kaiser Family Foundation, Pritzker Children's Initiative, Bill & Melinda Gates Foundation, Irving Harris Foundation, Alfond Foundation (ME), Cafritz Foundation (DC) and more	Mile High United Way; private gifts, grants, and contracts; government grants and contracts	Federal funding: Early Head Start, Head Start, Daniels Fund (CO)	Prevent Child Abuse America, funded by Freddie Mac Foundation, David and Lucile Packard Foundation, Gerber Foundation, Ronald McDonald House Charities, Doris Duke Charitable Foundation, Annie E. Casey Foundation (MD), and more	Arkansas Children's Hospital, Connelly 3 Publishing Group, GHP Media, Heising Simons Foundation, Social Solutions Group, Twin City Printing, Weil, Gotshal & Manges LLP (2012)Temple Hoyne Buell (CO), Kellogg Foundation (MI)	Temple Hoyne Buell (CO), Daniels Fund (CO)
Model type: Programming		x	x	x	x	x	x	x	x	
Model type: Training	x	x	x			x		x	x	x
Incorporates a focus on:										
Arts integration					x		x			
Attachment	x	x		x	x					x
Center-based			x	x	x		x			
Child focused primarily (rather than parent focused)			x	x	x	x	x			x
Collaborates with other programs, organizations	x		x	x	x	x	x			x
Diverse support (i.e., fathers, culture, language)	x	x	x			x	x	x		
Early literacy		x	x	x	x	x	x		x	x
Family support	x	x	x	x	x	x	x	x	x	
Health (prenatal or child)	x	x	x	x		x		x	x	
Home visit	x	x	x	x		x		x	x	
Interpersonal skills			x	x	x					
Language other than English		x	x	x		x	x		x	
Language acquisition	x	x	x		x	x	x		x	x
Parent engagement/ education	x	x	x	x	x	x		x	x	
Parent-child engagement	x	x	x	x	x	x		x		
Play		x			x				x	x
Poverty	x	x	x	x		x	x	x	x	x
Prenatal	x	x	x	x			x		x	
Problem solving					x		x			x
Self regulation							x			
Social-emotional development		x		x	x	x	x			x
Source	http://www.brazeltontouchpoints.org/about/evidence-based-research/; http://harvardmagazine.com/2012/01/early-learning	http://brightbeginningsusa.org/	http://www.claytonearlylearning.org/practice/educare-school/our-approach/	http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/ehsnrc/Early%20Head%20Start/about.html; http://www.ehsnrc.org/AboutUs/ehs.htm	http://www.educareschools.org/about/educare-core-features.php	http://www.savethechildren.org/site/c.8rKLIXMGIpI4E/b.6234479/; http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/ESSS-11-2010-OVERVIEW.PDF	http://www.dpp.org/find-a-preschool-app/family-star-montessori-and-early-head-start-northwest	http://www.healthyfamiliesamerica.org/about_us/index.shtml	http://www.hippyusa.org/the_hippy_model_curriculum.php	http://www.howtoreadyourbaby.org/

NOTE: The checkboxes are main focuses of the programs listed. This is not to indicate that the program does not ever address the topic, or does not indirectly address the topic. This was the best available, public information at the time the research was conducted in July 2013.

(continued on next page)

	Love and Logic	Montessori Educational Philosophy	Nurse Family Partnership	Ounce of Prevention (Home Visits and Doula)	PASO	Parents as Teachers	Reach out and Reach Colorado	Tools of the Mind
Founded in	1977	1907	1996	1982	2006	1981	1989	1993
Age group of kids served	birth through teenage years	ages 3 to 18	prenatal to two	zero to five	birth to five	prenatal to kindergarten	6 months to 5 years	pre-K and kindergarten
Total number served	unable to determine at time of research	currently over 4,000 U.S. schools	currently serving 25,944 families nationwide	Home Visits Program: 1,900 families annually in Illinois; Doula Program: 1,000 families annually in Illinois	90 families annually in Colorado	Rocky Mountain Parents as Teachers currently serves 109 families (including 161 children)	more than 86,000 children in Colorado (4 million nationwide) annually	unable to determine at time of research
Cost of the program	$700 for facilitator training	tuition ranges $1,296-$1,909 for 2-36 month age groups	$4,500 per family per year	home visits: $2,750 per family per year; Doula: $2,200 per doula for 5 month program	unable to determine at time of research	$1,500-$3,500 affiliation fee for program affiliates and parent educators; $230-$915 for core trainings	$2.75 per child (cost of a book)	calculated on per-classroom basis & dependent on size of program and needs for prof. dev.
Services in Colorado	X	X	X	x	X	X	X	X
Geographic location	Colorado: Trainings offered statewide		Colorado: located in 50 counties statewide	Illinois for program services. Trains professionals nationally	Colorado: Boulder County; replicated in Weld County	St Louis, MO. Training, curriculum, and model affiliates nationwide	serves 48 of Colorado's 64 counties, via 200 clinics	Colorado: rural and urban; national and international locations
Major funders 2010–2013	Temple Hoyne Buell, The Sherwood Foundation (NE), Gannett Foundation, 3M Foundation, and more	Tuition-based and private sector funding	The Edna McConnell Foundation, The Bill and Melinda Gates Foundation, The Robert Wood Johnson Foundation; other private foundation and corporate funding and Nurse Family Partnership National Board of Directors, California Wellness Foundation (CA), Duke Endowment (NC), Gates Foundation (WA), Kellogg Foundation (MI), Knight Foundation (FL), and more	Ounce of Prevention Fund, Buffett Early Childhood Fund (NE), Gates Foundation (WA), Harris Foundation (IL), Pritzker Family Foundation (IL), Reese Health Trust (IL), Zell Family Foundation (IL)	Boulder Community Foundation, Phillips Family Foundation (MN)	U.S. Department of Education, U.S.Health Resources and Services Administration, Blank Family Foundation (GA), Annie E. Casey (MD), Ford Foundation (NY), Fremont Area Community Foundation (MI), Gates Foundation (WA), Heinz Endowments (PA), Robert Wood Johnson (NJ), Kansas City Community Foundation (MO), Kauffman Foundation (MO), Kellogg Foundation (MI), MacArthur Foundation (IL), Wallace Foundation (NY)	Public and Private funding: William R. Kenan, Jr. Charitable Trust (2013); U.S. Department of Education's Fund for the Improvement of Education (2000-2010), Denver Foundation (CO), Gates Family Foundation (CO) , Temple Hoyne Buell (CO)	Chambers Family Fund, Cummings Foundation (NY), Daniels Fund (CO), Gates Foundation (WA), Irvine Foundation (CA), Marin Community Foundation (CA), Noyce Foundation (CA), Reynolds Foundation (NC)
Model type: Programming		x	x	x	x	x		x
Model type: Training	x		x	x	x	x	x	x
Incorporates a focus on:								
Arts integration		x						
Attachment			x	x		x		
Center-based		x						x
Child focused primarily (rather than parent focused)		x					x	
Collaborates with other programs, organizations			x				x	
Diverse support (i.e., fathers, culture, language)					x	x		
Early literacy		x	x	x		x	x	x
Family support			x			x		
Health (prenatal or child)			x			x		
Home visit			x	x	x	x		
Interpersonal skills		x						x
Language other than English	x		x	x	x	x	x	
Language acquisition	x	x		x	x	x	x	
Parent engagement/ education	x		x	x		x	x	
Parent-child engagement	x		x	x		x		
Play								
Poverty			x	x	x	x	x	
Prenatal			x	x		x		
Problem solving	x	x						x
Self regulation	x	x						x
Social-emotional development		x	x					
Source	http://www.loveandlogic.com/t-parent-faq.aspx	http://tsl.org/family/2010/06/montessori-for-infants-and-toddlers-0-3-years-old-sensitive-periods/	http://www.nursefamilypartnership.org/About/What-we-do	http://www.ounceofprevention.org/programs/homevisiting.php	http://coparentcoalition.org/paso/	http://www.parentsasteachers.org/images/stories/documents/LogicModel_Web.pdf	http://reachoutandreadco.org/	http://www.toolsofthemind.org/

NOTE: The checkboxes are main focuses of the programs listed. This is not to indicate that the program does not ever address the topic, or does not indirectly address the topic. This was the best available, public information at the time the research was conducted in July 2013.

Other programs:
Grand Beginnings (http://www.grandbeginnings.org/)
Los Padres/Las Madres (http://coparentcoalition.org/los-padreslas-madres/);
Boulder Day Nursery (http://www.boulderdaynursery.org/)
The Incredible Years: http://www.iik.org/incredible/
Babies Ready for College (http://www.denverchildrenscorridor.org/stories/babies-ready-for-college)
Parent-Child Home Program (http://www.parent-child.org/)

2. Strengthen and develop early childhood networks and infrastructure

As previously stated, there are many early childhood initiatives and programs throughout the state of Colorado that have demonstrated diverse rates of success, quality, effectiveness and support. As a second recommendation, in order to best support quality programs, it is critical for Colorado to have the networks and infrastructure to strengthen these initiatives, ensuring that care is reaching all children, and works to effect a collective impact, a role which some organizations are currently taking on. Without infrastructure and scaffolding, early childhood programs have less ability to significantly "move the needle" and make a significant impact in the zero to three population.

Two promising approaches have been identified in the state of Colorado. First, the *Temple Hoyne Buell Foundation*, an organization that focuses on children zero to five, has partnered with and funded various early childhood programs throughout the state. Specifically, the Temple Hoyne Buell Foundation strives to support: "the positive development of children through grants and partnerships with other sectors of [the] community" (Temple Hoyne Buell Foundation, 2013). Second, the Colorado Early Childhood Leadership Commission has created 31 councils in Colorado that focus on early childhood care and education. Both approaches represent an emerging network for early childhood in Colorado.

Further, in interviews conducted for this report, Temple Hoyne Buell Foundation's Executive Director, Susan Steele, and Program Office, Laura Carlson, suggested that what is needed most in the Colorado landscape is to strengthen and develop early childhood networks and infrastructure. Steele explained,

> *I would invest in infrastructure [because] it would be best for improved outcomes. [We need] well-educated trained people to lead trainees, people to provide mentoring, people who have the savvy to take good programs to scale, [and] ways to collect and analyze data to make system-wide improvements. Those are all infrastructure things.*

This systematic approach would help maximize available resources (e.g., trained staff, programs, educational materials) while ensuring that early childhood education services would not be duplicated throughout the state. In addition, such an approach could improve the referral of services offered throughout the state. For example, if Organization A is already trusted among family, friends and neighbor communities in the state, Organization B could partner with Organization A to more effectively reach this community. In fact, Provan and Millard (1995) found that when individuals access services, they rely on the coordinated efforts and resource sharing of multiple agencies. In addition, many agencies may have their own agendas, service orientations and funding services that may not always line up with the complex needs of the populations that they serve (Provan, Veazie, Staten, Teufel, & Shone, 2005). Furthermore, organizations may be unaware of the types of services similar agencies provide (Valente, 2007). Therefore, strategies that can strengthen the availability of existing services may be critical for making an impact.

