Taking on Trauma to Improve Population Health: Population Based Findings on Childhood Trauma and Resilience Among US Children and Adolescents

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Authors: Christina D. Bethell, PhD, MBA, MPH, Paul Newacheck, DrPH, Eva Hawes, MPH, Neal Halfon, MD

“It is easier to build strong children than to repair broken men.”
Frederick Douglass (1817–1895)
BACKGROUND
Study Context: Policy Environment and Scientific Advances
Make Way for Shifting Perspectives in Health Care

- **Well-Being Focus**: Increasing focus in health care reform and health systems transformation on whole person, whole population well-being, and life course health development.

- **Economic incentives** for population health and functional outcomes emerging (again!)

- **Socio-Emotional Determinants** of Health increasingly recognized; translation into policy and public health and clinical practice the challenge and our call to action.

- **Chronic stress and trauma** gaining focus as developmental neuroscience and epigenetic sciences further illuminate mechanism of effect between
Study Context: Policy Environment and Scientific Advances Make Way for Shifting Perspectives in Health Care

- **Adverse Childhood Experiences** (ACEs) increasingly recognized as a key risk factor in child development and lifelong health as studies accumulate.

- **Positive health development** science suggest promising methods to prevent and ameliorate impact of chronic stress and trauma among individuals, families and communities.

- **We are the Medicine**: Recognition that promoting positive health and resilience, parenting skills and well-being requires safe, stable and nurturing relationships in the home, school and community. Interventions are contextual, relational and intergenerational, not only individual and pharmaceutical!

- “**Human and relational technologies**” required: Relationship as a healing force. This is both promising and a challenge.
Healing is Upon Us!
Where Science, Policy, and Experience Across the Life Course Meet
The Adverse Childhood Experiences Study -- the Largest Public Health Study You Never Heard Of

"Adverse childhood experiences" has become a buzzword in social service, public health, education, juvenile mental health, pediatrics, crime, medical research and even business. The ACE Study -- the CDC's Adverse Childhood Experiences Study -- has recently been featured in the New York Times, American Life, and Salon.com. Many people say that just as you should know your cholesterol score, so you should know your ACE score. But what is it? And do you know your own ACE score?

Got Your ACE Score?

What’s Your ACE Score? (and, at the end, What’s Your Resilience Score?)

There are 10 types of childhood trauma measured in the ACE Study. Five are personal -- physical abuse, verbal abuse, sexual abuse, physical neglect, and emotional neglect. Five are related to other family members: a parent who’s an alcoholic, a mother who’s a victim of domestic violence, a family member in jail, a family member diagnosed with a mental illness, and the disappearance of a parent through divorce, death or abandonment. Each type of trauma counts as one. So a person who’s been physically abused, with one alcoholic parent, and a mother who was beaten up has an ACE score of three.
Prevalence of ACEs Among Adults in 18 States Assessing ACEs on their State BRFSS

http://acestoohigh.com/got-your-ace-score/

36.10%

26.00%

15.90%

9.50%

12.50%

No ACEs  1 ACE  2 ACEs  3 ACEs  4+ ACEs

States with ACE Studies in 2009-2013

21 States

Source: Behavioral Risk Factor Surveillance System, CDC.
Growing Science Reveals Mechanisms of Effect Connecting Adverse Child Experiences, Health Development and Adult Health

Social, Neurodevelopmental, Epigenetic and Other Sciences Map the Biologic Mechanisms and Pathways Linking Childhood Trauma and Chronic Stress to Health Through Life and, Possibly, Intergenerationally
Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health

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Look After the Child

Pediatrics 2012;129;e224; originally published online December 26, 2011;
DOI: 10.1542/peds.2011-2662
ACEs and Toxic Stress: Impact Pathways

“'You can go good places with your mind if you can’t go good places with your body.' “
Stephen Porges, PhD
Professor Emeritus, University of Illinois at Chicago. Director, Brain Body Center in the Department of Psychiatry. Author: The Polyvagal Theory
Prior Research and Study Motivation

