Understanding Adverse Childhood Experiences

Building Self-Healing Communities

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Co-PI, ACE Study
Co-Founder, ACE Interface

www.aceinterface.com
Building Self-Healing Communities

Population Affected by ACEs

Education System

Justice System

Medicine & Public Health

Child & Family Services

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

Unpredictable
Severe

Predictable
Moderate

Number of Episodes
Chronicity

More Vulnerable

Less Vulnerable

Epigenetic mechanisms
Effects on brain structure/function
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)
What gets experienced gets wired...
Health and Functioning of the Genome--Epigenetics
Telomeres

• Like the ends of shoelaces, telomeres prevent DNA from fraying

• Telomere length determines whether a cell can be reproduced

• Emerging research suggests a link between short telomeres and certain diseases, including diabetes and dementia.

• Stress load can effect telomere length
ACEs Influence Gene expression

epigenetics

Chromosomes tightly packed DNA

Telomere

Source: NIAA Alcohol Alert Number 86
Memory of our experiences is stored in our body.
# Ten Forms of Adverse Childhood Experiences (ACEs)—CDC Kaiser ACE Study

## Household Dysfunction

<table>
<thead>
<tr>
<th>Experience</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substance abuse</td>
<td>27%</td>
</tr>
<tr>
<td>Parental separation or divorce</td>
<td>23%</td>
</tr>
<tr>
<td>Mental illness</td>
<td>17%</td>
</tr>
<tr>
<td>Domestic violence</td>
<td>13%</td>
</tr>
<tr>
<td>Criminal behavior</td>
<td>6%</td>
</tr>
</tbody>
</table>

## Abuse

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>11%</td>
</tr>
<tr>
<td>Physical</td>
<td>28%</td>
</tr>
<tr>
<td>Sexual</td>
<td>21%</td>
</tr>
</tbody>
</table>

## Neglect

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>15%</td>
</tr>
<tr>
<td>Physical</td>
<td>10%</td>
</tr>
</tbody>
</table>
ACEs tend to come in groups...

<table>
<thead>
<tr>
<th>Additional ACEs (%)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household</td>
<td>81</td>
<td>60</td>
<td>41</td>
<td>58</td>
</tr>
<tr>
<td>Substance Abuse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACE Score</td>
<td>Prevalence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>33%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>26%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>16%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 or more</td>
<td>16%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adverse Childhood Experiences Score
Biologic Stress “Dose”
Mental Health and Substance Abuse
ACE Score and Addiction

% addicted

ACE Score

0 | 1 | 2 | 3 | 4 | >5

ACE Interface
The ACE Score and Attempted Suicide

ACE Score

Percent attempted (%)
ACEs are a Pathway to Chronic Diseases
The ACE Score and Liver Disease

![Bar chart showing the relationship between ACE Score and percentage of liver disease patients.](chart.png)
The ACE Score and the Prevalence of Coronary Heart Disease
<table>
<thead>
<tr>
<th>ACEs and Leading Causes of Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
</tr>
<tr>
<td>Chronic lung disease</td>
</tr>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>Diabetes</td>
</tr>
<tr>
<td>Cancer</td>
</tr>
<tr>
<td>Lung cancer</td>
</tr>
<tr>
<td>Liver disease</td>
</tr>
<tr>
<td>Suicide</td>
</tr>
<tr>
<td>Injuries</td>
</tr>
<tr>
<td>HIV and STDs</td>
</tr>
<tr>
<td>Autoimmune diseases</td>
</tr>
<tr>
<td>Premature mortality</td>
</tr>
</tbody>
</table>
Adverse Childhood Experiences have a strong influence on common health and social problems:

- adolescent health
- reproductive health
  - smoking
  - obesity
  - alcohol abuse
- addiction.. including opiates
  - sexual behavior
  - mental health
- risk of violence and revictimization
  - stability of relationships
  - productivity of the workforce
Being Trauma Informed

It’s not what’s WRONG with you…

It’s what HAPPENED to you…
Anxiety
Depression
Difficulty Concentrating

SMOKING
Population Attributable Risk

- Drinking & driving past 30 days: 25%
- Workplace injury: 22%
- ≥3 falls require treatment in 90 days: 31%
- Currently smoking: 51%
- High risk for HIV: 15%
- Diabetes (insulin): 17%
- Asthma: 41%
- Chronic depression: 65%
- Alcoholism: 26%
- Cardiovascular disease: 24%
- Cancer: 45%

