Understanding Adverse Childhood Experiences

Building Self-Healing Communities

Robert Anda, MD, MS
Co-Founder ACE Interface
Building Self-Healing Communities

Population Affected by ACEs

Health Care

Education System

Child Welfare System

Justice System
The Biology of Adversity
Stress (adrenaline, cortisol)

Unpredictable
  Severe

Predictable
  Moderate

Number of Episodes
  Chronicity

Vulnerability

Resilience

Neurodevelopment
  Epigenetics
Seeing the Pain
America's physicians confront family violence
SYNAPTIC DENSITY: Synapses are created with astonishing speed in the first three years of life. For the rest of the first decade, children’s brains have twice as many synapses as adults’ brains.

Drawings supplied by H.T. Chugani.
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)
Integrity and Functioning of the Genome--Epigenetics
ACEs Influence Gene expression

Methylation patterns

Chromosomes tightly packed DNA

Epigenetics
Memory of our experiences is stored in our body.
Death

Epigenetic mechanisms

Intergenerational transmission

Conception
The Adverse Childhood Experiences (ACE) Study

Examines the health and social effects of ACEs throughout the lifespan among 17,421 members of the Kaiser Health Plan in San Diego County

A Primary Care Setting…
Educated…
Middle Class..
Predominantly White…
Adverse Childhood Experiences Are Common

<table>
<thead>
<tr>
<th>Household dysfunction:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance abuse</td>
<td>27%</td>
</tr>
<tr>
<td>Parental sep/divorce</td>
<td>23%</td>
</tr>
<tr>
<td>Mental illness</td>
<td>17%</td>
</tr>
<tr>
<td>Battered mother</td>
<td>13%</td>
</tr>
<tr>
<td>Criminal behavior</td>
<td>6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abuse:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological</td>
<td>11%</td>
</tr>
<tr>
<td>Physical</td>
<td>28%</td>
</tr>
<tr>
<td>Sexual</td>
<td>21%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neglect:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>15%</td>
</tr>
<tr>
<td>Physical</td>
<td>10%</td>
</tr>
</tbody>
</table>
Adverse Childhood Experiences Rarely Occur in Isolation…

_They come in groups._
ACEs tend to come in groups…

<table>
<thead>
<tr>
<th>If you grew up with:</th>
<th>Additional ACEs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household</td>
<td>1</td>
</tr>
<tr>
<td>Substance Abuse</td>
<td>81</td>
</tr>
<tr>
<td>ACE Score</td>
<td>Prevalence</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>0</td>
<td>33%</td>
</tr>
<tr>
<td>1</td>
<td>26%</td>
</tr>
<tr>
<td>2</td>
<td>16%</td>
</tr>
<tr>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td>4 or more</td>
<td>16%</td>
</tr>
</tbody>
</table>
ACEs and Adolescent Health
ACE Score and Early Initiation of Drug Use (by age 14)
Adverse Childhood Experiences and Teen Pregnancy

Percent who had a teen pregnancy

ACE Score

0 1 2 3 4 5 6 7-8
Mental Health and Substance Abuse
ACE Score and Ever Addicted to Drugs

ACE Score

% addicted

0         1           2          3        4

>5

ACE Score

% addicted

0  1  2  3  4  5

ACE Interface
The ACE Score and Alcoholism

ACE Score
- 0
- 1
- 2
- 3
- 4 or more

Percent with alcohol related problem

Alcoholic

Married an Alcoholic

ACE Score
The ACE Score and the Prevalence of Attempted Suicide

![Graph showing the relationship between ACE Score and percent attempted suicide.](image-url)
ACEs have a strong influence on:
- adolescent health
- reproductive health
- smoking
- obesity
- alcohol abuse
- illicit drug abuse
- sexual behavior
- mental health
- risk of violence and revictimization
- stability of relationships
- performance in the workforce
ACEs are a Pathway to Disease
The ACE Score and Liver Disease

ACE Score

Percent (%)

ACE Score

0 1 2 3 4 >=4
The ACE Score and the Prevalence of Coronary Heart Disease
ACEs and Leading Causes of Death

- Heart disease
- Chronic lung disease
- Stroke
- Diabetes
- Cancer

- Lung cancer
- Liver disease
- Suicide
- Injuries
- HIV and STDs

- Autoimmune diseases
- Premature mortality
Being Trauma Informed

It’s not what’s WRONG with you…

It’s what HAPPENED to you…

…a different narrative
Anxiety
Depression
Difficulty Concentrating
SMOKING
“The Kiss”

Constantin Brancusi
1909
Rewriting the Narrative of Your Life

The ACE Score provides a chance to see the story of your life...

And to create a different path for the future...
Rewriting the Narrative of Your Life

From shame, confusion, and adaptations with a downside....