The importance of developing this type of infrastructure was noted in the research as well as in a number of expert interviews. In particular, interviewee Dr. Neal Halfon advocated the critical need to approach solutions by building coordinated, comprehensive ongoing systems. Halfon explained,

> *Unfortunately, the call for universal, comprehensive and coordinated approaches to improving child well-being has become an all-too-familiar refrain with little to show for itself. The fact is*

that we know a tremendous amount already about what it takes to construct a bridge from birth to school that will set a child off on an optimal life trajectory. We know what that scaffolding looks like, how it must be engineered and what the building codes must be, yet we are too often stymied when it comes to making sure that our codes are updated and that our scaffoldings are built to the specifications that our children so desperately need in communities across the U.S. (p. 2)

In a recent report from FSG (2013), researchers encountered similar findings, noting,

Experts interviewed for [the Markers That Matter] report indicated a range of issues that have contributed to a fragmented field, including a lack of shared identity or common purpose; a sense of competition, particularly for funds; and a lack of awareness of opportunities for alignment (Preskill, Jones, & Tengue, p. 9).

Another promising application of this approach is the *Transforming Early Childhood Community Systems (TECCS) Initiative*, directed by Halfon.[41] This systems approach strives to improve the school readiness of children who are zero to five by engaging a diverse group of stakeholders in strategic planning strategies. As is evidenced in its name, TECCS was founded on the premise that children are embedded in systems of care (e.g., families, educational systems, social service organizations, local governments). Halfon (2013) explains, "Only when we take a systems perspective, with attention to the interacting parts contributing to emergent system properties, can we discover ways to shift the curve by improving outcomes for an entire population of children" (p. 2)

3. Optimize delivery methods and approaches

How can we invest in expensive education reforms that require stronger performance standards and financial incentives to attract and retain talented teachers for grades K-12, while we tolerate inadequate training and poor compensation for the providers of early care and education throughout the important preschool years? … How can we all agree about the critical importance of supporting families, yet do so little as a society to provide an economic cushion to help parents delay their return to work after the birth of a baby, and then not assure access to decent quality child care when they re-enter the workforce? – Jack Shonkoff (2004)

---

[41] TECCS consists of four core components: 1) measurement and mapping, 2) community engagement, 3) place-based systems improvement, and 4) a shared learning network. TECCS uses an early development instrument (EDI), a tool that measures early childhood development outcomes (e.g., physical health and well-being, social competence, language and cognitive skills) to strengthen community impact. Through TECCS, communities can work together to systematically identify, address and resolve early childhood development issues in a particular region. For example, in Tulsa, Oklahoma, TECCS identified a school in which students on average scored lower in emotional maturity. In response, the community developed a toxic stress training for these youth at risk. While TECCS is a new program in the United States, it currently has 30 sites throughout the nation (e.g., Texas, California, New York, Ohio). TECCS holds great promise in the field of early childhood development; however, it may be too early to determine the effectiveness of these programs in the United States.

To ensure that care is reaching those who need it the most in the best possible way, this third recommendation seeks high-impact, economically feasible approaches to optimizing program delivery and approach. While various types of interventions have been developed to address the cognitive, emotional, social, motor skills, and moral needs of children zero to three, to date, no "quick fix" or "magic bullet" has been developed in the realm of early childhood intervention to lead directly to early childhood success. Moreover, it is often difficult to understand why some programs are able to optimize success while others fail. Indeed, Shonkoff and Phillips (2000) conclude in their review of the literature that it may be difficult to determine why some interventions are more effective than others.

As a result, Shonkoff (2004) explained, "Therefore, is not as much about cost as it is about cost-effectiveness and return on investment, or doing the right thing at the right time in order to have the greatest impact on a child's future" (p. 3). In particular, in recent years, the *cost-effectiveness* of parent training programs has become a focus for at-risk families (Bert, Farris, & Borkowski, 2008; Nixon, 2002; Sanders, Mazzucchelli, & Studman, 2004). In fact, there are a number of methods through which researchers, practitioners and policy makers can package early childhood interventions that target children ages zero to three to reduce short- and long-term costs, including parent education programs and home visitation, both discussed in previous sections of this report. These two methods are highlighted because of their potential to advance the early childhood development field in an effective and economically feasible direction.

In addition to these two methods, below is a list of additional approaches that may be easy to sustain and cost-effective to create and implement:

- **Online training.** Bert, Farris, and Borkowski (2008) found that, for at-risk mothers, web-based training was just as effective as face-to-face education in terms of increasing parenting knowledge. In addition, the more at-risk mothers engaged with the materials, the less depression and anxiety they reported.
- **Online blogs/Websites**—These approaches provide an interactive forum for parents and caregivers to access information that is relevant to families and their needs. *Note on Internet-based approaches and access disparities.* While disparities exist in Internet access, which limits access to online training, local resources such as libraries and community centers regularly offer no-fee web browsing and programming focused on information technology education.
- **Self-instruction literacy programs**—In this approach, parents are offered instructional literacy materials to promote learning. Self-instruction training runs similarly to online training, but does not require the use of a computer or Internet connection.
- **Book publishing**—While research trends discovered through JVA research did not lead explicitly to the consideration of the role of published children's books, JVA did research basic cost structure of pursuing mass distribution publishing.
  - *Standard print publishing at high quantity.* Dog Ear Publishing (dogearpublishing.net) will produce a standard, full-color, 48-page, paperback, perfect bound, 8.5 x 11 trim price book for $4.41 (based on a base fee of $2.25 per unit and a charge of $0.045 per page). Shorter books (e.g., targeted at children) would cost less, but would not drop below the base fee cost.
  - *Electronic self-publishing.* In addition, publishing consultant Carla King (2011) recommends that self-publishing is most cost-effective when creating e-books, which

she estimates are about $500 to produce. The books could then be distributed for free using Kindle e-book, Smashwords or CreateSpace. Although this option is significantly cheaper, it requires both an electronic reading device and an Internet connection (to download the book), making it likely that it would be less accessible to lower-income populations.

Focus on the professional development of providers. In order to pursue optimal program delivery, it is imperative to ensure that programs are being implemented by quality providers. To do this, many interviewees recommended focusing on the professional development of providers. In particular, interviewees focused on FFN providers who may be poorly trained in terms of health and safety and may not understand the importance of language development in the cognitive, emotional and social development of children zero to three. In addition, interviewees were concerned with how providers lack incentives (e.g., salary, loan repayment, accessible classes) in their professional development. For example, one interviewee shared, "It's all about professional development in early childhood programs…[unfortunately] there's not enough money and professional development for teachers." Another interviewee explained,

> There are other programs that take FFN and go through licensing, but I think that might be a smaller percentage. I think universally everyone wanted training or support so how do you open up training so people can take CPR and have a home safety kit like a fire extinguisher… just to provide another level of safety. Providers need access to [early childhood] books and brain development [materials]. When you know better you do better. Everyone wants to do better. FFN care so deeply about the children in their care.

Engage FFN providers and children. Furthermore, to truly engage *all* children, interventions must consider how to include children who receive FFN care. This group may be difficult to identify and access; however, the majority of Colorado children receive care from such providers. Children in FFN care, thus, represent a significant and often overlooked subpopulation within the zero to three population. As interviewees asserted,

> I think that FFN providers are an under-recognized group of providers for children in the state of Colorado.

> Quality [of FFN] is totally unknown; in some cases can be good, in others, could be absolutely horrendous. We need more grassroots outreach—we need to reach FFN and then reach in a culturally competent way.

> Family-friend-neighbor care is where a huge proportion of children are, yet we are very constrained in being able to work directly with that population. They're not licensed, and it's informal [so] there's liability [but] whether you approve or not, it's there. There should be resources around quality, health and safety.

> There is not enough funding there. It's a hard population to reach as well. You can't run a database to find them. It's more intensive and more expensive to reach out to that population. At the same time, a lot of kids are in that type of care.

4. Evaluate and measure program effectiveness and success

By focusing on program accountability and on whether the dollars that are being spent are actually producing positive outcomes, leaders can help promote public support and buy-in. Designing and implementing a data collection and evaluation system should be a priority early in the process. –Julie Cohen, Barbara Gebhard, Ann Kirwan, & Brandy Jones Lawrence (2009)

The fourth recommendation is to encourage a stronger focus on evaluating and measuring program effectiveness and success. Demonstrating the importance of this recommendation, the American Academy of Pediatrics (2005) found that although consistent, high-quality care outside of the home is becoming more necessary for many families, most child care centers in the U.S. are actually of "poor" or "mediocre" quality. Efforts to improve quality through public policy and licensing standards still result in only minor shifts in outcomes. Improved program evaluation and measurement could shed light onto the key factors driving programmatic success (or preventing it).

> "Really, early childhood development is invisible [because] the impacts are too far down the line. We need to make it visible, and we need to start measuring it earlier" –Interviewee

Based on the literature, policy findings and overall climate in Colorado, it is clear that we *can* improve early childhood outcomes through programming and intervention (Shonkoff & Phillips, 2000). However, the quality and impact of early childhood intervention programs may be challenging to measure. Research has shown this difficulty to be pervasive for a number of reasons. The type of quality (i.e., program, provider, implementation) may need to be defined in terms of evaluating and measuring child success. Specifically, Bakermans–Kraneburg and colleagues (2003) argue that it may be difficult to evaluate the best timing of interventions because such a comparison would require a number of different age cohorts. In addition, Owen and Mulvihill (1994) list a number a methodological concerns in evaluating parent education and support programs: (1) translating the goals of the program into researchable questions, (2) the use of comparison groups, (3) sample size, and (4) sample attrition for longitudinal studies.

These limitations can be surmounted; however, researchers and practitioners may need to account and plan for such methodological issues. A number of existing metrics exist for measuring and evaluating early childhood programming (see Appendix E for a list of metrics that may guide future early childhood intervention research). It may also be helpful to measure the effectiveness of early childhood interventions via child and parent outcomes (Owen & Mulvihill, 1994). In addition, future researchers and practitioners may need to describe in detail how they implemented their programs to better identify effective strategies.

Despite potential challenges, it is important to engage in more robust evaluation and measurement to understand the factors involved in program effectiveness and success. Shonkoff and Fisher (in press) cite "the complex relationship between science and politics" as a reason for the very slow scaling up of effective early childhood programs and phasing out of ineffective programs (p. 13). As such, a central leader in program evaluation and measurement may be needed not only to help programs more

effectively measure outcomes and understand key factors and barriers to success, but also to mediate tensions between scientific and political realms.

5. Facilitate program sustainability and build community capacity

Dunst and Trivette (2009) make the case that the goal of all early childhood intervention programs should be to: "Support and strengthen caregivers' (practitioners, parents, or both) confidence and competence to promote and enhance young children's interactive competencies, optimizing their learning and development" (p. 40). Following this perspective, a fifth recommendation is to encourage practitioners, researchers and policy makers to consider program sustainability and community capacity building in the development of effective early childhood education interventions. This area of research has received less attention in the context of early childhood intervention programs. Therefore, this section describes program sustainability and community capacity strategies more generally as they may relate to early childhood development programs.

Program sustainability. First, the sustainability of early childhood development programs and interventions is an important factor. Researchers agree on some of the structural factors that make programs more sustainable, including the fidelity of program implementation (Anderson et al., 2008; Pluye, Potvin, Denis, & Pelletier, 2004; Rabin et al., 2008), the level of support within existing community infrastructure (Johnson, Hays, Center, & Daley, 2004; Savaya et al., 2008), and systemic openness to change (Edwards, 2006).[42] In addition, there are elements that help the sustainability of low-income families in particular; for example, Shonkoff and Phillips (2000) found that early childhood development programs that offer a parent and child component were more likely to be sustained over time for low-income families. However, even with these findings, there is work to be done to determine how programs can be more sustainable, and metrics to measure sustainability are not readily available. As such, more research needs to be done within this area.

