

Social Determinants of Health:

Lifetime Consequences of Maltreatment;
Children as the Key to Lifespan Health;
Brain Development Related to Social
Determinants.

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➤ Disclosure:

- I have no relevant financial relationships with manufacturers of any commercial products nor provider of commercial services discussed in this CME activity.
- I do not intend to discuss unapproved/investigative use of a commercial product/device.

Why Are Social Determinants Important?

- The Heckman Equation
- Felitti, Anda: The Adverse Childhood Experiences (ACE) Studies
- Evolving Science in Brain and Human Development
 - The Effects of Toxic Stress

Health and Economics

- While not all children are able to become adults, it is certainly true that all adults once were children.
- Developing science underscores the need to invest in children's health, education, and general well-being in order to avoid the continuation of an unsustainable health care system, and a failing system of education.

James J. Heckman

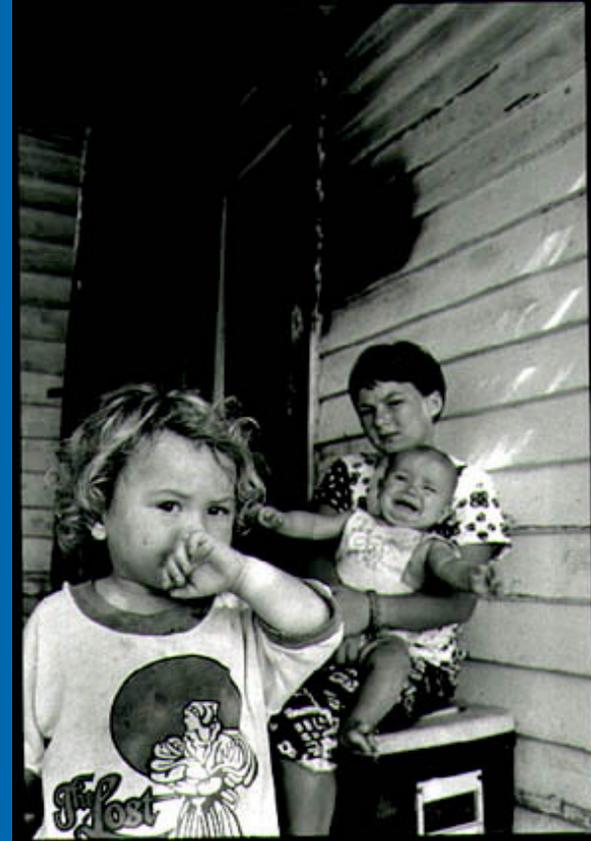


About Professor Heckman

- Nobel Memorial Prize Winner
- Professor of Economics,
University of Chicago
- Equation on Human Capital
Development is a Solution for
Securing America's Economic
Future.

1

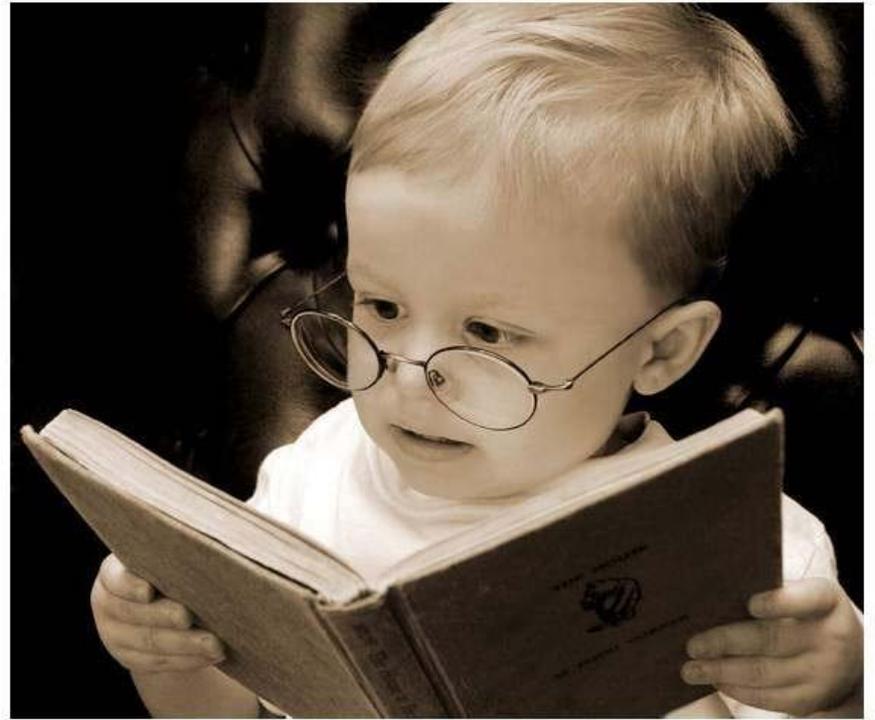
Intelligence and social skills are developed at an early age — and both are essential for success.



Many major economic and social problems in America — crime, teenage pregnancy, high school dropout rate, adverse health conditions — can be traced to low levels of skill and social ability such as attentiveness, persistence and impulse control.

2

Early investment produces the greatest returns in human capital.



Professor Heckman found that early nurturing, learning experiences and physical health from ages zero to five greatly impact success or failure in society. The most economically efficient time to develop skills and social abilities is in the very early years when developmental education is most effective.

3

America's advantage will come from helping the disadvantaged.



Professor Heckman shows that disadvantaged families are least likely to have the economic and social resources to provide the early developmental stimulation every child needs as a basic opportunity for future success in school, college, career and life.

4

Quality economic returns come from quality investments in early childhood development.



Professor Heckman studied decades worth of data from early childhood development programs that gave disadvantaged children and their families developmental support.

Invest
+ Develop
+ Sustain
= Gain

Invest in educational and developmental resources for disadvantaged families to provide equal access to successful early human development.

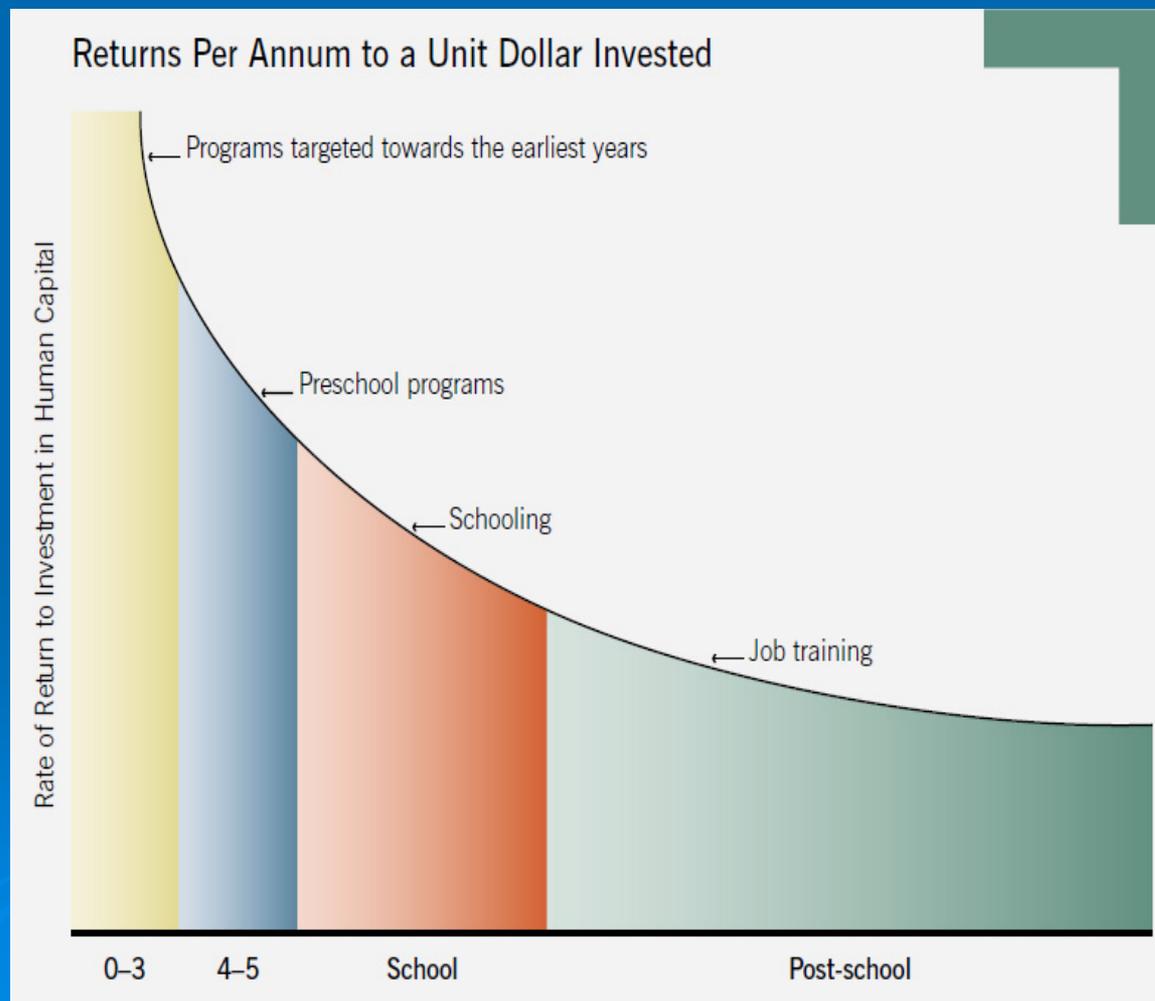
Develop cognitive skills, social skills and physical well-being in children early — from birth to age five when it matters most.