- **Longitudinal ACEs Study**: Significant predictive associations between childhood abuse, neglect, and exposure to violence and health and quality of life problems in adulthood.
- **Exposure Itself Predictive**: Strong dose-response relationship between ACEs and health shown to persist for decades;
- **ACEs among US children and youth not known**: Less is known about population-based epidemiology of ACEs and health among children in US and in the contexts of a child’s family, school, and neighborhood.
- **National Survey of Children’s Health**: Since 2007 work has occurred to include ACEs and resilience information in the NSCH. The 2011-12 NSCH allow examination of prevalence and associations between ACEs and both positive and negative health experiences and the family, school and neighborhood contexts in which children live.
Study Questions

#1: What is the prevalence and variations in ACEs prevalence among children and adolescents 0-17 in the US

- By child and family demographic characteristics
- By health status and presence of chronic conditions
- By presence of developmental risk
- By maternal health and home environment
- By neighborhood and school environment
- By health care quality experiences (e.g. Medical Home)
- Across states after adjustment for child characteristics
Study Questions

#2: Is ACEs status independently associated with:
   - Presence of chronic conditions
   - Engagement in school
   - Grade repetition
   - Demonstration of resilience

#3: Are impacts lower when resilience is learned
   - School engagement and grade repetition among children with chronic conditions and who have two or more ACEs by resilience status
METHODS
Data, Measures and Analytic Methods

- **Data**: Used cross-sectional data from the 2011-12 National Survey of Children’s Health (NSCH)
- **Sample**: Representative sample of 95,677 children age 0-17 years, weighted to represent the population of non-institutionalized children nationally and in each state (approx. 1,800 children per state)
- **Key Measures**: ACEs, resilience and positive and negative health outcomes and risk factor variables were developed
  - 9 ACEs assessed: extreme economic hardship, victim/witness of neighborhood or home violence, divorce, living with someone with drug/alcohol or mental health problem; parental death or incarceration
- **Analysis**: Multivariate and multi-level logistic regression models in SPSS were used to examine associations
RESULTS
47.9% of US Children 1+ (of 9) ACEs Age 0-17 years

State Variation In Prevalence of 2+ (of 9) ACES: 16.3% (UT) – 32.9% (OK)
Variation across states significant after adjustment for variations in differences in child and family demographics

22.6

52.1

25.3

No adverse family experiences
One adverse family experience
Two or more adverse family experiences
Almost half of US children have had at least one of 9 key adverse childhood experiences – an estimated 34.8 million children nationwide

<table>
<thead>
<tr>
<th>Experience</th>
<th>National Prevalence</th>
<th>State Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child had ≥ 1 ACEs</td>
<td>47.9%</td>
<td>40.6% (CT) - 57.5% (AZ)</td>
</tr>
<tr>
<td>Extreme economic hardship</td>
<td>25.7%</td>
<td>20.1% (MD) - 34.3% (AZ)</td>
</tr>
<tr>
<td>Family discord leading to divorce or separation</td>
<td>20.1%</td>
<td>15.2% (DC) - 29.5% (OK)</td>
</tr>
<tr>
<td>Has lived with someone who had an alcohol/drug problem</td>
<td>10.7%</td>
<td>6.4% (NY) - 18.5% (MT)</td>
</tr>
<tr>
<td>Has been a victim or witness of neighborhood violence</td>
<td>8.6%</td>
<td>5.2% (NJ) - 16.6% (DC)</td>
</tr>
<tr>
<td>Has lived with someone who was mentally ill or suicidal</td>
<td>8.6%</td>
<td>5.4% (CA) - 14.1% (MT)</td>
</tr>
<tr>
<td>Witnessed domestic violence in the home</td>
<td>7.3%</td>
<td>5.0% (CT) - 11.1% (OK)</td>
</tr>
<tr>
<td>Parent served time in jail</td>
<td>6.9%</td>
<td>3.2% (NJ) - 13.2% (KY)</td>
</tr>
<tr>
<td>Treated or judged unfairly due to race/ethnicity</td>
<td>4.1%</td>
<td>1.8% (VT) - 6.5% (AZ)</td>
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<tr>
<td>Death of parent</td>
<td>3.1%</td>
<td>1.4% (CT) - 7.1% (DC)</td>
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</table>
Prevalence of Adverse Childhood Experiences, by Age Groups and Household Income Level

While prevalence is higher for lower income children, the majority of children with ACEs do not live in poverty. Many in poverty do not report on economic hardship ACEs item.

