



# NCC Pediatrics Continuity Clinic Curriculum: **Toxic Stress and Adverse Childhood Experiences**



## **Goals & Objectives:**

*To understand toxic stress, its adverse effects on children, and how children and their families can overcome these negative health effects*

- Define toxic stress.
  - How do stress responses differ?
- What determines whether an adverse childhood experience (ACE) may be associated with a toxic stress response?
- What is the Adverse Childhood Experiences study?
- How does toxic stress affect the developing brain?
- What are the potential health consequences of toxic stress?
- What is resilience?

## **Pre-Meeting Preparation:** *Please review the following enclosures:*

- Watch the [TEDTalk on ACEs](#) (16 minutes long) by Nadine Burke-Harris, MD, MPH, FAAP
- Read AAP Technical Report “The Lifelong Effects of Early Childhood Adversity and Toxic Stress”
- Read *Military Children and Families: Strengths and Challenges During Peace and War* (begin at “Strengths and Challenges Among Military Children and Families” pg. 66 and stop at “Strengths-Based Approaches” pg. 68, or continue through for extra credit 😊)

## **Conference Agenda:**

- Discuss, “[T]he ACE score is neither a diagnostic tool nor is it predictive at the individual level. Thus, great care should be used when obtaining ACE scores for children and adults as a part of community-wide screening, service, or treatment.” *Inside the Adverse Childhood Experience Score: Strengths, Limitations, and Misapplications, Journal of Preventive Medicine, 2020*
- Quiz
- Cases

## **Extra Credit:**

- ["The Adverse Childhood Experiences "](#) (*American Journal of Preventive Medicine, 1998*)
- [CSF and GAT](#) (*military specific screening*) and [CSF2](#)
- ["Preventing Childhood Toxic Stress. . ."](#) (*AAP Policy Statement, 2021*)
- [Preventing Adverse Childhood Experiences](#) (*CDC website*)
- ["Adverse Childhood Experiences and the Consequences on Neurobiological, Psychosocial, and Somatic Conditions Across the Lifespan"](#) (*Frontiers in Psychiatry, 2018*)
- ["Adverse Childhood Experiences: The Protective and Therapeutic Potential of Nature"](#) (*Frontiers in Psychology, 2020*)
- ["Expanding adverse child experiences to inequality and racial discrimination"](#) (*PrevMed, 2022*)
- ["Population vs Individual Prediction of Poor Health From Results of Adverse Childhood Experiences Screening"](#) (*JAMA Peds, 2021*)
- ["Adverse childhood experiences and premature mortality through mid-adulthood: A five-decade prospective study"](#) (*Lancet, 2022*)
- [ACES Aware Self Care Tool](#) *handout for families from ACES Aware website*



## TECHNICAL REPORT

# The Lifelong Effects of Early Childhood Adversity and Toxic Stress

## abstract

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Advances in fields of inquiry as diverse as neuroscience, molecular biology, genomics, developmental psychology, epidemiology, sociology, and economics are catalyzing an important paradigm shift in our understanding of health and disease across the lifespan. This converging, multidisciplinary science of human development has profound implications for our ability to enhance the life prospects of children and to strengthen the social and economic fabric of society. Drawing on these multiple streams of investigation, this report presents an ecobiodevelopmental framework that illustrates how early experiences and environmental influences can leave a lasting signature on the genetic predispositions that affect emerging brain architecture and long-term health. The report also examines extensive evidence of the disruptive impacts of toxic stress, offering intriguing insights into causal mechanisms that link early adversity to later impairments in learning, behavior, and both physical and mental well-being. The implications of this framework for the practice of medicine, in general, and pediatrics, specifically, are potentially transformational. They suggest that many adult diseases should be viewed as developmental disorders that begin early in life and that persistent health disparities associated with poverty, discrimination, or maltreatment could be reduced by the alleviation of toxic stress in childhood. An ecobiodevelopmental framework also underscores the need for new thinking about the focus and boundaries of pediatric practice. It calls for pediatricians to serve as both front-line guardians of healthy child development and strategically positioned, community leaders to inform new science-based strategies that build strong foundations for educational achievement, economic productivity, responsible citizenship, and lifelong health. *Pediatrics* 2012;129:e232–e246

## INTRODUCTION

*Of a good beginning cometh a good end.*

John Heywood, *Proverbs* (1546)

The United States, like all nations of the world, is facing a number of **social and economic challenges** that must be met to secure a promising future. Central to this task is the **need to produce a well-educated and healthy adult population** that is sufficiently skilled to participate effectively in a global economy and to become responsible **stakeholders in a productive society**. As concerns continue to grow about the quality of public education and its capacity to prepare the nation's future workforce, increasing investments are being made in

Jack P. Shonkoff, MD, Andrew S. Garner, MD, PhD, and THE COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, COMMITTEE ON EARLY CHILDHOOD, ADOPTION, AND DEPENDENT CARE, AND SECTION ON DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS

### KEY WORDS

ecobiodevelopmental framework, new morbidity, toxic stress, social inequalities, health disparities, health promotion, disease prevention, advocacy, brain development, human capital development, pediatric basic science

### ABBREVIATIONS

ACE—adverse childhood experiences  
CRH—corticotropin-releasing hormone  
EBD—ecobiodevelopmental  
PFC—prefrontal cortex

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The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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the preschool years to promote the foundations of learning. Although debates about early childhood policy focus almost entirely on educational objectives, science indicates that sound investments in interventions that reduce adversity are also likely to strengthen the foundations of physical and mental health, which would generate even larger returns to all of society.<sup>1,2</sup> This growing scientific understanding about the common roots of health, learning, and behavior in the early years of life presents a potentially transformational opportunity for the future of pediatrics.

Identifying the origins of adult disease and addressing them early in life are critical steps toward changing our current health care system from a “sick-care” to a “well-care” model.<sup>3–5</sup> Although new discoveries in basic science, clinical subspecialties, and high-technology medical interventions continue to advance our capacity to treat patients who are ill, there is growing appreciation that a successful well-care system must expand its scope beyond the traditional realm of individualized, clinical practice to address the complex social, economic, cultural, environmental, and developmental influences that lead to population-based health disparities and unsustainable medical care expenditures.<sup>2,6,7</sup> The science of early childhood development has much to offer in the realization of this vision, and the well-being of young children and their families is emerging as a promising focus for creative investment.

The history of pediatrics conveys a rich narrative of empirical investigation and pragmatic problem solving. Its emergence as a specialized domain of clinical medicine in the late 19th century was dominated by concerns about nutrition, infectious disease, and premature death. In the middle of

the 20th century, as effective vaccines, antibiotics, hygiene, and other public health measures confronted the infectious etiologies of childhood illness, a variety of developmental, behavioral, and family difficulties became known as the “new morbidities.”<sup>8</sup> By the end of the century, mood disorders, parental substance abuse, and exposure to violence, among other conditions, began to receive increasing attention in the pediatric clinical setting and became known as the “newer morbidities.”<sup>9</sup> Most recently, increasingly complex mental health concerns; the adverse effects of television viewing; the influence of new technologies; epidemic increases in obesity; and persistent economic, racial, and ethnic disparities in health status have been called the “millennial morbidities.”<sup>10</sup>

Advances in the biological, developmental, and social sciences now offer tools to write the next important chapter. The overlapping and synergistic characteristics of the most prevalent conditions and threats to child well-being—combined with the remarkable pace of new discoveries in developmental neuroscience, genomics, and the behavioral and social sciences—present an opportunity to confront a number of important questions with fresh information and a new perspective. What are the biological mechanisms that explain the well-documented association between childhood adversity and adult health impairment? As these causal mechanisms are better elucidated, what can the medical field, specifically, and society, more generally, do to reduce or mitigate the effects of disruptive early-life influences on the origins of lifelong disease? When is the optimal time for those interventions to be implemented?

This technical report addresses these important questions in 3 ways. First, it presents a scientifically grounded,

ecobiodevelopmental (EBD) framework to stimulate fresh thinking about the promotion of health and prevention of disease across the lifespan. Second, it applies this EBD framework to better understand the complex relationships among adverse childhood circumstances, toxic stress, brain architecture, and poor physical and mental health well into adulthood. Third, it proposes a new role for pediatricians to promote the development and implementation of science-based strategies to reduce toxic stress in early childhood as a means of preventing or reducing many of society’s most complex and enduring problems, which are frequently associated with disparities in learning, behavior, and health. The magnitude of this latter challenge cannot be overstated. A recent technical report from the American Academy of Pediatrics reviewed 58 years of published studies and characterized racial and ethnic disparities in children’s health to be extensive, pervasive, persistent, and, in some cases, worsening.<sup>11</sup> Moreover, the report found only 2 studies that evaluated interventions designed to reduce disparities in children’s health status and health care that also compared the minority group to a white group, and none used a randomized controlled trial design.

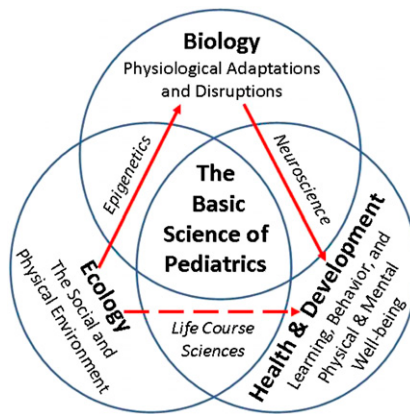
The causal sequences of risk that contribute to demographic differences in educational achievement and physical well-being threaten our country’s democratic ideals by undermining the national credo of equal opportunity. Unhealthy communities with too many fast food franchises and liquor stores, yet far too few fresh food outlets and opportunities for physical activity, contribute to an unhealthy population. Unemployment and forced mobility disrupt the social networks that stabilize communities and families and, thereby, lead to higher rates of violence

and school dropout. The purpose of this technical report is to leverage new knowledge from the biological and social sciences to help achieve the positive life outcomes that could be accrued to all of society if more effective strategies were developed to reduce the exposure of young children to significant adversity.

## A NEW FRAMEWORK FOR PROMOTING HEALTHY DEVELOPMENT

Advances in our understanding of the factors that either promote or undermine early human development have set the stage for a **significant paradigm shift**.<sup>12</sup> In simple terms, the process of development is now understood as a function of “**nature dancing with nurture over time**,” in contrast to the longstanding but now outdated debate about the influence of “**nature versus nurture**.”<sup>13</sup> That is to say, beginning prenatally, continuing through infancy, and extending into childhood and beyond, **development is driven by an ongoing, inextricable interaction between biology (as defined by genetic predispositions) and ecology (as defined by the social and physical environment)**<sup>12,14,15</sup> (see Fig 1).

