



# START EARLY TO BUILD A HEALTHY FUTURE

The research linking early learning and health

Brooke Fisher  
Ann Hanson  
Tony Raden<sup>1</sup>



Provide children a healthy start, watch how they bloom.



## EXECUTIVE SUMMARY

**Every child deserves a fair chance. A chance to learn, grow, explore possibilities, persevere and achieve his or her potential. The Ounce of Prevention Fund believes that no child's potential should be limited by poor health.**

Yet many children in America, particularly children who live in poverty or are racial or ethnic minorities, face inequitable conditions that reduce their chances of leading healthy lives.<sup>2</sup> These conditions lead to pronounced health disparities<sup>3</sup>—what we refer to as the health gap. This gap appears early in life and builds over time.<sup>4</sup> Science suggests that adverse early life experiences—prenatally and in a child's first years—can contribute to the health gap, leaving biological imprints on the developing child that can have strong and lasting effects.<sup>5</sup>

Research on the health consequences of early life adversity raises the question: What are the foundations that children need, prenatally and in the first five years, to prevent chronic disease and build sound health throughout their lives? Child development experts say those foundations are nurturing relationships, safe and secure environments, access to nutrition, and health-promoting behaviors.<sup>6</sup> And they are no less essential to preventing disease than quality medical care.

What's more, good health in early childhood is an essential component of school readiness. The benefits of health and learning are mutually-

reinforcing: A healthy child is less likely to miss school and is better able to concentrate and process information in class, and the skills the child acquires in school often pay off in mental and physical health benefits down the road.<sup>7</sup> For these reasons, we join the National Institute for Early Education Research in encouraging a definition of good health that "includes cognitive ability, a low likelihood of engaging in risky behaviors, mental stability, and positive social-emotional development,"<sup>8</sup> all of which are fostered by enriching early learning experiences.

Here we summarize the latest research on what children need to get a healthy start at life. The good news is, research now directs us to a critical strategy in narrowing the health gap and giving all children a strong chance at a healthy future: We can ensure that every child has access to high-quality early childhood education and development programs. We offer policy and practice recommendations aimed at increasing the impact of these programs on children's health and improving coordination and integration across systems that touch the lives of vulnerable young children and their families.

***Because after all, good health doesn't simply start in a pediatrician's office—it is nurtured in homes, classrooms and playgrounds, and we all have a role to play in helping every child reach his or her potential for a lifetime of health.***

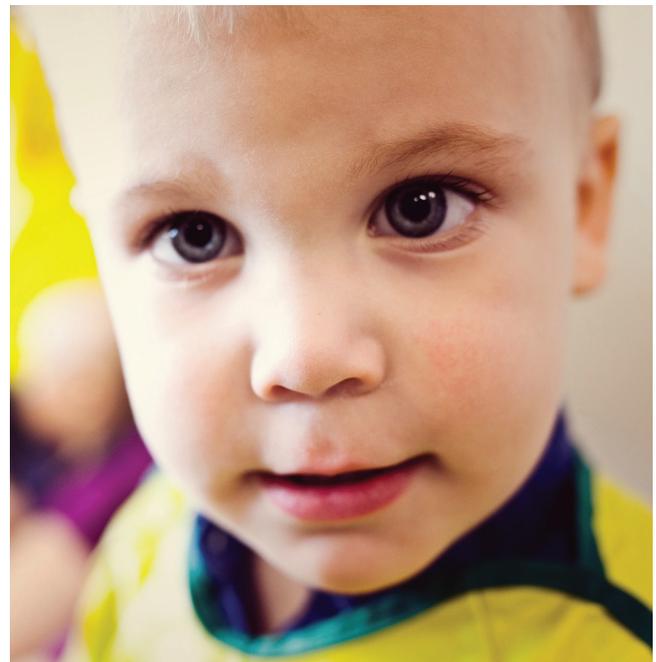
## CHILDREN IN POVERTY FACE A HEALTH GAP

While much attention and effort have been directed at addressing the widening achievement gap in the United States, children growing up in poverty face an equally pervasive and related health gap: By and large, they have markedly worse health than their higher-income peers.<sup>9</sup> This health gap appears early in life and grows larger over time,<sup>10</sup> affecting the potential for children in poverty to lead lives unfettered by illness or injury. Children in poor families are almost five times more likely than their higher-income peers to be in “less than optimal health.”<sup>11</sup> Health inequities exist along a gradient, with the poorest families most likely to experience the worst health.<sup>12</sup> Indeed, life expectancy decreases and diseases become more common the further you descend on the socioeconomic scale.<sup>13</sup>

**Children in poor families are almost five times more likely than their higher-income peers to be in “less than optimal health.”**

Forty-nine percent of American children under three and 48% of those between age 3 and age 5 live in poverty or near-poverty.<sup>14</sup> All told, this means that 11.5 million children under age 6<sup>15</sup> face heightened risk of adverse health in their lives. These children receive fewer vaccinations and experience higher incidences of childhood injury, chronic disease, suppressed immune systems, and cognitive and behavioral challenges.<sup>16</sup> And while most children in low-income families are white, black and Hispanic children are disproportionately likely to live in poverty or near-poverty, at more than twice the rate of their white peers.<sup>17</sup> What’s more, many children who are racial or ethnic minorities face the added health burden of past

and present discrimination,<sup>18</sup> contributing to profound inequities in many health outcomes and access to health services.<sup>19</sup> Socioeconomic, racial and ethnic health disparities in the development of chronic diseases are often already present by the time children are preschool age<sup>20</sup> and persist throughout their lives.<sup>21</sup> Children under age 5 are the most racially and ethnically diverse age cohort in the United States<sup>22</sup> and the most likely age group to live in low-income households,<sup>23</sup> heightening the need to start at the very beginning in addressing the health gap so that all children might have a fair chance at a healthy life.



To overcome the health disparities facing our country’s youngest citizens, we must first understand the factors that contribute to these disparities—and how it is that early childhood adversity can lead to poorer health over a lifespan. ●

## UNDERSTANDING THE HEALTH GAP: THE SCIENCE OF EARLY CHILDHOOD DEVELOPMENT

Even before birth, many factors converge that will profoundly influence a child's lifelong health. Cutting-edge research on the developmental biology of early childhood increasingly makes the case that early life experiences—prenatally and in a child's first years—leave biological imprints on the developing child, which can have strong and lasting effects.<sup>24</sup> As the Robert Wood Johnson Foundation aptly puts it, the early years “set us on paths leading toward—or away from—good health.”<sup>25</sup> The Center on the Developing Child at Harvard University uses a similar metaphor, that of experiences becoming “built into children's bodies,”<sup>26</sup> affecting the ways our bodies grow, develop and respond to stress.



Over the last century, child development experts debated whether a child's life outcomes were largely determined by the child's nature—inherited characteristics such as genes—or nurture—the circumstances of the child's life and environment. Yet recent findings from the field of epigenetics, the study of how factors such as environment and experience influence gene expression, reveal that our understanding of young children's development has moved far beyond the old nature-nurture debate.

Research suggests that early experiences and environments interact with biology to trigger gene expression during gestation, throughout childhood and into adulthood.<sup>27</sup> According to the

Center on the Developing Child, “Our genes contain instructions that tell our bodies how to work, but the environment leaves a ‘signature’ on the genes that authorizes or prevents those instructions from being carried out—or even speeds up or slows down genetic activity.”<sup>28</sup> Epidemiological analysis of patterns of chronic illness in adulthood shows that the developmental origins of disease can appear in the early years, with children who experience early life adversity at increased risk of various diseases throughout life.<sup>29</sup>

Put simply, early experiences, for better or worse, can embed themselves in the developing bodies of young children.<sup>30</sup> Research suggests that there are two ways that adverse experiences “get under the skin”<sup>31</sup>: through the accumulation of physical and psychological stress over time, or through heightened activation of the stress-response system during sensitive periods of development such as early childhood.<sup>32</sup> Leading child development experts J. P. Shonkoff, W. T. Boyce, and B. S. McEwen divide the physiological experience of stress in early childhood into three categories:

- **Positive stress**, which is short-lived, occurs through the course of normative life experiences such as immunizations and can promote healthy development if a child is supported by responsive relationships.
- **Tolerable stress**, which is triggered by more intense events such as a natural disaster but is not long-lasting and is experienced in the context of supportive caregiving.
- **Toxic stress**, which is the frequent or long-lasting activation of the body's stress-response system. However, in many instances, responsive caregiving may cushion a child against the adverse experiences.<sup>33</sup>

The Adverse Childhood Experiences Study examined the impact of very stressful early childhood experiences on adults' overall health.

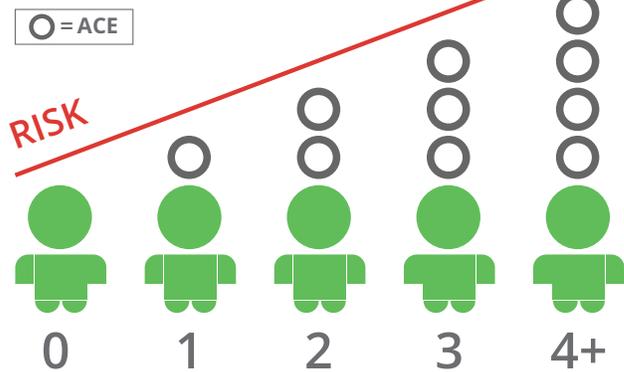
More than 17,000 adult participants undergoing a comprehensive medical examination agreed to participate, sharing detailed information about their childhood exposures to several categories of adversity, such as maltreatment, neglect, food insecurity or family mental illness. The study showed a strong relationship between adverse early experiences and adult health, with health problems increasing along a gradient as the number of adverse childhood experiences increased.<sup>34</sup> Participants who had frequent or intense stressful experiences in early childhood were significantly more likely to develop cardiovascular disease, diabetes, cancer and depression, and to use tobacco, illicit drugs and alcohol.<sup>35</sup> They were also more likely to report that they had become pregnant in adolescence, that their first pregnancy had resulted in miscarriage and that they had developed long-term psychosocial problems.<sup>36</sup> Conversely, childhood family strengths—such as family closeness, support, loyalty and responsiveness to health needs—were found to foster resiliency, with a strong, protective effect against negative outcomes.<sup>37</sup>

### Early experiences, for better or for worse, can embed themselves in the developing bodies of young children.

While toxic stress affects families at all income levels, many low-income families face challenging circumstances that place them at risk of sustained stress and poor health throughout their lives.

Often called social determinants of health, these are defined by the Centers for Disease Control and

As the number of ACEs (Adverse Childhood Experiences) increases, so does the risk for negative health outcomes.



Prevention and the World Health Organization as “the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness.”<sup>38</sup> On the following page, we describe some of these social determinants of health that place young children in low-income households—as well as children who are racial and ethnic minorities—at increased risk for negative health outcomes.