Sustain early development with effective education through to adulthood.

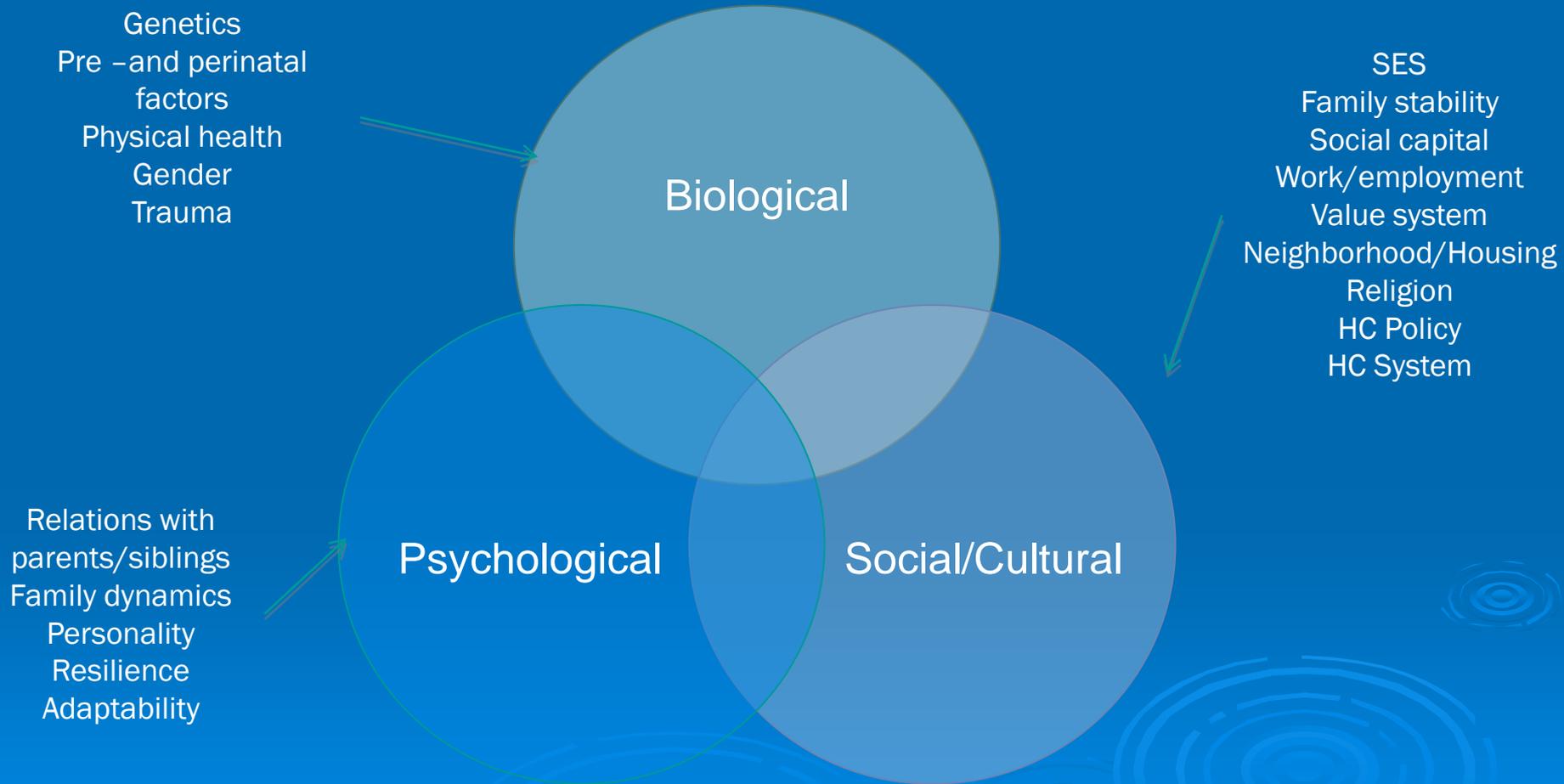
Gain a more capable, productive and valuable workforce that pays dividends to America for generations to come.

The Heckman Equation:

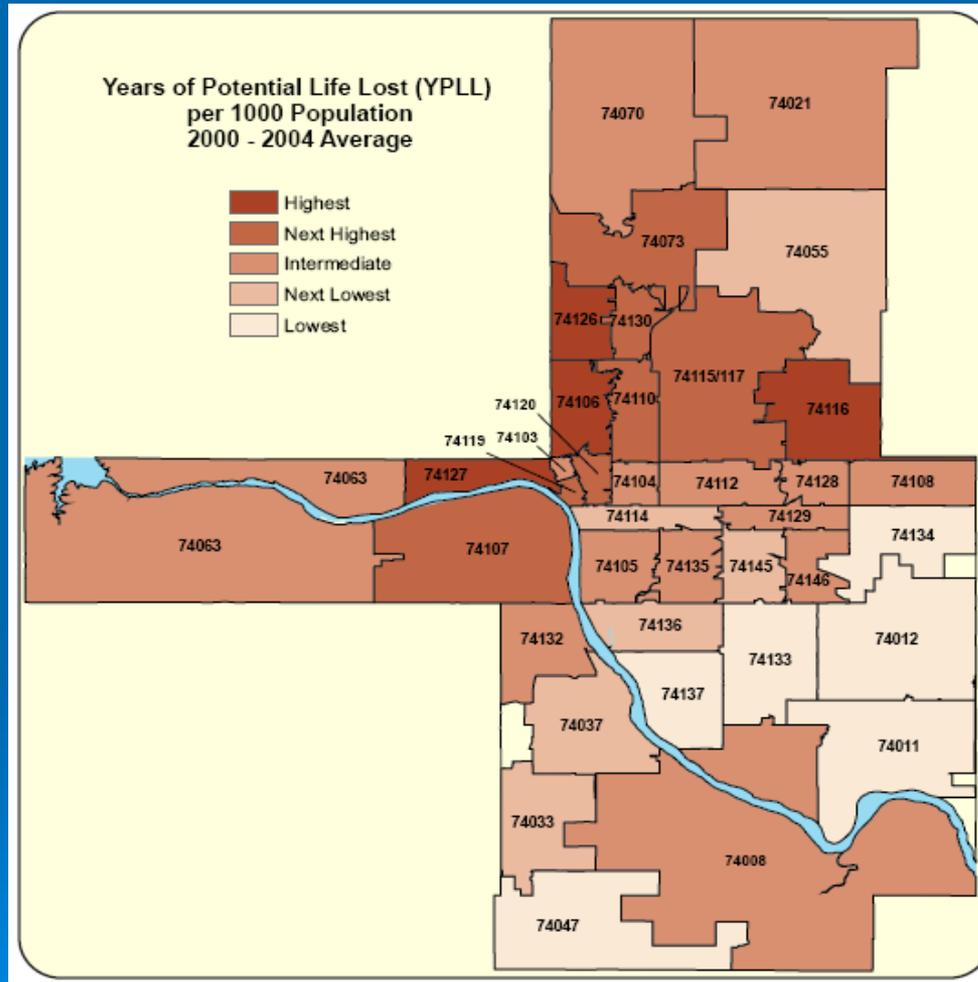
Investing in early childhood development builds the human capital we need for economic success.



What determines health?



ACCESS → Access to and equity in healthcare are key health determinants.



