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Addressing Toxic Stress to Promote Child Wellbeing

An Orientation Guide for Creating a
State Toxic Stress Prevention Plan

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Addressing Toxic Stress to Promote Child Wellbeing

(An Orientation Guide for Creating a State Toxic Stress Prevention Plan)

JCLCC Principles: From its reconstitution in 2009 , the JCLCC has sought to enhance child wellbeing at an affordable cost by promoting: (1) the application of research in policy and practice; (2) relentless use of data to inform decisions and evaluate effectiveness, (3) collaboration among organizations to coordinate their efforts and integrate their services, (4) public-private partnerships, (5) community-based mobilization of capacity to improve child wellbeing, and (6) acceptance of personal responsibility by the persons served and by their families, whenever possible.

JCLCC Priorities: In the 2012 and 2013 Annual Reports, initiatives were created to address the following: trauma and trauma-informed practice, obesity, injuries and fatalities, school readiness, immunization, and safe sleeping.

DHHS Priorities in the DHHS-CLC Contract: The FY'13 deliverables emphasize findings from the 1995/96 birth cohort for which data is available through age 15. The FY'14 contract addresses adolescence and young adulthood for a cohort of all 8th graders in public schools during SY'03, linked back to birth and forward to on-time high school graduation in 2007 and on-time college graduation in 2011 and then, using 2013 data and beyond, to employment status at age 23 or 24 and onward in the future. The prioritized contract topics for the 1995/96 cohort are: mental disorders, injuries, and obesity for health issues; abuse and trauma for social-emotional wellbeing; early risk behaviors for responsible behavior; and kindergarten readiness and reading proficiency for workforce preparation. The contract further emphasizes examination of health in terms of disparities and problems constituting the largest portion of Medicaid expenditures for children and young adolescents. The contract asks that age, race, and gender demographics and other risk groups and factors such as income, family composition, education, employment, and geography be analyzed.

Focusing JCLCC and DHHS Priorities on Toxic Stress: Given the diverse, though compatible topics identified by the JCLCC and DHHS and the contract emphasis on viewing these topics whenever possible through the comprehensive scope of the 1995/96 birth cohort topics, it seems logical to approach the topics in an inclusive and integrated fashion. Such an approach requires finding common perspectives not only applicable to the majority of the topics but also of significant interest to both DHHS and the JCLCC. Fortunately such an integrative perspective became apparent in the research and practice focus on toxic stress and trauma and their impact on critical health, mental disorders, cognition, and behavioral regulation centers in the brain. This body of knowledge has become increasingly clear only during the last decade. Its implications

appear to be substantial for the diverse fields of mental health, child welfare, education, risk behaviors, and especially health and disabilities.

The implications of the impact of stress and trauma on critical brain structures have become better understood through a wide array of research approaches. At the present time there is increasing consensus regarding the nature of the relationships and the types of impacts. However, the magnitude of the impacts is still being investigated, a matter of great importance since these impacts must provide sufficient benefits to justify substantial costs required to support prevention and mitigation of the stress and trauma. Generally the research findings have created a powerful rationale for a wide array of preventive efforts during early childhood and for mitigation as early as possible before adolescence and young adulthood when the most serious and damaging consequences start to become painfully apparent. Because of the complexity of the research and its focus on unfamiliar centers and functions of the human brain, the explanation of these matters will be presented through quotations from the best available summaries prepared by prominent researchers and national synthesis committees of leading research and practice authorities. The purpose of citing the findings of these leading researchers is not to endorse their conclusions. Rather the purpose is to make available in the fewest pages possible what research offers for consideration by the top decision-makers in SC of the most compelling research findings and their implications for policy and practice in health, human services, and education. After the overview of these findings has been presented, the most pertinent SC data on the relevant problems in health, mental health, child welfare, other human services, and education will be summarized to provide a quantitative perspective on the problems that may be prevented or mitigated through the approaches suggested by the national researchers.

Several arenas of research have contributed to the concern with what has been termed “toxic stress” and which is said to call for “trauma-informed practice”. The emphasis on stress versus trauma is partly selective or clumsy labeling (trauma being either an extreme form of or a cause of stress) and partly varying focal points in different service fields (for example “stress” for those concerned with the impact of maternal depression versus “trauma” for those concerned with domestic violence and child battering). It should initially be sufficient for those first learning from this new research to consider the two labels (toxic stress vs. trauma) as being sometimes totally separate, sometimes only partially overlapping, and sometimes just unclear. This is because toxic stress is generally used as an inclusive term for the substantial impact of powerful negative experiences during fetal development and early childhood or even in middle childhood and adolescence.

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:

*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 non-normative 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 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 (See Appendix A).¹

For investigating the phenomenon of toxic stress, at least two major research arenas have caught the attention of practitioners, advocates, policy-makers, and researchers in different fields. For determining the consequences of toxic stress, the research arena explaining the impacts on and through the brain has grown substantially over many decades. This research has accelerated in volume and clarity since the Carnegie Corporation *Starting Points* report in 1994 led to widespread infatuation among the media and child advocates with the brain's role in child development. The infatuation peaked with the publication of the *Newsweek* special edition on the brain and early childhood in 1997. This resulted in substantial brain research funding from the National Institutes of Health. For investigating the causes of toxic stress, the second arena which has gained popular attention is the concept of Adverse Childhood Experiences, as symbolized by its widely recognized acronym ACEs. The ACEs phenomenon gained enthusiastic attention through the findings of Dr. Vincent Felitti, based on his research with patients of the Department of Preventive Medicine at Kaiser Permanente in California. The following extract comes from his 2009 book chapter entitled "*The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare.*" The entire chapter can be found in [Appendix B](#).²

Conclusions: *The Adverse Childhood Experiences (ACE) Study was carried out in Kaiser Permanente's Department of Preventive Medicine in San Diego, in collaboration with the US Centers for Disease Control and Prevention (CDC). This particular Department of Preventive Medicine provided an ideal setting for such collaboration because for many years we have carried out detailed biomedical, psychological, and social (bio-psychosocial) evaluations of over 50,000 adult Kaiser Health Plan members a year. The CDC contributed the essential skill sets for study design and massive data management required for meaningful interpretation of clinical observations. Eight categories of adverse childhood experiences (ACEs) were studied in the first wave; two categories of neglect were added in the second wave. We empirically selected these categories because of their discovered high prevalence in the Weight Program. Their prevalence in a general, middle-class population was also unexpectedly high. We created for each individual an ACE Score, a count of the number of categories of adverse childhood experience that had occurred during the first eighteen years of life. ACE Score does not tally incidents within a category. The scoring system is simple: the occurrence during childhood or adolescence of any one category of adverse experience is scored as one point. There is no further scoring for multiple incidents within a category; thus, an alcoholic and a drug user within a household score the same as one alcoholic; multiple sexual molestations by multiple individuals are totaled as*

¹ Jack P. Shonkoff, Andrew S. Garner et. al. "Technical Report: The Lifelong Effects of Early Childhood Adversity and Toxic Stress." *Pediatrics* 2012; originally published online December 26, 2011: <http://pediatrics.aappublications.org/content/129/1/e232.full.pdf>

² Vincent J. Felitti & Kaiser Permanente. "The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare," Book Chapter for: "The Hidden Epidemic: The Impact of Early Life Trauma on Health and Disease" R. Lanius & E. Vermetten editors. Cambridge University Press, 2009: <http://www.theannainstitute.org/LV%20FINAL%202-7-09.pdf>

*one point. If anything, this would tend to understate our findings. The ACE Score therefore can range from 0 to 8 or 10, depending on the data being from Wave 1 or Wave 2. Specifics of the questions underlying each category are detailed in our original article. Only one third of this middle-class population had an ACE Score of 0. If any one category was experienced, there was 87% likelihood that at least one additional category was present. One in six individuals had an ACE Score of 4 or more, and one in nine had an ACE Score of 5 or more. Thus, every physician sees several high ACE Score patients each day. Typically, they are the most difficult patients of the day. Women were 50% more likely than men to have experienced five or more categories of adverse childhood experiences. We believe that here is a key to what in mainstream epidemiology appears as women's natural proneness to ill-defined health problems like fibromyalgia, chronic fatigue syndrome, obesity, irritable bowel syndrome, and chronic non-malignant pain syndromes. In light of our findings, we now see these as medical constructs, artifacts resulting from medical blindness to social realities and ignorance of the impact of gender. Somewhat surprisingly, the ACE categories turned out to be approximately equal to each other in impact; an ACE Score of 4 thus consists of any four of the categories. The categories do not occur randomly; the number of individuals with high ACE Scores is distinctly higher than if the categories exist independently of each other.*³

The major substantive evidence regarding the impact of ACEs and toxic stress has come primarily from academic researchers. The investigations of these researchers have followed advanced statistical methods far more sophisticated and reliable than Felitti's cross-tabulation of the number of ACEs with subsequent health, psychiatric, and risk-behavior problems portrayed as outcomes. The research findings on toxic stress are multifaceted, complex, and based on unfamiliar biology and other scientific terms and phenomena. The excerpts that follow are the best attempts of teams of leading researchers to summarize for lay reader and practitioner audiences the findings from the fields of "neuroscience, molecular biology, genomics, developmental psychology, epidemiology, sociology, and economics." Any attempt to resummaries their summarizations would run serious risks of distortion and misrepresentation which would mislead practitioners, policy-makers, and other audiences in SC. Their findings are presented in sections of this overview report for: 1) **toxic stress** as caused by 2) **adverse childhood experiences**, including 3) **maltreatment**, and then the consequences of toxic stress in terms of 4) **mental disorders**, 5) **chronic physical conditions**, 6) **risk-taking**, and 7) **executive functioning mental processing deficits** resulting in impulsive behavior, learning problems, and academic underachievement.

The first excerpt presents the conclusions of the "Technical Report: The Lifelong Effects of Early Childhood Adversity and Toxic Stress" ([See Appendix A](#)).⁴ It was prepared by a committee of the American Academy of Pediatrics chaired by Drs. Jack Shonkoff and

³ Vincent J. Felitti & Kaiser Permanente. "The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare," Book Chapter for: "The Hidden Epidemic: The Impact of Early Life Trauma on Health and Disease" R. Lanius & E. Vermetten editors. Cambridge University Press, 2009: <http://www.theannainstitute.org/LV%20FINAL%202-7-09.pdf>

⁴ Jack P. Shonkoff, Andrew S. Garner et. al. "Technical Report: The Lifelong Effects of Early Childhood Adversity and Toxic Stress." Pediatrics 2012; originally published online December 26, 2011: <http://pediatrics.aappublications.org/content/129/1/e232.full.pdf>

Andrew Garner. Dr. Shonkoff is widely known as the editor of *Neurons to Neighborhoods*, a major book summarizing the state of knowledge on early childhood. He is also the Director of the Center on the Developing Child at Harvard University.

The Technical Report presents an Ecobiodevelopmental (EBD) framework which was created by “*building on an ecological model that explains multiple levels of influence on psychological development and a biodevelopmental framework that offers an integrated, science-based approach to coordinated early childhood policy-making and practice across sectors*”. The origins of the EBD framework came from a report of the Center on the Developing Child designed for “*helping physicians and policy-makers think about how early childhood adversity can lead to lifelong impairments in learning, behavior, and both physical and mental health*”. This report, “*The Foundations of Lifelong Health Are Built in Early Childhood*” is attached as **Appendix C**.⁵

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.*

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 hyper-responsive 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 ecobiodevelopmental (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.*

8. *Pediatrics provides a powerful yet underused platform for translating scientific advances into innovative early childhood policies. Practicing pediatricians are ideally positioned to participate*

⁵ Jack P. Shonkoff, Greg J. Duncan et.al. “The Foundations of Lifelong Health Are Built in Early Childhood.” Center on Developing Child at Harvard University, 2010: http://developingchild.harvard.edu/resources/reports_and_working_papers/foundations-of-lifelong-health/

“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.

Toxic Stress: An explanation of the science of toxic stress presented in the American Academy of Pediatrics Technical Report is quoted below⁶. *Appendix A* provides a longer section explaining the impact of toxic stress on various parts of the brain which are transformed in ways undermining physical and mental health, causing impulsivity and risk-taking, and altering the executive function of the prefrontal cortex which affects learning and memory.

In order to understand the impact of toxic stress on learning, health, mental disorders, and behavior, it would be critical to understand the functioning of the prefrontal cortex, hippocampus, amygdala, orbitofrontal cortex, hypothalamic-pituitary-adrenocortical (HPA) axis, sympathetic-adrenomedullary axis, corticotropin-releasing hormone (CRH), allostatic load, cortisol, cytokines, and other parts and functions of the brain. All these are easy to understand if only readers were well-versed in the fields of neuroscience, molecular biology, genomics, and developmental psychology. Readers untrained in these fields must anticipate serious comprehension barriers posed by unfamiliar vocabulary and background knowledge needed to grasp the ecobiodevelopmental (*EBD*) phenomena being presented. However, one can readily learn that very critical *EBD* processes and impacts occur during pregnancy, infancy, and toddlerhood, as well as the middle childhood and adolescent periods for which the consequences are more obvious and thus have been more thoroughly studied and communicated to interested stakeholders.

Understanding the Biology of Stress⁷: Although genetic variability clearly plays a role in stress reactivity, early experiences and environmental influence can have considerable impact. Beginning as early as the prenatal period, both animal and human 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. 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. 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. The most extensively studied involve

⁶ Jack P. Shonkoff, Andrew S. Garner et. al. “Technical Report: The Lifelong Effects of Early Childhood Adversity and Toxic Stress.” *Pediatrics* 2012; originally published online December 26, 2011: <http://pediatrics.aappublications.org/content/129/1/e232.full.pdf>

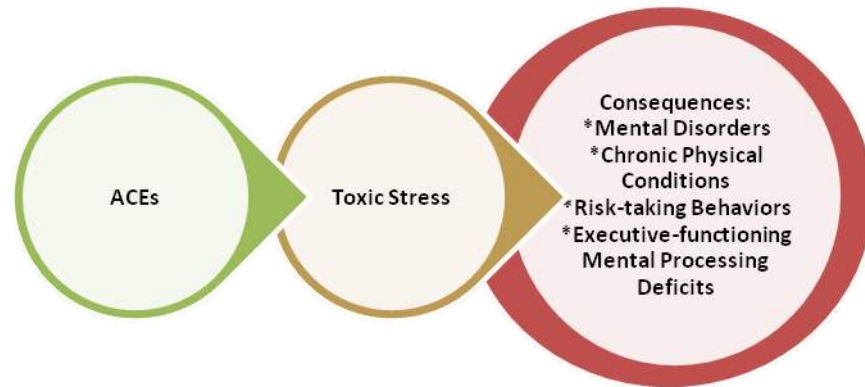
⁷ *Id.*

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, 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. 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.” 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.

Readers well-acquainted with this science can feast on pages 235-7 in the Technical Report ([See Appendix A](#)). Unfortunately understanding these scientific terms, their functions, and their impacts is required in order to judge how large the benefits may be from addressing the ambitious scope of preventive efforts necessary to reduce the impact of toxic stress. Therefore those readers who want a thorough orientation to the science of toxic stress and who are willing to invest sufficient time to learn the basics should study a very helpful overview publication entitled *The Impact of Early Life Trauma on Health and Disease: the Hidden Epidemic* (edited by Ruth Lanius, Eric Vermetten, and Clare Pain; Cambridge Press, 2010) .This book is organized to explain the causes, consequences, and neurobiological mechanisms of the trauma “epidemic”. The book is divided into three sections, each of which is summarized through two synopses of 3-5 pages. Each synopsis provides an interpretive summary of 4 or 5 chapters. The three main sections cover: Early Life Trauma: Impact on Health and Disease; Biological Approaches to Early Life Trauma; and Clinical Perspectives: Assessment and Treatment of Trauma Spectrum Disorders. If one is willing to spend the time reading the dense overviews, it is possible to acquire an initial acquaintance with trauma, toxic stress, and the resulting mental disorder, chronic health, and cognitive problems. However, the scientific terms and phenomena of brain functions, hormones, and other biology factors will leave the reader still far from minimal mastery of the issues and processes involved. Unless one wants to respond to the calls for the toxic stress crusade on blind faith alone, then investing several hours on this book appears to be the best option.

Planning Prevention and Mitigation of Toxic Stress: Based on the conceptualization and research findings presented in this overview report, readers might start to organize their understanding through the following highly simplified causal model.

Figure 1:



The phenomena referred to as toxic stress deserve further elaboration as provided by Sonia Lupien in her synopsis section in *The Impact of Early Life Trauma on Health and Disease: the Hidden Epidemic*. She provides a simple framework for the “biology of stress” as: Genes x Environment x Development. The interaction of these three major influences produces the consequences of trauma and neglect. Development is explained not just through age but also with reference to the sensitive developmental periods of various brain and neuroendocrine systems.

It is clear from their review of the literature that different expression of genes from exposure to different environments may also depend on the timing of exposure to these various environments. This results in a broadening of the G x E model to a G x E x development model. Indeed, exposure to a stressful environment in a very young child may have a different effect on the expression of a given gene when compared with exposure to the same environment in an older child. The authors remind us that at each developmental stage there may be an epigenetic mechanism by which environmental cues can alter gene expression. Studies on developmental cognitive processes in children demonstrate that the interpretation of events depends on the age of the child. Consequently, it may be possible that the impact of a given environmental factor has different epigenetic effects (negative or positive) as a function of the developmental stage of the child when exposed to the event⁸.

The EBD framework promoted by the Center on the Developing Child is incorporated into a more complex logic model illustrated by a visual summary covering the challenges

⁸ Ruth A. Lanius , Eric Vermetten & Clare Pain. *The Impact of Early Life Trauma on Health and Disease: The Hidden Epidemic*. Cambridge University Press: New York, 2010.

involved in reducing toxic stress and its impacts. The magnitude of the challenges is presented more completely in [Appendix C](#)⁹ for pages 7-20 of *The Foundations of Lifelong Health are Built in Early Childhood*. The benefits from addressing the challenge could be huge, as will be the efforts required. The visualization of the logic model is shown above.

Figure 2:



The EBD framework calls for mobilization of all service sectors, communities, and private groups to prevent and mitigate toxic stress. The sectors are referred to as “*Policy and Program Levers*”. They include “*primary health care, public health, child care and early education, child welfare, early intervention, family economic stability, community development, and private sector actions*”. In *The Foundations of Lifelong Health*, pages 13-20 present what the policies and programs should undertake for “*the promotion of health and the prevention of disease*”. The policies and programs include: parenting education and home visiting, parental leave, income supports and “make work pay” programs, expanded professional development for early care & education (ECE) providers, health & safety requirements for ECE programs, physical features of a community and neighborhood resources, laws and safety regulations for commercial products, regulation of chemical environments in which children grow and develop, and policies and programs that promote good nutrition such as SNAP and WIC and private sector policies promoting breast-feeding. These policies and programs would constitute a comprehensive societal commitment to prevention of toxic stress. Absent from the

⁹ Jack P. Shonkoff, Greg J. Duncan et al. “The Foundations of Lifelong Health Are Built in Early Childhood.” Center on Developing Child at Harvard University, 2010: http://developingchild.harvard.edu/resources/reports_and_working_papers/foundations-of-lifelong-health/

proposed agenda but logically essential would be a massive public education campaign to inform families, communities, program workers, and policy-makers regarding the causes of and strategies for preventing toxic stress.

Nowhere in the research is any attempt to estimate both the costs of and benefits from such a crusade against toxic stress. The articles do suggest that the potential savings could be enormous. Based on the explanation of the consequences of toxic stress and the data attempting to quantify the prevalence of its impact, the potential savings do indeed seem substantial, perhaps enormous. However, the standard economic calculus for the anticipated benefit streams is expressed as “expected value” which is the financial savings if the desired outcomes were attained multiplied by the probability of achieving the desired change(s). At this point the probability has not been estimated, nor have the concrete details of the toxic stress prevention crusade been presented as a detailed blueprint for action. Since many of the fields of efforts involved in this prevention are already well-developed, creation of a comprehensive plan of concrete actions should be a practical undertaking for most of the proposed policies and programs. Development of a state (or national) Toxic Stress Prevention Plan would be a logical way to start.

Data Perspectives on Toxic Stress: One essential part of a Toxic Stress Prevention Plan would be a thorough analysis of data on: 1) the prevalence of ACEs, toxic stress, and their consequences; then 2) compared with services currently provided; and finally 3) compared with the smaller numbers of children whose toxic stress exposure or prevalence of their disorders, disease, and restricted functioning was actually reduced or are predicted to be reduced by the prevention and mitigation efforts. The following sections review the data available for such analysis. This review is necessarily an initial inventory of data availability rather than a conclusive data-based analysis of problem prevalence, services provided, and the outcome consequences of the toxic stress.

Adverse Childhood Experiences: A logical starting point for investigation of toxic stress must be the specific ACEs which have played such a large role in popularizing what has become known as toxic stress, the global term for the consequences of adverse experiences and environmental conditions during childhood. The compelling question for a Toxic Stress Prevention Plan would be: how many of which children are affected by ACEs? The data reported on ACEs varies somewhat according to both the conceptualization of toxic stress and the data available to the authors. Felitti, the popularizer of the concept of Adverse Childhood Experiences, listed ten specific ACEs and divided them into three categories: Abuse, Neglect, and Household Dysfunction. He provides retrospective prevalence rates.

The essence of the ACE Study has been to match retrospectively, approximately a half century after the fact, an individual's current state of health and well-being against adverse events in

childhood (the ACE Score), and then to follow the cohort forward to match ACE Score prospectively against doctor office visits, ER visits, hospitalization, pharmacy costs, and death. We recently have passed the fourteen-year mark in the prospective arm of the Study.¹⁰

National Comorbidity Survey Replication (See Appendix D)¹¹: Drs. Green, Kessler, and colleagues report on ACEs data generated by the National Comorbidity Survey Replication. The ACEs were grouped in four major categories and 12 subcategories: (A) interpersonal loss [(1) parental death, (2) parental divorce, (3) other separation from parents and caregivers]; (B) parental maladjustment [(4) mental illness, (5) substance abuse, (6) criminality, (7) violence], (C) maltreatment [(8) physical abuse, (9) sexual abuse, (10) neglect], and (D) Other [(11) life-threatening childhood physical illness, (12) extreme family childhood economic adversity].

National Survey of Children’s Health: Fortunately the 2011 NSCH has generated some state and national data on the prevalence of ACEs. The NSCH data was gathered through a telephone survey of a representative sample in each state. Mothers constituted the substantial majority of the survey respondents. The data presented below compares the NSCH prevalence rates in SC with those of the nation. The prevalence of adverse experiences surveyed by the NSCH is somewhat higher in SC compared with the US. The NSCH surveyed nine specific adverse experiences. These did not include abuse or neglect which would likely not be revealed candidly by the survey respondents. Fortunately since the nine adverse experiences in the NSCH survey are correlated with abuse and neglect, they are somewhat helpful for investigating the conditions breeding toxic stress.

Table 1: SC Prevalence of Adverse Child or Family Experiences based on the 2011/12 NSCH

Adverse Child or Family Experiences	SC	Nationwide
Child had ≥ 1 Adverse Child/Family Experiences	52.3%	47.9%
Child had ≥ 2 Adverse Child/Family Experiences	24.2%	22.6%
Socioeconomic hardship	27.0%	25.7%
Divorce/parental separation	23.0%	20.1%
Lived with someone who had an alcohol or drug problem	10.8%	10.7%
Lived with someone who was mentally ill or suicidal	9.6%	8.6%
Victim or witness of neighborhood violence	8.0%	8.6%
Domestic violence witness	8.1%	7.3%
Parent served time in jail	6.8%	6.9%
Treated or judged unfairly due to race/ethnicity	5.4%	4.1%
Death of parent	4.3%	3.1%

The nine childhood experiences surveyed by the NSCH are compared below with the ACEs cited by Felitti and those investigated by Dr. Green from retrospective responses

¹⁰ Vincent J. Felitti & Kaiser Permanente. “The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare,” Book Chapter for: “The Hidden Epidemic: The Impact of Early Life Trauma on Health and Disease” R. Lanius & E. Vermetten editors. Cambridge University Press, 2009: <http://www.theannainstitute.org/LV%20FINAL%202-7-09.pdf>

¹¹Jennifer Greif Green, Katie A. McLaughlin et.al. “Childhood Adversities and Adult Psychiatric Disorders in the National Comorbidity Survey Replication I” Arch Gen Psychiatry. 2010; 67(2):113-123: <http://archpsyc.jamanetwork.com/article.aspx?articleid=210584>

of adults ages 18 and older in the NCS-A and Dr. McLaughlin from adolescents ages 13-17 in the NCS-A.

Table 2: Adverse Childhood Experiences Comparison

ACEs Categories by Felitti ¹²	National Comorbidity Survey Replication ¹³ (Ages 18+ years)	National Survey of Adolescents ¹⁴ (Ages 13 to 17 years)	2011/12 National Survey of Children's Health (NSCH) ¹⁵
Abuse	Maltreatment		X
Emotional – recurrent threats, humiliation (11%)	X	Emotional abuse (5.9%)	X
Physical - beating, not spanking (28%)	Physical abuse (8.4%)	Physical abuse (4.2%)	X
Contact sexual abuse (28% women, 16% men; 22% overall)	Sexual abuse (6.0%)	Sexual abuse (4.4%)	X
Neglect	Neglect (5.6%)	Neglect (2.2%)	X
Physical neglect (10%)			X
Emotional neglect (15%)			X
Household Dysfunction	Parental maladaptation+ Interpersonal Loss		
Mother treated violently (13%)	Violence (14.0%)	Family Violence (8.4%)	Domestic violence witness (7.3%)
Household member was alcoholic or drug user (27%)	Substance abuse (8.5%)	Parental substance abuse (10.7%)	Lived with someone who had an alcohol or drug problem (10.7%)
Household member was imprisoned (6%)	Criminality (7.2%)	Parental criminality (26.3%)	Parent served time in jail (6.9%)
Household member was chronically depressed, suicidal, mentally ill, or in psychiatric hospital (17%)	Mental illness (10.3%)	Parental mental illness (15.6%)	Lived with someone who was mentally ill or suicidal (8.6%)
Not raised by both biological parents (23%)	Parental death (9.9%) Parental divorce (17.5%) Other separation from parents and caregivers (6.7%)	Parental death (7.3%) Parental divorce (28.4%) Other parental loss (4.9%)	Death of parent (3.1%) Divorce/parental separation (20.1%)
	Others		
X	Life-threatening childhood physical illness-internal factors (5.8%)	X	X
X	Extreme family childhood economic adversity (household dysfunctional) (10.6%)	Family economic adversity (16.2%)	Socioeconomic hardship (25.7%)
X	X	X	Treated or judged unfairly due to race/ethnicity (4.1%)
X	X	X	Victim or witness of neighborhood violence (8.6%)

¹² Design: Kaiser Permanente's Department of Preventive Medicine in San Diego, in collaboration with the US Centers for Disease Control and Prevention (CDC). This Department of Preventive Medicine carried out detailed biomedical, psychological, and social (biopsychosocial) evaluations of over 50,000 adult Kaiser Health Plan members a year.

http://acestudy.org/yahoo_site_admin/assets/docs/LaniusVermetten_FINAL_8-26-09.12892303.pdf

¹³ Design: Cross-sectional community survey with retrospective reports of (Childhood adversity) CAs and lifetime DSM-IV disorders. Setting: Household population in the United States. Participants: Nationally representative sample of 9282 adults
<http://archpsyc.jamanetwork.com/article.aspx?articleid=210584>

¹⁴ Design: A US national survey of adolescents (age range, 13-17 years) assessing DSM-IV anxiety, mood, behavior, and substance use disorders and CAs: <http://archpsyc.jamanetwork.com/article.aspx?articleid=1389368>

¹⁵ Design: cross-sectional, parent-reported data on nine ACEs among US children age 0 to 17 years

<http://archpsyc.jamanetwork.com/article.aspx?articleid=1389368>http://www.childhealthdata.org/docs/drc/aces-data-brief_version-1-0.pdf?Status=Master

The ACEs specified by Dr. Felitti, the NSCH, the National Comorbidity Survey Replication (NCS-R), and the NCS-Adolescent Supplement (NCS-A) are a mixture of similarities and differences. The main categories employed by Felitti are Abuse, Neglect, and Household Dysfunction. The Comorbidity Replication main categories are Abuse and Neglect, Family Maladaptation, Interpersonal Loss, and Other (child's physical illness and economic adversity). However, based on factor analysis, the NCS-R research reports only the two major categories of Maladaptive Family Functioning and Other (parental death, parental divorce, other parental loss, economic adversity, and child physical illness). Moreover, there are differences in the subcategories. The NCS-R does not subdivide Neglect into Physical and Emotional as the NCS-A and Felitti do, but does provide much more detail on Felitti's category "Not Raised by Both Biological Parents" for which the Comorbidity Survey reports Death, Divorce, and Other Parental Loss. Also the Comorbidity Surveys have a category for Other which includes Physical Illness and Economic Adversity.

Additionally, there are major differences between Felitti, the NSC-R, and the NCS-A in some of the percentages found to have experienced ACEs. The NSC-A ACE rates are much higher than for the NCS-R for criminality (26% vs 7%), parental divorce (28.4% vs 17.5%), parental mental illness (15.6% vs 10.3%), and economic adversity (26% vs 7%). The NCS-R rates are higher for physical abuse (8.4% vs 4.2%), neglect (5.6% vs 2.2%), and somewhat higher for sexual abuse (6.0% vs 4.4%), and family violence (14.0% vs 8.4%). The NCS-R should have somewhat higher rates because its period for childhood adversity is longer than the NCS-A (2 1/2 years longer to age 18 versus age 15.5 on average) but the NSC-A adversities occurred almost 25 years earlier on average in an era when some adversities have increased substantially with the weakening of the family, neighborhoods, and economic opportunity. An additional factor with unexplained influence is the difference in recall bias for teens in the NCS-A versus adults in the NCS-R. Felitti's percentages seem to be higher the NSC-R and the NCS-A, especially for Neglect, Parental Substance Abuse, and Physical, Emotional, and Sexual Abuse which are triple those in the Comorbidity Surveys. The ACE family violence, parent loss, and imprisonment rates from Felitti and the NCS-R are similar, perhaps because they are both reported by adults and require less subjective interpretation as in the case of parental loss. However, imprisonment is much narrower indicator than criminality. Also assessment of family violence seems quite subjective, though Felitti defines violence in terms of violence against the mother. Thus for both violence and criminality, Felitti uses narrower definitions that bring down his prevalence rates. If Felitti had used criminality and any type of family violence, all of his rates except for the more objective phenomenon "not being raised by both biological parents" would be much higher than the NCS-R rates. The NCS-A adolescents report rates of criminality at 26%, almost four times the NCS-R rate. While it would be helpful to understand why some of Felitti's abuse, neglect, and substance abuse rates are much higher, the statistical methods of

the Comorbidity Surveys are very rigorous and should therefore be treated as more reliable estimations of ACEs prevalence.

The NSCH data does not address Abuse and Neglect at all, probably because of the difficulty in obtaining candid responses from parents through a one-time interview. Most of the NSCH ACEs questions address Household Dysfunction, but the NSCH also surveys two additional topics not included by Felitti and the Comorbidity Surveys. These additional topics are: Victim of Neighborhood Violence and Treated Unfairly for Race/Ethnicity. The NSCH is less revealing than either Felitti or the Comorbidity Surveys but does provide a comparison of rates across states and among conditions and disorders. Compared with the Comorbidity Surveys, the Felitti data comes from less structured survey methodology but is presented through a framework of interpretation that is coherent. However, Felitti's interpretation seems somewhat imposed on the data, such as his emphasis on addictions as a gratification mechanism caused by childhood adversity. The NSCH simply reports survey data on ACEs with no interpretation. The Comorbidity Surveys provide carefully designed and collected data analyzed through advanced statistical methods; and their authors interpret the implications in a guarded manner based on other research findings and theories. Since all three sources of data rely on retrospective recall, more conclusive evidence from long-term prospective studies will be needed to confirm or revise the retrospective ACEs survey research.