The growing evidence on the lasting effects of early childhood experiences and environments on long-term health raises the question: What are the cornerstones that children need in the early years to build sound health throughout their lives? Child development experts have an answer: They have identified four “foundations of health,”<sup>39</sup> detailed in the next section. ●

## SOCIAL DETERMINANTS OF HEALTH

Evidence increasingly shows that our early experiences and environments can have strong and lasting effects on our lifetime health. As the Robert Wood Johnson Foundation's nonpartisan, interdisciplinary Commission to Build a Healthier America put it in a commission report, "Where we live, learn, work and play can have a greater impact on how long and well we live than medical care. Our zip code may be more important to our health than our genetic code."<sup>40</sup> The following are some examples of social determinants of health faced by many young children in low-income households and communities:

### Food Insecurity

More than one in five households with children are food insecure.<sup>41</sup> The consequences of food insecurity can last a lifetime: Children who do not have adequate nutrition in the early years are more susceptible to illness, chronic health conditions, and cognitive and behavioral issues.<sup>42</sup> Some of the same conditions that place children in poverty at higher risk for hunger also increase the likelihood that they consume high-calorie and nutrient-poor food, which can lead to childhood obesity.<sup>43</sup> In some low-income neighborhoods called food deserts, residents have few supermarkets where families can purchase affordable, nutritious food.<sup>44</sup> Hispanic and black children are particularly vulnerable: Disparities in nutrition and obesity rates are already present by the time they are preschool age.<sup>45</sup>

### Housing Instability and Homelessness

One in 45 US children experiences homelessness each year—1.6 million children in all.<sup>46</sup> Families with young children are one of the fastest-growing groups facing homelessness,<sup>47</sup> and the National Center on Family Homelessness estimates that 42% of homeless children are 6 years or younger.<sup>48</sup> What's more, pregnancy is a risk factor for homelessness among low-income families.<sup>49</sup> Young children who are homeless are more likely than children who are not homeless to experience hunger, poor mental and physical health and chronic health problems, and to have greater difficulty accessing medical and dental care and other supportive services.<sup>50</sup>

### Poor Environmental Quality

Because their bodies are rapidly developing, young children are particularly sensitive to environmental toxins.<sup>51</sup> Diseases such as lead poisoning, lung cancer, mesothelioma and asthma are frequently linked to environmental exposures children encounter in their homes and communities.<sup>52</sup> Immunology research finds that environmental factors such as pollution may interact with chronic stress to worsen children's symptoms.<sup>53</sup> Some of the most common chronic health conditions linked to environmental exposures occur at higher rates among children who are ethnic or racial minorities or are living in low-income communities; for instance, asthma and lead exposure rates are higher among children living in poverty or near-poverty, and rates are also higher among black and Hispanic children, even after controlling for socioeconomic status.<sup>54</sup>

### Limited Health Literacy

Many parents have limited health literacy, the "ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions."<sup>55</sup> A nationally representative study of US parents found that at least 1 in 4 have limited health literacy, which has been linked to disparities in young children's own health literacy, health outcomes and health-promoting behaviors.<sup>56</sup> For one example, research shows a strong link between mothers' oral health knowledge and children's oral health status, with children of mothers with low oral health knowledge at much higher risk of dental caries (tooth decay).<sup>57</sup>

## FOUNDATIONS OF HEALTH

Leading researchers from the Center on the Developing Child at Harvard University and the Women and Children's Health Policy Center at Johns Hopkins University have collaboratively identified four foundations of health that buffer young children against adverse childhood experiences,<sup>58</sup> allowing their bodies and brains to develop without the lasting effects of toxic stress. These four foundations that all children need to thrive are stable and responsive relationships, safe and secure environments, nutrition and health-promoting behaviors.<sup>59</sup>

### **Stable and Responsive Relationships**

According to a report by the Robert Wood Johnson Foundation's Commission to Build a Healthier America, "While much emphasis has been placed on the foundational importance of the early years for later success in school and the workplace, we are convinced that an environment of supportive relationships is also the key to lifelong physical and mental health."<sup>60</sup> Secure attachments with caregivers affect young children's ability to form relationships and regulate emotions.<sup>61</sup> Stable, responsive relationships support young children's social-emotional health, helping them develop skills such as trust, compassion, cooperation and self-soothing.<sup>62</sup> According to a literature review by researchers from Johns Hopkins,<sup>63</sup> stable and responsive relationships help build up children's neuroendocrine,<sup>64</sup> stress regulatory,<sup>65</sup> inflammatory,<sup>66</sup> and immune systems.<sup>67</sup> The healthy development of these bodily systems is necessary to reduce the risk of chronic health problems, including respiratory or cardiovascular disease.<sup>68</sup>

### **Safe and Secure Environments**

As young children grow, their exposure to different environments expands—from the prenatal environment to the home, school, community and beyond. The safety and security of their environments at every level have strong implications for their health throughout their lives. The need for safe and secure environments begins prenatally—for instance, children whose mothers smoke tobacco or live in very stressful environments during pregnancy are more likely to be born with low birth weight, a significant risk for chronic diseases such as coronary heart disease, hypertension and diabetes.<sup>69</sup>

### **Nutrition**

A healthy diet fuels learning, growth and development and staves off obesity and disease.<sup>70</sup> Nutritional interventions for young children have been shown to promote growth and development across every domain.<sup>71</sup> Undernourishment in early life, on the other hand, has been associated with higher risks for hypertension, insulin resistance and heart disease,<sup>72</sup> and may play a key role in the development of osteoporosis, autoimmune diseases, diabetes and cancer.<sup>73</sup> And childhood obesity raises children's risks of developing heart disease, high blood pressure, cancer and asthma.<sup>74</sup>

### **Health-Promoting Behaviors**

Early learning about health-promoting behaviors helps young children establish routines that lead to healthier choices throughout life.<sup>75</sup> Young children are developing the ability to create causal theories about how things happen, as evidenced by their perpetual question, "Why?"<sup>76</sup> Child psychologist Alison Gopnik cites studies showing that 2- and 3-year-olds can develop causal explanations of health, including an understanding that illness is caused by invisible germs and that, "He needs more to eat because he is growing long arms."<sup>77</sup> Caregivers can help young children develop healthy behaviors by engaging their curiosity and budding independence, providing them with healthy choices and explaining why healthy behaviors are important. ●

## THE LINK BETWEEN EARLY LEARNING AND HEALTH

In addition to the four foundations of health, research shows that there is another critical factor that significantly affects children’s chances at leading healthy lives: enriching early learning experiences.

In the early years, learning opportunities help children develop the cognitive, social, emotional and behavioral skills, as well as the neural connections that allow them to make decisions, control impulses, interpret social cues and build strong bonds with others—promoting health over the lifespan.

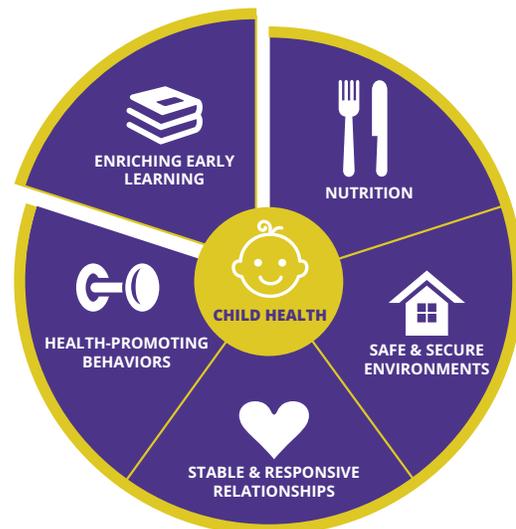
A large body of evidence links learning to lifetime health, even above and beyond the secondary health benefits of education, such as increased earnings.<sup>78</sup> A young child’s health needs are tightly coupled to the child’s developmental needs, since learning and health are mutually reinforcing. A healthy child is less likely to miss school and is better able to concentrate and process information in class, and the skills he or she acquires in school often pay off in mental and physical health benefits down the road.<sup>79</sup> Hence, good health is a crucial component of school readiness.

**A young child’s health needs are tightly coupled to the child’s developmental needs, since learning and health are mutually reinforcing.**

The strong link between young children’s learning and health has led to exciting new alliances between health care practitioners, educators and families. Acknowledging the critical importance of the first five years and the “interplay of health and development,”<sup>80</sup> the American Academy of Pediatrics (AAP) released a policy statement in June 2014 declaring language and literacy promotion “an essential component of primary care pediatric practice.”<sup>81</sup> It recommends that pediatric providers advise parents about the importance of reading with their children from birth to at least school entry. It also cites multiple studies that find when pediatric practitioners counsel parents on the importance of reading aloud with their children and provide

strategies for doing so effectively, families read more with their children; have “more opportunities to facilitate the safe, stable and nurturing relationships associated with long-term academic success and health”;<sup>82</sup> the language, literacy and school readiness skills of their children improve; and their children engage in less passive or solitary screen-watching time.

### ENRICHING EARLY LEARNING HELPS BUILD FOUNDATION FOR GOOD HEALTH



*Adapted from the Center on the Developing Child at Harvard University (2010). “The Foundations of Lifelong Health are Built in Early Childhood.”*

In addition to early literacy and language, executive function is another group of skills developed in early childhood, enabling a child to focus, multitask, make decisions, think flexibly and handle anxiety or frustration.<sup>83</sup> Strong executive function skills have been linked to positive health outcomes throughout life, including better physical health in adulthood and a reduced likelihood of engaging in unhealthy behaviors such as overeating, smoking or substance use.<sup>84</sup>

As emerging research establishes the critical importance of skills such as these that are unmeasured by academic assessments—what Nobel laureate economist James Heckman and author Paul Tough call “character skills”<sup>85</sup>—the early childhood field is piloting new ways to comprehensively measure these skills, and developing and evaluating innovative ways to support them. Several early learning interventions have been shown to help young children develop these crucial noncognitive and executive function skills,<sup>86</sup> often focusing on a child’s ability to control impulsive behavior and set goals in learning and social interactions.<sup>87</sup>

These examples illustrate some of the fundamental ways that early learning helps to build a child’s brain, constructing neural pathways and strengthening skills that promote healthy behaviors throughout life. We join the National Institute for Early Education Research in encouraging a definition of good health that “includes cognitive ability, a low likelihood of engaging in risky behaviors, mental stability, and positive social-emotional development”<sup>88</sup>—all of which are fostered by enriching early learning experiences. ●



## EARLY EDUCATION PROGRAMS: SUPPORTING THE FOUNDATIONS

Because positive and negative early experiences have such a powerful impact on health and development, high-quality early education programs take a “whole-child” approach, supporting each of the foundations of health. Here are some examples of how.