Community capacity building. Second, community capacity building is important to improving both sustainability and also successful implementation. Community capacity building involves collaborating with existing organizations in order to share resources and support the sustainability of an innovation. SAMSHA's SMF model describes the importance of building capacity and offers some suggestions to facilitate this process. Altman (1995) recommended strengthening community capacity by making sure that collaborating organizations have the technical and professional experience necessary to assist in the sustainability of an innovation and that the partnership was mutually beneficial. Gruen and colleagues (2008) offer some ideas that may promote community capacity: (1) increase community awareness, (2) tailor interventions, (3) provide clear objectives and performance indicators, and (4) provide volunteer training and incentives to support an innovation. Additionally, Evashwick and Ory (2003) suggest that programs will be more likely to be maintained if such programs clearly address a community need. Therefore, in terms of community capacity building for early childhood development

---

[42] Regarding this final factor, Edwards (2006) contends that "Sustaining the long-term benefits of successful interventions involves change at individual, organizational, and institutional levels, as organizations adopt innovations and effective approaches are diffused into other parts of the system" (p. 45).

interventions, it may be critical to partner with existing communities to best identify and address the needs of the community. One potential partner in this endeavor may be network of 31 Early Childhood Councils, discussed earlier in this report, which help connect resources and build infrastructures for Colorado's youngest children and their families. Colorado started the councils as a way to infuse seed money into the communities to use as needed.

Considering the nuances of community capacity building, it becomes clear there a need for a facilitator of program sustainability and community capacity building. An organization fulfilling this role could develop research-supported best practices in program sustainability and serve as a resource to build communities' capacity to collaborate, share resources and support sustainability. Alternatively, this role could be filled by a less direct approach and instead focus on building local and self-directing networks that share resources and time to collectively build capacity to improve zero to three efforts.

6. Promote research and development innovation

If you keep on doing what you've always done, you'll keep on getting what you've always got." –W. L. Bateman

We know [the problems] and we know some solutions, but why haven't we done better? Why haven't we seen more progress? The issue isn't whether the problem is real or not [rather], it's why our solutions don't produce a bigger impact, or why the more effective programs aren't as effective when we increase the scale. People keep talking about how many kids we're serving and who is getting left out, [but] rather than talking about making the intervention better, we need to focus on the magnitude of the impact. –Jack Shonkoff

Finally, to ensure that the interventions employed are achieving the highest possible magnitude of impact, a final recommendation is to continue to promote research and development innovation in the field of early childhood education. Typically, most research and development focuses on the innovation,[43] implementation and improvement of products and services. There is no question that a variety of early childhood development programs and interventions have been created and disseminated. However, such programs may be grounded too heavily in strategies of the past or may not be making a significant enough magnitude of impact. Thus, in order to make a more meaningful impact, the final recommendation is to continue to promote research and development innovation by taking calculated risks and challenging existing approaches in the field.

> "As far as funding mechanisms, the big thing now are the social innovation funds…[other states are] launching these and they could be the biggest game changer out there. I hope Colorado jumps in and tries to pilot this." –Interviewee

---

[43] An innovation is an idea, object or practice that is perceived as being new by an individual or group (Rogers, 1995).

The importance of promoting research and development innovation was noted in the research as well as in a number of expert interviews. In particular, interviewee Dr. Jack Shonkoff stressed the critical importance of investing in new innovation. To find more impactful strategies, Shonkoff advocates for the critical importance of promoting research and development innovation. During an interview for this report, Shonkoff explained,

> I think part of the problem is that we haven't had many new ideas…I think if we fully funded the best of what we have right now, clearly it would make an impact, but I don't think that it would be a big enough impact. Clearly we have interventions that shift the curve, but the magnitude of their impact or ROI relative to the problem that kids face is still small. So we need to fund new ideas and more effective interventions, not just statistically significant interventions.

Research and development innovation encompasses a need for radical improvement in existing ideas and the creation of new types of programs that can reach a more diverse audience. Shonkoff (2013) encourages the development of environments that foster learning from successes as well as failures. Innovation can stem from a number of environments and take a variety of forms. What may be most important in the development of effective interventions are innovations that can be readily adaptable and mindsets that are open to new challenges and ideas.

One resource that is working to catalogue new ideas in early childhood development research is Shonkoff's *Frontiers of Innovation* initiative*.* Frontiers of Innovation focuses on ways to improve strategies for change and create the infrastructure for a community in which professionals can learn from one another. So far, approximately 500 stakeholders have joined this initiative. This research and development innovation makes new ideas and strategies more accessible to the wider early childhood development community while providing a place for stakeholders to share best practices with each other.

Another resource that may help researchers, practitioners and policy makers identify evidence-based intervention for children zero to three is *SAMHSA's National Registry of Evidence-based Programs and Practices (NREPP).* NREPP provides detailed information for over 290 empirically sound interventions in a diverse variety of domains. For example, searching the term "infant" in the database resulted in 10 related interventions. It should be noted that NREPP does not provide an exhaustive list of all evidence-based programs; however, this resource may provide a useful starting place for interested stakeholders. Furthermore, NREPP may help stakeholders identify evidence-based interventions in the future by providing relevant criteria to guide the process.

In pursuit of effective innovations, *Diffusions of Innovations Theory* (DIT; Rogers, 1995) offers a solid theoretical framework toward understanding the adoption, implementation and sustainability of effective innovations. Indeed, DIT has successfully been applied to strengthening community-based interventions in a variety of settings (Backer & Rogers, 1998; Bertrand, 2004; Pagoto, Kantor, Bodenlos, et al., 2008). In the context of strengthening early childhood development programs, DIT offers a mechanism to improve the development of evidence-based innovations and promote the adoption and implementation of new ideas in the field. In some ways, DIT addresses Shonkoff's (2013) suggestion for radical improvement by providing a framework that can increase the likelihood that new ideas will be adopted.

According to Rogers (2003), there are four main elements that promote the successful diffusion of an idea: (1) *the innovation* (i.e., characteristics or attributes of an idea), (2) *communication channels* (i.e., how the idea is disseminated), (3) *time* (i.e., rate of adoption), and (4) t*he social system* (i.e., environmental context supporting or inhibiting the idea). Each of these elements can determine the short- and long-term success of early childhood interventions and strategies.

In addition, there are five key attributes that can influence the likelihood that an idea will be adopted:
1. *Relative advantage*—the degree to which an idea is viewed as being superior to other ideas that can fulfill the same needs
2. *Compatibility*—the degree to which an idea is consistent with existing values and mental models of the potential adopter
3. *Complexity*—the degree to which an idea is consistent with existing values and mental models of the potential adopter
4. *Observability*—the degree to which the results of the innovation can be seen in action
5. *Triability*—the degree to which an innovation is able to be tried on a trial basis and positive correlates with adoption

Previous studies have found that relative advantage, compatibility and complexity may best impact innovation adoption (Rogers, 2003). In other words, innovations that are perceived as better than existing practices, are familiar to adopters' existing values and mental models, and are easy to use are more likely to be adopted and disseminated. For example, Dunst and Trivette (2009) argue that poor intervention fidelity may stem from innovations that are too complex for parents to implement effectively. In particular, Carroll and colleagues (2007) suggest that simple interventions produce higher fidelity because such interventions result in fewer response barriers. Furthermore, Thompson and colleagues (1993) argue that interventions for low-income families need to be as accessible as possible. These researchers recommend offering programs at multiple locations, at different times, and providing additional sessions if trainings are missed.

Finally, a central distribution system—where resources and research can be matched with on-the-ground leaders (e.g., providers and policymakers)—is likely needed to improve the effectiveness of this recommendation. This system would help ensure that empirically supported information is distributed to local providers and that it can reach to all children within the distribution area (e.g., region, state).

CLOSING REMARKS

This report was designed to assist the Hemera Foundation in better understanding the research, programmatic, policy and funding environment surrounding early childhood development. In this process, JVA conducted a thorough review of scholarly research on key issues and theories that are important to the zero to three population; gathered on-the-ground data about the factors driving policy and decision-making in both national and local (i.e., Colorado) contexts; and interviewed leading local and national experts and practitioners in diverse fields related to early childhood development.

Through this data gathering and analysis process, it was clear that a broad array of fields—science, medicine, education, psychology and policy, to name a few—agree that the earliest years of a child's life (i.e., zero to three) represent a critical period in development, and set a foundation for all future development. In addition, there are many important actors (e.g., parents, friends, pediatricians, care providers, researchers, policy makers, etc.) who play key roles in the process of supporting children and families during these years. As such, there is a substantial need for a direct focus on the zero to three age group, as well as to engage the many actors who can contribute to innovations in research, funding, program effectiveness and sustainability, and policies in order to dramatically impact the future of zero to three.

REFERENCES

Ainsworth (1969). Maternal sensitivity scales. Retrieved from
http://www.psychology.sunysb.edu/ewaters/552/senscoop.htm

Ainsworth, M. D. S., & Bolby, J. (1991). An ethological approach to personality development. *American Psychologist, 46*, 331–341.

Altman, D. G. (1995). Sustaining interventions in community systems: On the relationship between researchers and communities. *Health Psychology*, *14*, 526–536.

American Academy of Pediatrics (2005). Policy statement: Quality early education and child care from birth to kindergarten. *Pediatrics*, *115*, 187–191.

American Montessori Society (2013). Introduction to Montessori. Retrieved from
http://www.amshq.org/Montessori-Education/Introduction-to-Montessori.aspx

American Speech-Language-Hearing Association (2013). Sensorineural hearing loss. Retrieved from
http://www.asha.org/public/hearing/sensorineural-hearing-loss/

Anderson, P. (2002). Assessment and development of executive function (EF) during childhood. *Child Neuropsychology*, *8*, 71–82

Andersen, P. A., Buller, D. B., Voeks, J. H., Walkosz, B. J., Scott, M. D., Cutter, G. R., & Dignan, M. B. (2008). Testing the long-term effects of the Go Sun Smart worksite health communication campaign: A group-randomized experimental study. *Journal of Communication, 58,* 447–471

Atchison, B., & Tackett, C. (2013). The Colorado Early Childhood Investment model. Early Childhood Leadership Commission. Retrieved from
http://earlychildhoodcolorado.org/inc/uploads/MiniPP_Presentation_Investment_Model_Jan2013.pdf

Backer, T. E. & Rogers, E. M. (1998). Diffusion of innovations theory and worksite AIDS programs. *Journal of Health Communication*, *3(*1), 17–28.

Baker, R., Hupfeld, K., Taske, P., & Hill P. (2013) Turnaround in Colorado: Partnering for innovative reform. Retrieved from
http://www.cde.state.co.us/sites/default/files/documents/turnaround/download/schoolturnaroundreport.pdf

Bakermans-Kranenburg, M. J., van Ijzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analysis of sensitivity and attachment interventions in early childhood. *Psychological Bulletin, 129,* 195–215.

