Healthy Starts for All
Policy Prescriptions

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Context: The Robert Wood Johnson Foundation Commission to Build a Healthier America recommended that substantial resources be committed to ensure all children have high-quality developmental experiences through family support, child care, and early education. This article reviews and updates the evidence base informing that recommendation and explores federal and state policy challenges involved in implementing it.

Evidence acquisition: Reviews of published research, analyses of federal child health data sets, consultation with early development and state and local program experts, and site visits were conducted between 2006 and 2009, with statistics and literature reviews updated through mid-2010.

Evidence synthesis: The economic and social conditions of children's lives, especially in the early years, affect their health and development in childhood and across the life course. Forty percent of children in the U.S. live in families with incomes <200% of the federal poverty level and consequently are at higher risk of poor health and development. Recent advances in neuroscience and life course epidemiology reveal that these children are more likely to experience chronic or "toxic" stress resulting from frequent or sustained adverse experiences, increasing their lifetime risk of chronic disease. Intervening early in childhood by providing a safe, stable, nurturing, and stimulating environment can improve cognitive, emotional, and behavioral development and health outcomes in children—particularly socially and economically disadvantaged children—and both their health and social and economic well-being as adults.

Conclusions: Coordination of multiple programs and funding sources, along with higher standards of accountability for services, outcomes, and ongoing evaluation of effectiveness, are needed to ensure more effective state and local programs providing early developmental support. Federal leadership and funding are needed to ensure that children at high risk for multiple adverse exposures and their families receive attention and services as early as possible.
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Introduction

Addressing public and private sector leaders and decision makers in its 2009 report, "Beyond Health Care: New Directions to a Healthier America," The Robert Wood Johnson Foundation Commission (the commission)[1] led with the following recommendation:

> Ensure that *all* children have high-quality early developmental support (child care, education and other services). This will require committing substantial additional resources to meet the early developmental needs particularly of children in low-income families. Children who do not receive high-quality care, services and education begin life with a distinct disadvantage and a higher risk of becoming less healthy adults, and the evidence is overwhelming that too many children are facing a lifetime of poorer health as a result. Helping every child reach full health potential requires strong support from parents and communities, and must be a top domestic priority for the nation. New resources must be directed to this goal, even at the expense of other national priorities, and must be tied to greater measurement and accountability for impact of new and existing early childhood programs.[2]

The commission's recommendation was informed by the growing scientific consensus and evidence about promising policies and interventions to support at-risk families and children. Ten years ago, the IOM and the National Research Council issued a report that repre-

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sented a new scientific understanding of the dynamics of child health and well-being. *From Neurons to Neighborhoods: the Science of Early Childhood Development*[3] presented a biodevelopmental framework that integrated insights about early life across the disciplinary domains of learning, health, and behavioral sciences. Over the past decade, interdisciplinary work by neurophysiologists, geneticists, epidemiologists, and developmental and life-course researchers, among others, has revealed how disease in adulthood can begin with early life experience. This work underscores the importance of supporting families and young children at risk for inadequate care and developmental experiences as a key strategy for preventing disease and promoting lifelong health.

This article presents a brief synopsis of current knowledge regarding the implications of early experiences for health throughout life. It updates information developed for the commission regarding the health of American infants, children, and youth,[2,4] identifies evidence-based policies and interventions to improve developmental and health outcomes for young children, and considers current state and federal policies and programmatic initiatives. The paper concludes with the authors' recommendations for strengthening supports and services for families and young children at risk of poor developmental outcomes. Two accompanying articles in this supplement to the *American Journal of Preventive Medicine* take up the commission's other nine recommendations, which address promoting healthy behaviors[5] and healthy community environments.[6]

Evidence Acquisition

The evidence collected and synthesized for consideration by the commission and updated for this publication included reviews of child health and development research, primarily those conducted over the past 20 years, along with evaluations and syntheses of evaluations of interventions to improve cognitive, social, and emotional development, particularly for socially and economically disadvantaged children. The charge to the commission from its sponsor, the Robert Wood Johnson Foundation (RWJF), directed that the evidence presented be relevant to and compelling in U.S. policy contexts. Hence the review was restricted to programs and policies implemented in the U.S. The commission's charge also excluded reviewing and making recommendations for clinical healthcare services, as these issues were addressed by other RWJF efforts. Some of the strongest evidence regarding the impacts of early childhood interventions was quantitative data from experimental or observational studies. See Braveman and colleagues[7] in this supplement to the *American Journal of Preventive Medicine* for a thorough discussion of the types of evidence the commission considered. In addition to the literature review, the commission heard testimony from early child development experts and program innovators at both site visits and a field hearing focused on nonmedical initiatives that have an impact on children's health.

A Link Between Early Life Experience and Later Health

A large body of evidence has accumulated, revealing that early life experiences can affect adult health long before disease is manifest. Researchers with the National Scientific Council on the Developing Child have described the pathways by which young children exposed to certain types of stress incur multiple health risks and physiologic assaults.[8–10] In this context, "stress" refers to the "physiological expression of the stress response system"—not the specific stress-inducing experience or stressor.[11] Shonkoff has defined three different kinds of stress affecting young children's development:

1. **Positive stress,** evoked by routine, short-lived challenges such as getting an injection, meeting someone new, or having a toy taken away. Positive stress promotes healthy development, if experienced in the context of stable, supportive relationships.
2. **Tolerable stress,** evoked by adverse experiences that are more intense but still short-lived, such as the death of a loved one, a natural disaster, or parents' separation or divorce. If the stress occurs for a limited time and the child is supported by stable, protective relationships, the short-term disruption of normal brain circuitry and function is reparable or compensable.
3. **Toxic stress,** resulting from frequent or sustained adverse experiences such as extreme poverty, physical or emotional abuse, chronic neglect, maternal depression, parental substance abuse, and exposure to violence, without the buffer of adult support. Toxic stress disrupts healthy brain development and affects other organs; it may also dysregulate the physiologic systems involved in the stress response, establishing persistently high or low thresholds for responding to stress, thereby increasing risks of stress-related disease and cognitive impairment over a lifetime.[11]

The relationship between serious adverse experiences in childhood—sources of toxic stress—and risk of disease in adulthood has been documented through the retrospective Adverse Childhood Experiences (ACE) study. This collaboration between the CDC and Kaiser Permanente retrospectively examined the current health status and behaviors and premature deaths among a sample of more than 17,000 adults along with their past history of abuse, neglect, and family dysfunction. Extent of exposure to ACE showed a strong, graded relationship with conditions and outcomes including ischemic heart disease, cancer, chronic lung disease, depression, alcoholism, illicit drug use, sexually transmitted diseases, suicide attempts, smoking, and premature death.[10,12–15]

In addition to this epidemiologic evidence, understanding is growing of the underlying physiologic processes that account for socioeconomic differences in the experience of stress. One recent study that monitored physiologic markers of stress response (salivary cortisol levels) over 2 years found that children with lower SES had greater increases in daily cortisol output over the study period than children with higher SES.[16] Factors that accounted for this difference included the greater tendency of lower SES children to perceive threats in socially ambiguous situations and their more frequent experience of disorder and lack of routines in daily life ("family chaos"). These findings, taken together with the risk profile for U.S. children sketched in the following section, suggest the magnitude of the challenge to improve prospects for good health among the youngest Americans.

American Children at Risk

American children experience a high prevalence of conditions that compromise their care and development, including insufficient family income to meet basic living needs, food insecurity, unstable housing and homelessness, environmental toxins, compromised caregiving due to parental mental illness and substance abuse, and a lack of high-quality child care.

