Adverse Childhood Experiences and their Impact on Tennesseans

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You are allowed to be both a Masterpiece and a Work in Progress, simultaneously.
THE SCIENCE
Brain Development
Early Brain Development is Rapid

A BABY’S BRAIN DOUBLES IN SIZE DURING THE FINAL 6 WEEKS OF PREGNANCY

BY AGE 3, A CHILD’S BRAIN IS ALREADY 80% OF IT’S ADULT VOLUME

http://developingchild.harvard.edu/resources/multimedia/videos/three_core_concepts/
700
New Neural Connections per Second
Early Period Sets the Trajectory

Developmental Progress

Age

- "Healthy" Trajectory
- "At Risk" Trajectory
- "High risk" Trajectory

Age:
- 6 mo
- 12 mo
- 24 mo
- 3 yrs
- 5 yrs
- 8 yrs
- 12 yrs
Example: Language Trajectory

THE SCIENCE
Toxic Stress
Positive Stress

Short, stressful events like meeting new people or starting the first day of school are healthy for brain development. They prepare the brain and body for stressful situations later in life.

Tolerable Stress

Tragic, unavoidable events like a natural disaster or losing a loved one aren't good for us. But if supportive caregivers are around to buffer the stress response, these events won't do lasting damage to the brain and body.

Toxic Stress

Ongoing, repeated exposure to abuse or neglect is bad for brain development. If no supportive adults are present to help buffer the stress response, stress hormones will damage developing structures in the child's brain. The result is an increased vulnerability to lifelong physical and mental health problems, including addiction.
Impacts:
Brain Architecture
Gene Expression
Biology and Physiology
Toxic Stress Changes the Brain

Persistent Stress Changes Brain Architecture

Normal

Typical neuron—many connections

Toxic stress

Damaged neuron—fewer connections

Prefrontal Cortex and Hippocampus

Sources: Radley et al. (2004)
Bock et al. (2005)
Normal vs. Neglected Brain

As cited by Felitti & Anda, 2003; source CDC
What happens?

Amygdala:
activates the stress response
*Toxic stress:* enlargement

Prefrontal cortex:
usually a check to the amygdala
*Toxic stress:* loss of neurons, less able to function

Hippocampus:
major role in memory and mood
*Toxic stress:* impairment in understanding and emotion
Executive Function Skills are Compromised by Toxic Stress

• **Impulse Control**
  – Filter distractions
  – Resist temptation
  – Maintain focus
  – Persist
  – Think before acting

• **Working Memory**
  – Hold onto info while working on something else
  – Follow multi-steps

• **Mental Flexibility**
  – Easily switch gears
  – Multitask
  – Alter strategies
  – Innovate
Toxic Stress Changes Gene Expression

Intergenerational Transmission of Stress Response in Male Rats
Toxic Stress Changes Biology

- Pulmonary diseases
- Cancer
- Cardiovascular diseases
- Neurological diseases
- Autoimmune diseases
- Arthritis
- Diabetes II
- Alzheimer

INFLAMMATION
THE RESEARCH
The Original ACEs Study
Adverse Childhood Experiences (ACE) Study
A Collaborative Effort of Kaiser Permanente and the CDC

Kaiser Permanente HMO population in San Diego

Over 17,000 participants – average age of 57

Study of the impact of adverse childhood experiences on health throughout the lifespan.

“Findings suggest that certain experiences are major risk factors for the leading causes of illness and death as well as poor quality of life in the United States.”

www.acestudy.org
ACE Study

Participants were mostly white, middle-aged, college educated, and insured.

Source: Centers for Disease Control and Prevention. Available at: http://www.cdc.gov/ace/about.htm
Adverse Childhood Experiences include the following:

**Abuse and Neglect**
1. Child physical abuse
2. Child sexual abuse
3. Child emotional abuse
4. Emotional neglect
5. Physical neglect

**Indicators of Family Dysfunction**
6. Mentally ill, depressed, or suicidal person in the home
7. Drug addicted or alcoholic family member
8. Witnessing domestic violence against the mother
9. Parental discord – indicated by divorce, separation, abandonment
10. Incarceration of any family member
ACE Study Findings

Of the 17,337 individuals:

• ~2/3 had at least 1 ACE
• ~1/5 reported 3 or more ACEs

Source: Centers for Disease Control and Prevention. Available at: http://www.cdc.gov/ace/about.htm
ACE Study Findings

- **Health-risk Behaviors**
  - Sexual promiscuity
  - Sexual perpetration
  - Alcohol abuse
  - Illicit/injected drug use
  - Smoking
  - Physical Inactivity

- **Disease and Injury**
  - STDs, including HIV
  - Gynecological problems
  - Heart disease
  - Diabetes
  - Stroke
  - Cancer
  - Suicide
  - Obesity and Overweight