Additional Causal and Risk Factors (as Identified for Mental Disorders): Additional perspective on ACEs is available from epidemiological analyses which investigate the predictive or concurrent strength of a variety of causal factors. Two articles prepared by Copeland, Shanahan, Costello, and Angold (*See appendix E*)¹⁶ seek to determine which psychosocial risk factors are statistically most strongly related with psychiatric disorders. Using data for 9-16 year olds in the WNC Great Smoky Mountains Study and the 9-17 age group in ENC Caring for Children in the Community study, these two articles approach correlation and causality through the broader framework of risk factors. This broader perspective moves closer to a Logic Model comprised of Distal and Proximal Causal Factors, also as affected by Interventions (often in the form of services) which impact Outcomes. By comparison, the full logic model framework helps to illustrate the strengths and limitations of the ACEs approach, even as applied in the Comorbidity Replication analyses. Causality in the real world is very complicated. Unfortunately, research typically is able to gather and present variables of only modest scope and accuracy to mirror the real world. For example, causal factors have quite different predictive power depending on whether they are for Status (of significant persons or

¹⁶ William Copeland, Lilly Shanahan, E. Jane Costello & Adrian Angold. "Configurations of common childhood psychosocial risk factors." *Psychiatry*. 2009 April; 50(4): 451-459. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2685166/>

organizations) or for Transactions/Interactions (especially involving both the persons whose outcomes are being investigated and also the significant persons or organizations affecting the persons investigated). It is often the case that data is more readily available or could be more practically gathered for Status than for Transactions. Most Transactions/Interactions occur unobserved by objective reporting sources and, if sought from the participants, are subject to bias or even denial and falsification. This is especially the case in households which are private environments seldom studied in the depth needed for reliable data. (*Note: this issue is discussed later regarding the impact of parenting on early childhood development, as summarized by Brook-Gunn and Markman*). The table below prepared by Copeland and colleagues presents risk factors for mental disorders. All of these risk factors are for Status with the exception of Maltreatment and the three Family Dysfunction variables of Poor Supervision, Parent-Child Conflict, and Parent Tense or Disinterested in Parent Child Activities, and also in some instances of Interparental Problems for which the child is present.

Table 3: Definition and weighted cumulative prevalence of risk factors in the CCC (N=920)¹⁷

Risk factors	% observations (N unweighted)
Socioeconomic disadvantage	
1. <i>Poverty</i> : Meets the federal guidelines for poverty based on income and family size	30.6 (327)
2. <i>Parental unemployment</i> : At least one parent registered as unemployed at time of interview	13.3 (143)
3. <i>Poor parental education</i> : At least one parent left school before 11th grade	28.3 (305)
4. <i>Teenage parent</i> : At least one parent was younger than 18 years old at subject's birth	19.5 (202)
Non-nuclear family structure	
5. <i>Single-parent household</i>	30.4 (314)
6. <i>Step-parent household</i>	14.8 (143)
Parental risk characteristics	
7. <i>Parental mental illness</i> : Interviewed parent scored 9 or higher on the Short Mood and Feelings Questionnaire (SMFQ) or has a history of mental health treatment	30.7 (313)
8. <i>Parental drug use</i> : At least one parent has been treated for drug and alcohol problems	10.4 (122)
9. <i>Parental crime</i> : At least one parent has been convicted of a crime	37.1 (372)
10. <i>Step-parent dysfunction</i> : History of mental illness, substance abuse, or criminality in step-parent	11.9 (125)
Family dysfunction	
11. <i>Poor supervision</i> : Parents do not exert age-appropriate control over child's activities or friends	8.4 (96)
12. <i>Tense or disinterested parent</i> : Many parent-child activities involve tension, worry or disinterest in the child	18.7 (193)
13. <i>Parent-child conflict</i> : Frequent arguments between a parent and the child	19.4 (207)
14. <i>Interparental problems</i> : Arguments, apathy, dissatisfaction, or poor communication between parents	31.7 (284)
Stressful life events	
15. <i>Maltreatment</i> : Physical or sexual abuse of the child by a family member	9.7 (110)
16. <i>Loss life events</i> : e.g., death of a parent, sibling, or friend, separation from parents	9.2 (98)
17. <i>Violent life events</i> : e.g., victim of physical violence, witness of a death caused by violence	10.2 (105)

Note: When possible, risk factors with a prevalence of < 5% were aggregated into one category (e.g., physical and sexual abuse were aggregated into the maltreatment category).

¹⁷ William Copeland, Lilly Shanahan, E. Jane Costello & Adrian Angold. "Configurations of common childhood psychosocial risk factors." *Psychiatry*. 2009 April; 50(4): 451-459. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2685166/>

Further specification of potentially available factors is presented in the article by Shanahan and colleagues (*See Appendix F*). The first table provides a useful list of risk factors with a notation of whether each risk factor has a research-documented association with seven specific mental disorders. The Transactional/Interactional risks appear to fall in the categories of Stressful Events (sexual abuse, humiliation, violence, and threats) and Family Dysfunction (poor parental supervision; harsh, punitive, conflictual parent-child relationship; neglect, physical abuse, maltreatment; scapegoating; parental over-intrusion and control; and negative/coercive relationships); and Peer and Friendship Problems (friendship difficulties). Some of the risk factors just listed may or may not be Transactional depending on the specific questions used to generate the data.

Table 4: Putative psychosocial risk factors for youth disorders¹⁸

	CD/ODD	ADHD	Depr	SoPh	SAD	GAD/OAD	Comb Anx
Parental risk characteristics							
Parental mental health	√	√	√	√	√	√	√
Parental depression	√	√	√	√	√	√	√
Parental substance/drug abuse	√	√	√	√	√	√	√
Parental antisocial personality/crime	√	√	√		√		√
Socioeconomic disadvantage							
Poverty, low income, low education	√	√	√	√	√	√	√
Parental unemployment	√		√	√			√
Teenage mother	√						
Disadvantaged/dangerous community	√	√	√		√		√
Non-intact family structure							
Parental divorce/single parent	√	√	√	√	√	√	√
Step-parent	√	√	√				
Stressful life events							
Foster care	√	√	√				√
Sexual abuse	√	√	√	√	√	√	√
High number of stressful events	√	√	√	√			√
Loss/Humiliation events			√		√	√	√
Violence/Danger/Threat events	√		√	√	√	√	√
Family dysfunction							
Poor parental supervision	√						
Harsh, punitive, conflictual parent-child relationship	√	√	√	√		√	√
Neglect, physical abuse, maltreatment, Scapegoating	√	√	√	√			√
Parental overintrusion, control	√	√	√	√		√	√
Negative/coercive sibling relationships	√		√				√
Interparental conflict/violence	√	√	√	√	√		√
Peer and friendship problems							
Friendship difficulties	√	√	√	√			√
Deviant peers	√		√				

An additional table from the Shanahan article presents the risk factors by gender and by developmental stage for Behavior Disorders (CD, ODD, and ADHD) and for Emotional

¹⁸ Lilly Shanahan, William Copeland, E. Jane Costello, and Adrian Angold. "Specificity of putative psychosocial risk factors for psychiatric disorders in children and Adolescents." *Journal of Child Psychology and Psychiatry* 49:1 (2008), pp. 34–42: <http://onlinelibrary.wiley.com/doi/10.1111/j.1469-7610.2007.01822.x/full>

Disorders (specific phobia, separation anxiety disorder, general anxiety/over-anxiety, and combined anxiety disorders). The table shows the odds ratios for specific risk factors and mental disorders that resulted for the entire sample (or for either preadolescents or adolescents). The importance of this article is both the more extensive array of causal factors employed and the analysis of impact by gender and by age/developmental phase.

Table 5: Putative risk factors by sex and developmental stage, adjusted for comorbidity and correlations among risk factors <Risk factors that were not significant at $p < .05$ are shown in parentheses. Risk factors specific to one disorder at $p < .05$ are underlined; risk factors specific to one disorder domain (i.e., behavioral or emotional) at $p < .05$ are indicated by a *. Risk factors that are shared by pre-/adolescent males and females are listed in the upper part of each cell, risk factors that are nonshared are listed in the lower part of each cell>

	Preadolescent		Adolescent		Odds ratio (Confid. interval)
	Males $n = 1,541$	Females $n = 1,220$	Males $n = 2,128$	Females $n = 1,785$	
Behavioral					
CD	Sexual abuse* Problem. peers* Poor supervision* P. unemployment Poor sibling rel. (Dang. environ.) Loss events Parental depression	Sexual abuse* Problem. peers* Poor supervision* P. unemployment Poor sibling rel. (Dang. environ.) Loss events Parental depression	Sexual abuse* Problem. peers* Poor supervision* P. unemployment Poor sibling rel. (Dang. environ.) Loss events Parental depression	Sexual abuse* Problem. peers* Poor supervision* P. unemployment Poor sibling rel. (Dang. environ.) Loss events Parental depression	4.94 (2.05–11.92) 4.88 (2.89–8.25) 3.68 (1.73–7.84) 2.68 (1.58–4.54) 2.48 (1.56–3.96) 2.06 (0.99–4.31) 2.02 (1.05–3.86) 1.69 (1.00–2.87)
ODD	Poor supervision* Poor sibling rel. (Scapegoating) Sexual abuse* Problem. peers*	<u>Neglect</u> Poor supervision* Poor sibling rel. (Scapegoating) Sexual abuse* Problem. peers*	Poor supervision* Poor sibling rel. (Scapegoating) Sexual abuse* Problem. peers*	<u>Neglect</u> Poor supervision* Poor sibling rel. (Scapegoating) Sexual abuse* Problem. peers*	5.71 (2.04–16.01) 4.66 (2.87–7.59) 3.29 (1.94–5.59) 2.61 (0.90–7.58) 2.26 (1.19–4.32) 1.91 (1.21–3.03)
ADHD	Interpar. violence Overintrusive par. (Scapegoating)	Overintrusive par. (Scapegoating)	Interpar. violence Overintrusive par. (Scapegoating)	Overintrusive par. (Scapegoating)	2.26 (1.47–3.48) 3.61 (1.38–9.50) 2.63 (0.89–7.76)
Emotional					
Depression	<u>Foster home</u> (Scapegoating) Parental depression <u>Single parent</u> (Parental arrest)	<u>Foster home</u> (Scapegoating) Parental depression <u>Single parent</u> (Parental arrest)	<u>Foster home</u> (Scapegoating) Parental depression <u>Single parent</u> (Parental arrest)	<u>Foster home</u> (Scapegoating) Parental depression <u>Single parent</u> (Parental arrest)	3.69 (1.15–11.83) 3.63 (0.95–13.93) 2.81 (1.42–5.57) 2.23 (1.24–4.03) 2.05 (0.28–15.24)
	Loss events Poor sibling rel. Violent events* No friends*	Loss events Poor sibling rel. Violent events* No friends*			7.32 (3.57–14.97) 4.77 (2.15–10.55) 4.74 (1.88–11.98) 3.22 (1.47–7.05)
SoPh	No friends* (Violent events)* (Overintrusive par.) (Harsh discipline) (Parental drug use)	No friends* (Violent events)* (Overintrusive par.) (Harsh discipline) (Parental drug use)	No friends* (Violent events)* (Overintrusive par.) (Harsh discipline) (Parental drug use)	(Poor sibling rel.) (No friends*) No friends* (Violent events)* (Overintrusive par.) (Harsh discipline) (Parental drug use)	2.06 (0.84–5.02) 1.91 (0.71–5.13) 3.77 (1.05–13.53) 3.10 (0.38–25.56) 3.05 (0.47–19.60) 2.15 (0.69–6.71) 2.05 (0.84–5.02)
SAD					
		Violent events* (Teenage mother)		Violent events* (Teenage mother)	5.87 (2.04–16.92) 2.18 (0.94–5.07)
GAD/OAD	<u>Harsh discipline</u> (Dang. environ.) P. unemployment	<u>Harsh discipline</u> (Dang. environ.) P. unemployment	<u>Harsh discipline</u> (Dang. environ.) P. unemployment	<u>Harsh discipline</u> (Dang. environ.) P. unemployment	4.26 (1.01–17.90) 3.12 (0.77–12.70) 2.60 (1.16–5.81)
	Interpar. violence No friends*			No friends*	14.15 (1.48–135.10) 3.97 (1.15–13.70) 3.86 (1.07–13.88)
	(Par. depression) <u>Dang. environ.</u> Overintrusive par. P. unemployment (Violent events)* Parental drug use	(Par. depression) <u>Dang. environ.</u> Overintrusive par. P. unemployment (Violent events)* Parental drug use	<u>Dang. environ.</u> Overintrusive par. P. unemployment (Violent events)* Parental drug use	Interpar. Violence	2.69 (0.78–9.29) 2.23 (0.95–5.24) 3.10 (1.29–7.43) 2.89 (1.12–7.48) 2.46 (1.44–4.20) 2.10 (0.77–5.78) 2.02 (1.11–3.66)
Combined anxiety disorders		<u>Step-parent</u>		No friends*	3.23 (1.18–8.79) 2.68 (0.83–8.70) 2.34 (0.77–7.14)
	No friends*				

In the real world, a full model of causal factors and outcomes would be very complex, with outcomes varying at minimum by gender and age. Thus assessing the impact of Adverse Experiences would be analyzed within elaborated subgroups by age and gender

or by additional subgroups for race, income, and other factors. However, it is quite expensive to gather and analyze enough accurate data to achieve sufficient sample size over time to approximate the complexity of reality. Fortunately, the more rigorous, comprehensive, and expensive analyses are making progress elaborating the logic model in high quality survey studies to quantify the impact of various causal factors on mental disorders. These analyses include the NCS-R and NCS-A and the regional studies by the Duke researchers and others in the US and internationally. But mental disorders are only one focal point for child development. Physical health, educational achievement, responsible behavior, and other critical outcome domains must be investigated with comparable analytical rigor.

Child Maltreatment and Toxic Stress: [(1) research on the impact of maltreatment in terms of toxic stress and its consequences; (2) NIS data on prevalence; (3) SC data on abuse and neglect; (4) SC services response to child abuse and neglect; # 3 & 4 not yet written].

Maltreatment Research Perspectives on ACEs and Toxic Stress: Scott and her New Zealand colleagues have provided highly revealing evidence of the adverse mental disorder consequences resulting from child abuse. In their study child abuse was defined as follows (*See Appendix G*)¹⁹:

Child maltreatment was assessed with items that correspond to 3 of the 5 accepted dimensions of child maltreatment: physical abuse, sexual abuse, and witnessing intimate partner violence. Sexual abuse was measured in terms of penetrative abuse occurring prior to age 17 years (referred to herein as child rape) and other contact sexual abuse occurring prior to age 17 years (referred to herein as child sexual abuse). For child rape and child sexual abuse, the following questions were asked: The next two questions are about sexual assault. The first is about rape. We define this as someone either having sexual intercourse with you or penetrating your body with a finger or object when you did not want them to, either by threatening you or using force, or when you were so young that you didn't know what was happening. Did this ever happen to you? Other than rape, were you ever sexually assaulted, where someone touched you inappropriately, or when you did not want them to? For this article, participants were coded as positive for these events if they endorsed the relevant item and indicated that it had occurred prior to age 17 years (a subsequent question was asked about age of event occurrence). For child physical abuse, the following question was asked: "As a child, were you ever badly beaten up by a parent or someone who brought you up?" Participants were coded positive for this event if they endorsed the item. For witnessing parental violence, the following question was asked: "When you were a child, up until the age of 16, did you ever witness serious physical fights at home, such as one parent beating up another parent?" Participants were coded positive for this event if they endorsed the item.

¹⁹ Kate M. Scott, Don R. Smith & Pete M. Ellis. "Prospectively Ascertained Child Maltreatment and Its Association With DSM-IV Mental Disorders in Young Adults." Arch Gen Psychiatry. 2010;67(7):712-719:<http://archpsyc.jamanetwork.com/article.aspx?articleid=210834>

The survey participants were 2144 respondents ages 16-24 in a community mental health survey nationally representative of New Zealand; of the respondents, 221 were subsequently matched with child protection records for child abuse. Those with child abuse records were compared with the remainder of the sample, both for all other respondents and separately for those without child protection records who reported past experiences of abuse. The findings from the study were summarized as:

Results: After adjusting for demographic and socioeconomic correlates, child protection agency history was associated with several individual mental disorders, mental disorder comorbidity, and all mental disorder groups, both 12-month and lifetime. Odds of 12-month posttraumatic stress disorder were 5.12 (95% confidence interval [CI], 2.42-10.83); of any 12-month mood disorder, 1.86 (95% CI, 1.12-3.08); of any anxiety disorder, 2.41 (95% CI, 1.47- 3.97); and of any substance use disorder, 1.71 (95% CI, 1.01-2.88). These associations increased in magnitude when those who retrospectively reported child maltreatment were removed from the comparison group.

Conclusions: Prospectively ascertained child maltreatment is significantly associated with a range of subsequent mood, anxiety, and substance use disorders, indicating that maltreatment, not just the memory of maltreatment, is associated with subsequent psychopathology. There is a need for both targeted mental health interventions with the present and past clients of child welfare agencies and for concerted population-level strategies to meet the needs of the many other children who experience maltreatment.

The statistical results were documented in three tables presenting the odds ratios for specific 12 month and lifetime mental disorders, for the major categories of mood, anxiety, and substance abuse, and by the number of disorders.

Table 6: DSM-IV 12-Month Disorders Among Young Adults With Child Protection Agency History Compared With Those Without ^a

DSM-IV 12-Month Mental Disorder	Child Protection Agency Group		Comparison Group Including Retrospectively Reported Childhood Maltreatment ^b		Comparison Group			
	No. (%)	SE	No. (%)	SE	Including Retrospectively Reported Childhood Maltreatment ^b		Excluding Retrospectively Reported Childhood Maltreatment ^b	
					Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^c	Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^c
Major depressive disorder	25 (14.15)	3.35	133 (7.84)	0.93	1.94 (1.06-3.54) ^d	1.83 (0.99-3.38)	2.32 (1.26-4.27) ^d	2.23 (1.16-4.28) ^d
Dysthymia	8 (4.01)	1.79	19 (1.45)	0.40	2.83 (0.98-8.16)	3.13 (1.09-9.01) ^d	4.15 (1.35-12.78) ^d	4.33 (1.32-14.22) ^d
Bipolar disorder	18 (5.81)	1.73	92 (3.96)	0.97	1.50 (0.75-2.98)	1.35 (0.67-2.72)	2.00 (0.96-4.15)	1.79 (0.83-3.85)
Panic disorder	10 (3.93)	1.81	51 (2.30)	0.41	1.74 (0.63-4.76)	1.48 (0.49-4.47)	1.97 (0.71-5.48)	1.68 (0.52-5.40)
Specific phobia	36 (16.63)	3.17	174 (8.60)	0.79	2.12 (1.30-3.46) ^d	1.83 (1.10-3.04) ^d	2.50 (1.51-4.14) ^d	2.19 (1.29-3.74) ^d
Social phobia	30 (13.37)	2.90	143 (7.09)	0.73	2.02 (1.18-3.47) ^d	2.14 (1.22-3.75) ^d	2.32 (1.33-4.05) ^d	2.64 (1.46-4.80) ^d
GAD	5 (2.27)	1.24	31 (1.84)	0.40	1.24 (0.38-4.04)	1.41 (0.43-4.62)	1.52 (0.45-5.16)	2.12 (0.71-6.35)
PTSD	24 (10.66)	2.59	45 (2.20)	0.44	5.56 (2.83-10.93) ^d	5.12 (2.42-10.83) ^d	10.96 (4.91-24.49) ^d	10.92 (4.38-27.22) ^d
OCD	8 (3.32)	1.59	19 (1.39)	0.47	2.44 (0.74-7.98)	4.00 (1.28-12.54) ^d	2.60 (0.73-9.22)	5.21 (1.57-17.23) ^d
Alcohol abuse/dependence	27 (12.38)	2.69	161 (7.50)	0.75	1.74 (1.03-2.95) ^d	1.39 (0.78-2.46)	1.92 (1.12-3.32) ^d	1.73 (0.95-3.15)
Drug abuse/dependence	18 (9.21)	2.47	77 (3.54)	0.53	2.77 (1.43-5.34) ^d	1.99 (0.96-4.11)	3.81 (1.89-7.67) ^d	3.15 (1.38-7.22) ^d

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; OCD, obsessive-compulsive disorder; OR, odd ratio; PTSD, posttraumatic stress disorder; SE, standard error.

^aThe sample numbers are unweighted observations; the percentages are based on weighted data.

^bRetrospectively reported childhood maltreatment was indicated by endorsement of 1 or more of the following items (see "Methods" section for full questions): child rape (prior to age 17 years); contact sexual abuse not including rape (prior to age 17 years); physical abuse (ever being badly beaten up by a caregiver or parent); and witnessing parental violence (ever witness to serious physical fights at home such as one parent beating up another parent).

^cAdjusted for age, sex, ethnicity, maternal education, respondent education, and current household income.

^dStatistically significant at $P < .05$.

Table 7: DSM-IV Lifetime Disorders Among Young Adults With Child Protection Agency History Compared With Those Without

DSM-IV Lifetime Mental Disorder	Child Protection Agency Group		Comparison Group Including Retrospectively Reported Childhood Maltreatment ^b		Comparison Group			
	No. (%)	SE	No. (%)	SE	Including Retrospectively Reported Childhood Maltreatment ^b		Excluding Retrospectively Reported Childhood Maltreatment ^b	
					Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^c	Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^c
Major depressive disorder	50 (23.91)	3.63	252 (14.40)	1.11	1.87 (1.21-2.89) ^d	1.76 (1.13-2.73) ^d	2.30 (1.47-3.61) ^d	2.10 (1.32-3.35) ^d
Dysthymia	12 (5.57)	1.98	27 (1.83)	0.44	3.16 (1.32-7.59) ^d	3.84 (1.46-9.07) ^d	4.35 (1.71-11.09) ^d	4.82 (1.74-13.38) ^d
Bipolar disorder	23 (7.72)	1.97	144 (5.74)	0.65	1.38 (0.76-2.49)	1.23 (0.67-2.24)	1.86 (1.00-3.47)	1.68 (0.88-3.20)
Panic disorder	12 (4.27)	1.83	65 (2.97)	0.45	1.46 (0.57-3.71)	1.23 (0.45-3.36)	1.69 (0.66-4.38)	1.44 (0.50-4.11)
Specific phobia	48 (20.61)	3.35	236 (11.68)	0.90	1.96 (1.26-3.04) ^d	1.81 (1.15-2.85) ^d	2.37 (1.50-3.72) ^d	2.20 (1.37-3.53) ^d
Social phobia	46 (18.67)	3.25	212 (10.05)	0.82	2.05 (1.29-3.26) ^d	2.06 (1.26-3.39) ^d	2.49 (1.54-4.03) ^d	2.70 (1.58-4.61) ^d
GAD	19 (6.38)	1.74	73 (4.03)	0.61	1.62 (0.85-3.11)	1.66 (0.83-3.33)	2.00 (1.01-3.99) ^d	2.16 (1.03-4.51) ^d
PTSD	33 (14.16)	3.03	100 (4.40)	0.62	3.59 (2.05-6.28) ^d	2.46 (1.25-4.85) ^d	7.04 (3.80-13.06) ^d	4.86 (2.26-10.45) ^d
OCD	12 (5.43)	2.03	39 (2.41)	0.55	2.33 (0.94-5.77)	2.28 (0.94-5.54)	3.03 (1.11-8.31) ^d	4.00 (1.63-9.82) ^d
Alcohol abuse/dependence	81 (32.76)	4.01	353 (16.36)	1.09	2.49 (1.69-3.67) ^d	1.89 (1.24-2.88) ^d	3.16 (2.12-4.71) ^d	2.50 (1.59-3.91) ^d
Drug abuse/dependence	59 (25.85)	3.77	218 (10.05)	0.90	3.12 (2.04-4.77) ^d	2.27 (1.39-3.71) ^d	3.95 (2.54-6.16) ^d	3.03 (1.78-5.15) ^d

See abbreviation and footnotes to table 6.

Table 8: DSM-IV Disorder Groups Among Young Adults With Child Protection Agency History Compared With Those Without^a

DSM-IV Mental Disorder Group	Child Protection Agency Group		Comparison Group Including Retrospectively Reported Childhood Maltreatment ^b		Comparison Group			
	No. (%)	SE	No. (%)	SE	Including Retrospectively Reported Childhood Maltreatment ^b		Excluding Retrospectively Reported Childhood Maltreatment ^b	
					Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^c	Unadjusted OR (95% CI)	Adjusted OR (95% CI) ^c
12-Month Disorders								
Any mood disorder	44 (20.94)	3.80	227 (11.90)	1.10	1.96 (1.19-3.23) ^d	1.86 (1.12-3.08) ^d	2.47 (1.47-4.13) ^d	2.38 (1.37-4.14) ^d
Any anxiety disorder	80 (35.74)	5.02	345 (17.92)	1.26	2.55 (1.62-4.00) ^d	2.41 (1.47-3.97) ^d	2.96 (1.87-4.69) ^d	2.92 (1.73-4.91) ^d
Any substance use disorder	38 (16.98)	3.13	186 (8.70)	0.88	2.15 (1.32-3.49) ^d	1.71 (1.01-2.88) ^d	2.55 (1.55-4.21) ^d	2.29 (1.31-4.01) ^d
Any disorder	103 (50.54)	5.03	540 (29.02)	1.81	2.55 (1.62-4.00) ^d	2.32 (1.39-3.85) ^d	2.96 (1.87-4.69) ^d	2.83 (1.68-4.80) ^d
Any 2 disorders	28 (12.13)	3.13	130 (6.11)	0.68	2.12 (1.15-3.92) ^d	1.40 (0.72-2.73)	2.54 (1.35-4.76) ^d	1.55 (0.75-3.21)
Any ≥3 disorders	28 (13.27)	3.03	110 (5.44)	0.68	2.66 (1.49-4.75) ^d	2.67 (1.47-4.87) ^d	3.71 (2.00-6.89) ^d	4.47 (2.29-8.75) ^d
Lifetime Disorders								
Any mood disorder	75 (32.91)	3.95	399 (20.23)	1.25	1.93 (1.31-2.85) ^d	1.80 (1.21-2.68) ^d	2.50 (1.67-3.74) ^d	2.31 (1.52-3.50) ^d
Any anxiety disorder	99 (43.72)	5.22	498 (25.47)	1.46	2.27 (1.47-3.52) ^d	2.04 (1.24-3.33) ^d	2.84 (1.82-4.44) ^d	2.68 (1.61-4.46) ^d
Any substance use disorder	93 (39.68)	4.32	389 (18.15)	1.12	2.97 (2.02-4.37) ^d	2.38 (1.55-3.65) ^d	3.73 (2.51-5.55) ^d	3.11 (1.97-4.91) ^d
Any disorder	136 (64.66)	5.99	795 (43.83)	2.05	2.34 (1.37-4.01) ^d	2.12 (1.20-3.75) ^d	2.91 (1.69-5.00) ^d	2.80 (1.58-4.97) ^d
Any 2 disorders	36 (17.68)	4.04	214 (10.43)	0.88	1.84 (1.05-3.25) ^d	1.30 (0.67-2.53)	2.28 (1.28-4.04) ^d	1.54 (0.77-3.08)
Any ≥3 disorders	67 (28.77)	4.13	247 (11.35)	0.94	3.16 (2.03-4.90) ^d	2.86 (1.79-4.56) ^d	4.19 (2.64-6.66) ^d	3.80 (2.29-6.33) ^d

See abbreviation and footnotes to table 6.

The concluding comments emphasized the impact of the child abuse on subsequent mental disorders; these comments parallel and reinforce the findings from the Comorbidity Surveys in the US. The linkage of data to child protection records and the construction of a comparison group provide credibility both for the New Zealand study and, by inference, for the ACEs and toxic stress research previously presented.

We found significant associations between prospectively ascertained child maltreatment (as indexed by a child protection agency history) and a number of subsequently measured 12-month and lifetime mental disorders after adjustment for socioeconomic and demographic covariates. When individual disorders were considered, associations were strongest for some of the anxiety

disorders (PTSD and obsessive-compulsive disorder). Fifteen percent of the general population comparison group retrospectively reported child maltreatment. After excluding these individuals from the comparison group, the magnitude of associations increased, with child protection agency history conferring a 10-fold higher odds of 12-month PTSD, together with elevated odds of other anxiety disorders, mood disorders, and drug use disorders. Child protection agency history was significantly associated with all mental disorder groups and with 3 or more disorders, both 12-month and lifetime, whether or not the comparison group excluded those retrospectively reporting child maltreatment.

Maltreatment Incidence Rates: The true incidence of maltreatment is not known. Most available data is for cases of abuse and neglect reported to Child Protective Services (CPS). The rates from these cases are inevitably the small visible tip of a large iceberg, as suggested by the figure below. The phenomenon of the layers of the maltreatment iceberg above and below the surface was presented in the National Incidence Survey-4 report to Congress.

Although CPS investigates a substantial number of the maltreated children in the nation, these children represent only the “tip of the iceberg.” The NIS assumes that not all maltreated children are reported or investigated by CPS. The conceptual model in Figure 3 guided the NIS methodology. Children investigated by CPS are in the first level of recognition, while other abused and neglected children are at levels below this. Each successive level is associated with decreasing degrees of official recognition or public awareness.²⁰

Figure 3: Levels of Recognition of Child Abuse and Neglect



At the second level are those children that other “investigatory” agencies, such as law enforcement agencies, courts, or public health departments, recognized as maltreated but who

²⁰ Administration for Families and Children Archives. Fourth National Incidence Study of Child Abuse and Neglect (NIS-4): http://archive.acf.hhs.gov/programs/opre/abuse_neglect/natl_incid/reports/natl_incid/natl_incid_methodology.html

are not investigated by CPS. These agencies may have overlapping or even conflicting responsibilities concerning certain situations, such as felonious assault, homicide, delinquency, dependency, domestic violence, those formerly called “children in need of control,” or nutrition and hygiene problems. Children may remain at this second level because of questions of definition or disputes concerning the appropriate responsibilities of these different agencies in relation to CPS. Although children in this second level are in some sense “officially known,” the community does not necessarily regard them as abused or neglected in the same sense as children in the first level, and they do not necessarily receive assistance that specifically targets their abuse or neglect problems.

The third level includes abused and neglected children who are not investigated by CPS and who are not recognized as maltreated at any agency in the second level but who are known to professionals in other major community institutions, such as schools, hospitals, mental health agencies, day care centers, shelters, public housing agencies, and other social services agencies. Children may remain at this level because the professional who recognized their maltreatment did not report it for any number of reasons. One reason may be definitional ambiguities as to what types of cases they should report to CPS or to other investigatory agencies. Other reasons relate to the attitudes and assumptions of the professionals who are aware of these situations. For example, they may feel that they are in the best position to help, may not trust CPS to handle the problem appropriately, may fear the loss of trust from their client, or may have apprehensions about becoming involved in an official investigation. Children can also remain at this level (or other levels “below the waterline”) when the professional who recognized their maltreatment did report them, but CPS declined to accept their cases for investigation. As with non-reporting, there are multiple possible reasons for screen-outs. A child’s case may not meet the agency’s criteria for investigating (e.g., the maltreatment may not be in the CPS agency’s jurisdiction or sufficiently serious to warrant an investigation). Another possibility is that the professional did not provide sufficient information to CPS to enable an investigation or to meet the threshold for investigation.