One adverse childhood experiences

Two or more adverse childhood experiences

- 0-5 years:
  - 12.5%
  - 24.4%
  - 25.8%

- 6-11 years:
  - 24.1%
  - 30.5%

- 12-17 years:
  - 26.0%
  - 34.8%

- 0-99% FPL:
  - 11M Age 0-17
  - 9.4M Age 0-17

- 100-199% FPL:
  - 30.4%
  - 28.6%
  - 9.47M Age 0-17

- 200-399% FPL:
  - 24.1%
  - 21.0%
  - 9.47M Age 0-17

- 400% FPL or more:
  - 17.4%
  - 9.6%

Age 0-17
Prevalence of Health Problems and Risks Significantly Higher for Children Experiencing ACEs

Impacts on chronic condition status seem to appear early in life. This is consistent with the adult ACEs study and growing neurodevelopmental and epigenetic sciences.

**CSHCN**: Children with special health care needs; **EBD**: emotional, behavioral or developmental problem; **Devlp Risk**: Meets “at risk” criteria on the Parents Evaluation of Developmental Status tool;
Prevalence of Special Health Care Needs (CSHCN) and Emotional, Mental or Developmental Problems: By Specific ACEs Experienced

- Child victim of violence or witnessed violence in neighborhood:
  - Non-CSHCN: 6.8%
  - CSHCN without EMB problems: 10.4%
  - CSHCN with EMB problems: 26.2%

- Child lived with anyone with drug/alcohol problem:
  - Non-CSHCN: 9.1%
  - CSHCN without EMB problems: 12.5%
  - CSHCN with EMB problems: 25.0%

- Divorce/parental separation:
  - Non-CSHCN: 9.1%
  - CSHCN without EMB problems: 17.8%
  - CSHCN with EMB problems: 38.0%
We Know School Success is Impacted
Age Children without ACES less likely to repeat a grade in school and more likely to be engaged in school
(AOR = Adjusted Odds Ratio; factors include income, race, health status, etc.)
We Know Family Context Matters
Parental Aggravation Higher and Mother’s Health Substantially Lower Among Children and Adolescents With ACEs
(AOR = Adjusted Odds Ratio; factors include income, race, health status, etc.)

<table>
<thead>
<tr>
<th>No ACEs</th>
<th>1 ACE</th>
<th>2+ ACEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents report often aggravated with child</td>
<td>13.20%</td>
<td>17.60%</td>
</tr>
<tr>
<td>Mother in very good or excellent physical and mental health</td>
<td>68.30%</td>
<td>48.60%</td>
</tr>
</tbody>
</table>

AOR: .61
AOR: 2.52
We Know Resilience Can Be Learned
School age CSHCN with 2+ ACEs do better when they have learned a basic level of resilience
(AOR = Adjusted Odds Ratio; factors include income, race, health status, etc.)

- Usually/Always Resilient
  - 80.90%

- Never/Sometimes Resilient
  - 19.80%
  - AOR: 1.66s

- Usually/Always engaged in school
  - 52.00%
  - AOR: .26s

- Repated grade(s) in school
  - 11.00%
DISCUSSION
Take-home

- ACEs exposures may play a role in the development or exacerbation of certain childhood diseases early in life
- Children with existing health problems significantly more likely to have experienced ACEs
  - Dose-response effect with children having 2+ ACEs
- Over 3 out of 4 children who qualified as CSHCN with emotional, mental, or developmental problems had experienced 1 or more ACEs
- High risk and population-based, public health efforts called for
Realizes the widespread impact of trauma and understands potential paths for recovery;

Recognizes the signs and symptoms of trauma in clients, families, staff, and others involved with the system;

Responds by fully integrating knowledge about trauma into policies, procedures, and practices; and

Seeks to actively resist re-traumatization

Trauma-Informed Approach: Six Key Principles
Safety
Trustworthiness and Transparency
Peer support
Collaboration and mutuality
Empowerment, voice and choice
Cultural, Historical, and Gender Issues
High Risk Trauma-Specific Interventions

Recognize:

1. The survivor's need to be respected, informed, connected, and hopeful regarding their own recovery.

2. The interrelation between trauma and symptoms of trauma such as substance abuse, eating disorders, depression, and anxiety.