- **Mental health and Well-being**
  - Depression, PTSD
  - Aggression
  - Anxiety
  - Somatic complaints
  - Attempted suicide
  - Social ostracism
  - Anxiety
  - Academic achievement
  - Re-victimization
  - Unwanted pregnancy

- **Job Problems**
  - Absenteeism/Lost time from work
  - Impaired productivity

ACE Score ➞ RISK
Early experiences actually get into the body, with lifelong effects—not just on cognitive and emotional development, but on long term physical health as well. A growing body of evidence now links significant adversity in childhood to increased risk of a range of adult health problems, including diabetes, hypertension, stroke, obesity, and some forms of cancer. This graph shows that adults who recall having 7 or 8 serious adverse experiences in childhood are 3 times more likely to have cardiovascular disease as an adult. And children between birth and three years of age are the most likely age group to experience some form of maltreatment—16 out of every thousand children experience it.

Source: Dong et al. (2004)
ACE Study Findings

“When we as children encounter sudden or chronic adversity, excessive stress hormones cause powerful changes in the body, altering our body chemistry. The developing immune system and brain react to this chemical barrage by permanently resetting our stress response to “high,” which in turn can have a devastating impact on our mental and physical health.”

Childhood Disrupted, 2015
Mechanisms by which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan
ACE reduction reliably predicts simultaneous decrease in all of these conditions.
Opportunities for Future Studies of ACEs

Intensity and Duration
Death of a Parent
Bullying and Community Violence
Institutional Racism
Poverty
THE RESEARCH

The Tennessee Study
2012 Tennessee Specific ACEs Data

ACE Module added to the Behavioral Risk Factor Surveillance System (BRFSS) in 2012

BRFSS Sample = 7,056 non-institutionalized adults in Tennessee with either a land line or cellular telephone. Those answering at least one question in the ACE module were included in the analysis (n=6,918).

[Logo of TN Department of Health]
Results of ACEs Data Collection at The Family Center

- **74%**
  - Have 4 or more ACEs
  - Results in 5 – 10 years earlier death
  - Compare to 13% from original ACE study

- **44%**
  - Have 7 or more ACEs
  - Results in 20 years earlier death

Slide courtesy of Jennifer Drake Croft– The Family Center
ACEs in TN (2012)

Prevalence of Adverse Childhood Experiences in Tennessee, 2012

- 52% had at least 1 ACE
- 21% had 3 or more ACEs (that’s 1 in 5)

Prevalence of Adverse Childhood Experiences in Tennessee by Category, 2012

- Separation/Divorce
- Emotional Abuse
- Substance Abuse
- Violence Between Adults
- Mental Illness
- Physical Abuse
- Incarceration
- Sexual Abuse

Figure 2: Prevalence of Specific ACEs in TN by Gender

Geographic Distribution

*Percentage of population that has 2 or more ACEs

Association of Health Outcomes and Behaviors by ACE Score*

* = All significant p>=0.05
Association of Economic Outcomes by ACE Score*

* = All significant p>=0.05
THE OPPORTUNITIES
Reasons to Hope

• Resiliency buffers the effects of trauma.
• Social support and resources are protective factors that build resiliency at any age.
• Safety can be created from multiple sources and a little may go a long way.
• Brain development is far more dynamic than we used to think.
Overall Focus is to Implement Recommendations to Prevent and Respond to Toxic Stress from the CDC

- Safe
- Stable
- Nurturing

Relationships and Environments
One Step Further: ACEs and Public Health

Public Health Approach

Primary Prevention
Creating safe, stable, nurturing relationships and environments as well as community infrastructures that promote social cohesion

Raise Awareness
Policy Change
Norms Change

Secondary Prevention
Services for those “at risk”

Tertiary Prevention
Treatment Services

One Step Further: ACEs and Public Health
Moving the Needle

Primary prevention saves money

Source: Bruce D. Perry MD PhD lecture: Maltreatment and the Developing Child. Available at: http://www.lfcc.on.ca/mccain/perry8.html
Shifting the Conversation...

What is wrong with you?

TO

What has happened to you?
The brains of infants and young children are rapidly developing (700 synapses per second are forming).

“Toxic Stress” damages brain development and inhibits synaptic growth.

Safe, stable, nurturing relationships and environments promote optimal brain development and synaptic growth.
Stressful and traumatic childhood experiences literally become “biology” affecting brain structure and function (as well as endocrine, immune, and other biologic functions) thus leading to persistent effects.

Until now, these persistent effects were “hidden” from the view of both neuroscientists and public health researchers.

This is no longer the case. In fact, with this information comes the responsibility to use it.

Dr. Robert Anda, ACE Study
What are you going to do to become a champion?

In seven days from now....
In one month from now...
In six months from now...