Inadequate Family Income

Children are more likely than any other age group to live in homes with inadequate income and other resources for meeting basic needs, with consequences for healthy development more extensive than simply material deprivations. Child poverty rates are high in the U.S. In 2008, 14 million American children aged <18 years—one in five—lived in families with incomes at or below the federal poverty level.[17] Twenty-six of 30 industrialized nations have lower childhood poverty rates than the U.S., with four Scandinavian countries the lowest at rates between 3% and 5%.[18] Black and Hispanic children are more likely to be in poverty than non-Hispanic white and Asian children (Figure 1).[19] The federal poverty level (FPL) was $22,050 for a family of four in 2009; however, a more realistic estimate of the level of resources needed to cover basic necessities is twice the FPL.[20] In 2008, almost 30 million U.S. children—two in every five—lived in low-income families (<200% FPL).[21] Throughout this article, unless noted otherwise, "low-income" refers to households with incomes <200% FPL.

Younger children are at even higher risk of living in low-income families. In 2008, 44% of children aged <6 years lived in low-income families, with the risk for young black, Hispanic, and American Indian children more than twice that for white and Asian children.[22] Children living in households headed by single mothers are especially likely to be poor or low-income (Figure 1). In 2008, 43% of children in these households were poor compared to 10% of children living in households with married parents.[23] Among children aged <3 years who live with a single parent, almost three fourths are in low-income households.[24]

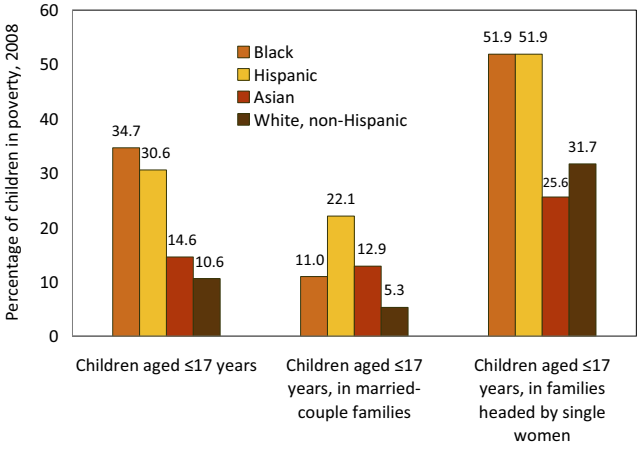

Figure 1. Child poverty by racial/ethnic group and family structure, 2008[19,23]
Data source: Current Population Survey, 2009 Annual Social and Economic Supplement

Food Insecurity

In 2008, 16.7 million children (22.5%) lived in food-insecure households—households that at times were uncertain of having or unable to acquire enough food for all household members because they had insufficient money and other resources for food.[25] Of these, 1.1 million children lived in households with very low food security, where one or more members had their food intake reduced and eating patterns disrupted.[25] Even when children in food-insecure households do not have their food intake disrupted, their health and development can still be affected. Household food insecurity has been associated with poor health status, acute illness, and behavior problems in children, and with inadequate access to health care.[26–28] A recent study has reported that children aged 0–5 years who experienced hunger at least once over that period have been found to have a much higher risk of poor health (OR=2.5) 10 years later than children who never went hungry.[29] Household food insecurity in infancy has been found to affect attachment and cognitive development in toddlerhood, mediated by maternal depression and parenting practices.[30]

Housing Instability and Homelessness

Housing instability and homelessness are also consequences of inadequate family resources, among other factors. The 2002 National Survey of America's Families (NSAF) shows that 30% of low-income children lived in

households with housing instability—defined as frequent moves, difficulty paying rent, spending more than 50% of household income on housing, being evicted or living in overcrowded conditions.[28] Approximately 1.5 million children (one of every 50) in the U.S. experience homelessness each year[31] and 15% of children living in extreme poverty (<50% FPL) at birth experienced homelessness by age 5 years.[32] Housing instability is associated with delays in children's receipt of health care and their increased use of emergency departments for primary care.[28] It is also associated with poor academic performance, lower high school graduation rates, poor school readiness skills, and increased behavior problems in children.[32,33] Since the start of the most recent economic recession at the end of 2007, the economic situation of many children has considerably worsened. Nineteen states collectively reported a 49% increase in homeless children in 2009.[34]

Environmental Toxins

Exposures to environmental toxins contribute to health and developmental deficits, particularly among disadvantaged children. For example, although blood lead levels have substantially decreased in the past 30 years, in 2007 it was found that 1% of American children aged <6 years who were tested had elevated blood lead levels (levels greater or equal to 10 μg/dL, also referred to as lead poisoning).[35] Exposure to lead is associated with lower IQ and behavioral problems; blood lead levels as low as 2.1 μg/dL have shown effects on IQ.[36] Poor children aged 1–5 years are approximately 2.5 times as likely to have blood lead levels greater or equal to 2.5 μg/dL as children who are not poor.[37] Only levels under 1 μg/dL appear to be safe (i.e., "to produce minimal cognitive effects").[38] Approximately 16.7 million American children aged <6 years have blood lead levels of 1 μg/dL or higher.[35,38] Muennig's economic analysis estimated that reducing blood lead levels to less than 1 μg/dL among all U.S. children aged ≤5 years would save approximately $1.2 trillion through reduced crime and increased on-time high school graduation rates.[38]

Compromised Caregiving

Mental illness and substance abuse touch many American children. Approximately 7% of parents have severe or major depression in a given year, with 15.6 million children living with an adult who had major depression.[39] Overall, mothers are significantly more likely to experience depression than fathers.[39] Within their first year, about 9% of infants will be exposed to their mother's major depression.[40] Low-income mothers, unemployed fathers or fathers not in the workforce, and divorced, widowed, or separated parents experience depression or depressive symptoms at higher rates than their counterparts.[39–41] Parents who have not graduated from high school are eight times more likely to have depressive symptoms than parents who are college graduates (Figure 2).[42] Data from the Early Childhood Longitudinal Study Birth Cohort revealed that one fourth of poor mothers with infants were moderately or severely depressed—more than twice the rate for nonpoor mothers with infants.[40,41]

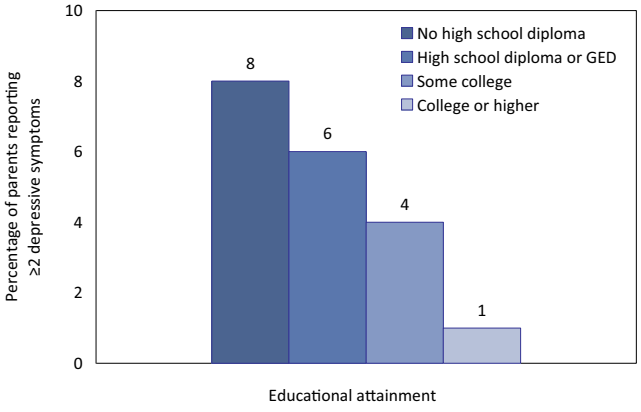

Figure 2. Percentage of parents with depressive symptoms by educational attainment, 2008
Source: Analyses by Child Trends of 2008 National Health Interview Survey data[42]
GED, General Educational Development test

The number of stressors—financial, social, and related to a child's health—that a mother reports is significantly related to her mental health. Mistry et al.[43] estimated a risk of poor mental health more than ten times greater for mothers reporting two or more stressors compared with mothers who reported none. Depression, especially in mothers, is associated with less warmth for the child and more negative, hostile, and withdrawn parenting, and with poor child health, development, and behavior, particularly in conjunction with other risk factors.[39]

People with depression often have other mental health or substance abuse problems.[39] Nearly 12% of children aged <18 years—8.3 million—"lived with at least one parent who was dependent on or abused alcohol or an illicit drug during the past year."[44] Younger children and children living in father-only households are somewhat more likely to be exposed. Parental substance dependence and abuse can result in children's neglect or abuse, poor health and development, and own dependence on or abuse of substances (Table 1).[45–48]

