A New Framework for Childhood Health Promotion: The Role of Policies and Programs in Building Capacity and Foundations of Early Childhood Health

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Although the connection between early life experiences and later health is becoming increasingly clear, what is needed, now, is a new organizing framework for childhood health promotion, grounded in the latest science. We review the evidence base to identify the steps in the overall pathway to ensuring better health for all children. A key factor in optimizing health in early childhood is building capacities of parents and communities. Although often overlooked, capacities are integral to building the foundations of lifelong health in early childhood. We outline a framework for policymakers and practitioners to guide future decision-making and investments in early childhood health promotion. (Am J Public Health. 2012;102:1688–1696. doi:10.2105/AJPH.2012.300687)

There is a growing recognition that health in the earliest years lays the groundwork for lifelong well-being. This life-course view is particularly valuable for understanding the roots of health disparities and the potential role of early childhood policies and programs in producing benefits well into the adult years.1-5 Focusing health promotion and disease prevention efforts on children in the first 5 years of life can provide important strategies for reducing the population-level burden of disease.

Several recent reports thoughtfully consider the factors that place young children at risk for poor outcomes and list recommendations for effective interventions.6-14 What is now needed, to advance the field of early childhood health promotion, is an underlying, organizing framework to illustrate the intermediate steps linking policies and programs to outcomes. Such a conceptualization will allow stakeholders to develop, apply, and sustain policies and programs that promote public health goals across early childhood settings.

The framework presented here, introduced by the Harvard Center on the Developing Child in collaboration with the Women’s and Children’s Health Policy Center at Johns Hopkins University, illustrates the key pathway that policymakers and practitioners can follow to promote children’s health in the preschool years.5 This framework advances previous efforts to link policies to intended health outcomes by embedding the capacities of parents and communities within the pathway; these capacities are integral to ensuring optimal environments and experiences for young children.

Our objectives are to (1) describe a framework linking early childhood policies and programs to subsequent health outcomes, (2) outline key action steps within the framework and the underlying scientific evidence, and (3) demonstrate how the framework can be applied to evaluate current policies and programs and spur innovative, evidence-based strategies to improve children’s health.

BACKGROUND

Early childhood is a time of rapid development in body systems that are critical to health, including the brain, nervous, endocrine, and immune systems. These systems are under construction even before birth, and, from the earliest moments of life, a child’s experiences and environments exert powerful influences on his or her development and subsequent functioning. Social, cultural, and economic determinants of health shape the context of early experiences and environments and are particularly salient in early childhood when the roots of lifelong health and development are being established. Poorly constructed systems have an impact on health in early life, and these effects may be magnified as children grow into adulthood. Establishing strong systems in early childhood by meeting the foundational needs of all children may avoid costly and less effective solutions required to redress disease later in life.5,7

The current patchwork of health-promotion policies and programs for young children and their families emerged during the growth of public health and medical care programs in the 20th century.8 As a consequence, this non-system does not reflect recent advances arising from molecular biology, genomics and epigenetics, neuroscience, and social science that emphasize the significance of early experiences and the importance of families and communities in promoting children’s health. Nor do they reflect the importance of considering social, economic, and cultural determinants of health in strategies to promote health and reduce disparities. A new framework grounded in the latest science is needed to conceptualize how early childhood programs should be designed to enhance children’s health and development and to inform investments in early childhood programs and policies.

A FRAMEWORK FOR ACTION

Our framework illustrates (Figure 1) the pathway by which policies and programs can promote childhood health outcomes and ultimately have an impact on life-course health.
Policies and programs operate to enhance family and community capacities. These capacities enable the building of the foundations of health in early childhood. The foundations of health encompass the basic needs of all children—responsive care, safe and secure environments, adequate and appropriate nutrition, and health-promoting behaviors. The foundations of health, in turn, influence basic biological mechanisms that shape health and development in early childhood and across the life span. In addition, the figure illustrates the moderating role of the 2 important contexts that are critical considerations for strategies aimed at promoting children’s health. First, social, economic, and cultural determinants of health, including the effects of poverty, education, and discrimination, directly and indirectly influence each aspect of the conceptual model. And second, the settings—or places—in which young children and their families live, work, and develop, are ideal sites for interventions. Building on the work of Bronfenbrenner and other social-ecological models, the framework illustrates the importance of considering the individual within a dynamic embedded system characterized by the interrelatedness of multiple levels of influence.

