

SUMMARY OF ESSENTIAL FINDINGS

**Neuroscience, Molecular Biology, and the Childhood Roots of Health Disparities:
Building a New Framework for Health Promotion and Disease Prevention**

Shonkoff, Boyce & McEwen (*JAMA*, June 3, 2009)

Advances in developmental biology are building a persuasive case for a new way of thinking about health promotion and disease prevention based on increasing evidence that the origins of many adult diseases can be found among adversities in the early years of life. These adversities establish biological “memories” that weaken physiological systems and produce latent vulnerabilities to problems that emerge well into the later adult years.

While adult conditions such as coronary artery disease, stroke, diabetes, and cancer have been regarded until recently as products solely of adult behavior and lifestyles, an extensive body of new evidence links adult chronic disease to processes and experiences occurring decades before, in some cases as early as intrauterine life. Early experience can affect adult health in at least two ways—by accumulating damage over time or by the biological embedding of adversities during sensitive developmental periods. If the damage occurs through a cumulative process, chronic diseases can be seen as the products of repeated encounters with both psychologically and physically stressful experiences. When exposures occur during sensitive periods of development, their effects can become permanently incorporated into regulatory physiological processes, and subsequent adult disease may be viewed as the latent outcome of critical events that occurred during early periods of special susceptibility.

Children from families and communities with low income and low education levels may be especially vulnerable to the biological embedding of disease risk because of their disproportionate exposure to highly stressful influences such as neighborhood violence, dysfunctional schools, household chaos, and absent parents. These risk factors are often compounded by limited access to healthful foods and high consumption of energy-dense products, which are contributing to the rising prevalence of obesity and diabetes among low-income children. In some cases, the cumulative burden of multiple risk factors early in life may limit the impact of later interventions, making it impossible to completely reverse the neurobiological and health consequences of growing up poor.

Although early adversity can lead to greater vulnerability later in life, positive experiences can decrease such risk, in some cases across generations. Alterations of stress systems across generations—caused not by genetic inheritance but by early

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experiences—are facilitated by epigenetic changes in response to environmental cues, which, in turn, influence how the next generation’s genes are expressed.

Notwithstanding the fundamental importance of high-quality medical care for those who are ill, the limited capacity of high-quality care to reduce socioeconomic and racial disparities in health outcomes is clear. Yet little attention has been paid to the development of health promotion and disease prevention strategies based on the reduction of significant stressors affecting everyday life for vulnerable, young children and their parents. It is important to distinguish among three kinds of stress:

Positive stress, caused by dealing with frustration, getting an immunization, and other normative experiences, is an important aspect of healthy development that is experienced in the context of stable and supportive relationships that facilitate adaptive responses.

Tolerable stress, from experiences such as the loss of a loved one, serious illness, or a natural disaster, occurs within a time-limited period, during which protective relationships help to bring the body’s stress-response systems back to baseline.

Toxic stress refers to strong, frequent, and/or prolonged activation of the body’s stress-response systems in the absence of the buffering protection of adult support. Major risk factors include extreme poverty, recurrent physical and/or emotional abuse, chronic neglect, severe maternal depression, parental substance abuse, and family violence. Toxic stress disrupts brain architecture, affects other organ systems, and leads to lower thresholds for responsiveness in stress-management systems, thereby increasing the risk for stress-related disease and cognitive impairment, well into the adult years.

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Generally, current health promotion and disease prevention efforts consist of individually-focused medical services for children, such as immunizations and early identification and management of problems, and programs to modify the behavior of adults, such as encouraging better nutrition and increased exercise or reducing smoking, substance abuse, and risk-taking sexual behaviors. The ultimate impact of adult-focused policies is limited by the increasing difficulty of changing behavior as people get older; by the need to overcome biological vulnerabilities that may have been embedded physiologically as a result of early adversity; and by shifting responsibility toward individuals and away from the modifiable circumstances that shaped them.

A fundamental transformation in the circumstances of children who face significant adversity early in life could not only affect their own individual well-being but also improve societal health and longevity. To that end, three promising directions in health policy and clinical practice are indicated by the integrated developmental sciences:

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- Adult disease prevention begins with reducing toxic stress in early childhood, as a reduction in the number and severity of early adverse experiences will lead to a decrease in the prevalence of a wide range of health problems.
- High-quality early care and education programs benefit lifelong health, not just learning, by providing safe, stable, responsive environments and evidence-based treatments for family mental health problems.
- Child welfare services represent an opportunity for lifelong health promotion by augmenting their exclusive focus on child safety and custody with comprehensive developmental assessments and appropriate interventions by skilled professionals.

Focusing on access problems and differential treatment in the health care system is certainly important, but confronting the early childhood origins of disparities in physical and mental health may offer far greater return on investment.

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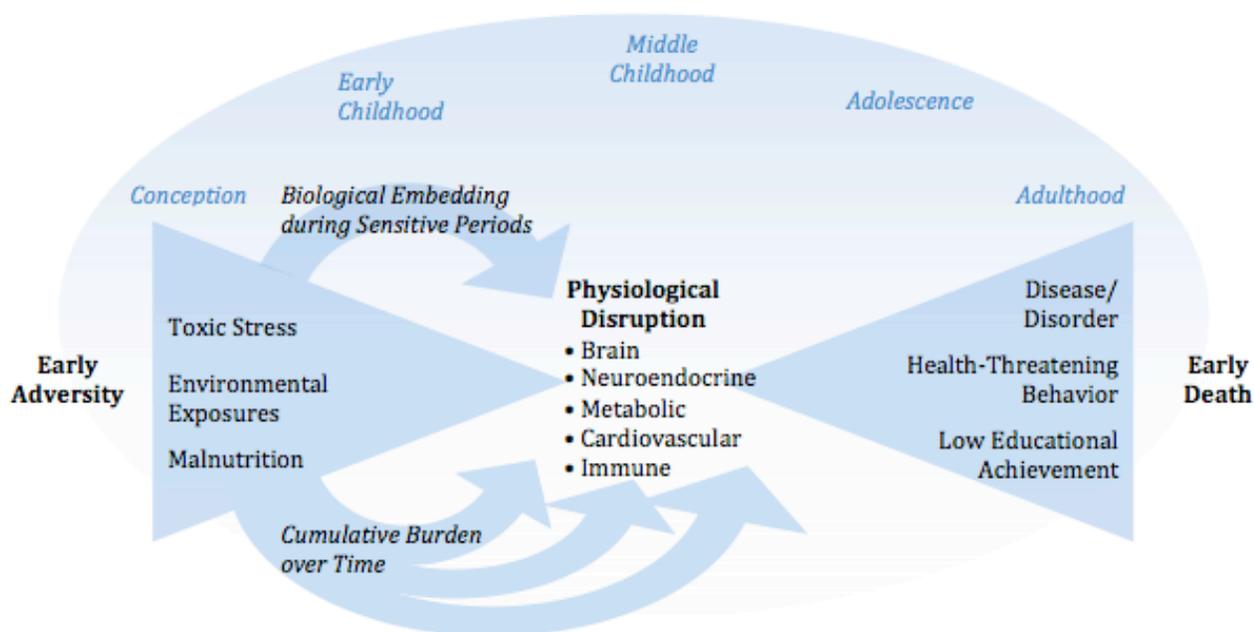


Fig. 1: The Childhood Roots of Health Disparities: How Adversity Is Built Into the Body