

THE ADVERSE CHILDHOOD EXPERIENCE STUDY (ACES): IMPLICATIONS OF LONG- TERM EFFECTS

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ADVANCING HEALTH EDUCATION & RESEARCH



USEFUL FOR NOW, BUT THESE NEED TO GO AWAY

- CPS
- CPT system
- Trauma informed communities
- DV shelters



- Need to prevent all of this instead!!

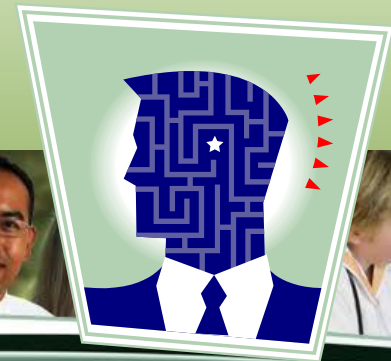


SAVE THE BRAIN – PREVENT ABUSE

GROW THE BRAIN - STIMULATION

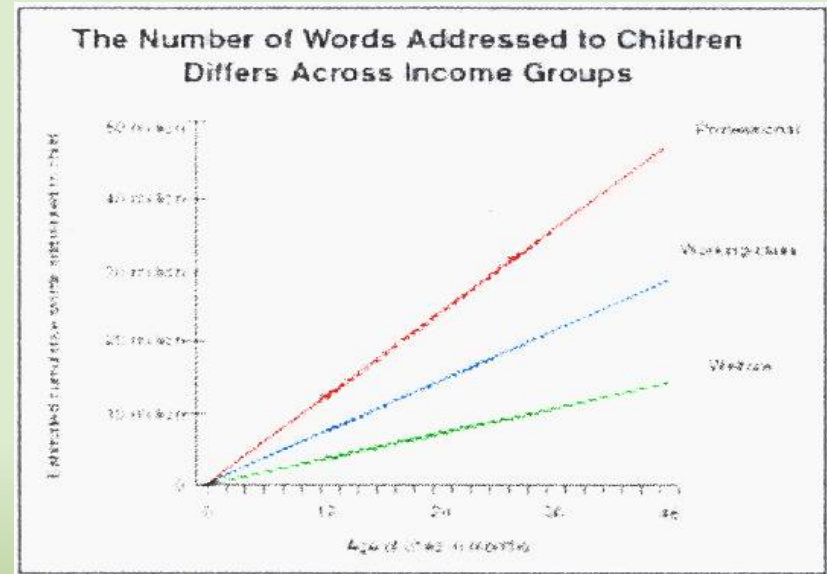
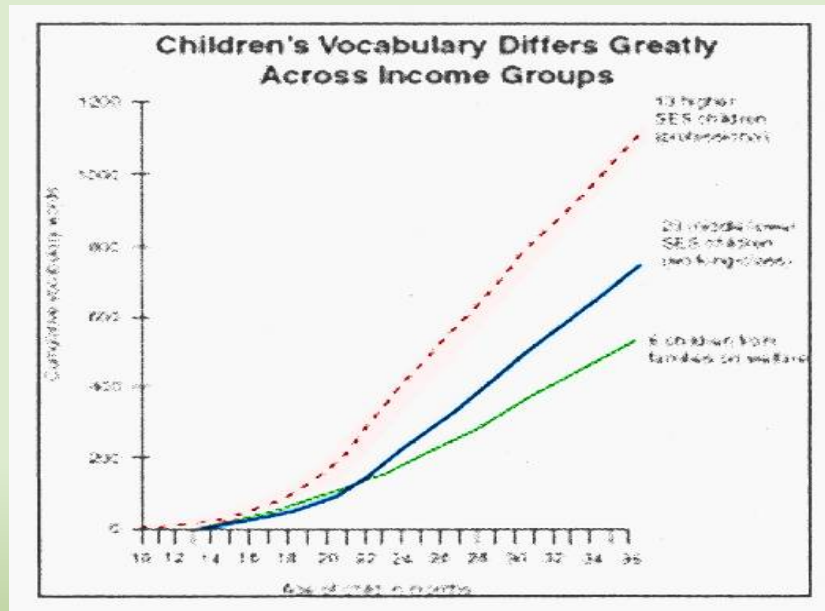
Brains need both:

1. Freedom from abuse
2. Positive stimulation



Left Behind By Kindergarten:

Children living in poverty average 15 IQ points below their peers.



Vocabulary at Age 3

Poor children: 525 words

Working class: 749 words

Professional: 1,116 words

By age 4, the average child in a poor family might have been exposed to 13 million fewer words than child in a working class family and **30 million fewer words** than a child in a professional family.

The Evolution of Prevention

What Kind of Problem is it?

**Justice &
Social
Service
Problem**



**Public
Health
Problem**

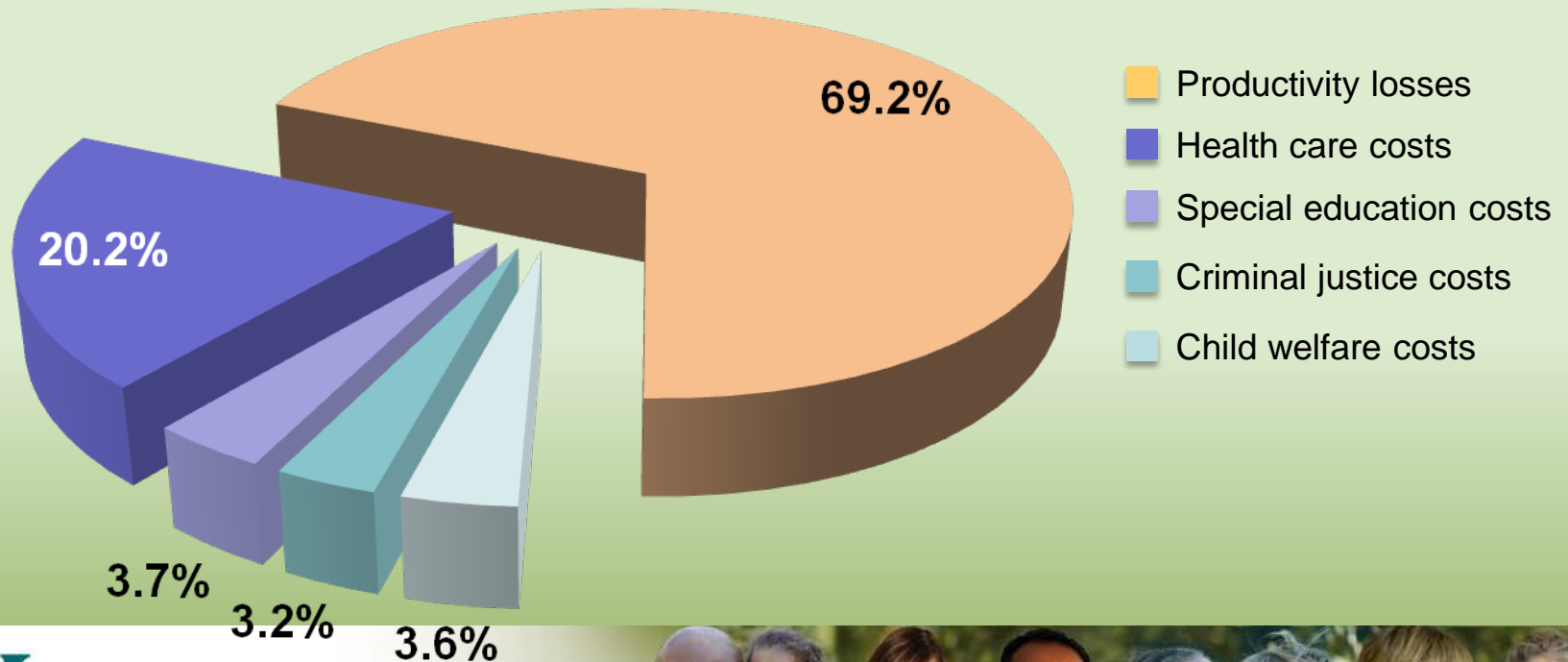
“It is time for critical thinking to formulate a new national public health priority, preventing child maltreatment and promoting child well treatment.”

Surgeon General Richard H. Carmona, MD MPH – March 2005



Lifetime Economic Burden of Child Maltreatment: \$124 billion in 2008

Economic burden



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6 VIOLENCE & ABUSE

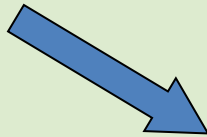


(Fang X, et al. *Child Abuse Negl* (2012))

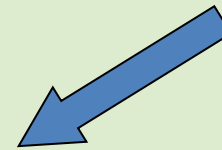
WHAT HAPPENS IF WE DON'T PREVENT ABUSE?

FOUR AREAS OF RESEARCH CONVERGENCE

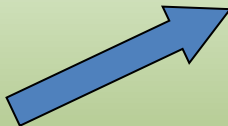
ACES STUDY



NEUROSCIENCE



BRAIN IMAGING



TELOMERES



#1



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ACES



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The Influence of Child Maltreatment Throughout Life

Child Maltreatment

Health-risk Behaviors

Sexual promiscuity
Sexual perpetration
Alcohol abuse
Illicit/injected drug use
Smoking
Behavior problems

Mental/Social Problems

PTSD
Depression
Anxiety
Eating disorders
Academic achievement
Unwanted pregnancy
Obesity
Revictimization

Disease and Injury Conditions

Ischemic heart disease
Diabetes
Stroke
Cancer
Suicide
Skeletal fractures
Chronic bronchitis/
emphysema
STDs (e.g., HIV)
Hepatitis

Adverse Childhood Experiences and their Relationship to Adult Health and Well-being

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

www.acestudy.org

Vincent J. Felitti, M.D.
Robert F. Anda, M.D.