Inadequate Child Care Services

More than 12 million American children aged <6 years are in a child care setting, either home-based family daycare or a center, each week.[52] Yet, in total, only about 11 million legally operating child care spaces are available, and these

Table 1. Child maltreatment

Among American children aged <18 years, one in ten experienced some form of maltreatment (physical abuse, psychological or emotional abuse, neglect, and family abduction or custodial interference) in 2008, with a cumulative rate over the course of childhood almost twice that.[49] Children who have experienced maltreatment are at an increased risk for experiencing other forms of victimization such as physical or sexual assault and being exposed to violence.[49] Based on the Longitudinal Studies of Child Abuse and Neglect, two thirds of the children at elevated risk for maltreatment had at least one adverse exposure (physical abuse, sexual abuse, psychological maltreatment, caregiver problem drinking, caregiver depression, caregiver treated violently, and criminal behavior in the household) at age 4 years, with over 6% of the children experiencing four or more adverse exposures. One third of the children had caregivers who were depressed, and one fourth of the children had suffered psychological maltreatment. By age 6 years, the children with one adverse exposure at age 4 years were nearly twice as likely to be in poor physical health, and the ones with four or more adverse exposures were nearly three times more likely to have an illness requiring medical attention.[50] By age 12 years, only 10% of the children in this study had not experienced any adversity, including abuse, neglect, and household dysfunction, while more than 20% had experienced five or more adverse exposures. Children who had experienced five or more adverse exposures were nearly three times as likely to have somatic complaints.[51]

serve school-age children as well as infants, toddlers, and preschoolers. About one third of children aged <6 years in child care are in more than one care arrangement to meet parents' need for coverage during work hours.[52] In 2008, the annual cost for center-based care for an infant ranged from $4,600 to $15,900 and from $4,000 to $11,700 for a child aged 4 years.[53] In every region of the U.S., the average cost of infant care is higher than average family food expenditures, and in every state the cost of care for two children of any age was in the range of average mortgage payments and higher than median rents.[53]

Low-income families in particular have difficulty finding affordable, high-quality child care services for their young children. Children in poor and near-poor (income cutoff for near-poor varied, but was less than 200% FPL in the studies reviewed here) families are more likely to receive poor-quality child care and less likely to receive excellent-quality care—especially in the early years—than are children in higher-income families.[54] At the same time, poor and low-income families spend much greater shares of their income on child care (32% and 16%, respectively) than families with incomes ≥200% FPL (7%).[55] Of the 5.6 million American children aged <3 years who live in low-income families,[56] a total of 91,000 low-income infants and toddlers are served by Head Start and Early Head Start and another 480,000 receive federal subsidies for child care;[57] thus, just one in ten infants and toddlers in economically disadvantaged families receive federal financial support for these developmental and care services. The proportion of low-income children aged 3 or 4 years served by federally sponsored programs is greater; the inadequacy of services and supports is particularly great for infants and toddlers.

Child Health and Developmental Outcomes by SES

As seen in the accompanying overview article by Braveman and colleagues,[58] children's health varies dramatically by family income, education, and racial or ethnic group. Socioeconomic gradients exist across a range of child health indicators with children in the least-advantaged groups typically experiencing the worst health.[59–61] Figure 3 illustrates this; children in poor families were almost five times as likely to be in less than optimal health, compared with children in families with the highest incomes (≥400% FPL).[59] While children in middle-income families are less healthy than those with greater advantages, even children in the most-advantaged groups are not as healthy as they could be. Figure 3 presents a national benchmark, based on the lowest statistically reliable rate observed in any state among children whose families were not only higher income but also practiced healthy behaviors, which represents a level of health that should be attainable for all American children.[59]

Larson and Halfon found that, controlling for race/ethnicity, child age and sex, family structure and size, and health insurance coverage, compared with children in the highest-income families, children in impoverished families were still more than twice as likely to have the following conditions: less than optimal health, less than optimal oral health, diabetes, moderate/severe asthma, severe headaches, ear infection, problems with emotions/concentration/behavior, learning disabilities, behavior/conduct problems, and speech problems.[61] It should be noted that controlling for race/ethnicity made these estimates very conservative, because income does not capture the large differences in accumulated wealth and neighborhood socioeconomic conditions that have important health effects.

Differences in children's health and development by income and education are evident early on. As shown in Figure 4, children aged 4 months to 5 years in poor families are 2.6 times as likely as those in the highest-income families to be at high risk for developmental, behavioral, or social delays.[62] Differences in cognitive development at 24 months are also seen between children whose mothers have less than a high school degree and children whose mothers have at least a bachelor's

degree.[63] Childhood SES is also a powerful predictor of cardiovascular morbidity and mortality and of all-cause mortality later in life.[64] The more risks and adversity a child is exposed to the more likely he or she will experience behavioral problems and poor health and educational outcomes.[65,66] Parents in low-income and low-education households are themselves exposed to multiple stressors, including during pregnancy,[67] that undermine their capacity to provide their children with the stimulating and nurturing care and the safe and wholesome environments that the children need. Figure 5 shows the differences in young children's experience of positive and stimulating interactions with their mother by maternal educational attainment.[68]

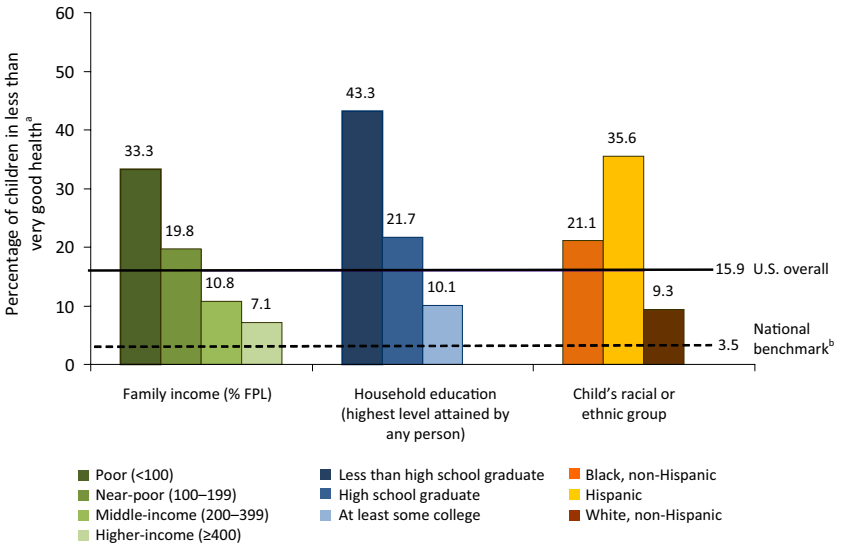

Figure 3. Child health status by family income, household education level, and child's racial or ethnic group[59]
[a]Aged ≤17 years; based on parental assessment and measured as poor, fair, good, very good, or excellent; health reported as less than very good was considered to be less than optimal.
[b]The national benchmark for children's general health status represents the level of health that should be attainable for all children in every state. The benchmark used here—3.5% of children with health that was less than optimal, seen in Colorado—is the lowest statistically reliable rate observed in any state among children whose families were not only higher income but also practiced healthy behaviors (i.e., nonsmokers and at least one person who exercised regularly). Rates with relative SEs of ≤30% were considered statistically reliable.
Data source: 2003 National Survey of Children's Health
FPL, federal poverty level