Barnett, W. S. (2000). Economics of early childhood intervention. In S. J. Meisels (Ed.), *Handbook of early childhood intervention* (pp. 589–610). New York, NY: Cambridge University Press

Beckwith, L. (2000). Prevention science and prevention programs. In C. H. Zeanah (Ed.), *Handbook of infant mental health* (pp. 439–456). New York: Guilford Press.

Berrueta-Clement, J. R., Schweinhart, L. J., Barnett W. S., Epstein, A. S., & Weikart, D. P. (1984) Changed lives: The effects of the Perry Preschool Program on youth through Age 19. High/Scope Educational Research Foundation.

Berry, D., Blair, C., Willoughby, M., & Granger, D. A. (2012). Salivary alpha-amylase and cortisol in infancy and toddlerhood: Direct and indirect relations with executive functioning and academic ability in childhood. *Psychoneuroendocrinology*, *37*, 1700–1711.

Bert, S. C., Farris, J. R., & Borkowski, J. G. (2008). Parent training: Implementation strategies for Adventures in Parenting. *The Journal of Primary Prevention*, *29*, 243–261.

Bertrand, J. T. (2004). Diffusion of innovations and HIV/AIDS. *Journal of Health Communication*, *9*(S1), 113-121.

Blair, C., Granger, D. A., Willoughby, M., Mills-Koonce, R., Cox, M., Greenburg, M. T...the FLP Investigators. (2011). Salivary cortisol mediates effects of poverty and parenting on executive functions in early childhood. *Child Development, 82*, 1970–1984.

Blair, C., & Raver, C. C. (2012). Child development in the context of adversity: Experiential canalization of brain and behavior. *American Psychologist*, *67*, 309.

Bodrova, E., & Leong, D. J. (2009). Tools of the mind: A Vygotskian-based early childhood curriculum. *Early Childhood Services: An Interdisciplinary Journal of Effectiveness*, *3*, 245–262.

Bodrova, E., Leong, D. J., & Akhutina, T. V. (2011). When everything new is well-forgotten old: Vygotsky/Luria insights in the development of executive functions. *New Directions for Child and Adolescent Development*, *2011*(133), 11–28.

Bolby, J. (1988). *A secure base: Parent-child attachment and healthy human development*. New York: Basic Books

Bonnier, C. (2007). Evaluation of early stimulation programs for enhancing brain development. *Foundation Acta Paediatrica, 97*, 853–858.

Boushey, H., & Wright, J. (2004). Working moms and child care. (Data Brief No. 3). Washington, DC: Center for Economic and Policy Research. Retrieved from www.researchconnections.org/location/ccrca3636

Bradley, R. H. & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, *53*, 371–399.

Brazelton Touchpoints Center (2013). Touchpoints and home visitation. Retrieved from http://www.brazeltontouchpoints.org/about/evidence-based-research/touchpoints-home-visitation/

Bretherton, I. (1992). The origins of attachment theory: John Bolby and Mary Ainsworth. *Developmental Psychology, 28*, 759–775.

Brooks-Gunn, J., Berlin, L. J., & Fuligni, A. S. (2000). Early childhood intervention programs: What about the family? In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 549–588). New York, NY: Cambridge University Press.

Brown, S. (2009). *Play: How it shapes the brain, opens the imagination and invigorates the soul.* New York: Penguin Group.

Campbell, F. A., Helms, R., Sparling, J., & Ramey, C. T. (1998). Early-childhood programs and success in school: The Abecedarian Study. In W. S. Barnett & S. S. Booncock (Eds.), *Early care and education for children in poverty: Promises, programs, and long-term results* (pp. 145–166). Albany, NY: State University of New York Press.

Carlson, E. A., Stroufe, L. A., Collins, W. A., Jimerson, S., Weinfield, N., Henninghausen, K., & Meyer, S. (1999). Early environmental support and elementary school adjustment as predictors of school adjustment in middle adolescence. *Journal of Adolescent Research, 14*, 72–94.

Carroll, C., Patterson, M., Wood, S., Booth, A., Rick., J., & Balain, S. (2007). A conceptual framework for implementation fidelity. *Implementation Science, 2*, 2–40.

Center on the Developing Child at Harvard University (2007). A science-based framework for early childhood policy: Using evidence to improve outcomes in learning, behavior, and health for vulnerable children. Retrieved from http://www.developingchild.harvard.edu

Center on the Developing Child at Harvard University (2010). The foundations of lifelong health are built in early childhood. Retrieved from http://www.developingchild.harvard.edu

Center on the Developing Child at Harvard University (2011). Building the brain's "air traffic control" system: How early experiences shape the development of executive function: Working paper No. 11. Retrieved from www.developingchild.harvard.edu

Cerezo, M. A., Dasi, C., & Ruiz, J. C. (2013). Supporting parenting of infants: Evaluating outcomes for parents and children in a community-based program. *Evaluation and Program Planning, 37*, 12–20.

Child Care and Early Education Research Connections (2013). Early Head Start research and evaluation, 1996–2010. Mathematica Policy Research. Retrieved from http://www.researchconnections.org/childcare/resources/2925

Child Find (2013). About Child Find. Retrieved from http://www.childfindidea.org/overview.htm

Cohen, J., Gebhard, B., Kirwan, A., & Lawrence, B. J. (2009). Inspiring innovation: Creative state financing structures for infant-toddler services. Retrieved from http://main.zerotothree.org/site/DocServer/Ounce_brief_Oct6B.pdf?docID=9642

Colorado Children's Campaign (2013a). *KIDS COUNT in Colorado!* Retrieved from http://www.coloradokids.org/kidscount2013/kidscount2013.html

Colorado Children's Campaign (2013b). Ready, set, go! Investing in infants and toddlers. Set: Birth and healthy development. Retrieved from http://www.coloradokids.org/data/publications/

Colorado Department of Education (2013). Colorado's next generation Quality Rating & Improvement System (QRIS). Retrieved from http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22Next+Generation+Fact+Sheet.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251864031155&ssbinary=true

Colorado Department of Education, Office of Learning and School Readiness (2012). Supporting school readiness: Building a foundation for success. CDE Factsheet. Retrieved from http://www.cde.state.co.us/sites/default/files/SchoolReadinessFactSheet_0.pdf

Colorado Family, Friend, and Neighbor Community (2013). School readiness for all: The contribution of Family, Friend, and Neighbor care in Colorado. Retrieved from http://www.coloradokids.org/data/publications/family-friend-and-neighbor-care.html

Corel, J. L. (1975). *The postnatal development of the human cerebral cortex.* Cambridge, Massachusetts: Harvard University Press.

Cowan, P. A., & Cowan, C. P. (2002). Interventions as tests of family systems theories: Marital and family relationships in children's development and psychopathology. *Development and Psychopathology, 14*, 731–759.

De Wolff, M. S., & Van Ijzendoorn, M. H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child development*, *68*, 571–591.

Dozier, M., Higley, E., Albus, K. E., & Nutter, A. (2002). Intervening with foster infants' caregivers: Targeting three critical needs. *Infant Mental Health Journal*, *23*, 541–554.

Dueker, G., Portko, S., & Zelinsky, M. (2011). Meaningful touch in naturalistic contexts: Haptic input as a cue to the referent of infant directed speech. *Cognition, Brain, Behavior*, *15*, 449–484.

Duncan, G. J., & Brooks-Gunn, J. (2000). Family poverty, welfare reform, and child development. *Child Development*, *71*, 188–196.

Duncan, G. J., Brooks-Gunn, J., & Klebanov, P. K. (1994). Economic deprivation and early childhood development. *Child development*, *65*, 296–318.

Dunst, C. J., & Trivette, C. M. (2009). Using research evidence to inform and evaluate early childhood intervention practices. *Topics in Early Childhood Special Education, 29*, 40–52.

Early Childhood Colorado (2009). The Framework in Action State Plan 2010-2012. Retrieved from http://earlychildhoodcolorado.org/inc/uploads/ECC_Framework_in_Action_State_Plan_2010-2012.pdf

Early Childhood Leadership Commission (2011, November). Colorado early childhood needs assessment. Retrieved from http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=ContentDisposition&blobheadername2=ContentType&blobheadervalue1=inline%3B+filename%3D%22Colorado+Early+Childhood+Needs+Assessment.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251821727266&ssbinary=true

Engdahl, T. (2013, May 21). Hick signs school finance reform bill. *EdNews Colorado*. Retrieved from http://www.ednewscolorado.org/news/capitol-news/hick-signs-school-finance-reform-bill

Edwards, R. W., Jumper-Thurman, P., Plested, B. A., Oetting, E. R., & Swanson, L. (2006). Community readiness: Research to practice. *Journal of Community Psychology, 28*, 291–307.

Egeland, B., Weinfield, N. S., Bosquet, M., & Cheng, V. K. (2000). Remembering, repeating, and working through: Lessons from attachment-based interventions. *Handbook of Infant Mental Health*, *4*, 35–89.

Evashwick, C., & Ory, M. (2003). Organizational characteristics of successful innovative health care programs sustained over time. *Family & Community Health*, *26*(3), 177–193.

Farran, D. C. (2000). Another decade of intervention for children who are low income or disabled: What do we know now? In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed., pp. 510–548). New York, NY: Cambridge University Press.

Feldman, R., Masalha, S., & Alony, D. (2006). Microregulatory patterns of family interactions: Cultural pathways to toddlers' self-regulation. *Journal of Family Psychology*, *20*, 614–623.

Finello, K.M & Poulsen, M.K. (2011). Unique system of care issues and challenges in serving children under age 3 and their families. *American Journal of Community Psychology, 49*, 417–429.

Fox, N. A., Leavitt, L. A., & Warhol, J. G. (Eds.). (1999). *The role of early experience in infant development*. Johnson & Johnson Pediatric Institute.

Greenberg, M. T. (1999). Attachment and psychopathology in childhood. In M. T. Greenberg, J. Cassidy, & P. R. Shaver (Eds), *Handbook of attachment: Theory, research, and clinical applications* (pp. 469–496). New York, NY, US: Guilford Press.

Grossmann, K., Grossmann, K. E., Fremmer-Bombik, E., Kindler, H., Scheurer-Englisch, & Zimmerman, P. (2002). The uniqueness of the child-father attachment relationship: Fathers' sensitive and challenging play as a pivotal variable in a 16-year longitudinal study. *Social Development, 11*, 307–331.

Gruen, R. L., Elliot, J. H.,Nolan, M. L., Lawton, P. D., Parkhill, A., McLaren, L., & Lavis, J. N. (2008). Sustainability science, an integrated approach for health-programme planning. *Public Health, 372*, 1579–1589.

Guibert, S. (2013, January 22) Modern parenting may hinder brain development, research shows. *University of Notre Dame, Department of Psychology.* Retrieed from http://psychology.nd.edu/news/37082-modern-parenting-may-hinder-brain-development-research-shows/

Guralnick, M. J. (2005). Early intervention for children with intellectual disabilities: Current knowledge and future prospects. *Journal of Applied Research in Intellectual Disabilities*, *18*, 313–324.

Halfon, N. (2013). Transforming Early Childhood Community Systems, unpublished internal report.

Harms, W. (2012). U Chicago doctor examines language across socioeconomic levels. *UChicago News*. Retrieved from http://news.uchicago.edu/article/2012/09/26/uchicago-doctor-examines-language-across-socioeconomic-levels

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children.* Baltimore, MD: Brookes.

Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development, 74*, 1368–1378.