To date, most early childhood health programs and policies have focused on specific outcomes, e.g., reducing injuries, without conceptualizing how underlying family or community capacities build the foundations for success. Using our framework, policymakers and practitioners can focus on 3 steps—selecting programs and policies that enhance capacities, connecting capacities to foundations of health, and understanding how biological mechanisms link foundations and health outcomes—and together form a coherent pathway that can influence children’s health.

Selecting Policies and Programs That Enhance Capacities

Policies and programs across public and private sectors aim to improve children’s health and development. Not all policies, however, incorporate the central role of families and communities in the lives of young children. Policymakers and program officials should intentionally identify the steps by which policies build the capacities of families and communities. Capacities play a critical mediating role in ensuring that families and communities have the tools needed to provide the foundations of children’s health.
There are many types of family and community capacities. Ideally, programs and policies address multiple capacities so as to be mutually reinforcing and support families to comprehensively provide the experiences and environments for ensuring that children have strong foundations for health and development.

**Family Capacities**

Family capacities are resources that parents and other caregivers bring to the tasks of raising young children. They can be grouped into 4 general categories: financial resources (economic ability to purchase material goods or services), time spent with or for children, psychological resources (physical and mental health and parenting style), and human capital (knowledge and skills for decision-making acquired through education or training, experience, or interactions with medical providers or others outside the immediate family).

**Financial resources.** More than 22% of children younger than 6 years in the United States live in poor families. This constitutes more than 5 million infants, toddlers, and preschoolers. Numerous studies have documented the link between childhood poverty and poor health and developmental outcomes in early life and subsequent adult attainment. The association, in large part, is associated with the availability of fewer resources for families living at or below poverty compared with those with higher incomes. Fewer financial resources may limit caregivers’ ability to purchase goods such as health care, housing, child care, and food.

**Time investments.** Most young children today are raised by working caregivers with serious time constraints. Despite the rise in maternal workforce participation, recent studies have observed an increase in the number of hours parents spend with their children. This uptick may be a result of families finding ways to maximize their time and decrease “work and family conflict,” by shifting occupations, altering places of work, and increasing fathers’ involvement. However, less-educated parents in low-wage jobs have not realized similar gains in time investments with their children. Well-educated parents allocate a higher number of hours to caring for children compared with less-educated parents. Less-educated working parents often do not have the same level of flexibility or resources to meet the challenges because of the demand of low-income jobs, which disproportionately require shift work or nonstandard hours. In addition, lack of paid leave may limit breastfeeding duration and time spent forming critical maternal-infant attachments.

**Psychological resources.** Psychological resources of family and caregivers are critical to children’s health and development. These resources include parental mental health and more broadly the skills and abilities caregivers possess to address parenting demands. Prevalence estimates of maternal depressive symptoms in the postpartum period range from 8% to 15% and approximately 32% in mothers of toddlers. The quality of parent-child interaction is an important mediator of the relation between depression and adverse child outcomes ranging from less favorable patterns of health care utilization to increased negative affect and aggression.

**Human capital.** Human capital includes the skills that serve as an advantage related to employment opportunities for parents or increased knowledge about child rearing. Educational attainment is perhaps the most commonly recognized form of human capital. Approximately one fourth of children at 9 months of age have mothers who have not graduated high school, with rates varying by race/ethnicity. Multiple theoretical models describe the relation between parental education and child outcomes. Educated parents are more likely to earn higher incomes, which in turn may allow for an increased financial investment with regard to providing enhanced resources and experiences for their children. Alternatively, higher educational attainment may be a proxy for quality of parent-child interactions or greater emphasis on learning and other behaviors that are rewarded in school.

Health literacy of parent or caregiver is another important form of human capital. Health literacy is the capacity to obtain, process, and understand health information needed to make basic health-related decisions. Approximately 30% of US parents have limited health literacy skills. Caregivers’ health literacy influences children’s access to and use of health care services as well as the development of children’s own health literacy. Low parental literacy is associated with low levels of other preventive health behaviors such as breastfeeding and identification of appropriate food portion sizes for children, even after adjustment for demographic factors such as race/ethnicity and language.