Building on an ecological model that explains multiple levels of influence on psychological development,<sup>16</sup> and a recently proposed biodevelopmental framework that offers an integrated, science-based approach to coordinated, early childhood policy making and practice across sectors,<sup>17</sup> this technical report presents an EBD framework that draws on a recent report from the **Center on the Developing Child at Harvard University** to help physicians and policy makers think about how early childhood adversity can lead to lifelong impairments in learning, behavior, and both physical and mental health.<sup>1,6</sup>



**FIGURE 1**

The basic science of pediatrics. An emerging, multidisciplinary science of development supports an EBD framework for understanding the evolution of human health and disease across the life span. In recent decades, epidemiology, developmental psychology, and longitudinal studies of early childhood interventions have demonstrated significant associations (hashed red arrow) between the ecology of childhood and a wide range of developmental outcomes and life course trajectories. Concurrently, advances in the biological sciences, particularly in developmental neuroscience and epigenetics, have made parallel progress in beginning to elucidate the biological mechanisms (solid arrows) underlying these important associations. The convergence of these diverse disciplines defines a promising new basic science of pediatrics.

Some of the most compelling new evidence for this proposed framework comes from the rapidly moving field of **epigenetics**, which **investigates the molecular biological mechanisms (such as DNA methylation and histone acetylation) that affect gene expression without altering DNA sequence**. For example, studies of maternal care in rats indicate that differences in the quality of nurturing affect neural function in pups and negatively affect cognition and the expression of psychopathology later in life. Moreover, rats whose mothers showed increased levels of licking and grooming during their first week of life also showed less exaggerated stress responses as adults compared with rats who were reared by mothers with a low level of licking and grooming, and the expression of mother-pup interactions in the pups

has been demonstrated to be passed on to the next generation.<sup>18–22</sup> This burgeoning area of research is challenging us to **look beyond genetic predispositions to examine how environmental influences and early experiences affect when, how, and to what degree different genes are actually activated**, thereby elucidating the mechanistic linkages through which **gene-environment interaction** can affect lifelong behavior, development, and health (see Fig 1).

Additional evidence for the proposed framework comes from insights accrued during the “Decade of the Brain” in the 1990s, when the National Institutes of Health invested significant resources into understanding both normal and pathologic neuronal development and function. Subsequent advances in developmental neuroscience have begun to describe further, in some cases at the molecular and cellular levels, how an integrated, functioning network with billions of neurons and trillions of connections is assembled. Because this network serves as the biological platform for a child’s emerging social-emotional, linguistic, and cognitive skills, developmental neuroscience is also beginning to clarify the underlying causal mechanisms that explain the normative process of child development. In a parallel fashion, longitudinal studies that document the long-term consequences of childhood adversity indicate that **alterations in a child’s ecology can have measurable effects on his or her developmental trajectory, with lifelong consequences for educational achievement, economic productivity, health status, and longevity**.<sup>23–27</sup>

The EBD framework described in this article presents a new way to think about the underlying biological mechanisms that explain this robust link between early life adversities (ie, the



new morbidities of childhood) and important adult outcomes. The innovation of this approach lies in its mobilization of dramatic scientific advances in the service of rethinking basic notions of health promotion and disease prevention within a fully integrated, life span perspective from conception to old age.<sup>6</sup> In this context, significant stress in the lives of young children is viewed as a risk factor for the genesis of health-threatening behaviors as well as a catalyst for physiologic responses that can lay the groundwork for chronic, stress-related diseases later in life.

### Understanding the Biology of Stress

Although genetic variability clearly plays a role in stress reactivity, early experiences and environmental influences can have considerable impact. Beginning as early as the prenatal period, both animal<sup>28–30</sup> and human<sup>31,32</sup> studies suggest that fetal exposure to maternal stress can influence later stress responsiveness. In animals, this effect has been demonstrated not only in the offspring of the studied pregnancy but also in subsequent generations. The precise biological mechanisms that explain these findings remain to be elucidated, but epigenetic modifications of DNA appear likely to play a role.<sup>31,33,34</sup> Early postnatal experiences with adversity are also thought to affect future reactivity to stress, perhaps by altering the developing neural circuits controlling these neuroendocrine responses.<sup>34,35</sup> Although much research remains to be performed in this area, there is a strong scientific consensus that the ecological context modulates the expression of one's genotype. It is as if experiences confer a "signature" on the genome to authorize certain characteristics and behaviors and to prohibit others. This concept

underscores the need for greater understanding of how stress "gets under the skin," as well as the importance of determining what external and internal factors can be mobilized to prevent that embedding process or protect against the consequences of its activation.

Physiologic responses to stress are well defined.<sup>36–38</sup> The most extensively studied involve activation of the hypothalamic-pituitary-adrenocortical axis and the sympathetic-adrenomedullary system, which results in increased levels of stress hormones, such as corticotropin-releasing hormone (CRH), cortisol, norepinephrine, and adrenaline. These changes co-occur with a network of other mediators that include elevated inflammatory cytokines and the response of the parasympathetic nervous system, which counterbalances both sympathetic activation and inflammatory responses. Whereas transient increases in these stress hormones are protective and even essential for survival, excessively high levels or prolonged exposures can be quite harmful or frankly toxic,<sup>39–41</sup> and the dysregulation of this network of physiologic mediators (eg, too much or too little cortisol; too much or too little inflammatory response) can lead to a chronic "wear and tear" effect on multiple organ systems, including the brain.<sup>39–41</sup> This cumulative, stress-induced burden on overall body functioning and the aggregated costs, both physiologic and psychological, required for coping and returning to homeostatic balance, have been referred to as "allostatic load."<sup>38,42–44</sup> The dynamics of these stress-mediating systems are such that their overactivation in the context of repeated or chronic adversity leads to alterations in their regulation.

The National Scientific Council on the Developing Child has proposed

a conceptual taxonomy comprising 3 distinct types of stress responses (in contrast to the actual stressors themselves) in young children—positive, tolerable, and toxic—on the basis of postulated differences in their potential to cause enduring physiologic disruptions as a result of the intensity and duration of the response.<sup>17,45</sup> A positive stress response refers to a physiologic state that is brief and mild to moderate in magnitude. Central to the notion of positive stress is the availability of a caring and responsive adult who helps the child cope with the stressor, thereby providing a protective effect that facilitates the return of the stress response systems back to baseline status. Examples of precipitants of a positive stress response in young children include dealing with frustration, getting an immunization, and the anxiety associated with the first day at a child care center. When buffered by an environment of stable and supportive relationships, positive stress responses are a growth-promoting element of normal development. As such, they provide important opportunities to observe, learn, and practice healthy, adaptive responses to adverse experiences.

A tolerable stress response, in contrast to positive stress, is associated with exposure to nonnormative experiences that present a greater magnitude of adversity or threat. Precipitants may include the death of a family member, a serious illness or injury, a contentious divorce, a natural disaster, or an act of terrorism. When experienced in the context of buffering protection provided by supportive adults, the risk that such circumstances will produce excessive activation of the stress response systems that leads to physiologic harm and long-term consequences for health and learning is greatly

reduced. Thus, the essential characteristic that makes this form of stress response tolerable is the extent to which protective adult relationships facilitate the child's adaptive coping and a sense of control, thereby reducing the physiologic stress response and promoting a return to baseline status.

The third and most dangerous form of stress response, toxic stress, can result from strong, frequent, or prolonged activation of the body's stress response systems in the absence of the buffering protection of a supportive, adult relationship. The risk factors studied in the Adverse Childhood Experiences Study<sup>23</sup> include examples of multiple stressors (eg, child abuse or neglect, parental substance abuse, and maternal depression) that are capable of inducing a toxic stress response. The essential characteristic of this phenomenon is the postulated disruption of brain circuitry and other organ and metabolic systems during sensitive developmental periods. Such disruption may result in anatomic changes and/or physiologic dysregulations that are the precursors of later impairments in learning and behavior as well as the roots of chronic, stress-related physical and mental illness. The potential role of toxic stress and early life adversity in the pathogenesis of health disparities underscores the importance of effective surveillance for significant risk factors in the primary health care setting. More important, however, is the need for clinical pediatrics to move beyond the level of risk factor identification and to leverage advances in the biology of adversity to contribute to the critical task of developing, testing, and refining new and more effective strategies for reducing toxic stress and mitigating its effects as early as possible, before irrevocable damage is done. Stated simply, the next chapter of innovation

in pediatrics remains to be written, but the outline and plot are clear.

### Toxic Stress and the Developing Brain

In addition to short-term changes in observable behavior, toxic stress in young children can lead to less outwardly visible yet permanent changes in brain structure and function.<sup>39,46</sup>

The plasticity of the fetal, infant, and early childhood brain makes it particularly sensitive to chemical influences, and there is growing evidence from both animal and human studies that persistently elevated levels of stress hormones can disrupt its developing architecture.<sup>45</sup> For example, abundant glucocorticoid receptors are found in the amygdala, hippocampus, and prefrontal cortex (PFC), and exposure to stressful experiences has been shown to alter the size and neuronal architecture of these areas as well as lead to functional differences in learning, memory, and aspects of executive functioning. More specifically, chronic stress is associated with hypertrophy and overactivity in the amygdala and orbitofrontal cortex, whereas comparable levels of adversity can lead to loss of neurons and neural connections in the hippocampus and medial PFC. The functional consequences of these structural changes include more anxiety related to both hyperactivation of the amygdala and less top-down control as a result of PFC atrophy as well as impaired memory and mood control as a consequence of hippocampal reduction.<sup>47</sup> Thus, the developing architecture of the brain can be impaired in numerous ways that create a weak foundation for later learning, behavior, and health.

Along with its role in mediating fear and anxiety, the amygdala is also an activator of the physiologic stress response. Its stimulation activates

sympathetic activity and causes neurons in the hypothalamus to release CRH. CRH, in turn, signals the pituitary to release adrenocorticotrophic hormone, which then stimulates the adrenal glands to increase serum cortisol concentrations. The amygdala contains large numbers of both CRH and glucocorticoid receptors, beginning early in life, which facilitate the establishment of a positive feedback loop. Significant stress in early childhood can trigger amygdala hypertrophy and result in a hyperresponsive or chronically activated physiologic stress response, along with increased potential for fear and anxiety.<sup>48,49</sup> It is in this way that a child's environment and early experiences get under the skin.