### Stable and Responsive Relationships

- A large body of research shows that children in the early years learn best within the context of nurturing relationships.<sup>90</sup> Building on this research, best practice in early education programs involves positive and emotionally supportive interactions between teachers and children.<sup>91</sup> Early educators facilitate learning when they are responsive, respectful and sensitive to students and communicate pleasure in interactions and regard for children’s ideas and perspectives.<sup>92</sup> One way early education programs foster the development of such strong and trusting relationships and supportive interactions is by providing continuity of care, in which children stay with the same teacher over time.<sup>93</sup>
- Home visiting programs have historically placed strong emphasis on supporting parents as children’s first nurturers. Evidence-based home visiting programs offer intensive, relationship-based services, built on research that shows that the supportive relationships home visitors build with parents directly influence the nature of the parents’ relationships with their children.<sup>94</sup> For example, parents participating in home visiting programs have demonstrated increased positive interactions with their children,<sup>95</sup> with fewer instances of child maltreatment and neglect.<sup>96</sup>



### Safe and Secure Environments

- Early education programs have long recognized the importance of safe and secure environments to young children’s health and development. Urie Bronfenbrenner, the renowned developmental psychologist who helped plan the national Head Start program, famously offered an “ecological model” that underscores the role children’s contexts—their relationships, homes, schools, communities and societies—play in shaping their well-being.<sup>97</sup> To build a sense of security and continuity between school and home, many quality, center-based early childhood programs engage and include family members in day-to-day program activities, provide intensive family-support services and regular home visits and maintain rigorous health and safety standards.
- Home visiting programs help parents learn how to create safer and healthier home environments. For example, research shows that some evidence-based home visiting programs may reduce mothers’ smoking throughout their pregnancies,<sup>98</sup> improving the prenatal environment and, potentially, birth outcomes.



### Nutrition

- Home visiting programs have been shown to encourage dietary improvements among pregnant mothers and to increase their enrollment in the Special Supplementary Nutrition Program for Women, Infants, and Children,<sup>99</sup> with beneficial implications for the health of both mother and child. Home visiting programs can also help support breastfeeding or explain its benefits to future mothers, and research links participation in home visiting programs with higher rates of breastfeeding.<sup>100</sup>



### Health-Promoting Behaviors

- Early childhood educators have the opportunity to teach children myriad healthy habits, including how to eat a balanced diet, exercise, brush their teeth, have good hygiene and moderate time spent looking at television and digital media to ensure it is enriching and developmentally appropriate. A recent study discovered that preschoolers who were read storybooks illustrating nutrition-related concepts were more likely to voluntarily consume vegetables and be able to explain the importance of eating healthy foods,<sup>101</sup> demonstrating the promise of teaching health concepts to young children in a kid-friendly way.
- Studies document that high-quality, center-based early education programs increase access to physical, developmental,<sup>102</sup> oral,<sup>103</sup> social-emotional and behavioral health screenings.<sup>104</sup> They also can facilitate linkages to a medical or dental home designed to provide comprehensive, coordinated and continuous care.<sup>105</sup> ●

## THE EVIDENCE: HIGH-QUALITY EARLY CHILDHOOD PROGRAMS LINKED TO POSITIVE HEALTH OUTCOMES

Because high-quality early childhood programs support the foundations of health, one would expect that they pay off in health benefits for years to come. Indeed, findings from several landmark studies of high-quality early education and home visiting programs have linked participation in these programs to a variety of health benefits for participants throughout childhood and into adulthood, detailed on the following pages. These

findings are from some of the most rigorous studies in the early childhood field to date, including evaluations of five early childhood interventions: the High/Scope Perry Preschool Program, the Carolina Abecedarian Project, the Nurse-Family Partnership, the federal Head Start program and the Chicago Child-Parent Center Education Program (summaries of the evaluations of these programs are in the Appendix).



## RESEARCH LINKING COMPREHENSIVE, HIGH-QUALITY EARLY EDUCATION & HOME VISITING TO HEALTH

### PERINATAL HEALTH OUTCOMES \*



#### Improved health during pregnancy, childbirth and the postnatal period

- Dietary improvements during pregnancy<sup>106</sup>
- Increased social support during pregnancy and childbirth<sup>107</sup>
- Lower rates of cesarean delivery<sup>108</sup>
- Shorter length of labor<sup>109</sup>
- Increased spacing between pregnancies<sup>110</sup>
- Lower incidence of maternal depression<sup>111</sup>
- Higher rates of breastfeeding<sup>112</sup>

### CHILD HEALTH OUTCOMES \*



#### Improved physical health

- Better birth outcomes<sup>113</sup>
- Lower rates of overweight/obesity<sup>114</sup> and lower body mass index (BMI)<sup>115</sup>
- Increased rates of age-appropriate physical health and developmental screenings,<sup>116</sup> including sensory screenings for hearing and vision<sup>117</sup>
- Increased access to age-appropriate immunizations<sup>118</sup>
- Lower rates of injury<sup>119</sup>
- Lower rates of maltreatment and neglect<sup>120</sup>
- Less emergency hospital care<sup>121</sup>
- Reduced child mortality<sup>122</sup>
- Fewer teen births<sup>123</sup>

#### Improved oral health

- Increased access to oral health screenings<sup>124</sup>
- Increased access to dental care<sup>125</sup>

#### Improved social-emotional, mental and behavioral health

- More likely to receive screening for attention deficit disorder<sup>126</sup>
- Better classroom and interpersonal conduct<sup>127</sup>
- Higher scores on measures of social-emotional development<sup>128</sup>
- Fewer behavior problems<sup>129</sup>
- Lower rates of delinquency<sup>130</sup>

#### Increased engagement in health-promoting behaviors

- More likely to be physically active<sup>131</sup>
- More likely to consume nutritious meals<sup>132</sup>
- Lower rates of cigarette, alcohol or marijuana use at age 12<sup>133</sup>

\* as compared with randomized control group or comparison group

**LONG-TERM HEALTH OUTCOMES IN ADULTHOOD\*****Improved physical health**

- Reduced risk of coronary heart disease<sup>134</sup>
- Lower rates of prehypertension<sup>135</sup>
- Lower incidences of hypertension (among male participants)<sup>136</sup>
- Lower systolic and diastolic blood pressure (among male participants)<sup>137</sup>
- Higher levels of “good” HDL cholesterol (among male participants)<sup>138</sup>
- Reduced likelihood of having a combination of hypertension and obesity (among male participants)<sup>139</sup>
- Reduced incidence of metabolic syndrome (among male participants)<sup>140</sup>
- Lower rates of abdominal obesity (among female participants)<sup>141</sup>
- Better self-reported health<sup>142</sup>

**Improved mental health**

- Fewer depressive symptoms<sup>143</sup>

**Increased engagement in health-promoting behaviors**

- Lower rates<sup>144</sup> and delayed onset<sup>145</sup> of marijuana use
- Lower rates of hard drug use<sup>146</sup>
- Lower rates<sup>147</sup> and delayed onset<sup>148</sup> of smoking
- Lower rates of drug or alcohol treatment<sup>149</sup>
- More likely to engage in physical activity (among female participants)<sup>150</sup>
- More likely to eat nutritious food (among female participants)<sup>151</sup>

\* as compared with randomized control group or comparison group

## TO BUILD A HEALTHY FUTURE, START SMALL—AND EARLY

As evidence increasingly illuminates the links between childhood experiences in the first five years and later life health outcomes, voices from early childhood, health and allied fields unite in calling for greater access to quality early education, particularly for our youngest and most vulnerable children.

The demonstrated potential of these programs to improve health led the Robert Wood Johnson Foundation's Commission to Build a Healthier America to recommend "investing in America's youngest children"—including high-quality early childhood programs, family-support programs and early childhood research and evaluation—as one of its three main strategies to achieve better health for all Americans.<sup>152</sup> Likewise, the Academic Pediatric Association and the American Academy of Pediatrics, in a 2013 report, recommended high-quality, affordable early education and care for low-income families as essential strategies to mitigate the effects of poverty on children's health.<sup>153</sup> According to their report:

**"The clearest evidence for interventions that alleviate the effects of poverty on children and give them a chance at productive lives is in early childhood. We support free high quality pre-kindergarten for all 3- and 4-year-old poor and near poor children; improving and expanding Head Start and Early Head Start, as well as other innovative models starting at birth; evidence-based home visiting programs for all poor children; and evidence-based interventions in pediatric primary care. We also support high quality affordable child care."<sup>154</sup>**

In recent years, policymakers at the state and federal levels have elevated the important role of early childhood programs in improving health, education and employment outcomes for the most vulnerable children and families. Political will has continued to shift in favor of investing in early childhood programs that offer comprehensive supports for our youngest children and their families. Ongoing national efforts include statutory and regulatory changes to policies governing early childhood programs that support

healthy development and well-being for children enrolled in publicly funded programs.

**High-quality early education programs have repeatedly proven to be sound investments with lasting health benefits - yet too few low-income children have access.**

Yet despite these recent policy opportunities that support early childhood, many young children still lack access to high-quality care that provides the comprehensive supports they need to grow up healthy. More than two out of every three low-income 4-year-olds in home-based child care are in a setting rated as low quality, according to the National Center for Education Statistics.<sup>155</sup> And more than half a million 3- and 4-year-olds—42% of those enrolled—attend early childhood programs that meet fewer than half of the quality benchmarks identified by the National Institute for Early Education Research.<sup>156</sup>

For infants and toddlers, the situation is even more dire. According to the Robert Wood Johnson Foundation's estimates, "Only one of every nine children under age 3 who are eligible for federally supported developmental and care services actually receives them—leaving 4.8 million infants and toddlers in low-income families with unmet needs."<sup>157</sup> While high-quality early interventions have repeatedly proven to be sound investments with strong and lasting impacts on children's health, particularly among children in poverty, too few little ones have access—especially those who stand to benefit the most. ●

## RECOMMENDATIONS FOR EARLY EDUCATION AND HEALTH CARE POLICY AND PRACTICE

In the context of a changing health care landscape that places increasing emphasis on disease prevention and health promotion—on keeping people healthy and thereby reducing the need for costly treatments later in life—early childhood programs have an opportunity to play a larger part.

The logic is compelling: Rather than pay later for disease treatment and diminished productivity due to health problems, why not invest from the very beginning in programs that protect young children against preventable disease, disability or injury? While outside of the traditional health care system, quality early education programs do more than promote cognitive and social-emotional development and academic achievement—they demonstrably improve the health of children and families. And by developing strong linkages with community health providers, these programs can increase the likelihood that no child misses opportunities to learn or develop socially due to ailments that could have been prevented or successfully managed through early detection and responsive intervention.



Several organizations—including the Robert Wood Johnson Foundation’s Commission to Build a Healthier America, the Academic Pediatric Association, the American Academy of Pediatrics,

### EARLY EDUCATION LINKS CHILDREN WITH HEALTH SERVICES THAT PROMOTE SCHOOL READINESS



*Adapted from the Office of Head Start’s online tool, “Making the Link Between Health and School Readiness.” Available at <http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/health/center/link-between/docs/link-health-and-school-readiness.pdf>*

and the Alliance for Early Success—are working to advance a shared health and early education policy agenda. We join these organizations in calling for increased investment in high-quality early childhood and family-support programs, as well as for greater coordination and integration across systems that touch the lives of vulnerable young children and their families. In the following pages, we offer some policy, practice, funding and research recommendations to bring us closer to achieving our vision of a healthy start for all.