3. The need to work in a collaborative way with survivors, family and friends of the survivor, and other human services agencies in a manner that will empower survivors and consumers.

Known Trauma-Specific Interventions

- Addiction and Trauma Recovery Integration Model (ATRIUM)
- Essence of Being Real Risking Connection®
- Sanctuary Model®
- Seeking Safety
- Trauma, Addiction, Mental Health, and Recovery (TAMAR)
- Trauma Affect Regulation: Guide for Education and Therapy (TARGET)
- Trauma Recovery and Empowerment Model (TREM and M-TREM)
Public Health Models Might

- Normalize the need for awareness of how chronic stress and trauma impact well being
- Proactively promote capacities, practices and strategies that
  - Promote resilience
  - Promote safe, stable and nurturing relationships as a public health intervention

Shall we add:

- “The relationships we nurture”
- “The stress we carry”
- “How we work together”
- “The way we work together”
Can practicing mindfulness combat toxic stress, childhood adversity?

By Ryan White

September 25, 2014

Even if you don’t spend much time considering children’s health, there’s a good chance you’ve heard the terms “adverse experience” and “toxic stress” bandied about. The new field of epigenetics has added a new layer to the conversation on how trauma can linger malignantly through childhood and adulthood.

Can Meditation Slow Rate of Cellular Aging?
Cognitive Stress, Mindfulness, and Telomeres

Elissa Epel, Jennifer Daubenmier, Judith Tedlie Moskowitz, Susan Folkman, and Elizabeth Blackburn

Longevity, regeneration, and optimal health

The Neurobiology of "WE"

Daniel J Siegel M.D.
Take-home

- Screening for ACEs should be further considered and coordinated; early findings promising:
  - Shall we avoid repeatedly asking parents about their and their child’s ACEs?
  - Periodicity of screening and context unclear; web-based methods promising
  - Coordinated screening essential also to coordinate action across systems of care
  - Asking about ACEs along with many other variables and including ACEs data in electronic health records is needed to collect the data we need to understand associations with diagnoses, functioning, health care costs and child and family well-being
- ACEs screening
  - will not replace diagnostic assessments
  - likely does not confirm presence of PTSD or current trauma
  - might be best to do with both parents, as well as about their children
  - requires further research but holds promise to identify subset of children with social determinants of health who require attention in primary and specialty care settings
- New Methods Needed?
  - Might a non-event oriented check-list model and instead a consequences-based tool help us not to engage in “is this event worse than that event” distractions and, rather, focus on whether a child would benefit from positive health development interventions and approaches (can’t we all?). Model: CSHCN Screener
Some Next Steps to Translate Social Determinants and ACEs Knowledge into Policy and Practice

• Name and promote a **collective action** research and policy agenda to address the origins and impacts of chronic stress and ACEs
  - support coordination, learning and synthesis among many existing and emerging efforts

• **Synthesize existing research** for translation and identification of gaps in knowledge to support action

• **Promote priority research** required to fill knowledge gaps

• **Expedite education and training** among health care providers and leaders
Some Next Steps to Translate Social Determinants and ACEs Knowledge into Policy and Practice

- There is no silver bullet! Embrace an “era of experimentation” to demonstrate and scale up clinical, family, community and policy innovations.

- Stay the course on poverty—keeping in mind that most children with ACEs in the US are not poor and many in poverty do not experience ACEs.

- Promote a primary care, public health, positive health model and consider a consequences-based, non-event based model for addressing ACEs.
ACEs Data and Reports Available Online: [www.childhealthdata.org](http://www.childhealthdata.org)

Welcome to the Data Resource Center for Child & Adolescent Health!

Welcome to the newly redesigned DRC website. Take a tour of the site and give us your feedback.

The mission of the Data Resource Center (DRC) is to take the voices of parents, gathered through the National Survey of Children’s Health (NSCH) and the National Survey of Children with Special Health Care Needs (NS-CSHCN), and share the results through this online resource so they can be used by researchers, policymakers, family advocates and consumers to promote a higher quality health care system for children and families. We’d love to hear from you. Please connect with the DRC.