NORTH TULSA

Shorter Life Expectancy

**14 Year difference
in Life Expectancy**

SOUTH TULSA

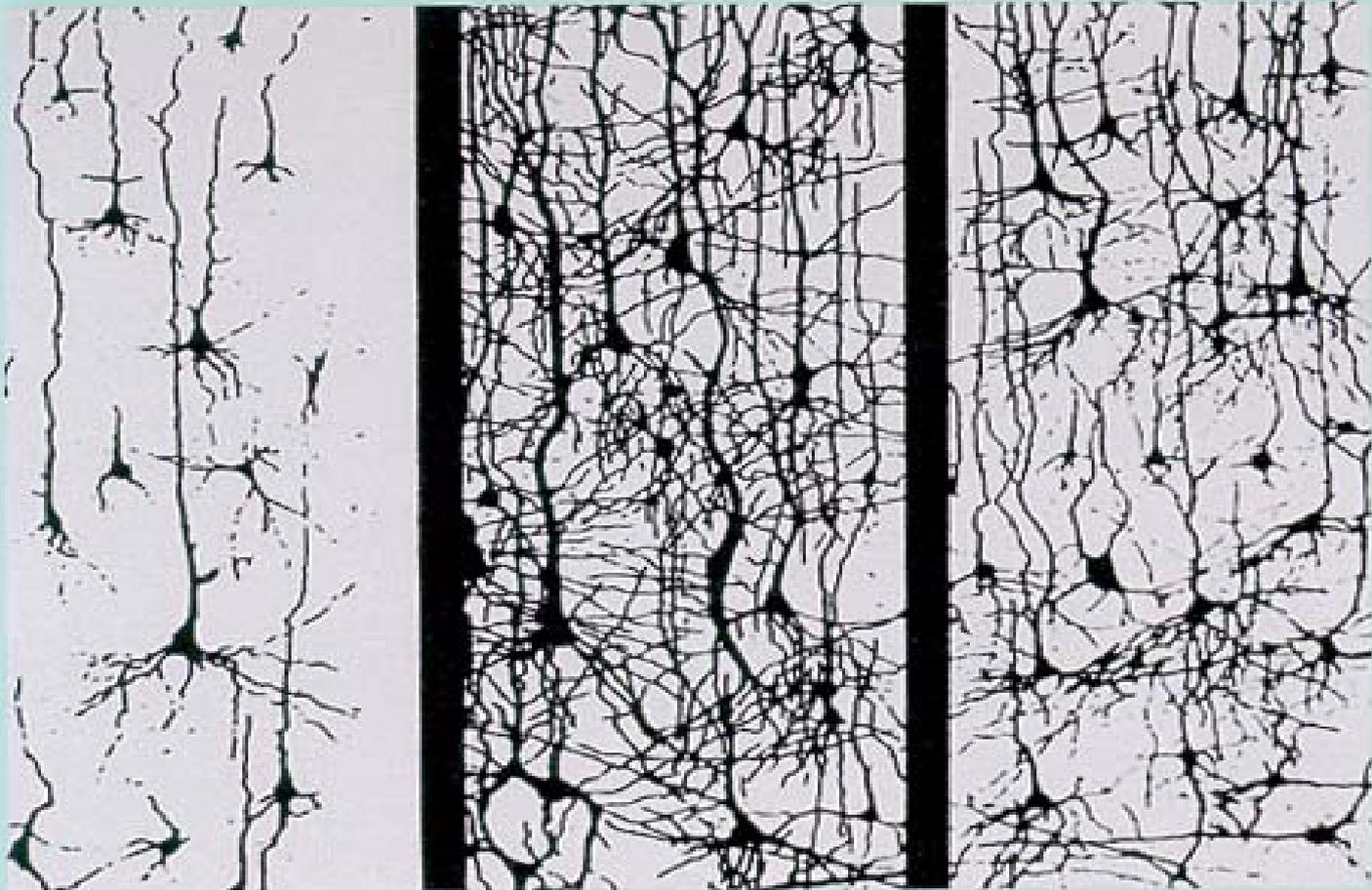
Longer Life Expectancy

Brain Development

At Birth

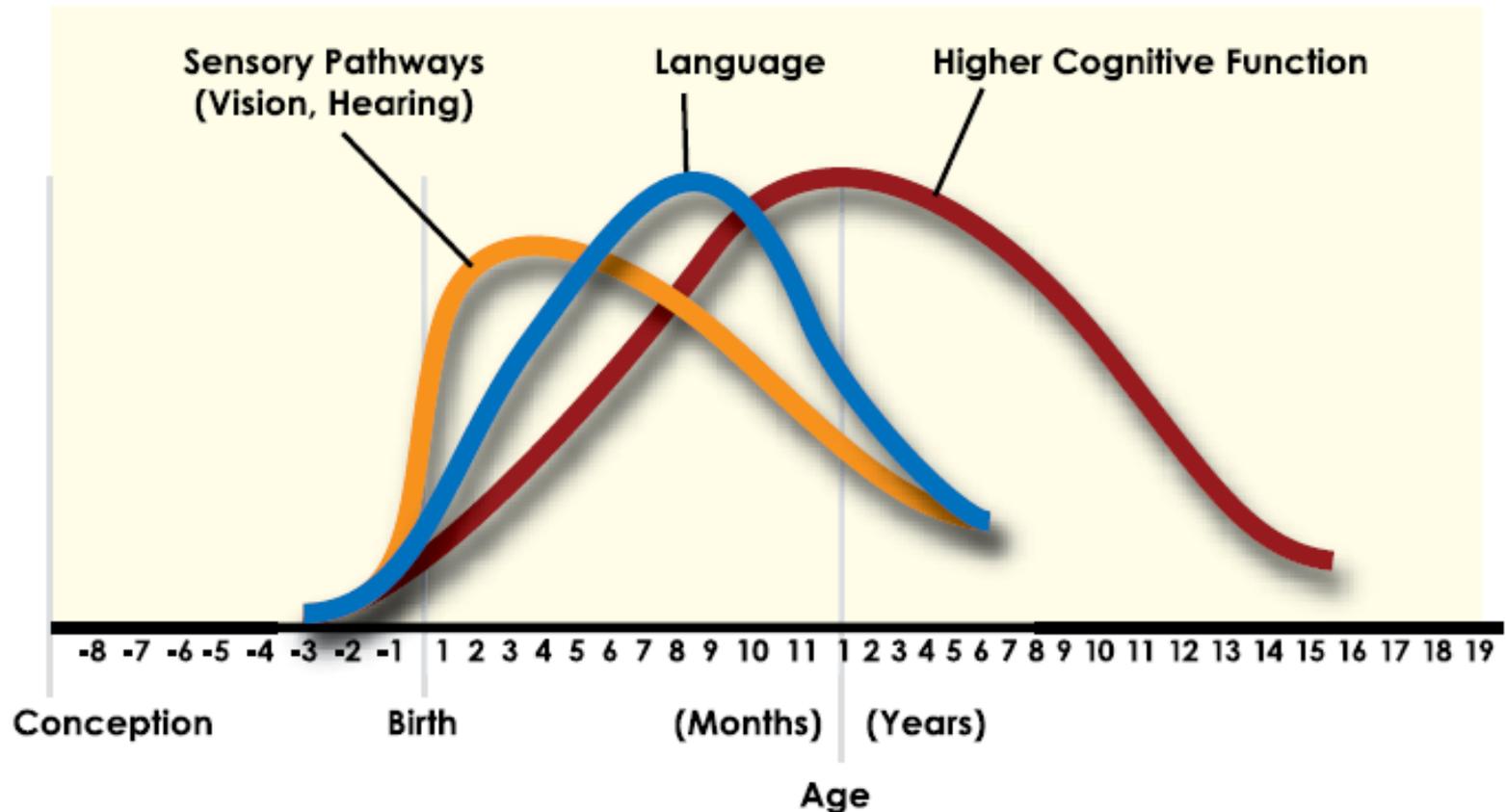
6 Years Old

14 Years Old



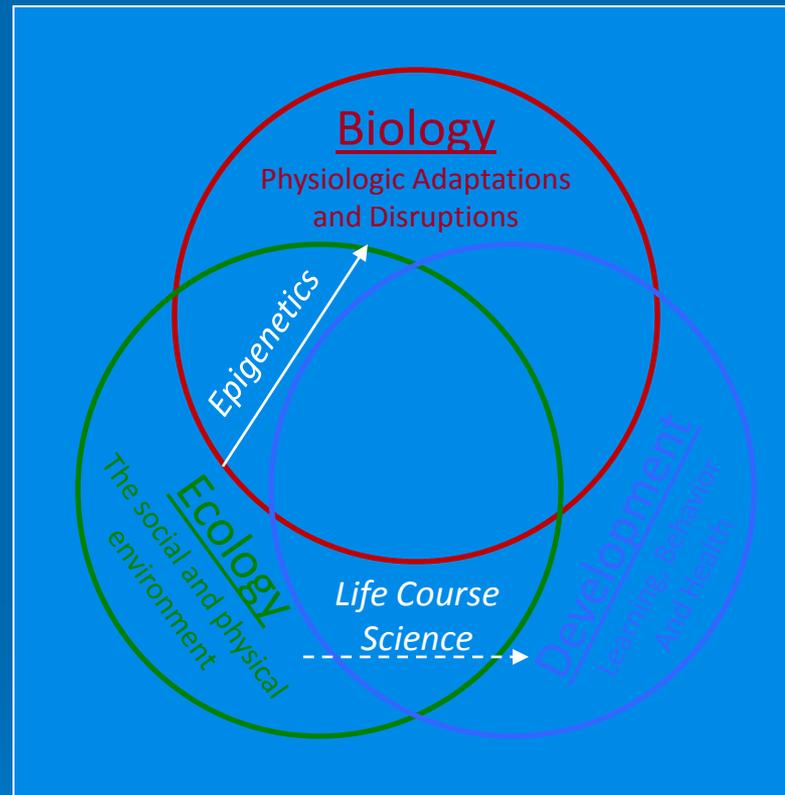
Human Brain Development

Synapse Formation Dependent on Early Experiences



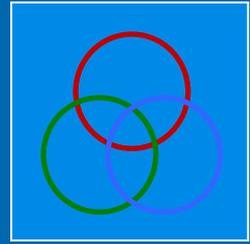
Source: Nelson, C. A., in *Neurons to Neighborhoods* (2000). Shonkoff, J. & Phillips, D. (Eds.)

Developing a Model of Human Health and Disease



Through epigenetic mechanisms,
the early childhood **ecology** becomes