**Community Capacities**

Families and caregivers most directly influence young children, but there is extensive evidence highlighting the important role of communities. Community capacity can be described as the underlying processes within the neighborhood to affect health and well-being. Specifically, community capacity may affect early childhood health in 2 main ways—institutional resources and collective efficacy.

**Institutional resources.** Institutional resources include parks, fresh food markets, and early education centers. These institutions play important roles in promoting the health and development of young children, yet there is varied level of investment across communities. Physical features such as the proximity of parks and green space increase physical activity for children and provide opportunities for children and parents to interact and enhance social ties. Proximity of parks alone does not guarantee use; other factors such as parental perceptions of safety and playground characteristics must also be considered in concert with increasing access to “built” environments. Neighborhoods with access to retailers with fresh food options have healthier diets compared with neighborhoods with greater availability of processed food.

In addition, one half to two thirds of early education centers fail to meet the minimum safety requirements. Children who attend poor-quality child care facilities receive less supervision and individualized attention; they are also at increased risk for injuries because of unsafe conditions including hazardous playground equipment, missing safety gates, and unsafe cribs.
Collective efficacy. Collective efficacy is the ability of communities to establish informal social structures and a broader sense of mutual trust and shared values.\textsuperscript{32,41,42} Collective efficacy emphasizes not only the role of social connections within communities but also the function of social control mechanisms. These mechanisms include monitoring the behavior of others and supervising children.\textsuperscript{34,43} Although parenting behavior has been hypothesized to be a primary mechanism by which collective efficacy may have an impact on child outcomes, little empirical research has examined this in the context of families with young children.\textsuperscript{32}

**Linking the Foundations of Health to Health Outcomes**

The foundations of health refer to broad domains of personal experiences and environmental conditions in early childhood; these serve as important building blocks for later adult health. Basic biological processes and structures are shaped by early experiences. The interactions among experiences, environments, and biology are powerful influences on childhood health and exert their effects into adolescence and later adulthood. “Getting it right” in early childhood by ensuring children’s foundational needs are met can avoid costly and less effective solutions that are needed to “fix” later health problems. Thus, in describing the foundations of health, we focus on “positive” experiences and environments that are needed to optimize children’s health and development. However, investments in reduction of significant adversity, including neglect and maltreatment, are equally important as they undermine the foundations of health.\textsuperscript{1}

The science across multiple fields including public health, medicine, psychology, and sociology points to 4 core foundations of children’s health: responsive caregiving, safe and secure environments, adequate and appropriate nutrition, and health-promoting behaviors. Focusing on these areas does not negate the importance of other influences, but does highlight 4 key contexts that are highly interconnected, are important for all children, and can be strengthened through early childhood policies and programs.

**Responsive caregiving.** The care that infants experience, whether from parents, extended family members, or child care professionals, lays the groundwork for the development of a multitude of basic health processes, including self-regulation, attention, and, ultimately, social—emotional functioning.\textsuperscript{44–46} Moreover, the quality of the care children experience is predictive of a range of developmental and health outcomes.\textsuperscript{47–52}

Responsive caregiving has long-lasting effects on developing brain structures through the formation of secure attachments, or strong positive bonds with an important adult. Securely attached infants show more positive emotion and less anxiety and, years later, have more successful relationships with teachers and peers.\textsuperscript{53,54} Although attachment develops in the first few years of life, it influences psychological and social—emotional functioning throughout life.\textsuperscript{53,55,56}

Another way in which responsive caregiving affects the health of young children is by shaping the development of biological systems. For example, responsive caregiving plays a key role in the normal maturation of the neuroendocrine and immune systems.\textsuperscript{57–59} Numerous animal studies, now being replicated in humans, demonstrate that responsive caregiving shapes the development of neural circuits that regulate how individuals respond to stressful situations. If the stress management system is activated too easily or does not shut down appropriately in response to repeated stimuli, these stress responses, also known as toxic stress, can negatively affect multiple body systems throughout the life course.\textsuperscript{1,59–61} Major risk factors for toxic stress include extreme poverty, recurrent physical or emotional abuse, chronic neglect and maltreatment, severe maternal depression, parental substance abuse, and family violence.\textsuperscript{1}