Controls: gender, age, income, education, race-ethnicity

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Summary

- ACEs are common
- ACEs are highly interrelated
- ACEs “pile up” and have a cumulative impact… captured by the ACE Score
- ACEs account for a large percentage of costly health and social problems
- ACEs affect brain development, and how our DNA/genes are regulated
Understanding ACEs
Can Unify Prevention Efforts

Poverty
Homelessness
Health disparities
Violence
Early Death

Mental illness
Addiction
Domestic violence
Adolescent/Reproductive Health

Crime/mass incarceration
School safety & “failure”
Chronic Diseases
Suicide
Publications Citing the CDC-Kaiser ACE Study (2001-2017)

Total ACE Study Citations: 32,119
Published in over 150 journals

*Citations listed on the CDC website, as of 10/27/2017 (https://www.cdc.gov/violenceprevention/acestudy/journal.html)
Citation counts collected from Google Scholar in January, 2018. Information gathered by Lisa S. Panisch, MSW
The Progressive Nature of Adversity in the Life-Course

Adverse Childhood Experiences
Predictable patterns of brain development, traits & behaviors

- Slowed language & reading
- Lateralization
- Diminished IQ
- Poor decision making skills
- Memory Problems
- Attention problems
- ADD
- ADHD

- Aggressive behavior
- Social isolation among peers
- Poor understanding of social cues = conflict

Early use/abuse of alcohol, tobacco, illicit or prescription drugs

- Special education
- School failure
- Dropping out

- Suspension
- Expulsion
- Delinquency
- Prison pipeline

Adult Adversity

- Low-wage jobs
- Unemployment
- Public Assistance
- Incarceration
- Chronic health problems
- Mental health and substance abuse
- Parenting and relationships more difficult

Intergenerational Risk

© 2013 ACE Interface
ACEs... tend to be progressive throughout the life course.

And intergenerationally transmitted.

These tendencies are opportunities for prevention!
Two Key Questions About Prevention

Are we…

• Slowing or halting the progression of adversity in the life course?

• Reducing the intergenerational transmission of adversity?
Evidence Supports the Concept of Self-Healing Communities
Dropping Out of High School

Yearly H.S. Drop-out

<table>
<thead>
<tr>
<th></th>
<th>98</th>
<th>06</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPC Funded (n=28)</td>
<td>8.57</td>
<td>5.37</td>
</tr>
<tr>
<td>Non-Funded (n=10)</td>
<td>6.04</td>
<td>6.48</td>
</tr>
</tbody>
</table>

Proportion dropping out in a single year
Juvenile Arrests for Violent Crime

Juv. Arrest for Violent Crime

<table>
<thead>
<tr>
<th></th>
<th>97-99</th>
<th>04-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPC Funded (n=28)</td>
<td>3.22</td>
<td>2.13</td>
</tr>
<tr>
<td>Non-Funded (n=10)</td>
<td>2.52</td>
<td>2.27</td>
</tr>
</tbody>
</table>
Juvenile Alcohol Arrests

Alcohol Juv. Arrests

- **FPC Funded (n=28)**
  - 97-99: 16.23
  - 04-06: 9.26

- **Non-Funded (n=10)**
  - 97-99: 15.11
  - 04-06: 11.55

Arrests Per 1,000 adolescents ages 10-17
Child Out-of-Home Placements

Out-of-Home Placements

Per 1,000 adolescents ages 0-17

<table>
<thead>
<tr>
<th></th>
<th>97-99</th>
<th>04-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPC Funded (n=28)</td>
<td>3.01</td>
<td>3.45</td>
</tr>
<tr>
<td>Non-Funded (n=10)</td>
<td>3.81</td>
<td>5.37</td>
</tr>
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Births to Teen Mothers

Large Communities**

<table>
<thead>
<tr>
<th></th>
<th>97-99</th>
<th>04-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPC Funded (n=28)</td>
<td>8.09</td>
<td>4.59</td>
</tr>
<tr>
<td>Non-Funded (n=10)</td>
<td>6.92</td>
<td>8.79</td>
</tr>
</tbody>
</table>

Live Births per 1,000 female adolescents
Juvenile Suicide

Large Communities

Completed Suicide or Admitted to Hospital per 100,000 adolescents

<table>
<thead>
<tr>
<th>Large Communities</th>
<th>97-99</th>
<th>04-06</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPC Funded (n=28)</td>
<td>5.81</td>
<td>5.04</td>
</tr>
<tr>
<td>Non-Funded (n=10)</td>
<td>7.25</td>
<td>9.68</td>
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