At the fourth level, someone outside of the purview of the first three levels recognizes the abused and neglected children as maltreated, such as a neighbor, another member of the family, or one or both of the involved parties—the perpetrator and the child victim. However, no one at this level has disclosed the maltreatment to anyone in the first three levels. Here again, it is possible that individuals in this fourth level did reveal the maltreatment to persons in the first, second, or third levels, but that the latter did not recognize the maltreatment as such. (This would include CPS screening out a child in the fourth level.)

In the fifth level are those children no one recognizes as maltreated. These are cases where the individuals involved do not themselves regard their behavior or experiences as child maltreatment and where their situations have not come to the attention of outside observers who would identify them as abuse and neglect.

The model conveys the inherent difficulty of efforts to measure the incidence of child maltreatment. Cases in the fifth level are by definition impossible to document (unless they can be brought into the fourth level). In principle, it should be possible to identify children in the fourth level through methods such as surveys of parents, children, and/or neighbors. Several such surveys have been conducted, but the stigmatizing nature of acknowledgments of abuse and neglect introduces serious (and unknown degrees of) underreporting bias into estimates of cases

at this level. As a result, all NIS efforts have focused on assessing the incidence of cases identified only in the first, second, and third levels.

The NIS-4 reports incidence for two 3-month periods, one in the fall of 2005 and the other in the spring of 2006. The data was collected by 126 CPS agencies in 122 counties representative of the US for all children reported and accepted for investigation. Additional data was gathered by non-CPS sentinels as follows:

Community professionals who work in certain categories of agencies and who typically encounter children and families in the course of their job duties serve as lookouts for victims of child abuse and neglect. In each county, these professionals, called “sentinels,” represent all staff that have contact with children and families in police and sheriffs’ departments, public schools, day care centers, hospitals, voluntary social service agencies, mental health agencies, the county juvenile probation and public health departments, public housing, and shelters for runaway and homeless youth and for victims of domestic violence. The participating sentinels in the NIS-4 were 10,791 professionals in 1,094 sentinel agencies. They submitted data forms on any children they encountered who were maltreated during the study data period. The NIS-4 collected a total of 6,208 completed data forms from sentinels and 10,667 completed forms on the investigation outcomes and the abuse and neglect involved in cases sampled at participating CPS agencies.

The NIS uses standard definitions of abuse and neglect, so its estimates of the numbers of maltreated children and incidence rates have a calibrated, standard meaning across the various sites (multiple states and agencies), sources (CPS and community professionals), and NIS cycles. As in previous cycles, children submitted by sentinels and those described in the CPS sampled cases were evaluated according to standard study definitions of abuse and neglect, and only children who fit the standards were used in generating the national estimates.

In the NIS classifications, maltreatment encompasses both abuse and neglect. Abuse includes physical abuse, sexual abuse, and emotional abuse. Neglect includes physical neglect, emotional neglect, and educational neglect. Each of these categories comprises more specific forms of abuse or neglect. The standardized NIS definitions describe the acts and omissions for each specific form.

These standards specify the criteria for deciding whether a child’s situation “counts” as maltreatment to include in the study estimates. The criteria specify a number of required features, such as the child’s relationship to the perpetrator (the abuse or neglect must be within the jurisdiction of CPS, perpetrated or permitted by a parent or caretaker), the severity of the injury or harm that resulted, and the degree of evidence for holding the alleged perpetrator(s) responsible for the maltreatment.

The NIS applies two definitional standards in parallel: the Harm Standard and the Endangerment Standard. The Harm Standard is relatively stringent in that it generally requires that an act or omission result in demonstrable harm in order to be classified as abuse or neglect. It permits exceptions in only a few specific maltreatment categories, where the nature of the maltreatment itself is so egregious that one can infer that the child was harmed. The chief advantage of the Harm Standard is its strong objectivity. Its principal disadvantage is that it is

so stringent that it provides a perspective that is too narrow for many purposes, excluding even many children whom CPS substantiates or indicates as abused or neglected.

The Endangerment Standard includes all children who meet the Harm Standard but adds others as well. The central feature of the Endangerment Standard is that it counts children who were not yet harmed by abuse or neglect if a sentinel thought that the maltreatment endangered the children or if a CPS investigation substantiated or indicated their maltreatment. In addition, the Endangerment Standard is slightly more lenient than the Harm Standard in allowing a broader array of perpetrators, including adult caretakers other than parents in certain maltreatment categories and teenage caretakers as perpetrators of sexual abuse.²¹

The incidence data is based on these two criteria for calculating maltreatment: the Harm Standard and the Endangerment Standard. This data provides a plausible minimal estimate for maltreatment occurring which is affecting children in ways described by the ACEs and Comorbidity research. This minimal estimate offers a starting point for the numbers of children who should be targeted for prevention and mitigation, as suggested by Dr. Shonkoff and the Center for the Developing Child.

Table 9: National Incidence of Endangerment Standard Maltreatment in the NIS-4 (2005-2006)²²

<i>Maltreatment Types</i>	<i>Rate per 1,000 Children</i>	
	<i>Endangerment</i>	<i>Harm</i>
ALL MALTREATMENT	39.5	17.1
ABUSE:		
ALL ABUSE	11.3	7.5
Physical Abuse	6.5	4.4
Sexual Abuse	2.4	1.8
Emotional Abuse	4.1	2.0
NEGLECT:		
ALL NEGLECT	30.6	10.5
Physical Neglect	16.2	4.0
Emotional Neglect	15.9	2.6
Educational Neglect†	4.9	4.9

The incidence data should be interpreted based on the severity of the maltreatment. The NIS-4 sorts the incidence data by severity, as shown below.

²¹ Administration for Families and Children Archives. Fourth National Incidence Study of Child Abuse and Neglect (NIS-4): http://archive.acf.hhs.gov/programs/opre/abuse_neglect/natl_incident/reports/natl_incident/natl_incident_methodology.html

²² Administration for Families and Children Archives. Fourth National Incidence Study of Child Abuse and Neglect (NIS-4): http://archive.acf.hhs.gov/programs/opre/abuse_neglect/natl_incident/reports/natl_incident/natl_incident_child_abuse.html

Table 10: Severity of Outcomes from Endangerment Standard Maltreatment in the NIS-4 (2005-2006)

	<i>Rate per 1,000 Children</i>	
	<i>Endangerment</i>	<i>Harm</i>
Fatal	0.03	0.03
Serious	6.9	6.6
Moderate	13.9	9.4
Inferred	3.1	1.0
Endangered	15.6	--
Total	39.5	17.1

Based on the NIS-4 description of Harm versus Endangerment, the latter seems to be a better standard for planning prevention efforts. The severity categories are not self-explanatory. If the severity categories selected for planning include the Moderate level, then roughly 2% of children would need targeting for prevention and intervention. This would seem to be a minimal estimate of significant need, since all the unknown cases in the “iceberg” levels 4 and 5 and some in levels 2 and 3 have been omitted. The explanation in the NIS-4 report to Congress does not seem to provide guidance regarding the percentage of children who should be targeted. This should become a matter for further analysis and discussion, especially for targeting in the toxic stress prevention efforts proposed by Dr. Shonkoff. Moreover, the targeted population percentage should not be based on just three months of incidence, since additional children will become endangered in subsequent periods and prevention efforts cannot predict when vulnerable families and their children will actually become involved in maltreatment. The percentage to be targeted would seem to be at least two to three times the 2% based on the Moderate and higher levels of severity, possibly many more times. The size of the targeted group should be an issue for discussion with researchers and practice leaders nationally. The following text is what the authors of NIS-4 had to say about the lower rates of maltreatment for the youngest children, though their explanations are not particularly revealing.

Child’s age: A consistent feature of the age differences in NIS-4 incidence rates is the lower incidence of maltreatment among the youngest children in the Harm Standard abuse and neglect rates and in the rates of Endangerment Standard abuse. In most cases, the 0-to 2-year-olds had significantly lower maltreatment rates than older children. It is possible that the lower rates at these younger ages reflect some under-coverage of these age groups. That is, prior to attaining school age, children are less observable to community professionals. In contrast, the age differences in Endangerment Standard neglect (overall, as well as in the specific categories of physical neglect and emotional neglect) revealed a distinctly different pattern. In these categories, the oldest children (15 to 17-year-olds) have the lowest rates and 6-to 8-year-olds have the highest rates. This curvilinear age pattern may reflect the combination of opposing age distributions for different maltreatment outcomes—rates of children with serious and moderate harm from maltreatment generally increase with increasing age, whereas rates of children who were endangered, but not demonstrably harmed, by their maltreatment experiences sharply decrease across the age continuum. Because the endangered children are more prevalent among

those who experienced Endangerment Standard physical and emotional neglect, this opposing age trend primarily affected the age distribution in the NIS.

Another recurring theme in connection with age was that of disproportionate increases since the NIS–3 in the incidence of maltreatment among the youngest children (ages 0 to 2). This occurred for rates of Harm Standard sexual abuse and, in the Endangerment Standard, for overall maltreatment, neglect, emotional neglect, and the endangerment outcome. All of these are categories where the NIS–4 maltreatment rates for the youngest children are not lower than those for the older children. The changes since the NIS–3 have essentially flattened the age differences in incidence rates, evidencing broad vulnerability across the age spectrum. These changes may reflect true increases in maltreatment of the youngest children or could instead represent improvement in the NIS coverage of these maltreatment events among 0- to 2-year-olds.²³

The NIS provides information on risk factors that correlate with maltreatment. These risk factors are presented as cross-tabulated tables rather than the more sophisticated multivariate analyses such as used by the Comorbidity Surveys or the Shanahan risk factors for mental disorders presented previously. However, the simple descriptive data on child and family demographics are helpful for targeting prevention and intervention services.

Distribution of child abuse and neglect by family characteristics: *The incidence of child maltreatment varied as a function of several characteristics of children’s families, including their parents’ employment, family socioeconomic status, family structure and living arrangement, grandparent caregivers, family size, and the metropolitan status of the county.*

Socioeconomic status: *Low socioeconomic status households were those in the bottom tier on any indicator: household income below \$15,000 a year, parents’ highest education level less than high school, or any member of the household a participant in a poverty program, such as TANF, food stamps, public housing, energy assistance, or subsidized school meals. Children in low socioeconomic status households had significantly higher rates of maltreatment in all categories and across both definitional standards. They experienced some type of maltreatment at more than 5 times the rate of other children; they were more than 3 times as likely to be abused and about 7 times as likely to be neglected.*

Parents’ employment: *The incidence of maltreatment and of all severities of injury or harm was higher for children with no parent in the labor force and those with an unemployed parent and lowest for those with employed parents. Compared to children with employed parents, those with no parent in the labor force had 2 to 3 times the rate of maltreatment overall, about 2 times the rate of abuse, and 3 or more times the rate of neglect. Children with unemployed parents had 2 to 3 times higher rates of neglect than those with employed parents.*

Family structure and living arrangement: *The NIS–4 classified children into six categories: living with two married biological parents, living with other married parents (e.g., step-parent, adoptive parent), living with two unmarried parents, living with one parent who had an*

²³Administration for Families and Children Archives. Fourth National Incidence Study of Child Abuse and Neglect (NIS-4): http://archive.acf.hhs.gov/programs/opre/abuse_neglect/natl_incid/reports/nis_execsumm/nis_execsum.html

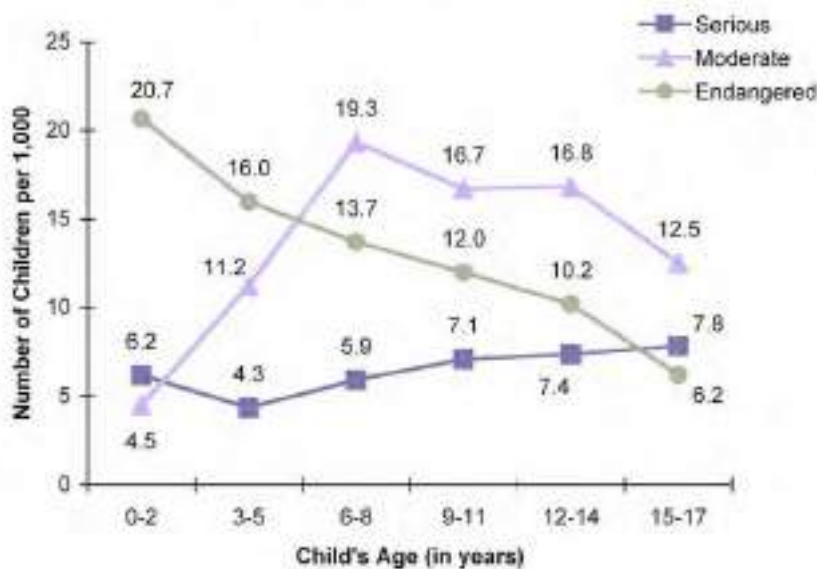
unmarried partner in the household, living with one parent who had no partner in the household, and living with no parent. The groups differed in rates of every maltreatment category and across both definitional standards. Children living with their married biological parents universally had the lowest rate, whereas those living with a single parent who had a cohabiting partner in the household had the highest rate in all maltreatment categories. Compared to children living with married biological parents, those whose single parent had a live-in partner had more than 8 times the rate of maltreatment overall, over 10 times the rate of abuse, and nearly 8 times the rate of neglect.

Grandparents as caregivers: Children whose grandparent cared for them had lower rates of physical abuse compared to those with no identified grandparent caregiver; they had two-thirds the rate of Harm Standard physical abuse and less than four-fifths the rate of Endangerment Standard physical abuse.

County metropolitan status: Except for educational neglect, the incidence of all categories of Endangerment Standard maltreatment was higher in rural counties than in urban counties and similar patterns also emerged in rates of most categories of Harm Standard maltreatment. Rural children had a nearly 2 times higher rate of overall Harm Standard maltreatment and nearly 2 times higher rate of overall Endangerment Standard maltreatment. Whether this reflects better coverage of maltreated children in the rural counties or higher rates of actual maltreatment in rural communities is not clear. Nor is it clear how differential distribution of other factors, such as socioeconomic status and family size differences, may contribute to these metropolitan status differences.

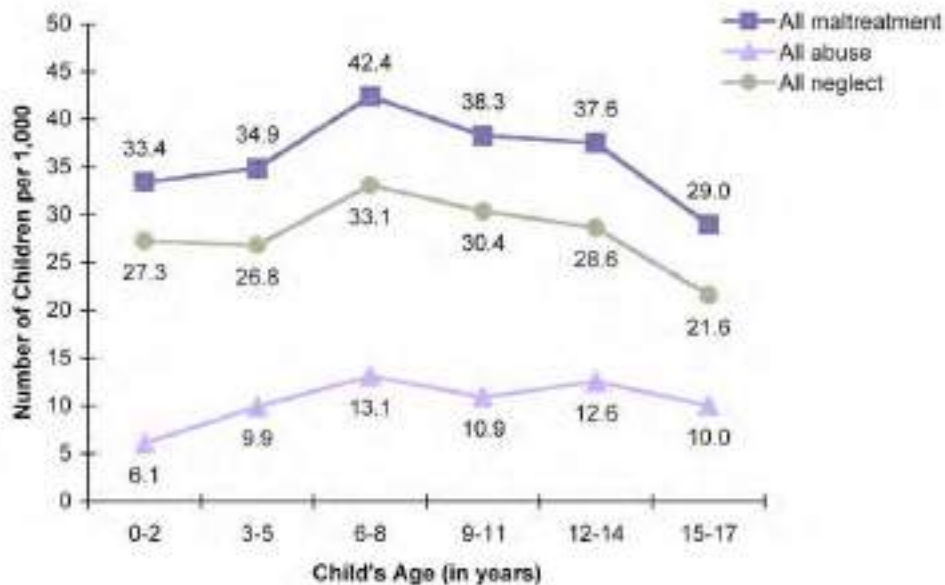
The NIS provides an important perspective on the rates of maltreatment at various ages. Overall, the severity of maltreatment reported is lower for the youngest children, though their endangerment without resulting harm is very high.

Figure 4: Age Differences in the Incidence of Children Seriously Harmed, Moderately Harmed, and Endangered by Endangerment Standard Maltreatment



For the Endangerment Standard, the youngest are not particularly less at risk for Serious maltreatment which would be associated with toxic consequences. For Moderate risk, the youngest children under age 3 have a very low rate of maltreatment compared with children ages 6-17 whose rate is almost four times as high. The youngest children have much higher rates of “Endangered” without being harmed. The high rate of potential harm which has not yet been proven may mean that harm is actually occurring but is not observable by persons outside the household. The youngest children spend almost all their time with family members who are the most likely perpetrators of maltreatment and least likely to report abuse and neglect. Once children begin to spend substantial time away from home in childcare or school, the potential for reporting increases significantly. However, the NIS is unable to detect and report maltreatment occurring at these lower levels of the maltreatment iceberg; therefore, the question is whether the lower rate of maltreatment in the early years may be a reality or is actually an illusion created by the limited surveillance from objective reporters. The surveillance dilemma is of critical importance to the contention of Dr. Shonkoff and colleagues who urge major attention to the toxic stress consequences of maltreatment during the developmentally sensitive early years of life.

Figure 5: Age Differences in Incidence Rates for All Endangerment Standard Maltreatment, Abuse, and Neglect.



The Endangerment Standard rates for abuse and neglect seem to provide some support for the suspicion that lower rates in the early years are a consequence of limited surveillance by persons outside the family, especially in childcare and school. By ages 6-8, rates of both abuse and neglect increase to levels highest among all the age groups.

For the subcategories of neglect, physical neglect is almost as high during ages 0-2 as for the peak 6-8 age group, while emotional neglect is lower but not substantially so during ages 0-5 than the peak in ages 6-8. For abuse, all the rates are much lower than for neglect. Physical and emotional abuse are very low during ages 0-2, increase somewhat during ages 3-5, and peak during ages 6-8, remaining relatively high through age 14. The implications of the lower rates before school entry are not clear and must be explained further through the findings in other research reports.

Figure 6: Age Differences in Incidence Rates for Endangerment Standard Physical and Emotional Abuse.

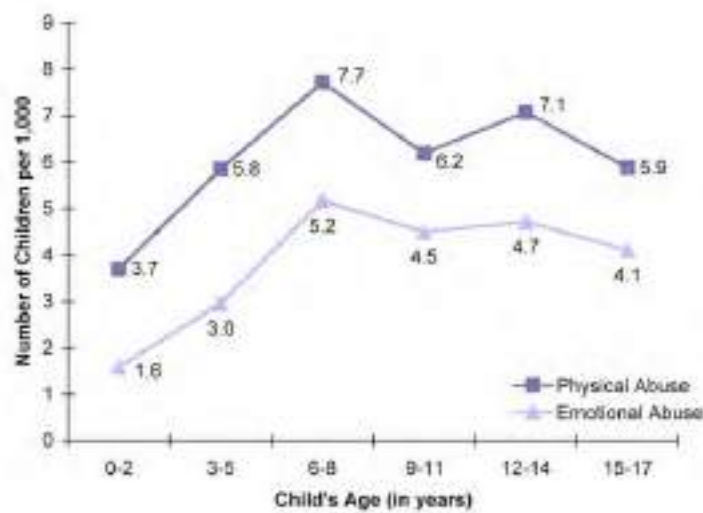
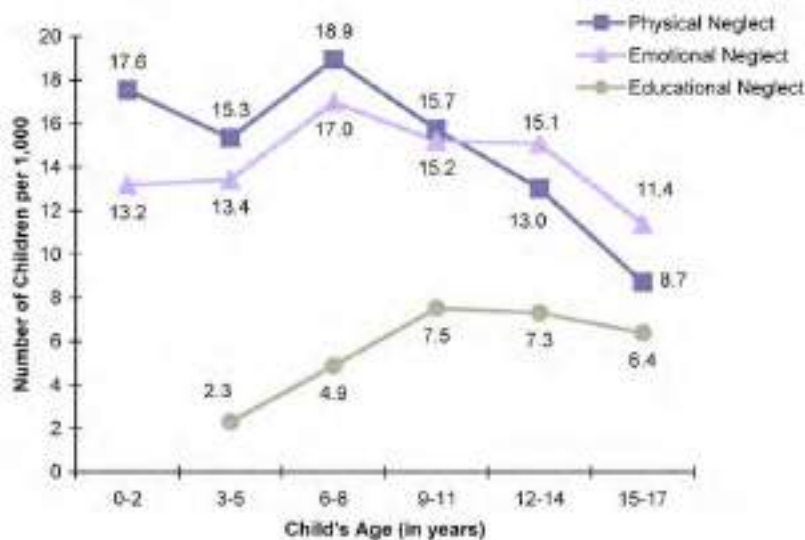


Figure 7: Age Differences in Incidence Rates for Endangerment Standard Physical, Emotional, and Educational Neglect.



The Federal Response to Toxic Stress: In July of 2013, a guidance letter ([See Appendix H](#))²⁴ was sent to state program directors regarding a coordinated approach for dealing with the consequences of trauma. The letter, signed by the USDHHS directors over ACF, CMS, and SAMHSA, calls for partnerships at the federal and state levels to address trauma.

This guidance letter is intended to encourage the integrated use of trauma-focused screening, functional assessments and evidence-based practices (EBPs) in child-serving settings for the purpose of improving child well-being. The Department of Health and Human Services' (HHS) Administration for Children and Families (ACF), Centers for Medicare & Medicaid Services (CMS) and Substance Abuse and Mental Health Services Administration (SAMHSA) are engaged in an ongoing partnership to address complex, interpersonal trauma and improve social-emotional health among children known to child welfare systems. We look to state and tribal governments to further this important work.

The Focus of the Effort is Defined as "Complex Trauma"

Background: *Complex trauma is a common yet serious concern for children, especially those referred to child welfare services. Rates of trauma exposure are approximately 90 percent among children in foster care. These high rates of trauma have far-reaching consequences. The term "complex trauma" describes children's exposure to multiple or prolonged traumatic events, which are often invasive and interpersonal in nature. Complex trauma exposure involves the simultaneous or sequential occurrence of child maltreatment, including psychological maltreatment, neglect, exposure to violence and physical and sexual abuse. In addition to these traumatic events, a child's experience of these events can create wide-ranging and lasting adverse effects on developmental functioning, and physical, social, emotional or spiritual well-being. These adverse effects can include a child's physiological responses; emotional responses; ability to think, learn, and concentrate; impulse control; self-image; and relationships with others. Across the life span, complex trauma is linked to a wide range of problems, including addiction, chronic physical conditions, depression and anxiety, self-harming behaviors and other psychiatric disorders.*

Complex trauma affects a child's sense of safety, ability to regulate emotions and capacity to relate well to others. Since complex trauma often occurs in the context of the child's relationship with a caregiver, it interferes with the child's ability to form a secure attachment. Consequently, an important aim of service delivery is to help children and youth develop positive social-emotional functioning, restore appropriate developmental functioning and reestablish healthy relationships. New legislation, the Child and Family Services Improvement and Innovation Act of 2011, requires states to include details of how trauma associated with maltreatment and removal from home will be monitored and treated in their Child and Family Services Plans.

The guidance letter (available in full through the link in the footnote below) presents an overview of the approaches and services supported by the three key USDHHS organizations: Medicaid, ACF, and SAMHSA. The letter also presents and promotes a cross-system approach for promoting child wellbeing by integrating screening,

²⁴ U.S. Department of Health and Human Services, <http://medicaid.gov/Federal-Policy-Guidance/Downloads/SMD-13-07-11.pdf>

assessment, referrals, and interventions. The letter summarizes the federal financial resources for addressing child trauma with short but helpful explanations of what the various funding sources emphasize. Finally, the letter urges attention to the quality of and impact from efforts addressing child trauma and provides the following focal points for measurement of outcomes for the federal response to complex trauma.

Key to success is measuring outcomes and using on-going progress monitoring to determine the extent to which the approach taken is making a difference. Quality improvements may include:

- *Reduction in the number of children with a clinical level of need receiving no services;*
- *Increase in the number of children receiving evidence-based screening, assessment and treatment;*
- *Reduction in the use of “deep-end” services, including emergency department visits for acute crisis stabilization and residential treatment for extended periods;*
- *Reduction in the use of psychotropic medication prescribing practices that do not conform with the American Academy of Child and Adolescent Psychiatrists Practice Parameters;*
- *Reduction in the number of psychotropic medications prescribed and a reduction in the total number of youth with prescriptions for psychotropic medications;*
- *Reduction in the use of foster home placements to include re-entries into care;*
- *Net increase of Medicaid-participating EBP-trained clinicians;*
- *Improvements in child functioning across well-being domains and reductions in trauma symptoms.*

The guidance letter constitutes a call to action by each state to create partnerships for responding to the complex trauma resulting from adverse childhood experiences. This call to action emphasizes mitigation through services and engagement of positive family and community supports. It does not address the primary prevention efforts urged by Dr. Shonkoff and the Center on the Developing Child, but primary prevention could and should logically be coupled with the mitigation efforts supported by USDHHS. It would be logical for the State of SC to respond to this guidance by formally developing a plan of response by all appropriate parties, such as those constituting the SC Joint Council on Children and Adolescents. While the Joint Council may decide to focus its actions plan on the mitigation urged by the USDHHS guidance, it would be desirable for the Joint Council or some other entity to undertake primary prevention as an earlier, complementary effort. The Joint Council may choose to collaborate with the ECCS grant partners whose early childhood focus complements the Joint Council's work which tends to address the needs of adolescents. Addressing the social-emotional problems of the youngest children, the current ECCS grant can collaborate with the Joint Council to promote coverage of children under age 6 affected by toxic stress. The ECCS grant will undertake mitigation of toxic stress and trauma in infancy and early childhood. This strategy will be broadly focused across multiple systems in communities, and coordinated with medical homes, trauma prevention activities, and collective impact approaches.

ACYF Blueprint for Addressing Trauma from Maltreatment (See Appendix I)²⁵: In 2012, the Commissioner of ACYF issued an Information Memorandum to state agencies administering Titles IV-B and IV-E child welfare service. The memorandum was entitled "Promoting social and emotional well-being for children and youth receiving child welfare services". In conjunction with the 2013 USDHHS guidance letter to state Medicaid, mental health, and child welfare directors, this memorandum provides a comprehensive framework for federally funded programs addressing children affected by trauma resulting from maltreatment and other causes. These documents offer a starting point for a state framework to address trauma, especially when caused by maltreatment. The ACYF Information Memorandum presents specific expectations for responding to abuse and neglect cases which are the responsibility of the state child welfare agency. While maltreatment cases reported to CPS are the most visible, legally recognized maltreatment obligations of the State of SC, other children suffering from trauma not reported to and confirmed by DSS as maltreated also suffer from "complex trauma". All cases of "complex trauma" should be accorded the multi-systems responses outlined in the USDHHS guidance letter and the ACYF Information Memorandum.

The excerpts quoted below from the ACYF memorandum outline logical, compelling obligations which states should consider in addressing complex trauma. The reader should keep in mind that the "well-being" objective promoted in the memorandum will apply to many of the children suffering from unreported maltreatment. Many maltreated but unreported children likewise suffer from complex trauma with problems which come to the attention of and should be addressed by the state's mental health, substance abuse, law enforcement, health, education, and other service systems. Therefore the USDHHS guidance letter and the ACYF information memorandum present challenges that call for an active, committed state system of care to respond to complex trauma and other related challenges.

During FY??, the state of SC received from USDHHS over \$?? million to support our child welfare services and \$?? million for the mental health system. An additional \$??million in federal funds expended by SCDHHS through Medicaid on children with mental disorders. These federal dollars are combined with \$?? in state funds to address the needs of maltreated children and \$??million on children with mental disorders. With the anticipated shrinkage of federal funds because of deficit reduction and rapidly increasing expenditures on retiring Baby Boomers, all states should be attentive to prudent guidance regarding the use of federal funds. The lengthy text that follows may have been directed primarily to the child welfare system, but it applies quite well to "downstream" and "upstream" organizations serving abused and neglected, mentally ill,

²⁵ U.S. Department of Health and Human Services, Administration on Children, Youth and Families, http://www.lacdcfs.org/katieA/practices/docs/Well_Being_IM.pdf

and other children harmed by maltreatment. Their needs present a critical challenge to all stakeholders on the SC Joint Council on Children and Adolescents who should be applauded for their collaborative efforts to build a trauma-focused system of care. This system is essential to meet the needs of maltreated children, whether they have been identified and served by DSS or if their unidentified maltreatment results in emotional, behavioral, and cognitive problems that must be addressed by education, mental health, substance abuse, juvenile justice, teen pregnancy, and other services. Readers who choose to skip the following 8 pages should plan to return to these pages after reaching the end of this document.

***Overview:** The Administration on Children, Youth and Families (ACYF) is focused on promoting the social and emotional well-being of children and youth who have experienced maltreatment and are receiving child welfare services. ACYF is organizing many of its activities around the promotion of meaningful and measurable changes in social and emotional well-being for children who have experienced maltreatment, trauma, and/or exposure to violence. The terms “abuse and neglect” and “maltreatment” are used synonymously in this Information Memorandum.*

The child welfare system has made significant strides in recent years. Today, there are 27% fewer children in foster care than there were in 1998. There are fewer children entering foster care and more exiting to permanency through reunification, adoption, and guardianship. The system’s integration of knowledge about the importance of family connections and stable, nurturing relationships, as well as collaborative efforts among child welfare and other child-serving systems, made these advances possible.

However, there is a growing body of evidence indicating that while ensuring safety and achieving permanency are necessary to well-being, they are not sufficient. Research that has emerged in recent years has suggested that most of the adverse effects of maltreatment are concentrated in behavioral, social, and emotional domains. The problems that children develop in these areas have negative impacts that ripple across the lifespan, limiting children’s chances to succeed in school, work, and relationships. Integrating these findings into policies, programs, and practices is the logical next step for child welfare systems to increase the sophistication of their approach to improving outcomes for children and their families.

There is also an emerging body of evidence for interventions that address the behavioral, social, and emotional impacts of maltreatment. By (a) anticipating the challenges that children will bring with them when they enter the child welfare system, (b) rethinking the structure of services delivered throughout the system, and (c) de-scaling practices that are not achieving desired results while concurrently scaling up evidence-based interventions, meaningful and measurable improvements in child-level and system-level outcomes are possible.

Increasing the focus on well-being is not a move away from the child welfare system’s essential emphasis on safety and permanency; rather an integrated approach is needed. Policies, programs, and practices can improve children’s social and emotional functioning while concurrently working towards goals of reunification, guardianship, or adoption. Addressing the

social and emotional elements of functioning for children in foster care can even improve permanency outcomes. For example, a study of adoption recruitment services demonstrated that, in addition to intensive recruitment efforts, ensuring that children receive effective behavioral and mental health services is critical to facilitating a smoother transition to an adoptive home, and can decrease the chances of a disruption of an adoption (Vandivere, Allen, Malm, McKindon, & Zinn, 2011). In an effort to understand what well-being looks like and how to support it for young people who have experienced maltreatment, ACYF has adapted a framework by Lou, Anthony, Stone, Vu, & Austin (2008). The framework identifies four basic domains of well-being: (a) cognitive functioning, (b) physical health and development, (c) behavioral/emotional functioning, and (d) social functioning. Aspects of healthy functioning within each domain are expected to vary according to the age or developmental status of children or youth. As was stated above, it is important to attend to the overall well-being of children and youth who have experienced maltreatment. By focusing on social and emotional well-being in particular, ACYF is not de-emphasizing other aspects of well-being. Rather, ACYF is prioritizing social and emotional well-being because: (a) the challenges that children face in these domains are great, (b) there are resources and policies that can be leveraged to improve child functioning in these areas, (c) effective practices and programs for promoting social and emotional well-being are available, and (d) outcomes for children and child welfare systems can significantly improve with an emphasis on social and emotional well-being.