The same mechanisms connect responsive caregiving to developing immune and inflammatory responses. Young children cared for by individuals who are available and responsive to their emotional and material needs develop immune systems that are better equipped to deal with initial exposures to infections and to keep dormant infections in check.\textsuperscript{62} Poorly constructed stress, immune, and inflammatory systems increase the risk of health impairments such as asthma, respiratory infections, and cardiovascular disease.\textsuperscript{52–66}

**Safe and secure environments.** Exposure to unsafe and insecure environments can significantly damage physical and mental health, educational attainment, and later adult productivity. Chemical toxins pose a threat to immature biological systems, as exposures during pregnancy and early childhood often yield more damaging and longer-lasting effects than exposure in adult life.\textsuperscript{67–69} For example, prenatal exposure to diethylstilbestrol (DES), a drug prescribed to pregnant women until the 1970s, has been linked to reproductive cancers in the mothers’ offspring.\textsuperscript{69} Whereas some effects can be more latent, exposure to other types of toxins can have more immediate effects. Exposure to lead, for instance, has been linked to disruption of neurotransmitter regulation of synaptic development in the brain and, therefore, serves as a risk factor for cognitive deficits across the life course.\textsuperscript{70–72}

Access to community resources such as parks and sidewalks, as discussed earlier, is an important aspect of health promotion. Beyond access, the design and maintenance of a child’s physical or “built” environment also can affect the risk of disease, disability, and injury.\textsuperscript{5,60,73} For example, access to safe neighborhood parks and playgrounds offers children an opportunity to play and socialize with friends and family, encourages physical activity, reduces child pedestrian injuries, and increases social ties.\textsuperscript{74–76} Children living in such communities tend to be more active and have a lower risk for obesity than those who live in neighborhoods with fewer recreational facilities.\textsuperscript{31,77}

**Adequate and appropriate nutrition.** Health at every stage of the life course is influenced by good nutrition, beginning with the mother’s prepregnancy status. As such, adequate and appropriate nutrition serves as a foundational need for children and provides an important example of how early influences contribute to patterns of health across the life course. Adequate and appropriate intake of both macronutrients (e.g., proteins, carbohydrates, and fats) and micronutrients (e.g., vitamins and minerals) is essential in early childhood when growth and development of body systems are most rapid. Yet both food insecurity (lack of consistent access to adequate food) and the growing epidemic of childhood obesity threaten early health.

Inadequate nutrition during pregnancy is associated with many undesirable outcomes...
including obesity in childhood and adulthood and later hypertension and cardiovascular disease.\textsuperscript{78–81} When pregnant mothers do not receive adequate calories and nutrients, fetuses develop in anticipation of “making do” with fewer nutritional resources. This response is beneficial if the postnatal environment provides minimal calories. However, if the postnatal environment offers sufficient nutrients, the infant’s previous adaptation becomes a liability.\textsuperscript{80,81} predisposing to obesity. Maternal undernutrition also affects the development of the fetal immune system, as adversity can stimulate the release of maternal stress hormones that impair thymus development.\textsuperscript{82,83} Decreased infant thymus size, in turn, is associated with higher rates of neonatal infection and mortality.\textsuperscript{84} and poor immune response through adolescence.\textsuperscript{83,85}

In addition, postnatal and infant micronutrient deficiencies such as deficiencies in iron and vitamins A and D remain important health concerns. During early childhood, micronutrient requirements often increase to support the rapid growth of blood cells, tissues, and bones. Deficiencies in selected micronutrients early in life can adversely affect cognitive, motor, social–emotional, and neurophysiological development and behavior as well as lead to chronic medical conditions such as osteoporosis, asthma, and diabetes.\textsuperscript{86–88}

\textit{Health-promoting behaviors.} An often overlooked foundation of health is the health-promoting behaviors that young children acquire because of the consistency, quality, and timing of daily routines. Such learning may be the precursor of lifestyle choices and behaviors. Early habits include routines regarding physical activity, television viewing, car seat restraint use, oral hygiene, and food preferences. As biologic regulatory processes and systems are developing, the predictability and quality of everyday experiences influence the basic rhythms of life, such as sleeping and eating.\textsuperscript{89,90} When sleep routines vary daily, the organization and consolidation of sleep–wake patterns and self-soothing responses do not develop well, and infants’ systems do not “learn” healthy routines and self-regulation.\textsuperscript{91} In addition, the type, amount, and frequency of foods offered to infants and toddlers shape the biological processes that affect taste and texture preferences, thereby influencing dietary likes and dislikes.\textsuperscript{92,93} Early learning of food preferences, along with similar learning about levels of physical activity, affect the risk for obesity.\textsuperscript{94}