The Adverse Childhood Experiences (ACE) Study

- The largest study of its kind ever done to examine the health, social, and economic effects of adverse childhood experiences over the lifespan (18,000 participants)
- Average age = 57 years old



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



Categories of Adverse Childhood Experiences

Category
Prevalence (%)

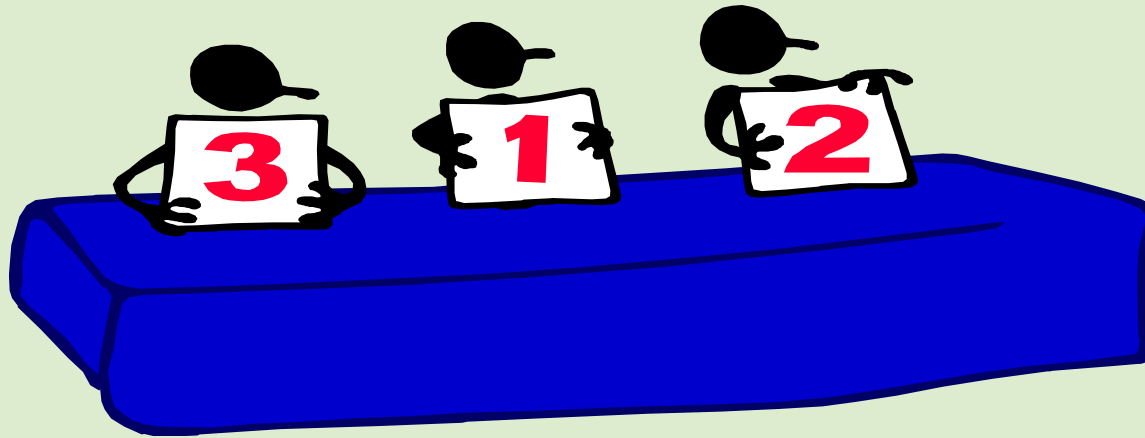
Abuse, by Category

Psychological (by parents)	11%
Physical (by parents)	11%
Sexual (anyone)	22%

Household Dysfunction, by Category

Substance Abuse	26%
Mental Illness	19%
Mother Treated Violently	13%
Imprisoned Household Member	3%

ACE Score



- Total number of ACE that each participant reported
- Used to assess negative experiences during childhood
- Example: Experiencing physical abuse as a child is an ACE score of one. Experiencing physical abuse plus witnessing IPV is an ACE score of two.



Adverse Childhood Experiences Score

Number of categories of adverse childhood experiences are summed ...

<i>ACE score</i>	<i>Prevalence</i>
0	48%
1	25%
2	13%
3	7%
4 or more	7%



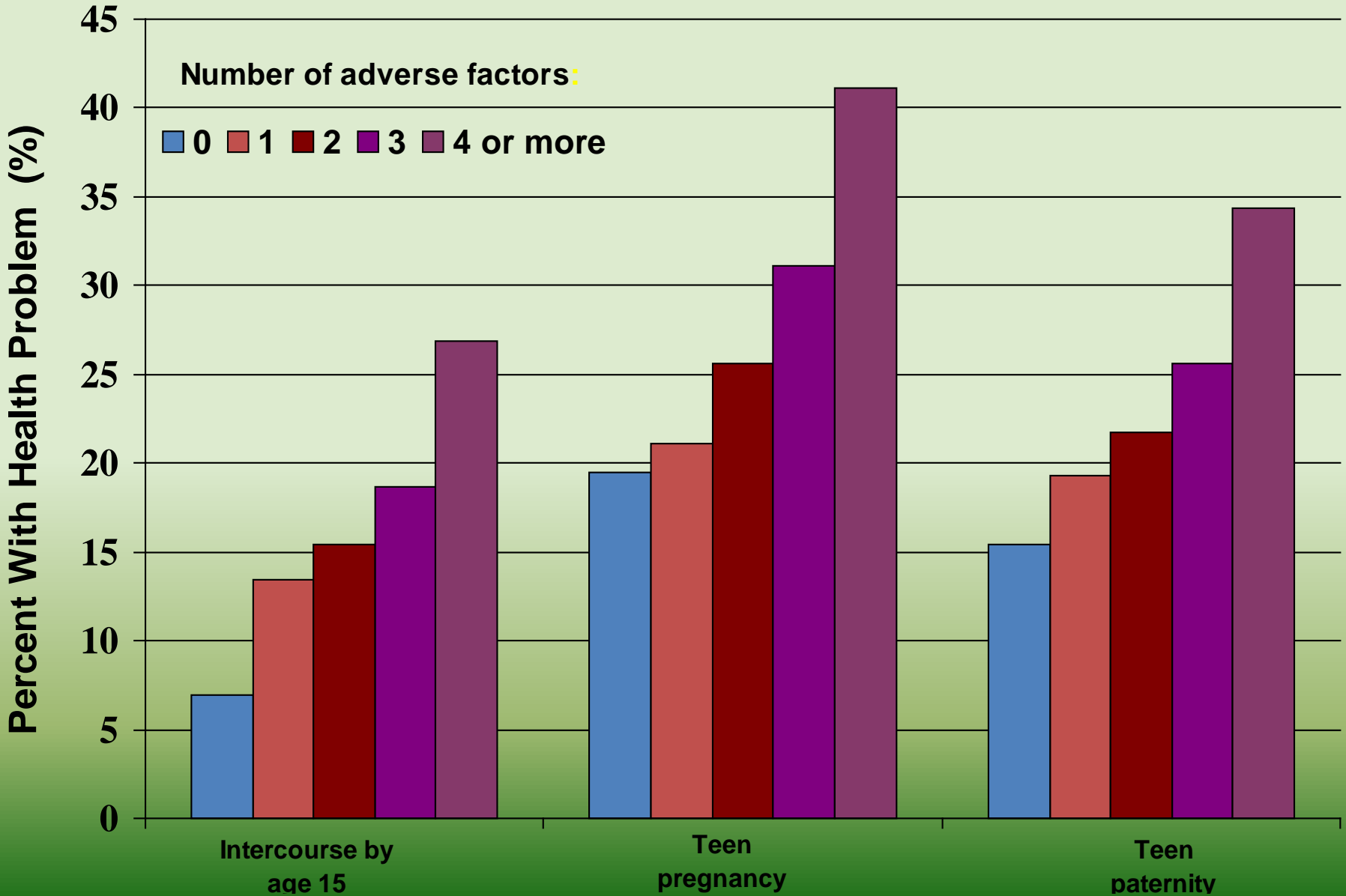
- More than *half* have at least one ACE
- If one category of ACE is present, there is an 84% likelihood of additional categories being present.