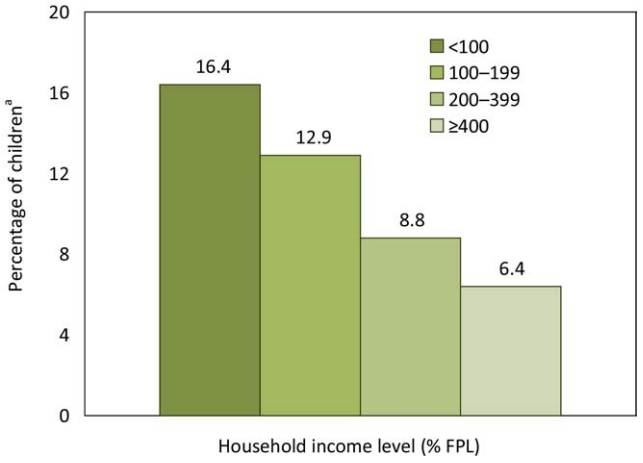

Figure 4. Percentage of children at high risk for developmental, behavioral, or social delays by household income, 2007[62]
[a]Aged 4 months to 5 years
Data source: 2007 National Survey of Children's Health
FPL, federal poverty level

When looking at family risk factors for children's development (poverty, single-parent family, low level of parental educational attainment, large family size, and inability to buy or own a home), Moore found that, while nearly two thirds of American children experienced no or only one of these risk factors, 7% of children experienced four or five of them.[65] As noted in the introduction, multiple adverse experiences put children at increased risk of toxic stress. Figures 2–5 reflect a characteristic gradient relating family income or maternal education to developmental risks or health outcomes for children. This pattern suggests that targeting interventions only to the worst-off children and families would fail to remedy many developmental and health shortfalls that occur throughout the child population.

The following section considers a variety of interventions that have been found effective in at least some contexts. The issues that remain unresolved are as much fiscal and political as programmatic: who should receive the services and the mechanisms through which they should be financed and provided.

Effective Interventions

Every child needs safe, stable, and nurturing relationships, first and foremost with their parents or other pri-

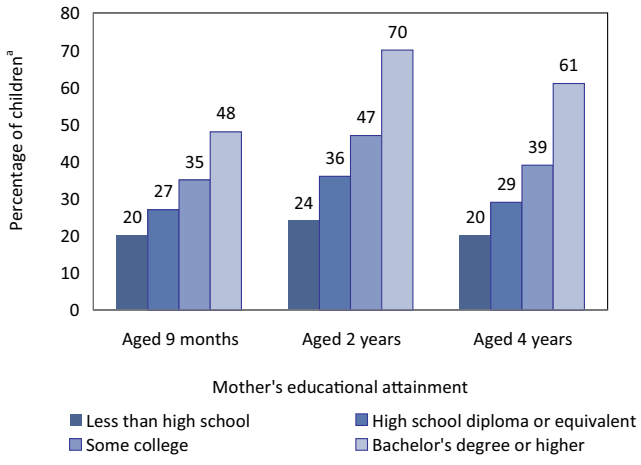

Figure 5. Stimulation level of child's environment by mother's educational attainment[68]
[a]Percentage of children read to, told stories, and sung to daily in a typical week by a family member: 2001–2002, 2003–2004, and 2005–2006
Data source: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B)

mary caregivers in the home, but also with others beyond the immediate family with whom the child—especially when very young—spends substantial amounts of time. Young children who are at risk for multiple adverse experiences, notably, those whose families have low incomes, are especially likely to benefit from programs that assist and support young families. In 2003, the Task Force on Community Preventive Services identified several early life interventions associated with positive health and developmental outcomes.[69,70]

Over the past decade additional evidence of the health impacts of these interventions has accumulated. A literature review of this evidence—updated for this paper—was conducted to inform the commission of the "best available" evidence of effective early childhood programs. Also, in 2009, the IOM Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth and Young Adults: Research Advances and Promising Interventions concluded that "Interventions that strengthen families, individuals, schools and other community organizations and structures have been shown to reduce MEB [mental, emotional, and behavioral] disorders and related problems. Family and early childhood interventions appear to be associated with the strongest evidence at this time."[71] The IOM committee's report includes an extensive review of family and early childhood development interventions, along with school and community interventions for older children, which covers much of the same material highlighted here. Based on the investigations and evidence synthesis conducted for the commission and subsequently by the authors of this paper, the following key interventions are considered.

Family Supports in Pregnancy, Infancy, and Early Childhood

Home visiting programs provide parental guidance and support services as a stand-alone intervention or in conjunction with center-based child development and care. Home visitors can be nurses, social workers, paraprofessionals, or volunteers, and programs vary in their methods and focus. While effect sizes tend to be small (0.1–0.2 of a SD when considered on an individual level), some home visiting programs have been associated with improved parenting attitudes and behavior, and improved children's socioemotional and cognitive development.[72] In addition, parents receiving home visiting services are more likely to continue their own education. Although home visiting programs in general have not been found to affect levels of child abuse or parents' levels of stress directly, by improving parenting practices and the home environment, child maltreatment is less likely.[73]

The most well-known home visiting program, the Nurse–Family Partnership (NFP), provides home visits to first-time low-income mothers and their families beginning in pregnancy and continuing through the child's second birthday. Since 1996 the program has served more than 110,000 families through public and private program sites in 375 counties in 29 states.[74] The NFP aims to: improve pregnancy outcomes by promoting healthy behaviors; improve child health, development and safety by promoting competent care-giving; and enhance parents' personal and economic development through pregnancy planning, educational achievement, and employment. NFP home visitors are highly trained registered nurses who carry a maximum of 25 cases and follow specific protocols during each visit, involving family members and friends in the program and helping families to use other community health and human services. Visits occur approximately every 1–2 weeks through most of the intervention.

The program has undergone three large randomized studies with up to 19 years of longitudinal follow-up. Modest significant effects from nurse visits have been shown for several measures of maternal health, child health and safety, and measures of adolescent delinquency.[75,76] Girls whose mothers participated in the program were less likely to have been arrested or convicted compared to girls whose mothers did not participate in the program, although comparable benefits were not seen for boys, and the gender differential was not explained.[77] In all the trials, the program was most effective for first-time mothers with multiple risk factors; compared with lower-risk women, they were more likely

Table 2. The Triple-P—Positive Parenting Program

Implemented in research-based settings around the world, this program has been successful in exposing large proportions of parents within a community to effective strategies in guiding their children's positive socialization and addressing common behavioral problems. At the broadest level, **Triple-P** employs a media strategy "to normalize and acknowledge the difficulties of parenting experiences, to break down parental sense of social isolation . . . to destigmatize getting help, and to alter the community context for parenting."[90] Designed by Sanders and colleagues,[91,92] Triple-P is a five-level system that provides increasingly intensive interventions to correspondingly more targeted groups of families.[90]
In the U.S., 18 mid-sized counties in a single state were randomly assigned to a countywide Triple-P intervention or served as a control group. Outcomes were assessed 2 years following implementation of the program, which included training and supporting a variety of professionals—social workers and county health center and school therapists; preschool and child care directors and teachers; primary school counselors, parent educators, and teachers; primary care clinicians—in strategies and specific parenting skills.[90] In addition to media presentations, the program reached parents through large classes, day care interviews, and well-child visits (level 2), and, for families with specific behavioral issues and detectable problems, a graduated series of skills trainings, or multiple individualized or group sessions for parents, with follow-up (levels 3–5). Large effect sizes were found for three outcomes measured as countywide population rates for children from birth to age 8 years: child maltreatment cases (1.09 of a SD), out-of-home placements (1.22 of a SD), and child maltreatment injury reports from hospitals (1.14 of a SD).[90]

to become employed and experience fewer subsequent births, and their children were less likely to run away from home, had fewer sexual partners, and consumed less alcohol.[78–81]

Home visiting programs that modified the original NFP model, such as having a shorter duration, beginning at birth rather than in pregnancy or less frequent visits, have been less effective. There have been mixed results using paraprofessionals instead of registered nurses as visitors; some experts believe that approach has been inadequately tested. Questions remain about adapting the program to be less resource intensive. The NFP reports average per-family operating costs of $4,500 per year.[74] Although not every home visiting program has a benefit–cost ratio greater than 1, Aos et al.[82] estimated that, on average, home visiting programs for at-risk mothers and children yield a savings of $2.24 per dollar invested.