Emerging Evidence on the Impact of Maltreatment: Researchers have extensively documented the impacts of abuse and neglect on the short- and long-term health and well-being of children. Emerging evidence demonstrates that these biological and psychological effects are concentrated in behavioral, social, and emotional domains. These effects can keep children from developing the skills and capacities they need to be successful in the classroom, in the workplace, in their communities, and in interpersonal relationships. As a result, this can hinder children's development into healthy, caring, and productive adults and keep them from reaching their full potential. The following points describe some of the impacts of abuse and neglect on children's behavioral, social, and emotional functioning. These findings argue that many of the children involved with child welfare have a set of complex challenges; these challenges may not be addressed by the system and services as they are currently designed. Integrating these recent findings into the design of systems and services will enhance child welfare's ability to improve outcomes for these children and their families.

• Neurological Impact: *Early childhood is a time of rapid and foundational growth. During this time, the neurological development taking place is building the architecture for the skills and capacities that children will rely on throughout life (National Research Council and Institute of Medicine, 2000). Neglect and abuse have distinct effects on the developing brain. During early childhood, neurons are created, organized, connected, and pruned to form the complex workings of the brain. These actions depend, in large part, on the environment in which a young child grows. Neglect (physical, emotional, social, or cognitive) hinders these neurological activities such that the brain does not develop along a normal healthy trajectory towards its full potential.*

This negatively impacts a young person's capacity for optimal social and emotional functioning (Perry, 2002). Abuse has a different, though still harmful impact on neurobiology. Experiences of mild or moderate stress in the context of a secure caregiving environment, such as being

temporarily separated from a reliable caregiver or frustrated by the inability to complete a task, support children's development of adaptive coping. Chronic or extreme stress, however, such as maltreatment, has a different result. Children who experience abuse or neglect have abnormally high levels of cortisol, a hormone associated with the stress response, even after they are removed from maltreating caregivers and placed in safe circumstances. Such continuously high cortisol levels adversely affect stress responsiveness, emotion, and memory (National Scientific Council on the Developing Child, 2005). Studies have also shown that heightened stress impairs the development of the prefrontal cortex, the brain region that is critical for the emergence of abilities that are essential to "autonomous functioning and engagement in relationships" (Cook, Blaustein, Spinazzola, & van der Kolk, 2003, p.11). These "executive functions" include planning, focusing, self-regulation, and decision-making. Executive functions are necessary to successfully managing school, work, and healthy relationships.

• **Traumatic Impact:** Traumatic events can elicit mental and physical reactions in children, including hyperarousal and dissociation. If these acute "states" are not treated after children experience trauma, they can become chronic, maladaptive "traits" that characterize how children react in everyday, nonthreatening situations (Perry, 1995). Maltreatment is distinct from other types of trauma because it is interpersonal in nature. A caregiver who is supposed to be a secure base --the source of attachment, safety, and security --is also the source of hurt and harm. This creates a confused and ineffective attachment and serves as the model for other significant attachments (Bloom, 1999). Often referred to as "chronic interpersonal trauma" or "complex trauma," maltreatment's impact spans multiple domains, and its severity is further complicated depending on a child's developmental stage. Chronic interpersonal trauma can result in difficulties regulating emotional responses, accurately interpreting the cues and communications of others, managing intense moods (particularly rage and anxiety), regulating arousal states (resulting in dissociation), and accurately forming perceptions of self and others (Terr, 1991). Among children entering foster care in one State, a comprehensive assessment revealed that one in four exhibited trauma symptoms necessitating treatment, including traumatic grief/separation, adjustment reactions, avoidance, re-experiencing, numbing, and dissociation (Griffin, Kisiel, McClelland, Stolback, & Holzberg, 2012).

• **Behavioral Impact:** Whether or not children enter foster care, the prevalence of behavior problems rising to a clinical level is high among children who have experienced maltreatment. "Rising to the clinical level" describes problems that have been assessed to be severe enough to warrant clinical behavioral health services. The National Survey of Child and Adolescent Well-Being (NSCAW), a longitudinal study of children who were the subject of child protective services reports, provides data to demonstrate this: twenty-two percent of children who remain in their homes after a report of abuse or neglect have clinical-level behavior problems--the same rate as children who are removed and living with kin. Rates rise to 32% for children living in foster homes and nearly 50% for children in group homes or residential care (Casaneuva, Ringeisen, Wilson, Smith, & Dolan, 2011a).

• **Relational Competence:** Maltreatment also affects the way in which children and youth engage in social interactions and participate in relationships. NSCAW findings indicate that children who are the subject of child protective services reports are twice as likely as children in the general population to have significant challenges in the area of social competence (Casaneuva,

Ringeisen, Wilson, Smith, & Dolan, 2011a). The effects of maltreatment can influence relationships across a person's lifetime, impacting the ability to form a new attachment to a primary caregiver, make friends, and engage in romantic or marital partnerships (Mikulincer & Shaver, 2007).

• **Mental Health:** Studies have demonstrated that rates of mental illness are high among children who have experienced maltreatment and have been in foster care. Posttraumatic Stress Disorder (PTSD), Attention Deficit/Hyperactivity Disorder (ADHD), Major Depressive Disorder (MDD), and Conduct Disorder (CD)/Oppositional Defiant Disorder (ODD) are the most common mental health diagnoses among this population. As McMillan, et al. (2005) demonstrated, many children meet diagnostic criteria for these disorders before entering foster care, indicating that it is frequently the experience of maltreatment rather than participation in foster care that predicates mental health problems. By the time they are teenagers, 63% of children in foster care have at least one mental health diagnosis; 23% have three or more diagnoses (White, Havalchack, Jackson, O'Brien, & Pecora, 2007).

• **Psychotropics:** According to a 2010 study of Medicaid-enrolled children in thirteen States, children in foster care, who represent only three percent of those covered by Medicaid, were prescribed antipsychotic medications at nearly nine times the rate of children enrolled in Medicaid who were not in foster care (MMDLN/Rutgers CERTs, 2010). Over three years, 22% of children in foster care will have taken a psychotropic drug at some point (Leslie, Raghavan, Zhang, & Aarons, 2010). Data from NSCAW show that rates of psychotropic medication use are comparable for children receiving in-home child welfare services (10.9%), children in kinship care (11.8%), and children in foster care (13.6%) (Casaneuva, Ringeisen, Wilson, Smith, & Dolan, 2011a). Although numerous studies have demonstrated that rates of psychotropic medication prescription are comparatively high, these rates, at least in part, reflect increased levels of emotional and behavioral distress necessitating treatment among this group.

These scientific findings clearly demonstrate the profound impact that maltreatment has on social and emotional well-being. As such, focusing on ensuring safety and permanency alone for children who have experienced abuse or neglect is unlikely to resolve these complex biological and psychosocial issues. For this reason, child welfare policies, programs, and practices should give greater consideration to explicit efforts to reduce young people's impairment and improve their functioning.

Requirements and Policy Opportunities: Titles IV-B and IV-E of the Social Security Act and the Child Abuse Prevention and Treatment Act (CAPTA) have historically included provisions that promote the well-being of children. Title IV-B programs are intended to enhance the safety, permanence, and well-being of children who are in foster care or are being served in their own homes. The title IV-E foster care program includes requirements to address a child's well-being, such as in the areas of health and education. CAPTA provides funding for prevention, assessment, and treatment programs to increase the well-being and safety of children who have been abused or neglected. Some policy requirements and opportunities in existing policies related to social and emotional well-being are listed below.

Detailed text from the Information Memorandum has been deleted below but is available via the link in footnote #. The policy requirements and opportunities in the deleted text are presented for:

- 1) *State Plan for Child Welfare Services (Section 422 of the Social Security Act) : a) Mental Health Services; b) Early and Periodic Diagnosis, Screening, and Assessment (EPSDT); c) Trauma Screening and Treatment; d) Psychotropic Medication Oversight and Monitoring*
- 2) *Child Abuse Prevention and Treatment Act (CAPTA) State Grants: Early Intervention*

Maltreatment impacts how young people form relationships with others throughout their lives. For many maltreated children, nurturing and supportive parental behavior was inconsistent or unavailable, leaving children lacking confidence to explore new environments and relationships (Bretherton, 2000; Sorce & Emde, 1981). States should consider how these policies might best be linked and carried out to support healing and recovery and promote healthy functioning of children and youth.

Other Federal child welfare policies also address elements of well-being, including policies related to kinship care, family connections, sibling placements, monthly parent visits, placement stability, and school stability. When implemented in a purposeful way, these policies all contribute to improving social and emotional well-being, repairing ruptured relationships, and enhancing relational skills.

Current State and County Investments: *Currently, state and county child welfare systems are investing significant funds in providing services intended to improve well-being outcomes for children and their families. Three of the most common services purchased by states and counties are counseling, parenting classes, and life skills training. However, a number of studies suggest that some of these services are not grounded in the best available evidence and may be provided to children without sufficient attention to their specific maltreatment and trauma histories. In a study of children receiving mental health services, McCrae, Guo, and Barth (2010) found that children who got typical mental health services had more behavioral problems over time than those who received none. “The study should not be understood to indicate that all [mental health services] for children involved with [child welfare services] are ineffective; rather, it indicates that children [in child welfare] do not predictably receive services that are sufficient to help them overcome their behavioral difficulties.”*

Another study examined interventions to improve caregivers’ parenting skills and found “that most of the parent focused interventions currently delivered to families in child welfare and most foster family training do not use treatment strategies with solid empirical support” (Horwitz, Chamberlain, Landsverk, Mullican, 2010, p.28).

Child welfare systems also work to provide youth who are exiting foster care to emancipation with the skills and resources they will need to function as adults. Often this takes the form of programs that teach basic life skills, budgeting and financial management, and health and nutrition. In an evaluation of outcomes for youth in foster care participating in four youth development programs around the country, researchers determined that the life skills training

programs studied resulted in no statistically significant improvement on any of the key outcomes measured (Koball, et al., 2011).

Screening and Functional Assessment: *Functional assessment is a central component of promoting social and emotional well-being for children who have experienced abuse or neglect. Traditionally, child welfare systems use assessment as a point-in-time diagnostic activity to determine if a child has a particular set of symptoms or requires a specific intervention. Screening for symptoms related to trauma, specifically how experiences of trauma may impair healthy functioning, is an essential element of functional assessment. Trauma screening involves universal administration of a brief tool(s) to: (1) estimate the prevalence of trauma symptoms and/or traumatic experiences and (2) identify children who may require further assessment and intervention. Examples of trauma screening tools include the Child and Adolescent Needs and Strengths (CANS) Trauma Version, the Childhood Trauma Questionnaire (CTQ), and the Pediatric Emotional Distress Scale (PEDS).*

Functional assessment tools can be used to inform decisions about the appropriateness of services. They can be useful tools, for example, for informing the design of outcomes-oriented case plans (Wotring, Hodges, & Xue, 2005). Functional assessments can also track progress toward social-emotional well-being outcomes. Several valid and reliable tools used to measure domains of social-emotional functioning with children and adolescents have been tested and normed with representative samples of children from the general population. Examples include the Strengths and Difficulties Questionnaire (SDQ), the Child Behavior Checklist (CBCL), the Social Skills Rating Scale (SSRS), and the Emotional Quotient Inventory Youth Version (EQ-i:YV). Data from these assessments allow States and programs to measure a child's level of functioning and monitor how it compares with general populations of the same age group. In other words, assessment helps systems to determine not only whether a child meets the threshold for a particular concern but also how the child fares relative to the expected developmental trajectory for child functioning. This allows States and programs to better understand whether interventions are moving each child back on track developmentally within the well-being domains.

Additionally, the universal administration of these types of functional assessment tools to all children in a system at entry and at key follow-up periods can help systems track changes in children's social-emotional functioning compared to their own baseline during and after the delivery of services. This allows systems to generate data that help them understand whether their services are making a positive difference for children and youth. Continuously monitoring progress using these functional assessment tools also helps decision-makers reassess the appropriateness of the service array over time for individual children. Broader analyses of the aggregate data from assessments can help decision-makers at the program and systems levels to identify the best and most effective practices for all children in the target population and for particular subgroups (Wotring, Hodges, & Xue, 2005).

Effective Interventions: *Recent research has expanded the knowledge base regarding interventions that treat the behavioral, social, and emotional problems that are common among children who have experienced maltreatment. While generic counseling is not consistently effective in reducing mental health symptoms for children in foster care, several evidence-based*

treatments have been successful when delivered with fidelity to the model; the same is true for parenting interventions and programs for youth. Many of these interventions have been rigorously tested and shown to reliably improve child functioning by targeting the impact of maltreatment and developing skills and competencies that help children navigate their daily lives. The emergence of promising and effective interventions at multiple levels --at the child level related to trauma and behavioral/mental health; at the older youth level related to relational health and social and emotional well-being; and at the caregiver level related to increasing capacity to care for their children -- provides an opportunity to impact the life circumstances of families as a whole.

Child welfare and mental health systems can develop the capacity to install, implement, and sustain these evidence-based and evidence-informed interventions by using research to identify effective and promising interventions that meet the needs of the specific population to be served; making needed adaptations to bring the interventions to scale within the child welfare system, developing an awareness of principles of evidence-based practices among staff at all levels; and reorganizing infrastructure to support implementation fidelity and further evaluations of these practices and interventions.

Evidence-based and evidence-informed practices have been developed to address the most common mental health diagnoses, trauma symptoms, and behavioral health needs of children and show measurable improvements or promising results. Evidence-based and evidence-informed practices such as Trauma-focused Cognitive Behavioral Therapy, Multi-systemic Therapy, and Parent-Child Interaction Therapy are examples. These interventions show measurable improvements or promising results in decreasing emotional/behavioral symptoms; diminishing depression, anxiety; increasing the ability to self-regulate; improving physical health; and helping traumatized children and youth form and maintain healthy attachments. There are also evidence-based and evidence informed interventions geared toward improving outcomes related to youth skill development, education, and employment. (Job Corps and Big Brothers/Big Sisters are examples.)

It is important to note that many of the evidence-based interventions that improve child functioning require the involvement of caregivers and specifically target their behaviors for change as well. Caregivers need support in managing the behaviors of children who have experienced maltreatment and in providing a nurturing environment in which healing can occur. In such supportive contexts, children can learn “the value, purpose and safety of relationships” (Rees, 2010). In order to achieve better outcomes for children who have experienced maltreatment, it is essential to engage families, whether biological, foster, or adoptive, in the process of healing and recovery.

Focusing on Social and Emotional Well-Being: Focusing the work of a child welfare system on well-being, particularly social and emotional well-being, requires a concerted effort on behalf of all staff and stakeholders, from directors, to managers, to supervisors, to caseworkers, to foster parents. It entails (a) understanding the challenges that children who have experienced maltreatment bring with them when they come to the attention of the child welfare system, (b) considering how services are structured and delivered at each point along children’s trajectory

through the child welfare system, and (c) de-scaling practices that are not improving outcomes while simultaneously installing and scaling up effective approaches.

Understanding Impact of Maltreatment and Anticipating Challenges: An understanding of the impact maltreatment has had on children when they come to the attention of the child welfare system allows providers to be more proactive, knowing what to look for and anticipating the services that may be needed. This capacity is necessary at the caseworker-level, but also at the level of administrators who are making decisions about the array of services needed internally or through contracts.

Responding and Intervening along the Child Welfare Continuum: Focusing child welfare on improving social and emotional well-being requires careful consideration of how services are structured and delivered throughout the system. For example, a child welfare system with a focus on social and emotional well-being might be characterized by the following:

- Assessment tools used with children receiving child welfare services are reviewed to ensure that they are valid, reliable, and sensitive enough to distinguish trauma and mental health symptoms.*
- Children are screened for trauma when their cases are opened.*
- In-home caregivers receive services that have been demonstrated to improve parenting capacities and children's social-emotional functioning.*
- Child welfare staff and foster parents receive ongoing training on issues related to trauma and mental health challenges that are common among the children and youth being served by the system.*
- Assessments take place at regular or scheduled intervals to determine whether services being delivered to children and youth are improving social and emotional functioning.*
- Independent living and transitional living programs implement programs to support youths' development of self-regulation and positive relational skills.*

De-Scaling and Scaling Up: When child welfare systems make changes, new programs and practices are often added onto the already existing array of services. Ongoing contracts and the need to provide continuous services make it difficult to discontinue or downsize programs that are not improving outcomes for children and youth. Transforming the array of services, rather than simply augmenting it, requires "de-scaling" programs that are not reliably enhancing child functioning by divesting funds and simultaneously shifting resources to support proven practices. Additional dollars may be necessary initially to support installation of evidence-based practices. However, de-scaling programs that are not working and reallocating resources ensures that effective services can be sustained without requiring new, ongoing funding.

Strategies for Shifting the System to Promote Social and Emotional Well-Being: There are many ways that child welfare systems can begin to embed a focus on social and emotional well-being in their work. A few specific examples are listed below.

Services: *This IM has shown that children who have experienced abuse or neglect have significant behavioral, social, and emotional challenges; it has also shown that there are evidence-based practices and interventions that can improve outcomes for children and their*

families. Delivering effective services is the most critical component of a focus on promoting social and emotional well-being.

- *Screening and Functional Assessment*
- *Evidence-Based Interventions*
- *Services within Child Welfare*

Workforce: *It is essential to develop a workforce strategy that supports an emphasis on promoting social and emotional well-being. Administrators and staff of child welfare and other systems that affect children receiving child welfare services, including Medicaid, mental health, and the courts must understand the rationale for the focus and have the capacity to implement changes.*

- *Capacity around Evidence-Based Practices*
- *Training on Specific Populations*
- *Training for Professionals Outside of Child Welfare*
 - *Engaging the judiciary and the courts*

Court System: *Promoting social and emotional well-being requires a careful analysis of the way the child welfare system is currently structured and the systemic changes that are necessary.*

- *Program Inventory*
- *Measure Outcomes, Not Services*

Building a child welfare system that responds effectively to the traumatic impact of maltreatment and promotes social and emotional well-being is complex work. Multiple, complementary strategies must be employed in order to create systematic changes that improve outcomes for children. The progress that the child welfare system has made in recent years has been the result of ongoing and evolving collaborations across multiple child-serving systems, including mental health, Medicaid, education, early childhood, and more. Together, these systems integrated knowledge about the importance of permanency and family connections and structured themselves to deliver services that keep young people safer; keep children with their families more often; and ensure reunification, adoption, and guardianship for more of the children who come into foster care.

As child welfare systems continue to improve and refine their work to promote safety and permanency for children, a strengthened focus on the social and emotional well-being of children who have experienced maltreatment is the logical next step in reforming the child welfare system. Children who have been abused or neglected have significant social-emotional, behavioral, and mental health challenges requiring attention, and treating them with a trauma-focused and evidence-based approach can improve outcomes throughout child welfare. This approach can result in increased placement stability; greater rates of permanency through reunification, adoption, and guardianship; and greater readiness for successful adulthood among all children who exit foster care, especially those youth who leave foster care without a permanent home. Most importantly, it will enable children who have experienced maltreatment to look forward to bright, healthy futures.

Causes of Problems and Consequences Related to Toxic Stress: The following sections in the remainder of this document provide a data-based overview for the prevalence of

problems related to toxic stress, their consequences in terms of cost and outcomes, and, where possible, the rates at which individual children receive services in SC. The sections are presented in the following sequence: mental disorders, health disorders and conditions, risk behaviors, and executive function consequences.

Mental Disorders: A starting point for understanding the consequences of ACEs and other causal factors for mental disorders should be a review of the types and prevalence of mental disorders. The prevalence of mental disorders may seem confusing, especially when data from several different sources are being compared. There are many types of mental disorders, though these can be summarized into major categories such as emotional vs. behavioral. Also, the prevalence rates differ substantially for short term (currently or during the last month or last 3 months) versus lifetime (ever) prevalence. Additionally, data is collected at different ages which vary across studies. There are other complications such as the criteria for determining the presence or severity of a disorder and of resulting impairment of functioning. Finally, rates differ for subgroups by gender, race, and income. At minimum, prevalence rates should be read and used with careful attention to the varying ways they were defined and collected. This complexity is explained in a Mental Health Surveillance report in the MMWR²⁶ ([See Appendix J](#)):

Methods used by different surveillance systems often vary because of the differing priorities of the agencies collecting the data and because of budget constraints. For example, systems vary in terms of 1) what is measured (e.g., diagnostic criteria for a mental disorder, reports of previously diagnosed conditions, reports of mental health symptoms, or other indicators of mental health problems), 2) sample (e.g., age range, oversampling, and geographical coverage), 3) source of the information (e.g., proxy respondent for the child, self-report by the child, or administrative records), 4) the way the data are collected (e.g., in-person interview, telephone interview, self-administered survey, and administrative records), 5) sample size (precision of estimates), and 6) periodicity of data collection (annual or other). Differences in these surveillance modalities and methods might limit comparisons of estimates between different systems. In addition, changes in the characteristics of the same surveillance system over time might limit information about time trends in the prevalence of mental disorders (Centers for Disease Control and Prevention, 2013).²⁷

To reduce these complications for readers new to mental disorder rates, an overview table from five different sources is shown below. The NSC-A, ENC, and WNC data comes from rigorously administered surveys. The NSCH comes from a parent survey by telephone. Unlike the other sources, the Medicaid data comes from billing records for services, thus is not intended to show population prevalence. The table is organized in two sets of survey blocks. The first set is for lifetime or cumulative prevalence up

²⁶ Centers for Disease Control and Prevention. "Mental Health Surveillance Among Children — United States, 2005–2011." 2013: http://www.cdc.gov/mmwr/preview/mmwrhtml/su6202a1.htm?s_cid=su6202a1_w

²⁷ Id.

through ages 17, 18, and 16 respectively. The second set is for short-term prevalence defined as: over three months, currently, and during one year. The table suffers from not comparing “apples to apples” but does provide enough similarity within each block to be useful as a first overview of mental disorder prevalence, with the exception of the Medicaid services data. The Medicaid data has been included to enable the reader to begin comparing population prevalence to the percent of children receiving mental health services. Overall, the prevalence data indicates that between one-third and half of adolescents by ages 16-18 have ever had a psychiatric disorder. Approximately one-fifth have ever had a disruptive behavior disorder, including ADHD. The lifetime prevalence of anxiety disorders is over 30% in the NCS-A, even with the higher rates of childhood anxiety under age 9 excluded. The lifetime prevalence of mood disorders through age 18 is 18% for the NSC-A. The WNC survey reported depression rates approaching 10% during ages 9-16. Compared with the lifetime or long interval prevalence rates, the short-term rates are far lower because the condition has not persisted or the onset is after the age interval being reported. The ENC study reported overall rates for the past 3 months ranging from 17% at age 12 to 26% at age 9 to 31% at age 17. The ENC short-term prevalence rates for depression and anxiety were one-third to over half of the cumulative rates during ages 9-16 in WNC and one-fourth to one-fifth compared with the lifetime NCS-A prevalence rates.

Table 11: Data comparison among NSCH, NCS-A, WNC, ENC and SC Medicaid data

Disorders	NSCH (Lifetime) ever told		NCS-A (Lifetime by ages)					WNC during ages 9-16 years	ENC last 3 months				NSCH currently		SC Medicaid over one year	
	11-14 years	14-17 years	13-18 years	13-14 years	15-16 years	17-18 years	18 years		9-17 years	9 years	12 years	17 years	11-14 years	14-17 years		
Any Psychiatric Disorder	-	-	49.5	45.3	49.3	56.7	-	36.7	21.1	26.4	16.8	31.2	-	-		
Any Severe Impairment	-	-	27.6	-	-	-	-	-	-	-	-	-	-	-		
-ditto without substance abuse	-	-	22.2	-	-	-	-	-	-	-	-	-	-	-		
Any Disruptive Behavior Disorder	4.1*	8.6*	19.6	18.2	19.5	21.9	17.6	23.0	7.3	-	-	-	2.3	6.8		
-ADHD	14.1	16.8	8.7	8.8	8.6	9.0	-	4.1	2.6	-	-	-	11.0	10.4		
Any mood or Anxiety Disorder	-	-	-	-	-	-	-	15.0	7.8	-	-	-	-	-		
Any Mood Disorder	-	-	14.3	10.5	15.5	18.1	18.2	-	-	-	-	-	-	-		
-Depression	3.6	6.2	11.7	8.4	12.6	15.4	-	9.5	2.9	-	-	-	2.5	4.0		
Any Anxiety Disorder	5.7	5.7	31.9	31.4	32.1	32.3	-	9.9	5.7	-	-	-	3.7	3.9		

The Mental Disorder Consequences of Toxic Stress: One might expect intuitively that trauma and stress would have a major impact on mental wellbeing, as compared with physical health and cognitive performance for which trauma and stress seem less directly related. Fortunately one can rely on numerous rigorous studies which have confirmed this expectation. Among the studies, the National Comorbidity Survey Replication has provided valuable data and analysis on the impact of Adverse Childhood Experiences. One of the Comorbidity studies found that childhood adversities (as population-attributable risk) explained 32% of all disorders. These studies found that the major source of the mental disorders was Maladaptive Family Functioning as the primary source of adverse childhood experiences. This should come as no surprise, since very young children spend the majority of their time with family members. The findings from the National Comorbidity Survey Replication are presented below in an excellent summary by three Australians.

As the Twig Is Bent, the Tree Inclines: Adult Mental Health Consequences of Childhood Adversity (See Appendix K)²⁸: Folk psychology has long appreciated the links between childhood trauma and both childhood and adult mental health problems. In this issue of Archives, 2 related articles from the National Comorbidity Survey Replication enhance this traditional wisdom with precise estimates, confidence intervals, and sophisticated modeling. Based on detailed interviews with 5692 adults, the researchers derived lifetime diagnoses for a range of mental health disorders. In addition, the respondents were asked to recall if they had been exposed to 12 different stressors prior to the age of 18 years. The prevalence of childhood adversities (CAs) was high—about half of all respondents endorsed at least 1 CA. The CAs were also highly intercorrelated. Factor analysis grouped the CAs into those reflecting maladaptive family functioning (parental mental illness, parental substance abuse, criminal behavior, domestic violence, physical abuse, sexual abuse, and neglect) and other CAs (parental death, parental divorce, other parental loss, childhood physical illness, and family economic adversity). Multiple childhood adversities were the norm in subjects exposed to any of the CAs that contributed to the maladaptive family functioning factor. The first article, by Green et al, examined associations between CAs and the risk of various DSM-IV disorders. Many previous studies have examined the association between 1 particular variety of CA and later mental illness. Because these studies could miss the contribution of other correlated CAs, they are prone to overestimate the strength of the association between the variables of interest.

While mindful of issues related to recall bias and direction of causality within cross-sectional data, the researchers show a subadditive dose-response effect, with the association between CAs and mental illness increasing with a higher count of CA exposures. However, while the strength of the association increased with more CAs, the increase in the strength of the association was smaller with each additional exposure. From a clinical perspective, the subadditive effect suggests that to prevent CA-associated mental health problems, maladaptive family functioning needs to be addressed in a more holistic perspective rather than one CA at a time. It is a

²⁸ James Scott, Daniel Varghese et al. "As the Twig Is Bent, the Tree Inclines: Adult Mental Health Consequences of Childhood Adversity." Arch Gen Psychiatry. 2010; 67(2):111-112: <http://archpsyc.jamanetwork.com/article.aspx?articleid=210545>

reminder to choose the appropriate category of observation when assessing CAs. There are patterns of cosegregation within CAs, and these broader patterns may better capture the “toxic” nature of the exposure with respect to later mental health. Merely summing individual exposures does not always provide an obedient linear dose-response relationship.

The findings also bring into sharp relief the non-specificity between CAs and subsequent mental disorders. Childhood adversity arising from problems in family functioning was significantly associated with all types of mental illness. This challenges early studies that suggested that particular exposures (e.g., death of mother) may be linked to particular mental health outcomes (e.g., depression). While not assessed in the current study, there is also evidence that CAs are associated with an increased risk of later psychosis. Thus, childhood trauma upsets the orderly psychological and biological cascades of development, leaving the affected individual at increased risk of a wide range of adverse mental health outcomes. In the companion article, McLaughlin et al found that childhood adversity from maladaptive family functioning was more strongly associated with persistence of psychiatric disorders compared with other childhood adversities. Childhood adversity was more strongly associated with persistence of mood disorders compared with other disorder classes. While the effect size for this association was modest, this finding suggests that not only are CAs associated with an increased risk of adult mental health disorders, the nature of these disorders also appears to be more chronic. When considered from a dynamic epidemiological perspective, CAs appear to contribute to the increased prevalence (or stock) of mental health disorders from 2 mechanisms: (1) more new cases (ie, greater inflow) and (2) less recovery (ie, less outflow). Green et al reported that childhood adversity could potentially explain 32.4% of all disorders examined in the study. While the authors recommend caution in the interpretation of population-attributable fractions, this is a very disturbing estimate. If we were to add in adverse physical health outcomes associated with CAs, these childhood exposures would be associated with an even greater later disease burden. The disability-adjusted life-years attributed to childhood sexual abuse have been assessed, but neither other CAs nor the broad category of maladaptive family functioning have. Based on the findings presented in these articles, we speculate that the burden of disease attributable to maladaptive family functioning would be sizable. In addition, CAs would also be expected to contribute to societal burden related to adverse educational and crime-related outcomes. Within Waddington’s epigenetic landscape metaphor perhaps vulnerable individuals are less able to maintain optimal developmental trajectories (canalization) in the face of CAs. Once the developmental pathway is “decanalized,” the affected individuals could be at increased risk of different disorders as a reflection of their particular disease susceptibilities (i.e., their unique epigenetic landscape). On a related note, Gibson has suggested that the apparent rise in the prevalence of psychological disorders such as depression may reflect the rapid evolution of the human genome combined with marked environmental and cultural change over recent generations. Regardless of these broader speculations, we need a better understanding of factors that confer resilience and vulnerability to understand the pathways linking CAs and adult mental health outcomes. It is unrealistic to think that we could protect all children from all adversities, but can we identify factors that bolster resilience and focus our efforts on the most vulnerable subgroups?

Although it has been known for several decades that child maltreatment has a deleterious effect on health outcomes, interventions to improve the safety of children in their homes have been

relatively poorly studied. This is even more disappointing when one considers that family functioning is intergenerational. Adults who have mental health problems associated with childhood adversity (ie, in their family of origin) are more likely to expose their offspring to CAs (ie, in their family of procreation), thus the cycle continues. With such a large proportion of mental illness attributable to childhood adversity and the evidence of transgenerational transmission of childhood adversity, part of any future national policy initiatives regarding mental health must address the welfare of families and children. In short, we now must shift our attention to focus on the development of population-based strategies that target prevention and early intervention and ensure that these programs are carefully evaluated. The quality of the primary epidemiological research has far surpassed the quality of the research related to prevention and intervention. It is now time for the latter to catch up.

Mental Disorder Consequences of ACEs and Toxic Stress: Important data and research findings regarding the effects of ACEs come from an article by Drs. Green, Kessler, and colleagues on the relationship of ACEs (here initialized as CAs for childhood adversities) with mental disorders ([See Appendix D](#)). Their findings presented below from the NCS-R succinctly capture much of what all the similar studies have found regarding the relationship between ACEs/CSs and mental disorders.