Although the hippocampus can turn off elevated cortisol, chronic stress diminishes its capacity to do so and can lead to impairments in memory and mood-related functions that are located in this brain region. Exposure to chronic stress and high levels of cortisol also inhibit neurogenesis in the hippocampus, which is believed to play an important role in the encoding of memory and other functions. Furthermore, toxic stress limits the ability of the hippocampus to promote contextual learning, making it more difficult to discriminate conditions for which there may be danger versus safety, as is common in posttraumatic stress disorder. Hence, altered brain architecture in response to toxic stress in early childhood could explain, at least in part, the strong association between early adverse experiences and subsequent problems in the development of linguistic, cognitive, and social-emotional skills, all of which are inextricably intertwined in the wiring of the developing brain.<sup>45</sup>

The PFC also participates in turning off the cortisol response and has an important role in the top-down

regulation of autonomic balance (ie, sympathetic versus parasympathetic effects), as well as in the development of executive functions, such as decision-making, working memory, behavioral self-regulation, and mood and impulse control. The PFC is also known to suppress amygdala activity, allowing for more adaptive responses to potentially threatening or stressful experiences; however, exposure to stress and elevated cortisol results in dramatic changes in the connectivity within the PFC, which may limit its ability to inhibit amygdala activity and, thereby, impair adaptive responses to stress. Because the hippocampus and PFC both play a significant role in modulating the amygdala's initiation of the stress response, toxic stress-induced changes in architecture and connectivity within and between these important areas might account for the variability seen in stress-responsiveness.<sup>50</sup> This can then result in some children appearing to be both more reactive to even mildly adverse experiences and less capable of effectively coping with future stress.<sup>36,37,45,51</sup>

### Toxic Stress and the Early Childhood Roots of Lifelong Impairments in Physical and Mental Health

As described in the previous section, stress-induced changes in the architecture of different regions of the developing brain (eg, amygdala, hippocampus, and PFC) can have potentially permanent effects on a range of important functions, such as regulating stress physiology, learning new skills, and developing the capacity to make healthy adaptations to future adversity.<sup>52,53</sup> As the scientific evidence for these associations has become better known and has been disseminated more widely, its implications for early childhood policy and programs have become increasingly

appreciated by decision makers across the political spectrum. Notwithstanding this growing awareness, however, discussions about early brain development in policy-making circles have focused almost entirely on issues concerned with school readiness as a prerequisite for later academic achievement and the development of a skilled adult workforce. Within this same context, the health dimension of early childhood policy has focused largely on the traditional components of primary pediatric care, such as immunizations, early identification of sensory impairments and developmental delays, and the prompt diagnosis and treatment of medical problems. That said, as advances in the biomedical sciences have generated growing evidence linking biological disruptions associated with adverse childhood experiences (ACE) to greater risk for a variety of chronic diseases well into the adult years, the need to reconceptualize the health dimension of early childhood policy has become increasingly clear.<sup>1,6</sup> Stated simply, the time has come to expand the public's understanding of brain development and shine a bright light on its relation to the early childhood roots of adult disease and to examine the compelling implications of this growing knowledge base for the future of pediatric practice.

The potential consequences of toxic stress in early childhood for the pathogenesis of adult disease are considerable. At the behavioral level, there is extensive evidence of a strong link between early adversity and a wide range of health-threatening behaviors. At the biological level, there is growing documentation of the extent to which both the cumulative burden of stress over time (eg, from chronic maltreatment) and the timing of specific environmental insults during

sensitive developmental periods (eg, from first trimester rubella or prenatal alcohol exposure) can create structural and functional disruptions that lead to a wide range of physical and mental illnesses later in adult life.<sup>1,6</sup> A selective overview of this extensive scientific literature is provided below.

The association between ACE and unhealthy adult lifestyles has been well documented. Adolescents with a history of multiple risk factors are more likely to initiate drinking alcohol at a younger age and are more likely to use alcohol as a means of coping with stress than for social reasons.<sup>54</sup> The adoption of unhealthy lifestyles as a coping mechanism might also explain why higher ACE exposures are associated with tobacco use, illicit drug abuse, obesity, and promiscuity,<sup>55,56</sup> as well as why the risk of pathologic gambling is increased in adults who were maltreated as children.<sup>57</sup> Adolescents and adults who manifest higher rates of risk-taking behaviors are also more likely to have trouble maintaining supportive social networks and are at higher risk of school failure, gang membership, unemployment, poverty, homelessness, violent crime, incarceration, and becoming single parents. Furthermore, adults in this high-risk group who become parents themselves are less likely to be able to provide the kind of stable and supportive relationships that are needed to protect their children from the damages of toxic stress. This intergenerational cycle of significant adversity, with its predictable repetition of limited educational achievement and poor health, is mediated, at least in part, by the social inequalities and disrupted social networks that contribute to fragile families and parenting difficulties.<sup>7,58,59</sup>

The adoption of unhealthy lifestyles and associated exacerbation of socioeconomic inequalities are potent



risk factors for poor health. Up to 40% of early deaths have been estimated to be the result of behavioral or lifestyle patterns,<sup>3</sup> and 1 interpretation of the ACE study data is that toxic stress in childhood is associated with the adoption of unhealthy lifestyles as a coping mechanism.<sup>60</sup> An additional 25% to 30% of early deaths are thought to be attributable to either inadequacies in medical care<sup>3</sup> or socioeconomic circumstances, many of which are known to contribute to health care–related disparities.<sup>61–67</sup>

Beyond its strong association with later risk-taking and generally unhealthy lifestyles, it is critically important to underscore the extent to which toxic stress in early childhood has also been shown to cause physiologic disruptions that persist into adulthood and lead to frank disease, even in the absence of later health-threatening behaviors. For example, the biological manifestations of toxic stress can include alterations in immune function<sup>68</sup> and measurable increases in inflammatory markers,<sup>69–72</sup> which are known to be associated with poor health outcomes as diverse as cardiovascular disease,<sup>69,70,73</sup> viral hepatitis,<sup>74</sup> liver cancer,<sup>75</sup> asthma,<sup>76</sup> chronic obstructive pulmonary disease,<sup>77</sup> autoimmune diseases,<sup>78</sup> poor dental health,<sup>72</sup> and depression.<sup>79–81</sup> Thus, toxic stress in early childhood not only is a risk factor for later risky behavior but also can be a direct source of biological injury or disruption that may have lifelong consequences independent of whatever circumstances might follow later in life. In such cases, toxic stress can be viewed as the precipitant of a physiologic memory or biological signature that confers lifelong risk well beyond its time of origin.<sup>38,42–44</sup>

Over and above its toll on individuals, it is also important to address the enormous social and economic costs

of toxic stress and its consequences for all of society. The multiple dimensions of these costs extend from differential levels of civic participation and their impacts on the quality of community life to the health and skills of the nation's workforce and its ability to participate successfully in a global economy. In the realm of learning and behavior, economists argue for early and sustained investments in early care and education programs, particularly for children whose parents have limited education and low income, on the basis of persuasive evidence from cost-benefit analyses that reveal the costs of incarceration and diminished economic productivity associated with educational failure.<sup>82–86</sup> In view of the relatively scarce attention to health outcomes in these long-term follow-up studies, the full return on investments that reduce toxic stress in early childhood is likely to be much higher. Health care expenditures that are paying for the consequences of unhealthy lifestyles (eg, obesity, tobacco, alcohol, and substance abuse) are enormous, and the costs of chronic diseases that may have their origins early in life include many conditions that consume a substantial percentage of current state and federal budgets. The potential savings in health care costs from even small, marginal reductions in the prevalence of cardiovascular disease, hypertension, diabetes, and depression are, therefore, likely to dwarf the considerable economic productivity and criminal justice benefits that have been well documented for effective early childhood interventions.

In summary, the EBD approach to childhood adversity discussed in this report has 2 compelling implications for a full, life span perspective on health promotion and disease prevention. First, it postulates that toxic

stress in early childhood plays an important causal role in the intergenerational transmission of disparities in educational achievement and health outcomes. Second, it underscores the need for the entire medical community to focus more attention on the roots of adult diseases that originate during the prenatal and early childhood periods and to rethink the concept of preventive health care within a system that currently perpetuates a scientifically untenable wall between pediatrics and internal medicine.

### THE NEED FOR A NEW PEDIATRIC PARADIGM TO PROMOTE HEALTH AND PREVENT DISEASE

In his 1966 Aldrich Award address, Dr Julius Richmond identified child development as the basic science of pediatrics.<sup>87</sup> It is now time to expand the boundaries of that science by incorporating more than 4 decades of transformational research in neuroscience, molecular biology, and genomics, along with parallel advances in the behavioral and social sciences (see Fig 1). This newly augmented, interdisciplinary, basic science of pediatrics offers a promising framework for a deeper understanding of the biology and ecology of the developmental process. More importantly, it presents a compelling opportunity to leverage these rapidly advancing frontiers of knowledge to formulate more effective strategies to enhance lifelong outcomes in learning, behavior, and health.

The time has come for a coordinated effort among basic scientists, pediatric subspecialists, and primary care clinicians to develop more effective strategies for addressing the origins of social class, racial, and ethnic disparities in health and development. To this end, a unified, science-based approach to early childhood policy and practice across multiple sectors (including primary health care, early