State and local home visiting programs use federal, state, local, and private funding. Private funding can be a substantial source. In 2007, the NFP received $50 million from private foundations and individual donors in order to support organizational infrastructure to expand the program.[83] More than a dozen state Medicaid programs have begun to pay for home visitation services, either as a covered benefit or as an administrative (case management) cost.[84]

In FY 2008, a total of $10 million in federal funding was made available to develop infrastructure for home visiting programs through the Administration for Children and Families' (ACF) Home Visitation Initiative.[85] The FY 2010 budget for ACF proposed expanding this initiative by requesting $124 million for a new mandatory home visitation program so that states could establish and expand evidence-based home visitation programs for approximately 50,000 low-income families.[86] Section 2951 of the 2010 Patient Protection and Affordable Care Act (ACA) authorized mandatory funding of $1.5 billion (FY 2010–2014) for grants to states for home visitation programs through the Maternal and Child Health program. In July 2010, HHS awarded the first year's allocation ($88 million), conditional on states' completion of resources and needs assessments.[87]

Parenting information and training, and referrals to high-quality, affordable child care services help parents fulfill their responsibility to ensure that children are in safe, stable, and nurturing relationships and environments that foster adequate early development.[88,89] Most communities offer parenting information and provide some form of supportive services to new families; these resources, however, should be more widely available and actively promoted to parents, and they should be linguistically and culturally appropriate.[3] Table 2 describes one such intervention, Triple P—Positive Parenting Program, targeted at multiple levels from the universal (community-wide informational and social marketing activities) to the individual clinical service level.

Comprehensive Early Childhood Development Programs

Over the past 40 years, longitudinal studies have documented cognitive gains and better academic achievement in the short term and lower prevalence of delinquency and arrests later in adolescence for low-income and otherwise at-risk infants, toddlers, and preschoolers in comprehensive, high-quality developmental programs.[70,75,93–97] Anderson and colleagues reported median effect sizes for center-based early childhood programs: 0.35 of a SD for academic achievement; 0.38 for school readiness; 0.43 for IQ; 0.38 for social competence; and 0.60 for social risk behaviors.[70]

These educational and social achievements have positive consequences for health in adulthood. Economist James Heckman and colleagues[98,99] have examined long-term outcomes for participants in the Perry Preschool

Table 3. Scope of Head Start and Early Head Start programs

Head Start, established in 1965 to improve school readiness among economically disadvantaged children, provides comprehensive early education; medical, dental, mental health care; nutrition services; and social services to children aged 3–5 years and their families who live at or below 130% of the federal poverty level.[100] **Early Head Start**, established in 1994, expanded the scope of the program to serve low-income pregnant women and families with infants and toddlers. The program supports prenatal health, cognitive and socioemotional development of the children, supportive parent–child relationships, and family development.[101]
In 2007, approximately 790,300 children aged 3 and 4 years and almost 91,000 infants and toddlers aged <3 years participated in Head Start and Early Head Start.[102] About half of all income-eligible children are enrolled in Head Start; the capacity of Early Head Start, however, is much more limited; enrollees are approximately 3% of all eligible infants and toddlers.[103] The average cost per child in FY 2008 was $7100 for Head Start and $10,200 for Early Head Start. The FY 2009 appropriation for Head Start and Early Head Start was $7.2 billion. The American Recovery and Reinvestment Act provided an additional $2.1 billion for the programs, with $1.1 billion of that amount dedicated to Early Head Start, financing the enrollment of an additional 50,000 infants and toddlers.[104]

Project that have yielded insights into how and over what time periods early childhood programs achieve their effects. For example, while cognitive benefits surface in the initial school years (effect size=0.97 of a SD, as reported in Karoly et al.[75]), participants' relative advantages in terms of noncognitive traits such as conscientiousness and persistence appear later, in higher rates of high school completion.[99,100]

The earliest prototypes of comprehensive child development programs—such as the Carolina Abecedarian model and the federal Head Start program—incorporated health-related components such as nurturing, cognitive stimulation, developmental assessments, immunizations, dental care, high-quality nutrition, and adequate physical activity for young children, along with parental engagement and education to support healthy diets, active living, and nurturing parenting. Most child care settings and many early education programs lack the resources and staffing to provide all of the components of model programs, nor do they link to healthcare services, as is required of Head Start programs. (Table 3 outlines the scope and reach of Head Start and Early Head Start.) High-quality developmental programs require more resources than are typically available for child care and preschool.

A large number of studies have shown positive short-term outcomes for Head Start; however, only recently did an evaluation of Head Start have a suitable comparison group.[105] The Congressionally mandated Head Start Impact Study randomly assigned 4700 children ages 3 and 4 to a Head Start group or a control group. The effect sizes were generally small or moderate (0.1–0.35 of a SD); however, the authors deemed effects of 0.25 of a SD or greater to be "educationally meaningful."[105] At the end of the Head Start year and compared to the control group, those aged 4 years had significantly better scores in language and literacy skills such as vocabulary, spelling, and letter naming (but not in math skills). Those aged 3 years had improved language and literacy skills, perceptual motor skills, and math skills. Those aged 3 years were also less likely to be hyperactive or have problem behaviors, and their parents were less likely to spank and more likely to read to their children and provide family cultural activities. Those aged 3 and 4 years enrolled in Head Start were more likely to have received dental care, and those aged 3 years were more likely to have better health status than the control group by the end of their first year in Head Start.[105]

Evaluations of Early Head Start have likewise demonstrated positive impacts on children's well-being. A randomized study of 3000 families from 17 local Early Head Start programs across the country found a consistent pattern of modest but significant positive effects on outcomes at age 3 years including children's cognitive and language (effect size=0.10–0.13 of an SD), and socioemotional (0.11–0.20 of an SD) development; parenting (0.10–0.15 of an SD) and, specifically, fathering; and parents' participation in education or in job training.[106]

A follow-up of the study showed that some of the impacts on the children and parents persisted when the children were 5 years old.[107] Local EHS programs must tailor their approach to meet their community's needs, using a center-based, home-based, mixed (combination of center-based and home-based delivery), or even a locally modified approach. The randomized evaluation study of Early Head Start found larger impacts on developmental outcomes among programs that provided a mix of home- and center-based services (effect size=0.23–31 of a SD)[106] and among parents who enrolled while pregnant, those with a moderate level of demographic risk factors, and African-American and Hispanic families.[101]

In the aggregate, Head Start has been shown to improve child development and school readiness. Debate continues, however, over the program's cost relative to the magnitude of its measured impacts. The substantial variability in the quality of individual Head Start programs accounts for its modest showing overall. Nevertheless, a small effect size affecting a very large population can have meaningful population health effects. Furthermore, the recent Impact Study[105] may have underestimated the effects of Head Start as compared with no intervention; 60% of children in the control group re-

Table 4. Workforce training and retention initiatives in child care

The **T.E.A.C.H.** Early Childhood Project, an initiative of the national Child Care Services Association that operates in 21 states, offers scholarships to child care providers to partially cover the cost of tuition, books, release time, and travel expenses.[113] Scholarships are funded by a combination of public, employer, and foundation support, in particular the quality-improvement set-aside of the federal Child Care and Development Block Grant. T.E.A.C.H. scholarships help address the issues of under-education, poor compensation, and high turnover within the early childhood workforce. An evaluation of the program showed that participants in the associate degree scholarship program improved their education level and left their child care centers at a rate of less than 9% per year, well below the national annual turnover rate of 30%.[113]
The national Child Care Services Association's **WAGE$** project offers a model and technical support for state or local agencies that want to increase financial incentives for their child care workforce.[113] WAGE$ is offered in three states, NC, FL, and KS. In North Carolina, WAGE$ provides salary supplements directly to low-wage teachers, directors, and family child care providers working with children from birth to age 5 years. Participants in WAGE$ have lower annual turnover rates (9%–15%) as compared with a national average turnover rate of about one third.[113]

ceived some nonparental care or developmental services, and not every child in the experimental group enrolled in Head Start.[100,105] Also, the long-term benefits of the relatively modest effect sizes have not been considered. USDHHS responded to the recent impact study with plans to improve performance standards, program accountability, and classroom practices for both Head Start and Early Head Start.[108]

Improving Quality in Center-Based and Family Child Care

Child care services present one of the greatest opportunities for positively affecting the health and developmental trajectories of infants and children, particularly those in low-income families. More than half of all low-income children aged <5 years are in nonparental care (including care by relatives) for more than 30 hours per week.[109] A meta-analysis of the quality of representative (i.e., nonmodel) child care and early education settings showed modest positive associations among academic, language, and social skills in preschoolers and program quality characteristics.[110] Yet child care programs frequently do not meet minimal standards of safety and quality.[3,52] At the core of the issue is societal underinvestment in the child care enterprise.