Results: *The CAs studied were highly prevalent and intercorrelated. The CAs in a maladaptive family functioning (MFF) cluster (parental mental illness, substance abuse disorder, and criminality; family violence; physical abuse; sexual abuse; and neglect) were the strongest correlates of disorder onset. The best-fitting model included terms for each type of CA, number of MFF CAs, and number of other CAs. Multiple MFF CAs had significant subadditive associations with disorder onset. Little specificity was found for particular CAs with particular disorders. Associations declined in magnitude with life course stage and number of previous lifetime disorders but increased with length of recall. Simulations suggest that CAs are associated with 44.6% of all childhood onset disorders and with 25.9% to 32.0% of later-onset disorders.*

Conclusions: *The fact that associations increased with length of recall raises the possibility of recall bias inflating estimates. Even considering this, the results suggest that CAs have powerful and often subadditive associations with the onset of many types of largely primary mental disorders throughout the life course.*

Prevalence and co-occurrence of CAs: *Approximately 53.4% of NCS-R respondents reported having at least 1 CA (Table 12). The most common CAs were parental divorce (17.5%), family violence (14.0%), family economic adversity (10.6%), and parental mental illness (10.3%). Multiple CAs were the norm in respondents with each CA, from 51.2% in those with death of a parent to 95.1% in those with parental neglect; there were a mean of 3.2 CAs in respondents with more than 1 CA. Factor analysis found 3 meaningful factors. Most CAs have significant loadings on the first factor of maladaptive family functioning (MFF) (eg, parental substance abuse, criminality, domestic violence, and abuse and neglect). The second factor represents parental death and other loss with associated economic adversity. The third factor represents parental divorce with associated economic adversity.*

Table 12: Prevalence of retrospectively reported CAs and promax-rotated tetrachoric factors loading (standardized regression coefficients) of CAs based on a 3-factor model (n=5692)^a (p.116)²⁹

	Individual CAs, % (SE)	Respondents With a Given CA Who Also Had ≥1 Other CA, % (SE)	CAs in Those With >1 CA, Mean No. (SE)	Factor (F) Loadings		
				F1 ^b	F2 ^c	F3 ^c
Interpersonal loss						
Parental death	9.9 (0.5)	51.2 (2.8)	3.1 (0.1)	-0.09	0.67	-0.34
Parental divorce	17.8 (0.8)	63.2 (2.2)	3.4 (0.1)	-0.02	0.00	0.60
Other parental loss	6.7 (0.4)	75.9 (2.7)	3.8 (0.1)	0.07	0.58	0.09
Family maladaptation						
Parental mental illness	10.3 (0.6)	71.7 (2.1)	3.9 (0.1)	0.62	-0.14	-0.20
Parental substance use	8.5 (0.5)	85.5 (1.5)	4.1 (0.1)	0.67	-0.14	-0.01
Parental criminality	7.2 (0.3)	85.3 (1.7)	4.1 (0.1)	0.87	-0.11	0.19
Family violence	14.0 (0.7)	86.6 (1.8)	3.8 (0.1)	0.99	0.10	0.18
Abuse and neglect						
Physical abuse	8.4 (0.5)	87.6 (2.4)	4.3 (0.1)	0.62	0.21	-0.09
Sexual abuse	6.0 (0.2)	72.3 (3.3)	4.1 (0.1)	0.22	0.19	-0.07
Neglect	5.6 (0.4)	95.1 (1.1)	4.6 (0.1)	0.69	0.24	-0.04
Other CAs						
Physical illness	5.8 (0.5)	60.7 (4.2)	3.3 (0.1)	0.14	0.10	-0.17
Economic adversity	10.6 (0.5)	89.4 (2.2)	3.5 (0.1)	-0.01	0.90	0.48
Any adversity	53.4 (1.2)	49.6 (1.1)	3.2 (0.0)			

Abbreviation: CA, childhood adversity.

^aCorrelations among factors: F1-F2: 0.15; F1-F3: 0.24; and F2-F3: 0.07.

^bFactor 1 refers to maladaptive family functioning CAs.

^cFactors 2 and 3 are combined and refer to other CAs.

The text quoted below will be very difficult for most readers to comprehend well but is presented to alert the readers to what one must understand in order to grasp the complicated relationships between ACEs and mental disorders individually and collectively over time. This research would be best understood through an interactive presentation by an advanced statistician with expertise regarding this field of research.

Associations of CAs with the First Onset of DSM-IV/CIDI Disorders: In the bivariate models (ie, only 1 CA considered at a time) of the pooled associations of CAs with the first onset of the 20 DSM-IV/CIDI disorders, all but 1 CA (parental death) was significant, with odds ratios (ORs) of 1.5 to 1.9 for MFF CAs and 1.0 to 1.5 for other CAs. The ORs are generally smaller in the additive multivariate model, with 8 CAs significant and ORs of 1.0 to 1.4 for MFF CAs and 1.0 to 1.3 for other CAs. The multivariate model that considers only number rather than type of CAs shows generally increasing ORs with number of CAs, from 1.3 for 1 CA (compared with respondents who had no CAs) to highs of 3.4 for 6 CAs and 3.2 for 7 or more CAs.

Differential Associations by Class of DSM-IV/CIDI Disorder: Disaggregation shows that CAs are significantly associated with the first onset of each class of disorders (mood, anxiety, disruptive behavior, and substance use). The ORs associated with types of CAs are always associated with increased odds. Those for MFF CAs are more consistently significant than are those for other CAs. The ORs associated with number of CAs are always associated with decreased odds, although they are largely confined to MFF CAs. Close inspection finds what

²⁹ Jennifer Greif Green, Katie A. McLaughlin et al. "Childhood Adversities and Adult Psychiatric Disorders in the National Comorbidity Survey Replication I" Arch Gen Psychiatry. 2010; 67(2):113-123: <http://archpsyc.jamanetwork.com/article.aspx?articleid=210584>

seems to be meaningful variation in the ORs associated with some MFF CAs, such as parental criminality consistently having its lowest OR and parental substance abuse its highest OR predicting respondent substance use disorders. The more striking pattern, though, is that each MFF CA is significantly associated with each disorder class with rather consistent ORs. The ORs of other CAs are less consistent, with only 25% significant at P.05. Again, there seems to be some meaningful variation, most notably family economic adversity and respondent physical illness associated with anxiety but not mood disorders, but these differences are not statistically significant.

Differential Associations by Life Course Stage and Number of Previous Disorders:

Disaggregation by life course stage (childhood: aged 4-12 years, adolescence: aged 13-19 years, early adulthood: aged 20-29 years, and middle-later adulthood: aged 30 years) shows that the significant ORs of some, but not all, CAs persist throughout the life course. The ORs associated with other CAs decline with age, but these declines are generally not statistically significant. The exceptions are significant declines with age in ORs for parental death, physical abuse, sexual abuse, and physical illness. The persistence of the OR for other parental loss throughout the life course is striking compared with the OR for parental death being significant only in childhood. More highly disaggregated analyses showed that age-related declines involving sexual abuse were consistent across all disorder classes (although significant only for mood disorders), whereas declines associated with physical abuse, parental death, and physical illness varied by class of disorder. We also examined differential associations of CAs with the first onset of DSM-IV/CIDI disorders as a function of the number of previous lifetime disorders. We found that the ORs associated with most CAs become smaller as the number of previous disorders becomes larger. This means that CAs are more strongly associated with the onset of temporally primary vs. secondary disorders.

Population-level Associations of CAs with Disorder Onset: *We calculated the PARPs associated with CAs based on the best-fitting model. Results show that CAs explain (in a predictive sense) 32.4% of all disorders, 41.2% of disruptive behavior disorders, 32.4% of anxiety disorders, 26.2% of mood disorders, and 21.0% of substance use disorders (Table 13). The CAs explain a higher proportion of childhood-onset disorders (44.6%) than adolescent onset disorders (32.0%) and adult-onset disorders (28.6% and 25.9%). This decline is largely explained by the PARPs for mood disorders decreasing with age from a high of 57.1% for childhood-onset cases to a low of 20.5% for onsets in the age range of 30 years or older. The PARPs also decrease with age for anxiety disorders, but less dramatically than for mood disorders (from 39.5% of childhood onset cases to 29.8% of onsets in the age range 30 years and older). The PARPs do not decrease with age, in comparison, for substance use disorders. The number of disruptive behavior disorders that occur for the first time in adulthood is so small that we could not calculate the PARPs for these disorders beyond adolescence.*

Table 13.³⁰ Population-attribution risk proportions (PARPs) of lifetime DSM-IV/CIDI disorder types associated with childhood adversities by life course stage ^a

	PARPs				
	Overall	Childhood, Aged 4-12 y	Adolescence, Aged 13-19 y	Early Adulthood, Aged 20-29 y	Middle-Later Adulthood, Aged ≥30 y
Mood	26.2	57.1	30.5	24.7	20.5
Anxiety	32.4	39.5	29.7	31.3	29.8
Substance use	21.0	^b	26.1	25.6	32.1
Disruptive behavior ^c	41.2	34.4	38.9	^b	^b
Any	32.4	44.6	32.0	28.6	25.0

Abbreviation: CIDI, Composite International Diagnostic Interview.

^aThe PARPs were calculated using simulation methods to generate individual-level predicted probabilities of the outcome disorders twice from the coefficients in the best-fitting model: the first time using all the coefficients in the model (probability of the disorder in those exposed to childhood adversities) and the second time assuming that the coefficients associated with the childhood adversities were all zero (probability of the disorder in those unexposed). One minus the ratio of the predicted prevalence estimates in the 2 specifications was then used to calculate PARP. In the pooled data set, the PARP value is the average PARP across all disorders included in the calculation based on a constant model across disorders.

^bToo few cases available to estimate the PARP.

^cDisruptive behavior disorders are restricted to respondents 44 years and younger at interview.

Developing SC Data on Mental Disorder Prevalence: Most SC data for mental disorders is services data rather than true population prevalence. Services data is available for hospitalization and emergency room (ER) billing charges to all payors and billing charges to Medicaid for all services received. Additional SC data is available from NSCH telephone surveys conducted every four years. The NSCH asks the parent of a child: “have you ever been told by a doctor or a healthcare professional that your child had [the following conditions]?” and “overall, do you think that your child has difficulties with emotions, concentration, behavior, or being able to get along with other people?” The questions regarding conditions identified by professionals are primarily services-related and are better thought of as rates of either positive screening results or services received at some time rather than true condition prevalence. Also to be considered is that the questions asking “ever told” is a lifetime prevalence proxy which naturally generates higher rates than “last 30 days” or “last year” prevalence. By comparison, the “do you think” question is closer to a 30 day prevalence approach; however, “difficulties” tend to elicit positive responses for low severity problems which inflate the estimates. As a result, the NSCH data on mental disorders and other conditions are more useful for comparisons of prevalence across states and also among conditions and disorders than for accurate estimates of the true prevalence rates. The data shown below are for SC children under age 18.

³⁰ Jennifer Greif Green, Katie A. McLaughlin et al. “Childhood Adversities and Adult Psychiatric Disorders in the National Comorbidity Survey Replication I” Arch Gen Psychiatry. 2010; 67(2):113-123: <http://archpsyc.jamanetwork.com/article.aspx?articleid=210584>

Table 14: 2007 National Survey of Children's Survey (NSCH) for South Carolina

2007 SC NSCH											
Categories	Total	Male	Female	Poor	Not Poor	0-5 years	6-10 years	11-14 years	14-17 years	White	Black
Emotional, developmental, behavioral problems	6.6%	7.9%	5.2%	9.4%	4.7%	1.8%	9.7%	7.8%	8.3%	5.7%	7.8%
Required therapy last 12 months	5.6%	7.0%	4.3%	7.6%	4.4%	1.1%	9.7%	7.0%	5.5%	5.2%	6.4%
ADD/ADHD	10.8%	15.6%	5.8%	14.5%	8.4%	0.1%	11.4%	14.1%	16.8%	9.4%	13.7%
• Current	8.5%	11.7%	4.7%	10.5%	7.1%	0	10.7%	11.0%	10.4%	7.4%	9.9%
• Mild	3.5%	5.2%	1.5%	2.9%	3.3%	0	4.6%	4.0%	4.6%	3.4%	3.5%
• Moderate	2.7%	2.9%	2.3%	3.8%	2.3%	0	3.6%	3.3%	3.3%	2.1%	3.8%
• Severe	2.3%	3.6%	0.9%	3.8%	1.5%	0	2.4%	3.7%	2.8%	1.9%	2.6%
Taking medication	6.2%	8.5%	3.5%	7.2%	5.5%	0	9.2%	8.2%	5.8%	5.9%	6.2%
Depression	3.9%	3.9%	4.0%	6.5%	2.6%	0.5%	4.7%	3.6%	6.2%	3.9%	3.2%
• Current	2.4%	1.9%	1.2%	5.7%	1.6%	0	2.6%	2.5%	4.0%	2.1%	2.6%
• Mild	0.8%	0.2%	0.6%	0.9%	0.6%	0	0.9%	0.1%	1.8%	1.1%	0.4%
• Moderate	1.3%	1.7%	0.3%	1.9%	1.0%	0	1.2%	1.5%	2.2%	1.0%	1.8%
• Severe	0.3%	0.1%	0.3%	0.7%	0	0	0.4%	0.8%	0	0	0.4%
Anxiety	4.1%	3.7%	4.6%	4.5%	4.3%	0.7%	3.9%	5.7%	5.7%	4.5%	2.9%
• Current	2.9%	2.7%	2.6%	3.5%	2.8%	0.5%	2.8%	3.7%	3.9%	2.8%	2.5%
• Mild	1.5%	1.5%	1.2%	1.7%	1.7%	0.5%	1.7%	1.4%	1.8%	1.8%	1.1%
• Moderate	1.1%	0.7%	1.3%	1.3%	1.1%	0	0.6%	1.9%	1.5%	0.8%	0.7%
• Severe	0.3%	0.5%	0.1%	0.5%	0.1%	0	0.6%	0.4%	0.6%	0.2%	0.6%
ODD/CD	4.4%	5.8%	3.0%	7.5%	4.2%	0.9%	4.0%	4.1%	8.6%	3.1%	6.4%
• Current	3.3%	3.9%	2.2%	5.9%	1.6%	0.1%	3.5%	2.3%	6.8%	2.3%	4.7%
• Mild	0.6%	0.7%	0.3%	0.8%	0.5%	0	0.9%	0.3%	0.9%	0.5%	0.7%
• Moderate	1.7%	1.7%	1.4%	3.0%	0.7%	0.1%	1.6%	0.9%	4.0%	1.0%	3.0%
• Severe	1.1%	1.5%	0.6%	2.1%	0.4%	0	1.0%	1.1%	1.9%	0.7%	1.0%
Autism	0.8%	1.4%	0.25%	0.5%	1.2%	0.1%	0.9%	1.0%	1.1%	0.9%	0.7%
• Current	0.4%	0.6%	0.1%	0.1%	0.8%	0.1%	0.3%	0.6%	0.5%	0.8%	0
• Mild	0.1%	0.1%	0.1%	0.7%	0.3%	0.1%	0.1%	0.1%	0.2%	0.3%	0
• Moderate	0.3%	0.5%	0	0	0.5%	0	0.2%	0.5%	0.3%	0.5%	0
• Severe	0	0	0	0	0	0	0	0	0	0	0
Received treatment or counseling from a mental health professional	6.2%	6.2%	6.1%	7.6%	5.6%	0.3%	8.9%	8.2%	10.6%	6.0%	6.4%
In past 12 months took medication for emotion, concentration or behavior	1.7%	2.3%	1.1%	1.6%	1.9%	0.2%	1.5%	1.8%	4.5%	2.2%	1.0%

The mental disorder data from the NSCH or from services in SC should be compared with structured research surveys. Fortunately such survey data is available, including two high quality surveys in our neighbor state North Carolina. One of the NC surveys was in the mostly white Western part of the state and the other in the Eastern part for counties with a racial composition which is roughly half white and half African-American. The data for Eastern NC is presented below first, since it is more similar to the demographics of race and income in SC. The data reported was generated for 3 month

prevalence so that it could be compared with concurrent service usage. The 3 month prevalence rates for youth ages 9-17 are shown below (*See Appendix L*)³¹.

Table 15: Three-month prevalence of DSM-IV diagnoses*

Diagnosis	Total (N = 920)	White (n = 379)	African American (n = 541)	Female (n = 438)	Male (n = 482)
Attention-deficit/hyperactivity disorder					
Combined	1.3 (0.8-2.0)	1.7 (0.9-3.0)	0.9 (0.4-1.9)	0.4 (0.1-1.3)	2.1 (1.3-3.5)†
Predominantly inattentive	0.7 (0.4-1.3)	0.9 (0.4-2.0)	0.5 (0.2-1.3)	0.4 (0.2-1.1)	1.0 (0.5-2.1)
Predominantly hyperactive and impulsive	0.6 (0.3-1.1)	0.6 (0.2-1.4)	0.6 (0.3-1.4)	0.1 (<0.1-0.6)	1.1 (0.6-2.1)‡
Any type	2.6 (1.9-3.5)	3.2 (2.1-4.8)	2.1 (1.3-3.3)	0.9 (0.4-1.8)	4.3 (3.0-6.1)§
Conduct disorder (CD)					
Childhood onset	4.2 (2.9-5.8)	4.4 (2.8-6.9)	4.0 (2.4-6.6)	1.7 (0.8-3.4)	6.6 (4.5-9.7)§
Adolescent onset	1.3 (0.7-2.2)	1.2 (0.5-2.6)	1.4 (0.7-2.9)	1.2 (0.5-2.9)	1.3 (0.7-2.6)
Either type	5.4 (4.1-7.3)	5.6 (3.7-8.2)	5.3 (3.5-8.1)	2.9 (1.7-5.0)	8.0 (5.6-11.2)†
Oppositional defiant disorder					
Excluding those with CD	1.8 (1.1-3.0)	2.7 (1.4-5.1)	1.1 (0.5-2.3)	1.2 (0.6-2.8)	2.4 (1.3-4.6)
Including those with CD	2.9 (1.9-4.2)	4.2 (2.5-6.9)	1.7 (1.0-3.0)‡	2.0 (1.0-4.0)	3.7 (2.3-5.9)
Substance abuse and dependence					
Substance abuse	4.7 (3.3-6.8)	4.0 (2.4-6.6)	5.4 (3.3-8.7)	4.4 (2.6-7.4)	5.0 (3.0-8.2)
Depressive disorders					
Major depression	1.0 (0.5-1.8)	1.5 (0.7-3.1)	0.5 (0.2-1.5)	1.2 (0.5-2.8)	0.7 (0.3-1.6)
Dysthymia	0.3 (0.1-0.6)	0.3 (0.1-1.0)	0.2 (<0.1-0.9)	0.2 (<0.1-0.9)	0.3 (0.1-1.0)
Minor depression	1.7 (1.0-2.8)	2.8 (1.5-5.3)	0.7 (0.3-1.5)†	1.4 (0.7-2.7)	2.0 (0.9-4.1)
Any depressive disorder	2.9 (2.0-4.2)	4.6 (2.9-7.3)	1.4 (0.8-2.5)†	2.8 (1.7-4.6)	3.0 (1.7-5.1)
Anxiety disorders					
Generalized anxiety	1.3 (0.8-2.1)	1.7 (0.9-3.3)	0.9 (0.4-2.0)	1.3 (0.6-2.8)	1.2 (0.6-2.3)
Panic	1.2 (0.5-2.9)	1.4 (0.4-5.2)	0.9 (0.3-3.1)	2.1 (0.8-5.6)	0.2 (0.1-1.0)‡
Separation anxiety	3.0 (1.9-4.6)	4.1 (2.2-7.3)	2.0 (1.2-3.5)	3.4 (1.8-6.5)	2.5 (1.5-4.2)
Specific phobia	0.4 (0.2-1.1)	0.2 (<0.1-0.8)	0.6 (0.2-1.9)	0.8 (0.3-2.2)	0
Social phobia	1.4 (0.7-2.6)	1.1 (0.4-2.9)	1.6 (0.7-3.8)	1.6 (0.6-4.0)	1.1 (0.4-2.7)
Any of the above	5.7 (4.2-7.6)	6.7 (4.3-10.1)	4.8 (3.2-7.2)	7.1 (4.7-10.6)	4.2 (2.8-6.3)
Obsessive-compulsive	0.2 (0.1-0.8)	0.4 (0.1-1.8)	0.1 (<0.1-0.8)	0.4 (0.1-1.6)	0.1 (<0.1-0.8)
Agoraphobia	0.5 (0.2-1.1)	0.2 (<0.1-1.3)	0.7 (0.3-1.9)	0.6 (0.2-1.8)	0.3 (0.1-1.3)
Elimination disorders					
Functional enuresis	2.4 (1.6-3.5)	2.0 (1.0-3.6)	2.7 (1.7-4.4)	1.3 (0.6-2.6)	3.5 (2.2-5.4)‡
Functional encopresis	0.4 (0.2-0.9)	0.5 (0.2-1.5)	0.3 (0.1-1.1)	0	0.9 (0.4-1.9)
Aggregate categories					
Any disruptive behavior disorder	7.3 (5.7-9.3)	8.3 (5.9-11.6)	6.4 (4.4-9.3)	4.2 (2.6-6.5)	10.4 (7.7-14.0)
Any disruptive behavior or substance use diagnosis	12.5 (10.3-15.1)	12.9 (9.8-16.7)	12.2 (9.1-16.1)	7.9 (5.5-11.1)	17.1 (13.4-21.5)§
Any affective or anxiety diagnosis	7.8 (6.1-10.0)	10.0 (7.1-14.0)	5.9 (4.1-8.3)‡	9.0 (6.4-12.6)	6.6 (4.6-9.3)
≥1 DSM-IV diagnosis	21.1 (18.2-24.4)	21.9 (17.5-27.0)	20.5 (16.8-24.8)	18.2 (14.4-22.8)	24.1 (19.8-28.9)
>1 DSM-IV diagnosis	6.3 (4.9-8.1)	8.0 (5.6-11.1)	4.9 (3.4-7.0)	5.4 (3.5-8.2)	7.2 (5.3-9.8)

*Data are given as prevalence (95% confidence interval). Statistical comparisons are between boys and girls, and white and African American youth.

†P<.01.

‡P<.05.

§P<.001.

The 3 month rates for the surveyed population of 9-17 year olds were: 2.6% ADHD, 5.4% conduct disorder, 1.8% oppositional defiant disorder excluding conduct disorder, 2.9% oppositional defiant disorder including conduct disorder, 4.7% substance abuse and dependency, 2.9% any depressive disorder, 5.7% anxiety disorders which exclude obsessive-compulsive disorder (0.2%) and agoraphobia (0.5%). Overall these categories were summarized as: 7.3% any disruptive behavior disorder, 12.5% any disruptive

³¹ Adrian Angold, Alaattin Erkanli, Elizabeth M.Z. Farmer, John A. Fairbank, Barbara J. Burns, Gordon Keeler and E. Jane Costello. "Psychiatric disorder, impairment, and service use among in Rural African American and White Youth." Arch Gen Psychiatry. 2002; 59:893-901: <http://archpsyc.jamanetwork.com/article.aspx?articleid=206784>

behavior disorder or substance abuse diagnosis, 7.8% any affective or anxiety diagnosis, 21.1% any DSM-IV diagnosis, and 6.3% more than one DSM-IV diagnosis.

The 3 month prevalence data for ENC can be compared with data from the Western NC study which found cumulative prevalence during ages 9-16 as follows: 36.7% any disorder, 15.0% any emotional disorder, 9.9% any anxiety disorder, 9.5% any depressive disorder, 23.9% any behavior disorder, 9.0% conduct disorder, 11.3% oppositional defiant disorder, 4.1% ADHD, and 12.2% substance abuse disorders. The 3-month prevalence of any disorder was 13.3% during ages 9-16 as compared with 36.7% lifetime, thus slightly more than one-third of the prevalence during ages 9-16 (*See Appendix M*).³²

Table 16: Predicted cumulative prevalence of psychiatric disorders by age 16 years*

Diagnosis	Total	Girls	Boys
Any disorder	36.7 (2.7)	31.0 (2.3)	42.3 (3.1)
Any emotional disorder	15.0 (1.7)	17.1 (1.7)	13.0 (1.6)
Any anxiety disorder	9.9 (1.5)	12.1 (1.5)	7.7 (1.4)
Any depressive disorder	9.5 (1.1)	11.7 (1.2)	7.3 (1.0)
Any behavior disorder	23.0 (1.7)	16.1 (1.2)	29.9 (2.2)
Conduct disorder	9.0 (1.2)	3.8 (.7)	14.1 (1.8)
Oppositional defiant disorder	11.3 (1.0)	9.1 (1.0)	13.4 (1.0)
ADHD	4.1 (.7)	1.1 (.2)	7.0 (1.1)
SUDs	12.2 (.6)	10.1 (.5)	14.3 (.7)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; SUDs, substance use disorders.

*Data are given as the percentage of participants (SE).

Results³³: *Although 3-month prevalence of any disorder averaged 13.3%, during the study period 36.7% of participants (31% of girls and 42% of boys) had at least 1 psychiatric disorder. Some disorders (social anxiety, panic, depression, and substance abuse) increased in prevalence, whereas others, including separation anxiety disorder and attention-deficit/hyperactivity disorder (ADHD), decreased. Lagged analyses showed that children with a history of psychiatric disorder were 3 times more likely than those with no previous disorder to have a diagnosis at any subsequent wave. Risk from a previous diagnosis was high among both girls and boys, but it was significantly higher among girls. Continuity of the same disorder (homotypic) was significant for all disorders except specific phobias. Continuity from one diagnosis to another (heterotypic) was significant from depression to anxiety and anxiety to depression, from ADHD to oppositional defiant disorder, and from anxiety and conduct disorder*

³² E. Jane Costello; Sarah Mustillo; Alaattin Erkanli; Gordon Keeler; Adrian Angold. "Prevalence and Development of Psychiatric Disorders in Childhood and Adolescence." *Arch Gen Psychiatry*. 2003; 60:837-844:

<http://archpsyc.jamanetwork.com/article.aspx?articleid=207725&link=xref>

³³ Id.

to substance abuse. Almost all the heterotypic continuity was seen in girls. **Conclusions:** The risk of having at least 1 psychiatric disorder by age 16 years is much higher than point estimates would suggest. Concurrent comorbidity and homotypic and heterotypic continuity are more marked in girls than in boys. In summary, data on a representative population of children and adolescents growing up in the 1990s show that at any time 1 in 6 will have a psychiatric disorder and at least 1 in 3 will have 1 or more psychiatric disorders by age 16 years. As children grow older, psychiatric disorders are more and more likely to be accompanied by significant functional impairment. Once children, particularly girls, develop a psychiatric disorder their chances of continuing to have one, or of developing another episode after remission, are much higher than those of their unaffected peers. By mid-adolescence, although some disorders of childhood have disappeared, impairing adult disorders such as depression, panic disorder, and SUDs are becoming the most prevalent problems. Much more work on the childhood antecedents of these disorders is needed if prevention programs are to be effective.

This study also calculated the comorbidity among the disorders and also their impact on the continuity of the disorders. These findings are presented in [Appendix M](#).

Another major survey of the lifetime prevalence of adolescents ages 13-18 in the US is the National Comorbidity Survey Replication Adolescent Supplement (NCS-A). The study reported the lifetime prevalence rates in age groups 13-14, 15-16, and 17-18. The survey provides critical data on serious emotional disorders (SEDs) for youth with severe impairment accompanying specific mental disorders. For ages 13-18, these prevalence rates were summarized as follows ([See Appendix N](#))³⁴:

Results: Anxiety disorders were the most common condition (31.9%), followed by behavior disorders (19.1%), mood disorders (14.3%), and substance use disorders (11.4%), with approximately 40% of participants with one class of disorder also meeting criteria for another class of lifetime disorder. The overall prevalence of disorders with severe impairment and/or distress was 22.2% (11.2% with mood disorders, 8.3% with anxiety disorders, and 9.6% behavior disorders). The median age of onset for disorder classes was earliest for anxiety (6 years), followed by 11 years for behavior, 13 years for mood, and 15 years for substance use disorders.

Conclusions: These findings provide the first prevalence data on a broad range of mental disorders in a nationally representative sample of U.S. adolescents. Approximately one in every four to five youth in the U.S. meets criteria for a mental disorder with severe impairment across their lifetime. The likelihood that common mental disorders in adults first emerge in childhood and adolescence highlights the need for a transition from the common focus on treatment of U.S. youth to that of prevention and early intervention.

³⁴ Kathleen Ries Merikangas et. al. "Lifetime Prevalence of Mental Disorders in US Adolescents: Results from the National Comorbidity Study-Adolescent Supplement (NCS-A)." *Am Acad Child Adolesc Psychiatry*. 2010 October; 49(10): 980-989: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2946114/>

Table 17: Lifetime Prevalence of DSM-IV Disorders by Sex and Age Group and Severe Impairment in the National Comorbidity Survey–Adolescent Supplement (NCS-A)³⁵

Lifetime Prevalence of DSM-IV Disorders by Sex and Age Group and Severe Impairment in the National Comorbidity Survey-Adolescent Supplement (NCS-A)														
DSM-IV Disorders ^a (a)	DSM-IV Disorders													
	Sex				Age						with Severe Impairment			
	Female		Male		13–14 yr		15–16 yr		17–18 yr		Total			
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE
Mood disorders														
Major depressive disorder or dysthymia	15.9	1.3	7.7	0.8	8.4	1.3	12.6	1.3	15.4	1.4	11.7	0.9	8.7	0.8
Bipolar I or II	3.3	0.4	2.6	0.3	1.9	0.3	3.1	0.3	4.3	0.7	2.9	0.3	2.6	0.2
Any mood disorder	18.3	1.4	10.5	1.1	10.5	1.3	15.5	1.4	18.1	1.6	14.3	1	11.2	1
Anxiety disorders														
Agoraphobia	3.4	0.4	1.4	0.3	2.5	0.4	2.5	0.4	2	0.5	2.4	0.2	–	–
Generalized Anxiety Disorder	3	0.6	1.5	0.3	1	0.3	2.8	0.6	3	0.5	2.2	0.3	0.9	0.2
Social phobia	11.2	0.7	7	0.5	7.7	0.6	9.7	0.7	10.1	1	9.1	0.4	1.3	0.2
Specific phobia	22.1	1.1	16.7	0.9	21.6	1.6	18.3	1	17.7	1.3	19.3	0.8	0.6	0.1
Panic disorder	2.6	0.3	2	0.3	1.8	0.4	2.3	0.3	3.3	0.7	2.3	0.2	–	–
Post-traumatic stress disorder	8	0.7	2.3	0.4	3.7	0.5	5.1	0.5	7	0.8	5	0.3	1.5	0.2
Separation Anxiety disorder	9	0.6	6.3	0.5	7.8	0.6	8	0.7	6.7	0.8	7.6	0.3	0.6	0.1
Any anxiety disorder	38	1.4	26.1	0.8	31.4	1.9	32.1	1	32.3	1.7	31.9	0.8	8.3	0.4
Behavior disorders														
Attention deficit hyperactivity disorder	4.2	0.5	13	1	8.8	0.9	8.6	0.8	9	1.1	8.7	0.6	4.2	0.4
Oppositional defiant disorder (ODD)	11.3	0.9	13.9	1.2	12	1.2	12.6	1.3	13.6	1.4	12.6	0.9	6.5	0.7
Conduct disorder	5.8	1.1	7.9	1.2	4.4	1.2	7.5	1.2	9.6	1.3	6.8	0.9	2.2	0.4
Any behavior disorder	15.5	1.2	23.5	1.6	18.2	1.5	19.5	1.7	21.9	1.8	19.6	1.2	9.6	0.8
Substance use disorders														
Alcohol abuse/dependence	5.8	0.5	7	0.6	1.3	0.3	6.5	0.6	14.5	1.2	6.4	0.4	---	---
Drug abuse/dependence	8	0.8	9.8	0.8	3.4	0.6	9.7	0.9	16.3	1.5	8.9	0.7	---	---
Any substance use disorder	10.2	0.9	12.5	0.8	3.7	0.6	12.2	0.9	22.3	1.6	11.4	0.7	---	---
Other														
Eating disorders	3.8	0.4	1.5	0.3	2.4	0.4	2.8	0.3	3	0.4	2.7	0.2	---	---
Any Class^a	51	1.4	48.1	1.6	45.3	2.1	49.3	1.9	56.7	2.7	49.5	1.2	22.2 ^b	1
1 class	30.3	1.3	30.3	1.3	31.2	1.8	29.4	1.4	30.4	2.3	30.3	0.9	16.2	0.6
2 classes	12.6	0.9	12.1	1.2	9.2	1	13	1.3	16.5	1.7	12.4	0.9	5.2	0.7
3 or 4 classes	8.1	1.1	5.7	0.6	5	1.1	6.9	0.9	9.9	1.3	6.9	0.7	0.8	0.2
Note:														
a. excludes eating disorders;														
b. excluding substance use disorders; [with substance use disorders: Any class = 27.6 (1.0); 1 class = 18.1 (0.7); 2 classes = 6.7 (0.5); 3–4 classes = 2.9 (0.6)]														

³⁵ Kathleen Ries Merikangas et. al. "Lifetime Prevalence of Mental Disorders in US Adolescents: Results from the National Comorbidity Study-Adolescent Supplement (NCS-A)." *Am Acad Child Adolesc Psychiatry*. 2010 October; 49(10): 980–989: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2946114/>

Significant gender differences were found for: any mood disorders = 18.3 female, 10.5% male; any anxiety disorder = 38% female, 26.1% male; any behavior disorder = 15.5% female, 23.5% male; any substance abuse disorder = 10.2% female, 12.5% male; 3 or 4 classes = 8.1% female, 5.7% male. Because of the unique and rigorous nature of this survey data as representative of youth in the US, additional comments from the journal article are presented below: **ask Kathleen.merikangas@nih.gov to ask for tables by race and gender and income**

Discussion: *These findings provide the first lifetime prevalence data on a broad range of mental disorders in a nationally representative sample of U.S. adolescents. The prevalence rates reported here closely approximate those of our nationally representative sample of adults using nearly identical methods, suggesting that the majority of mental disorders in adults emerge before adulthood. These rates are somewhat higher than those of prior studies, but within the range of estimates summarized in a meta-analysis of international community surveys of mental disorders in youth. In addition, the NCS-A provides a more comprehensive assessment of a wide range of DSM-IV disorders and subtypes than most previous studies. Despite the high prevalence rates, however, only about one in every four to five youths meet criteria for a lifetime mental disorder that is associated with severe role impairment and/or distress. The prevalence of severe emotional and behavior disorders is even higher than the most frequent major physical conditions in adolescence, including asthma or diabetes, which have received widespread public health attention.*

The finding that only about half of youth with a lifetime DSM-IV disorder report severe impairment confirms previous research demonstrating that a smaller proportion of youth with mental disorders actually have sufficiently severe distress or impairment to warrant immediate intervention. According to prior research, about one of every 10 youths with a current mental disorder fulfills criteria for Serious Emotional Disorder (SED) based on the Substance Abuse and Mental Health Services Administration (SAMSHA) definition (e.g., a mental health problem that has a drastic impact on a child's ability to function socially, academically, and emotionally). Although our study did not strictly assess all of the criteria for SED, our estimates of severe disorders were based on the full diagnostic criteria for DSM-IV disorders accompanied by severe impairment in major life roles.