\section*{APPLYING THE FRAMEWORK}

The framework described earlier can be used as a tool to inform investments in policies and programs via their impact on family and community capacities and the foundations of childhood health. A review of several promising initiatives illustrates how the framework can be used as a conceptually based approach for designing, implementing, and evaluating early childhood health promotion efforts (Table 1). These brief examples demonstrate that a range of public and private policies and programs situated in the diverse settings where families live, work, and develop can enhance capacities and, in turn, bolster the foundations of health. Policies and programs may aim to strengthen single or multiple capacities. They also may work synergistically as, for example, multiple interventions may be needed to promote responsive caregiving as programs and policies reach different populations.

The neighborhood “built environment” can influence children’s health outcomes through enhanced sidewalks, bicycle trails, and parks.\textsuperscript{95} These features are heavily influenced by community zoning laws and land use policies, which serve as important levers to enhance capacity and promote the foundations of health. Having safe and appealing places to play outdoors enhances family capacities; parks allow parents to play with their children outdoors, thereby increasing positive parental interaction and physical activity. Such gathering places also allow caregivers to interact with other adults, thereby enhancing social support and cohesion and promoting mental health.\textsuperscript{34} Zoning laws and land use policies also promote community capacities by protecting parks and green space and limiting the density of fast-food outlets. Children living in such communities tend to be more active and have a reduced risk for obesity than those living in neighborhoods with fewer recreational facilities.\textsuperscript{77,96} Together, these types of programs strengthen the capacities of families and communities to support the foundations of health.
of children's health and improve well-being across the life course.

The Family Medical Leave Act ensures that family members have time off (up to 12 weeks unpaid in companies of 50 or more workers) after the birth of a child and retain their job. Parental leave may be linked to improved children's health through enhanced bonding with infants, thus encouraging responsive caregiving and promoting children's positive development. Yet, few workers can afford unpaid leave. Children of mothers who have the financial support to delay returning to work receive more timely well-child care and are more likely to be breastfed and for longer durations. Job-protected paid leave also is associated with lower rates of infant mortality and low birth weight.

Continuing debate in both the public and private sectors about the merits and costs of paid leave should be informed by a greater understanding of its implications for children's health and well-being.

"Healthy Steps" was created by The Commonwealth Fund and Boston University School of Medicine as a strategy to improve the delivery of developmental and behavioral services and address parents' needs regarding their young children's development. Healthy Steps places child development specialists in pediatric practices to work with the families of children from birth through 3 years to enhance parenting knowledge and skills about early childhood development, growth, nutrition, and health. Currently, 50 sites in the United States offer Healthy Steps. The intervention improved quality of care and the capacity of pediatric practices as institutional resources within the community. Healthy Steps also enhanced human capital through its effects on improved parenting practices related to discipline and the promotion of children's development and safety.

Sure Start for Children

The British government established Sure Start Children's Centers as part of comprehensive legislation to eradicate childhood poverty, based on the principles of increasing societal investment in children from birth. Located in some of England's poorest areas, Sure Start provides family support, early learning, and play experiences for children younger than 4 years. By 2009, centers provided services for 2.3 million children. These "place-based" programs serve defined populations and are well integrated with community health programs including nurse home visiting, thereby expanding community capacity. Sure Start also works with parents to increase family capacities including human capital through more favorable parenting skills related to discipline and early childhood learning and psychological resources through enhanced life satisfaction. These expanded capacities, in turn, have led to more responsive caregiving (as measured by more stimulating home learning environments) and safety and security (as measured by less chaotic home environments) and contribute to improvements in selected health outcomes including better physical health and reduced overweight among 5-year-old children.