Training and education requirements for center-based and home-based child care workers vary widely from state to state, and child care workers and early childhood educators are often inadequately trained. Requirements range from a high school diploma or completion of community college coursework, to a college degree in child development or early childhood education, or a Child Development Associate (CDA) credential. Twenty-one states, however, have no minimum education requirements (not even a high school diploma) for teachers in centers, and 40 states do not require a 2-year post–high school degree for child care center directors.[52] Twenty-eight states do not regulate family child care providers who care for three or fewer children.[111] Retaining a skilled and stable workforce is integral to high-quality care and developmental services.

Poor compensation is often cited as a key contributor to markedly high turnover rates in the child care industry and to less highly trained staff coming into the field. Median annual wages of child care workers in 2008 were $17,440; their average hourly earnings of $11.32 amounted to just 63% of the private industry average hourly wage for nonsupervisory workers.[112] Both national professional organizations and some states support the training, credentialing, and retention of early childhood caregivers and teachers, described in Table 4.

Finally, states can act to establish and promote higher-quality standards and aspirations for child care services and organizations. Quality Rating and Improvement Systems (QRIS) are tools for evaluating, improving and communicating the level of quality in early care and education programs. Using state regulations and licensing as a foundation to build benchmarks for program quality and award quality ratings based on defined standards, QRIS share five common elements: standards; accountability; program and provider outreach and support; financial incentives linked to compliance; and consumer education. Currently, 18 states and the District of Columbia have statewide QRIS, and 27 states have systems in development.[114] Quality ratings can be mandatory and linked to child care licensing or, as in most states, voluntary.

Income and Resource Supplements

Interventions that raise a family's purchasing power through cash or in-kind supplements for food, housing expenses, medical services, and child care are associated with better child health, development, and academic achievement outcomes. Companion papers in this supplement address the commission's recommendations for nutrition and housing.[5,6] Focusing here on income supplementation, in 2009, the federal Earned Income Tax Credit (EITC) for low- and middle-income working families with children and for working poor individuals without children, lifted an estimated 6.6 million people, half of whom were children, out of poverty.[115] Dahl and Lochner[116] found that the tax credit significantly improved the

Table 5. Child health and education impacts in income supplementation experiments

New Hope, an earnings supplementation demonstration program that operated in Milwaukee in the mid-1990s, provided low-income adults working full-time an income supplement that raised them out of poverty, subsidized child care, and subsidized health insurance. A randomized evaluation found that, compared to children in control group families, children of New Hope participants demonstrated improved behavior and improved academic achievement. Five years after the end of the program children were more likely to be engaged in school. In addition, boys were significantly less likely to have negative attitudes about work and future employment and significantly more likely to participate in career/employment preparation activities.[117]
Opportunity NYC-Family Rewards, a privately funded, experimental conditional cash transfer (CCT) program in six high-poverty New York City communities, began in 2007. The 3-year program makes cash assistance available conditional on students' school performance, use of preventive health care, and parents' work and training.[118] The New York program is modeled on Mexico's 15-year-old Progresa-Oportunidades Program, which provides cash transfers directly to poor families in exchange for participating in preventive health and nutrition programs and incentives for school attendance.[119] Participation in Progresa-Oportunidades has been associated with a decrease in maternal mortality rates; improved health, motor development, nourishment, and anthropometric measurements for young children; reduced infant mortality and reduced smoking and drinking among adolescents. Children were also more likely to be enrolled in secondary school and less likely to fail.[120] Findings from the first 2 years of New York's CCT program, in which 4800 families with 11,000 children were randomly assigned to either the cash incentive or control group, were released in 2010. Evaluators reported that nearly all families in the intervention group earned rewards—more than $6000, on average, over the first 2 years. Effects from family rewards included reductions in poverty and hardship, increased savings and the likelihood that parents would have bank accounts, increased school attendance, course credits, grade advancement, and standardized test results among better-prepared high school students (no scholastic achievement gains among elementary and middle school students, however, who did not receive incentives directly, as did high schoolers), reduced reliance on hospital emergency rooms for routine care, and increased receipt of preventive dental care.[118]
A natural experiment. An abrupt localized change in economic circumstances presented researchers with an opportunity to assess the impact of income supplements on children's health. In 1996, American Indians in western North Carolina began to receive a large increase in income due to the opening of a casino on a federal reservation. The opening of the casino ensured that every 6 months each tribal member received a portion of the profits. This income supplement moved some families out of poverty as well as increased employment opportunities for everyone living in the area. Costello et al.[121] found that American Indian children living in families that had moved out of poverty after the opening of the casino experienced a 40% reduction in conduct and oppositional defiant disorders, while persistently poor children experienced a 21% increase over the same period. A follow-up study in 2006 compared the prevalence of psychiatric disorders among members of the original study sample as adults in different age cohorts—those aged 22, 24, and 26 years. Fewer of the youngest age cohort had a psychiatric disorder than the middle or oldest cohort (ORs of 0.43 and 0.69, respectively), suggesting that the earlier (or, possibly, longer) exposure to higher income offers better protection against psychiatric illness.[122]

short-term academic achievement of children; an increase in family income of $1000 from the EITC raised children's math and reading test scores by 2.1% and 3.6% of an SD, respectively. In addition, several experimentally designed income supplement programs have demonstrated positive child health or developmental impacts, summarized in Table 5.

Policy Issues and Challenges

The body of evidence linking health disparities during adulthood to children's social and economic conditions early in life is compelling,[1,9,11] yet initiatives to make larger investments in child well-being, and on social factors that could improve children's developmental and health trajectories are rarely prominent in national public policy discussions or health budgets. The disconnect between what we know and what we do has many sources, including the factors discussed below.