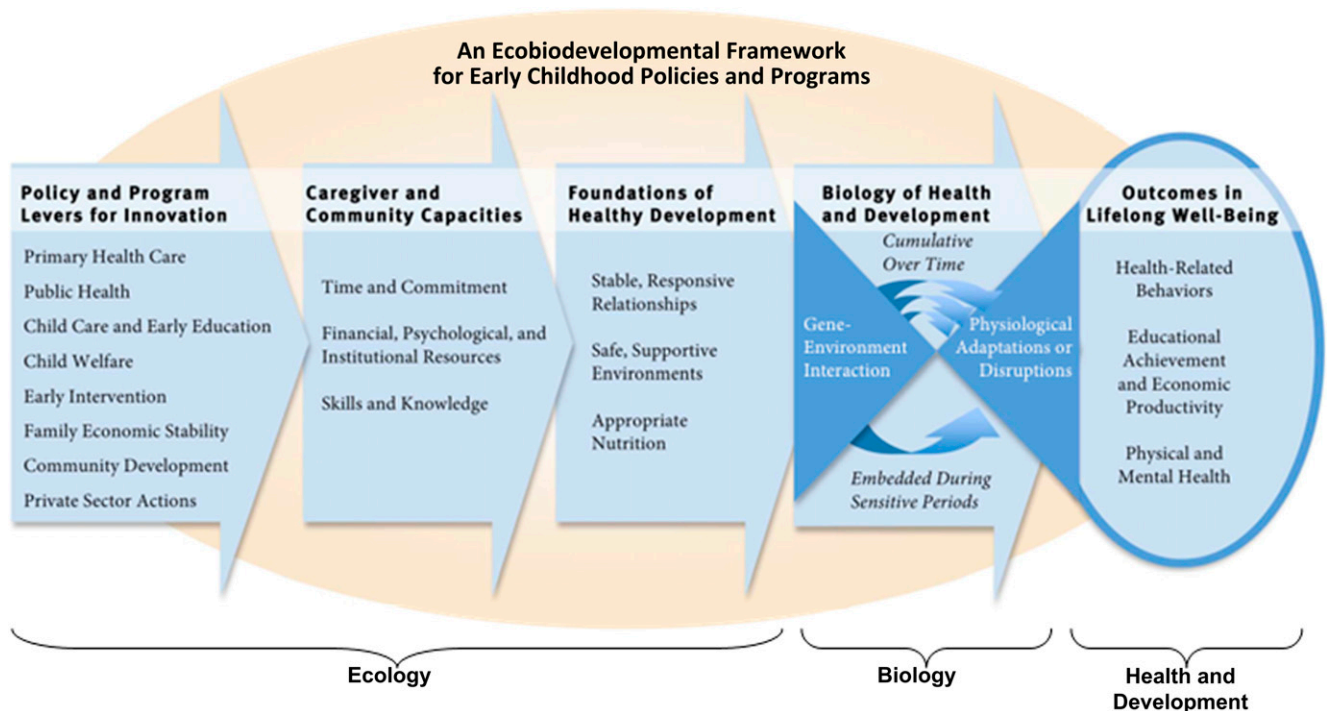
care and education, and child welfare, among many others) could provide a compelling framework for a new era in community-based investment in which coordinated efforts are driven by a shared knowledge base rather than distracted by a diversity of traditions, approaches, and funding streams. Recognizing both the critical value and clear limitations of what can be accomplished within the constraints of an office visit, 21st century pediatrics is well positioned to serve as the primary engine for a broader approach to health promotion and disease prevention that is guided by cutting-edge science and expanded in scope beyond individualized health care.<sup>88,89</sup> The pediatric medical home of the future could offer more than the early identification of concerns and timely referral to available programs, as enhanced collaboration between pediatricians and community-based agencies could be viewed as a vehicle for testing promising new intervention strategies rather than simply

improving coordination among existing services. With this goal in mind, science tells us that interventions that strengthen the capacities of families and communities to protect young children from the disruptive effects of toxic stress are likely to promote healthier brain development and enhanced physical and mental well-being. The EBD approach proposed in this article is adapted from a science-based framework created by the Center on the Developing Child at Harvard University to advance early childhood policies and programs that support this vision (see Fig 2).<sup>1</sup> Its rationale, essential elements, and implications for pediatric practice are summarized below.

### Broadening the Framework for Early Childhood Policy and Practice

Advances across the biological, behavioral, and social sciences support 2 clear and powerful messages for leaders who are searching for more

effective ways to improve the health of the nation.<sup>6</sup> First, current health promotion and disease prevention policies focused largely on adults would be more effective if evidence-based investments were also made to strengthen the foundations of health in the prenatal and early childhood periods. Second, significant reductions in chronic disease could be achieved across the life course by decreasing the number and severity of adverse experiences that threaten the well-being of young children and by strengthening the protective relationships that help mitigate the harmful effects of toxic stress. The multiple domains that affect the biology of health and development—including the foundations of healthy development, caregiver and community capacities, and public and private sector policies and programs—provide a rich array of targeted opportunities for the introduction of innovative interventions, beginning in the earliest years of life.<sup>1</sup>



**FIGURE 2**

An ecobiodevelopmental framework for early childhood policies and programs. This was adapted from ref 1. See text for details.

**The biology of health and development** explains how experiences and environmental influences get under the skin and interact with genetic predispositions, which then result in various combinations of physiologic adaptation and disruption that affect lifelong outcomes in learning, behavior, and both physical and mental well-being. These findings call for us to augment adult-focused approaches to health promotion and disease prevention by addressing the early childhood origins of lifelong illness and disability.

**The foundations of healthy development** refers to 3 domains that establish a context within which the early roots of physical and mental well-being are nourished. These include (1) a stable and responsive environment of relationships, which provides young children with consistent, nurturing, and protective interactions with adults to enhance their learning and help them develop adaptive capacities that promote well-regulated stress-response systems; (2) safe and supportive physical, chemical, and built environments, which provide physical and emotional spaces that are free from toxins and fear, allow active exploration without significant risk of harm, and offer support for families raising young children; and (3) sound and appropriate nutrition, which includes health-promoting food intake and eating habits, beginning with the future mother's preconception nutritional status.

**Caregiver and community capacities to promote health and prevent disease and disability** refers to the ability of family members, early childhood program staff, and the social capital provided through neighborhoods, voluntary associations, and the parents' workplaces to play a major supportive role in strengthening the foundations of child health. These capacities can be grouped into 3 categories: (1) time

and commitment; (2) financial, psychological, social, and institutional resources; and (3) skills and knowledge.

**Public and private sector policies and programs** can strengthen the foundations of health through their ability to enhance the capacities of caregivers and communities in the multiple settings in which children grow up. Relevant policies include both legislative and administrative actions that affect systems responsible for primary health care, public health, child care and early education, child welfare, early intervention, family economic stability (including employment support for parents and cash assistance), community development (including zoning regulations that influence the availability of open spaces and sources of nutritious food), housing, and environmental protection, among others. It is also important to underscore the role that the private sector can play in strengthening the capacities of families to raise healthy and competent children, particularly through supportive workplace policies (such as paid parental leave, support for breastfeeding, and flexible work hours to attend school activities and medical visits).

### **Defining a Distinctive Niche for Pediatrics Among Multiple Early Childhood Disciplines and Services**

Notwithstanding the important goal of ensuring a medical home for all children, extensive evidence on the social determinants of health indicates that the reduction of disparities in physical and mental well-being will depend on more than access to high-quality medical care alone. Moreover, as noted previously, experience tells us that continuing calls for enhanced coordination of effort across service systems are unlikely to be sufficient if the systems are guided by different

values and bodies of knowledge and the effects of their services are modest. With these caveats in mind, pediatricians are strategically situated to mobilize the science of early childhood development and its underlying neurobiology to stimulate fresh thinking about both the scope of primary health care and its relation to other programs serving young children and their families. Indeed, every system that touches the lives of children—as well as mothers before and during pregnancy—offers an opportunity to leverage this rapidly growing knowledge base to strengthen the foundations and capacities that make lifelong healthy development possible. Toward this end, explicit investments in the early reduction of significant adversity are particularly likely to generate positive returns.

The possibilities and limitations of well-child care within a multidimensional health system have been the focus of a spirited and enduring discussion within the pediatric community.<sup>88,90,91</sup> Over more than half a century, this dialogue has focused on the need for family-centered, community-based, culturally competent care for children with developmental disabilities, behavior problems, and chronic health impairments, as well as the need for a broader contextual approach to the challenges of providing more effective interventions for children living under conditions of poverty, with or without the additional complications of parental mental illness, substance abuse, and exposure to violence.<sup>10</sup> As the debate has continued, the gap between the call for comprehensive services and the realities of day-to-day practice has remained exceedingly difficult to reduce. Basic recommendations for routine developmental screening and referrals to appropriate community-based services have been particularly difficult

to implement.<sup>92</sup> The obstacles to progress in this area have been formidable at both ends of the process—beginning with the logistical and financial challenges of conducting routine developmental screening in a busy office setting and extending to significant limitations in access to evidence-based services for children and families who are identified as having problems that require intervention.

Despite long-standing calls for an explicit, community-focused approach to primary care, a recent national study of pediatric practices identified persistent difficulties in achieving effective linkages with community-based resources as a major challenge.<sup>92</sup> A parallel survey of parents also noted the limited communication that exists between pediatric practices and community-based services, such as Supplemental Nutrition Program for Women, Infants, and Children; child care providers; and schools.<sup>95</sup> Perhaps most important, both groups agreed that pediatricians cannot be expected to meet all of a child's needs. This challenge is further complicated by the marked variability in quality among community-based services that are available—ranging from evidence-based interventions that clearly improve child outcomes to programs that appear to have only marginal effects or no measurable impacts. Thus, although chronic difficulty in securing access to indicated services is an important problem facing most practicing pediatricians, the limited evidence of effectiveness for many of the options that are available (particularly in rural areas and many states in which public investment in such services is more limited) presents a serious problem that must be acknowledged and afforded greater attention.

At this point in time, the design and successful implementation of more effective models of health promotion

and disease prevention for children experiencing significant adversity will require more than advocacy for increased funding. It will require a deep investment in the development, testing, continuous improvement, and broad replication of innovative models of cross-disciplinary policy and programmatic interventions that are guided by scientific knowledge and led by practitioners in the medical, educational, and social services worlds who are truly ready to work together (and to train the next generation of practitioners) in new ways.<sup>88,89</sup> The sheer number and complexity of under-addressed threats to child health that are associated with toxic stress demands bold, creative leadership and the selection of strategic priorities for focused attention. To this end, science suggests that 2 areas are particularly ripe for fresh thinking: the child welfare system and the treatment of maternal depression.

For more than a century, child welfare services have focused on physical safety, reduction of repeated injury, and child custody. Within this context, the role of the pediatrician is focused largely on the identification of suspected maltreatment and the documentation and treatment of physical injuries. Advances in our understanding of the impact of toxic stress on lifelong health now underscore the need for a broader pediatric approach to meet the needs of children who have been abused or neglected. In some cases, this could be provided within a medical home by skilled clinicians with expertise in early childhood mental health. In reality, however, the magnitude of needs in this area generally exceeds the capacity of most primary care practice settings. A report from the Institute of Medicine and National Research Council<sup>15</sup> stated that these needs could be addressed through regularized referrals from

the child welfare system to the early intervention system for children with developmental delays or disabilities; subsequent federal reauthorizations of the Keeping Children and Families Safe Act and the Individuals with Disabilities Education Act (Part C) both included requirements for establishing such linkages. The implementation of these federal requirements, however, has moved slowly.

The growing availability of evidence-based interventions that have been shown to improve outcomes for children in the child welfare system<sup>94</sup> underscores the compelling need to transform “child protection” from its traditional concern with physical safety and custody to a broader focus on the emotional, social, and cognitive costs of maltreatment. The Centers for Disease Control and Prevention has taken an important step forward by promoting the prevention of child maltreatment as a public health concern.<sup>95,96</sup> The pediatric community could play a powerful role in leading the call for implementation of the new requirement for linking child welfare to early intervention programs, as well as bringing a strong, science-based perspective to the collaborative development and implementation of more effective intervention models.