Hunziker, U. & Barr, R. (1986). Increased carrying reduces infant crying: A randomized controlled trial. *Pediatrics*, *77*, 641–648.

Iverson, J. M. (2010). Developing language in a developing body: The relationship between motor development and language development. *Journal of Child Language*, *37*, 229–261. doi:http://dx.doi.org/10.1017/S0305000909990432

Johnson, K., Hays, C., Center, H., & Daley, C. (2004). Building capacity and sustainable prevention innovations: A sustainability planning model. *Evaluation and Program Planning*, *27*(2), 135–149.

Kagan, S., & Kagan, M. (2005). Raising smarter children–Creating an enriched learning environment. *Kagan Online Magazine*. Retrieved from http://www.kaganonline.com/free_articles/dr_spencer_kagan/287/Raising-Smarter-Children-Creating-an-Enriched-Learning-Environment

Kaminski, J. W., Valle, L. A., Filene, J. H., & Boyle, C. L. (2008). A meta-analytic review of components associated with parent training program effectiveness. *Journal of Abnormal Child Psychology, 36,* 567–589.

King C. (2011). The easiest, cheapest fastest way to self-publish your book. *PBS.org.* Retrieved from http://www.pbs.org/mediashift/2011/04/the-easiest-cheapest-fastest-way-to-self-publish-your-book097

Knudsen, E. I., Heckman, J. I., Cameron, J. L., & Shonkoff, J. P. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. *Proceedings of the National Academy of Sciences, 103*, 10155–10162.

Kozulin, A., Gindis, B., Ageyev, V., & Miller, S. (2003). *Vygotsky's educational theory and practice in cultural context.* Cambridge: Cambridge University Press.

Kreader, J. L., & Lawrence, S. (2006, September). *Toward a national strategy to improve Family, Friend and Neighbor child care. Report of a symposium.* National Center for Children in Policy. Retrieved from http://nccp.org/publications/pdf/text_676.pdf

Kuhl, P. K. (2011). Early language learning and literacy: neuroscience implications for education. *Mind, Brain, and Education*, *5*, 128–142.

Kuhl, P. K. (2007). Is speech learning 'gated' by the social brain? *Developmental Science,* 10, 110–120.

Lamb, M. E. (1997). Fathers and child development. An introductory overview and guide. In M. E. Lamb (Ed.), *The role of the father in child development* (3rd ed)(pp. 1–18). New York: Wiley.

Leak, J., Duncan, G. J., Li, W., Magnuson, K., Schindler, H., & Yoshikawa, H. (2010, October). Is timing everything? How early childhood education program impacts vary by starting age, program duration, and time since the end of the program. Proceedings from the annual meeting of the Association for Public Policy Analysis and Management, Boston, MA.

Lee, V E., & Burkam, D. T. (2002). Inequality at the starting gate: Differences in achievement as children begin school. Washington, D.C.: Economic Policy Institute.

Leigh, F. F., Vergara, V. B., & Santelices, M. P. (2013). Enhancing early attachment: Design and pilot study of an intervention for primary health care dyads. *Journal of Child Care Health, 17(1)*, 82–91.

Lewis, M., Feiring, C., & Rosenthal, S. (2000) Attachment over time. *Child Development, 71,* 707–720.

Lillard, A. & Else-Quest, N. (2006). The early years: evaluating Montessori education. *Science, 313,* 1893–1894.

Lonigan, C. J., & Phillips, B. M. (2012). Comparing skills-focused and self-regulation focused preschool curricula: Impacts on academic and self-regulatory skills. Proceedings from Society for Research on Educational Effectiveness Conference. Retrieved from https://www.sree.org/conferences/2012s/program/downloads/abstracts/437_2.pdf

Lopata, C., Wallace, N.V., & Finn, K.V. (2005) Comparison of academic achievement between Montessori and traditional education programs. *Journal of Research in Childhood Education, 20,* 5–13.

Love and Logic (2013). Research. Retrieved from http://www.loveandlogic.com/t-research.aspx

Lundahl, B., Risser, H. J., & Lovejoy, C. (2006). A meta-analysis of parent training: Moderators and follow-up effects. *Clinical Psychology Review, 26*, 86–104.

Lupe, T. (2011). Closing the 30 million word gap: A cochlear implant surgeon steps out of the operating room and into the community to better children's language environment. The University of Chicago, Institute for Translational Medicine. Retrieved from http://itm.uchicago.edu/2011/07/29/closing-the-30-million-word-gap/

Luria, A. R. (2002). L.S. Vygotsky and the problem of functional localization. *Journal of Russian and East European Psychology*, *40*, 17–25.

Lyons-Ruth, K., Alpern, L., Repacholi, B. (2008). Disorganized infant attachment classification and maternal psychosocial problems as predictors of hostile-aggressive behavior in the preschool classroom. *Child Development, 64,* 572–585.

Maher, E. J. & Joesch, J. M. (April, 2005). The prevalence and characteristics of child care provided by family, friends, and neighbors. Paper presented at the Society for Research in Child Development Biennial Meeting, Atlanta.

Mahoney, G., Kaiser, A., Girolametto, L., MacDonald, J., Robinson, C., Safford, P., & Spiker, D. (1999). Parent education in early intervention: A call for a renewed focus. *Topics in Early Childhood Special Education, 19(3)*, 131–140.

Mahoney, G., O'Sullivan, P., & Dennebaum, J. (1990). Maternal Perceptions of Early Intervention Services A Scale for Assessing Family-Focused Intervention. *Topics in Early Childhood Special Education*, *10*, 1–15.

Mahoney, G., & Wheeden, C. A. (1997). Parent-child interaction—The foundation for family-centered early intervention practice: A response to Baird and Peterson. *Topics in Early Childhood Special Education*, *17*(2), 165–184.

Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized/disoriented during the Ainsworth strange situation. In M. T. Greenberg, D. Ciccheti, E. M. Cummings (Eds.), *Attachment in the preschool year: Theory, research, and intervention* (pp. 121–160). Chicago: University of Chicago Press.

Middlebrooks, J. S., & Audage, N. C. (2008). The effects of childhood stress on health across the lifespan. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Retrieved from http://www.cdc.gov/ncipc/pub-res/pdf/childhood_stress.pdf

Middlemiss, W., Granger, D. A., Goldberg, W. A., & Nathans, L. (in press). Asynchrony of mother-infant hypothalamic-pituitary-adrenal axis activity following extinction of infant crying responses induced during the transition to sleep. *Early Human Development*.

NAESP (National Association of Elementary School Principals) (2013). Impact of sequestration on federal education programs: Colorado. Retrieved from http://www.naesp.org/sequestration-resource-page

National Center for Children in Poverty (2013). Child poverty. Retrieved from http://www.nccp.org/topics/childpoverty.html

National Center for Infants, Toddlers, and Families. (2013). Behavior and development. Retrieved from: http://www.zerotothree.org/child-development/

National Education Association (2013). Impact of sequestration on federal education progams: Colorado (p. 6). Retrieved from http://www.nea.org/assets/docs/CBPP_Sequester_Impact_States.pdf#page=6

Neufield, S. (2013). Addressing the achievement gap: The Earliest Intervention. *The Atlantic*. Retrieved from http://www.theatlantic.com/national/archive/2013/06/addressing-the-achievement-gap-the-earliest-intervention/277141/

Nixon, R. D. V. (2002). Treatment of behavior problems in preschoolers: A review of parent training programs. *Clinical Psychology Review, 22*, 525–546

Noble, K. G., McCandliss, B. D., and Farah, M. J. (2007). Socioeconomic gradients predict individual differences in neurocognitive abilities. *Developmental Science, 10*, 464–480.

Nurse–Family Partnership (2008). Proven outcomes. Retrieved from www.nursefamilypartnership.org

Ogawa, J., Sroufe, L. A., Weinfield, N. S., Carlson, E., & Egeland, B. (1997). Development and the fragmented self: A longitudinal study of dissociative symptomatology in a non-clinical sample. *Development and Psychopathology, 9*, 855–1164.

Olds, D. L., & Kitzman, H. J. (1993). Review of research on home visiting for pregnant women and parents of young children. *Home Visiting, 3,* 53–92.

Olds, D., Henderson, C. R., Cole, R., Eckenrode, J., Kitzman, H., Luckey, D., Pettitt, L., Sidora, K., Morris, P., & Powers, J. (1998). Long-term effects of nurse home visitation on children's criminal and antisocial behavior: 15-year follow-up of a randomized controlled trial. *Journal of the American Medical Association, 280,* 1238–1244.

Ounce of Prevention (2010). Its possible. Closing the achievement gap in academic performance. Retrieved from http://www.ounceofprevention.org/includes/tiny_mce/plugins/filemanager/files/ClosingTheAchievementGap.pdf

Ounce of Prevention (2013a). Doula program. Retrieved from http://www.ounceofprevention.org/programs/doula.php

Ounce of Prevention (2013b). Home visitation. Retrieved from http://www.ounceofprevention.org/research/pdfs/HomeVisitation.pdf

Ounce of Prevention, (2013c). Research and evaluation. Retrieved from: http://www.ounceofprevention.org/research/research.php

Owen, M. T., & Mulvihill, B. A. (1994). Benefits of a parent education and support program in the first three years. *Family Relations, 43,* 206–212.

Pagoto, S. L., Kantor, L., Bodenlos, J. S., Gitkind, M., & Ma, Y. (2008). Translating the diabetes prevention program into a hospital-based weight loss program. *Health Psychology, 27*, S91–S98.

Pan, B. A., Rowe, M. L., Singer, J. D., & Snow, C. E. (2005). Maternal correlates of growth in toddler vocabulary production in low-income families. *Child Development, 76*, 763–782.

Pinquart, M., FeuBner, C., & Ahner, L. (2013). Meta-analytic evidence for stability in attachments from infancy to early adulthood. *Attachment and Human Development, 15(2), 189–218.*

Pluye, P., Potvin, L., Denis, J. L., & Pelletier, J. (2004). Program sustainability: Focus on organizational routines. *Health Promotion International*, *19*, 489–500.

Porter, T. (2007). Assessing initiatives for Family, Friend and Neighbor child care: An overview of models and evaluations. Retrieved from http://nccp.org/publications/pdf/text_718.pdf

Preskill, H., Jones, N., & Tengue, A. (2013). Markers that matter: Success indicators in early learning and education. Retrieved from http://www.fsg.org/Portals/0/Uploads/Documents/PDF/Success_Markers_Early_Learning.pdf

Protzko, J., Aronson, J., & Blair, C. (2013). How to make a young child smarter: Evidence from the database of raising intelligence. *Perspectives on Psychological Science, 8*, 25–40.

Rampoon C., Tang Y., Goodhouse J., Shimizu E., Kyin M., & Tsien J. (2000). Enrichment induces structural changes and recovery from nonspatial memory deficits in CA1 NMDAR1-knockout mice. Nature *Neuroscience*, *3*, 238–244.

Rabin, B. A., Brownson, R. C., Haire-Joshu, D., Kreuter, M. W., & Weaver, N. L. (2008). A glossary for dissemination and implementation research in health. *Journal of Public Health Management and Practice, 14(2)*, 117–123.

Ramey, C. T., & Campbell, F. A. (1984). Preventive education for high-risk children: Cognitive consequences of the Carolina Abecedarian Project. Ame*rican Journal of Mental Deficiency*, *88*, 515–523.