Historical Interpretations of Federal/State Responsibility for Health and Social Welfare Programs

Education, along with other domestic issues, was long considered the responsibility of state and local governments, in contrast with defense and interstate commerce, which were viewed as a federal responsibility. Although this division became less distinct during the Great Depression with the passage of the Social Security Act (which also firmly established the federal role in social welfare), a tension between what is viewed as federal versus state responsibilities continues today. Currently, states and localities spend more per capita than the federal government on children and families. In 2009, less than one tenth of the federal budget ($334 billion of $3.5 trillion in outlays) was spent on children aged <18 years.[123] Federal child-related tax expenditures and exemptions amounted to an additional $72 billion. The average public spending (federal, state, and local) was $10,642 per child in 2007, the most recent year for which state spending estimates were available.[123] Of this amount, more than two thirds ($7294) was spending by state and local governments primarily on education (almost 90% of the state and local total), with the remainder on medical care, child care, and other child welfare services. Federal spending accounts for more than three fourths of total public expenditures for infants and toddlers, however, largely due to spending on tax credits, Medicaid, and food and nutrition programs (2004 data).[124]

Absence of a Programmatic Infrastructure for Translating Evidence on Effective Interventions into Policy and Practice Settings on a Larger Scale

Despite an abundance of evidence on interventions that are effective in improving the social conditions of children and their families, investments in replicating these strategies in local communities or states have been modest to date. For example, the short- and long-term effects of the home visiting program Nurse–Family Partnership are well documented, yet adoption of this model has been far less than what would be expected given evidence that children who participate in these programs are more likely than other children to be healthy adults and have greater social mobility. While some of the slow pace of change is due to funding constraints (i.e., finding new dollars to implement new services), the slow uptake of knowledge is also a result of the nation's failure to invest in ongoing mechanisms to facilitate the systematic translation and dissemination of research and evaluation results for use by policy audiences and practitioners.[125–127]

Skepticism About Whether Primary Prevention Can Lower the Trajectory of U.S. Medical Care Spending

As noted previously, longer-term follow-up studies of relatively intensive early life interventions have demonstrated savings when costs and benefits are evaluated from a broad, societal perspective. The Patient Protection and Affordable Care Act of 2010[87] authorized funding for prevention and wellness, including home visitation, a community transformation grant program, an education and outreach campaign about the benefits of prevention, and insurance coverage of evidence-based clinical preventive services. Nonetheless, concerns about the rising costs of medical care reignited a long-standing debate about whether the costs of preventive interventions outweigh their benefits.

While some prevention services are not only cost effective but actually result in cost savings to the health system (e.g., some vaccines), the impact of specific preventive interventions on spending varies, depending both on the health conditions targeted and on the cost of the intervention. In fact, as reported by the Congressional Budget Office, one study found the proportion of interventions yielding net financial savings comparable for preventive and treatment services—20% in both cases.[128] Further, the notion that preventive interventions should be expected to result in savings has been challenged.[129–131] Woolf, for example, argues that the question for either a preventive or therapeutic intervention should be "how much health the investment purchases."[129] Still, the substantially increased public dollars that are needed to address widespread deficits in the quality of and access to services for families with young children at risk for poor developmental and health outcomes keeps the question of whether offsets would be seen in public spending for health care on the table.

Barriers to Sustaining Interventions Across Multiple Systems and Service Sectors

One perennial challenge to undertaking interventions on social factors that impede or enhance health is collaborating across multiple service delivery systems and funding streams for specific service sectors. At the federal level, multiple organizational entities in, for example, the USDHHS, and the Departments of Education, Agriculture, Housing, and Transportation have key responsibilities for the welfare of children and their families. Within USDHHS alone, several entities have legislatively defined responsibilities for children and their families. (Agencies with key responsibilities for young children and families include the Administration for Children and Families, which encompasses Head Start and Early Head Start, the Child Care Development Fund, and child welfare programs; the Maternal and Child Health Bureau of the Health Resources and Services Administration; the Family and Children's Health Program Group of the Centers for Medicare and Medicaid Services, responsible for the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) program and the Children's Health Insurance Program (CHIP); and the Indian Health Service.

Similar overlaps and redundancies exist in Congressional committee jurisdictions, and in state and local governments. For example, despite serving a substantially overlapping population, USDHHS's Administration for Children and Families and the Department of Agriculture's Food and Nutrition Service (school meals, WIC) each have distinct funding streams for operating their programs, improving performance, and measuring outcomes. Although agency leadership undoubtedly seeks in each case to be effective and efficient in accomplishing its mission, legal authority, information management systems, and incentives to combine resources to better serve their clients typically are lacking. The question of leadership or—more precisely, who takes the lead—is one of the many challenges facing cross-sector initiatives. The question of what the goal should be—better coordination or new structures for integration of services—needs thoughtful and open discussion. At the very least, it is time to identify and propose solutions for how best to remove the structural barriers that complicate the development of initiatives across systems and sectors that can nurture the growth of healthier children.

Bridging Health and Social Policy: Emerging Opportunities

Although integration of children's services and policy is far from being realized, a number of recent efforts suggest that policymakers increasingly recognize the need for a more comprehensive and coordinated approach. At both the federal and state level, cabinet secretaries, governors, and agency staff have begun to talk about, and in some cases build, the organizational scaffolding that will allow for standard setting, data sharing, referrals, and, potentially, service delivery across program boundaries. In the private sector, major businesses, organizations representing employers, and philanthropies have taken the initiative to seed and develop early life initiatives and programs that bridge child health, education, and social policies.

Federal Initiatives

Recognizing the fragmentation in funding streams and service delivery, the federal government launched the Early Childhood Comprehensive Systems (ECCS) Initiative in 2003. Administered by the Maternal and Child Health Bureau (MCHB), USDHHS, the initiative provided small grants to states (about $7.3 million in FY 2009 for up to 52 grantees) in their efforts to plan and implement collaborations in early childhood service systems.[132] States must address five domains under their grants: access to comprehensive pediatric services and medical homes; socioemotional development of young children; early care and education; and parenting education and family support. To complement ECCS, in 2005, MCHB launched Project Thrive to support state efforts with policy analysis and synthesis of early childhood research. A 1-year evaluation of the 2005 cohort of 20 ECCS grantees identified factors that facilitated services integration (e.g., available resources, strong partnerships) or, conversely, were barriers (e.g., lack of transportation, budget cuts, staff turnover).[133] Eighteen of the 20 grantees identified resource limitations as a barrier to sustaining ECCS. A follow-up evaluation including the 24 additional grantees that were awarded implementation grants in 2006 was recently completed (Jennifer Kuo, Lewin Group, personal communication, 2010).

The American Recovery and Reinvestment Act (ARRA) of 2009 increased federal spending on young children through one-time supplementary appropriations to programs such as Early Head Start ($1.1 billion), Head Start ($1 billion, with $100 million designated for State Early Childhood Advisory Councils), the Child Care and Development Block Grant (CCDBG; $2 billion) and WIC ($500 million, with $400 million for additional services and $100 million for WIC information management systems).[134] In the case of CCDBG, this essentially doubled the program's funding (budget authority) between FY 2008 and 2009, from $2.062 billion to $4.127 billion, with funding then decreasing to $2.127 billion in FY 2010.[135,136] Although the program's outlays will grow more gradually between 2008 and 2010 as the budget authority is spent over 2 years, whether the increased funding level supporting additional child care slots will be maintained in FY 2011 and beyond is uncertain. While ARRA mandates that states and other grantees document the specific uses of the supplemental funds, impact evaluations will be particularly important to inform future public investments.

Opportunities to improve programs and more effectively target resources for children's social welfare are available through several pending reauthorizations such as the CCDBG, the Child Nutrition Act, and the Maternal and Child Health Block Grant (Title V). Each of these authorities can be used to create incentives for reform and collaboration across systems and service sectors. Title V, for example, requires states to devote 30% of these funds to primary and preventive care. In FY 2007, Title V funds amounted to $693 million dollars distributed to state and local governments for services to children and their families. Although many state governments report that Title V funds are inadequate, they provide an opportunity to integrate clinical preventive services such as lead screenings with nonclinical services, such as lead abatement services in the home, with the goal of reducing the number of children at risk for lead poisoning.

Recent legislative proposals and newly enacted healthcare reforms offer promise in connecting service delivery systems to better meet the needs of families with young children. The Administration's proposed Early Learning Challenge Fund would provide competitive grants to states—$10 billion over ten years—to improve standards for and raise the quality of child care and early learning programs.[137] If enacted, this authority, to be jointly administered by the secretary of education and the secretary of USDHHS, would add impetus and means to integrating early childhood services. In addition, healthcare reform (ACA) will expand sources of insurance coverage to millions of low-income families and reduce the financial barriers faced by parents as they attempt to access health services for their children.