The widespread absence of attention to the mother-child relationship in the treatment of depression in women with young children is another striking example of the gap between science and practice that could be reduced by targeted pediatric advocacy.<sup>97</sup> Extensive research has demonstrated the extent to which maternal depression compromises the contingent reciprocity between a mother and her young child that is essential for healthy cognitive, linguistic, social, and emotional development.<sup>98</sup> Despite that well-documented observation, the treatment of depression in women with



young children is typically viewed as an adult mental health service and rarely includes an explicit focus on the mother-child relationship. This serious omission illustrates a lack of understanding of the consequences for the developing brain of a young child when the required “serve and return” reciprocity of the mother-child relationship is disrupted or inconsistent. Consequently, and not surprisingly, abundant clinical research indicates that the successful treatment of a mother’s depression does not generally translate into comparable recovery in her young child unless there is an explicit therapeutic focus on their dyadic relationship.<sup>98</sup> Pediatricians are the natural authorities to shed light on this current deficiency in mental health service delivery. Advocating for payment mechanisms that require (or provide incentives for) the coordination of child and parent medical services (eg, through automatic coverage for the parent-child dyad linked to reimbursement for the treatment of maternal depression) offers 1 promising strategy that American Academy of Pediatrics state chapters could pursue. As noted previously, although some medical homes may have the expertise to provide this kind of integrative treatment, most pediatricians rely on the availability of other professionals with specialized skills who are often difficult to find. Whether such services are provided within or connected to the medical home, it is clear that standard pediatric practice must move beyond screening for maternal depression and invest greater energy in securing the provision of appropriate and effective treatment that meets the needs of both mothers and their young children.

The targeted messages conveyed in these 2 examples are illustrative of the kinds of specific actions that offer

promising new directions for the pediatric community beyond general calls for comprehensive, family-centered, community-based services. Although the practical constraints of office-based practice make it unlikely that many primary care clinicians will ever play a lead role in the treatment of children affected by maltreatment or maternal depression, pediatricians are still the best positioned among all the professionals who care for young children to provide the public voice and scientific leadership needed to catalyze the development and implementation of more effective strategies to reduce adversities that can lead to lifelong disparities in learning, behavior, and health.

A great deal has been said about how the universality of pediatric primary care makes it an ideal platform for coordinating the services needed by vulnerable, young children and their families. In this respect, the medical home is strategically positioned to play 2 important roles. The first is to ensure that needs are identified, state-of-the-art management is provided as indicated, and credible evaluation is conducted to assess the effects of the services that are being delivered. The second and, ultimately, more transformational role is to mobilize the entire pediatric community (including both clinical specialists and basic scientists) to drive the design and testing of much-needed, new, science-based interventions to reduce the sources and consequences of significant adversity in the lives of young children.<sup>99</sup> To this end, a powerful new role awaits a new breed of pediatricians who are prepared to build on the best of existing community-based services and to work closely with creative leaders from a range of disciplines and sectors to inform innovative approaches to health promotion and disease prevention that generate greater effects than existing efforts.

No other profession brings a comparable level of scientific expertise, professional stature, and public trust—and nothing short of transformational thinking beyond the hospital and office settings is likely to create the magnitude of breakthroughs in health promotion that are needed to match the dramatic advances that are currently emerging in the treatment of disease. This new direction must be part of the new frontier in pediatrics—a frontier that brings cutting-edge scientific thinking to the multidimensional world of early childhood policy and practice for children who face significant adversity. Moving that frontier forward will benefit considerably from pediatric leadership that provides an intellectual and operational bridge connecting the basic sciences of neurobiology, molecular genetics, and developmental psychology to the broad and diverse landscape of health, education, and human services.

## SUMMARY

A vital and productive society with a prosperous and sustainable future is built on a foundation of healthy child development. Health in the earliest years—beginning with the future mother’s well-being before she becomes pregnant—lays the groundwork for a lifetime of the physical and mental vitality that is necessary for a strong workforce and responsible participation in community life. When developing biological systems are strengthened by positive early experiences, children are more likely to thrive and grow up to be healthy, contributing adults. Sound health in early childhood provides a foundation for the construction of sturdy brain architecture and the achievement of a broad range of skills and learning capacities. Together these constitute the building blocks for a vital and sustainable society that invests in its



human capital and values the lives of its children.

Advances in neuroscience, molecular biology, and genomics have converged on 3 compelling conclusions: (1) early experiences are built into our bodies; (2) significant adversity can produce physiologic disruptions or biological memories that undermine the development of the body's stress response systems and affect the developing brain, cardiovascular system, immune system, and metabolic regulatory controls; and (3) these physiologic disruptions can persist far into adulthood and lead to lifelong impairments in both physical and mental health. This technical report presents a framework for integrating recent advances in our understanding of human development with a rich and growing body of evidence regarding the disruptive effects of childhood adversity and toxic stress. The EBD framework that guides this report suggests that many adult diseases are, in fact, developmental disorders that begin early in life. This framework indicates that the future of pediatrics lies in its unique leadership position as a credible and respected voice on behalf of children, which provides a powerful platform for translating scientific advances into more effective strategies and creative interventions to reduce the early childhood adversities that lead to lifelong impairments in learning, behavior, and health.

## CONCLUSIONS

1. Advances in a broad range of interdisciplinary fields, including developmental neuroscience, molecular biology, genomics, epigenetics, developmental psychology, epidemiology, and economics, are converging on an integrated, basic science of pediatrics (see Fig 1).
2. Rooted in a deepening understanding of how brain architecture is

shaped by the interactive effects of both genetic predisposition and environmental influence, and how its developing circuitry affects a lifetime of learning, behavior, and health, advances in the biological sciences underscore the foundational importance of the early years and support an EBD framework for understanding the evolution of human health and disease across the life span.

3. The biology of early childhood adversity reveals the important role of toxic stress in disrupting developing brain architecture and adversely affecting the concurrent development of other organ systems and regulatory functions.
4. Toxic stress can lead to potentially permanent changes in learning (linguistic, cognitive, and social-emotional skills), behavior (adaptive versus maladaptive responses to future adversity), and physiology (a hyperresponsive or chronically activated stress response) and can cause physiologic disruptions that result in higher levels of stress-related chronic diseases and increase the prevalence of unhealthy lifestyles that lead to widening health disparities.
5. The lifelong costs of childhood toxic stress are enormous, as manifested in adverse impacts on learning, behavior, and health, and effective early childhood interventions provide critical opportunities to prevent these undesirable outcomes and generate large economic returns for all of society.
6. The consequences of significant adversity early in life prompt an urgent call for innovative strategies to reduce toxic stress within the context of a coordinated system of policies and services guided by an integrated science of early childhood and early brain development.

7. An EBD framework, grounded in an integrated basic science, provides a clear theory of change to help leaders in policy and practice craft new solutions to the challenges of societal disparities in health, learning, and behavior (see Fig 2).
8. Pediatrics provides a powerful yet underused platform for translating scientific advances into innovative early childhood policies, and practicing pediatricians are ideally positioned to participate "on the ground" in the design, testing, and refinement of new models of disease prevention, health promotion, and developmental enhancement beginning in the earliest years of life.

## LEAD AUTHORS

Jack P. Shonkoff, MD  
Andrew S. Garner, MD, PhD

## COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, 2010–2011

Benjamin S. Siegel, MD, Chairperson  
Mary I. Dobbins, MD  
Marian F. Earls, MD  
Andrew S. Garner, MD, PhD  
Laura McGuinn, MD  
John Pascoe, MD, MPH  
David L. Wood, MD

## LIAISONS

Robert T. Brown, PhD – *Society of Pediatric Psychology*  
Terry Carmichael, MSW – *National Association of Social Workers*  
Mary Jo Kupst, PhD – *Society of Pediatric Psychology*  
D. Richard Martini, MD – *American Academy of Child and Adolescent Psychiatry*  
Mary Sheppard, MS, RN, PNP, BC – *National Association of Pediatric Nurse Practitioners*

## CONSULTANT

George J. Cohen, MD

## CONSULTANT AND LEAD AUTHOR

Jack P. Shonkoff, MD

## STAFF

Karen S. Smith

## COMMITTEE ON EARLY CHILDHOOD, ADOPTION, AND DEPENDENT CARE, 2010–2011

Pamela C. High, MD, Chairperson  
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Jill J. Fussell, MD  
Mary Margaret Gleason, MD  
Paula K. Jaudes, MD  
Veronnie F. Jones, MD  
David M. Rubin, MD  
Elaine E. Schulte, MD, MPH

## STAFF

Mary Crane, PhD, LSW

## SECTION ON DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS EXECUTIVE COMMITTEE, 2010–2011

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Carolyn Bridgemohan, MD  
Jill Fussell, MD  
Edward Goldson, MD  
Laura J. McGuinn, MD  
Carol Weitzman, MD  
Lynn Mowbray Wegner, MD, Immediate Past Chairperson

## STAFF

Linda B. Paul, MPH

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# Military Children and Families

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## *Strengths and Challenges During Peace and War*

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Nansook Park      University of Michigan

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*Throughout history, military children and families have shown great capacity for adaptation and resilience. However, in recent years, unprecedented lengthy and multiple combat deployments of service members have posed multiple challenges for U.S. military children and families. Despite needs to better understand the impact of deployment on military children and families and to provide proper support for them, rigorous research is lacking. Programs exist that are intended to help, but their effectiveness is largely unknown. They need to be better coordinated and delivered at the level of individuals, families, and communities. Research and programs need to take a comprehensive approach that is strengths based and problem focused. Programs for military children and families often focus on the prevention or reduction of problems. It is just as important to recognize their assets and to promote them. This article reviews existing research on military children and families, with attention to their strengths as well as their challenges. Issues in need of further research are identified, especially research into programs that assist military children and families. Military children and families deserve greater attention from psychology.*

**Keywords:** military children, military families, strengths, challenges, strengths-based approaches

The gathering of military men should be thanking their children, their fine and resourceful children, who were strangers in every school they entered, thanking them for their extraordinary service to their country, for the sacrifices they made over and over again . . . Military brats . . . [spend] their entire youth in service to this country and no one even [knows]. (Conroy, 1991, p. xxv)

**A** common saying in the military is that when one person joins, the whole family serves. Military families may often be in the background of public discourse on the military, but they are critical to its success. Although aspects of military life can be difficult for families, positive family functioning boosts a service member's morale, retention, and ability to carry out missions (Shinseki, 2003). According to a recent report, service members reported positive family relationships as a source of resilience and problems at home as a source of stress and interference (Mental Health Advisory Team 6, 2009). Any efforts to build a strong, effective, and sustainable military force must also consider military families, improving the relationships of the soldier with his or her family members and strengthening the family itself (cf. Gottman, Gottman, & Atkins, 2011).