biologically embedded, influencing how the genome is utilized

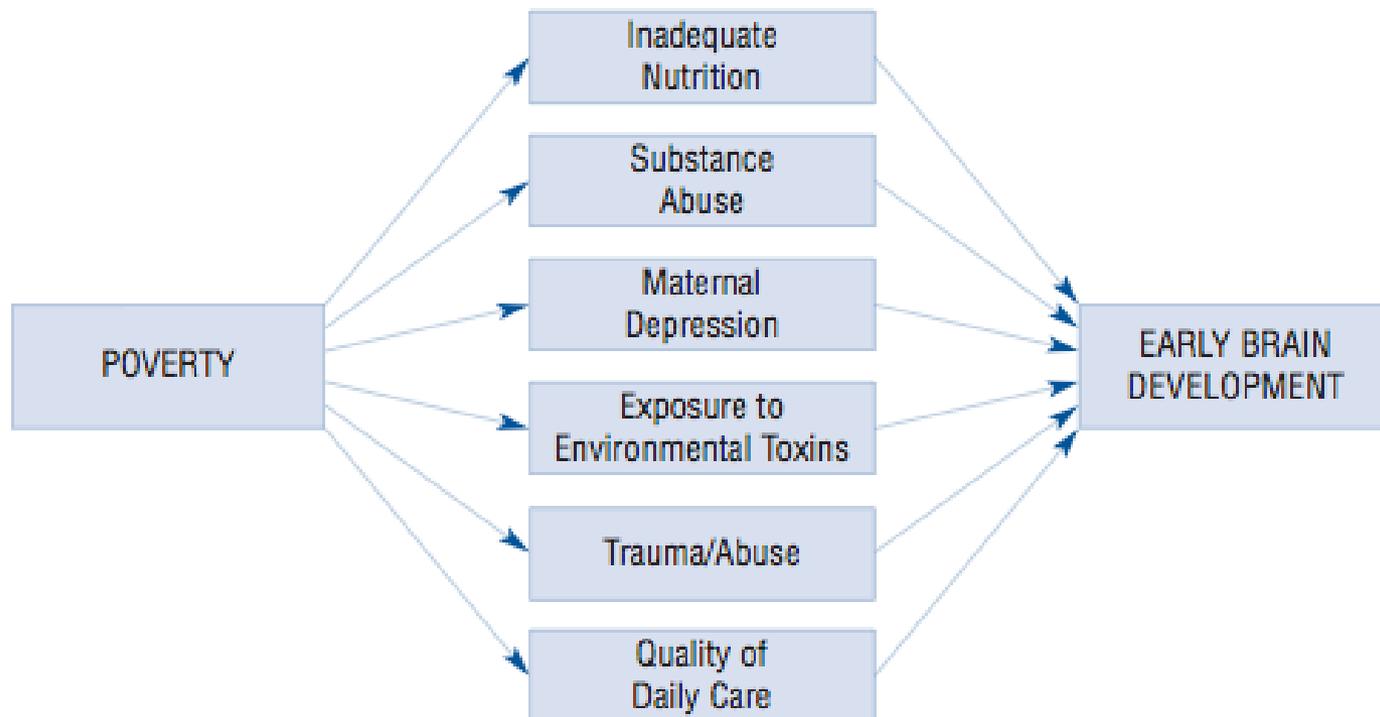
Advantages of an **EBD** Framework

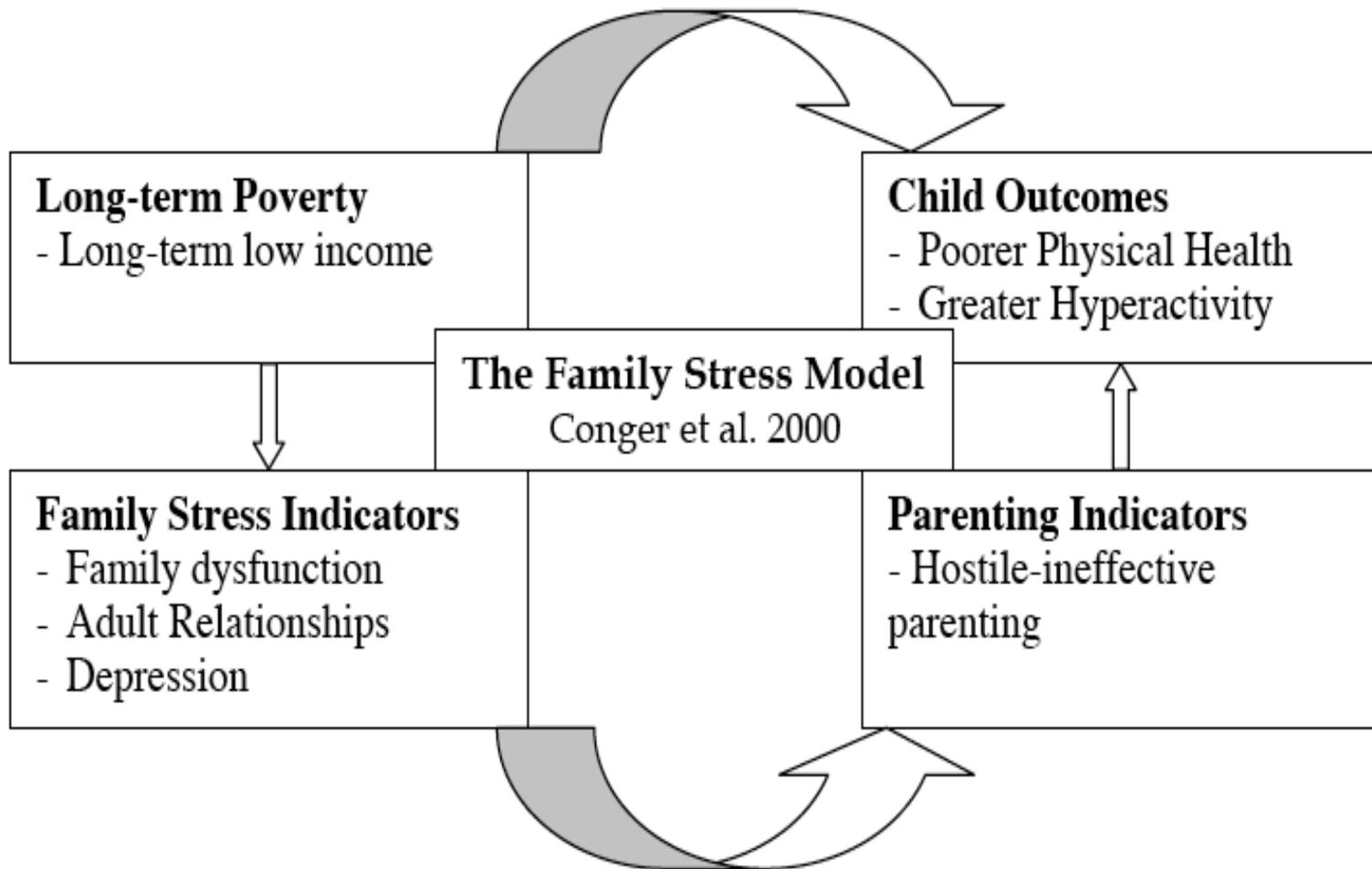


- **Underscores the need to improve the early childhood **ecology** in order to:**
 - Mitigate the **biological** underpinnings for educational, health and economic **disparities**
 - Improve **developmental/life-course trajectories**
- **Highlights the pivotal role of **toxic stress****
 - Not just “**step on the gas**” or enrichment
 - But “**take off the brake**” by treating, mitigating or immunizing against toxic stress