## DIRECT HEALTH RESOURCES TO THE YOUNGEST AND MOST VULNERABLE CHILDREN FROM THE PRENATAL PERIOD TO AGE FIVE.

Ensure that young children and their families, particularly those facing poverty and other stressors, have access to comprehensive, high-quality early childhood education, home visiting and health care services. Comprehensive care includes:

- Early education that provides enriching early learning experiences and supports all four foundations of health—safe and secure environments, good nutrition, nurturing relationships and health-promoting behaviors.
- Effective perinatal services for expectant and new mothers, including medical and mental health care, oral health care and home visiting.
- Coordinated, preventive health care and developmental services for young children, such as screenings, immunizations, well-child visits, mental health services, and early intervention services for children with developmental delays or disabilities.

---

## IMPLEMENT EFFECTIVE AND EVIDENCED-BASED PRACTICES THAT MEET YOUNG CHILDREN'S COMPREHENSIVE NEEDS IN BOTH EARLY EDUCATION AND HEALTH CARE SETTINGS.

Early educators and health care practitioners have unique and critical roles to play in ensuring young children's health. And both fields have their own approaches to, vocabulary for describing and challenges to implementing quality practice. Yet the philosophical underpinnings of many of their quality practice standards are similar. For instance, both early educators and pediatric primary health care professionals emphasize:

- **Timely and developmentally appropriate screenings, assessments, referrals and response.** Quality practice in both early education and health care should involve the coordination of early learning, health care, early intervention and family-support services to ensure that young children receive timely, valid and developmentally appropriate screenings and assessments. Practitioners must also follow through on necessary referrals for more in-depth evaluation, services and supports.<sup>158</sup>
- **Building trusting relationships with families.** To meet standards of best practice, both fields must respect parents' central role in nurturing young children's health and well-being and work in partnership with families to meet children's holistic health and developmental needs in a culturally competent fashion.
- **Continuous care.** Early educators must strive to provide continuity of care in early education in order to build strong relationships between early childhood practitioners, the children in their care and their families, and to more effectively track children's development. And practitioners in both the early childhood education and health care fields must work together to link young children in their care to a medical home in order to ensure that their health care is "accessible, family-centered, compassionate, comprehensive, continuous, coordinated, and culturally effective."<sup>159</sup>
- **Understanding multiple systems of support and care.** Higher education and professional development in both fields should deepen practitioners' understanding of other systems that touch the lives of families.
- **Individualized care.** Maintaining low student-staff ratios in early education and optimal patient-practitioner caseloads in health care is essential to ensuring that practitioners can deliver high-quality interactions, individualized care and the best outcomes.
- **Innovations and continuous improvement.** Best practice in both fields must continuously seek innovations and improvements to policy and practice, informed by the latest science.

### **INVEST IN SYSTEMS TO SUPPORT HIGH-QUALITY AND EFFECTIVE SERVICES IN EARLY CHILDHOOD AND HEALTH CARE SETTINGS.**

- Provide ongoing opportunities for quality professional development, monitoring, evaluation, technical assistance and consultation to health care and early education providers.
- Ensure that medical providers for young children and expectant mothers are well-versed in early childhood development and in early childhood systems.
- Support early childhood educators in understanding young children’s medical needs and available services; in addition, as health care in the United States undergoes historic reforms, support early childhood providers in understanding the changes to health-insurance eligibility and enrollment and how these changes impact the young children in their care and the families they serve.

---

### **BUILD CROSS-SECTOR COLLABORATION TO SUPPORT YOUNG CHILDREN IN ACHIEVING GOOD HEALTH, BROADLY DEFINED TO INCLUDE CHILDREN’S INTERRELATED HEALTH AND DEVELOPMENTAL NEEDS.**

- Coordinate efforts between early education and health care systems to ensure that the young children and families in their care are linked to quality physical, mental and oral health care, early education and family support—recognizing the critical role of early education in promoting health and the equally vital role of good health in supporting learning.
- Explore innovative health-financing models that incentivize efforts by medical and nonmedical providers to reduce disease by keeping people healthy in the first place, acknowledging the health-promoting benefits and savings generated by programs and professionals working outside of the medical system, such as early childhood educators and home visitors.
- Create innovative models for coordinating care that facilitate linkages between health and early education providers.
- Invest in data systems that help facilitate this collaboration and integration and keep track of health outcomes.

## **EMBARK ON RESEARCH AND EVALUATION THAT EXPLORE THE LINK BETWEEN EARLY LEARNING AND HEALTH.**

Leading child development and public health experts, supported by the early childhood field's research evidence, make a strong case for the health-promoting benefits of high-quality early education programs. Yet many evaluations of early childhood education programs still fail to assess health outcomes: for instance, almost no studies examine the effects of public preschool on children's health.<sup>160</sup> And most longitudinal studies of early education programs have focused primarily on behavioral health outcomes, such as substance use, insurance coverage or engagement in risky behaviors, leaving gaps in knowledge about other potential health benefits of these programs, such as reducing chronic disease or strengthening protective factors and resilience for children and families.

- Future studies should examine and record the full spectrum of health outcomes associated with early education programs, allowing for more accurate estimates of the programs' health benefits and cost savings over the lifespan.
- By closely tracking progress toward improving children's health, research can inform continuous improvement and the development of innovative, health-focused interventions.

---

These recommendations put forth a vision for a comprehensive approach to disease prevention and health promotion that takes into consideration the health and developmental needs of the "whole child." A comprehensive, whole-child perspective acknowledges that supportive and enriching experiences in homes and early education classrooms are no less integral than care received in pediatricians' offices in reducing young children's risks of toxic stress, disease, injury, preventable disability and premature death and giving every child a fair chance at health. By holistically supporting young children in the critical first years, high-quality early childhood programs with an intentional focus on health have the potential to change the course of children's lives. They have a powerful role to play in narrowing the health gap and elevating children's chances at a healthy future from the very start. ●

## APPENDIX: KEY EARLY EDUCATION RESEARCH STUDIES

### THE HIGH/SCOPE PERRY PRESCHOOL PROGRAM

In 1962, researchers began following 123 high-risk 3- and 4-year-olds and their families in Ypsilanti, Michigan. Nearly 60 of those children were randomly assigned to the treatment group, which received a high-quality early learning program. The rest were assigned to the control group and received no preschool. The children's progress was monitored in follow-up studies through adolescence, young adulthood and into middle age. In adulthood, in addition to myriad academic, social and employment benefits, program participants reported better health, lower rates of marijuana, tobacco or hard drug use and lower rates of drug or alcohol treatment than the control group.<sup>161</sup>

### THE CAROLINA ABECEDARIAN PROJECT

Based in North Carolina, this study tracked 109 low-income families, 98% of whom were African-American. Study participants were randomly assigned to the treatment or control condition. The treatment group received full-time early learning services in an early childhood center from infancy to kindergarten entry, and the control group received no educational services. Children in the program received a nutritional diet and had primary pediatric care on site; children in the control group were provided free iron-fortified formula during the first 15 months of life. The children's progress was monitored in follow-up studies at ages 12, 15 and 21. The follow-up studies found that, in addition to a variety of employment and social benefits, participants in the treatment group experienced fewer depressive symptoms<sup>162</sup> and had lower rates and delayed initiation of marijuana<sup>163</sup> and tobacco use<sup>164</sup> in adulthood. In addition, a 2014 study found that former participants who attended the Abecedarian program had significantly better health in their mid-30s than the control group across many health outcomes.<sup>165</sup> Male former participants of the Abecedarian program exhibited lower systolic and diastolic blood pressure, were less likely to have stage one hypertension, had higher levels of "good" HDL cholesterol, and none had metabolic syndrome, which is associated with increased heart disease, stroke and diabetes risk. Female former Abecedarian participants were less likely to have developed abdominal obesity or prehypertension.<sup>166</sup>

### THE NURSE-FAMILY PARTNERSHIP

This home visitation program trains nurse home visitors to support low-income mothers to have a healthy pregnancy, while also working to strengthen the bonds between parent and infant and help mothers build economic self-sufficiency. Three rigorous randomized controlled trials evaluated the effectiveness of the program among diverse populations and in urban and rural settings. The studies found a variety of positive perinatal health outcomes among participating mothers, including dietary improvements during pregnancy,<sup>167</sup> increased social support during pregnancy and childbirth,<sup>168</sup> increased spacing between pregnancies<sup>169</sup> and better birth outcomes.<sup>170</sup> One study found that among the mothers characterized as being at highest risk, during the first two years of their children's lives, there were fewer verified cases of child abuse and neglect, and their children visited the emergency room less frequently than those in the comparison group.<sup>171</sup> Another found that when nurse-visited young children were ages 25 to 48 months, they had fewer injuries, accidental ingestions, behavioral problems and visits to the emergency room than the comparison group.<sup>172</sup> An additional follow-up study at age 12 found that program participants nurse-visited prenatally or as infants reported fewer internalizing disorders and less cigarette, alcohol and marijuana use than the comparison group;<sup>173</sup> and another follow-up study at age 19 found that girls born to mothers in the program utilized Medicaid less than their comparable peers.<sup>174</sup>

## APPENDIX: KEY EARLY EDUCATION RESEARCH STUDIES

### HEAD START

Since Head Start was established in 1965, a core program priority has been supporting a child's health as well as learning, first by providing health services directly and now by linking children to health services in their communities.<sup>175</sup> Head Start's rigorous performance standards require programs to facilitate comprehensive, interdisciplinary services in the areas of physical and oral health, mental health, nutrition, environmental health and safety, education and parent involvement.<sup>176</sup> And not only does Head Start support the health of participating children—true to its dual-generation focus, program standards include increasing parents' health literacy and helping parents with mental health challenges to gain appropriate supports. Head Start has been linked to a variety of health outcomes, including increased child screening<sup>177</sup> and immunization rates<sup>178</sup> and receipt of dental care,<sup>179</sup> protective effects against asthma, respiratory ailments and allergies,<sup>180</sup> and better self-reported health<sup>181</sup> and decreased smoking in adulthood.<sup>182</sup> The program has even been shown to reduce child mortality, particularly from causes that may have been prevented by the health component of the program, such as measles, diabetes and respiratory problems.<sup>183</sup>

### CHICAGO CHILD-PARENT CENTER EDUCATION PROGRAM

Rigorous longitudinal studies of the publicly funded Chicago Child-Parent Centers follow participants for as many as 25 years after they first attended the program as preschoolers.<sup>184</sup> The studies followed 989 students enrolled in 20 Chicago Child-Parent Centers beginning at age 3 and a comparison group of 550 other eligible children the same age. Evaluations of the high-quality preschool program found that children who received early education with robust parent engagement showed strong social, academic and employment gains, as well as significant gains in health status and behavior, with higher health-insurance coverage (including private insurance) and lower rates of tobacco, alcohol and illegal substance use.