Rimm-Kaufman, S. E., Pianta, R. C., Cox, M. J. (2000). Teachers' judgments of problems in the transition to kindergarten. *Early Childhood Research Quarterly*, *15*, 147–166.

Rogers, E. (1995). *Diffusions of innovations*. New York: Simon & Schuster.

Rose-Jacobs, R., Black, M. M., Casey, P. H., Cook, J. T., Cuts, D. B., Chilton, M…Frank, D. A. (2008). Household food insecurity: Association with at-risk infant and toddler development, *Pediatrics, 121(1*), 65–72.

Rucker, T. (2010). Promoting school readiness by improving Family, Friend and Neighbor care. National League of Cities Municipal Action Guide. Retrieved from http://www.resourcelibrary.gcyf.org/node/1109

Sanders, M., Mazzucchelli, T., and Studman, L. (2004). Stepping Stones Triple P: The theoretical basis and development of an evidence-based parenting program for families with a child who has a disability. *Journal of Intellectual & Developmental Disability, 29*, 1–19.

Savaya, R., Spiro, S. E., & Elran-Barak, R. (2008). Sustainability of social programs: A comparative case study analysis. *American Journal of Evaluation, 29*, 478–493.

Schumacher, R., & Hoffman, E., (2008). Charting Progress for Babies in Childcare: A CLASP child care and early education project. Retrieved from http://www.clasp.org/babiesinchildcare/recommendations?id=0013

Shaw, D.S., & Vondra, J. (1995). Infant attachment security and maternal predictors of early behavior problems: A longitudinal study of low-income families. *Journal of Abnormal Child Psychology, 23*, 335–351.

Sroufe, L. A., Duggal, S., Weinfield, N. S., & Carlson, E. A. (2000). Relationships, development, and psychopathology. In A. Sameroff, M. Lewis, & S. Miller (Eds.), *Handbook of developmental psychopathology, 2nd Edition* (pp.75–91). New York: Plenum Press.

Shaw, D. S., & Voodra, J. L. (1995). Infant attachment security and maternal predictors of early behavior problems: A longitudinal study of low-income families. *Journal of Abnormal Child Psychology, 23*, 335–352.

Shonkoff, J. P. (2004). Science, policy and the young developing child: Closing the gap between what we know and what we do. Retrieved from http://www.ounceofprevention.org/news/pdfs/shonkoff.pdf

Shonkoff, J. P. (2010). Building a new biodevelopmental framework to guide the future of early childhood policy. *Child Development*, *81*, 357–367.

Shonkoff, J.P., & Fisher, P.A. (in press). Rethinking evidence-based practice and two-generation programs to create the future of early childhood policy. *Development and Psychopathology.*

Shonkoff, J. P., & Phillips, D. A. (Eds.) (2000). *From neurons to neighborhoods: The science of early childhood development.* Washington, DC: National Academy Press.

Snyder, K., Dore, T., & Adelman, S. (2005). Use of relative care by working parents. Snapshots of America's families III No. 23. Washington, DC: Urban Institute. Retrieved from www.researchconnections.org/location/ccrca5978

Sonenstein, F. L., Gates, G. J., Schmidt, S., & Bolshun, N. (2002). Primary child care arrangements of employed parents: Findings from the 1999 National Survey of America's Families (Occasional Paper No. 59). Washington, DC: The Urban Institute. Retrieved from www.researchconnections.org/location/ccrca587Susman-

Spanglar, G., Schieche, M., Ilg, U., Maier, U., & Ackerman, C. (1994). Maternal sensitivity as an external organizer for biobehavioral regulation in infancy. *Developmental Psychobiology*, *27*, 425–437.

Sparks, S. D. (2012, March 9). Tools of the Mind shows lackluster results in experimental trials. *Education Week*. Retrieved from http://blogs.edweek.org/edweek/inside-school-research/2012/03/tools_of_the_mind_shows_lacklu.html

Spiegel, A. (2008, February 28). Creative play makes for kids in control. *National Public Radio.* Retrieved from http://www.npr.org/templates/story/story.php?storyId=76838288

Stebbins, H., & Knitzer, J. (2007). United States health and nutrition: State choices to promote quality. Improve the odds: State early childhood profiles. Retrieved from http://www.nccp.org/publications/pdf/text_725.pdf.

Stein, A., Freel, K., Hanson, A. T., Pacchiano, D., & Eiland-Williford, B. (2013). The Educare Chicago research–program partnership and follow-up study: Using data on program graduates to enhance quality improvement efforts. *Early Education and Development*, *24*, 19–41.

Stephens, H. (2013, February 10). Remarkable woman: Dana Suskind. Surgeon helps children hear, but that's just the beginning. *Chicago Tribune Lifestyles.* Retrieved from http://articles.chicagotribune.com/2013-02-10/features/ct-tribu-remarkable-suskind-20130210_1_cochlear-implant-social-science

Stilman & Banghart (2011). Quality in Family, Friend and Neighbor child care settings. *Child Care and Early Education Research Connections*. Retrieved from http://www.nccp.org/publications/pdf/text_1010.pdf

Suskind, D. L., Leffel, K. R., Hernandez, M. W., Sapolich, S. G., Suskind, E., Kirkham, E., & Meehan, P. (2013). An exploratory study of "quantitative linguistic feedback:" Effect of LENA feedback on adult language production. *Communication Disorders Quarterly*, *34*, 199–209.

Susman-Stilman, A., & Banghart, P. (2008). Demographics of Friend, Family, and Neighbor child care in the United States. *Child Care and Early Education Research Connections*. Retrieved from http://www.nccp.org/publications/pdf/text_835.pdf

Thelen, E., Schnöer, G., Scheier, C., & Smith, L. B. (2001). The dynamics of embodiment: A field theory of infant perseverative reaching. *Behavioral and Brain Sciences, 24*, 1–86.

Thompson, R. W., Grow, C. R., Ruma, P. R., Daly, D. L., Burke, R. V. (1993). Evaluation of a practical parenting program with middle- and low-income families. *Family Relations, 42*, 21–25.

Tough, P. (2012). *How Children Succeed*. New York: Mariner Books, Houghton Mifflin Harcourt.

Tough, P. (2009). Can the right kinds of play teach self-control? *The New York Times*. Retrieved from http://www.nytimes.com/2009/09/27/magazine/27tools-t.html?pagewanted=all&_r=0

Turnbull, H. R., Turnbull, A. P., Wehmeyer, M. L., & Park,. J. (2003). A quality of life framework for special education outcomes. *Remedial and Special Education, 24(2)*, 67–74.

U.S. Department of Education (2004). The condition of education 2004 (NCES 2004-077), Indicator 8. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

U.S. Department of Health and Human Services. (2013). Home visiting evidence of effectiveness: Model reports. Retrieved from http://homvee.acf.hhs.gov/programs.aspx

Weinfield, N. S., Sroufe, L. A., & Egeland, B. (2003). Attachment from infancy to early adulthood in a high-risk sample: Continuity, discontinuity, and their correlates. *Child Development, 71*, 695–702.

The White House (2013) Impact of March 1st cuts on middle class families, jobs and economic security: Colorado. *Sequester FactSheets.* From http://www.whitehouse.gov/sites/default/files/docs/sequester-factsheets/Colorado.pdf

The White House, Office of the Press Secretary (2013, February 13). *Fact sheet President Obama's plan for early education for all Americans.* Retrieved from http://www.whitehouse.gov/the-press-office/2013/02/13/fact-sheet-president-obama-s-plan-early-education-all-americans

Wilson, S. J., & Farran, D. C. (2012). Experimental evaluation of the Tools of the Mind preschool curriculum. Proceedings from Society for Research on Educational Effectiveness Conference. Retrieved from https://www.sree.org/conferences/2012s/program/downloads/abstracts/437_1.pdf

Yazejain, N. & Bryant, D. M. (2012). *Educare Implementation Study Findings–August 2012.* Chapel Hill: Frank Porter Graham Child Development Institute, UNC-CH. Retrieved from http://eln.fpg.unc.edu/sites/eln.fpg.unc.edu/files/FPG-Demonstrating-Results-August-2012-Final.pdf

Zero to Three Policy Center (2007). Early Head Start works. Retrieved from www.zerotothree.org

Zero to Three (2009). Early experiences matter: Making the case for a comprehensive infant and toddler policy agenda. Retrieved from http://www.zerotothree.org/public-policy/policy-toolkit/case_statementsingmar5__2_.pdf

Zero to Three (2010). Parenting infants and toddlers today: Key findings from a Zero to Three 2009 national parent survey. Retrieved from http://www.zerotothree.org/about-us/funded-projects/parenting-resources/keyfindings_hr.pdf

Zero to Three (2013). State baby facts: Colorado. A look at infants, toddlers and their families. Retrieved from http://www.zerotothree.org/public-policy/state-community-policy/baby-facts/colorado-baby-facts.pdf

Zigler, E. F., & Bishop-Josef, S. J. (2006). The cognitive child vs. the whole child: Lessons from 40 years of Head Start. In D. Singer, R. M. Golinkoff, & K. Hirsh-Pasek (Eds.), *Play = Learning: How play motivates and enhances children's cognitive and social-emotional growth* (pp. 15–34). New York: Oxford University Press.

APPENDICES

Appendix A: List of Expert Interviewees (alphabetical)

Bruce Atchison, M.A.	Director, Early Learning Institute at Education Commission of the States
Letty Bass	Executive Director, Chambers Family Fund
Christine Benero, M.A.	President & CEO, Mile High United Way
Clancy Blair, M.P.H.	Childhood Developmental Psychologist, NYU
Emily Bustos, M.U.R.P	Executive Director, Denver Early Childhood Council
Laura Carlson, M.S.	Program Officer, Temple Hoyne Buell Foundation
Darlene DeMarie, Ph.D.	Associate Professor & Program Coordinator for Educational Psychology
Neal Halfon, M.D., M.P.H.	Director, UCLA Center for Healthier Children, Families & Communities
Erica Hoff, Ph.D.	Director, Language Development Lab, Florida Atlantic University
Bill Jaeger, M.A.	Vice President, Early Childhood Initiatives
Lisa Merlino, B.A.	Executive Director, Invest in Kids
Judith Orion, M.A.	Director of Training, The Montessori Institute
Jessie Rasmussen, M.A.	President, Buffet Early Childhood Fund
Nicole Riehl, B.S.	Director of Quality Improvement Initiatives, Denver Early Childhood Council
Diana Romero Campbell, M.A.	Director, School Readiness; Mile High United Way
Lisa Roy, M.A.	Executive Director, Marquez Foundation
Jack Shonkoff, M.D.	Center Director, Center on the Developing Child, Harvard University
Jennifer Stedron, Ph.D.	Executive Director, Early Childhood Leadership Commission, State of Colorado, Office of the Lt. Governor
Susan Steele, B.A.	Executive Director, Temple Hoyne Buell Foundation
Dana Suskind, M.D.	Associate Professor, University of Chicago
Martha Urioste, Ph.D	Education Counselor, Martha M. Urioste, LLC

Appendix B: Expert Interview Protocol

1. To begin, please tell me a bit about yourself and your profession.
    a) What is your particular interest or expertise within early childhood development?

For the next set of questions, you are welcome to focus in on your particular expertise, but we would welcome any relevant topics that may come to mind, or suggestions of people or organizations that would be helpful for us to speak to.