Brain development in the context of poverty

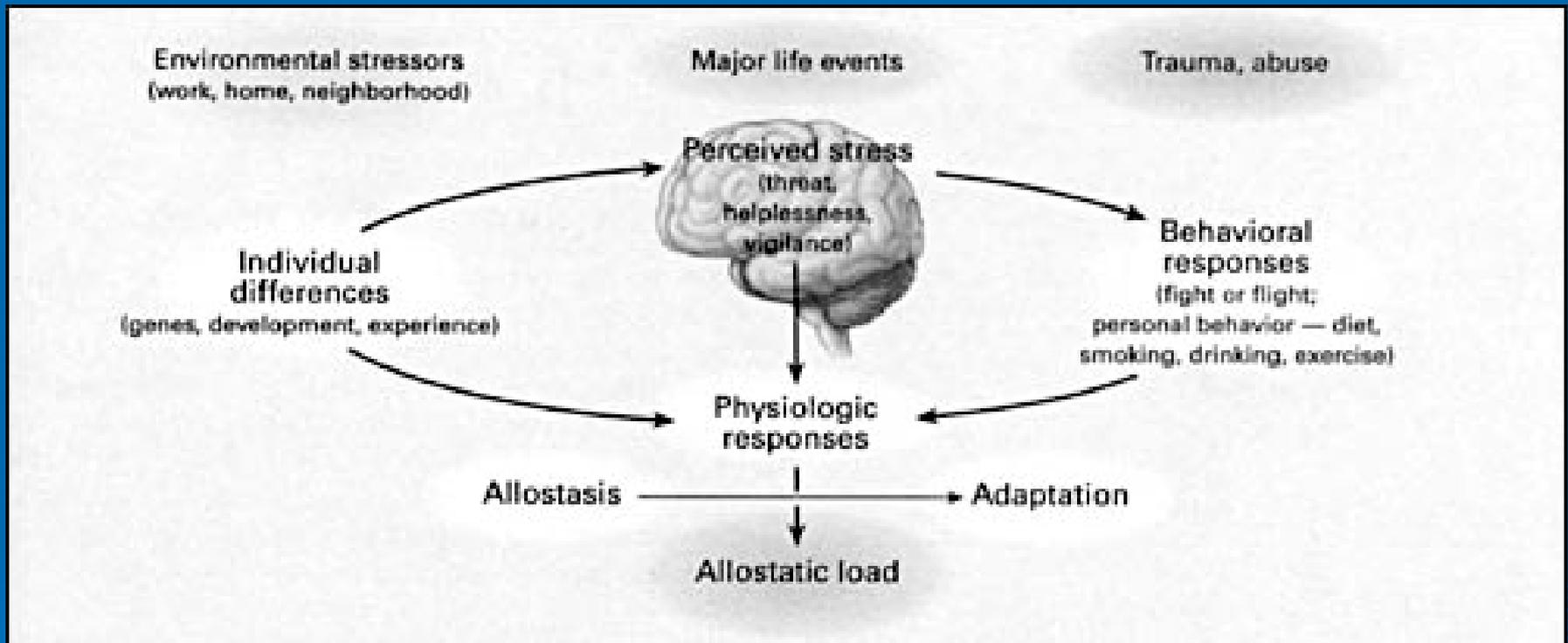
THE IMPACT OF POVERTY ON BRAIN DEVELOPMENT: MULTIPLE PATHWAYS



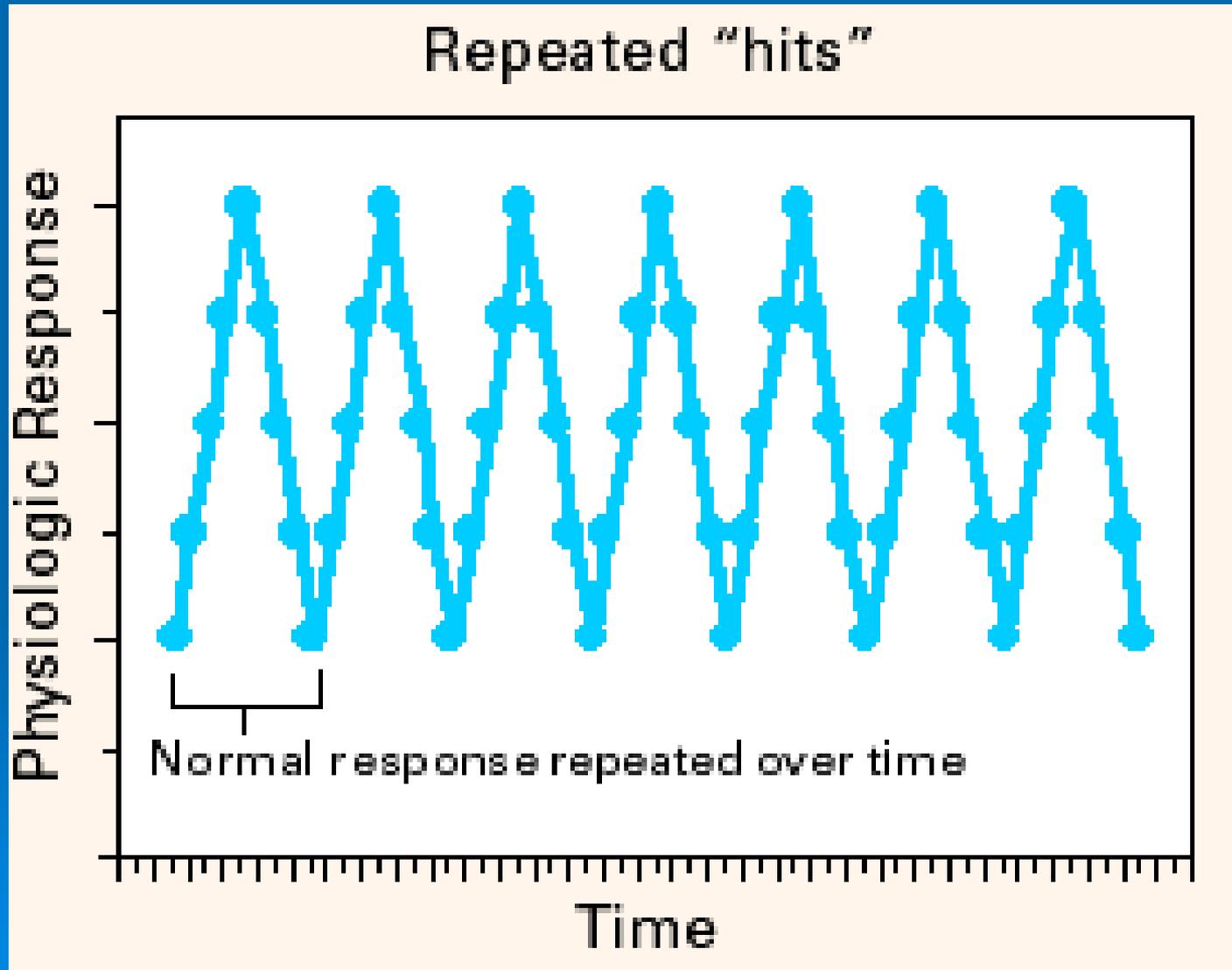


Hardship & Stress, Isolation & Exclusion, Adverse Health

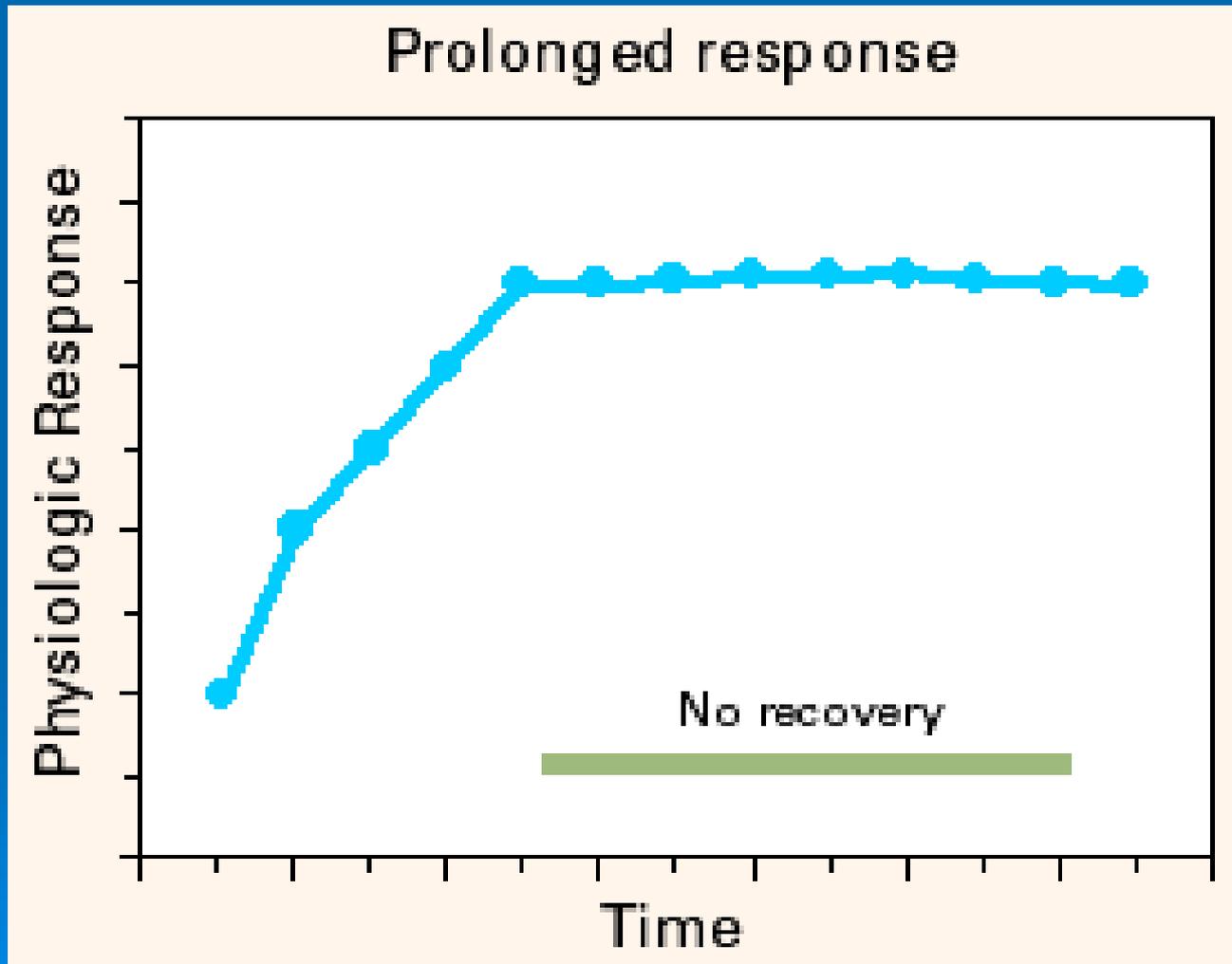
Allostasis and Allostatic Load



Positive & Tolerable Stress



Toxic Stress



Adversities During Childhood and Toxic Stress

POLICY STATEMENT

Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health

abstract

Advances in a wide range of biological, behavioral, and social sciences are expanding our understanding of how early environmental influences (the ecology) and genetic predispositions (the biologic program) affect learning capacities, adaptive behaviors, lifelong physical and mental health, and adult productivity. A supporting technical report from the American Academy of Pediatrics (AAP) presents an integrated ecobiodevelop mental framework to assist in translating these dramatic advances in developmental science into improved health across the life span. Pediatricians are now armed with new information about the adverse effects of toxic stress on brain development, as well as a deeper understanding of the early life origins of many adult diseases. As treated as the risks in child health and development, pediatric providers must now complement the early identification of developmental concerns with a greater focus on those interventions and community investments that reduce external threats to healthy brain growth. To this end, AAP endorses a developing leadership role for the entire pediatric community—one that mobilizes the scientific expertise of both basic and clinical researchers, the family-centered care of the pediatric medical home, and the public influence of AAP and its state chapters—to catalyze fundamental change in early childhood policy and services. AAP is committed to leveraging science to inform the development of innovative strategies to reduce the precipitants of toxic stress in young children and to mitigate their negative effects on the course of development and health across the life span. *Pediatrics* 2012;129:e224–e231