Our data document the early onset of major classes of mental disorders. Among affected adolescents, 50% of disorders had their onset by age 6 for anxiety disorders, by age 11 for behavior disorders, by age 13 for mood disorders, and by age 15 for substance use disorders. These findings closely approximate those of prospective studies of child and adolescent samples that have documented the incidence and progression of childhood mental disorders. The early age of onset of anxiety has been well established, and our findings on specific subtypes of anxiety closely track those of prospective community-based research that reveal differential peak periods of onset of specific subtypes of anxiety. Prospective studies have also shown that the average age of onset of major depression and dysthymia is between 11 and 14 years, with a steady increase in incidence across adolescence that continues through early adulthood. Our cross-sectional data reflect this increase, with a near doubling of rates from 13 to 14 years (8.4%) to 17 to 18 years (15.4%). Also consistent with prior cross-sectional and prospective research, the median onset of behavior disorders is slightly earlier than that of mood disorders,

with a later peak for conduct disorder than for oppositional defiant disorder. Finally, the later onset and steeper increase in rates of substance use disorders across adolescence has been repeatedly demonstrated, despite different prevalence periods and assessment methods. About 40% of affected youth in the NCS-A reported more than one class of lifetime disorder, with mood disorders being the most likely to co-occur with other classes. Non-random patterns of comorbidity between discrete classes of mental disorders have been documented extensively in prior community samples of youth. Future analyses of these data will investigate specific concurrent and prospective comorbidity patterns as well as their socio-demographic and clinical correlates.

In addition to providing prevalence estimates, the findings also confirm observations from previous U.S. and international investigations of adolescents concerning the association of socio-demographic characteristics and mental disorders. In particular, female adolescents were more likely than males to have mood and anxiety disorders, but less likely to have behavioral and substance use disorders. Non-Hispanic black adolescents were less likely to have substance use disorders compared with white adolescents, a finding similar to those in prior community studies of adolescents and adults. The increased prevalence of mood and substance use disorders in older adolescents has also been observed in previous investigations, thus indicating the importance of prevention strategies for early and mid-adolescence. By contrast, the stability of certain anxiety and behavioral disorders across this same developmental period suggests that earlier interventions may be appropriate for many of these conditions.

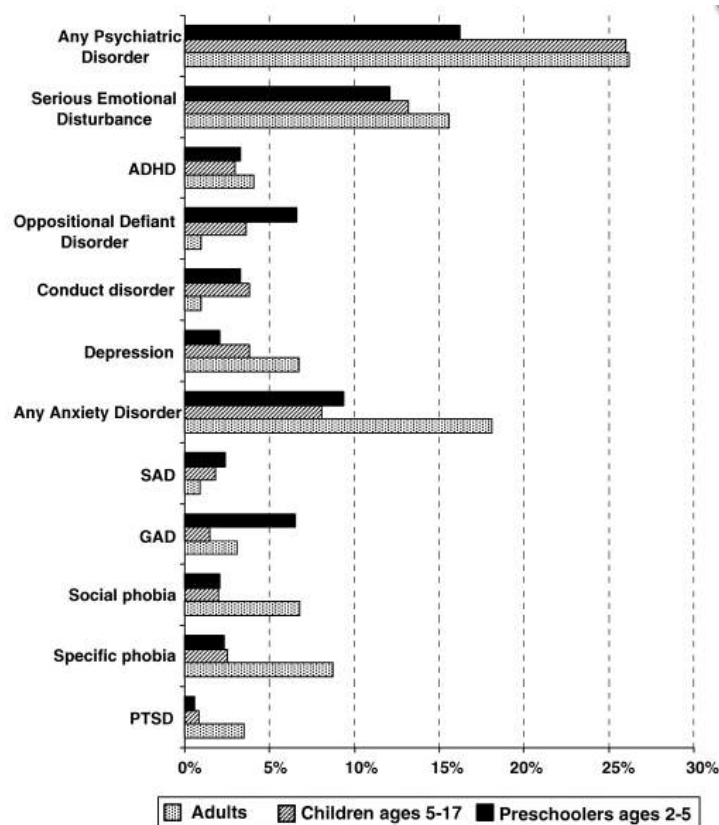
The strong links between adolescent mental disorders and parental characteristics indicate the importance of the family context in the development of mental disorders. Our finding of a prominent effect of parental education on mental disorders has been well-documented for both child physical and mental health outcomes. Divorce was often associated with mental disorders in youth, particularly anxiety, behavior, and substance use disorders. The mechanisms underlying the impact of non-intact homes on mental disorders in youth, including both biologic or genetic vulnerability, and indirect influences on disruptions in the home environment, warrant further study. However, the significant interactions observed among several socio-demographic characteristics attest to the complexity of these associations. For example, increased rates of substance use disorders among Hispanic adolescents whose parents were divorced may reflect interactions of individual, familial, and broader environmental influences that should be considered simultaneously in modeling the nature of risk and resilience in adolescent mental disorders. The lack of strong effects for some socio-demographic characteristics, such as poverty, may also be attributable to the multivariate statistical approach that adjusted for confounding variables.

Despite these limitations, our findings document the high prevalence of mental disorders in youth, and specify that slightly more than one in four to five adolescents in the general population experience disorders that result in severe impairment. Considered with recent estimates indicating that the annual economic burden of mental disorders on the well-being of American youth and their families approaches a quarter of one trillion dollars, these findings underscore the key public health importance of mental health in American youth. The present data can inform and guide the development of priorities for future research and health policy by providing previously lacking prevalence estimates in a nationally representative sample of U.S.

adolescents, as well as the individual, familial, and environmental correlates of mental disorders. Prospective research is now needed to understand the risk factors for mental disorder onset in adolescence, as well as the predictors of the continuity of these disorders into adulthood.

Early Childhood Mental Disorders: Prevalence data on children during early childhood is rather limited. Fortunately Duke University researchers Egger and Angold have surveyed parents to determine the prevalence of mental disorders in children ages 2-5. They also compared their findings with three other studies. Their conclusion is that there is significant continuity of prevalence rates from early childhood to later childhood and adolescence and also to adulthood, but with some specific exceptions as noted below. The prevalence of serious emotional disorders is quite similar across the age groups. These findings provide some support for the possible influence of ACEs and toxic stress on mental disorders, though prospective longitudinal research would be needed to confirm this anticipation (*See Appendix O*)³⁶.

Figure 8: Prevalence of psychiatric disorders in preschoolers, children and adolescents, and adults. <Data abstracted from: Angold, Egger, Erkanli, & Keeler, submitted; Costello, Egger, & Angold, 2005; Kessler, Chiu, Demler, & Walters, 2005b.>



³⁶ Helen Link Egger and Adrian Angold. "Common emotional and behavioral disorders in preschool children: presentation, nosology, and epidemiology." *Journal of Child Psychology and Psychiatry*, 47:3/4 (2006), pp 313–337: <http://onlinelibrary.wiley.com/doi/10.1111/j.1469-7610.2006.01618.x/full>

It is very important to compare the prevalence of mental disorders with the extent to which children and youth with mental disorders receive services to address their disorders. Egger and Angold also reported that very few preschoolers with mental disorders were being served for their disorders.

***Conclusion:** This review highlights how early we are in the process of characterizing the nosology and epidemiology of preschool behavioral and emotional disorders, particularly depression and anxiety disorders. However, it also reveals how late we are in recognizing the distress and impairment of preschool children and their families. The furor over prescription of psychotropic medication for very young children brought to attention the lack of consensus about how to define and diagnose psychiatric disorders in preschoolers and the paucity of treatment studies. However, it seems ironic that it did not lead to the conclusion that these increasing prescription rates reflect real unmet need. In fact, very few preschoolers who meet criteria for a psychiatric disorder are referred for a mental health evaluation or receive treatment.*

Services Provided Compared with Prevalence of Mental Disorders: Another study by the Duke researchers (Burns, Costello, Angold, and colleagues) compares services received with the prevalence of carefully diagnosed mental disorders ([See Appendix P](#)). The Great Smoky Mountain Survey in Western NC performed such an analysis in the 1990s. By telephone they surveyed 4,500 parents about their 9-13 year old children's behavior problems and services use. Each child with problems above a threshold was selected for diagnostic interviews with the parent and the child. This resulted in 1,015 children whose mental disorder prevalence and services usage were determined. The interviews revealed that 20% had a mental disorder diagnosis, whereas 4% had received specialty mental health services and 16% had received services from any sector. While it would appear that almost as many children received services from some sector as those who had a diagnosis, Exhibit 3 in the quoted text below shows that services receipt is spread across groups with and without a mental health diagnosis and/or an impairment (inability to function appropriately at home, in school, or with peers). Therefore, many of those served had low severity disorders or no diagnosed disorders at all. Moreover, Table 13 shows that of the youth with a serious emotional disturbance (both a diagnosis and an impairment), only 40% were receiving services from any sector and only 22% received care from the specialty mental health sector. Of those with a serious emotional disturbance who used services, 47% received service solely at school, only 14% received services solely from the mental health sector, and 29% received services from multiple sectors, with the remainder receiving service solely from health providers (5.5%), juvenile justice (3%), and child welfare (1%). Such a comparison of accurately assessed needs versus receipt of quality service is essential for understanding both disorder prevalence and unmet needs.³⁷

³⁷ B. J. Burns, E. J. Costello, A. Angold, D. Tweed, D., Stangl, E. M. Farmer and A. Erkanli. "Children's mental health service use across service sectors." Health Affairs, 14, no.3 (1995):147-159: <http://content.healthaffairs.org/content/14/3/147.full.pdf>

Mental health resources in the study area: *The eleven-county GSMS area is served by a relatively well developed service system. The Smoky Mountain and Blue Ridge Area Programs are recognized throughout the state for their well-developed, up-to-date services for children and their families. From 1989 to 1994 these programs were among seven sites across the nation that participated in The Robert Wood Johnson Foundation's (RWJF's) Mental Health Services Program for Youth (MHSPY). The MHSPY contributed resources to local communities to enrich the availability of community-based programs (for example, therapeutic foster care, respite care, and case management) in an effort to keep children with serious emotional disturbance from out-of-home and out-of-community placements. The MHSPY also emphasized interagency collaboration. As a result, the area programs improved, solidified, and formalized their relationships with other agencies serving children. All of this was well under way when the GSMS data reported here were being collected. Interagency collaboration was expanded even further during the final months of the first wave of GSMS data collection as the region prepared for implementation of a Medicaid waiver for children's mental health services. In short, providers of mental health services in the GSMS region were actively implementing the principles of a system and continuum of care.*

Study Results: Demographic factors in need for and use of services: *The number of children having a mental health diagnosis and the number using mental health services are broken down by sex, race, economic status, and urban/rural residence. We then used multivariate analyses to determine the relationship between each of these characteristics and recent use of mental health care. The results are broken down further to distinguish between use of mental health services within the specialty mental health sector (4.0 percent) and in all sectors combined (16.0 percent). The overall rate for having any diagnosis was 20.3 percent. The major demographic risk factors were being male and living in poverty. African Americans were slightly more likely than whites to have a diagnosis, but the difference was not statistically significant. Place of residence made no independent contribution to the likelihood of diagnosis. The most common diagnoses were anxiety disorder (5.7 percent), enuresis (5.1 percent), tic disorders (4.2 percent), conduct disorder (3.3 percent), oppositional defiant disorder (2.7 percent), and hyperactivity (1.9 percent). Being male and living in poverty were also the main demographic predictors for mental health service use in any sector. Children living in urban and rural areas were almost equally likely to have used services in any sector. Controlling for other factors, children from poor families were more likely than children from non-poor families to have used services within the specialty mental health sector. In this community, however, specialty mental health services were less accessible to rural than to urban children. Overall, poverty was the most powerful demographic risk factor for both diagnosis and service use. Boys were more likely than girls both to have a diagnosis and to have used mental health services in any sector.*

Clinical status and service use: *The likelihood of a child's having used mental health services within the three months preceding the initial interviews was strongly linked to the child's clinical status (Table 18). Of children with neither a diagnosable condition nor an impairment, only 1.6 percent reported using specialty mental health services during the three months prior to the interview, compared with 21.6 percent of children with both a diagnosis and an impairment. A similar relationship was evident for children obtaining mental health care from any sector, but the level of service use was higher for each clinical group in comparison with use of specialty mental health services*

Table 18: Relationship between clinical status and service use, Great Smoky Mountains study of youth³⁸

Clinical status	Number of cases in category ^a	Percent who used services in previous three months	
		Specialty mental health sector ^b	Any sector
No diagnosis/ no impairment	520	1.6%	10.1%
Diagnosis/ no impairment	150	3.3	26.9
No diagnosis/ impairment	193	6.0	23.3
Diagnosis/ impairment (SED) ^c	152	21.6	40.3

Source: Great Smoky Mountains Study of Youth.

^a Number of sample members in each category.

^b All percentages are weighted to reflect population rates.

^c Serious emotional disturbance.

Since the children with both a DSM-III-R diagnosis and significant functional impairment meet the federal Center for Mental Health Services (CMHS) definition for serious emotional disturbance, it seems reasonable to assume that these children have a prima facie need for mental health care. Thus, it is notable that 40 percent of these children received mental health care from any sector in the preceding three months, while only one in five received care from the specialty mental health sector.

Service provision by multiple service sectors: *Among the 16 percent of children in the sample who reported receiving mental health care in any sector, 13 percent (81 percent of those served) received care in only one sector, and 3 percent (19 percent of those served) received care in more than one sector (Table 19). The education system was clearly the major player in the de facto system of care for children with mental health problems. Between 70 and 80 percent of children who received services for a mental health problem were seen by providers working within the education sector (mostly guidance counselors and school psychologists). For the majority of children who received any mental health care, the education sector was the sole source of care.*³⁹

³⁸ B. J. Burns, E. J. Costello, A. Angold, D. Tweed, D., Stangl, E. M. Farmer, and A. Erkanli: "Children's mental health service use across service sectors." Health Affairs, 14, no.3 (1995):147-159: <http://content.healthaffairs.org/content/14/3/147.full.pdf>

³⁹ Id.

Table 19: Service provision for children receiving services, by sector, Great Smoky Mountains study of youth

Sector	Of children receiving mental health services in each diagnostic group, percent receiving services in sector			Of children receiving mental health services in each diagnostic group, percent for whom sector was sole source of services		
	No diagnosis/ no impairment (n = 74) ^a	Diagnosis or impairment (n=93) ^a	SED (n = 68) ^a	No diagnosis/ no impairment (n = 74) ^a	Diagnosis or impairment (n=93) ^a	SED (n= 68) ^a
	Mental health	16.8%	18.3%	41.5%	9.9%	9.2%
Education	78.1	84.8	71.5	70.2	67.3	46.5
Health	12.5	11.3	10.9	12.0	8.7	5.5
Child welfare	1.2	2.5	16.4	0	0	1.2
Juvenile justice	0.5	7.6	4.3	0.5	5.6	3.2
One sector	~	~	~	92.6	90.9	70.7
Multiple sectors	~	~	~	7.4	9.1	29.3

Source: Great Smoky Mountains Study of Youth.

Notes: Because of multiple sector service use, column percentages add to more than 100. All percentages are weighted to reflect population rates. SED is serious emotional disturbance.

^a Number of sample members in each category.

The role of the general medical sector in providing mental health care was much smaller for this sample of children than that reported for adults. Approximately 11-13 percent of children receiving any mental health services reported use of the general medical sector for these services, with little differentiation by clinical status. For children with a diagnosis and/ or impairment, the general health care system was rarely the sole source of mental health care. The child welfare and juvenile justice sectors provided mental health services to relatively few children in the sample. Our findings suggest, however, that seriously emotionally disturbed children were much more likely than other children to receive mental health services from the child welfare system, and that children with a diagnosis or serious emotional disturbance were more likely than children with neither to have received services from the juvenile justice system. The child welfare system was almost never the sole source of mental health services, but the juvenile justice system was the sole source of mental health services for many of the seriously emotionally disturbed children it served.

Multi-sector service use was influenced by clinical condition. Rates of multi-sector service use were highest for seriously emotionally disturbed children (29.3 percent) and lowest among children with neither a diagnosis nor an impairment (7.4 percent). Single-sector service use seemed to be the rule for those in the no diagnosis/ no impairment category who received services (92.6 percent), with the education sector the primary provider.⁴⁰

⁴⁰ B. J. Burns, E. J. Costello, A. Angold, D. Tweed, D. Stangl, E. M. Farmer and A. Erkanli, "Children's mental health service use across service sectors." Health Affairs, 14, no.3 (1995):147-159: <http://content.healthaffairs.org/content/14/3/147.full.pdf>

A reasonable reaction to the fact that only 40% of children with a SED were receiving services from any sector and only 22% from the specialty mental health sector would be for the specialty mental health sector to serve many more of those with a SED and to serve fewer without a SED, especially those with a threshold diagnosis or less. Research by Costello and colleagues suggests that prioritizing service by minimizing care for children with just a threshold diagnosis would be much less reasonable for children with a behavioral disorder than an emotional disorder. For emotional disorders, only 10% of those preadolescents with just a threshold diagnosis during childhood were predicted to have an adolescent SED. Those with behavioral disorder at just the threshold level without an impairment had almost a 40% likelihood to have a SED as adolescents. This suggests that it would be reasonable to prioritize service to preadolescents with threshold behavioral disorders and no impairment, but not similarly for emotional disorders. Unfortunately for program managers and insurers, the adolescents with SED came in equal numbers from three preadolescent groups, each comprising one-third for subsequent adolescent SEDs: 1) those with childhood SEDs (12% of the childhood sample), 2) those with only a threshold diagnosis (66%), and 3) those with a clinical diagnosis but no impairment (roughly 22%). Given the current and anticipated limits on funding and specialty mental health staff, these circumstances would seem to justify service during childhood to all except children with emotional disorders below the clinical level in the absence of impairment. If funding and staff were seriously limited, priority would seem to be appropriate for all with childhood SED and possibly also for those with behavioral disorders at the clinical level even without impairment. This speculation is based on the text from the Costello article ([See Appendix Q](#))⁴¹ quoted immediately below, thus should be confirmed or altered based on additional research findings.

Over all types of disorders, a threshold-level diagnosis did not carry a poor prognosis on its own, but only when it occurred in conjunction with a significant level of functional impairment. Children with only a threshold-level disorder did as well as healthy children in terms of adolescent SED. However, this picture breaks down when one looks separately at emotional and behavioral disorders. Emotional disorders were less predictive of adolescent SED, at any level of severity. Only in the case of childhood emotional SED in girls was there a significant increase in predictive power. Neither clinical nor threshold disorders predicted adolescent emotional disorders in girls in the absence of functional impairment, and there was no prediction at all in boys.

In the case of behavioral disorders, in contrast, threshold diagnoses without functional impairment did predict adolescent SED, as did the more severe levels of childhood psychopathology, in both boys and girls. The prediction from childhood to adolescent behavioral SED was even stronger in girls (OR 33.4) than in boys (OR 23.1). At the level of childhood

⁴¹ E. Jane Costello, Adrian Angold et.al. "Adolescent Outcomes of Childhood Disorders: The Consequences of Severity and Impairment." *Journal of Am. Acad. Child Adolesc. Psychiatry*, 38:2,:2/2, 1999: <http://devepi.duhs.duke.edu/library/pdf/11360.pdf>

threshold disorder, however, both sexes showed a similar increase in risk for future SED (OR 3.2 for girls, 3.5 for boys). The presence of impairment without at least a threshold level disorder was very rare (3%) at either wave. There are 2 possible interpretations of this finding. Either it is empirically true that clinicians dealing with a child who is functioning poorly at home or school can expect to find some type of psychiatric syndrome present, or the DISC interviews are structured in such a way as to produce this result.

From the point of view of providing adequate services, however, it is important to bear in mind that in actual numbers, there were more SED adolescents who came from the lower-risk groups than from the very highest-risk group with childhood SED. This occurred because although the risk in those groups was lower, the number of children was larger. Thus, while one third of SED adolescents came from the childhood SED group, which made up 11.8% of the sample, one third came from the groups with a threshold diagnosis or no disorder, which together made up two thirds of the sample. Compared with the report by Angold et al. (1999), this analysis of a different data set, using different instruments, nevertheless comes to many similar conclusions: disorders falling below the level of severity required to meet the criteria for treatment set by many HMOs or insurance companies nevertheless can carry a significantly increased risk for severe pathology years later. This is particularly true of behavioral disorders.

The findings reinforce the conclusions of the other articles in this Special Section, in emphasizing the importance of considering level of functioning as well as strict DSM symptoms and of paying attention to children who show functional impairment together with relatively low levels of symptomatology (what Angold et al. refer to in the accompanying article as "symptomatic impairment"). Assuming that treatment reduces the risk of future episodes, intervention in childhood (which almost none of the sample had received) could perhaps also have prevented some of the future severe disorder in children with threshold-level disorders. Other implications of these findings are related to current restrictions in eligibility for treatment or reimbursement. These data suggest that the most meaningful cutoff point for treatment of behavioral disorders would include all children with any level of psychiatric disorder, using the most lenient possible cutoff point. The data for emotional disorders are less clear-cut, but they point in the same direction. Apart from humanitarian considerations, this policy makes sense in the light of the uncertain quality of our current methods of psychiatric assessment. Given the episodic character of many childhood psychiatric disorders and the inevitable errors of measurement, many of the "threshold" children could have shown full-blown SED if assessed a few days earlier or later. Policies that exclude these children from access to treatment may prove to be short-sighted.

Table 20: Increases in likelihood of adolescent SED associated with level of childhood disorder, relative to being “healthy” in childhood⁴²

	Model 1: Any Disorder		Model 2: Behavioral Disorders		Model 3: Emotional Disorders	
	OR	95% CI	OR	95% CI	OR	95% CI
Childhood SED	8.0	2.4–27.0***	29.1	5.5–152.9***	2.0	0.7–6.0
Threshold SED	5.2	1.2–22.4*	3.5	1.2–10.7*	1.1	0.3–4.5
Clinical diagnosis	5.2	1.3–20.2*	3.7	1.1–12.8*	1.5	0.6–4.1
Threshold diagnosis	0.9	0.2–3.1	3.3	1.6–6.7**	0.3	0.1–1.0
Sex	0.6	0.3–1.4	0.5	0.3–0.9*	1.3	0.7–2.3
Race	2.1	1.0–4.3*	1.8	0.8–4.0	2.2	1.0–4.5*
Age	1.3	1.0–1.7	1.0	0.8–1.3	1.2	0.9–1.5
Behavioral disorder	— ^a	— ^a	— ^a	— ^a	0.4	0.2–1.0
Emotional disorder	— ^a	— ^a	0.5	0.2–1.2	— ^a	— ^a

Note: SED = serious emotional disturbance; OR = odds ratio; CI = confidence interval.

^a Not relevant to this model.

* $p < .05$; ** $p < .01$; *** $p < .001$.

One additional viewpoint on prioritization of services was presented by Merikangas based on the NCS-A data. She seems to suggest that youth without “sufficiently severe distress or impairment” should not receive “immediate attention” (See Appendix N)⁴³:

The finding that only about half of youth with a lifetime DSM-IV disorder report severe impairment confirms previous research demonstrating that a smaller proportion of youth with mental disorders actually have sufficiently severe distress or impairment to warrant immediate intervention. According to prior research, about one of every 10 youths with a current mental disorder fulfills criteria for Serious Emotional Disorder (SED) based on the Substance Abuse and Mental Health Services Administration (SAMSHA) definition (e.g., a mental health problem that has a drastic impact on a child’s ability to function socially, academically, and emotionally). Although our study did not strictly assess all of the criteria for SED, our estimates of severe disorders were based on the full diagnostic criteria for DSM-IV disorders accompanied by severe impairment in major life roles.

SC Mental Disorder Prevalence Compared with Services Received: Given the importance of mental disorders to the functioning of children, adolescents, and young adults and the impact of mental disorders on subsequent chronic physical conditions, risk-taking, and academic achievement, it is important to estimate the percentages of children with various disorders who do receive mental health treatment. Unfortunately no surveys have been carried out in SC comparable to those performed by the Duke researchers in NC to determine prevalence of mental disorders and of services received. One way to use the NC or national surveys would be to create synthetic prevalence estimates for SC by using the mental disorder prevalence rates by income and/or race from the NC or US surveys to produce estimated SC prevalence rates. Until such synthetic estimates have been calculated, the most appropriate ENC, WNC, or US NCS-A survey prevalence data will be presented in comparison with SC billing data for Medicaid

⁴² E. Jane Costello, Adrian Angold et.al. “Adolescent Outcomes of Childhood Disorders: The Consequences of Severity and Impairment.” Journal of Am. Acad. Child Adolesc. Psychiatry, 38:2,:2/2, 1999: <http://devepi.duhs.duke.edu/library/pdf/11360.pdf>

⁴³ Kathleen R. Merikangas, Jian-ping He, Marcy Burstein, Sonja A. Swanson, Shelli Avenevoli, Lihong Cui, Corina Benjet, Katholiki Georgiades, Joel Swendsen; J. Am. Acad. Child Adolesc. Psychiatry, 2010;49(10):980989. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2946114/>

mental disorders. Also the NCS-A, WNC, and ENC (if available) prevalence of SED will be compared with SC inpatient and ER charges as a crude proxy for SED cases receiving services. Then the SC service rates by ICD-9 codes compared with ENC and US prevalence rates will be discussed in relation to research conclusions regarding the adequacy of services provided in ENC and WNC. The ENC mental disorder prevalence rates are for a three month period, so the SC Medicaid billing data might be calculated as the average of four 3-month quarters of a year. Since the ages of children in ENC are calculated for 9-17, the SC Medicaid data will likewise be shown for ages 9-17. **Note: the three tables outlined below will be constructed as soon as the necessary data can be accessed.**

The first comparison is presented below for both one full year and an average of the four 3-month periods of SC Medicaid services aligned with the 3 month prevalence rates in ENC. [version in black if income-based data is available; if not, then blue text] Both SC Medicaid and ENC data are for low income children, though Medicaid also includes children eligible because of disability. The published ENC data is calculated to be representative of all youth, whereas the SC Medicaid data is for low income and disabled children who are at higher risk than all children, as presented for ENC. In order to start the comparison, ENC rates for All, Whites, and African-Americans are compared with the same subgroups for Medicaid in SC. This comparison is admittedly crude but serves to acquaint readers with the comparative levels of prevalence and service rates. **Create 1st table, later revising for ENC low income, if available**

Similarly, the 2010 hospital and ER data is presented first for all payors and then in a second table separately for Medicaid/public insurance compared with NCS-A SED mental disorder ICD-9 prevalence rates, with all tables shown for ages 0-18. **Create 2nd table**

A third comparison presents lifetime use of Medicaid-funded and DMH services by low income and disabled children in SC versus lifetime prevalence of mental disorders for low income US youth. The comparisons of lifetime prevalence up to ages 15 or 16 will require data analysis of the unduplicated number of all Medicaid-funded and non-Medicaid DMH service recipients with mental disorders over their lifetimes. This longitudinal cohort data will be compared with NCS-A prevalence rates through age 16 for youth below 150% poverty. **Insert table 3**

These comparisons are further informed by the services findings of the ENC Caring for Children in the Community Study and the WNC Great Smoky Mountain Study of Youth. The ENC study found that of youth ages 9-17, 21.1% had a DSM-IV diagnosis over a 3 month period and 13.3% had received some form of mental health care. However, over two-fifths of those served had no DSM diagnosis, thus only 36% of those with a mental disorder diagnosis received any mental health care. The major providers of mental

health care were the school systems from which 8.9% of youth received service. Just 4.6% received care from the specialty mental health sector and 2.0% from general medical providers.

Table 21: Use of service for mental health care in the past 3 months* (See Appendix K)⁴⁴.

Sector	Total (N = 920)	White (n = 379)	African American (n = 541)	Female (n = 438)	Male (n = 482)
Specialty mental health	4.6 (3.5-6.0)	6.1 (4.2-8.8)	3.2 (2.1-4.9)†	2.6 (1.5-4.5)	6.6 (4.7-9.1)‡
General medical	2.0 (1.4-3.0)	2.8 (1.6-4.7)	1.4 (0.8-2.5)	1.7 (0.8-3.4)	2.4 (1.5-3.8)
School system	8.9 (7.2-11.0)	8.6 (6.0-12.1)	9.2 (7.0-11.9)	8.6 (6.1-12.0)	9.2 (7.0-12.1)
Juvenile justice	0.6 (0.3-1.1)	0.6 (0.2-1.6)	0.6 (0.2-1.4)	0.3 (0.1-1.2)	0.9 (0.5-1.8)
Child welfare	0.8 (0.4-1.5)	0.4 (0.1-1.2)	1.1 (0.5-2.4)	0.8 (0.3-2.3)	0.7 (0.3-1.6)
Any	13.3 (11.2-15.7)	13.7 (10.5-17.7)	12.9 (10.3-16.0)	11.6 (8.7-15.1)	15.0 (12.0-18.5)

*Data are given as prevalence (95% confidence interval). Statistical comparisons are between boys and girls, and white and African American youth.

†P<.05.

‡P<.01.