2. Have you noticed any particular trends in how early childhood development is **practiced** in Colorado?
    a) What do you believe is the most promising development in current practices?

3. Have you noticed any particular trends in how **policies** have impacted or could impact early childhood development in Colorado/the nation?
    a) Can you think of any policies we should know about that might be occurring elsewhere? These can be policies that you believe work well or do not work well.

4. Have you noticed any particular trends for **funding** early childhood development projects or organizations?
    a) Are there any particular gaps in funding for this area?
    b) As sequestration continues to constrict certain funding areas, do you think that research on early childhood will be impacted?
        i. Do you believe private philanthropy can have a role in this transition?

5. Thinking about funding as well as other forms of support, what type of **evidence** do you think is needed to more effectively persuade philanthropic partners and policy makers to more fully engage in a focus on zero to three?

6. Who is influencing **decision-making** in the early childhood development focus? This can be on a community, local, state or national level.

7. Do you know of any **evaluation technique** that can be implemented into a program that allows us to understand the brain capacity of a child so to better design programs that fit that child's brain profile?
    a) Do you know the recommended or **"best practice"** evaluation metrics (targeted measurements to monitor growth) specifically for the zero to three spectrum?

8. Can you identify any communities that might not be currently reached by the policies, programs or developments you have mentioned?

9. Do you have any thing else to add or suggestions on whom we should speak to as we develop our research for Hemera? Do you have any other thoughts on how this research should progress in the next month?

Appendix C: Impact of the Sequester

Chart published by National Education Association (2013) with calculations conducted using federal agency budget data and based on an analysis by the Center on Budget and Policy Priorities

Selected Program	Applying CBPP's Estimate		
	Funding Cut ($000)	Students Affected	Potential Job Losses
Grants to Local Educational Agencies (ESEA Title I, Part A)	7,478	10,340	106
School Improvement State Grants (ESEA section 1003(g))	269	230	4
Migrant (ESEA I-C) and Neglected and Delinquent (ESEA I-D)	410	340	6
Impact Aid Basic Support Payments (ESEA VIII section 8003(b))	969	1,000	14
Improving Teacher Quality State Grants (ESEA II, Part A)	1,383	---	20
21st Century Community Learning Centers (ESEA IV-B)	598	1,100	13
Education for Homeless Children and Youths (MVHAA Title VII-B)	33	850	1
Rural Education (ESEA VI-B)	117	2,730	2
English Language Acquisition (ESEA III, Part A)	509	5,660	7
Special Education Grants to States (IDEA-B-611)	7,888	3,830	112
Preschool grants (IDEA-B-619)	247	630	4
Grants for infants and families (IDEA-C)	361	315	5
Vocational Rehabilitation State Grants (RA Title I-A and Title I-C)	2,294	580	8
Career and Technical Education State Grants (Carl D. Perkins CTEA Title I)	748	7,120	11
Adult Basic and Literacy Education State Grants (AEFLA & WIA section 503)	355	760	6
Federal Supplemental Educational Opportunity Grants (HEA IV-A-3)	523	16,390	5
Federal Work-Study (HEA IV-C)	647	7,080	7
Federal TRIO Programs (HEA IV-A-2, Chapter 1)	700	810	7
Head Start (HSA section 639)	4,135	550	266

Appendix D: Description of Programs Included in Crosswalk

Brazelton Touchpoints Center (1996)

Primary reach: A national program with Colorado outreach, focused on prenatal through eight years old.

Theories: Brazelton Touchpoints is an asset-based, family engagement and home visitation model.

Purpose: Brazelton Touchpoints focuses on training early child care professionals and creating partnerships with local providers to partner with families. Brazelton aims to create better relationships between parents and children through professionals that help empower parents to recognize their expertise as their child's first teacher. Local Touchpoint teams are created to create partnerships and collaboration on local levels and provide training to professionals, for the purpose of developing a community-level collaboration with systems of care so all children will be healthy, successful.

Research Support: Brazelton Touchpoints has conducted 10 years of evaluation for effectiveness, applicability and validity. The *Touchpoints Professional Development Report* (2011) shows that training participants gained knowledge of childhood development. The evaluations accessible from Brazelton Touchpoints focus on the growth of the trainers (parents, social workers, doctors) and less on the growth of the child.

Bright Beginnings (1995)

Primary reach: Serving Colorado children and families from zero to three years old. Programs are free to Colorado families and caregivers of children, prenatal to three.

Theories: Bright Beginnings focuses on the Abecedarian Project curriculum, dialogic reading, home visits and parent engagement.

Purpose: Bright Beginnings visits with parents and other caregivers through a three-step program model from prenatal to three years old. Program A focuses on prenatal to one year with emphasis on nurturing and stimulating interactions between parent and child, nutrition, talking and reading to the child, etc. Program B, for one to two years, focuses on how caregivers can talk with, engage and encourage their young children in nutrition, health and language development. Program C, for two to three year olds, focuses on increasing the supportive home environment, development, language and health. Programs are brought to caregivers homes for free and the organization additionally offers group visits. Bright Beginnings partners with organizations statewide to bring services to families across Colorado.

Research Support: This research-based program has received strong empirical support internally and through program evaluation conducted by independent evaluators. For example, Bright Beginnings partnered with The Center for Education Policy Analysis (CEPA) and the OMNI Research Institute to evaluate its program (see brightbeginningsusa.org/evaluation).

Clayton Early Learning Center (1910 approx.)

Primary reach: Colorado-based program that serves children from birth to age five and provides prenatal support. Clayton schools are open to everyone and offer tuition assistance along with Early Head Start and Head Start services.

Theories: The Clayton Early Learning Center focuses on parent engagement, home visitation and skilled teacher preparation.

Purpose: Educare partners with the Clayton Early Learning Center in Denver to deliver preschool-focused school readiness skills and parent empowerment techniques, in addition to providing home-based and center-based preschool programs. Clayton Early Learning Center also offers home visitation with a "Child Family Educator" for prenatal support through the child's development. Through parental empowerment initiatives, Clayton focuses on creating strong relationships between parents, teachers and children to improve family outcomes.

Research Support: In partnership with Educare, The Denver Preschool Program, Head Start and Early Head Start, evaluations have been completed at the Clayton Early Learning Center. Clayton also produces internal annual evaluation reports. The 2012 annual report suggest positive gains in terms of encouraging language development and teacher preparedness, as opposed to national averages (see http://www.claytonearlylearning.org/images/uploads/Clayton-2012-AnnualReport_singlePg.pdf).

Early Head Start (1994)

Primary reach: National program with 17 Colorado programs that serves infants and toddlers under the age of three and pregnant women. Early Head Start is a federally funded community-based program for low-income women and families.

Theories: Early Head Start is a strengths-based and relationship-centered approach.

Purpose: Early Head Start provides early, intensive and comprehensive child and family support to low-income pregnant women, infants, toddlers and their families. Early Head Start provides center based, home based and childcare services.

Research Support: Empirical support for this approach is strong. Longitudinal studies have found that the impact of this program has been effective over time. Research evaluation from Home Visiting Evidence of Effectiveness (HomVEE) rated Early Head Start effective for the Department of Health and Human Services in child development and school readiness, positive parenting practices and family economic self-sufficiency. See: http://www.acf.hhs.gov/programs/opre/research/project/head-start-impact-study-and-follow-up-2000-2012 and http://homvee.acf.hhs.gov/programs.aspx

Early Steps to School Success (ESSS): Save the Children (1932)

Primary reach: ESSS is aimed at expectant parents and those with children up to age five in rural communities, with support for caregivers and training for community educators.

Theories: ESSS utilizes parent education and rural development.

Purpose: A replicable program for expectant parents and those with children up to age five in rural communities, ESSS is designed to assist children with language and social and emotional development, build parent support to successfully be their child's "first teacher" and foster strong home–school connections.

Research Support: There is limited published research for ESSS effectiveness. A 2010 report, which was restricted in the number of sites evaluated (as many had not yet been developed), showed promising results. More research will need to be conducted to measure effectiveness. See:

http://www.researchconnections.org/childcare/resources/23463?classifCode=2-3-3&recency=FIVEYEAR&paging.startRow=1&type=Executive+Summary.

Educare (2003)

Primary Reach: Educare focuses on young children, who are at risk for school failure, through school-based programming and family support.

Theories: Educare focuses on the Abecedarian Project, Hart & Risley studies and the Perry Preschool project.

Purpose: Through collaboration with local partners, Educare schools aim to create, provide and promote quality, outcome-focused learning environments for young children. The Educare Denver School at Clayton Early Learning follows the 12 core features of the Educare model, which expand on Head Start and Early Head Start standards. Educare focuses on investing in zero to five years, parent involvement, continuity of care, and partnership between the public and private sectors.

Research Support: Educare is an evidence-based (see, e.g., Stein, Freel, Hanson, Pacchiano, & Eliand-Williford, 2013) program in which evaluation efforts have been conducted at the local level (i.e., within programs) as well as through empirical research (Stein et. al, 2013). For example, Stein found that children in an Educare program in Chicago were more excited about starting kindergarten, had more positive attitudes toward learning, and got along better with their classmates compared to the control group. Educare also requires Educare schools to participate in the Bounce Learning Network Implementation Study to show how implementation of the model contributes to program quality child/ family outcomes.

Family Star Montessori (1991)

Primary Reach: A Denver-based model based on international Montessori curriculum, which focuses on children ages two months to six years old and parents. The focus of this school is on ensuring that economic status does not impact child development and highly desires socioeconomic diversity.

Theories: Family Star uses a Montessori curriculum for teaching and classroom direction.

Purpose: Family Star offers a full-day, year-round Montessori curriculum to children ages two months to six years old. It offers programs to address the needs of each child and his or her family (Literacy Program, Child Services, Healthy Families, Family Services and Future Star Pregnancy Program). Family Star helps children become school ready, regardless of socio-economic background, and with trained professional education staff.

Research Support: Montessori programs are generally well supported in the literature. The majority of research studies on the efficacy of Montessori education have focused on older cohorts of children (i.e., three years and older), and many of these studies support the effectiveness of Montessori education. Additional research has been conducted on Family Star Montessori as it is an Early Head Start and Head Start program. See http://qz.com/89038/the-single-most-innovative-concept-in-education-is-at-least-100-years-old/ and http://www.mathematica-mpr.com/publications/pdfs/pathwayfnl.pdf

Healthy Families America (1992)

Primary Reach: A national program aimed at promoting child well-being from zero (i.e., prenatal) to five years

Theories: Healthy Families American focuses on homes visitation.

Purpose: The national program aims to promote child wellbeing and prevent the abuse and neglect of children through home visiting services. The model builds community partnerships for family engagement, in home visits, prenatal through birth and child growth. The model is focused on families at-risk for "adverse childhood experiences, including child maltreatment."

Research Support: Healthy Families America evaluated its program heavily through 2004. An implementation study looked at 90 sites to show results of family retention, service content, service intensity, site characteristics and staff retention. Positive outcomes were reported for reducing child maltreatment, increasing healthy child development, family self-sufficiency and school readiness. Research evaluation from Home Visiting Evidence of Effectiveness (HomVEE) rated the program as effective for use by the Department of Health and Human Services in child health, child development and school readiness, reductions in child maltreatment, positive parenting practices, linkages and referrals, and family economic self-sufficiency. Evaluation results post-2004 are not yet available on the website. For more, see: http://www.healthyfamiliesamerica.org/publications/download.shtml#research and http://homvee.acf.hhs.gov/programs.aspx

Home Instruction for Parents of Preschool Youngsters (HIPPY) (1984 in U.S.)