Limitations

Our conceptualization of the foundations of health is based on the current science. Although the evidence reviewed in this paper provides the underpinning for the 4 foundations of health, we recognize that, as the science base evolves, the foundations may evolve as well to accommodate emerging findings. In addition, the model was formulated to focus attention on the direct relations between policies and programs, capacities, and foundations of health; this approach is not meant to diminish the many complexities involved in implementing policies and programs. For example, often programs aimed at promoting early childhood health and development fall in a variety of sectors including education, welfare, and medical care. Each sector has distinct funding streams, legislation, and regulations guiding their priorities. This creates "silos" that are not coordinated or necessarily connected with regard to implementation or assessment of either individual or population-based concerns. Although competing priorities and lack of integration among sectors remain important barriers to children's health promotion, the model intends to guide action across and between sectors and highlight important considerations for children and families with regard to early childhood policies and programs.

In addition, the model does not fully explain why some policies and programs aimed at bolstering capacities and foundations may not fully reach the desired outcomes. For example, Head Start provides preschool education, health and nutrition services, parent involvement, and social services for low-income children and, as such, intends to promote caregiver capacities. Although the National Impact Evaluation demonstrates more favorable preschool experiences among children enrolled in Head Start compared with those in the control group, the effects were small to moderate across selected domains related to school readiness for 3- and 4-year-old children with few differences sustained at the end of first grade. Among the possible explanations for the lack of more robust treatment effects are the variable quality and implementation among the Head Start programs, the limited ability of a 1-year intervention to overcome the social and economic determinants of health, and the return of Head Start children to schools of variable quality. The conceptual model does not account for the efficacy of interventions, or important issues related to implementation. The linearity of the model also does not explicitly address timing and duration of early childhood policies and programs nor does it fully reflect the dynamic and reciprocal nature of the multiple environments influencing children within an embedded system.

Influencing the Current State of Children's Health Policy

Paul Wise recently decried the state of children's health policy in the United States as incoherent and ineffective. He argued that national health policy has become focused on cost-containment, insurance, and reimbursement and ignores children's health. Incoherent policy results in a "cacophony of programmatic pleas and extensive directories of recommendations." This is precisely the dilemma that we attempt to address with the framework provided in this article. First, the premise of the framework is that early childhood health is an essential antecedent of health across the life span and should, therefore, be of major concern to every health policymaker. This framework advances the thinking about the usefulness of the life course approach to understanding population health. The framework builds on the early origins of adult health.
concept to focus on preventive interventions in the earliest years of life, when the capacities of families and communities can shape healthy childhood and reduce future health disparities. Although the framework does not account for every causal factor in explaining children’s health, it can guide both researchers and practitioners in organizing new findings to advance policy and programs. There is much more to be learned about the underlying science of health during this period and better measures are needed to assess health in early life. However, redirecting the thinking of policymakers to focus on early health promotion—both for its own sake and as a cost-reduction strategy—may be one of those “big” ideas that will profoundly influence the future of preventive care.

Second, the framework provides a logic model for relating policy and programs to outcomes, working through the important mediating concepts of capacities and the foundations of early health. The framework recognizes the validity of the criticism that “government programs can’t raise children.” It acknowledges that children are raised by families who are embedded in communities. However, the role and responsibility of government also remains central to this idea. Whereas some families already have the capacities to provide the foundations for healthy early life for their children, many, even those who are considered affluent, would benefit from public and private sector policies that intentionally strengthen family and community capacities. Ultimately, such a population-based framework must guide the thinking of policymakers and program officials.

Finally, an underlying goal of the framework is to demonstrate how governmental units and private organizations, working in diverse sectors including public health, education, family welfare, housing, environment, or medical care can begin to plan and operate policies and programs in an integrated fashion to build capacities, drawing from the broad array of legal and administrative tools inherently theirs. The model is meant to spur such integrated thinking and action across agencies and branches of government and private efforts working within these sectors. However, to sustain an integrated approach to supporting children and families, both political will and changes in the legislative architecture, directing agencies to work together and leverage private investment, will also be important.

Sir Michael Marmot in the 2010 report “Fair Society, Healthy Lives” concluded that society must ensure every child the best start in life. Among the elements of such an approach, Marmot includes reducing inequalities in the early development of physical and emotional health, and cognitive, linguistic, and social skills; ensuring high-quality maternity services, parenting programs, child care, and early years education to meet needs across social classes; and, finally, building the resilience and well-being of young children across the social gradient. Although this framework is not meant to explicitly address broader issues such as equity and fairness, it does provide a conceptual map that may serve as a first step in accomplishing these lofty goals.

References