HEALTH CONSEQUENCES

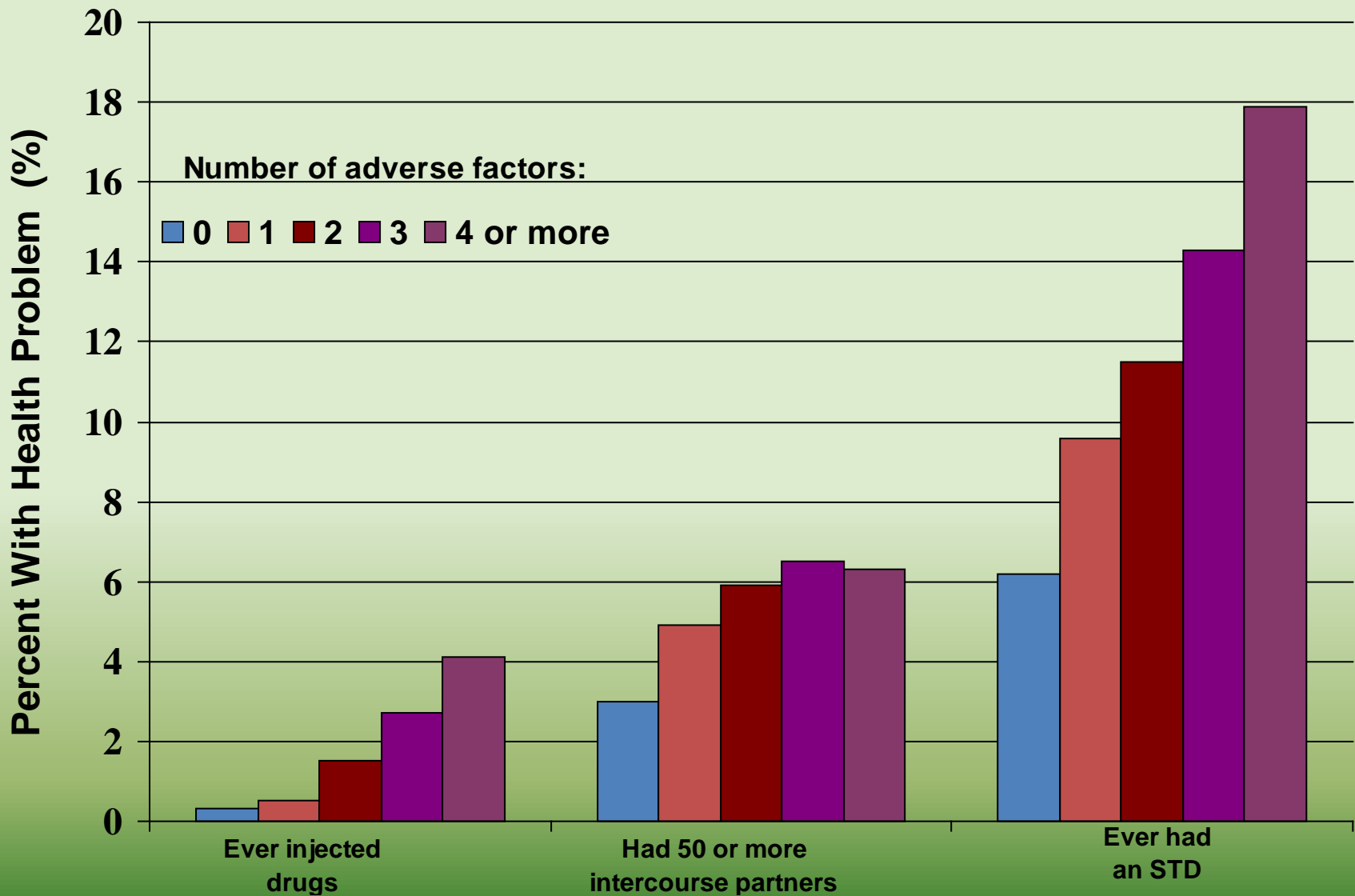


SEX

Number of Adverse Childhood Experiences and Teen Sexual Behaviors



ACE Score and HIV Risks



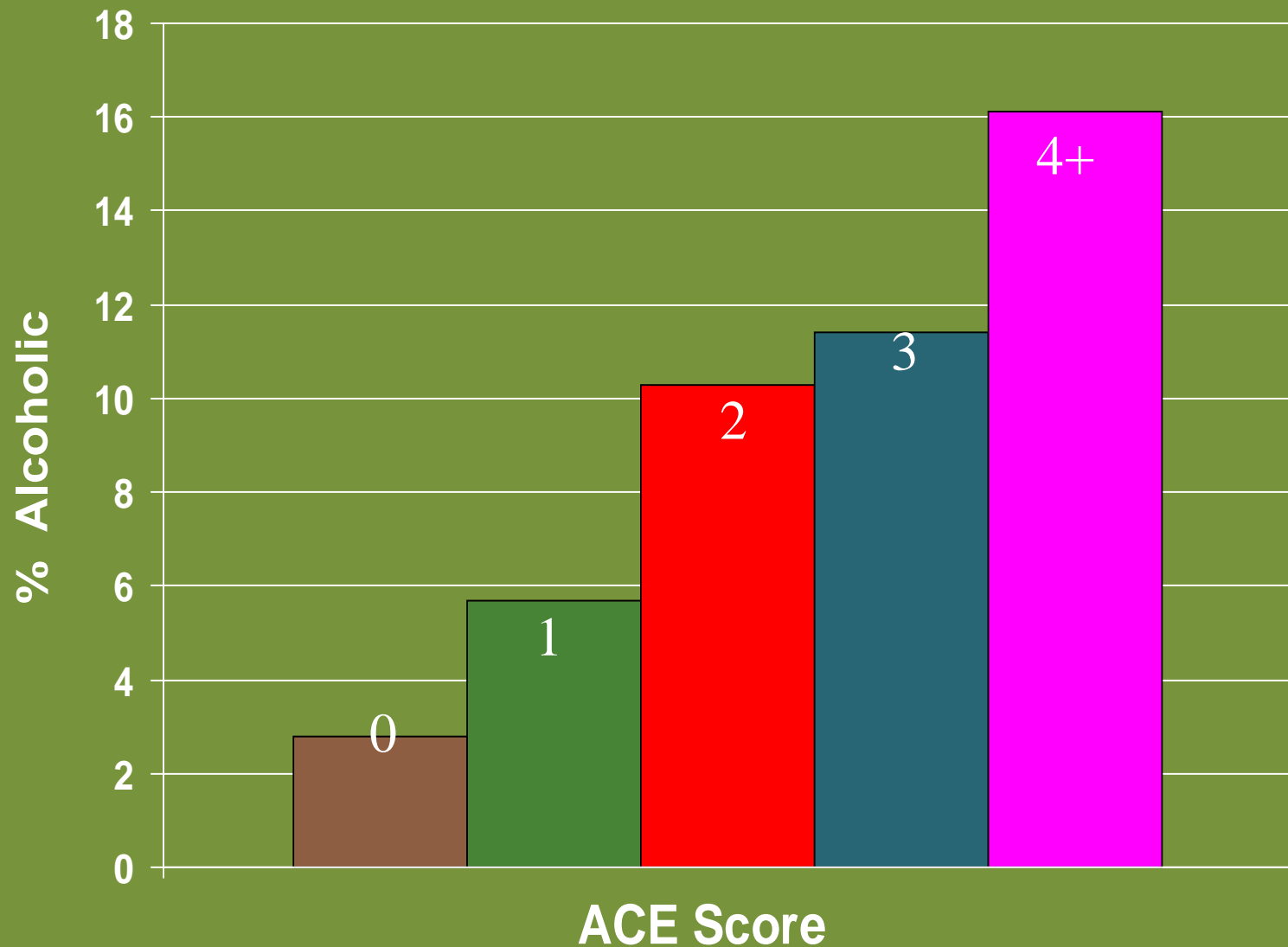
DRUGS



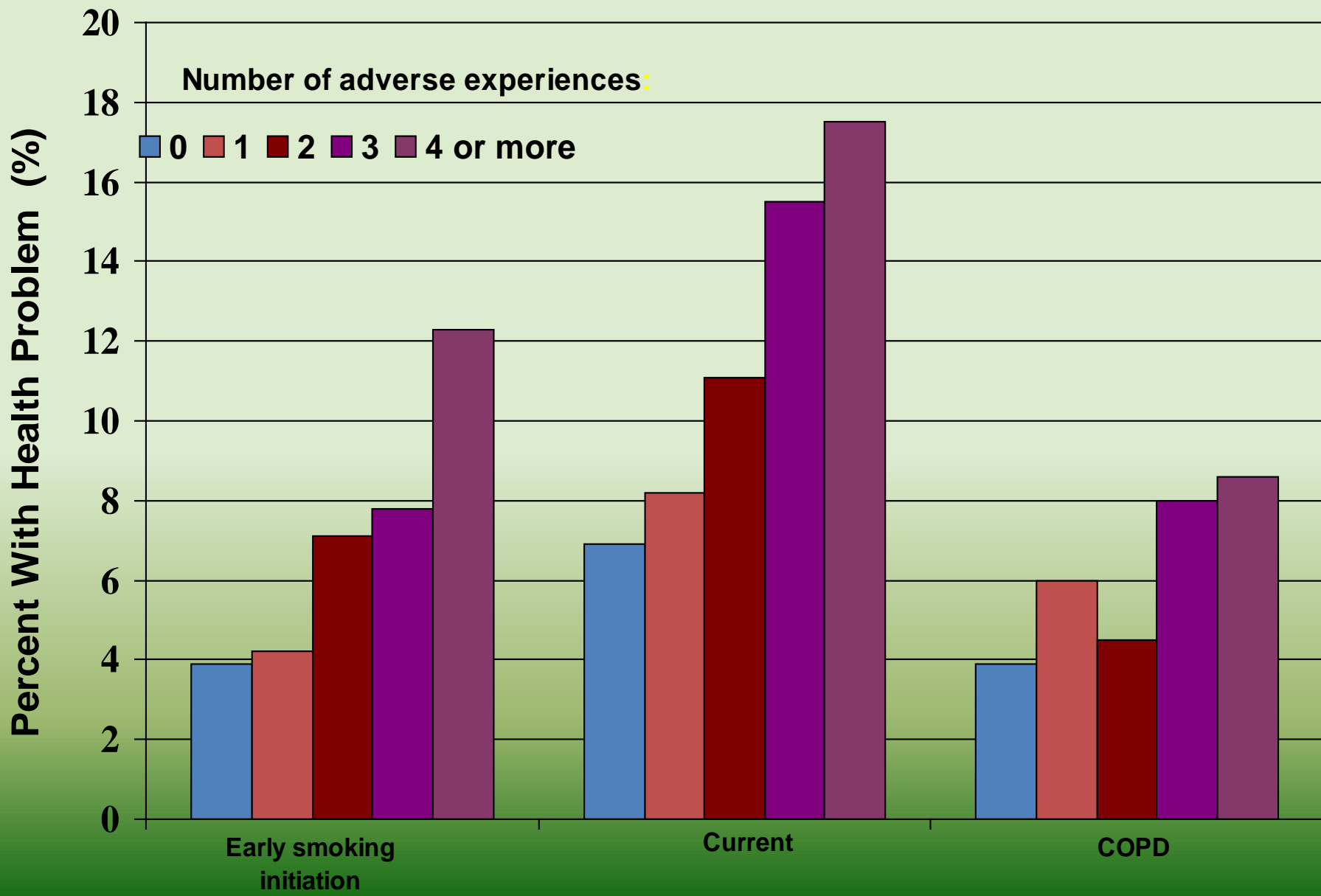
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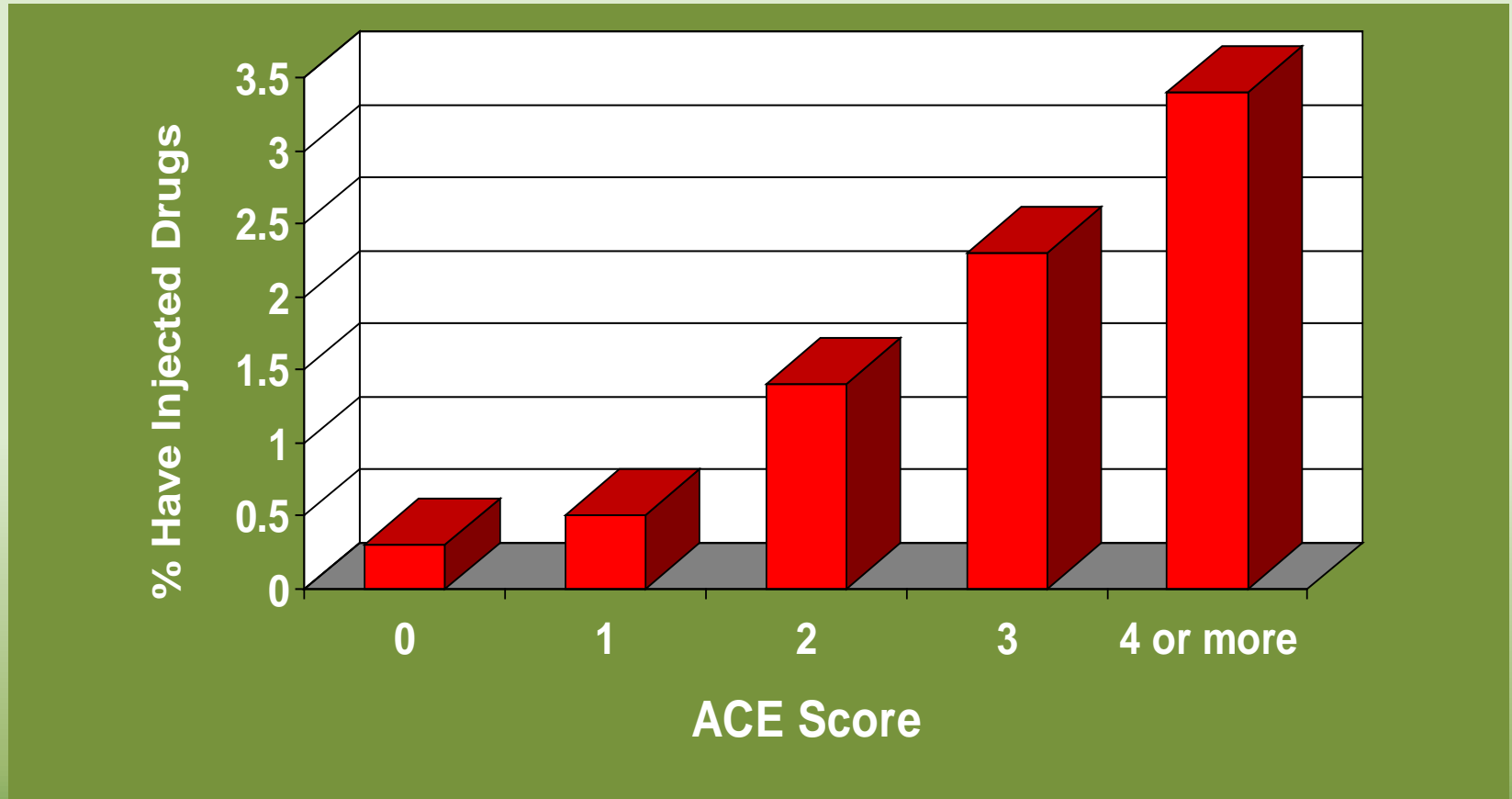
Childhood Experiences vs. Adult Alcoholism