## ENDNOTES

- 1 Special thanks to our many colleagues and partners who provided invaluable review that has shaped the development of this paper: Karen Berman, Carie Bires, Phyllis Glink, Bravetta Hassell, Barbara Hoffman, Bryce Marable, Carey McCann, Caroline McCoy, Anita Puri, Diana Rauner, Elliot Regenstein, Christy Serrano, Karen Sheehan, Nancy Shier, and Dartesha Wright.
- 2 Taveras, E., Gillman, M., Kleinman, K., Rich-Edwards, J., and Rifas-Shiman, S. (2010). "Racial/Ethnic Differences in Early-Life Risk Factors for Childhood Obesity." *Pediatrics*, Vol. 125, No. 4, 686–695; Ogden, C., Carroll, M., Curtin, L., Lamb, M., and Flegal, K. (2010). "Prevalence of High Body Mass Index in US Children and Adolescents, 2007–2008." *Journal of the American Medical Association*, Vol. 303, No. 3, 242–249; Litonjua, A., Carey, V., Weiss, S., and Gold, D. (1999). "Race, Socioeconomic Factors, and Area of Residence Are Associated With Asthma Prevalence." *Pediatric Pulmonology*, Vol. 28, No. 6, 394–401; Bloom, B., Cohen, R., and Freeman, G. (2012). "Summary Health Statistics for U.S. Children: National Health Interview Study, 2011." *Vital Health Statistics*, Vol. 10, No. 254; Kaminski, J., Perou, R., Visser, S., Scott, K., Beckwith, L., Howard, J., . . . and Danielson, M. (2013). "Behavioral and Socioemotional Outcomes Through Age 5 Years of the Legacy for Children Public Health Approach to Improving Developmental Outcomes Among Children Born Into Poverty." *American Journal of Public Health*, Vol. 103, No. 6, 1058–1066; Addy, S., Engelhardt, W., and Skinner, C. (2013). "Basic Facts About Low-Income Children: Children Under 18 Years, 2011." National Center for Children in Poverty, Mailman School of Public Health, Columbia University. [http://www.nccp.org/publications/pub\\_1076.html](http://www.nccp.org/publications/pub_1076.html); Miller, W., Sadegh-Nobari, T., and Lillie-Blanton, M. (2011). "Healthy Starts for All: Policy Prescriptions." *American Journal of Preventive Medicine*, Vol. 40, No. 1, S19–S37.
- 3 Taveras et al. "Racial/Ethnic Differences"; Ogden et al. "Prevalence of High Body Mass Index"; Litonjua et al. "Race, Socioeconomic Factors"; Bloom et al. "Summary Health Statistics"; Kaminski, et al. "Behavioral and Socioemotional Outcomes"; Addy et al. "Basic Facts About Low-Income Children"; Marmot, M., Friel, S., Bell, R., Houweling, T., and Taylor, S. (2008). "Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health." *Lancet*, Vol. 372, No. 9650, 1661–1669; Miller et al. "Healthy Starts for All."
- 4 Braveman, P., Sadegh-Nobari, T., and Egerter, S. (2008). "Early Childhood Experiences: Laying the Foundation for Health Across a Lifetime." Issue brief 1. Robert Wood Johnson Foundation Commission to Build a Healthier America. <http://www.commissiononhealth.org/PDF/095bea47-ae8e-4744-b054-258c9309b3d4/Issue%20Brief%201%20Jun%2008%20-%20Early%20Childhood%20Experiences%20and%20Health.pdf>
- 5 Diamond, A. (2009). "The Interplay of Biology and the Environment Broadly Defined." *Developmental Psychology*, Vol. 45, No. 1, 1; Center on the Developing Child at Harvard University. (2010). "The Foundations of Lifelong Health Are Built in Early Childhood." [http://developingchild.harvard.edu/index.php/resources/reports\\_and\\_working\\_papers/foundations-of-lifelong-health/](http://developingchild.harvard.edu/index.php/resources/reports_and_working_papers/foundations-of-lifelong-health/); Gluckman, P. D., and Hanson, M. A. (2004). "Living With the Past: Evolution, Development, and Patterns of Disease." *Science*, Vol. 305, No. 5691, 1733–1736.
- 6 Center on the Developing Child. "Foundations of Lifelong Health"; Mistry, K., Minkovitz, C., Riley, A., Johnson, S., Grason, H., Dubay, L., and Guyer, B. (2012). "A New Framework for Childhood Health Promotion: The Role of Policies and Programs in Building Capacity and Foundations of Early Childhood Health. *American Journal of Public Health*, Vol. 102, No. 9, 1688–1696.
- 7 Conti, G., and Heckman, J. (2013). "The Developmental Approach to Child and Adult Health." *Pediatrics*, Vol. 131, Supp. 2, S133–S141; Diamond. "Interplay of Biology," 1.
- 8 Friedman-Krauss, A., and Barnett, W. S. (2013). Early childhood education: Pathways to better health (Issue brief 25), 1. New Brunswick, NJ: National Institute for Early Education Research.

## ENDNOTES

- 9 Marmot et al. "Closing the Gap."
- 10 Braveman et al. Early childhood experiences
- 11 Miller et al. "Healthy Starts for All."
- 12 Marmot et al. "Closing the Gap."; Miller et al. "Healthy Starts for All."
- 13 Wilkinson, R., and Marmot, M. (eds.). (2003). "Social Determinants of Health: The Solid Facts." 2nd ed. World Health Organization. [http://www.euro.who.int/\\_data/assets/pdf\\_file/0005/98438/e81384.pdf](http://www.euro.who.int/_data/assets/pdf_file/0005/98438/e81384.pdf).
- 14 Addy et al. "Basic Facts About Low-Income Children."
- 15 Ibid.
- 16 Kaminski, et al. "Behavioral and Socioemotional Outcomes"
- 17 Addy et al. "Basic Facts About Low-Income Children."
- 18 Hayes, M. (April 17, 2014,). "Health Equity and Young Children: Helping States Take the Next Steps." Webinar. Child and Family Policy Center, BUILD Initiative.
- 19 Bruner, C., and Schor, E. (2009). "Clinical Health Care Practice and Community Building: Addressing Racial Disparities in Healthy Child Development." Des Moines: National Center for Service Integration Clearinghouse.
- 20 Taveras et al. "Racial/Ethnic Differences"; Ogden et al. "Prevalence of High Body Mass Index"; Litonjua et al. "Race, Socioeconomic Factors."
- 21 Bloom et al. "Summary Health Statistics."
- 22 Bruner, C., Calderon, M., Chang, H., Day, C., Grevstad, L., Hibbard, S., ... Reisman, B. (2008). "Building Early Childhood Systems in a Multi-Ethnic Society: An Overview of Build's Briefs on Diversity and Equity." Issue brief. Build Initiative Diversity and Equity Working Group. <http://www.buildinitiative.org/WhatsNew/ViewArticle/tabid/96/ArticleId/171/Building-Early-Childhood-Systems-in-a-Multi-Ethnic-Society-An-Overview-of-BUILDs-Briefs-on-Diversity.aspx>.
- 23 Miller et al. "Healthy Starts for All."
- 24 Shonkoff, J., Boyce, W., and McEwen, B. (2009). "Neuroscience, Molecular Biology, and the Childhood Roots of Health Disparities: Building a New Framework for Health Promotion and Disease Prevention." *Journal of the American Medical Association*, Vol. 301, No. 21, 2252–2259.
- 25 Braveman et al.. "Early Childhood Experiences."
- 26 Center on the Developing Child. "Foundations of Lifelong Health."
- 27 Diamond. "Interplay of Biology," 1; Center on the Developing Child. "Foundations of Lifelong Health."
- 28 Center on the Developing Child at Harvard University (n.d.). "Early Childhood Mental Health." Issue brief, 2. [www.developingchild.harvard.edu/resources](http://www.developingchild.harvard.edu/resources).
- 29 Gluckman and Hanson. "Living With the Past."
- 30 Center on the Developing Child. "Foundations of Lifelong Health."
- 31 Ibid.
- 32 Ibid.
- 33 Shonkoff et al. "Neuroscience, Molecular Biology."
- 34 Felitti, M., Vincent, J., Anda, M., Robert, F., Nordenberg, M., Williamson, M., . . . and Edwards, B. (1998). "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study." *American Journal of Preventive Medicine*, Vol. 14, No. 4, 245–258; Brown, D. W., Anda, R. F., Tiemeier, H., Felitti, V. J., Edwards, V. J., Croft, J. B., and Giles, W. H. (2009). "Adverse Childhood Experiences and the Risk of Premature Mortality." *American Journal of Preventive Medicine*, Vol. 37, No. 5, 389–396; Anda, R., Felitti, V., Bremner, J., Walker, J., Whitfield, C., Perry, B., . . . and Giles, W. (2006). "The Enduring Effects of Abuse and Related Adverse Experiences on Childhood." *European Archives of Psychiatry and Clinical Neuroscience*, Vol. 256, No. 3, 174–186; Hillis, S., Anda, R., Dube, S., Felitti, V., Marchbanks, P., and Marks, J.. (2004). "The Association Between Adverse Childhood Experiences and Adolescent Pregnancy, Long-Term Psychosocial Outcomes, and