INTRODUCTION

"It is easier to build strong children than to repair broken men."
 Frederick Douglass (1817–1895)

From the time of its inception as a recognized specialty of medicine, the field of pediatrics has attached great significance to both the process of child development and the social/environmental context in which it unfolds. When the American Academy of Pediatrics (AAP) was founded in 1930, the acute health care needs of children were largely infectious in nature.¹ Over the ensuing 80 years, as increasingly effective vaccines, hygiene, and other public health initiatives produced dramatic gains, astute observers began to note that many noninfectious disease entities, such as developmental, behavioral, educational, and

FROM 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, family pediatrician, brain plasticity, treatment, neuroplasticity, toxic stress, resilience

ABBREVIATIONS
 AAP—American Academy of Pediatrics
 CEO—chief executive officer

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TECHNICAL REPORT

The Lifelong Effects of Early Childhood Adversity and Toxic Stress

abstract

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 rethinking a broad range of boundaries of pediatric practice. It calls for pediatricians to serve as both frontline 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–e248

INTRODUCTION

"Of a great beginning cometh a good end."
 John Heyward, *Reveries* (1568)

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

FROM THE JACOB P. SHANKOFF, MD, ANDREW S. GAMER, 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, neuroplasticity, toxic stress, brain development, health disparities, health promotion, disease prevention, chronic brain development, human capital development, pediatric basic science

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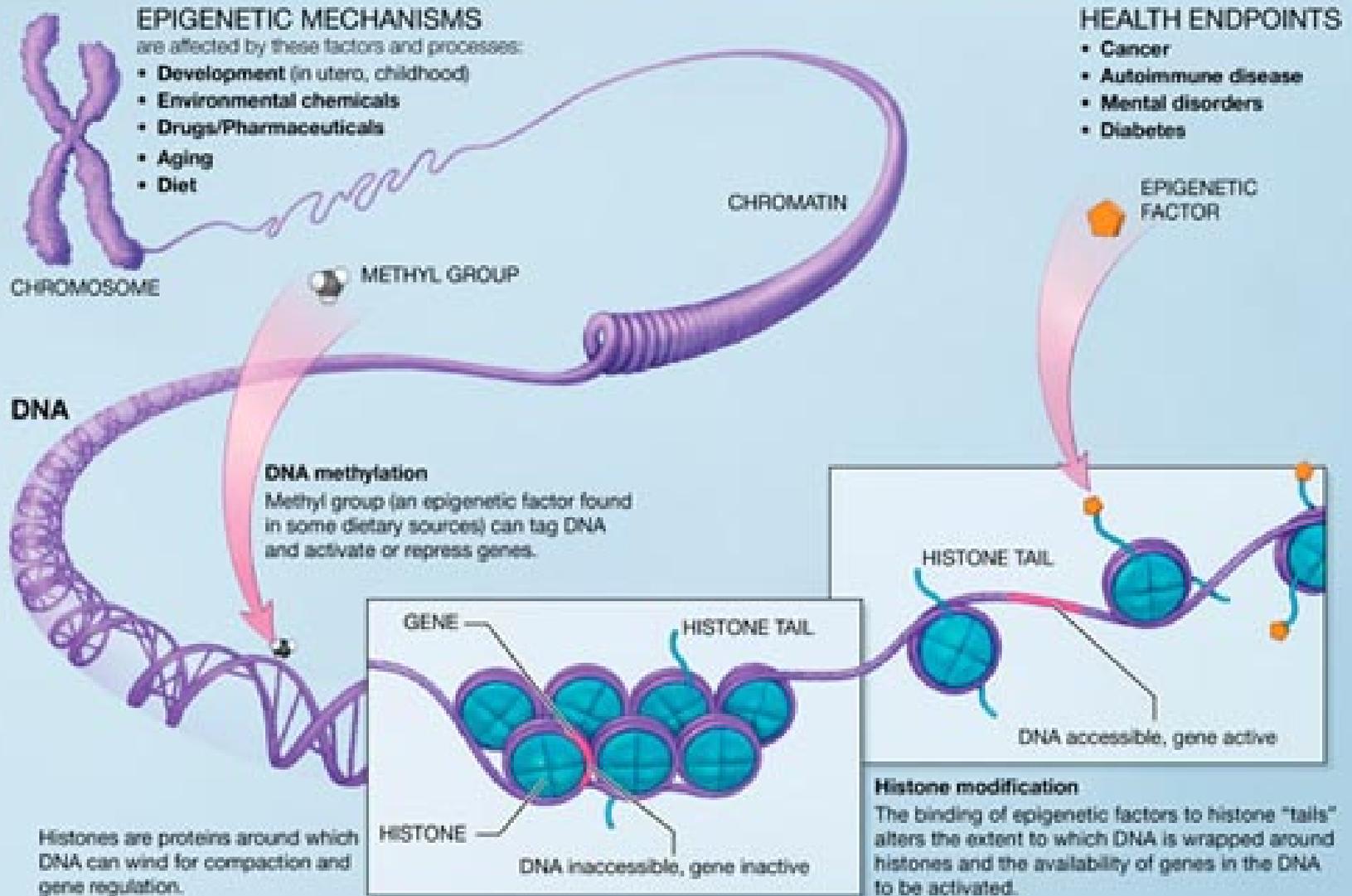
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The guidelines in this report do not include an explicit course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