Primary Reach: HIPPY is a national curriculum with seven Colorado-based sites. HIPPY is a model that aims to ensure parents are prepared and educated in their role as their child's first teacher, focusing on families at risk with children ages three to five.

Theories: HIPPY focuses on parent engagement, home visitation and a role-play method of teaching.

Purpose: The HIPPY models uses role play as the method of teaching, staffed by home visitors from the community, supervised by a professional coordinator and with home visits (as well as group meetings). The HIPPY model was designed to remove "remove barriers to participation, due to lack of education, poverty, social isolation and other issues."

Research Support: This program is an evidence-based research program with decades of empirical support. The model was tested to be effective in: improving school readiness, parent involvement, school attendance, classroom behavior, and standardized test scores. Research evaluation from Home Visiting Evidence of Effectiveness (HomVEE) rated the program as effective for the Department of Health and Human Services in areas of child development and school readiness and positive parenting practices. See: http://www.claytonearlylearning.org/images/uploads/Clayton-2012-AnnualReport_singlePg.pdf and http://homvee.acf.hhs.gov/programs.aspx

How to Read to Your Baby (2006)

Primary Reach: A Colorado-based, international and national curriculum directed toward training professionals that work with parents and caregivers of young children.

Theories: How to Read to Your Baby focuses on attachment theory and early literacy.

Purpose: Partners In Parenting Education and Emotional Beginnings are the two curricula taught to professionals and caregivers to support infant mental health via strong relationships. How to Read Your Baby hopes to empower, educate and support professionals and encourage positive relationships between primary caregivers and infants/toddlers.

Research Support: Currently, this program has received limited empirical support. In the future, How to Read to Your Baby plans to determine whether this program can be considered as evidence-based.

Love and Logic (1977)

Primary Reach: The Love and Logic training model is for parents of children ages three through their teenage years.

Theories: Love and Logic focuses on self-regulation and problem solving.

Purpose: Love and Logic is a curriculum based on the idea that every action has a consequence, emphasizing self-regulation. The parent or caregiver's job is to both give the child choices and a sense of control over his/her own life, as well as create appropriate consequences when the child has made positive or negative choices.

Research Support: In 2008 and 2011, research was conducted on teacher's perceptions of the Love and Logic curriculum. Teachers reported positive growth in their students' behavior and achievement and in their relationships and attitudes toward the students. Internal evaluation also appears to have been conducted by Love and Logic on the curriculum. See: http://qz.com/89038/the-single-most-innovative-concept-in-education-is-at-least-100-years-old/. Outside of these studies, there is limited access to outside or in-depth evaluation.

Montessori Education

Primary Reach: The Montessori curriculum is an international model, focused on ages three to 18, but also used with younger ages, including zero to three (e.g., Family Star Montessori, which is described above).

Theories: Montessori education focuses on early literacy, problem solving and self-regulation.

Purpose: Montessori education is a child-centered approach consisting of multi-age classrooms in which students learn through experience (i.e., smelling, touching, tasting, movement), are provided freedom within limits, and trained Montessori teachers respect children's natural, psychological and social development. This type of education is highly individualized and provides children of all ages and socio-economic backgrounds an opportunity to shape their own learning.

Research Support: The majority of research studies on the efficacy of Montessori education have focused on older cohorts of children (i.e., three years and older), and many of these studies support the effectiveness of Montessori education. General Montessori programs are well supported in the literature. See http://qz.com/89038/the-single-most-innovative-concept-in-education-is-at-least-100-years-old/

Nurse Family Partnership (1978)

Primary Reach: A national program with Colorado locations, Nurse Family Partnership (NFP) focuses on low-income, first-time moms from pregnancy through their child's second birthday.

Theories: NFP centers on home visitations, parent empowerment, nurse home visiting and self-sustainability.

Purpose: Through ongoing home visits from registered nurses, low-income, first-time moms are given support for pregnancy and care for their children and assisted in the process of becoming economically self-sufficient. From pregnancy until the child's second birthday, the Nurse Home Visitors create a relationship with the moms to empower them to achieve a better life for their children and themselves.

Research Support: NFP has been evaluated numerous times over the years, and was identified by the Coalition for Evidenced-Based Policy as the only early childhood program to meet its "top tier" of evidence (in that it prevents child abuse and neglect and produces economic return on investment). Evaluations are still in progress, based on controlled trials in Elmira, Memphis and Denver. Research evaluation from Home Visiting Evidence of Effectiveness (HomVEE) rated the program as effective in areas of child health, maternal health, child development and school readiness, reductions in child maltreatment, reductions in juvenile delinquency, family violence and crime, family economic self-sufficiency, and positive parenting practices. For more information see: http://www.nursefamilypartnership.org/proven-results/Evidence-of-Effectiveness#sthash.Y0d0clBr.dpuf and http://homvee.acf.hhs.gov/programs.aspx.

Ounce of Prevention (home visits and doula programs[44]) (1982)

Primary Reach: At-risk families in Illinois, and trainers nationally.

Theories: Ounce of Prevention's programs include a focus on home visitation, parent engagement and parent-child relationships.

Purpose: Ounce of Prevention's home visitation and doula programs connect with teen mothers and at-risk families. Ounce of Prevention volunteers model positive parent-child interactions, help create safe and stimulating environments for the child through a positive and language-rich environment, and connect families to resources in the community.

Research Support: Ounce of Prevention was recently awarded funds from the Maternal, Infant, and Early Childhood Home Visiting Program to conduct longitudinal evaluation of the home visitation program, and is partnering with the University of Chicago's School of Social Service Administration to conduct the study. Additionally, Ounce of Prevention is working on an "Infant and Toddler Language and Literacy Promotion Project" with heavy evaluation. Other programs at Ounce of Prevention, such as Educare, are also evaluated (Ounce of Prevention, 2013b).

---

[44] Doulas serve as birth assistants. According to Ounce of Prevention (2013a), "By encouraging healthy prenatal practices, offering support during labor and delivery, and fostering bonds between babies and mothers and fathers, doulas help establish the foundation for a child's future health and development."

Parents as Teachers (1981)

Primary Reach: With 31 Colorado locations, and as a national and international program, Parents as Teachers serves children and families from conception to kindergarten.

Theories: Parents as Teachers focuses on home visiting, fatherhood and a tribal home visiting program.

Purpose: Parents as Teachers develops curricula to support a parent's role in their child's school readiness and development, based on relationships and individual needs. Through the use of trained professionals and community partners, as well as advocacy, Parents as Teachers hopes to impact children through kindergarten so they will be fully ready to learn by school age. **Rocky Mountain Parents as Teachers** is a Denver nonprofit based on this model.

Research Support: This program is an evidence-based research program with decades of empirical support. The Home Visiting Evidence of Effectiveness (HomVEE) reviewed 51 former evaluations through 2011, and found the program to meet the criteria of the Department of Health and Human Services (because there were at least two high or moderate quality impact studies conducted). HomVEE rated the program as effective in areas of child development and school readiness and positive parenting practices. See: http://homvee.acf.hhs.gov/document.aspx?rid=1&sid=16

Providers Advancing School Outcomes (PASO) (2006)

Primary Reach: A Boulder, Colorado-based program that works with Latino children from birth to five years through targeting Spanish-speaking home child care providers. PASO focuses on integrating the FFN network into training, support and education on early childhood development.

Theories: PASO focuses on FFN and parent education.

Purpose: The purpose of PASO is to ensure school readiness for Latino children from birth to five years old. PASO strives to increase the quality of early education services and parental involvement in children's development. PASO aims to build capacity of community-based training for child care providers, encourage resource sharing and develop support networks.

Research Support: Although PASO is based on the Child Development Associate program for training, the program does not have published reports of effectiveness. More research will need to be done to monitor quality and impact.

Reach Out and Read (1989)

Primary Reach: A national program with Colorado integration that is linked to over 200 health care clinics in Colorado. Reach Out and Read focuses on low-income families and children six months to five years of age (at pediatric check ups).

Theories: Reach Out and Read focuses on early literacy, parent engagement and child care networks (such as pediatricians).

Purpose: Reach Out and Read partners with doctors to "prescribe" books and encourage families to read together. The program trains doctors and nurses to advise parents on why they should read aloud and give books to children at pediatric checkups.

Research Support: Reach Out and Read is a well-supported, evidence-based program that has been strongly supported in peer-reviewed medical journals (see http://reachoutandreadco.org/wp-content/uploads/2013/05/Research_Summary2.pdf).

Tools of the Mind (1993)

Primary Reach: The Tools of the Mind (TOM) program serves preschool and kindergarten through a curriculum focused on self-regulation.

Theories: TOM is made up of Vygotskian-based instructional strategies, self-regulation and scaffolding.

Purpose: TOM aims to create school success through intentional and self-regulated learning. Designed to support the development of cognitive and social-emotion self-regulation/executive functions.

Research Support: Empirical findings for Tools of the Mind suggest that this program may not be more effective for preschool success than typical preschool classrooms. However, there are some studies that have found success and growth in the model. For more information see http://www.toolsofthemind.org/philosophy/research/, https://my.vanderbilt.edu/toolsofthemindevaluation/files/2011/12/Tools-Report-8-10-11-Appendices-Removed1.pdf, and http://blogs.edweek.org/edweek/inside-school-research/2012/03/tools_of_the_mind_shows_lacklu.html.

Appendix E: Existing Metrics for Measuring and Evaluating Early Childhood Programming

A selected list of metrics (in alphabetical order) that may guide future early childhood intervention research:

- **Bracken Basics Concept Scale**
  - A developmentally sensitive and standardized measure that evaluates children's comprehension of concepts like sequence, letters and colors that are essential to early communication development and school readiness.
  - Used to evaluate School Readiness in Educare, administered before children leave Educare: http://www.educareschools.org/about/pdfs/Demonstrating-Results.pdf
- **Early Childhood Environmental Rating Scale-Revised (ETERS-R):** http://ers.fpg.unc.edu/
  - Designed to assess group programs (e.g. classroom quality)
  - Used to evaluate Educare: http://www.educareschools.org/about/pdfs/Demonstrating-Results.pdf
- **Early Development Instrument (EDI):**
  http://www.offordcentre.com/readiness/EDI_factsheet.html
  - A population-level research tool that measures school readiness along five core areas of child development—health and well-being; social competence; emotional maturity; language and cognitive development; and communication skills and general knowledge —that are known to be good predictors of adult health, educational and social outcomes
  - Used by TECCS and more than 700 other child development initiatives and community projects
- **Infant/Toddler Environmental Rating Scale-Revised (ITERS-R):** http://ers.fpg.unc.edu/node/84
  - Designed to assess group programs (e.g., classroom quality)
  - Used to evaluate Educare: http://www.educareschools.org/about/pdfs/Demonstrating-Results.pdf
- **Peabody Picture Vocabulary Test**
  - Measure of young children's vocabulary, administered at three years old
  - Used to evaluate vocabulary skills in Educare:
    http://www.educareschools.org/about/pdfs/Demonstrating-Results.pdf