Since the start of the Global War on Terror, military children and families have faced multiple tests associated with unprecedented lengthy and multiple deployments; shorter stays at home between deployments; and greater risks of death, injury, and psychological problems among service members. Although many military children and families rise to the occasion and do well (Wiens & Boss, 2006), these challenges can take a toll on their health and well-being (Chandra, Burns, Tanielian, Jaycox, & Scott, 2008; Flake, Davis, Johnson, & Middleton, 2009). Despite urgent needs to better understand the impact of deployment on military children and families and to provide appropriate support for them, there is a dearth of research. Programs and interventions exist, but definitive conclusions about what really works are by and large lacking.

Programs that try to assist military children and families often focus only on the prevention or reduction of problems. As important as it is to address problems, it is just as important to recognize the strengths and assets of military children and families and to promote and bolster them. A full and accurate picture of military children and families is needed upon which to base interventions. One of the best ways to prevent or solve problems is to identify what goes well and to use this as the basis of intervention (Park, 2004, 2009; Park & Peterson, 2008; Park, Peterson, & Brunwasser, 2009; Peterson & Park, 2003).

Over the years, studies of military children and families by psychologists have been isolated from and neglected by mainstream psychology. Most studies are done by researchers who are present or former members of the military or immediate members of military families. Studies are too rarely published in the mainstream psychology journals. This state of affairs needs to change to meet the surging needs of military children and families.

This article describes what is known about military children and families: their demographics, their challenges, and their strengths, during both peace and war times. Also

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Correspondence concerning this article should be addressed to Nansook Park, Department of Psychology, University of Michigan, 530 Church Street, Ann Arbor, MI 48109-1043. E-mail: nspark@umich.edu



**Nansook Park**

addressed are issues and gaps in the existing research and practice. The thesis is that greater attention to the strengths and assets of military children and families is needed in order to design and implement effective programs to support them. This approach echoes the premise of the U.S. Army Comprehensive Soldier Fitness (CSF) program described elsewhere in this special issue (Cornum, Matthews, & Seligman, 2011). The fitness of soldiers extends beyond mere physical prowess to include psychosocial well-being, a key component of which is the well-being of their families (Peterson, Park, & Castro, 2011; Rohall, Segal, & Segal, 1999). Currently, collaborative efforts between psychologists and the U.S. Army are extending the CSF program to family members.

### **The Changing Demographics of the Modern U.S. Military Family**

In the United States today, there are several million men and women wearing the uniform of the country's military. In broad terms, this is a young (50% below age 25) and male (85%) population, with individuals from rural, less affluent, and ethnic minority (African American and Latino/a) backgrounds overrepresented (U.S. Department of Defense, Defense Manpower Data Center, 2008). Almost all have a high school degree or equivalent, and 70% have at least some college credits. About half of them are married, with about 10% of the armed forces in dual-career marriages (i.e., married to another member of the military).

In contrast to the U.S. population as a whole, members of the military tend to marry earlier, a fact that researchers need to take into account in comparing military and civilian families because marriage at a younger age can be associated with more problems than marriage at an older age (Amato, Booth, Johnson, & Rogers, 2007). Among married

individuals in the armed forces, more than 70% have one or more children, and there are at least 1.85 million children with one or both parents in the military (65% active duty and 35% Reserves or National Guard; Chandra et al., 2008; Segal & Segal, 2004).

Research on military families as well as formal programs to support them often uses a narrow definition of what a family entails: mother and father—one of whom wears a uniform—and their biological children. The so-called nuclear family is not the only type that exists, especially in the contemporary United States. Single-parent families have increased in recent decades, as well as blended families and intergenerational families. With the increase of women in the military, dual-career military families have increased (Segal & Segal, 2004). Each type of family has unique difficulties and assets.

In this article, the phrase *military children and families* is used to refer broadly to all individuals who are connected to a military family—traditional and nontraditional families, extended and binuclear families, spouses and significant others, sons and daughters, stepsons and stepdaughters, brothers and sisters, parents and grandparents, and so on. The focus is on military-connected children, but the functioning of all family members bears on the well-being of these children.

### **Strengths and Challenges Among Military Children and Families**

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Military life presents both challenges and opportunities to grow for children and families (Hall, 2008). To provide effective services for military children and families, we need a better understanding of these challenges and strengths framed in terms of the culture and function of the military during peace and during war.

#### **During Peace**

Even during peaceful times, military children and families face recurrent separations, frequent and often sudden moves, difficult reunions, long and often unpredictable duty hours, and the threat of injury or death of the military service member during routine training and peaceful missions (Black, 1993). On average, active duty military families move every two to three years within the United States or overseas (Croan, Levine, & Blankinship, 1992). Secondary school-age students move three times more often than their civilian counterparts do (Shinseki, 2003). These frequent relocations disrupt children's schoolwork, activities, and social networks, requiring ongoing adjustment to new schools and cultures. Children can grow up feeling rootless and may have difficulties building deeper relationships or maintaining long-term commitments (Wertsch, 1991). Especially during adolescence, interruption of peer relationships can be detrimental to a child's psychosocial development (Shaw, 1979). Also, separation from a parent because of military assignments can have negative impacts on a child's school performance and mental health (Jensen, Grogan, Xenakis, & Bain, 1989). Due to different school and state requirements for course credits and course mate-

rials, frequent moves pose additional challenges for academic achievement and graduation by transferring students. These problems are especially pronounced for students with special needs (Hall, 2008).

Nevertheless, the available evidence suggests that military children typically function as well as or even better than civilian children on most indices of health, well-being, and academic achievement. They have similar or lower rates of childhood psychopathology, lower rates of juvenile delinquency, lower likelihood of alcohol or drug abuse, better grades, and higher median IQs than do their civilian counterparts (Jensen, Xenakis, Wolf, & Bain, 1991; Kenny, 1967; Morrison, 1981). According to a large-scale survey of military adolescents (Jeffreys & Leitzel, 2000), military children are in general healthy, have good peer relationships, are engaged in school and community, do well at school, and are satisfied with life. On average, military children report high optimism and positive self-images (Watanabe, 1985).

Compared with civilian children, military children have greater respect for authority and are more tolerant, resourceful, adaptable, responsible, and welcoming of challenges, and they have a greater likelihood of knowing and befriending someone who is "different" (Hall, 2008); they engage in fewer risky behaviors (Hutchinson, 2006); they exhibit greater self-control (Watanabe, 1985); and they show lower levels of impatience, aggression, and disobedience and higher levels of competitiveness (Manning, Balson, & Xenakis, 1988). Most military children are happy to embrace the term *military brat* and one or another of its backronyms such as "brave, resilient, adaptable, and trustworthy."<sup>1</sup>

Difficult life events do not automatically lead to problems in children. In some cases, challenges provide an opportunity to grow. For instance, relocation can be a positive experience. Children and families have the opportunity to meet new people and make new friends, to visit different places, and to experience diverse cultures (O'Connell, 1981).

If families have positive attitudes toward relocation, social support, previous relocation experience, and active coping styles, they do better when they move (Feldman & Tompson, 1993; Frame & Shehan, 1994). As stressful as parental separation can be, military children are afforded the opportunity to take on responsibilities and to be more independent and mature. Although the inherent hierarchy and structure of military culture can produce resentment among some military children and decrease their independent thinking, it can also foster discipline. Furthermore, military values that emphasize service, sacrifice, honor, teamwork, loyalty, sense of purpose, sense of community, and pride can work as resilience factors to overcome the difficulties of military life (Paden & Pezor, 1993).

### **During War**

The major challenge for military children and families during war is a lengthy deployment of the uniformed family member to a combat zone. Children not only miss the deployed parent, but they also experience obvious uncer-

tainty surrounding his or her safety, especially in single-parent or dual-career families. There are other issues as well. Children may be asked to take on greater responsibilities, and daily routines may change (Pincus, House, Christenson, & Adler, 2001). Families may move to be closer to other relatives. Unlike relocation during times of peace, war-time relocation of families may require them to move off base into the civilian community where they lose the existing military support system (MacDermid, 2006).

Nearly 900,000 U.S. children have had at least one of their parents deployed since 2001, and currently 234,000 children have one or both parents at war (Zoroya, 2009). Long and frequent deployments of service members put military children and families at risk for psychosocial problems (American Psychological Association, Presidential Task Force on Military Deployment Services for Youth, Families, and Service Members, 2007). According to U.S. Department of Defense data, between 2003 and 2008 the number of military children receiving outpatient mental health care doubled, and during that period inpatient visits by military children increased by 50%, with a 20% jump from 2007 to 2008 ("Department of Defense Reaches Out to Children of Soldiers," 2009). This indicates potentially a cumulative toll of parental deployments on military children and urgent needs for proper mental health services for this population.

Although scarce, several studies have looked at the impact of parental deployment on children during current wars. Although military children and families cope relatively well with shorter separations (less than six months), longer and multiple deployments create measurable distress (Chandra et al., 2010; Flake et al., 2009). Parental deployment can affect physical health, academic performance, behavior problems, depression, and anxiety of military children. Adolescent children of deployed parents show significantly higher levels of stress, systolic blood pressure, and heart rate than their civilian counterparts (Barnes, Davis, & Treiber, 2007). Children of deployed service members also show decreases in their academic performance, school engagement, and overall school adjustment (Engel, Gallagher, & Lyle, 2010). More than one third of school-age children showed high risk for psychosocial difficulties during parental deployment, 2.5 times the national norm (Flake et al., 2009). Children of deployed parents, especially older youth and girls, reported more problems with school, family, and mental health. The longer the parental deployment is, the greater these problems are, during and after deployment (Chandra et al., 2010).

Risk factors exacerbating the negative effects of deployment on military children and families include a history of family problems, younger families, less educated families, foreign-born spouses, families with young children, those with lower pay grades or reduced income, those without a unit affiliation such as National Guard and Re-

<sup>1</sup> The origin of the term *military brat* is not agreed on, although some have traced it to an acronym for British Regiment Attached Traveler (i.e., a soldier's child).



serve families, families with children who have disabilities, families with pregnancies, single-parent families, and families with mothers in the military (American Psychological Association, Presidential Task Force, 2007).

Although military deployment poses risks, especially for some families, it is equally important to remember that many military children and families show resilience and growth. During the deployment of a family member, parents report that their children are closer to family and friends, and that they are more responsible, independent, and proud. Seventy-four percent of the spouses of service members report personal growth, despite also reporting increased loneliness, stress, and anxiety (U.S. Department of Defense, Defense Manpower Data Center, 2009b).