Given that only 4.6% of youth in ENC received care from the specialty mental health sector, if all those served had a disorder (though overall from all services sectors two-fifths did not), then slightly more than one-fifth of the youth with a disorder would have received service from the specialty mental health sector. Adjusting for the general rate of those served with no diagnosis, the percent with a disorder received specialty mental health services could have been as low as 13%. Thus the services coverage for specialty mental health providers was approximately 13-21% of those with a diagnosis. White youth were twice as likely to receive care from specialty mental health and general medical providers, whereas African-American youth were slightly more likely than whites to receive mental health services from the school system. Compared with ENC, services in WNC may have been better developed. However, in WNC only 40% of youth with severe emotional disorders received any care and only half of those served (21.6%) received care from the specialty mental health sector.

The ENC and WNC studies together provide a useful orientation to services availability that may be more adequate than exists in SC, except perhaps for school-based mental health counselors in SC. The National Survey of Children’s Health (NSCH) found that half of children in SC with mental problems needed mental health services which they did not receive. SC has the 4th highest rate of unmet mental health needs among all the states. The national percentage of unmet mental health needs is 39% , as compared with 50% in SC. For demographic groups, only Whites and high income families with income above 400% of poverty had lower rates of unmet needs than the overall US average. The groups with the highest unmet need rates were: currently uninsured (87%), ages 2-5 (71%), African-Americans (69%), and Hispanics (64%). To investigate the

⁴⁴ Adrian Angold, Alaattin Erkanli, Elizabeth M.Z. Farmer, John A. Fairbank, Barbara J. Burns, Gordon Keeler and E. Jane Costello. “Psychiatric disorder, impairment, and service use among in Rural African American and White Youth.” Arch Gen Psychiatry. 2002; 59:893-901: <http://archpsyc.jamanetwork.com/Article.aspx?articleid=206784>

gap between estimated need and services received, the SY11 SC Medicaid and hospital discharge service rates versus ENC, WNC, and US prevalence rates can provide a starting point. SC mental disorder rates from the 1995/96 cohort can provide lifetime estimates for services received, as compared with lifetime US prevalence rates from the NCS-A. While this data has serious limitations, looking at the magnitudes of this data should help readers to raise questions that can lead to more complicated and refined analyses in the future.

Health Disorders and Conditions: There are two very important issues that should be investigated regarding childhood health and wellness. The first is: whether childhood adversities and consequent poor health and environment circumstances in childhood are associated with or may cause substantial amounts of the poor health later in life. The second is: to what extent prevention of childhood adversities combined with effective health practices, better environment conditions, and greater supports could improve health status during childhood with the benefits lasting into adulthood. On these questions, the extensive arrays of childhood diseases and disorders make clear and conclusive answers difficult. However, the most practical ways to start our inquiry are to report: a) what research has found regarding the relationships among adverse childhood experiences, mental disorders, and chronic physical health conditions; b) how much is spent on healthcare for the major health problems during childhood, especially those known to have serious consequences in adulthood; and c) how many children receiving reimbursed healthcare suffer from the major diseases and conditions. For the most expensive areas of healthcare expenditure during childhood, those conditions which are more preventable should be the priority. A further issue for investigation is the relationship between health problems during childhood and the subsequent serious health problems during adulthood, particularly those conditions which could be prevented or mitigated both in childhood and for their impact during adulthood. The major focus of this section is on the impact of adverse experiences and environmental circumstances causing toxic stress resulting in physical health conditions.

Major Health Conditions and Cost paid for by Medicaid during Childhood, Adulthood, and Elderly:

Group ages 1-19	Group 2 Description	Fee for Service Cost	Percent Cost	Cumulative Percent Cost
All Diagnoses	Overall	\$128,642,034.97	100.00%	
290-319	Mental Disorders	\$32,027,480.37	24.90%	24.90%
390-459	Diseases of the Circulatory System	\$17,698,078.89	13.76%	38.66%

780–799	Symptoms, Signs, and Ill-Defined Conditions	\$17,020,621.27	13.23%	51.89%
460–519	Diseases of the Respiratory System	\$9,564,470.71	7.44%	59.32%
580–629	Diseases of the Genitourinary System	\$7,750,106.80	6.03%	65.35%
320–359	Diseases of the Nervous System	\$7,190,525.72	5.59%	70.94%
140–239	Neoplasms	\$6,853,410.95	5.33%	76.26%
240–279	Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	\$5,271,283.87	4.10%	80.36%
001–139	Infectious and Parasitic Diseases	\$5,229,138.37	4.07%	84.43%
800–999	Injury and Poisoning	\$5,218,466.92	4.06%	88.48%
520–579	Diseases of the Digestive System	\$4,907,390.88	3.82%	92.30%
710–739	Diseases of the Musculoskeletal System and Connective Tissue	\$4,173,269.86	3.24%	95.54%
E and V codes	External Causes of Injury and Supplemental Classification	\$2,006,234.15	1.56%	97.10%
360–389	Diseases of the Sense Organs	\$1,390,657.75	1.08%	98.18%
680–709	Diseases of the Skin and Subcutaneous Tissue	\$1,234,181.32	0.96%	99.14%
280–289	Diseases of the Blood and Blood-Forming Organs	\$1,035,039.59	0.81%	99.95%
740–759	Congenital Anomalies	\$52,052.19	0.04%	99.99%
760–779	Certain Conditions Originating in the Perinatal Period	\$17,372.84	0.01%	100.00%
630–679	Complications of Pregnancy, Childbirth, and the Puerperium	\$2,252.52	0.00%	100.00%

Group ages 20-64	Description	Fee for Service Cost	Percent Cost	Cumulative Percent Cost
All Diagnoses	Overall	\$1,039,480,322.87	100.00%	
290–319	Mental Disorders	\$314,079,411.57	30.22%	30.22%
630–679	Complications of Pregnancy, Childbirth, and the Puerperium	\$86,803,255.61	8.35%	38.57%
390–459	Diseases of the Circulatory System	\$83,100,236.13	7.99%	46.56%
140–239	Neoplasms	\$67,440,301.44	6.49%	53.05%
800–999	Injury and Poisoning	\$67,013,710.53	6.45%	59.49%
E and V codes	External Causes of Injury and Supplemental Classification	\$61,444,278.66	5.91%	65.41%
460–519	Diseases of the Respiratory System	\$51,859,187.81	4.99%	70.39%
780–799	Symptoms, Signs, and Ill-Defined Conditions	\$48,389,176.41	4.66%	75.05%

710–739	Diseases of the Musculoskeletal System and Connective Tissue	\$44,785,424.81	4.31%	79.36%
520–579	Diseases of the Digestive System	\$44,725,946.35	4.30%	83.66%
580–629	Diseases of the Genitourinary System	\$39,418,244.00	3.79%	87.45%
001–139	Infectious and Parasitic Diseases	\$38,980,089.36	3.75%	91.20%
240–279	Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	\$29,424,361.86	2.83%	94.03%
320–359	Diseases of the Nervous System	\$26,634,419.02	2.56%	96.60%
280–289	Diseases of the Blood and Blood-Forming Organs	\$13,337,161.27	1.28%	97.88%
680–709	Diseases of the Skin and Subcutaneous Tissue	\$13,164,157.87	1.27%	99.15%
360–389	Diseases of the Sense Organs	\$6,060,089.28	0.58%	99.73%
740–759	Congenital Anomalies	\$2,684,690.16	0.26%	99.99%
760–779	Certain Conditions Originating in the Perinatal Period	\$136,180.73	0.01%	100.00%

Group ages 65+	Description	Fee for Service Cost	Percent Cost	Cumulative Percent Cost
All Diagnoses	Overall	\$128,642,034.97	100.00%	
290–319	Mental Disorders	\$32,027,480.37	24.90%	24.90%
390–459	Diseases of the Circulatory System	\$17,698,078.89	13.76%	38.66%
780–799	Symptoms, Signs, and Ill-Defined Conditions	\$17,020,621.27	13.23%	51.89%
460–519	Diseases of the Respiratory System	\$9,564,470.71	7.44%	59.32%
580–629	Diseases of the Genitourinary System	\$7,750,106.80	6.03%	65.35%
320–359	Diseases of the Nervous System	\$7,190,525.72	5.59%	70.94%
140–239	Neoplasms	\$6,853,410.95	5.33%	76.26%
240–279	Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	\$5,271,283.87	4.10%	80.36%
001–139	Infectious and Parasitic Diseases	\$5,229,138.37	4.07%	84.43%
800–999	Injury and Poisoning	\$5,218,466.92	4.06%	88.48%
520–579	Diseases of the Digestive System	\$4,907,390.88	3.82%	92.30%
710–739	Diseases of the Musculoskeletal System and Connective Tissue	\$4,173,269.86	3.24%	95.54%
E and V codes	External Causes of Injury and Supplemental Classification	\$2,006,234.15	1.56%	97.10%
360–389	Diseases of the Sense Organs	\$1,390,657.75	1.08%	98.18%

680–709	Diseases of the Skin and Subcutaneous Tissue	\$1,234,181.32	0.96%	99.14%
280–289	Diseases of the Blood and Blood-Forming Organs	\$1,035,039.59	0.81%	99.95%
740–759	Congenital Anomalies	\$52,052.19	0.04%	99.99%
760–779	Certain Conditions Originating in the Perinatal Period	\$17,372.84	0.01%	100.00%
630–679	Complications of Pregnancy, Childbirth, and the Puerperium	\$2,252.52	0.00%	100.00%

Relationships among Childhood and Adult Health Problems: Research and practice have made important progress in determining the childhood health conditions that affect major adult health problems. No longer is it possible to assume that the most harmful and expensive adult health conditions are just the result of bad genes, though genetic predispositions do play very important roles. Today the impact of poor diet and lack of exercise leading to obesity, heart disease, and diabetes is well-known. The impact of smoking on cancer, COPD, and heart disease is also well-established. The impact of speeding, reckless driving, and not wearing seat belts on death, injuries, and lasting impairment caused by motor vehicle crashes is understood by almost everyone. Similarly the consequences of excessive alcohol consumption are continuously publicized. These are just some of the widely understood links from bad habits in childhood or adolescence to painful adult consequences. However, new opportunities for health promotion and prevention of disorders and diseases are being discovered more rapidly now than ever before, thanks to advanced research methods, mapping of the human genome, and dissemination of research knowledge via the internet and the media. An important example of new, potentially powerful research on paths for prevention of costly disorders and conditions is the research evidence of the impact of ACEs on toxic stress which increases mental disorders and chronic adult health conditions. This knowledge is not the answer to all our health problems, whether chronic illness, disability, and impairment or their crushing cost. But it is an encouraging example of how much policy-makers can learn by following closely the guidance that research and proven-effective practice offers. This guidance suggests new prevention approaches for increasing good health and avoiding unnecessary costs at a time when the burden of ever-growing healthcare expenditures is no longer affordable.

Dr. Felitti has provided a simple presentation of the relationship between ACEs and chronic health conditions as documented among Kaiser Permanente enrollees.

***Medical disease:** We found in the ACE Study that biomedical disease in adults has a significant relationship to adverse life experiences in childhood. The implication of this observation that life*

experience can transmute into organic disease over time is a profound change from an earlier era when infectious diseases like rheumatic fever or polio, or nutritional deficiency like pellagra, would come to mind as the main medical link between childhood events and adult disease. In spite of this change in our understanding of the etiology of biomedical outcomes, we find no evidence that there has been a change in the frequency of overall adverse childhood experiences in various age cohorts spanning the twentieth century. Examples of the links between childhood experience and adult biomedical disease are the relationship of ACE Score to liver disease (Fig. 9), chronic obstructive pulmonary disease or COPD (Fig. 10), coronary artery disease or CAD (Fig. 11), and autoimmune disease. The data for CAD show the effect of ACE Score after correcting for, or in the absence of, the conventional risk factors for coronary disease like hyperlipidemia, smoking, etc.

Figure 9

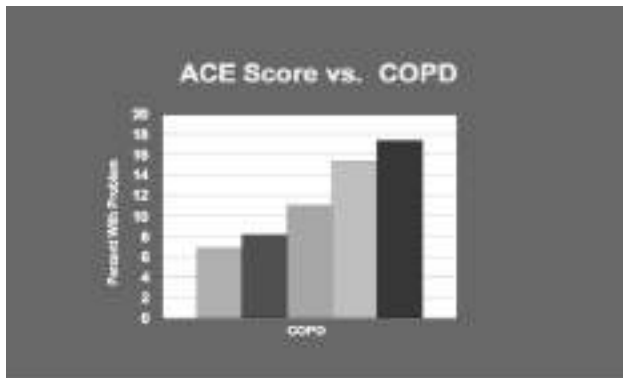


Figure 10

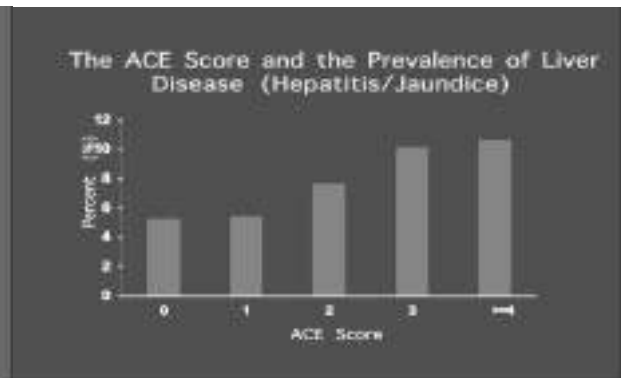


Figure 11

• Emotional abuse	1.7x
• Physical abuse	1.5x
• Sexual abuse	1.4x
• Domestic violence	1.4x
• Mental illness	1.4x
• Substance abuse	1.3x
• Household criminal	1.7x
• Emotional neglect	1.3x
• Physical neglect	1.4x

Certain of these relationships of childhood experience to later biomedical disease might initially be thought to be straightforward, for instance assuming that COPD or CAD are merely the obvious outcomes of cigarette smoking. In this case, one might reasonably assume that the total

relationship of adverse childhood experience to later biomedical disease lies in the observation that stressful early life experience leads to a coping behavior like smoking, which becomes the mechanism of biomedical damage. While this hypothesis is true, it is incomplete; the actual situation is more complex. For instance, in our analysis published in Circulation, we found that there was a strong relationship of ACE Score to coronary disease, after correcting for all the conventional risk factors like smoking, cholesterol, etc. This illustrates that adverse experiences in childhood are related to adult disease by two basic etiologic mechanisms: conventional risk factors that actually are attempts at self-help through the use of agents like nicotine with its documented, multiple psychoactive benefits, in addition to its now well-recognized cardiovascular risks, and the effects of chronic stress as mediated through the mechanisms of chronic hypercortisolemia, pro-inflammatory cytokines, and other stress responses on the developing brain and body systems, dysregulation of the stress response, and pathophysiological mechanisms yet to be discovered. A public health paradox is implicit in these observations. One sees that certain common public health problems, while indeed that, are often also unconsciously attempted solutions to major life problems harkening back to the developmental years. The idea of the problem being the solution, while understandably disturbing to many, is certainly in keeping with the fact that opposing forces routinely co-exist in biological systems. Understanding that it is hard to give up something that almost works, particularly at the behest of well-intentioned people who have little understanding of what has gone on, provides us a new way of understanding treatment failure in addiction programs where typically the attempted solution rather than the core problem is being addressed (See Appendix B).⁴⁵

Supporting Felitti's findings is a growing body of more rigorous research. For example Wegman and Stetler⁴⁶ have summarized the research on the impact of child abuse on physical health conditions through a meta-analysis of 25 studies. The result of the meta-analysis indicated that child abuse was significantly predictive of subsequent health conditions such as Cardiovascular problems (heart attack & stroke, Effect Size = 0.66); Respiratory problems (asthma & bronchitis, ES = 0.71); Gastrointestinal problems (hernia & spastic colon, EC = 0.63); Neurological problems (migraines, ES = 0.94); and Musculoskeletal problems (arthritis & broken bones. ES = 0.81).

Scott and colleagues report on a 10 nation investigation of the relationship between ACEs and mental disorders which found results indicating that both ACEs and early onset mental disorders are associated with increased chronic physical conditions later in life. The methodological issues regarding the validity of this research are presented in [Appendix R](#)⁴⁷. The relationship with onset of chronic physical disorders in adulthood was significant for both mental disorders and ACEs, even when controlling for each other. The following summary of research from the WHO World Mental Health Surveys

⁴⁵ Vincent J. Felitti & Kaiser Permanente. "The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare," Book Chapter for: "The Hidden Epidemic: The Impact of Early Life Trauma on Health and Disease" R. Lanius & E. Vermetten editors. Cambridge University Press, 2009: <http://www.theannainstitute.org/LV%20FINAL%202-7-09.pdf>

⁴⁶ <http://wwwtemp.furman.edu/academics/psychology/FacultyandStaff/Stetler/Documents/Wegman%20%20Stetler%202009.pdf>

⁴⁷ Kate M. Scott, Michael Von Korff et al. "Association of Childhood Adversities and Early-Onset Mental Disorders With Adult-Onset Chronic Physical Conditions." Arch Gen Psychiatry. 2011;68(8):838-844: http://share.eldoc.ub.rug.nl/FILES/root2/2011/Assoofcha/Scott_2011_Arch_Gen_Psychiatry.pdf

Initiative offers new insights about cause and effect and suggests opportunities for prevention in childhood to reduce the huge burden of chronic physical conditions during adulthood. Many of the actions to prevent toxic stress and thereby reduce chronic physical conditions and mental disorders are largely the same as those to prevent child maltreatment and also to promote positive child development resulting in the educational skills and personal traits necessary to be effective in tomorrow's workforce. These are the actions outlined, though briefly, in Appendix C by the Center on the Developing Child.

***Results:** A history of 3 or more childhood adversities was independently associated with onset of all 6 physical conditions (hazard ratios, 1.44 to 2.19). Controlling for current mental disorder made little difference to these associations. Early-onset mental disorders were independently associated with onset of 5 physical conditions (hazard ratios, 1.43 to 1.66).*

***Conclusions:** These results are consistent with the hypothesis that childhood adversities and early-onset mental disorders have independent, broad-spectrum effects that increase the risk of diverse chronic physical conditions in later life. They require confirmation in a prospectively designed study.*

Table 22: Associations between specific early-onset mental disorders and childhood adversities with the subsequent onset of chronic physical conditions in adulthood ^a

Variable	HR (95% CI) ^b					
	Heart Disease	Asthma	Diabetes Mellitus	Osteoarthritis	Chronic Spinal Pain (Back or Neck)	Frequent or Severe Headache
Early-onset (ie, at age <21 years) mental disorders						
Major depressive disorder	1.82 (1.67-3.09)	2.11 (1.51-2.93)	1.14 (0.88-1.47)	1.52 (1.26-1.85)	1.59 (1.37-1.95)	1.68 (1.40-2.03)
Generalized anxiety disorder	1.42 (0.78-2.59)	1.46 (0.89-2.38)	1.02 (0.57-1.80)	1.89 (1.32-2.17)	2.81 (1.84-2.45)	1.85 (1.32-2.66)
Social phobia	1.89 (1.30-2.59)	1.19 (0.85-1.67)	1.07 (0.70-1.46)	1.54 (1.34-1.76)	1.52 (1.34-1.73)	1.61 (1.35-1.91)
Posttraumatic stress disorder	2.39 (1.51-3.79)	1.95 (1.07-3.58)	1.08 (0.67-1.73)	1.81 (1.50-2.43)	2.27 (1.75-2.92)	1.65 (1.19-2.50)
Panic disorder or agoraphobia	2.32 (1.49-3.63)	2.05 (1.34-3.18)	1.32 (0.80-2.18)	1.68 (1.38-2.03)	1.82 (1.32-1.99)	1.76 (1.37-2.25)
Childhood adversity						
Physical abuse	1.82 (1.37-2.43)	1.92 (1.32-2.81)	1.52 (1.16-2.00)	1.42 (1.22-2.09)	1.61 (1.43-1.82)	1.54 (1.44-1.68)
Sexual abuse	3.91 (2.40-6.39)	1.20 (0.84-1.82)	0.99 (0.63-1.55)	1.64 (1.28-2.09)	1.62 (1.28-2.05)	1.73 (1.38-2.17)
Neglect	1.37 (0.98-1.91)	1.02 (0.70-1.49)	1.02 (0.74-1.42)	1.29 (1.08-1.55)	1.33 (1.15-1.54)	1.21 (1.02-1.43)
Parental death	1.34 (1.05-1.70)	1.34 (1.01-1.77)	0.91 (0.71-1.18)	1.02 (0.89-1.18)	1.08 (0.95-1.22)	1.10 (0.93-1.31)
Parental divorce	1.31 (0.98-1.80)	1.23 (0.84-1.82)	1.37 (1.01-1.96)	1.02 (0.86-1.22)	1.16 (1.01-1.34)	1.01 (0.84-1.22)
Other loss of parent ^c	1.41 (1.03-1.93)	1.36 (0.94-1.97)	1.58 (1.12-2.23)	1.26 (1.04-1.54)	1.26 (1.08-1.48)	1.29 (1.05-1.58)
Parental mental disorder	1.58 (1.18-2.12)	1.50 (1.05-2.17)	1.04 (0.74-1.47)	1.27 (1.07-1.51)	1.42 (1.24-1.63)	1.52 (1.25-1.83)
Parental substance use disorder	1.73 (1.18-2.60)	1.28 (0.83-1.97)	1.30 (0.92-1.84)	1.38 (1.14-1.67)	1.31 (1.12-1.54)	1.42 (1.18-1.71)
Violence in family	1.31 (0.95-1.82)	1.51 (1.05-2.17)	1.16 (0.87-1.55)	1.39 (1.16-1.67)	1.52 (1.32-1.74)	1.51 (1.30-1.76)
Criminal behavior in family	1.47 (0.87-2.47)	1.37 (0.82-2.31)	1.81 (1.25-2.59)	1.36 (1.07-1.71)	1.32 (1.08-1.62)	1.44 (1.10-1.88)
Family economic adversity	1.41 (0.96-2.07)	0.90 (0.61-1.33)	1.44 (1.04-1.98)	1.08 (0.93-1.26)	1.13 (0.95-1.34)	1.21 (0.98-1.48)

Abbreviations: CI, confidence interval; HR, hazard ratio.

^aAll models were adjusted for age, sex, and country, and models for heart disease and asthma were additionally adjusted for smoking status.

^bBold HRs are significant at $P < .05$.

^cFor example, adoption, foster care, or leaving home before the age of 16 years.

Table 23: Independent associations between early-onset mental disorders and number of children adversities with the subsequent onset of chronic physical conditions in adulthood^a

Variable	HR (95% CI) ^b					
	Heart Disease	Asthma	Diabetes Mellitus	Osteoarthritis	Chronic Spinal Pain (Back or Neck)	Frequent or Severe Headache
Any early-onset (ie, at age <21 years) mental disorder	1.66 (1.26-2.18)	1.54 (1.17-2.03)	1.06 (0.88-1.33)	1.43 (1.28-1.61)	1.56 (1.40-1.73)	1.62 (1.42-1.85)
Number of childhood adversities						
1	1.23 (0.96-1.52)	1.21 (0.96-1.54)	1.05 (0.84-1.34)	1.00 (0.88-1.14)	1.13 (1.02-1.25)	1.40 (1.22-1.60)
2	1.55 (1.19-2.03)	1.43 (1.04-1.98)	1.19 (0.98-1.62)	1.27 (1.08-1.50)	1.34 (1.17-1.54)	1.41 (1.19-1.67)
≥3	2.19 (1.59-3.01)	1.55 (1.06-1.28)	1.59 (1.20-2.09)	1.44 (1.24-1.67)	1.59 (1.36-1.82)	1.63 (1.37-1.95)

Abbreviations: CI, confidence interval; HR, hazard ratio.

^aAll models were adjusted for age, sex, and country, and models for heart disease and asthma were additionally adjusted for smoking status. Models with early-onset mental disorders as predictors were adjusted for childhood adversities; models with childhood adversities as predictors were adjusted for early-onset mental disorders.

^bBold HRs are significant at $P < .05$.

In this 10-country study, multiple childhood adversities and early-onset mental disorders were found to be independent predictors of a range of adult-onset chronic physical conditions. It is notable that the predictors were as strongly associated with the diagnosed medical conditions as they were with the symptomatic pain conditions. The association between 3 or more childhood adversities and the physical condition outcomes was generalized, occurring for all outcomes included in the study. It was largest in magnitude for heart disease, but all associations were within a fairly narrow range (HR, 1.44-2.19). Similarly, some early-onset mental disorders (especially major depressive disorder, PTSD, and panic disorder) were associated with the onset of all physical health outcomes except diabetes mellitus. These analyses did not take into account the severity or the precise timing of onset of the childhood adversities or the early-onset mental disorders. These associations should therefore be considered averages. Such averaged estimates

probably underestimate the strength of association between the more severe adversities or mental disorders occurring at critical childhood developmental stages. In conclusion, the results of this cross-national study are consistent with the hypothesis that childhood adversities and early-onset mental disorders have independent associations with adult onset of a spectrum of chronic physical conditions. Although the retrospective nature of these data precludes strong causal inference, the results are consistent with current theories of the role of allostatic load in the theorized cause of diverse chronic physical conditions. This study indicates a need for existing and future prospective studies to investigate the role of both childhood adversities and early-onset mental disorders in predicting a range of chronic physical conditions, while taking into account the potentially long time frame for the expression of associations between these early-life psychosocial risk factors and later disease outcomes.

Additional research on health conditions with serious pain and impairment consequences imposing substantial expenditures must be investigated. The focus of this investigation should be those serious conditions which can either be prevented or treated to eliminate long-term physical consequences and substantial cost. For our current analysis, the initial inquiry should address the potential for prevention and mitigation of adverse childhood experiences and toxic stress.

The Impact of ACEs on Risk Behaviors: The relationship between ACEs and risk-taking has been addressed by Dr. Felitti, based on retrospective recall of adversity during childhood and adolescence and linked to self-reported risk behaviors in subsequent years.

Health risks: *The most common contemporary health risks are smoking, alcoholism, illicit drug use, obesity, and high-level promiscuity. Though widely understood to be harmful to health, each is notably difficult to give up. Conventional logic is not particularly useful in understanding this apparent paradox. As though opposing forces are not known to exist commonly in biological systems, little consideration is given to the possibility that many long-term health risks might also be personally beneficial in the short term. For instance, American Indians understood the psychoactive benefits of nicotine for centuries with their peace pipe, before its risks were recognized. We repeatedly hear from patients of the benefits of these “health risks.” Indeed, relevant insights are even built into our language: “Have a smoke, relax.” “Sit down and have something to eat. You’ll feel better.” Or, need ‘a fix’, referring to intravenous drug use. Conversely, the common reference to “drug abuse” serves to conceal the short-term functionality of such behavior. It is perhaps noteworthy that the demonized street drug, crystal meth, is the very compound that was introduced in pure form and reliable dosage in 1940 as one of the first prescription antidepressants in the United States: methamphetamine. In the ACE Study, we found strong, proportionate relationships between the number of categories of adverse childhood experience (ACE Score) and the use of various psychoactive materials or behaviors. The saying, “It’s hard to get enough of something that almost works.” provides insight. Three common categories of what are usually termed addictions (the unconscious compulsive use of psychoactive agents) are illustrated in this section. Self-acknowledged current smoking (Fig. 12), self-defined alcoholism (Fig. 13), and self-acknowledged injection drug use (Fig. 14) are strongly related in a proportionate manner to our several specific categories of adverse*

experiences during childhood. Additionally, we found that poor self-rated job performance correlates with ACE Score.

Figure 12

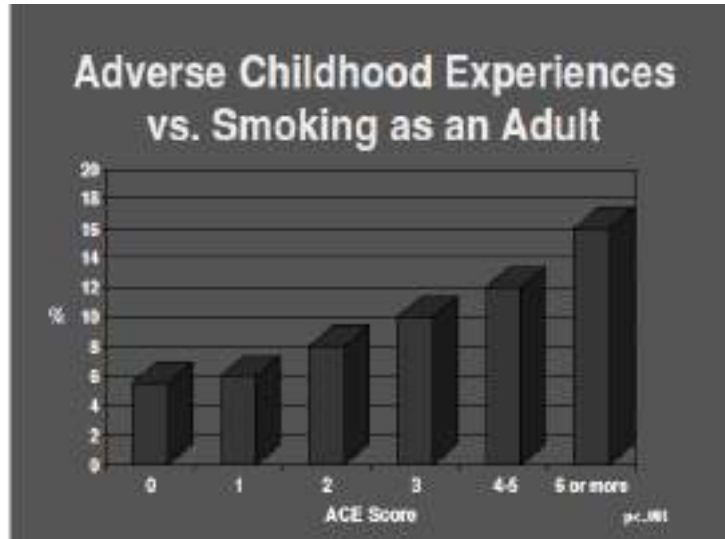
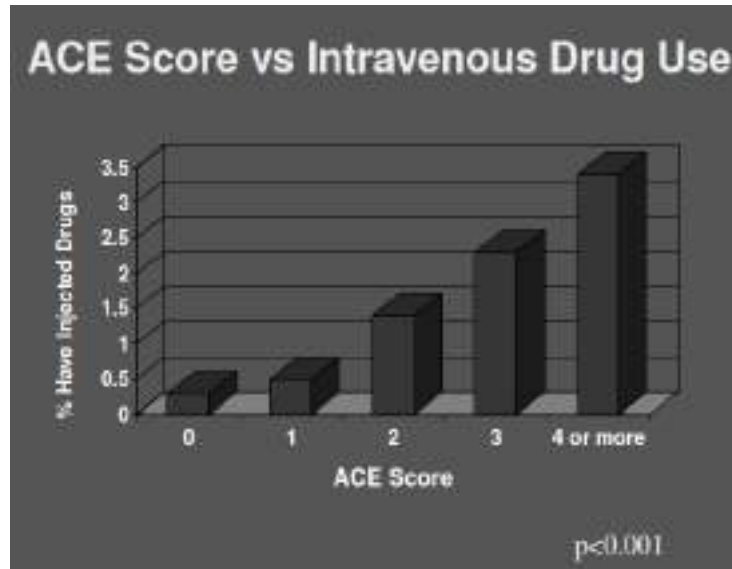


Figure 13



Figure 14



The relationship of ACE Score to IV drug use is particularly striking, given that male children with ACE Score 6 or more have a 4,600% increased likelihood of later becoming an injection drug user, compared to an ACE Score 0 male child; this moves the probability from an arithmetic to an exponential progression. Relationships of this magnitude are rare in epidemiology. This, coupled with related information, suggests that the basic cause of addiction is predominantly experience-dependent during childhood and not substance-dependent. This challenge to the usual concept of the cause of addictions has significant implications for medical practice and for treatment programs ([See Appendix B](#)).

The explanation by Dr. Felitti does not address the impact of the adversities on and through the brain as Dr. Shonkoff and others have emphasized by attributing to adversity the serious alteration in impulse control by the prefrontal cortex or changes in the release of cortisol and adrenaline. Dr. Felitti seems to attribute addiction more to the psychological reactions to adversity, apparently as emotional or ideational feelings rather than primarily to the bio-chemistry of the brain.

Our findings indicate that the major factor underlying addiction is adverse childhood experiences that have not healed with time and that are overwhelmingly concealed from awareness by shame, secrecy, and social taboo. The compulsive user appears to be one who, not having other resolutions available, unconsciously seeks relief by using materials with known psychoactive benefit, accepting the known long-term risk of injecting illicit, impure chemicals. Given that the conventional concept of addiction is seriously flawed, and that we have presented strong evidence for an alternative explanation, we propose giving up our old mechanistic explanation of addiction in favor of one that explains it in terms of its psychodynamics: unconscious although understandable decisions being made to seek chemical relief from the ongoing effects of old trauma, often at the cost of accepting future health risk. Expressions like 'self-destructive behavior' are misleading and should be dropped because, while describing the acceptance of long-term risk, they overlook the importance of the obvious short-term benefits that drive the use of these substances.

