The Relationship of Adverse Childhood Experiences to Adult Health Status

A collaborative effort of Kaiser Permanente and The Centers for Disease Control

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The Adverse Childhood Experiences (ACE) Study

- The largest study of its kind ever done to examine the health and social effects of adverse childhood experiences over the lifespan (18,000 participants)
What do we mean by Adverse Childhood Experiences?

- Experiences that represent medical and social problems of national importance.
  - childhood abuse and neglect
  - growing up with domestic violence, substance abuse or mental illness in the home, parental loss, or crime
Survey Wave 1 -- complete
71% response (9,508/13,454)

Survey Wave II
n=15,000
71% response
All medical evaluations abstracted

ACE Study Design

Present Health Status

VS.

Mortality
National Death Index

Morbidity
Hospital Discharge
Outpatient Visits
Emergency Room Visits
Pharmacy Utilization

All medical evaluations abstracted
The Adverse Childhood Experiences (ACE) Study

Summary of Findings:

• Adverse Childhood Experiences (ACEs) are very common
• ACEs are strong predictors of later health risks and disease
• This combination makes ACEs the leading determinant of the health and social well-being of our nation
## Categories of Adverse Childhood Experiences

<table>
<thead>
<tr>
<th>Category</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abuse, by Category</strong></td>
<td></td>
</tr>
<tr>
<td>Psychological (by parents)</td>
<td>11%</td>
</tr>
<tr>
<td>Physical (by parents)</td>
<td>11%</td>
</tr>
<tr>
<td>Sexual (anyone)</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Household Dysfunction, by Category</strong></td>
<td></td>
</tr>
<tr>
<td>Substance Abuse</td>
<td>26%</td>
</tr>
<tr>
<td>Mental Illness</td>
<td>19%</td>
</tr>
<tr>
<td>Mother Treated Violently</td>
<td>13%</td>
</tr>
<tr>
<td>Imprisoned Household Member</td>
<td>3%</td>
</tr>
</tbody>
</table>
Adverse Childhood Experiences Score

Number of categories adverse childhood experiences are summed …

<table>
<thead>
<tr>
<th>ACE score</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>48%</td>
</tr>
<tr>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td>2</td>
<td>13%</td>
</tr>
<tr>
<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>4 or more</td>
<td>7%</td>
</tr>
</tbody>
</table>

- More than half have at least one ACE
- If one ACE is present, the ACE Score is likely to range from 2.4 to 4
Adverse Childhood Experiences vs. Current Smoking
Smoking to Self-Medicate
ACE Score vs. Smoking and COPD

ACE Score:

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

Percent With Problem

Regular smoking by age 14

COPD
Molestation in Childhood
Childhood Experiences vs. Adult Alcoholism

ACE Score

% Alcoholic

ACE Score

Childhood Experiences vs. Adult Alcoholism

ACE Score

% Alcoholic

Childhood Experiences vs. Adult Alcoholism

ACE Score

% Alcoholic

Childhood Experiences vs. Adult Alcoholism

ACE Score

% Alcoholic
Some say depression is genetic.
Some say depression is due to a chemical imbalance.
Might depression be a *normal* response to *abnormal life experiences*?
With a Lifetime History of Depression

Childhood Experiences Underlie Chronic Depression

<table>
<thead>
<tr>
<th>ACE Score</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>&gt;=4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
Childhood Experiences Underlie Suicide
Estimates of the Population Attributable Risk* of ACEs for Selected Outcomes in Women

<table>
<thead>
<tr>
<th>Mental Health</th>
<th>PAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current depression</td>
<td>54%</td>
</tr>
<tr>
<td>Chronic depression</td>
<td>41%</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>58%</td>
</tr>
</tbody>
</table>

*That portion of a condition attributable to specific risk factors
Adverse Childhood Experiences vs. Likelihood of > 50 Sexual Partners

![Graph showing the relationship between ACE score and adjusted odds ratio for the likelihood of having > 50 sexual partners.](image-url)
Adverse Childhood Experiences vs. History of STD

ACE Score

Adjusted Odds Ratio

Graph showing the relationship between ACE Score and Adjusted Odds Ratio for a history of STD.
# Adverse Childhood Experiences and the Risk of:

- Multiple Sexual 3 or More Partners*
- 3 or More Marriages*
- Had Unwanted Pregnancy* (abortion)

<table>
<thead>
<tr>
<th>ACE Score</th>
<th>Multiple Sexual Partners*</th>
<th>3 or More Marriages*</th>
<th>Had Unwanted Pregnancy* (abortion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1</td>
<td>1.6</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>2</td>
<td>1.9</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>3</td>
<td>3.4</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>4</td>
<td>4.4</td>
<td>2.9</td>
<td>2.1</td>
</tr>
<tr>
<td>≥5</td>
<td>5.8</td>
<td>3.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>

*Adjusted Odds Ratio
Childhood Experiences Underlie Rape

% Reporting Rape

ACE Score
Ever Hallucinated* (%)

ACE Score and Hallucinations

*Adjusted for age, sex, race, and education.
### Adverse Childhood Experiences and the Risk of:

<table>
<thead>
<tr>
<th>ACE Score</th>
<th>Intimate Partner Violence*</th>
<th>Being Raped*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1</td>
<td>1.9</td>
<td>2.0</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>2.8</td>
</tr>
<tr>
<td>3</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>4</td>
<td>4.5</td>
<td>5.3</td>
</tr>
<tr>
<td>&gt;5</td>
<td>5.1</td>
<td>8.9</td>
</tr>
</tbody>
</table>

*Adjusted Odds Ratio
Estimates of the Population Attributable Risk* of ACEs for Selected Outcomes in Women

**Depression and Suicide**
- **48%**

**Crime Victim**
- **Sexual Assault**
  - **62%**
- **Domestic Violence**
  - **52%**

*That portion of a condition attributable to specific risk factors*
The traditional concept:

“Addiction is due to the characteristics intrinsic in the molecular structure of some substance.”
We find that:

“Addiction highly correlates with characteristics intrinsic to that individual’s childhood experiences.”
ACE Score vs. Intravenous Drug Use

% Have Injected Drugs

ACE Score

N = 8,022  p<0.001
### Adverse Childhood Experiences and the Risk of:

<table>
<thead>
<tr>
<th>ACE Score</th>
<th>Alcoholism*</th>
<th>Parenteral Drug Abuse*</th>
<th>Attempted Suicide*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1</td>
<td>1.9</td>
<td>1.0</td>
<td>1.8</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>2.5</td>
<td>4.0</td>
</tr>
<tr>
<td>3</td>
<td>2.7</td>
<td>3.5</td>
<td>4.0</td>
</tr>
<tr>
<td>4</td>
<td>4.5</td>
<td>3.8</td>
<td>7.2</td>
</tr>
<tr>
<td>≥5</td>
<td>5.1</td>
<td>9.2</td>
<td>16.8</td>
</tr>
</tbody>
</table>

*Adjusted Odds Ratio
Estimates of the Population Attributable Risk* of ACEs for Selected Outcomes in Women

<table>
<thead>
<tr>
<th>Drug Abuse</th>
<th>PAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcoholism</td>
<td>65%</td>
</tr>
<tr>
<td>Drug abuse</td>
<td>50%</td>
</tr>
<tr>
<td>IV drug use</td>
<td>78%</td>
</tr>
</tbody>
</table>

*That portion of a condition attributable to specific risk factors
Adverse Childhood Experiences determine the likelihood of the ten most common causes of death in the United States.

Top 10 Risk Factors: smoking, severe obesity, physical inactivity, depression, suicide attempt, alcoholism, illicit drug use, injected drug use, 50+ sexual partners, h/o STD.
With an ACE Score of 0, the majority of adults have few, if any, risk factors for these diseases.
However, with an ACE Score of 4 or more, the majority of adults have multiple risk factors for these diseases or the diseases themselves.
Effect of ACEs on Mortality

Percent in Age Group

19-34
35-49
50-64
>=65

ACE Score

Age Group

Percent in Age Group

0
10
20
30
40
50
60
Many chronic diseases in adults are determined decades earlier, in childhood.
Their risk factors are also reliable markers for antecedent problems.

“In my end is my beginning.”

T.S. Eliot - Quartets
Dismissing them as “bad habits” or “self-destructive behavior” totally misses their function.
ACE Score vs. Serious Job Problems

% with Job Problems

ACE Score

0 1 2 3 4 or more
Much of what causes time to be lost from work is actually predetermined decades earlier by the adverse experiences of childhood.
Premature mortality and excess morbidity are typically the result of a small number of common diseases.

ACE = Parental Loss
Evidence from ACE Study Suggests:
These chronic diseases in adults are determined decades earlier, by the experiences of childhood.
Evidence from ACE Study Suggests:

Risk factors for these diseases are initiated during childhood or adolescence . . .

Seeking to Cope
Evidence from ACE Study Suggests:

. . . and continue into adult life.

Outcome: social and biomedical damage
Another possible outcome.
The risk factors underlying these adult diseases are effective coping devices.
Why is this so difficult to treat later?
Healthy Brain
This PET scan of the brain of a normal child shows regions of high (red) and low (blue and black) activity. At birth, only primitive structures such as the brain stem (center) are fully functional; in regions like the temporal lobes (top), early childhood experiences wire the circuits.

An Abused Brain
This PET scan of the brain of a Romanian orphan, who was institutionalized shortly after birth, shows the effect of extreme deprivation in infancy. The temporal lobes (top), which regulate emotions and receive input from the senses, are nearly quiescent. Such children suffer emotional and cognitive problems.
What is conventionally viewed as a problem is actually a solution to an unrecognized prior adversity.
Evidence from ACE Study Suggests:

Adverse childhood experiences are the most basic cause of health risk behaviors, morbidity, disability, mortality, and healthcare costs.
The Influence of Adverse Childhood Experiences Throughout Life
“The truth about childhood is stored up in our bodies and lives in the depths of our souls. Our intellect can be deceived, our feelings can be numbed and manipulated, our perceptions shamed and confused, our bodies tricked with medication, but our soul never forgets. And because we are one, one whole soul in one body, someday our body will present its bill.”

Alice Miller
Bridging the Chasm

Acknowledgment that the problem exists.

Recognition of cases in medical practice.
What Can We Do Now?

• Routinely seek history of adverse childhood experiences from all patients
• Acknowledge their reality by asking, “How has this affected you later in life?”
• Arrange a return appointment to discuss possibilities for helping them.