Resilience plays an important role in all phases of deployment. Resilience mitigates stress and improves adjustment to deployment by children and families. Families that function most effectively are active, optimistic, self-reliant, and flexible (Jensen & Shaw, 1996; Wiens & Boss, 2006). Families that function well find meaning in military life and identify with the work of their uniformed family member (Hammer, Cullen, Marchand, & Dezsofi, 2006; Marchant & Medway, 1987). Family preparedness for deployment as well as community and social support lead to better adjustment (Wiens & Boss, 2006).

Huebner (2010) found that adolescents who adapted well during parental deployment showed the ability to put the situation in perspective; positive reframing; the embracing of change and adaptation as necessary; effective coping skills; and good relationships with family, friends, and neighbors. For example, one adolescent reported, "I have really good neighbors that understand the situation going on. And I'm always welcome at my neighbors" (Huebner, 2010, p. 14).

During deployment, the well-being of military children needs to be approached not just at the level of the individual child but also in terms of larger social systems—the extended family, neighborhoods, schools, and communities. The community environment affects children's adjustment and coping during wartime deployment, and parental stress strongly relates to a military child's psychosocial functioning during deployment (Flake et al., 2009; Huebner, Mancini, Bowen, & Orthner, 2009). The challenges faced by military children are exacerbated by family and community inability to recognize and provide proper support and assistance. If the family as a whole adjusts well to deployment, then so do children. If we care about military children's well-being, it is imperative to ensure family well-being because they are so closely connected.

All things considered, military families on average have done well and show resilience during peace and even war. Problems of course exist for some military families, but rarely to a greater extent than among civilian families. Contrast this conclusion with the notion of the *military family syndrome*, which refers to a constellation of out-of-control offspring, authoritarian fathers, and depressed mothers (Lagrone, 1978). This alleged syndrome has been refuted repeatedly by relevant evidence (e.g., Jensen, Gordon, Lewis, & Xenakis, 1986; Jensen et al., 1991; Morri-

son, 1981), but it seems to be as resilient as the healthy military family that it fails to acknowledge. The fact that military families overall have done well in the past deserves greater dissemination in the present than seems to occur in today's popular media. If nothing else, the historical strength of the military family can serve as a source of pride and inspiration.

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## Strengths-Based Approaches

Military children and families often do well, but they are not invulnerable (Cozza, Chun, & Polo, 2005). Rather, they do well because they have compensating strengths and assets (Bowen, Mancini, Martin, Ware, & Nelson, 2003; Palmer, 2008). It behooves us to identify what these may be, to enhance them, and to use what is learned to design interventions for all military children and families, those with or without problems. As noted, one way to prevent or solve problems is to base interventions on what is going well.

The previous section reviewed the strengths and assets of military children and families. More family support programs that address strengths as well as problems are needed. Existing programs need not be replaced but expanded. A focus on what goes well does not mean that what goes poorly should be ignored. Indeed, strengths-based interventions complement and extend problem-focused interventions (Park, 2004, 2009; Park & Peterson, 2006, 2008; Park et al., 2009; Peterson & Park, 2003). A comprehensive approach to the support of military families may be more effective than a problem-focused strategy, and it would certainly reduce the stigma that surrounds the seeking of "mental health" care.

Programs and resources, formal and informal, already exist in both military and civilian sectors to support military children and families. Targeted programs and services are helpful, but we need further assistance, support, and engagement of the broader community.

The *Military Child Education Coalition (MCEC)* programs to support military children are worthy of attention. They embody the strengths-based focus advocated here. MCEC has been working directly with different branches of the military, school districts, and parents to facilitate transition of transferring military children (MCEC, 2001). MCEC offers regular training for school counselors and teachers, involves civilian students in their programs, and makes available relevant information to schools as well as parents. Underlying all of the MCEC programs is the assumption that military families are resilient and resourceful, but that accessible information, consistent school rules, and support help reduce the annoyances associated with student relocation.

The Student 2 Student program of MCEC is a unique student-led, school-based program for transitioning students from military families. This program provides social as well as instrumental support for students relocating to and from different schools. A team of advisors, volunteer students, and school liaison officers from each school are trained to develop and implement specific plans that fit their particular school setting and to implement, recruit,



and train others at their school. These programs benefit all transitioning students, military connected or not.

As another example, MCEC's initiative "Living in the New Normal: Helping Children Thrive through Good and Challenging Times" engages and empowers the whole community. It is designed to reach everyone involved with military-connected children. It provides resources and trains adults to help children with deployment-related challenges to develop resilience. Further, the program brings together all sectors of the community to identify the unique assets of that community and to develop specific plans to utilize those assets to provide sustained support not only for military children and families but also for all community members. The MCEC programs stand in contrast to many other interventions for military families, which are often brief and highly targeted, because they involve larger social units (schools and communities) on an ongoing basis.

## Issues and Recommendations

There is a significant shortage of evidence-based programs. Indeed, many programs for military children and families are not evaluated at all. In the absence of evidence for their effectiveness, they are but well-intended interventions. When resources are limited and demands are great, it is even more critical to identify programs that are effective and efficient, and to understand the active ingredients that make programs successful (Lester, McBride, Bliese, & Adler, 2011). Following appropriate evaluation, successful programs can be disseminated with confidence, and ineffective programs can be modified or eliminated. A better job needs to be done coordinating and disseminating information about existing programs, increasing their accessibility to the entire military community, and reducing stigma associated with seeking mental health care.

More generally, the research literature on military children and families is too scant, especially in light of contemporary concerns with their well-being while the United States is at war. Several observations about this literature are offered, followed by recommendations for further research and interventions.

Much of the relevant research on military families is not methodologically rigorous. Studies are often hampered by small and nonrepresentative samples and often lack appropriate comparison groups. They are often cross-sectional and starkly descriptive. Potential confounds are often not measured and thus cannot be taken into account, leaving studies inconclusive.

Studies of military children need to use multiple informants. Studies usually depend on what the nonmilitary parent says and may reflect a reporting bias. Consider that one investigation found greater problems among military children than among civilian children according to parental report but *not* according to the direct report of the children (Jensen et al., 1991). Chandra et al. (2010) noted similar discrepancies between conclusions based on parental report and child report.

The lack of explicit theory is conspicuous, although there is an important exception: the cycle of deployment model, which distinguishes different phases through which

military families pass when a family member is deployed: (a) predeployment (from notification to departure), (b) deployment (from departure to return), (c) reunion (termed redeployment in the military), and (d) postdeployment. Each phase has its own characteristics and requirements (Pincus et al., 2001).

Research on the effects of deployment on military children and families usually focuses only on the period of actual deployment. Redeployment and postdeployment are poorly understood and in need of greater explication. Although reunion can be joyous, it also requires changes and adjustments in roles and routines for all family members, and these can be stressful and confusing (American Psychological Association, Presidential Task Force, 2007). Furthermore, many families have to start preparing for the next deployment again. For both families and service members alike, the postdeployment stage is particularly long and complex (MacDermid, 2006). Many returning service members experience combat-related mental health problems, injuries, and disabilities. These can burden children and families. There is simply not enough research about the long-term effects on children and families of living with a parent who is experiencing such difficulties and how to help them. Longitudinal studies are needed.

Also, a developmental perspective should be utilized in understanding the effect of deployment on children in order to provide developmentally appropriate services. Children at various developmental stages face different developmental tasks and have different levels of cognitive, emotional, and social skills. As a result, children may respond quite differently at each deployment cycle depending on their developmental stages (Paden & Pezor, 1993).

As already noted, most military family studies assume a traditional family and thus do not adequately sample the relevant populations. Considering the diversity of military family types, future studies should examine the impact of military life, especially deployment, on children from different types of families. Future studies should also compare the effects on children of maternal versus paternal deployment.

Although studies have been done spanning different military eras, they rarely use the same measures or procedures, precluding strong conclusions about similarities and differences among different military cohorts (e.g., those serving during Vietnam, Somalia, Desert Storm, and Operation Iraqi Freedom/Operation Enduring Freedom versus those serving during more peaceful times). Military families, no less than their civilian counterparts, are complex. The challenges they face are likely not across the board but rather are influenced by a host of interacting factors—branch of service, age, education, ethnicity, pre-existing problems and assets, community integration (e.g., living on base or off base), exposure to combat, and number of deployments—that are rarely studied in terms of their interactions.

Studies making direct comparisons across branches of the service are also rare, although those studies that do exist often find differences in family functioning across Army, Navy, Air Force, Coast Guard, and Marines. Another ne-

glected contrast related to family functioning is whether the uniformed family member is active duty or Reserve or National Guard. As is well known, a large number of Reserve and National Guard members currently serve; almost 700,000 members of the Reserve and National Guard have been activated since 9/11, parents of about 35% of military children (U.S. Department of Defense, Defense Manpower Data Center, 2009a). Reserve and National Guard families live off base among civilians and are less integrated into a military community, factors that limit their access to military support systems and programs. Many have either left or put on hold their civilian careers because of their “suddenly military” status. The effects on children and families are largely unknown, although one suspects that they include notable instability and stress.

Recent reports suggest that Reserve children and families may be at greater risk for mental health and adjustment issues (Chandra et al., 2008; Mental Health Advisory Team 6, 2009). Children from Reserve families report a lack of understanding and support from their peers and teachers more than children from active-duty families. And what about the children and families of civilian contractors and Federal Agency employees serving in war zones, so heavily relied upon during the current wars? No study has addressed the challenges they face.

There are members of the military family who are often neglected in research and intervention. Siblings can play an important role in bolstering the well-being and resilience of military children and deployed service members. Sibling relationships in general are among the most crucial in a person’s life (Bank & Kahn, 1982). Increased attention to military children who do or do not have siblings would be important. Given frequent relocations, siblings may be even more important for military children than for civilian children, providing stability, familiarity, and support not readily available elsewhere.

Another glaring absence in the literature is consideration of the brothers and sisters of service members. The siblings of service members are of course affected by the deployment, injury, or death of those who serve, but virtually nothing is known about challenges they face and how to help them. Studies of civilians make clear that sibling loss adversely affects health and well-being. Surviving siblings often experience anxiety, guilt, sadness, and anger (Bank & Kahn, 1982). They report health that is even worse than that of surviving spouses (Hays, Gold, & Pieper, 1997).

“Siblings of troops often are forgotten mourners” (Hefling, 2009). According to a recent report, there are several thousand surviving siblings from current wars. Many are in their 20s or 30s (Hefling, 2009), but considering that many service members who have lost their lives were young, a large number of surviving siblings are also in their teens or even younger—children themselves. When a service member dies, the spouse, the children, and the parents are generally expected to be most affected. Sibling death may be overlooked as a significant loss (Moss, Moss, & Hansson, 2001). As a result, siblings may not receive the support they need.