Relationship Between Number of Adverse Childhood Experiences and Smoking Behaviors and Smoking-Related Lung Disease



ACE Score vs. Intravenous Drug Use



N = 8,022

p < 0.001

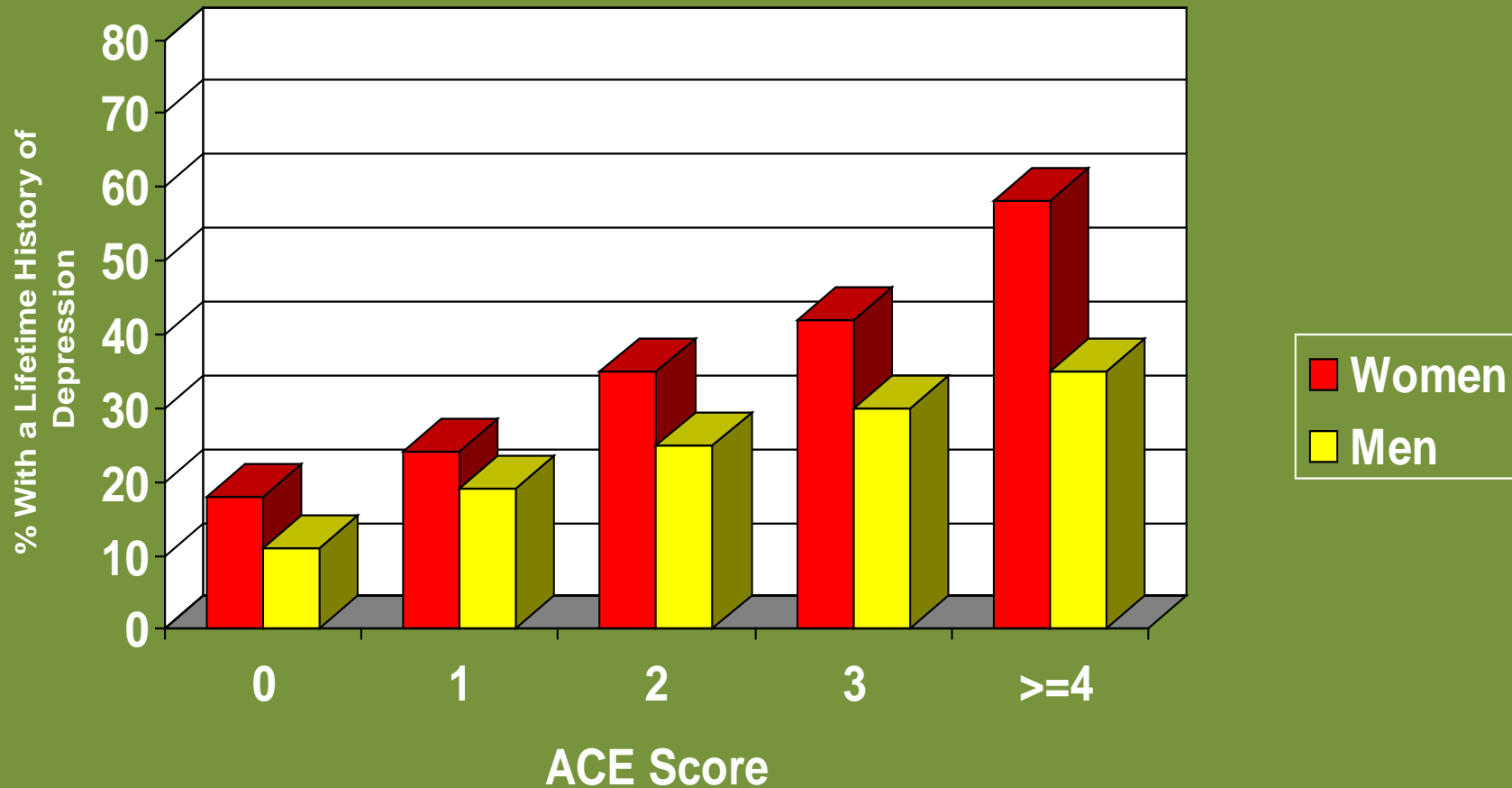
Estimates of the Population Attributable Risk* of ACEs for Selected Outcomes in Women

Drug Abuse	PAR
Alcoholism	65%
Drug abuse	50%
IV drug use	78%

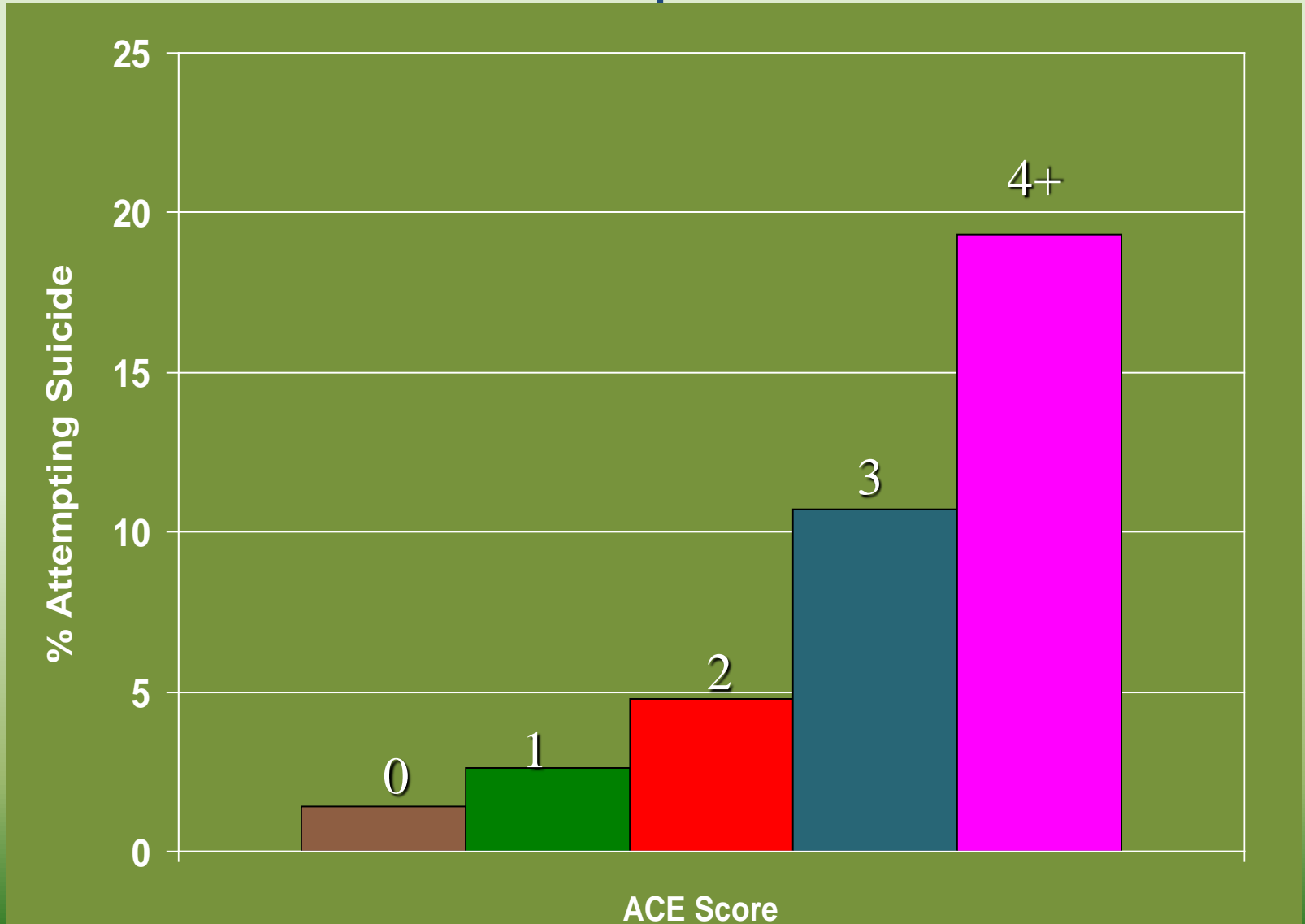
*That portion of a condition attributable to specific risk factors