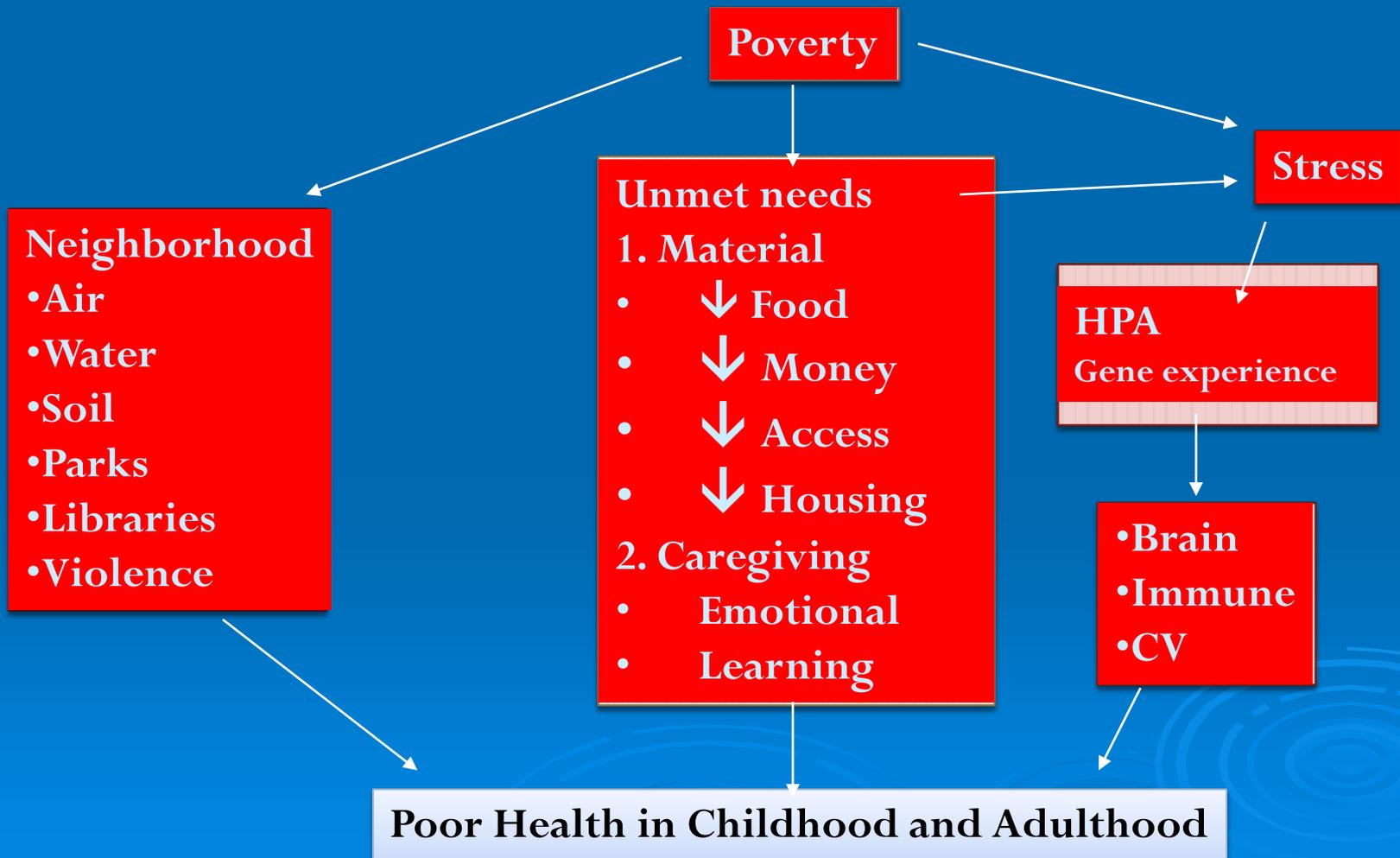
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Epigenetics



How Does Social Environment get Embedded into Biology?



Social Environment: Example One

- Survey of 67,853 Nurses
 - Report childhood physical abuse: 54%
 - Report childhood sexual abuse : 34%
- Increased Risk for Adult Type 2 diabetes:
- 26% – 69%, for moderate to severe abuse.

➤ Am J Prev Med, 12/2010



Example Two

- Survey of 68,505 Nurses
- Risk of Uterine Fibroids with increasing severity of childhood abuse:
 - 8% - 36%!
- Also found that an emotionally supportive relationship during childhood was protective against this risk.
- Jarrett RB, Epidemiology, 11/2010

Example Three

- Interpersonal Violence (IPV), and “Housing Disarray” cause (or, are associated with) an increase in incidence of childhood asthma.
- Cumulative or Multiple Stressors are most important.

- J Epidemiol Community Health, 2010



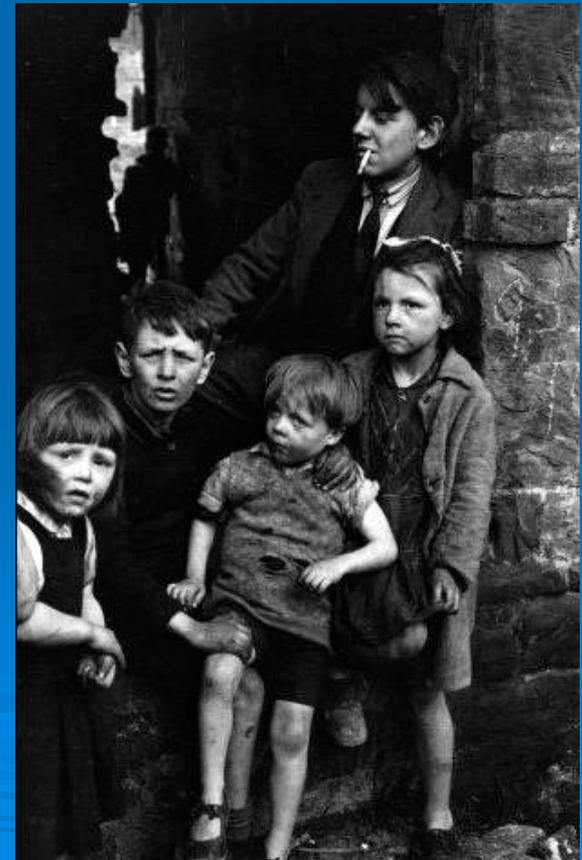
Example Four

- Among women with chronic pain syndromes, childhood maltreatment histories were associated with increased diurnal cortisol levels.
- Abuse can lead to long-term changes in HPA activity.
- Important to evaluate childhood experiences in fibromyalgia and pain syndrome patients.

Example Five

- Poverty, mediated by chronic stress –
- Associated with decreased working memory in young adults.

- Evans GW, Schamberg MA, Proceedings
of the National Academy of Science, 2009



Last Example

- Childhood Traumatic Stress –
- Increases the likelihood of hospitalization with a diagnosed autoimmune disease, “decades into adulthood.”