Finally, more research is needed to understand the impact of deployment and grief on military parents and grandparents (Rando, 1986). Their coping and adjustment are important for their own sake as well as in terms of the impacts on the health and well-being of all other family members (Fry, 1997).

## CSF Program for Military Family Members

Currently, a major effort is under way to extend the CSF program to all Army family members. Psychologists and the U.S. Army are collaborating to enhance the resilience and well-being of military family members. This project is based on the premise that family members play an important role in the soldier’s performance, resilience, and well-being. Parallel to the CSF for soldiers, the family CSF program will include both assessment and program modules built on a strengths-based approach.

The Global Assessment Tool for families, now under development, measures a person’s strengths and problems in four life domains: emotional, social, familial, and spiritual (Peterson et al., 2011). The contents of assessment and training modules for families are designed to address both common personal and family-related issues with special attention to unique challenges and experiences faced by military families. The assessment tool is planned to be available through a military website for family members, and the outcome will be confidential. Upon completion of the survey, participants will receive instant feedback on strengths and issues in each life domain. Depending on the results, tailored information and various training modules, from self-development online programs to more intensive group or personal interventions, will be made available.

At this early stage of the project, the target participants are adults in the military family—spouses or caretakers of military children. Strengths and problems among military children will be measured by the caretaker’s report, and separate training modules are planned to provide adults with tools to promote the resilience and well-being of military children. A larger community of military family members will be reached in an efficient and cost-effective way with computer technology in conjunction with other strategies to deliver assessment and programs (Gottman et al., 2011). The family component of the CSF program has just begun. The initiative will be revised on the basis of the results of ongoing research and evaluation. It is conceivable that in the future, additional direct assessment and programs for military children will be added to the CSF program.

## Conclusion

Throughout history, military children and families have shown great capacity to adapt to and grow from challenges, during peace or during war. However, with U.S. involvement in current wars, military families face multiple challenges that put them at high risk of distress and mental health problems. Their needs are greater than ever. The well-being of military children and families is desirable in

its own right and as a means to many other valued ends, for individuals and the larger society.

There is an urgent need for better understanding of both the challenges and the strengths and assets of military children and families to help them not only survive but also thrive. Studies and programs need to take a comprehensive approach that is strengths based and problem focused. Studies and programs must focus not just on the individual but also on larger social contexts. We need more high-quality research and more evidence-based programs. Programs need to be rigorously evaluated and better disseminated to reach all those who are in need. Current efforts to expand the CSF program to military family members are another example of a systematic collaboration between psychology and the military to achieve the goal of a healthy, resilient, and productive military community.

Psychology as a field is in a unique position to accomplish all of these goals (Seligman & Fowler, 2011). Military children and families deserve sustained attention from psychology. One hopes that more psychologists will join and indeed help lead this worthy endeavor. About one third of the population has a direct relationship with someone in the military, and virtually everyone has an indirect relationship (Black, 1993). Military families live in our neighborhoods. Their children go to our schools. Much can be learned from them. Building and sustaining healthy, resilient, and thriving military children and families will bring benefits not just to them but ultimately to all Americans. The military family is the American family.

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## Screening for ACEs at Walter Reed

**Our pediatric medical home screens for ACEs! Over the past year, we screened 38% of 4 year-olds at well-child visits. Over the next academic year, the Red and Blue team clinic PI project goal is to increase screening rates to 75% AND expand screening to include 2- and 3-year well-child visits.**

**Here's how to complete the screen for your patients:**

1. The family should receive the following ACE-Q handout at check-in. The family writes down the number of adverse events the child has experienced.
2. Add the total of the numbers recorded in the two boxes. This is the ACE score.
3. Your screener should document the ACE score in the vitals section along with hearing and vision screen. Be sure to review the hard-copy questionnaire if the score is >1 or is not documented in the vitals section.
4. Management of ACE score is as follows:
  - a. Score 0
    - i. Continue with regular well child check anticipatory guidance
  - b. Score 1-3
    - i. Ask if the parent is concerned about or sees any relationship between the ACEs they have identified and their child's mental or physical health.
      1. Yes - Code 'Problem related to upbringing, unspecified Z62.9' in A/P and refer to Dr. Elmore (WRB Pediatrics Clinic Health Psychologist)
        - a. Order consult: 'Behavioral Health MTF BE'. In 'Reason for Request' specify that patient is referred to Dr. Elmore. Consider including 'positive ACE screen' in your referral comment.
      2. No – Ensure ACE score documented in vitals section and continue with regular well child check anticipatory guidance
  - c. Score ≥4
    - i. Code 'Problem related to upbringing, unspecified Z62.9' in A/P
    - ii. Refer to Dr. Elmore as above
    - iii. CONSIDER: Social Work and Case Management Consults
    - iv. Ensure ACE score is recorded in vitals section

A note: Using this screen, it is not necessary for them to disclose *which* events have been experienced. Families should always be invited to discuss further, however a desire for privacy should not prevent an appropriate referral to Dr. Elmore to provide appropriate support.

# CYW Adverse Childhood Experiences Questionnaire (ACE-Q) Child

To be completed by Parent/Caregiver

Today's Date: \_\_\_\_\_

Child's Name: \_\_\_\_\_ Date of birth: \_\_\_\_\_

Your Name: \_\_\_\_\_ Relationship to Child: \_\_\_\_\_

**Many children experience stressful life events that can affect their health and wellbeing. The results from this questionnaire will assist your child's doctor in assessing their health and determining guidance. Please read the statements below. Count the number of statements that apply to your child and write the total number in the box provided.**

**Please DO NOT mark or indicate which specific statements apply to your child.**

**1) Of the statements in Section 1, HOW MANY apply to your child? Write the total number in the box.**

## Section 1. At any point since your child was born...

- Your child's parents or guardians were separated or divorced
- Your child lived with a household member who served time in jail or prison
- Your child lived with a household member who was depressed, mentally ill or attempted suicide
- Your child saw or heard household members hurt or threaten to hurt each other
- A household member swore at, insulted, humiliated, or put down your child in a way that scared your child OR a household member acted in a way that made your child afraid that s/he might be physically hurt
- Someone touched your child's private parts or asked your child to touch their private parts in a sexual way
- More than once, your child went without food, clothing, a place to live, or had no one to protect her/him
- Someone pushed, grabbed, slapped or threw something at your child OR your child was hit so hard that your child was injured or had marks
- Your child lived with someone who had a problem with drinking or using drugs
- Your child often felt unsupported, unloved and/or unprotected

**2) Of the statements in Section 2, HOW MANY apply to your child? Write the total number in the box.**

## Section 2. At any point since your child was born...

- Your child was in foster care
- Your child experienced harassment or bullying at school
- Your child lived with a parent or guardian who died
- Your child was separated from her/his primary caregiver through deportation or immigration
- Your child had a serious medical procedure or life threatening illness
- Your child often saw or heard violence in the neighborhood or in her/his school neighborhood
- Your child was often treated badly because of race, sexual orientation, place of birth, disability or religion

## Toxic Stress and Adverse Childhood Experiences Stress Continuity Module Quiz

1. Define the following:

- Positive stress response
  
- Tolerable stress response
  
- Toxic stress response

2. What are the 7 adverse childhood experiences assessed in the ACEs study?

- Abuse
  
- Neglect
  
- Household dysfunction

3. Name some military-specific adverse childhood experiences.

4. What does toxic stress do the developing brain?

5. The ACEs study showed that the consequences of toxic stress are not limited to mental health issues. What are some examples of these lifelong effects of toxic stress?

6. How can you prevent the consequences of adverse childhood experiences and toxic stress?

7. What is resiliency?



## Toxic Stress and Adverse Childhood Experiences Stress Continuity Module Cases

1. Annalise is a 13 year old female who has two older brothers and two younger sisters. Her mother started using drugs and alcohol when Annalise was 4 years old and her father is not in the picture. Often Annalise would have to ask her friends at school for food because her family didn't have enough food at home to feed everyone. She and her two younger sisters were recently placed in a foster home this month.

**Identify the ACE risk factors in this child's situation:**

**What can her foster family do to help build resiliency in Annalise?**

2. You are seeing three siblings, ages 12, 7, and 3 years, as new patients in your practice. They come to the office with their mother who reports that they all need physicals to start at a new school. When you take their social history, their mother tearfully reports that it's been a difficult year. She and the children left their physically abusive father several months ago. They have moved several times to stay with friends, and have just moved to town to stay with her sister. She reports that she has had difficulty finding work, and that money is tight. She has had difficulty finding childcare for her youngest child, and she is worried about the older children starting at a new school in the middle of the academic year. She asks what advice you can give to help them with the transition.

**What age-appropriate manifestations of stress might you see in each child?**

**What are some resources in the military that you can offer to their mother?**

3. You see a 2 year old male, Adrian. He is your last patient of the day. He is accompanied by his mother and grandmother and this is his first time in the Pediatrics Clinic. He and his mother recently moved into his grandmother's home due to conflict between his mother and father. He was born to a 20 year old active duty Army mother. He was born at 35 weeks EGA and weighed 1.9kg at birth (SGA). You look through his medical record and notice that his immunizations are only up to date until 6 months. His mother and father are married and his active duty Army father recently returned from deployment about six months ago. His father was recently arrested last month for drug possession. His mother reports that she has been very withdrawn lately and does not have the motivation to take care of Adrian, so Adrian's grandmother has been stepping in more to help out.

**What effects might the stressors in Adrian's home have on his brain development?**

**What are some lifelong health consequences that Adrian is at risk for?**

**How do you think the stressors in Adrian's home affected his mother's ability to parent?**

**How can Adrian's pediatrician intervene to help prevent these lifelong consequences on Adrian's health?**

4. Two siblings, a 4 year-old boy and 8 year-old girl, are in your office for well-child exams. After their exams, their father mentions that the children's mother will be deploying to Afghanistan in a month. This will be her second deployment in three years, and she is expected to be overseas for 9 months. The father says that younger child does not remember his mother's last deployment, but that his older daughter was very anxious and had difficulty starting school. The father is concerned about how this upcoming deployment may affect his children, and he asks what he can do at home to reduce the stress of separation.

**Do you think this situation represents positive, tolerable, or toxic stress? Why? What factors might change how this stressful situation is experienced by the children?**

**How might the 4 year-old boy react to separation from his mother? What advice can you offer to reduce the stress of deployment?**

**What advice can you offer to help her cope with this separation?**