MENTAL HEALTH

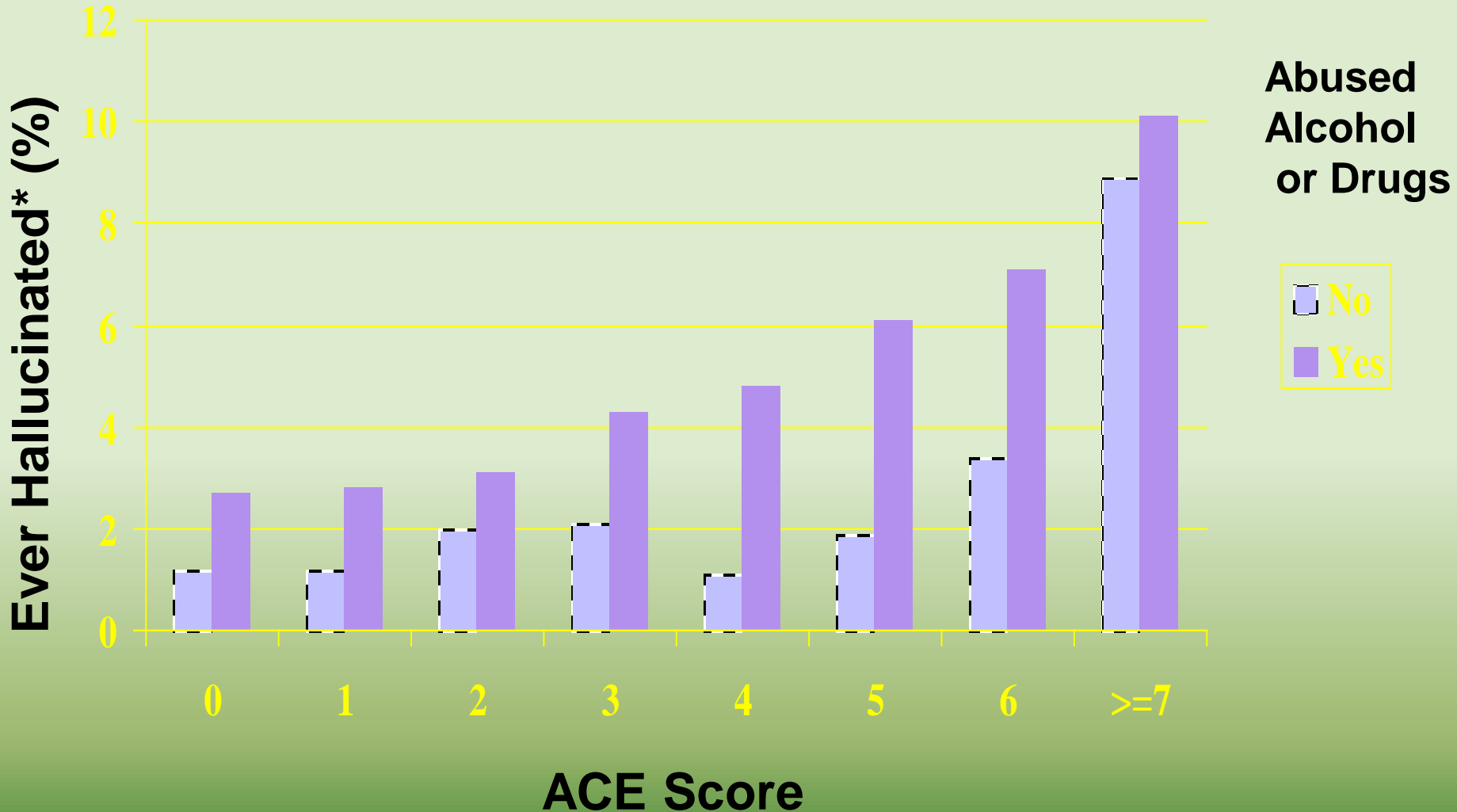
Childhood Experiences Underlie Chronic Depression



Childhood Experiences Underlie Attempted Suicide



ACE Score and Hallucinations



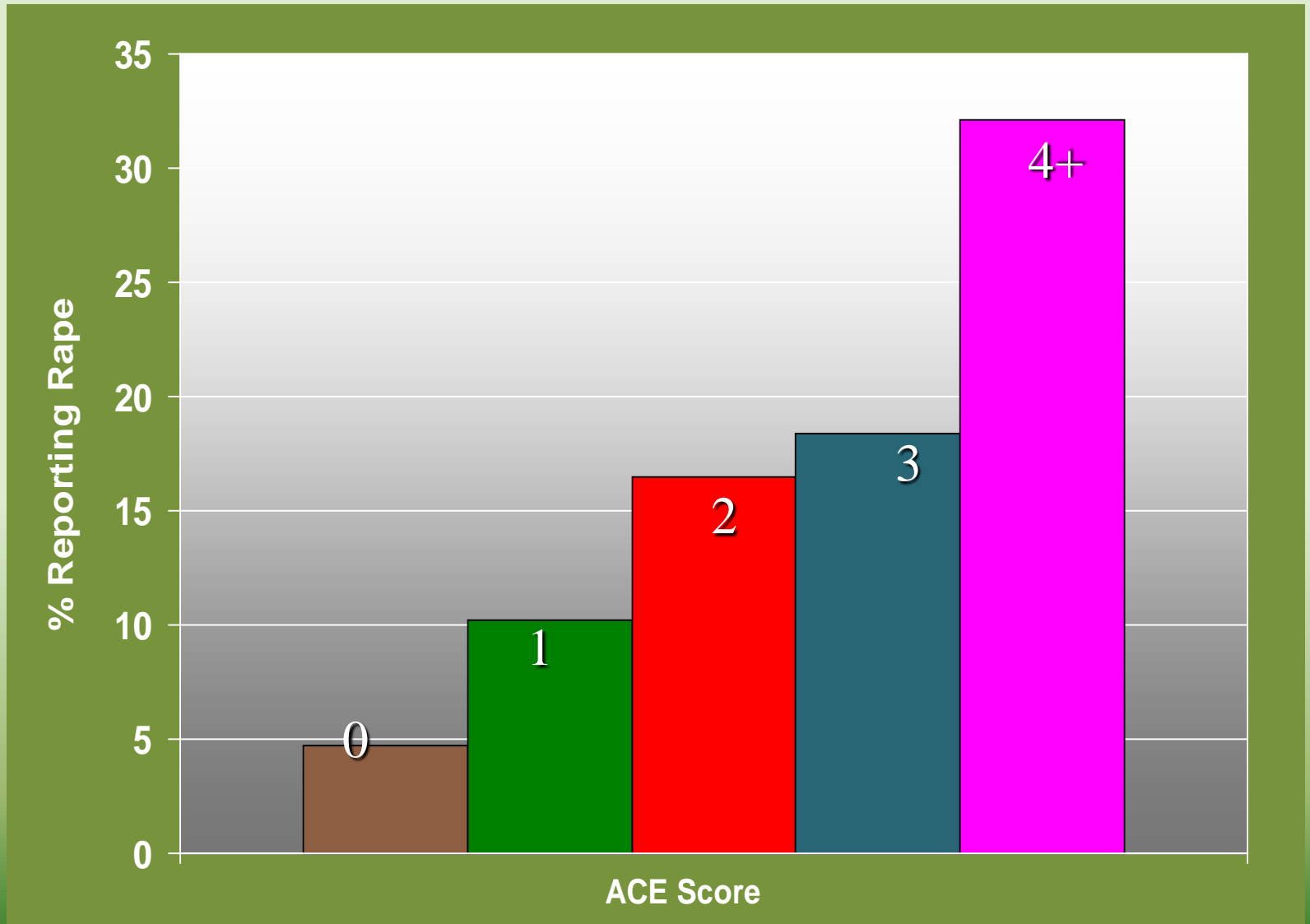
*Adjusted for age, sex, race, and education.