- Dube SR, et al, Psychosomatic Medicine, 2009

Adverse Childhood Experience (ACE) Study

- **Adverse Childhood Experiences (ACEs) are very common**
- **ACEs are strong predictors of later health risks and disease**
- **This combination makes ACEs *the leading determinant of the health and social well-being of our nation***
 - Recurrent physical abuse
 - Recurrent emotional abuse
 - Contact sexual abuse
 - An alcohol and/or drug abuser in the household
 - An incarcerated household member
 - Someone who is chronically depressed, mentally ill, institutionalized, or suicidal
 - Mother is treated violently
 - One or no parents
 - Emotional or physical neglect

Categories of Adverse Childhood Experiences

Category
Prevalence (%)

Abuse, by Category

Psychological (by parents)	11%
Physical (by parents)	11%
Sexual (anyone)	22%

Household Dysfunction, by Category

Substance Abuse	26%
Mental Illness	19%
Mother Treated Violently	13%
Imprisoned Household Member	3%

Adverse Childhood Experiences

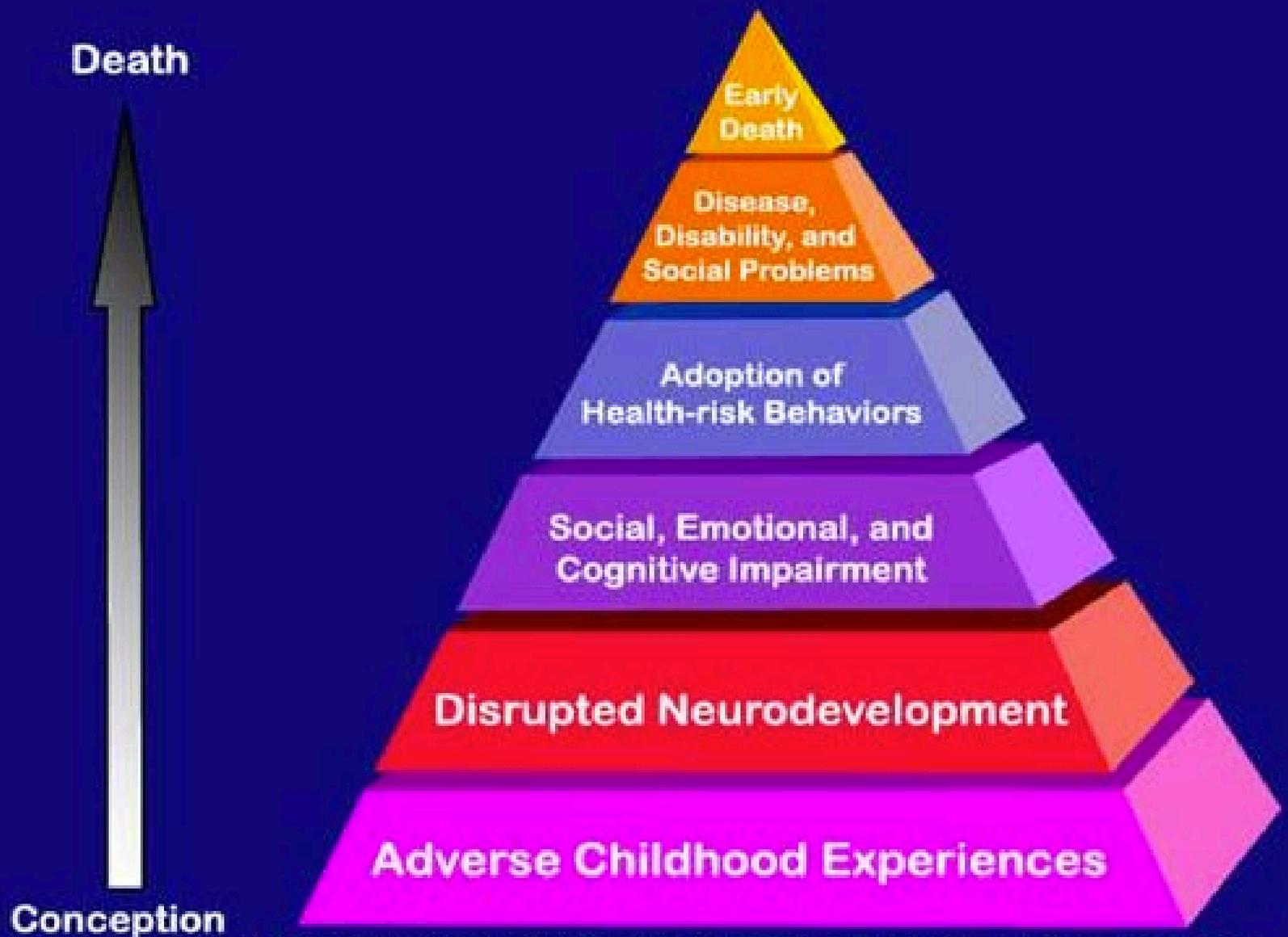
Score

Number of categories adverse childhood experiences are summed ...

<i>ACE score</i>	<i>Prevalence</i>
0	48%
1	25%
2	13%
3	7%
4 or more	7%

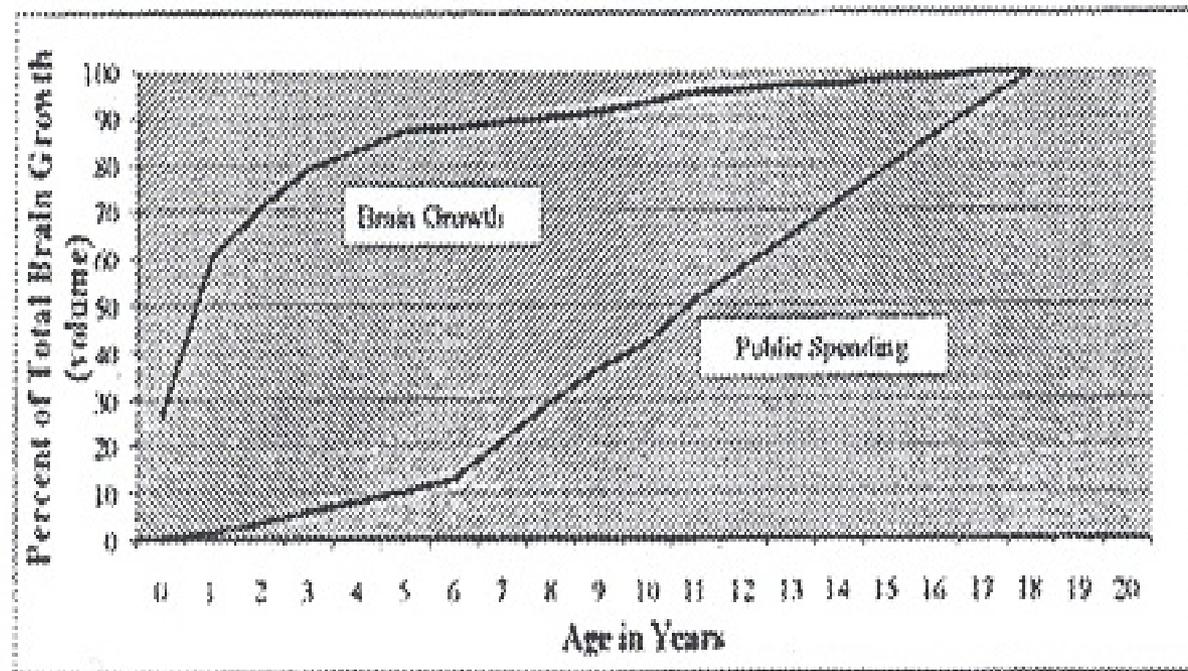


- More than *half* have at least one ACE
- If one ACE is present, the ACE Score is likely to range from 2.4 to 4



Mechanisms by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

Brain Growth vs. Public Spending



Source: Brain development: Figure 2.4 in D. Purves, *Body and Brain*, Harvard University Press, 1988. Public Spending on Children: Derived from Table 1 in R. Haverman and B. Wolfe, "The Determinants of Children's Attainments: A review of methods and findings," *Journal of Economic Literature*, Vol. 33, December 1995.

Total Cost of One Year's Cases

➤ \$1,038,461,500

- These are dollars spent over several years by DHS, Medicaid, Health and Mental Health, Juvenile Justice, and Adult Criminal Justice.
- Spent per year on ONE YEAR'S cohort of abuse and neglect victims.
- These are budgeted dollars!

Newest Data from CDC, 2012

- Based on available United States data from 2008
 - 772,000 US cases
 - 1,740 Fatal Cases (est)

Most Recent OK Data

- 2012 confirmed reports of child maltreatment: 9,842 (28% lower than 2006)
- Acceptance rate for reports:
 - Oklahoma County: 33%
 - Tulsa County: 58%

Upside-Down Economics

- Lifetime Cost per case of maltreatment:
 - \$210,000
- Lifetime Cost per fatal case:
 - \$1,273,000
- (From CDC data) Fang, X, et al. The economic burden of child maltreatment in the United States and implications for prevention. *Child Abuse & Neglect* (2012), doi:10.1016/j.chiabu.2011.10.006

We Cannot Afford to Ignore Prevention!

- Lifetime Cost to OK taxpayers to pay for all costs of the 10,000 children abused in 2012:

➤ **\$210 Billion**

Protect Our Children

- Preserve the Future of Oklahoma
- Protect the Economy of Our State



What are YOUR Thoughts?

How do We Achieve:

Success





Thank You for Inviting Me!