## ENDNOTES

- Fetal Death." *Pediatrics*, Vol. 113, No. 2, 320–327;
- Brown, D., Anda, R., Tiemeier, H., Felitti, V., Edwards, V., Croft, J., and Giles, W. (2009). "Adverse Childhood Experiences and the Risk of Premature Mortality." *American Journal of Preventive Medicine*, Vol. 37, No. 5, 389–396; Hillis, S., Anda, R., Dube, S., Felitti, V., Marchbanks, P., Macaluso, M., and Marks, J. (2010). "The Protective Effect of Family Strengths in Childhood Against Adolescent Pregnancy and Its Long-Term Psychosocial Consequences." *Permanente Journal*, Vol. 14, No. 3, 18.
- 35 Felitti et al. "Relationship of Childhood Abuse"; Brown et al. "Adverse Childhood Experiences"; Anda et al. "Enduring Effects of Abuse."
- 36 Hillis et al. "Association Between Adverse."
- 37 Hillis et al. "Protective Effect of Family Strengths," 18.
- 38 Centers for Disease Control and Prevention (2014). "Social Determinants of Health." <http://www.cdc.gov/socialdeterminants/>; World Health Organization (2014). "Social Determinants of Health." [http://www.who.int/social\\_determinants/thecommission/finalreport/key\\_concepts/en/](http://www.who.int/social_determinants/thecommission/finalreport/key_concepts/en/).
- 39 Center on the Developing Child. "Foundations of Lifelong Health"; Mistry et al. "New Framework."
- 40 Arkin, E., DeForge, D., and Rosen, A. (2009). "Breaking Through on the Social Determinants of Health and Health Disparities. Issue brief 7. Robert Wood Johnson Foundation Commission to Build a Healthier America. <http://www.rwjf.org/en/research-publications/find-rwjf-research/2009/12/breaking-through-on-the-social-determinants-of-health-and-health.html>.
- 41 Wight, V., and Thampi, K. (2010). Basic Facts About Food Insecurity Among Children in the United States, 2008." National Center for Children in Poverty, Mailman School of Public Health, Columbia University.
- 42 Kirkpatrick, S., McIntyre, L., and Potestio, M. (2010). "Child Hunger and Long-Term Adverse Consequences for Health." *Archives of Pediatrics and Adolescent Medicine*, Vol. 164, No. 8, 754–762; Miller et al. "Healthy Starts for All"; Arabi, M., Hsieh, A., and McLean, M. (2013). "A Global Research Agenda for Nutrition Science." Sackler Institute for Nutrition Science. <http://www.nyas.org/nutritionresearchagenda>.
- 43 American Academy of Pediatrics (2008). "Promoting Healthy Nutrition." In *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*, 123–145. [http://brightfutures.aap.org/pdfs/Guidelines\\_PDF/6-Promoting\\_Healthy\\_Nutrition.pdf](http://brightfutures.aap.org/pdfs/Guidelines_PDF/6-Promoting_Healthy_Nutrition.pdf).
- 44 Mistry et al. "New Framework"; Banghart, P. (2012). "Comprehensive Obesity Prevention in Early Childhood: Promising Federal and State Initiatives." National Center for Children in Poverty, Mailman School of Public Health, Columbia University. [http://www.nccp.org/publications/pub\\_1058.html](http://www.nccp.org/publications/pub_1058.html);
- Regenstein, E. (1998). "Food Stamp Trafficking: Why Small Groceries Need Judicial Protection From the Department of Agriculture (and From Their Own Employees)." *Michigan Law Review*, Vol. 96, No. 2156, 2175–2178.
- 45 Taveras et al. "Racial/Ethnic Differences"; Ogden et al. "Prevalence of High Body Mass Index".
- 46 Bassuk, E., Murphy, C., Coupe, N., Kenney, R., and Beach, C. (2011). "America's Youngest Outcasts 2010." National Center on Family Homelessness. [http://www.homelesschildrenamerica.org/media/NCFH\\_AmericaOutcast2010\\_web.pdf](http://www.homelesschildrenamerica.org/media/NCFH_AmericaOutcast2010_web.pdf).
- 47 Maternal, Infant, and Early Childhood Home Visiting Technical Assistance Center and Tribal Home Visiting Technical Assistance Center (March 2014). "Working Together to Provide Stability for Families: Home Visiting and Homeless Service Systems." Webinar. MIECHV Webinar Series: Systems Integration.
- 48 Bassuk et al. "America's Youngest Outcasts."
- 49 Maternal, Infant, and Early Childhood Home Visiting Technical Assistance Center and Tribal Home Visiting Technical Assistance Center. "Working Together."

## ENDNOTES

- 50 Bassuk et al. "America's Youngest Outcasts"; McCoy-Roth, M., Mackintosh, B., and Murphey, D. (2012). "When the Bough Breaks: The Effects of Homelessness on Young Children." Issue brief. *Child Trends*, Vol. 3, No. 1, 1-11; National Center on Family Homelessness (2009). "America's Youngest Outcasts: State Report Card on Child Homelessness." [http://www.homelesschildrenamerica.org/pdf/rc\\_full\\_report.pdf](http://www.homelesschildrenamerica.org/pdf/rc_full_report.pdf).
- 51 US Environmental Protection Agency (2008). "Children's Environmental Health Disparities: Black and African American Children and Asthma." [http://yosemite.epa.gov/ocephweb.nsf/content/HD\\_AA\\_Asthma.htm/\\$File/HD\\_AA\\_Asthma.pdf](http://yosemite.epa.gov/ocephweb.nsf/content/HD_AA_Asthma.htm/$File/HD_AA_Asthma.pdf).
- 52 Cummins, S., and Jackson, R. (2001). "The Built Environment and Children's Health." *Pediatric Clinics of North America*, Vol. 48, No. 5, 1241-1252.
- 53 Chen, E., Hanson, M., Paterson, L., Griffin, M., Walker, H., and Miller, G. (2006). "Socioeconomic Status and Inflammatory Processes in Childhood Asthma: The Role of Psychological Stress." *Journal of Allergy and Clinical Immunology*, Vol. 117, No. 5, 1014-1020.
- 54 Litonjua et al. "Race, Socioeconomic Factors"; Cleveland, L., Minter, M., Cobb, K., Scott, A., and German, V. (2008). "Lead Hazards For Pregnant Women and Children: Part 1." *American Journal of Nursing*, Vol. 108, No. 10, 40-49.
- 55 Abrams, M., Klass, P., and Dreyer, B. (2009). "Health Literacy and Children: Introduction." *Pediatrics*, Vol. 124, Supp. 3, S262-S264.
- 56 Yin, H., Johnson, M., Mendelsohn, A., Abrams, M., Sanders, L., and Dreyer, B. (2009). "The Health Literacy of Parents in the United States: A Nationally Representative Study." *Pediatrics*, Vol. 124, Supp. 3, S289-S298; Mistry et al. "New Framework."
- 57 Seow, W. (2011). "Environmental, Maternal, and Child Factors Which Contribute to Early Childhood Caries: A Unifying Conceptual Model. *International Journal of Paediatric Dentistry*, Vol. 22, 157-168.
- 58 Center on the Developing Child. "Foundations of Lifelong Health"; Mistry et al. "New Framework."
- 59 Center on the Developing Child. "Foundations of Lifelong Health"; Mistry et al. "New Framework."
- 60 Arkin, E., Braveman, P., Egerter, S., and Williams, D. (eds.). (2014). "Time to Act: Investing in the Health of Our Children and Communities. Robert Wood Johnson Foundation Commission to Build a Healthier America. <http://www.rwjf.org/en/research-publications/find-rwjf-research/2014/01/recommendations-from-the-rwjf-commission-to-build-a-healthier-am.html>.
- 61 Zero to Three (n.d.). Infant Mental Health Definition. [www.zerotothree.org/imh/definition.html](http://www.zerotothree.org/imh/definition.html).
- 62 McCann, C., and Yarbrough, K. (2006). "Snapshots: Incorporating Comprehensive Developmental Screening Into Programs and Services for Young Children." Ounce of Prevention Fund.
- 63 Mistry et al. "New Framework."
- 64 McGowan, P., Sasaki, A., D'Alessio, A., Dymov, S., Labonté, B., Szyf, M., ... and Meaney, M. (2009). "Epigenetic Regulation of the Glucocorticoid Receptor in Human Brain Associates With Childhood Abuse." *Nature Neuroscience*, Vol. 12, No. 3, 342-348.
- 65 Gunnar, M., and Quevedo, K. (2007). "The Neurobiology of Stress and Development." *Annual Review of Psychology*, Vol. 58, 145-173.
- 66 Shirtcliff, E., Coe, C., and Pollak, S. (2009). "Early Childhood Stress Is Associated With Elevated Antibody Levels to Herpes Simplex Virus Type 1. *Proceedings of the National Academy of Sciences*, Vol. 106, No. 8, 2963-2967.
- 67 Coe, C., Lubach, G., Schneider, M., Dierschke, D., and Ershler, W. (1992). "Early Rearing Conditions Alter Immune Responses in the Developing Infant Primate." *Pediatrics*, Vol. 90, No. 3, 505-509.
- 68 Shirtcliff et al. "Early Childhood Stress."; Chen et al. "Socioeconomic status and inflammatory processes"; McEwen, B. (1998). "Protective and Damaging Effects of Stress Mediators." *New England Journal of Medicine*, Vol. 338, 171-179.

## ENDNOTES

- 69 Leeson, C., Kattenhorn, M., Morley, R., Lucas, A., and Deanfield, J. (2001). "Impact of Low Birth Weight and Cardiovascular Risk Factors on Endothelial Function in Early Adult Life." *Circulation*, Vol. 103, No. 9, 1264-1268.
- 70 National Institutes of Health (2013). "Child Nutrition." <http://www.nlm.nih.gov/medlineplus/childnutrition.html>.
- 71 Black, M. (April 2013). "Conceptual Overview of Integrated Interventions to Address Optimal Child Growth and Development." Lecture at the New York Academy of Sciences. <http://www.nyas.org/asset.axd?id=2c34cf46-a9f3-4f2f-9807-56a83fd59729&t=634999859007070000>.
- 72 Barker, D. (1995). "Fetal Origins of Coronary Heart Disease." *British Medical Journal*, Vol. 311, No. 6998, 171;
- Barker, D. (2001). "Fetal and Infant Origins of Adult Disease." *Monatsschrift Kinderheilkunde*, Vol. 149, No. 1, S2-S6.
- 73 Huh, S., and Gordon, C. (2008). "Vitamin D Deficiency in Children and Adolescents: Epidemiology, Impact and Treatment." *Reviews in Endocrine and Metabolic Disorders*, Vol. 9, No. 2, 161-170.
- 74 Let's Move. (n.d.). "Learn the Facts." <http://www.letsmove.gov/learn-facts/epidemic-childhood-obesity>.
- 75 Mistry et al. "New Framework."
- 76 Gopnik, A. (2009). *The Philosophical Baby: What Children's Minds Tell Us About Truth, Love, and the Meaning Of Life*. New York: Picador.
- 77 Gopnik. *The Philosophical Baby*, 36.
- 78 Braveman, P., and Egerter, S. (2013). "Overcoming Obstacles to Health in 2013 and Beyond." Robert Wood Johnson Foundation Commission to Build a Healthier America.
- 79 Conti and Heckman. "The Developmental Approach"; Diamond. "Interplay of Biology," 1; Alliance for Early Success and Child Trends (2013). "The Research Base for a Birth Through Age Eight State Policy Framework. Issue brief. [http://www.earlysuccess.org/sites/default/files/website\\_files/files/B8%20Policy%20Framework%20Research%20At%20a%20Glance.pdf](http://www.earlysuccess.org/sites/default/files/website_files/files/B8%20Policy%20Framework%20Research%20At%20a%20Glance.pdf).
- 80 American Academy of Pediatrics. "Literacy Promotion," 2.
- 81 American Academy of Pediatrics (2014). "Literacy Promotion: An Essential Component of Primary Care Pediatric Practice (Policy Statement)." *Pediatrics*, Vol. 134, No. 2, 1-6.
- 82 American Academy of Pediatrics. "Literacy Promotion," 3.
- 83 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. <http://developingchild.harvard.edu/resources/>.
- 84 Moffitt, T., Arseneault, L., Belsky, D., Dickson, N., Hancox, R., Harrington, H., . . . and Ross, S. (2011). "A Gradient of Childhood Self-Control Predicts Health, Wealth, and Public Safety." *Proceedings of the National Academy of Sciences*, Vol. 108, No. 7, 2693-2698.
- 85 Tough, P. (2012). *How Children Succeed: Grit, Curiosity, and the Hidden Power of Character*. New York: Houghton Mifflin Harcourt; Heckman, J., Pinto, R., and Savelyev, P. (2013). "Understanding the Mechanisms Through Which an Influential Early Childhood Program Boosted Adult Outcomes." *American Economic Review*, Vol. 103, No. 6, 2052-2086; Heckman, J., Pinto, R., and Savelyev, P. (n.d.) "Perry Preschool and Character: Character Skills Are More Important Than IQ in Driving Better Life Outcomes." <http://www.heckmanequation.org/content/resource/research-summary-perry-preschool-and-character-skill-development>.
- 86 Center on the Developing Child. "Building the Brain's 'Air Traffic Control System'"; Heckman et al. "Understanding the Mechanisms."
- 87 Center on the Developing Child. "Building the Brain's 'Air Traffic Control System'"; Heckman et al. "Understanding the Mechanisms."