To create a different path for the future... with hope, meaning, and purpose
Building Self-Healing Communities

Population Affected by ACEs

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Justice System

Child Welfare System

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Implications for the Health Care System
Pharmacy and Polypharmacy
ACE Score and Rates of Antidepressant Prescriptions

![Bar chart showing the relationship between ACE Score and prescription rate (per 100 person-years). The x-axis represents ACE Score (0, 1, 2, 3, 4, >=5) and the y-axis represents prescription rate (0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100). The chart indicates a higher prescription rate with an increase in ACE Score.](image-url)
The Kaiser Formulary has 15 Classes of Drugs

- Anti-infectives
- Endocrine and Metabolic
- Cardiovascular
- Respiratory
- Gastrointestinal
- Genitourinary
- Neuromuscular
- Central Nervous System
- Analgesic and Anesthetic
- Antineoplastic
- Hematological
- Biologics
- Nutritional
- Topical
- Other
ACEs and Polypharmacy Among Young Adults

8 or More Classes of Drugs*

*18-44 years
Unexplained Symptoms
ACEs Predict Unexplained Symptoms

ACE Score

<table>
<thead>
<tr>
<th>Score</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>&gt;=5</td>
<td>25</td>
</tr>
</tbody>
</table>
Unexplained Symptoms
Create High Service Utilization
Unexplained Symptoms
And 10 or more Doctor Office Visits/Year

Number of Unexplained Symptoms

Percent with 10 or more DOV/yr

0 1 2 3 4 >=5
Significant care issues associated with high ACE patients include:

- Comorbid conditions
- Multiple somatic symptoms resulting in high levels of testing and referrals to different providers
- Frequent visits, high use of the emergency room, and no shows
- High pharmacy use and polypharmacy
Implications for
the
Education System
Students with 3 or more ACEs:

- Are 2 ½ times more likely to fail a grade
- Score lower on standardized tests
- Have language difficulties
- Are suspended or expelled more
- Are designated to special education more frequently
- Have poorer health

Courtesy of Chris Blodgett, PhD
Washington State University
Washington School Classroom (30 Students)
Adverse Childhood Experiences (ACEs)

- 6 students with no ACE
- 5 students with 1 ACE
- 6 students with 2 ACEs
- 3 students with 3 ACEs
- 7 students with 4 or 5 ACEs
- 3 students with 6 or more ACEs

Population Average
Implications for the Justice System

The Prison Pipeline
ACE Score and Repeated Suspension/Expulsion
Youth on Probation, Pierce County, WA

History of ≥ 7 expulsions or suspensions since the first grade

Prevalence (%) of ACE Score

ACE Score | Prevalence (%) | (n)
--- | --- | ---
0 | 16.9% | 11 | (n=69)
1 | 25.5% | 35.3% | (n=158) | (n=148)
2 | 35.7% | (n=124)
3 | 38.6% | (n=148)
4 | 39.4% | (n=148)
5+ | 100% | (n=1)

aOR (95% CI)
ACE Score and Felony Re-offense

Felony Re-offense Post Probation and ACE Score

ACE Score

<table>
<thead>
<tr>
<th>ACE Score</th>
<th>Within One Year</th>
<th>Within Two Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12%</td>
<td>16%</td>
</tr>
<tr>
<td>1</td>
<td>10%</td>
<td>18%</td>
</tr>
<tr>
<td>2</td>
<td>16%</td>
<td>25%</td>
</tr>
<tr>
<td>3</td>
<td>11%</td>
<td>20%</td>
</tr>
<tr>
<td>4</td>
<td>19%</td>
<td>25%</td>
</tr>
<tr>
<td>≥ 5</td>
<td>23%</td>
<td>31%</td>
</tr>
</tbody>
</table>

Within One Year

Within Two Years
Large numbers of youth in the juvenile justice system are experiencing mental health disorders.

<table>
<thead>
<tr>
<th>Prevalence of Mental Disorders - Findings From Recent Studies</th>
<th>Positive Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCMHJJ (2006)</td>
<td>70.4%</td>
</tr>
<tr>
<td>Teplin et al. (2002)</td>
<td>69.0%</td>
</tr>
<tr>
<td>Wasserman et al. (2002)</td>
<td>68.5%</td>
</tr>
<tr>
<td>Wasserman, Ko, McReynolds (2004)</td>
<td>67.2%</td>
</tr>
</tbody>
</table>
Most have co-occurring substance abuse disorders

% Without Co-Occurring Substance Use Disorders
28%

% With Co-Occurring Substance Use Disorders
72%

Source: The National GAINS Center, 2004
ACEs are the Common Source

Mental illness
Addiction
Domestic violence

Poverty
Homelessness
Health disparities
Violence
Disrupted families/relationships

Suicide
Crime/mass incarceration
School “failure”
Chronic Illnesses
ACEs and Population Attributable Risks

- Promiscuity: 48%
- Domestic violence: 52%
- Life dissatisfaction: 65%
- Alcoholism: 67%
- IV drug abuse: 78%
- Drug abuse: 50%
- Suicide attempt: 58%
- Hopelessness: 43%
- Disability days: 54%
- Current depression: 

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Power of the ACE Study?

- A Common Language
- And Conceptual Framework

• ACEs are common
• ACEs are highly interrelated
• ACEs “pile up” and have a cumulative impact
• ACEs account for a large percentage of health and social problems
• Biologic Plausibility
Building Self-Healing Communities

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