Estimates of the Population Attributable Risk* of ACEs for selected outcomes in women

Mental Health	PAR
Current depression	54%
Chronic depression	41%
Suicide attempt	58%


*That portion of a condition attributable to specific risk factors

Childhood Experiences Underlie Rape



ACE STUDY FINDINGS

- As ACE score goes up, so does risk for:
 - Smoking
 - Organic disease
 - Adult alcoholism
 - Depression and suicide attempts
 - Having 50+ lifetime sexual partners
 - STD's and Rape (from 5% to 33%)
 - Hallucinations
 - Domestic Violence
 - Addictions
 - Dying early
 - Job Problems and lost time from work



Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, Koss MP, et al JS. The relationship of adult health status to childhood abuse and household dysfunction. *American Journal of Preventive Medicine*. 1998;14:245-258.

Adverse Childhood Experiences Reported by Adults Five States, 2009

- First published report to document prevalence of ACEs in population-based representative sample from multiple states stratified by demographic characteristics, including sex, age, education, and race/ethnicity.
- Approximately 59% reported one or more ACEs
- These BRFSS estimates are similar to the findings in the Kaiser-CDC ACE study (2) and similar research, including study in Texas

CDC MMWR, December 17, 2010/59(49); 1609-1613



Adverse Childhood Experiences
determine the likelihood of the
10 most common causes of
death in the US

Top 10 Risk Factors: smoking, severe obesity, physical inactivity, depression, suicide attempt, alcoholism, illicit drug use, injected drug use, 50+ sexual partners, history of 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

Many chronic diseases
in adults are determined
decades earlier, in
childhood



Evidence from ACE Study

Adverse childhood experiences are the most basic cause of

- * health risk behaviors
- * morbidity
- * disability
- * mortality
- * healthcare costs



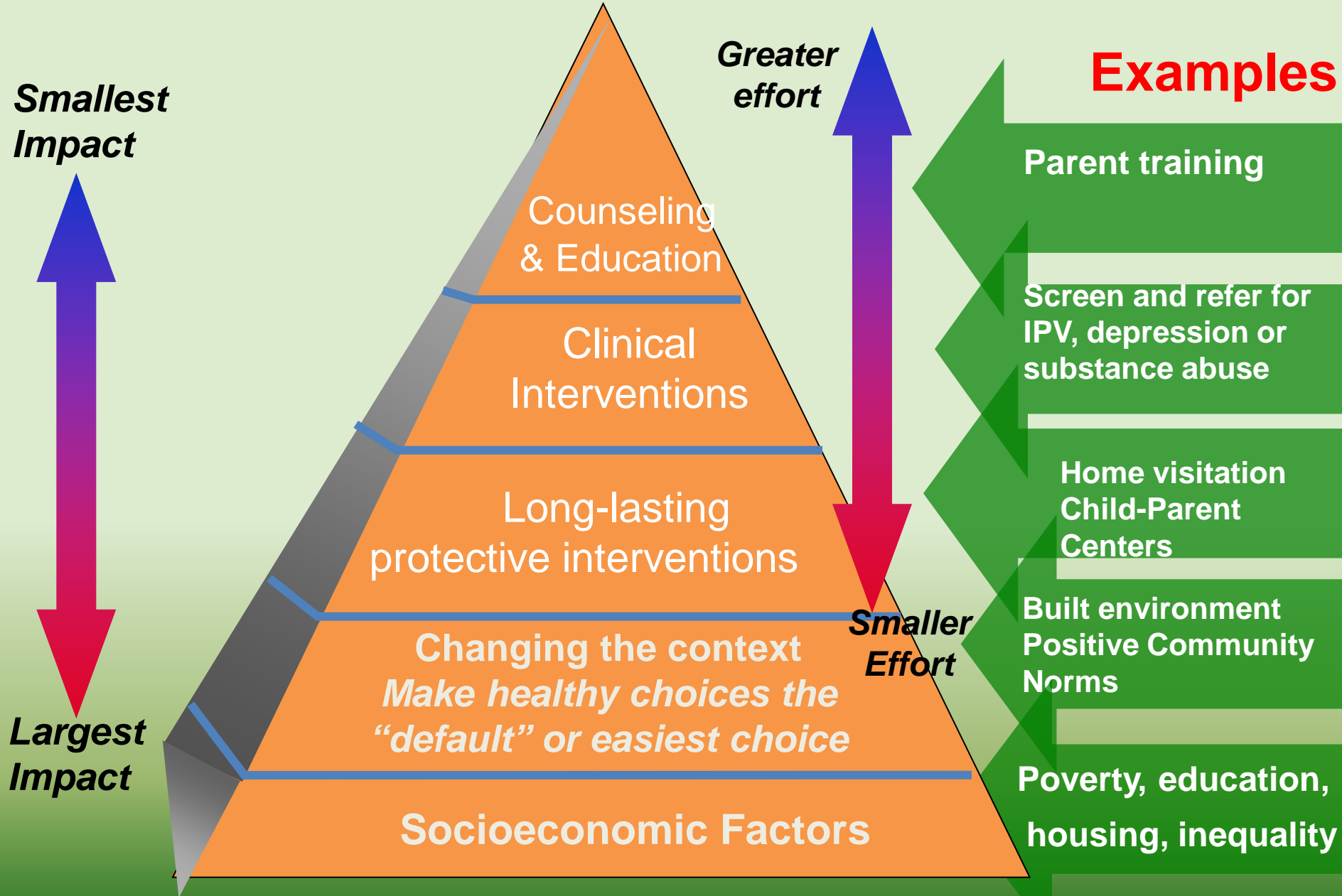
ACES AND PREVENTION



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Frieden's pyramid adapted to child maltreatment





Assuring safe, stable, nurturing relationships and environments for all children



**Vision for DVP's
Child Maltreatment Prevention Work**

SOCIAL NORMS CHANGE



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OPPORTUNITY FOR NORMS CHANGE: CORPORAL PUNISHMENT

- Adrian Peterson – NFL
- Sparking a debate about corporal punishment in USA
- Is your organization reaching out to NFL?
- AVA is trying



OPPORTUNITY FOR NORMS CHANGE: CORPORAL PUNISHMENT

- In the following 38 countries, children are protected by law from all corporal punishment (most recent first):
- Bolivia (2014)
- Brazil (2014)
- Malta (2014)
- Honduras (2013)
- TFYR Macedonia (2013)
- South Sudan (2011)



OPPORTUNITY FOR NORMS CHANGE: CORPORAL PUNISHMENT

- Albania (2010)
- Congo, Republic of (2010)
- Kenya (2010)
- Tunisia (2010)
- Poland (2010)
- Liechtenstein (2008)
- Luxembourg (2008)
- Republic of Moldova (2008)
- Costa Rica (2008)
- Togo (2007)
- Spain (2007)
- Venezuela (2007)

OPPORTUNITY FOR NORMS CHANGE: CORPORAL PUNISHMENT

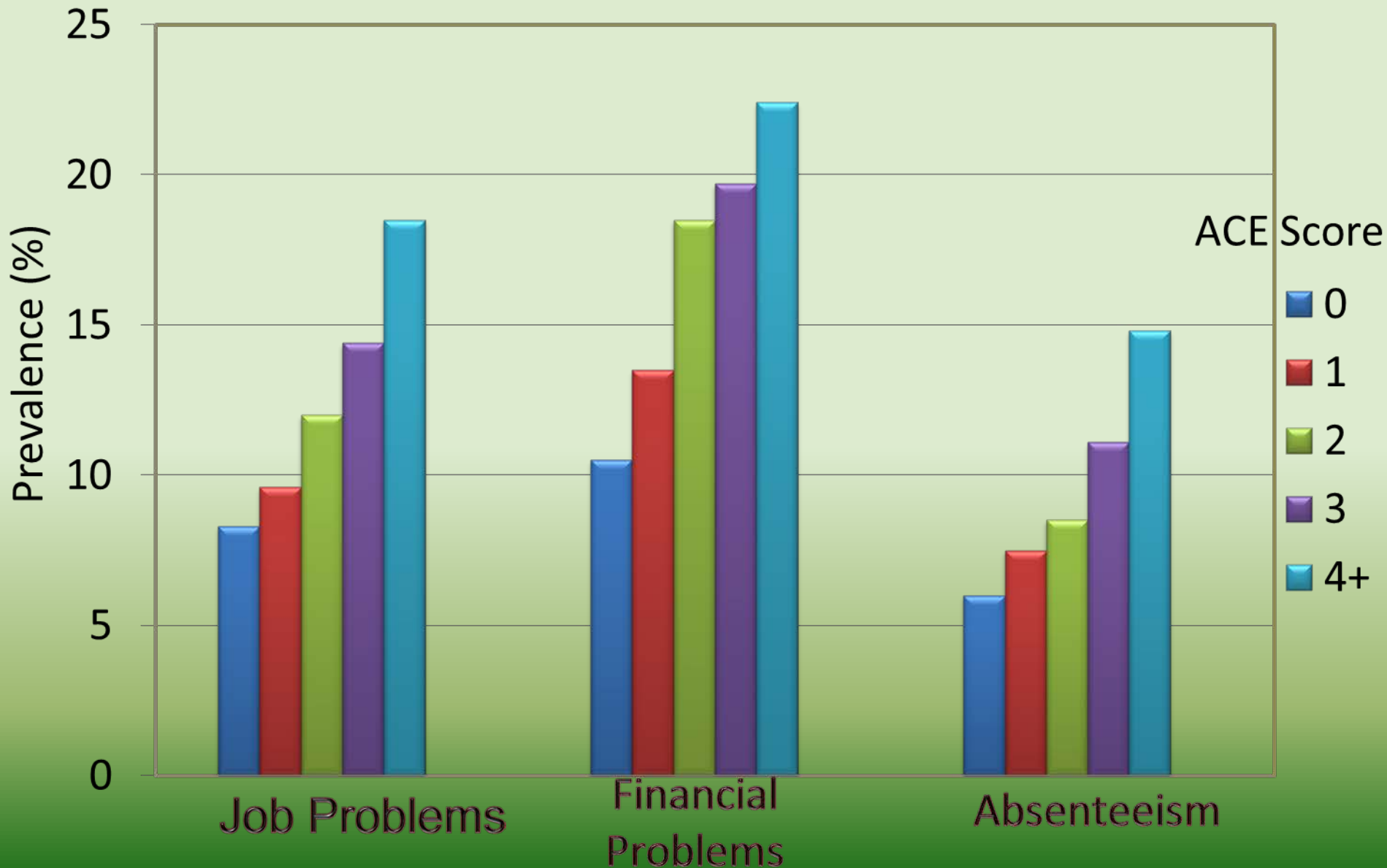
- Uruguay (2007)
- Portugal (2007)
- New Zealand (2007)
- Netherlands (2007)
- Greece (2006)
- Hungary (2005)
- Romania (2004)
- Ukraine (2004)
- Iceland (2003)
- Turkmenistan (2002)
- Germany (2000)
- Israel (2000)
- Bulgaria (2000)
- Croatia (1999)
- Latvia (1998)
- Denmark (1997)