## ENDNOTES

- 88 Friedman-Krauss and Barnett. "Early Childhood Education," 1.
- 89 C-SPAN3 (2014). "Early childhood health care." <http://www.c-span.org/video/?317147-1/report-improving-health-america>.
- 90 Regenstein, E., and Romero-Jurado, R. (forthcoming 2014). "A Framework for Rethinking State Education Accountability and Supporting Birth Through High School." Ounce of Prevention Fund; Dealy, K. (2006). "Foundations: How States Can Plan and Fund Programs for Babies and Toddlers." Ounce of Prevention Fund. <http://www.ounceofprevention.org/news/pdfs/Foundations.pdf>; Miller, S. (2008). "Secure Attachment." Ounce of Prevention Fund. <http://www.ounceofprevention.org/research/pdfs/SecureAttachment.pdf>.
- 91 La Paro, K., Hamre, B., Locasale-Crouch, J., Pianta, R., Bryant, D., Early, D., ... and Burchinal, M. (2009). "Quality in Kindergarten Classrooms: Observational Evidence for the Need to Increase Children's Learning Opportunities in Early Education Classrooms." *Early Education and Development*, Vol. 20, No. 4, 657–692; Pianta, R. C., and Hamre, B. K. (2009). "Conceptualization, Measurement, and Improvement of Classroom Processes: Standardized Observation Can Leverage Capacity." *Educational Researcher*, Vol. 38, No. 2, 109–119; Sabol, T., Soliday Hong, S., Pianta, R., and Burchinal, M. (2013). "Can Rating Pre-K Programs Predict Children's Learning?" *Science*, Vol. 341, 845–846; Dealy. "Foundations"; Miller. "Secure Attachment"; Dealy, K., Pacchiano, D., and Shimpi, P. (n.d.) *The Language of Babies, Toddlers, and Preschoolers: Connecting Research to Practice*. Ounce of Prevention Fund. <http://www.ounceofprevention.org/languageofbabies/index.html#/1/>.
- 92 Regenstein and Romero-Jurado. "A Framework for Rethinking"; La Paro et al. "Quality in Kindergarten Classrooms"; Pianta and Hamre. "Conceptualization, Measurement, and Improvement"; Sabol et al. "Can Rating Pre-K Programs Predict"; Dealy. "Foundations"; Miller. "Secure attachment"; Dealy et al. "The Language of Babies."
- 93 Miller. "Secure Attachment."
- 94 Wechsler, N. (2005) "Passing It On: Lessons in Relationships." *Zero to Three*, Vol. 25, No. 4, 14–21.
- 95 Olds, D., Henderson, C., Chamberlin, R., and Tatelbaum, R. (1986). "Preventing Child Abuse and Neglect: A Randomized Trial of Nurse Home Visitation." *Pediatrics*, Vol. 78, No. 1, 65–78; Hans, S., Thullen, M., Henson, L., Lee, H., Edwards, R., and Bernstein, V. (2013). "Promoting Positive Mother-Infant Relationships: A Randomized Trial of Community Doula Support for Young Mothers." *Infant Mental Health Journal*, Vol. 34, No. 5, 446–457.
- 96 Olds et al. "Preventing Child Abuse."
- 97 Bronfenbrenner, U. (1994). "Ecological Models of Human Development." In *International Encyclopedia of Education*, Vol. 3, 2nd ed. Oxford: Elsevier. <http://www.psy.cmu.edu/~sieglar/35bronfenbrenner94.pdf>
- 98 Olds, D. L., and Kitzman, H. (1993). "Review of Research on Home Visiting for Pregnant Women and Parents of Young Children." *Future of Children*, Vol. 3, No. 3, 53–99.
- 99 Olds, D., Henderson, C., Tatelbaum, R., and Chamberlin, R. (1986). "Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visiting." *Pediatrics*, Vol. 77, No. 1, 16–28.
- 100 Edwards, R., Thullen, M., Korfmacher, J., Lantos, J., Henson, L., and Hans, S. (2013). "Breastfeeding and Complementary Food: Randomized Trial of Community Doula Home Visiting." *Pediatrics*, Vol. 132, Supp. 2, S160–S166.
- 101 Gripshover, S., and Markman, E. (2013). "Teaching Young Children a Theory of Nutrition: Conceptual Change and the Potential for Increased Vegetable Consumption." *Psychological Science*, Vol. 24, No 8, 1541-1553.
- 102 Hale, B., Seitz, V., and Zigler, E. (1990). "Health Services and Head Start: A Forgotten Formula." *Journal of Applied Developmental Psychology*, No. 11, 447–458.

## ENDNOTES

- 103 Barnett, W., and Brown, K. (2000). "Issues in Children's Access to Dental Care Under Medicaid." American Dental Association; Abbot-Shim, M., Lambert, R., and McCarty, F. (2003). "A Comparison of School Readiness Outcomes for Children Randomly Assigned to a Head Start Program and the Program's Wait List." *Journal of Education for Students Placed at Risk*, Vol. 8, No. 2, 191–314.
- 104 Belfield, C., and Kelly, I. (2013). "Early Education and Health Outcomes of a 2001 U.S. Birth Cohort." *Economics and Human Biology*, Vol. 11, 310–325.
- 105 Schmit, S. (2013). "Early Head Start Participants, Programs, Families and Staff in 2012." Center for Law and Social Policy.
- 106 Olds et al. "Improving the Delivery."
- 107 Ibid.
- 108 Kozhimannil, K., Hardeman, R., Attanasio, L., Blauer-Peterson, C., and O'Brien, M. (2013). "Doula Care, Birth Outcomes, and Costs Among Medicaid Beneficiaries." *American Journal of Public Health*, Vol. 103, No. 4, 113–121.
- 109 Yarbrough, K. (2005). "The First Days of Life: Adding Doula to Early Childhood Programs." Ounce of Prevention Fund; Kennell, J., Klaus, M., McGrath, S., Robertson, S., and Hinkley, C. (1991). "Continuous Emotional Support During Labor in a U.S. Hospital: A Randomized Controlled Trial." *Journal of the American Medical Association*, Vol. 265, No. 17; Scott, K., Berkowitz, G., and Klaus, M. (1999). "A Comparison of Intermittent and Continuous Support During Labor: A Meta-Analysis." *American Journal of Obstetrics and Gynecology*, Vol. 180, No. 5, 1054–1059; Sosa, R., Kennell, J., Klaus, M., Roberson, S., and Urrutia, J. (1980). "The Effects of Supportive Companion on Perinatal Problems, Length of Labor and Mother-Infant Interaction." *New England Journal of Medicine*, Vol. 303, No. 11, 597–600; Zhang, J., Bernasko, J., Leybovich, E., Fahs, M., and Hatch, M. (1997). "Continuous Labor Support From Labor Attendant for Primiparous Women: A Meta-Analysis." *Obstetrics and Gynecology*, Vol. 88, 739–744.
- 110 Kitzman, H., Olds, D., Sidora, K., Henderson, C., Jr., Hanks, C., Cole, R., ... and Glazner, J. (2000). "Enduring Effects of Nurse Home Visitation on Maternal Life Course." *Journal of the American Medical Association*, Vol. 283, No. 15, 1983–1989.
- 111 Yarbrough, K. (2005). "The First Days of Life: Adding Doula to Early Childhood Programs." Ounce of Prevention Fund; Manning-Orenstein, G. (1998). "A Birth Intervention: The Therapeutic Effects of Doula Support Versus Lamaze Preparation on First-Time Mothers' Working Models of Caregiving." *Alternative Therapies*, Vol. 4, No. 4, 73–81; Wolman, W., Chalmers, B., Hofmeyr, G., Nikodem, V. (1993). "Postpartum Depression and Companionship in the Clinical Birth Environment: A Randomized, Controlled Study." *American Journal of Obstetrics and Gynecology*, Vol. 168, No. 5, 1388–1393.
- 112 Edwards et al. "Breastfeeding and Complementary Food."
- 113 Daro, D. (2006). "Home Visitation: Assessing Progress, Managing Expectations." Ounce of Prevention Fund and Chapin Hall Center for Children; Olds et al. "Improving the Delivery of Prenatal Care"; Olds, D., Henderson, C., and Kitzman, H. (1993). "Does Prenatal and Infancy Nurse Home Visitation Have Enduring Effects on Qualities of Parental Caregiving and Child Health at 25 to 50 Months of Life?" *Pediatrics*, Vol. 93, No. 1, 89–98.
- 114 Belfield and Kelly. "Early Education and Health Outcomes."
- 115 Wen, L., Baur, L., Simpson, J., Rissel, C., Wardle, K., and Flood, V. (2012). "Effectiveness of Home Based Early Intervention on Children's BMI at Age 2: Randomized Controlled Trial." *British Medical Journal*, Vol. 344. <http://www.bmj.com/content/344/bmj.e3732>.
- 116 Hale, et al. "Health Services and Head Start."
- 117 Belfield and Kelly. "Early Education and Health Outcomes."