*This revised concept of addiction suggests new approaches to primary prevention and treatment. The current public health approach of repeated cautionary warnings has demonstrated its limitations, perhaps because the cautions do not respect the individual when they exhort change without understanding. Adverse childhood experiences are widespread and typically unrecognized. These experiences produce neurodevelopmental and emotional damage, and impair social and school performance. By adolescence, children have a sufficient skill and independence to seek relief through a small number of mechanisms, many of which have been in use since biblical times: drinking alcohol, sexual promiscuity, smoking tobacco, using psychoactive materials, and overeating. These coping devices are manifestly effective for their users, presumably through their ability to modulate the activity of various neurotransmitters. Nicotine, for instance, is a powerful substitute for the neurotransmitter acetylcholine. Not surprisingly, the level of some neurotransmitters varies genetically between individuals. It is these coping devices, with their short-term emotional benefits, that often pose long-term risks leading to chronic disease; many lead to premature death. Addiction is not a brain disease, nor is it caused by chemical imbalance or genetics. Addiction is best viewed as an understandable, unconscious, compulsive use of psychoactive materials in response to abnormal prior life experiences, most of which are concealed by shame, secrecy, and social taboo. Felitti: The Origins of Addiction: Evidence from the Adverse Childhood Experiences Study (See Appendix S).*⁴⁸

This suggests an attitudinal or unconscious determinism rather than primarily brain-based causality through bio-chemical factors which reduce self-control and increase impulsivity as a result of altered functioning of the prefrontal cortex. Felitti's findings for the relationship of ACEs with substance abuse have been reinforced by similar evidence from the Comorbidity Survey. Drs. Green, and colleagues found that 26% of Population Attributable Risk Proportions for Substance Abuse during ages 13-19 and 20-29 and 32% for adults ages 30 and older were explained in a predictive sense by Childhood Adversities. The strongest odds ratios for specific ACEs related to substance abuse were parental substance abuse, family violence, neglect, and sexual abuse.

Drs. Felitti and Anda apply their same causal analysis to the impact of ACEs on sexual behavior (See Appendix B)⁴⁹.

Sexual Behavior: *Using teen pregnancy and promiscuity as measures of sexual behavior, we found that ACE Score has a proportionate relationship to these outcomes (see figures below). So too does miscarriage of pregnancy, indicating the complexity of the relationship of early life psychosocial experience to what are usually considered purely biomedical outcomes.*

⁴⁸ Vincent J. Felitti. "The Origins of Addiction: Evidence from the Adverse Childhood Experiences Study (2004)":

<http://www.niic.org/pdfs/Subject%20Matter%20Articles/Drugs%20and%20Alc/ACE%20Study%20-%20OriginsofAddiction.pdf>

⁴⁹ Vincent J. Felitti & Kaiser Permanente. "The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare," Book Chapter for: "The Hidden Epidemic: The Impact of Early Life Trauma on Health and Disease" R. Lanius & E. Vermetten editors. Cambridge University Press, 2009: <http://www.theannainstitute.org/LV%20FINAL%202-7-09.pdf>

Figure 15

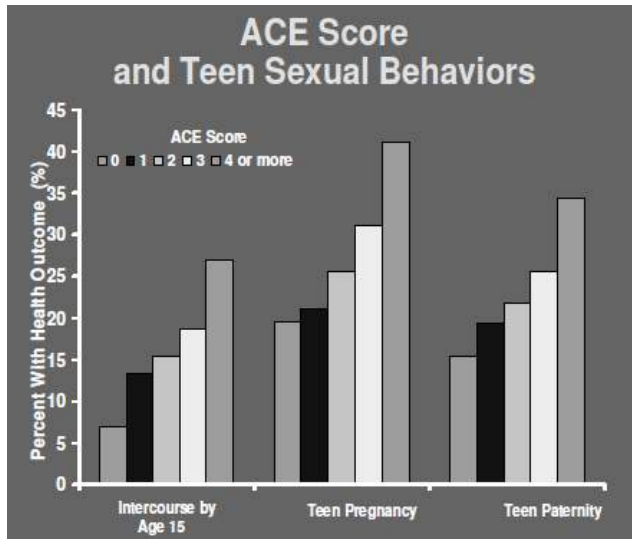
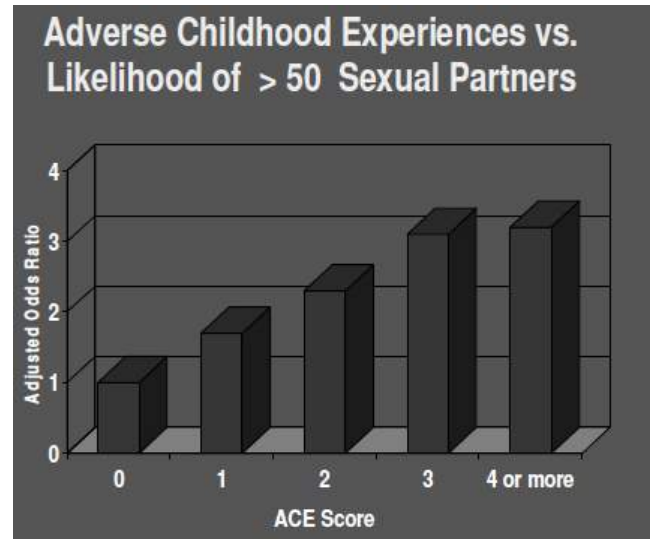


Figure 16



The cross-tabulated associations of ACEs with risk behaviors during adolescence and adulthood have been supported by the findings of McLaughlin and colleagues for adolescents ages 13-17 from the NCS-A data. This research found that ACEs had odds ratios for onset of Substance Abuse ranging from 1.8 to 4.8 (average 2.6) for Maladaptive Family Functioning, though not for parental death and divorce or for economic adversity.

Table 24: Multivariate associations between childhood adversities (CAs) and first onset of DSM-IV disorder classes based on model 5 among 6483 adolescent-parent pairs (See appendix T)⁵⁰ + multivariate associations between childhood adversities (CAs) and the persistence of DSM-IV/CIDI classes of disorders based on a simple interactive model (n=10915)(See Appendix U)⁵¹

Variable	DSM-IV Disorder Class, Odds Ratio for Onset (n=6483) (95% CI)	DSM-IV Disorder Class, Odds Ratio for Persistence (n=10915)
Maladaptive family functioning CAs	Substance Abuse	Substance Abuse
Emotional abuse	2.3 (1.3-4.1)	X
Physical abuse	2.0 (0.8-4.7)	1.3 (1.1-1.7)
Sexual abuse	4.8 (2.2-10.2)	1.6 (1.2-2.1)
Neglect	2.7 (1.1-6.8)	1.1 (0.8-1.5)
Parental mental illness	1.8 (1.2-2.8)	1.2 (0.9-1.5)
Parental substance abuse	2.4 (1.0-5.5)	1.5 (1.1-2.0)
Parental criminality	2.6 (1.8-3.6)	1.1 (0.8-1.5)
Family violence	2.4 (1.3-4.3)	1.4 (1.1-1.7)

⁵⁰ Katie A. McLaughlin, Jennifer Greif Green *et al.* "Childhood Adversities and First Onset of Psychiatric Disorders in a National Sample of US Adolescents." *Arch Gen Psychiatry*. 2012;69(11):1151-1160: <http://archpsyc.jamanetwork.com/article.aspx?articleid=1389368>

⁵¹ Katie A. McLaughlin, Jennifer Greif Green *et al.* "Childhood Adversities and Adult Psychiatric Disorders in the National Comorbidity Survey Replication II: Associations with Persistence of DSM-IV Disorders." *Arch Gen Psychiatry*. 2010 Feb;67(2):124-32: <http://archpsyc.jamanetwork.com/article.aspx?articleid=210588>

Other CAs		
Parent death	1.1 (0.6-2.2)	1.0 (0.8-1.2)
Parent divorce	1.0 (0.6-1.6)	1.0 (0.8-1.2)
Other parental loss	0.8 (0.4-1.6)	0.8 (0.6-1.0)
Physical illness	X	0.8 (0.6-1.1)
Family economic adversity	0.5 (0.2-1.0)	1.0 (0.8-1.3)

Table 25: Simulated effects of CAs on proportional increase in mean duration between time of interview and time of most recent episode in subsamples defined by the cross-classification of disorder type and respondent age at interview

	Overall			Age 18-29 y			Age 30-44 y			Age 45-59 y			Age ≥60 y		
	Mean		Difference, %	Mean		Difference, %	Mean		Difference, %	Mean		Difference, %	Mean		Difference, %
	Mean _r	Mean _u		Mean _r	Mean _u		Mean _r	Mean _u		Mean _r	Mean _u		Mean _r	Mean _u	
Mood	3.8	3.7	4.9	1.4	1.3	6.2	2.6	2.3	12.5	6.0	5.8	4.0	11.8	11.3	5.1
Anxiety	10.9	10.8	0.6	2.0	2.0	-1.5	9.3	9.1	1.5	15.6	15.7	-0.6	32.2	32.0	3.7
Substance use	7.4	7.3	2.1	1.8	1.8	2.2	6.9	6.6	3.3	11.3	11.0	2.7	15.2	13.7	10.7
Disruptive behavior ^b	9.2	9.3	-1.2	4.7	4.8	-2.5	11.5	12.3	-6.5	NA	NA	NA	NA	NA	NA
Any	8.4	8.3	1.6	3.0	2.9	1.4	8.1	7.9	2.7	11.4	11.2	2.0	20.0	19.7	1.3

Abbreviations: CA, childhood adversity; mean_r, mean number of years in the restricted model; mean_u, mean number of years in the unrestricted model; NA, not applicable.

Hopefully, additional rigorous research will investigate the relationship of ACEs with other risk behaviors such as violence, sexual promiscuity, and dangerous activities.

Executive Function Mental Processing Consequences for EC and Education: For more than 5 decades an ever-growing body of research has investigated early childhood development and its consequences. This research has been focused more on school readiness and education outcomes than other domains, partly because of concern for education as the most practical approach to increasing school achievement, improving workforce preparedness, and thereby reducing poverty. This paradigm became institutionalized when President Johnson’s War on Poverty created the political environment for funding Head Start and the Elementary and Secondary Education Act. The subsequent half-century of efforts to reduce poverty has given special attention to early childhood because most educational deficits of poor and minority children are already quite large even as early as preschool or kindergarten. Given this paradigm, research has focused more on language and literacy than emotional, behavioral, and health deficits, though not exclusively so. More recently this focus has been lamented by developmentalists, as represented by the complaint of Dr. Jack Shonkoff and his colleagues at the National Scientific Council on the Developing Child ([See Appendix C](#)) and by the expert committees of the American Academy of Pediatrics in a technical report entitled: *Lifelong Effects of Early Childhood Adversity and Toxic Stress* ([See Appendix B](#)). “As concerns continue to grow about the quality of public education and

its capacity to prepare the foundations of learning, increasing investments are being made in 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 also are likely to strengthen the foundations of physical and mental health, which would generate even larger returns to all of society. 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.”⁵²

The EC education paradigm manifests itself in policy debates over investment in preschool education (generally at age 4) versus comprehensive approaches from birth (or conception, even pre-conception) through age 3 during which health, social-emotional, childcare, parenting, and family support services are major concerns. The challenges of ACEs and toxic stress provide support for increased emphasis on comprehensive 0-3 approaches, with school readiness as only one of many considerations. Looking at childhood development as requiring multifaceted preventive interventions starting before or at birth results in two conflicting considerations: far greater complexity and cost of interventions versus many more and much greater benefits. Because of its substantially greater complexity, the B-3 (or Pre-B-3) approach is too complicated for most policy-makers and EC advocates. It also is far more difficult to evaluate, especially quantifying costs and benefits which can be summarized as succinctly as “Perry Preschool has a 17:1 benefit to cost ratio”. Too often this is understood to imply that funding any kind of preschool should be supported (usually disregarding whether its quality even remotely resembles that of Perry Preschool). The B-3 period is much harder to investigate because it occurs primarily in private arenas, mainly at home. Moreover, childrearing is dominated by family members who are naturally reluctant to report accurately, if at all, on the weaknesses of their own parenting, though one parent may be willing to report critically on the parenting by other family members. Also very young children are unable to answer surveys and cannot later remember accurately or at all to recall early experiences. Even research based on evaluator observations of the natural caregiving environment is limited in quantity and skewed by behavior change of those being observed because of the presence of the observer. The result is much weaker quality and quantity of data from research.

B-3 Research Findings on Early Education: Despite the limitations of the B-3 research, it offers more than enough to bring to our attention many critical matters of concern, especially things that seem obvious. A good place to start would be reviewing data

⁵² Vincent J. Felitti & Kaiser Permanente. “The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare,” Book Chapter for: “The Hidden Epidemic: The Impact of Early Life Trauma on Health and Disease” R. Lanius & E. Vermetten editors. Cambridge University Press, 2009: <http://www.theannainstitute.org/LV%20FINAL%202-7-09.pdf>

summarizing with whom young children spend their time and then presenting research on what is known about the quality and impact of parenting. Data on the waking hours of young children underscores the critical role of parents and other family in determining the environment and the developmental experiences (the EBD context) of young children.

A 2002 survey of families with young children in South Carolina found that African American children under age 5 spent 53% of their waking hours with their mothers, though sometimes with other adults also present. White children spent 59% of their waking hours in maternal care. Of the 47% of their time in non-maternal care, African American children spent 21.5% in child care, 12% with relatives, and 13.5% with fathers (spousal care). White children spent 18% in childcare, 10% with relatives, and 13% with fathers. Thus small children spent four-fifths of all waking hours before age 5 with parents or relatives: 78.5% for African American children and 82% for White children. This survey data verifies the widespread impression that early childhood development for the overwhelming majority of children is dominated by family influences, especially maternal interactions.

Table 26: Waking hours---2002 survey of families with young children in South Carolina

WAKING HOURS AGES 0-4		
Caregiver	% African American	% White
Not with Mom	47%	41%
With Mom	53%	59%
Total	100%	100%

Source: DSS Childcare Survey.

Table 27: Child care hours---2002 survey of families with young children in South Carolina

CHILD CARE HOURS AGES 0-4		
	% African American	% White
Childcare Center	12%	11%
Family Childcare	5%	4%
4K	2%	1.6%
Head Start or Early Head Start	1.2%	0.5%
Friends, Neighbors, Sitters	1.4%	1.4%
Total	21.5%	18.4%

Source: DSS Childcare Survey.

Parenting Influence: Although the impact of the family is more difficult to illustrate with data, important national research is available to describe the components and impact of parenting. The Spring 2005 journal edition of the *Future of Children* entitled *School Readiness: Closing the Racial and Ethnic Gaps* ([See Appendix V](#))⁵³ provides an overview of the impact of parenting on academic achievement gaps.

In an active sense, parenting is essentially parent-child interactions of which mothers typically constitute the substantial majority. Fathers and relatives each constitute a significant share of non-maternal interactions with young children. In the passive sense, parents provide the physical environment that shapes early development in many ways. In South Carolina, young children spend four times the hours with mothers and other family members than in child care or other environments away from family. Though parent-child interaction could be categorized in many ways, the components of parenting developed by Jeanne Brooks-Gunn and Lisa Markman are quite adequate for our report. Their analysis includes important information on how each parenting component can be assessed in research. *“Parenting encompasses the literally hundreds of activities that parents engage in either with or for their children. Often, researchers divide parenting into categories of behavior. In this article we use seven: **nurturance, discipline, teaching, language, monitoring, management, and materials**”* ([See Appendix W](#)).⁵⁴

Parenting Impact on the Achievement Gap: It is very difficult to determine the impact of parenting and other influences on sub-group differences such as the achievement gap. Fortunately, Brooks-Gunn and Markman have reviewed and summarized the research evidence. Their conclusion is that parenting differences across racial groups are both substantial and responsible for possibly the largest part of the achievement gap between African Americans and whites.

***Reduction in Racial Gaps in School Readiness as a Function of Parenting:** The racial differences in parenting do account for a portion of the racial gap in school readiness. In general, researchers who have conducted such analyses report that a 12 to 15 point gap between black and white children is reduced by 3 to 9 points when parenting is considered. Most national studies that follow a group of the same children over time use the Learning Scale as a measure of parenting. This particular measure of parenting is often posited to be one of the pathways through which parental income, education, marital status, and age affect children (just as language input and shared book reading are pathways through which family social class influences school readiness). Taking this measure into account narrows the racial gap in such early childhood outcomes by one-third to one-half.*⁵⁵

⁵³ The Future of Children. “School Readiness: Closing the Racial and Ethnic Gaps.” Vol. 15 No. 1, Spring 2005: http://futureofchildren.org/futureofchildren/publications/docs/15_01_FullJournal.pdf

⁵⁴ Jeanne Brooks-Gunn and Lisa B. Markman. “The Contribution of Parenting to Ethnic and Racial Gaps in School Readiness.” The Future of Children. Vol. 15 No. 1, Spring 2005: https://www.princeton.edu/futureofchildren/publications/docs/15_01_08.pdf

⁵⁵ Id.

Based on available research, Brooks-Gunn and Markman found convincing evidence ([see Appendix W](#)) of substantial differences in those parenting practices known to impact child development. Research appears to find a consistent pattern of racial, ethnic, and socio-economic differences in the critical parenting practices of nurturance, discipline, teaching, language, and materials in the home. Thus, research provides critical evidence of a “parenting gap” closely associated with and thought to cause a significant portion of the “achievement gap”. Additional research is needed on the more extreme deficits in parenting and the family environment (such as ACEs) in order to assess their role in causing toxic stress.

Early Childhood and Outcomes in SC: Over several years, SC Kids Count created and has followed a cohort of all births in 1995/96 up to 2012. This analysis has focused on the characteristics of children at greatest risk of poor outcomes in school and elsewhere. Since this data was accessed through the ORS Data Warehouse, it has provided the best of readily available perspectives on early childhood risk factors. Unfortunately, the data comes mainly from agencies and other routinely collected program files which do not contain many variables needed to compare with those used in advanced EC research. Fortunately, enough good information is available to provide numerous critical perspectives. The table below provides a broad but selective overview of the relationships between risk groups and risk factors with subsequent outcomes. Some of the highlighted risk factors/groups during early childhood from the table are: (a) low family literacy (mother with less than HS degree), (b) disability, (c) emotional-behavioral (executive function) problems, (d) low income, (e) mental disorders (at any age), (f) minority males, (g) Child Protective Services or foster care.

- Three EC characteristics are highlighted as potential problems that can be further assessed about the child for selection into programs: low family literacy, disability, and emotional-behavioral problems. They affect 4 in every 10 children, leaving 59% with none of these 3 risks.
- In grade 3 for children with 0, 1, 2, or all 3 risks, the percentages who scored below basic on ELA or math were: none = 14%; one = 32%; two = 55%; all three = 69%. In grade 8 the percentages for 0, 1, 2, or all 3 risks not meeting math standards were: none = 27%; one = 46%; two = 66%; all three = 78%. Thus, multiple risk characteristics are associated with a steadily increasing rate of bad outcomes.
- For various individual risks, the percentages not meeting math standards in grade 8 were: low educated mother = 55%, disability = 51%, emotional-behavioral problems = 61%, low income = 49%, mental disorders (at any age) = 57%, minority male = 53%.
- For the highlighted three risk groups, the percentages who had a juvenile delinquency record were: none = 6%; one = 12%; two = 17%; all three = 22%.

- For children in CPS or foster care before age 4, 44% were below basic in grade 3, 59% did not meet standards for math in grade 8, and 21% had a juvenile justice record by age 15.
- Of minority males, 38% were below basic in grade 3, 53% did not meet standards for math in grade 8, and 14% had a juvenile justice record by age 15.
- Of children with a recorded mental disorder at any age: 38% were below basic in grade 3, 55% did not meet standards for math in grade 8, and 18% had a juvenile justice record by age 15.
- Of children born to a mother under age 18: 37% were below basic in grade 3, 52% did not meet standards for math in grade 8, and 14% had a juvenile justice record by age 15.

Note: replace the table below with the most recent one from Deiana

Table 28: South Carolina Cohort Data

RISK FACTORS / South Carolina			% Below Standards		% Far Below Standards		% Standards not met			% of the girls who got pregnant	% w/ Juvenile Justice Records
			Grade 3	Grade 5	Grade 3	Grade 5	8th grade				
Early Childhood Group/Cohort	N	Percent of the Cohort	BB	BB	BB1	BB1	ELA	Writing	Math		
Having None of the Three Risk Factors	23,358	59	14	22	6	9	27	19	27	0.4	4
Having Any of the Three Risk Factors	16,529	41	39	48	21	27	51	45	51	0.86	10
Having Only Disability (Any kind)	4,616	12	31	40	17.5	23	42	37	40	0.3*	5
Having Only Low Educated Mother (Educ. <12 years)	5,195	13	31	42	15	20	48	38	48	1.25	11
Having Only The 4 Emotional /Behavioral Problems	2,615	7	35	46	18	23	48	42	50	**	9
Having only one of the risk factors	12,426	31	32	42	16.5	22	46	39	46	0.85	8.4
Having Disability and Low Educated Mother	1,305	3	53	63	32	42	62.5	62	61	**	13
Having Disability and Emotional Problems	1,237	3	59	67.5	37	47	66	66	70	**	11
Having Low Educated Mother and All 4 Emotional problems	1,012	3	52	63	29	37	63	61	68	**	17
Having any two of the risk factors	3,554	9	55	64	32.5	42	64	63	66	0.84*	13
Having three of the risk factors	549	1.4	69	81	45	62	77	80	78	**	14
Having Free/Reduced Lunch	20,940	52	35	46.5	18	24	50	42	51	0.9	10
Having Low Educated Mother: less than 12 years of education	8,061	18	39.5	50	21	28	54	48	55	1.2	12
Having Any Disability	7,707	17	42	51	25	33	52	48.5	51	0.5*	8
Having Emotional / Behavioral Problem	5,413	12	47	57	27	35	58	55	61	0.7	11.5
Foster Care or CPS before age of 4	1,263	3	44	54	24	32	57	51	59	1.2*	16
Mom age less than 18	2,682	8	37	46	18	25	52	45	52	1.2	11
Mom Age 18-20	3,737	11	32	43	17	21	48.5	39	48	1	9
Low Birth Weight (under 2000g)	1,087	3.2	39	50	23	27	46	43	51	**	6
Low Birth weight (2000-2500g)	2,026	6	33	41	15.5	20	44	36	47	**	8
TANF, FOOD STAMPS or Medicaid before 4	22,692	51	32	44	17	23	48	40	49	0.79	9.3
African American and Other/Male	9,688	22	40	53.5	22.5	30	57	50	53	-	12
African American and Other/Female	9,324	21	30	40	14	19	42	32	48	0.8	6
White/Male	13,189	30	17	23	8.5	12	29	26	26	-	5.6
White/Female	12,403	28	13	17	5.5	7	20	13	24	0.3	2.7
All cohort children	44,604*	100	24	32	12	16	35.5	29	36	0.5	6.3

- This table was composed for students from 1995-96 cohort using ELA and MATH PACT test scores.
- Pass 2010 was used for the 8th grade outcomes, which are not comparable with PACT test results.
- Small numbers for numerator and denominator make the percentages unreliable. Please use caution while interpreting

- ** Numerator less than 5.
- **Disability:** Disability info from years 2001,2002, 2003, which are for grades: PK, K, and grade1;
- 4 emotional factors are from SCRA (Kindergarten SY 2001-02) Emotional problems (from SCRA): 1) Self- concept; 2) Self-control; 3) Social Problem Solving 4) Interaction w/ others
- BB, BB1: Below Basic on ELA or Math PACT, Below Basic 1 on ELA or Math PACT Grades 3, 5
- Pregnancy percentages are calculated using DHEC birth files and Medicaid Diagnosis File (ICD-9 codes)

So what does this birth to age 15 longitudinal data tell us about an EC Toxic Stress Prevention Initiative and the EBD framework suggested by Dr. Shonkoff and the Center on the Developing Child? First and foremost it tells us that carefully designed data taken from high quality national surveys should be generated and made available through the SC Data Warehouse. This has sometimes been specially accessed and analyzed through the 1995/96 cohort when non-routine data has been available. For example, data on early reading skills has been accessed and linked, taking advantage of Reading Recovery records on 1st graders and SC Reading First student scores on the Stanford Reading First assessment in grades 1-3. In the future, it would be possible to select and collect data for highly revealing survey items from validated instruments. Such specially generated data could be used to investigate almost any topic of interest in the next decade for the late adolescent and young adult years of 1995/96 cohort. For example, ACEs questions could be administered to high school students in the 1995/96 cohort. Or a new cohort could be created starting with a sample of mothers served by the Nurse Family Partnership or Parents as Teachers during pregnancy and the first two years of the child's life. These mothers could be asked to respond to research survey questions that address adverse childhood experiences and the evidence of toxic stress as raised by Dr. Shonkoff. Their children could be assessed in future years for mental disorders, health conditions, learning difficulties, and behavior problems during childhood. This data could be collected in collaboration with pediatricians, child care providers, and schools. If gathered for a limited representative sample by professionals already working with the children and their families, the cost of the data gathering should be modest. SC has the ability to do high quality data collection and analysis, if only we would decide to do so. No other state has a data warehouse similar to the one managed by ORS. The potential of the Data Warehouse should be utilized much more for analysis than for simple counts.

The longitudinal data tell us some simple but compelling facts about which higher risk children have poor outcomes in adolescence and later in young adulthood. The longitudinal data suggest specific risk factors that should be used to target young (or older) children for screening and then selection for additional assessment resulting in diagnostic-prescriptive services decisions. What the longitudinal perspective explains is which risk factors are associated with serious consequences, so that targeting and selection can reduce the costs incurred in serving too many children with low risk, low consequence problems.

Based on the toxic stress dilemma, as described by the Center on the Developing Child, the 1995/96 cohort provides supportive evidence for early attention to children with low educated mothers, with disabilities such as speech and language, with emotional-behavioral (executive function) problems, and also with involvement in CPS cases and foster care. The potential consequences of toxic stress also would recommend gathering additional data such as from mothers troubled by depression, domestic violence, or chaotic life situations. As the Center on the Developing Child suggests, the appropriate service providers and community groups should be enlisted to identify the children at significant risk and to provide the support deemed necessary based on appropriate assessment. Pediatricians, obstetricians, school personnel, mental health providers, and child welfare staff would be some of the most appropriate partners in constructing a system of care to prevent and mitigate the phenomenon of toxic stress. Two logical ways to utilize data cohorts would be to: (1) start a new pregnancy/birth cohort using NFP and PAT data enhanced with additional representative sample survey data for items closely matching those used in toxic stress research; and (2) administer to adolescents in the 1995/96 cohort research survey questions on risk-taking, mental disorders, substance abuse, criminality, and physical health conditions predictive of serious chronic problems; and also 3) administer to young adults additional questions for welfare dependency, post-secondary education, employment, earnings, pregnancy, births, health care usage, marriage, and other indicators of wellbeing or dysfunctional behavior and dependency. A simple way to start would be to administer the Communities That Care (CTC) survey to troubled youth receiving services from DJJ, DAODAS, DMH, and schools. In addition, questions on ACEs should be administered retrospectively to investigate the extent of toxic stress experienced by the 1995/96 cohort and the SY03 8th grader cohort. In conclusion, cohorts are no better than the scope and quality of data available. At modest cost, additional critical data can be generated. The findings from even more revealing cohort or cube data could improve efficiency and effectiveness of services far more than enough to cover the small costs incurred by the enriched data gathering and analysis.

Concluding Comments and Recommendations: to be completed in collaboration with stakeholder groups of practitioners, program managers, and key decision-makers.

Appendix

Appendix A: Jack P. Shonkoff, Andrew S. Garner *et. al.* “Technical Report: The Lifelong Effects of Early Childhood Adversity and Toxic Stress.” *Pediatrics* 2012; originally published online December 26, 2011: <http://pediatrics.aappublications.org/content/129/1/e232.full.pdf>

Appendix B: Vincent J. Felitti & Kaiser Permanente. “The Relationship of Adverse Childhood Experiences to Adult Medical Disease, Psychiatric Disorders, and Sexual Behavior: Implications for Healthcare,” Book Chapter for: “The Hidden Epidemic: The Impact of Early Life Trauma on Health and Disease” R. Lanius & E. Vermetten editors. Cambridge University Press, 2009: <http://www.theannainstitute.org/LV%20FINAL%202-7-09.pdf>

Appendix C: Jack P. Shonkoff, Greg J. Duncan *et.al.* “The Foundations of Lifelong Health Are Built in Early Childhood.” Center on Developing Child at Harvard University, 2010: http://developingchild.harvard.edu/resources/reports_and_working_papers/foundations-of-lifelong-health/

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Appendix E: William Copeland, Lilly Shanahan, E. Jane Costello & Adrian Angold. “Configurations of Common Childhood Psychosocial Risk Factors.” *Psychiatry*. 2009 April; 50(4): 451–459. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2685166/>

Appendix F: Lilly Shanahan, William Copeland, E. Jane Costello, and Adrian Angold. “Specificity of putative psychosocial risk factors for psychiatric disorders in children and Adolescents.” *Journal of Child Psychology and Psychiatry* 49:1 (2008): 34–42: <http://onlinelibrary.wiley.com/doi/10.1111/j.1469-7610.2007.01822.x/full>

Appendix G: Kate M. Scott, Don R. Smith & Pete M. Ellis. “Prospectively Ascertained Child Maltreatment and Its Association With DSM-IV Mental Disorders in Young Adults.” *Arch Gen Psychiatry*. 2010;67(7):712-719:<http://archpsyc.jamanetwork.com/article.aspx?articleid=210834>

Appendix H: U.S. Department of Health and Human Services, <http://medicaid.gov/Federal-Policy-Guidance/Downloads/SMD-13-07-11.pdf>

Appendix I: U.S. Department of Health and Human Services, Administration on Children, Youth and Families, http://www.lacdcfs.org/katieA/practices/docs/Well_Being_IM.pdf

Appendix J: Centers for Disease Control and Prevention. “Mental Health Surveillance Among Children — United States, 2005–2011.” 2013: http://www.cdc.gov/mmwr/preview/mmwrhtml/su6202a1.htm?s_cid=su6202a1_w

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<http://archpsyc.jamanetwork.com/article.aspx?articleid=210545>

Appendix L: Adrian Angold, Alaattin Erkanli, Elizabeth M.Z. Farmer, John A. Fairbank, Barbara J. Burns, Gordon Keeler and E. Jane Costello. "Psychiatric Disorder, Impairment, and Service Use in Rural African American and White Youth." *Arch Gen Psychiatry*. 2002; 59:893-901:
<http://archpsyc.jamanetwork.com/article.aspx?articleid=206784>

Appendix M: E. Jane Costello; Sarah Mustillo *et al.* "Prevalence and Development of Psychiatric Disorders in Childhood and Adolescence." *Arch Gen Psychiatry*. 2003(60): 837-844:
<http://archpsyc.jamanetwork.com/article.aspx?articleid=207725&link=xref>

Appendix N: Kathleen Ries Merikangas *et al.* "Lifetime Prevalence of Mental Disorders in US Adolescents: Results from the National Comorbidity Study-Adolescent Supplement (NCS-A)." *American Academy Child and Adolescent Psychiatry*. 2010(10); 49(10): 980–989:
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Appendix S: Vincent J. Felitti. "The Origins of Addiction: Evidence from the Adverse Childhood Experiences Study (2004)":
<http://www.nijc.org/pdfs/Subject%20Matter%20Articles/Drugs%20and%20Alc/ACE%20Study%20-%20OriginsofAddiction.pdf>

Appendix T: Katie A. McLaughlin, Jennifer Greif Green *et al.* "Childhood Adversities and First Onset of Psychiatric Disorders in a National Sample of US Adolescents." *Arch Gen Psychiatry*. 2012; 69(11):1151-1160: <http://archpsyc.jamanetwork.com/article.aspx?articleid=1389368>

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