OPPORTUNITY FOR NORMS CHANGE: CORPORAL PUNISHMENT

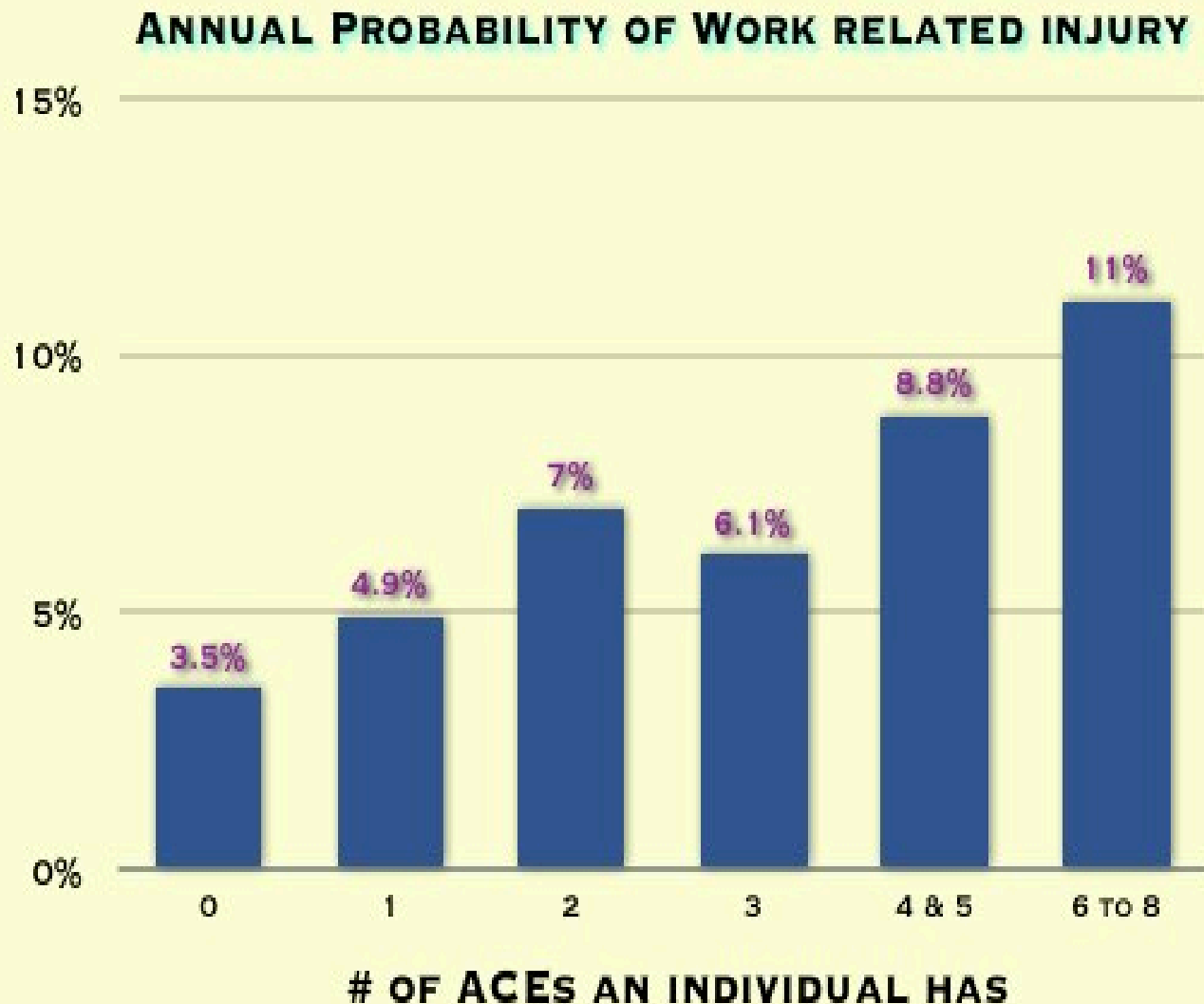
- Cyprus (1994)
- Austria (1989)
- Norway (1987)
- Finland (1983)
- Sweden (1979)



ACE Score and Work Problems

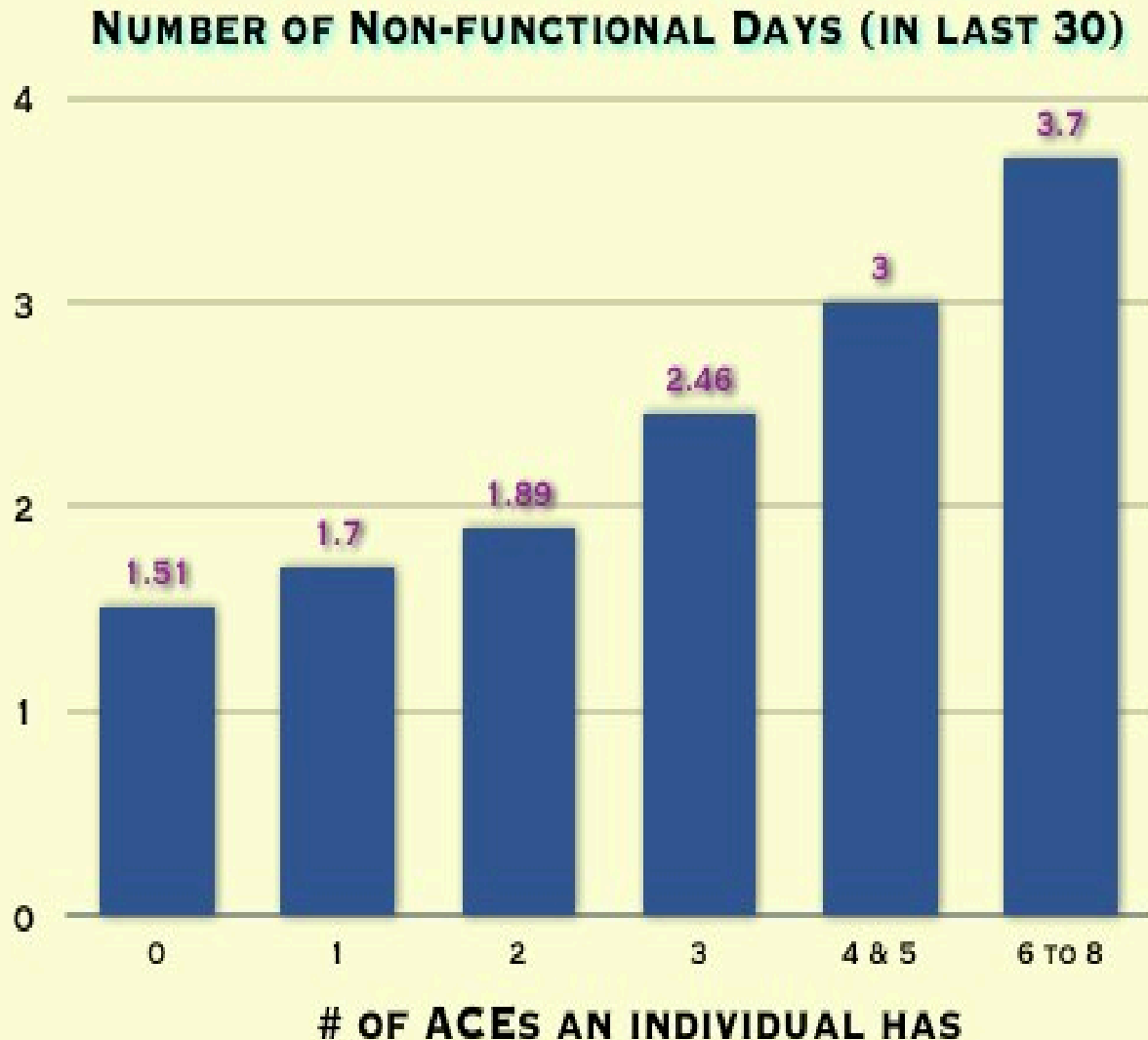


The more ACEs you've had, the more likely it is you'll experience work-related injury



from *Stress, Strength, Work, Hope*
published by the Washington State Family Policy Council, 2012

The more ACEs you've had, the more likely it is you'll miss work or work at lower productivity



from *Stress, Strength, Work, Hope*
published by the Washington State Family Policy Council, 2012

NEW ZEALAND SOVEREIGN INSURANCE



IMAGINE if.....