## ENDNOTES

- 118 Currie, J., and Thomas, D. (1995). "Does Head Start Make a Difference?" *American Economic Review*, Vol. 85, 341–364; Ludwig, J., and Miller, D. (2007). "Does Head Start Improve Children's Life Chances? Evidence From a Regression Discontinuity Design." *Quarterly Journal of Economics*, Vol. 122, 159–208; Yoshikawa, H., Weiland, C., Brooks-Gunn, J., Burchinal, M., Espinoza, L., Gormley, W., ... and Zaslow, M. (2013). "Investing in Our Future: The Evidence Base on Preschool Education." *Society for Research in Child Development*. <http://fcd-us.org/sites/default/files/Evidence%20Base%20on%20Preschool%20Education%20FINAL.pdf>.
- 119 Olds et al. "Does Prenatal and Infancy Nurse Home Visitation."
- 120 Olds et al. "Preventing Child Abuse and Neglect".
- 121 Olds, et al. "Does Prenatal and Infancy Nurse Home Visitation"; Olds et al. "Preventing Child Abuse and Neglect"; Dodge, K., Goodman, W., Murphy, R., O'Donnell, K., and Sato, J. (2013). "Randomized Controlled Trial of Universal Postnatal Nurse Home Visiting: Impact on Emergency Care." *Pediatrics*, Vol. 132, No. Supplement 2, S140–S146.
- 122 Ludwig and Miller. "Does Head Start Improve Children's Life Chances?"
- 123 Eckenrode, J., Campa, M., Luckey, D., Henderson, C., Jr., Cole, R., Kitzman, H., ... and Olds, D. (2010). "Long-Term Effects of Prenatal and Infancy Nurse Home Visitation in the Life Course of Youths." *Archives of Pediatric and Adolescent Medicine*, Vol. 164, No. 1, 9–15; Campbell, F., Ramey, C. (2007). "Carolina Abecedarian Project." Presentation at the National Invitational Conference of the Early Childhood Research Collaborative.
- 124 Barnett, W. and Brown, K. (2000). "Issues in Children's Access to Dental Care Under Medicaid." *American Dental Association*; Abbot-Shim, M., Lambert, R., and McCarty, F. (2003). "A Comparison of School Readiness Outcomes for Children Randomly Assigned to a Head Start Program and the Program's Wait List." *Journal of Education for Students Placed at Risk*, Vol. 8, No. 2, 191–314.
- 125 Ibid..
- 126 Belfield and Kelly. "Early Education and Health Outcomes."
- 127 Barnett, W. (2011). "Effectiveness of Early Educational Intervention." *Science*, Vol. 333, 975–978.
- 128 Barnett, W., and Ackerman, D. (2006). "Costs, Benefits, and Long-Term Effects of Early Care and Education Programs: Recommendations and Cautions for Community Developers." *Journal of the Community Development Society*, Vol. 37, No. 2, 86–100.
- 129 Kitzman et al. "Enduring Effects"; Olds et al. "Does Prenatal and Infancy Nurse Home Visitation."
- 130 Barnett. "Effectiveness of Early Educational Intervention"; Kitzman et al. "Enduring Effects."
- 131 Belfield and Kelly. "Early Education and Health Outcomes."
- 132 Ibid.
- 133 Kitzman et al. "Enduring Effects".
- 134 Campbell, F., Conti, G., Heckman, J., Moon, S., Pinto, R., Pungello, E., and Pan, Y. (2014). "Early Childhood Investments Substantially Boost Adult Health." *Science*, Vol. 343, 1478–1485.
- 135 Ibid.
- 136 Ibid.
- 137 Ibid.
- 138 Ibid.
- 139 Ibid.
- 140 Ibid.
- 141 Ibid.
- 142 Belfield, C., Nores, M., Barnett, S., and Schweinhart, L. (2006). "The High/Scope Perry Preschool Program: Cost-Benefit Analysis Using Data From the Age-40 Followup." *Journal of Human Resources*, Vol. 41, No. 1, 162–190; Palfrey, J., Hauser-Cram, P., Bronson, M., Warfield, M., Sirin, S., and Chan, E. (2005). "The Brookline Early Education Project: A 25-Year Follow-Up Study of a Family-Centered Early Health and Development Initiative." *Pediatrics*, Vol. 116, No. 1, 144–152; Deming, D. (2009). "Early Childhood

## ENDNOTES

- Intervention and Life-Cycle Skill Development: Evidence From Head Start." *American Economic Journal: Applied Economics*, Vol. 1, No. 3, 111–134.
- 143 McLaughlin, A., Campbell, F., Pungello, E., and Skinner, M. (2007). "Depressive Symptoms in Young Adults: The Influences of the Early Home Environment and Early Educational Child Care." *Child Development*, Vol. 78, No. 3, 746–756; Friedman-Krauss and Barnett. "Early Childhood Education."
- 144 Campbell, F., Ramey, C., Pungello, E., Sparling, J., and Miller-Johnson, S. (2002). "Early Childhood Education: Young Adult Outcomes From the Abecedarian Project." *Applied Developmental Science*, Vol. 6, No. 1, 42–57; Belfield et al. "High/Scope Perry Preschool Program"; Schweinhart, L., Montie, J., Xiang, Z., Barnett, W., Belfield, C., and Nores, M. (2005). "Lifetime Effects: The High/Scope Perry Preschool Study Through Age 40." High/Scope Educational Research Foundation.
- 145 Campbell et al. "Early Childhood Investments."
- 146 Schweinhart et al. "Lifetime Effects"; Belfield et al. "High/Scope Perry Preschool Program."
- 147 Campbell and Ramey. "Carolina Abecedarian Project"; Belfield et al. "High/Scope Perry Preschool Program"; Friedman-Krauss and Barnett. "Early Childhood Education."
- 148 Campbell et al. "Early Childhood Investments."
- 149 Belfield et al. "High/Scope Perry Preschool Program."
- 150 Campbell et al. "Early Childhood Investments."
- 151 Ibid.
- 152 Arkin et al. "Time to Act."
- 153 Academic Pediatric Association Task Force on Childhood Poverty. (April 2013). "A Strategic Road-Map: Committed to Bringing the Voice of Pediatricians to the Most Important Problem Facing Children in the US Today." [http://whsaonline.org/wp-content/uploads/2013/05/APA\\_Task\\_Force\\_Strategic\\_Road\\_Mapver3.pdf](http://whsaonline.org/wp-content/uploads/2013/05/APA_Task_Force_Strategic_Road_Mapver3.pdf).
- 154 Ibid., 4.
- 155 Coley, R., and Baker, B. (2013). "Poverty and Education: Finding the Way Forward." Educational Testing Service. [http://www.ets.org/s/research/pdf/poverty\\_and\\_education\\_report.pdf](http://www.ets.org/s/research/pdf/poverty_and_education_report.pdf); National Center for Education Statistics (2012). Digest of Education Statistics (NCES 2012-001). Washington, DC: Institute of Education Sciences.
- 156 Barnett, W., Carolan, M., Fitzgerald, J., and Squires, J. (2012). "The State of Preschool, 2012." National Institute for Early Education Research.
- 157 Robert Wood Johnson Foundation Commission to Build a Healthier America (2009). "Improving the Health of all Americans by Focusing on Early Childhood." Issue brief. <http://www.rwjf.org/content/dam/web-assets/2009/07/improving-the-health-of-all-americans-by-focusing-on-the-early-y>.
- 158 Bruner, C. (2009). "Connecting Child Health and School Readiness." Colorado Trust.
- 159 Medical Home Initiatives for Children With Special Needs, Ideas That Work, and American Academy of Pediatrics. (n.d.) "The Medical Home and Early Intervention Programs." <http://www.medicalhomeinfo.org/downloads/pdfs/eibrochuref.pdf>.
- 160 Yoshikawa et al. "Investing in Our Future."
- 161 Belfield et al. "High/Scope Perry Preschool Program."
- 162 McLaughlin, A., Campbell, F., Pungello, E., and Skinner, M. (2007). "Depressive Symptoms in Young Adults: The Influences of the Early Home Environment and Early Educational Child Care." *Child Development*, Vol. 78, No. 3, 746–756.
- 163 Campbell et al. "Early Childhood Education: Young Adult Outcomes"; Muennig, P., Robertson, D., Johnson, G., Campbell, F., Pungello, E., and Neidell, M. (2011). "The Effect of an Early Education Program on Adult Health: The Carolina Abecedarian Project Randomized Controlled Trial." *American Journal of Public Health*, Vol. 101, No. 3, 512–516; Campbell et al. "Early Childhood Investments."

## ENDNOTES

- 164 Muennig et al. "The Effect of an Early Education Program"; Campbell et al. "Early Childhood Investments"; Campbell and Ramey. "Carolina Abecedarian Project."
- 165 Campbell et al. "Early Childhood Investments"; Heckman Equation (April 2014). "The ABCs of Improving Health Outcomes With Early Childhood Development." Slide presentation. <http://heckmanequation.org/content/resource/slide-presentation-abcs-improving-health-outcomes-early-childhood-development>.
- 166 Campbell et al. "Early Childhood Investments"; Heckman Equation. "ABCs of Improving Health Outcomes."
- 167 Olds et al. "Improving the Delivery of Prenatal Care."
- 168 Ibid.
- 169 Kitzman et al. "Enduring Effects."
- 170 Olds et al. "Does Prenatal and Infancy Nurse Home Visitation."
- 171 Olds et al. "Preventing Child Abuse and Neglect".
- 172 Olds et al. "Prenatal and Infancy Nurse Home Visitation.
- 173 Kitzman et al. "Enduring Effects."
- 174 Eckenrode et al. "Long-Term Effects of Prenatal and Infancy."
- 175 Zigler, E., Piotrkowski, C., and Collins, R. (1994). "Health Services in Head Start." Annual Review of Public Health, Vol. 15, 511-534.
- 176 US Department of Health and Human Services, Administration for Children and Families, Office of Head Start. "Head Start Program Performance Standards." (n.d.). 45 CFR Chapter XIII (10-1-09 Edition). <http://eclkc.ohs.acf.hhs.gov/hslc/standards/Head%20Start%20Requirements/45-cfr-chapter-xiii/45-cfr-chap-xiii-eng.pdf>.
- 177 Hale, et al. "Health Services and Head Start"; Belfield and Kelly. "Early Education and Health Outcomes."
- 178 Currie and Thomas. "Does Head Start Make a Difference?"; Ludwig and Miller. "Does Head Start Improve Children's Life Chances?"; Yoshikawa et al. "Investing in Our Future."
- 179 US Department of Health and Human Services, Administration for Children and Families (2010). "Head Start Impact Study: Final report."
- 180 Belfield and Kelly. "Early Education and Health Outcomes."
- 181 Deming. "Early Childhood Intervention."
- 182 Anderson, K., Foster, J., and Frisvold, D. (2010). Investing in health: The Long-Term Impact of Head Start on Smoking. *Economic Inquiry*, Vol. 48, 587-602.
- 183 Currie and Thomas. "Does Head Start Make a Difference?"; Ludwig and Miller. "Does Head Start Improve Children's Life Chances?"; Yoshikawa et al. "Investing in Our Future."
- 184 Reynolds, A., Temple, J., Ou, S., Arteaga, I., and White, B. (2011). "School-Based Early Childhood Education and Age-28 Well-Being: Effects by Timing, Dosage, and Subgroups." *Science*, Vol. 333, 360-364.



For more information, please contact:

Tony Raden

Senior Vice President, Research and Policy Initiatives

[araden@theounce.org](mailto:araden@theounce.org)

Ounce of Prevention Fund

33 West Monroe Street, Suite 2400, Chicago, IL 60603

p 312.922.3863

[theOunce.org](http://theOunce.org)