Publicly insured children are more likely to have insurance coverage which adequately meets their health needs than privately insured.
Overview of Adverse Child and Family Experiences among US Children

Adverse childhood experiences (ACEs) can have profound effects on the lifelong health of adults. Many studies on ACEs have been retrospective in nature, asking adults to recall their childhood experiences and then examining the prevalence of various chronic conditions and economic outcomes. The recent 2011/12 National Survey of Children’s Health (NSCH) provides cross-sectional, parent-reported data on nine ACEs among US children age 0 to 17 years (Table 1). Nearly half (47.9%) of US children age 0-17 years experienced one or more of the nine ACEs asked about in this survey (Figure 1). This translates into an estimated 34,825,978 children nationwide.

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

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<td>40.6% (CT) – 57.5% (AZ)</td>
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<td>Child had ≥ 2 Adverse Child/Family Experiences</td>
<td>22.6%</td>
<td>16.3% (NJ) – 32.9% (OK)</td>
</tr>
<tr>
<td>Socioeconomic hardship</td>
<td>25.7%</td>
<td>20.1% (MD) – 34.3% (AZ)</td>
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<td>Divorce/parental separation</td>
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<td>Lived with someone who had an alcohol or drug problem</td>
<td>10.7%</td>
<td>6.4% (NY) – 18.5% (MT)</td>
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<td>Victim or witness of neighborhood violence</td>
<td>8.6%</td>
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<td>Lived with someone who was mentally ill or suicidal</td>
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Figure 1. Prevalence of Adverse Child and Family Experiences among US Children Age 0-17 years

Figure 2. Prevalence of Adverse Child and Family Experiences, by Age and Household Income* Subgroups

Figure 3. Exploring Disparities between States: State Ranking Map of Children with ≥ 2 ACEs
Adverse Childhood Experiences (ACEs) have been found to have a lifelong impact on the development and health of individuals. ACEs can range from extreme poverty, family problems to exposure to violence.

### Baltimore ACEs Profile

**For Children 0-17 years old**

Data from the National Survey of Children's Health 2011-2012 (www.nschdata.org)

**What Matters and What Can We Do?**

<table>
<thead>
<tr>
<th>Measure for Kids 0-17 yrs. old:</th>
<th>Baltimore City</th>
<th>Baltimore County</th>
<th>Howard County</th>
<th>Maryland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community is usually/always safe.</td>
<td>82.9%</td>
<td>88.7%</td>
<td>91.3%</td>
<td>88.7%</td>
</tr>
<tr>
<td>Lives in a supportive neighborhood.</td>
<td>75.7%</td>
<td>81.7%</td>
<td>85.6%</td>
<td>82.4%</td>
</tr>
<tr>
<td>Child has a Medical Home defined as comprehensive, coordinated, family-centered care.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child has a special health care need lasting 12 months or longer (shown as &quot;chronic conditions&quot;).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child has an emotional/behavioral/developmental problem lasting 12 months or longer (shown as &quot;chronic mental health problems&quot;).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measures for Kids 6-17 yrs. old:**

- Child is usually/always engaged in school.
- Child has a Medical Home defined as comprehensive, coordinated, family-centered care.
- Child has a special health care need lasting 12 months or longer (shown as "chronic conditions").
- Child has an emotional/behavioral/developmental problem lasting 12 months or longer (shown as "chronic mental health problems").

**Cultivate positive traits - like kids who show resilience (6-17 yrs):**

- Building resilience and safe, stable, nurturing relationships are the key!

---

**History is not Destiny**

This involves all of us...

**Fact #1:** Among children with any ACE, those who witnessed neighborhood violence were least likely to have a protective home environment, an adequate medical home, and to be engaged in school.

**Fact #2:** School performance goes hand-in-hand with ACEs. Compared to school-aged kids with 2+ ACEs, those with no ACEs are 1.3 times more likely to be engaged in school & 3 times less...
Empowering Parents To Improve Psychosocial/ACEs Screening and Referral During Well Visits (www.wellvisitplanner.org)
Contact Information

- Christina Bethell E-mail: cbethell@jhu.org
- Learn about national research and policy agenda: www.academyhealth.org/aces
- Connect with CAHMI
  - Facebook.com/childhealthdata
  - Follow us on Twitter: @childhealthdata