The ACA also authorizes $15 billion over ten years in mandatory spending under a Prevention and Public Health Fund to help reshape the physical and social environments of communities that face multiple long-standing impediments to healthier living. While this new authority is relatively modest, it offers a new funding stream that can be leveraged to promote the integration of clinical and community health interventions across service sectors. Also notable is that ACA identifies the U.S. Sur-

Table 6. Initiatives to strengthen and integrate early developmental services

North Carolina, Smart Start. Begun in 1993 by then–Governor Jim Hunt, Smart Start provides support, both financial and in policy research and development, for systems integration for early life interventions at the local level through early childhood development councils.[146] The North Carolina Partnership for Children assists local partnerships to improve child care quality and increase access to services by bringing together actors such as Head Start/Early Head Start grantees, local social services and licensing authorities, and healthcare providers to develop coordinated standards of care, placement, and referral policies for families with children aged ≤5 years. The introduction of the state's Assuring Better Child Health and Development (ABCD) project in 2000 to identify early children with behavioral and developmental delays with formal screenings and surveillance by primary care practices led to closer collaborations between clinical and social services providers.[147]
The Campaign to Make Delaware's Kids the Healthiest in the Nation. Nemours, a leading child healthcare provider in the state, led a consortium of public and private agencies and organizations including school districts, the state YMCA, community college programs, and state cabinet secretaries to promote and implement policy and practice changes to reduce childhood obesity and overweight.[148] The 6-year-old initiative sought partners that had extensive reach, the authority to make policy and practice changes affecting multiple priorities, and the ability to commit resources. The initiative includes a social marketing campaign promoting healthy eating and physical activity, has introduced more stringent nutritional and physical activity standards into child care and preschool licensing, and provides training to child care providers and teachers.[148,149]
Educare. Educare is an integrated birth-to-5 child care and development and family support program that began in Chicago in 2000, under the auspices of the Ounce of Prevention Fund (www.educarecenters.org). The Buffett Early Childhood Fund built the second center in Omaha, and the two sponsors partnered to create the Bounce Learning Network, which is now supported by additional philanthropies in the communities in which centers have subsequently opened. The network has grown to nine centers in seven states, with others in the planning stage. Each Educare center serves 150–200 children in a freestanding building that is close to where its low-income clients live and to schools, clinics, or other services. Charitable contributions fund the capital costs; federal funding, mainly Head Start and Early Head Start, account for about half of operating expenses. The network works with local consortia of state, municipal, and community agencies and organizations to devise a viable operating plan with funding commitments from each partner. Services begin with prenatal support employing community doulas. In addition to early education, Educare centers provide on-site developmental screening; mental health consultations; on-site services for adults, and function as community meeting places.
California's First 5. A tax on tobacco products funds an integrated system of early childhood development services in the state called First 5. Each of the 58 counties in California has a "First 5" commission that distributes revenues to fund a range of early childhood programs, with the goal of ensuring that "more children are born healthy, raised in nurturing homes and ready to succeed in school."[150] A review of the First 5 state and county accomplishments for FY 2002–2007 noted that 2 million children and their families had benefited from direct school readiness services, which promote successful transitions between pre-school care settings and elementary school. One California First 5 commission is building a model system of services that includes universal developmental surveillance and supports, secondary screening and surveillance, regionalized midlevel development assessments, and further assessments and interventions by state-funded centers for children with more-severe problems.[150]

geon General as the "lead" for coordinating prevention efforts across federal departments and agencies, which should reinforce efforts to integrate and reduce fragmentation among programs serving largely overlapping target populations.[87]

State, Local, and Private Sector Initiatives

States also have recognized the challenges and the opportunities for improving children's health by initiatives focused on early childhood development. Between 1998 and 2008, state expenditures on home visiting programs increased from $13 million to $280 million and on pre-K programs from $1.6 billion to $4.5 billion.[11] The National Governors Association (NGA) Center for Best Practices, with leadership by former Arkansas Governor Mike Huckabee and funding from the CDC and the Robert Wood Johnson Foundation, has supported 15 states in policy planning and multi-sector interventions, across child care, school, and community settings, to reduce childhood obesity.[138] Also, in 2009, the NGA convened 40 state teams of child health, welfare, and education program directors, and advocates for a summit to share resources with and among states and to begin an ongoing effort to coordinate and streamline child services within each state.[139]

In addition to public initiatives, the business community, the philanthropic sector,[140,141] and a wide array of public–private partnerships have engaged in efforts to improve early childhood policies and practices. National business organizations such as the Committee for Economic Development, PNC Financial Services Group, the Business Roundtable, and the Federal Reserve Bank of Minneapolis have called for universal early childhood development programs as a wise financial investment.[142–144] The American Business Collaboration (ABC) has brought together companies such as Deloitte & Touche, Exxon Mobil Corporation, General Electric, and Texas Instruments to ensure that their employees can find high-quality child care.[145] Early childhood development programs serve businesses both as an investment in their future workforce and as an important strategy for recruiting and retaining parent employees.

Table 6 illustrates the diversity of approaches across the country to coordinate multiple programs and funding sources for more effective systems of early developmental supports for young children and their families.

Conclusion

Interventions to support families with young children and that enrich the daily environments of infants, toddlers, and preschoolers have been demonstrated to be cost-beneficial when health, schooling, labor market, social services, and criminal justice outcomes are taken into account.[75] In 2004, the IOM Committee on Evaluation of Children's Health defined child health in terms of functional capacity and optimal development: "... the extent to which individual children or groups of children are able or enabled to (1) develop and realize their potential; (2) satisfy their needs; and (3) develop the capacities that allow them to interact successfully with their biological, physical, and social environments"[151] This conception of health directs attention to the conditions in which children experience the world and become effective actors within it.

In one sense, the prescription for children's healthy development is simple and obvious: provide every child with a material and social environment that is safe, stable, nurturing, and stimulating. Yet the reality is that almost half (44%) of American children aged <6 years live in economically disadvantaged families (<200% FPL),[22] who face multiple hardships and consequently are exposed to elevated risks of developmental harm and ill health over the life course. Preventing children from exposures to avoidable adversity and harmful environments requires understanding and addressing the risks for poor health in a broader social context. Interventions that focus exclusively on individual children and their parents will do little to stanch the flow of high-risk behaviors and worse health outcomes that stem from economic and social disadvantage. Moving "upstream" will require developing a broader consensus on the federal role in ameliorating the life circumstances of many American families. State and local governments vary tremendously in their resources—both financial and human—for improving the social conditions that generate toxic environments. Thus, federal–state partnerships will be needed to disseminate and apply new knowledge about effective interventions to reduce children's health inequalities across the nation.

At the same time as a greater federal investment in the well-being and development of young children is called for, state and local governments, and private entities serving young children and their families must be held to higher standards of accountability for services, outcomes, and ongoing evaluation of effectiveness. As this review of recent developments in governmental and private sector program design and coordination suggests, policymakers recognize the advantages and potential efficiencies of integrated planning, standard setting, and delivery of services for at-risk children and their families, but achievement of these goals has so far been limited. One of the most important outcomes of greater integration and information sharing among programs is the potential for identifying and targeting resources to children at highest risk of toxic stress and consequently of immediate and longer-term health and cognitive deficits.

Commenting on the recommendations of the Task Force on Community Preventive Services for early life interventions almost a decade ago, Shonkoff argued:

> [The]science of early childhood intervention tells us what is possible. The translation of that knowledge into policies and programs demonstrates what we are willing to do with what we know. The politics of resource allocation would be guided more constructively by empirical research if we moved beyond the basic question of *whether* early childhood interventions work and began to seriously address the more compelling challenge of *how* to achieve a maximum return on our early childhood investments."[127]

This point is even more compelling today, as the challenges and potential returns from investing in young lives continue to grow.

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