More employers offered on-site childcare and/or childcare benefits

To help reduce parental stress and allow parents to check in during day



ON & RE

IMAGINE If.....

Businesses helped reinforce prevention messages.....

With “floor talkers” on coping with infant crying



IMAGINE if.....

When business leaders talk with policy makers, they use the opportunity to talk about the impact of ACEs and the importance of safe, stable, nurturing relationships and communities



#2



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BRAIN DEVELOPMENT

National Scientific Council on the Developing Child

www.developingchild.net

Some of the top neuroscientists have also come to appreciate how brains:

1. Develop, and
2. Develop differently depending upon the environment they are exposed to



3 CATEGORIES OF *STRESS*

- Positive stress
- Tolerable stress
- Toxic stress



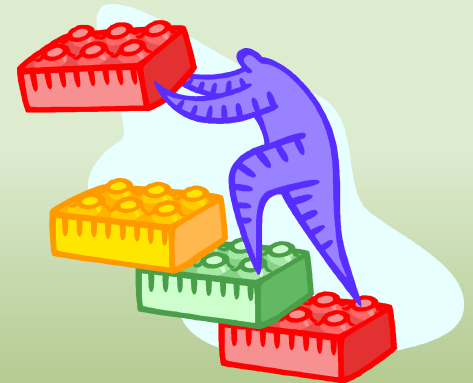
3 Core Concepts in Early Development

- Experiences build brain architecture
- “Serve and Return” interaction shapes brain circuitry
- Toxic stress derails healthy development



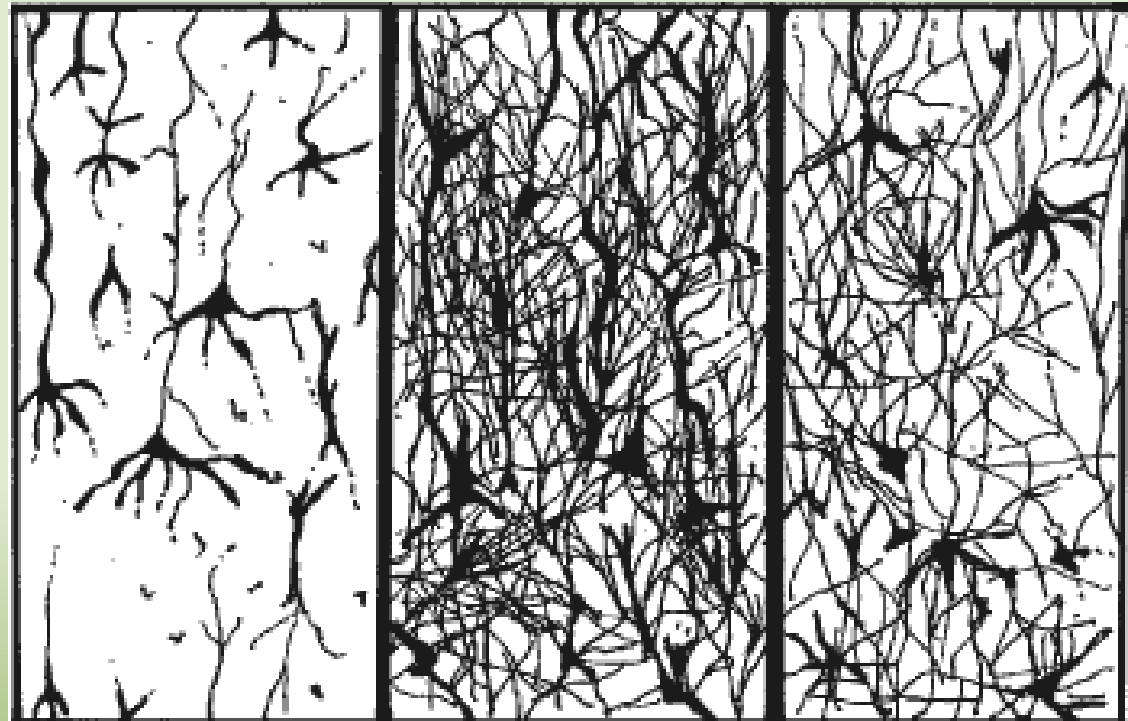
BRAIN DEVELOPMENT

- Early experiences are built into our bodies and brains--- for better or for worse
- Healthy development in the early years provides the building blocks for:
 - educational achievement
 - economic productivity
 - responsible citizenship
 - lifelong health
 - strong communities
 - successful parenting of the next generation



<http://www.developingchild.harvard.edu>

Synaptic Density



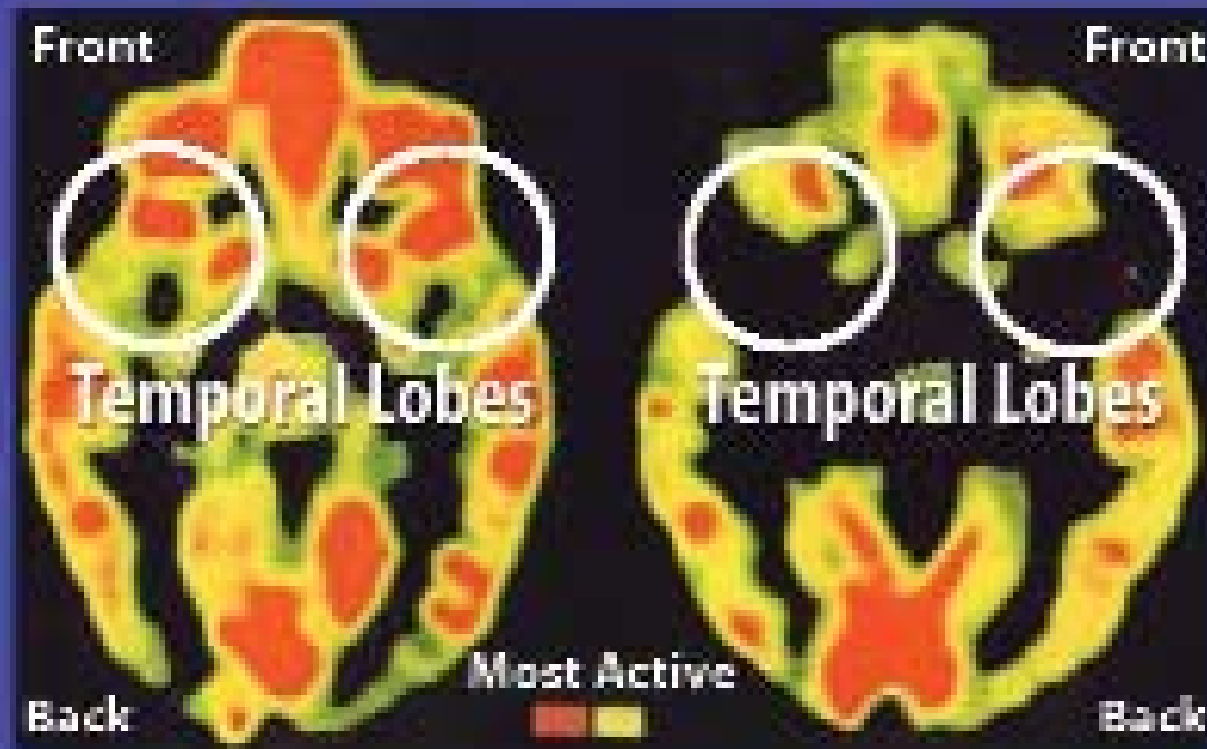
at a child's birth

at 7 years of age

at 15 years of age

700 new synapses (neural connections) every second

SOURCE: Harvard Center on the Developing Child



**Positive
Stimulation**

**Negative
Stimulation**

Brain activity of a normal five-year-old child (left)
and a five-year-old institutionalized orphan neglected in infancy (right).

SSNRs : Influence Early Brain Development and Buffer Adverse Childhood Experiences

- Healthy development depends on the quality and reliability of a young children's relationships with the important people in their lives
- Nurturing, responsive, and individualized interactions build healthy brain architecture that provides a strong foundation for future learning, behavior, and health



SSNRs can provide a buffer for ACE

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#3



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SEXUAL ABUSE AND THE BRAIN

- Children may be more susceptible than adults to cellular microenvironments and impact on brain development
- High rate of PTSD (42% to 90%)
- [Physical abuse rate of PTSD may be 50%]
- Limbic-hypothalamic-pituitary-adrenal axis is at risk (may be “over sensitive”)



SEXUAL ABUSE AND THE BRAIN

- Increased sensitivity of the locus ceruleus/SNS/chatecholamine system?
- Responsible for high heart rate, blood pressure, other effects
- Becomes dysregulated?



SEXUAL ABUSE AND THE BRAIN

- Serotonin may become low in the prefrontal cortex – associated with depression, suicidal behaviors, impulsivity
- May lead to “learned helplessness”



SEXUAL ABUSE AND THE BRAIN

- Neuroimaging of adults supports the concept that medial prefrontal regions responsible for executive functions are hyporesponsive when abused as children
- Amygdala is hyperresponsive
- Corpus callosum is decreased (males more than females?)
- Smaller overall brain volume (e.g. 8%) as adults



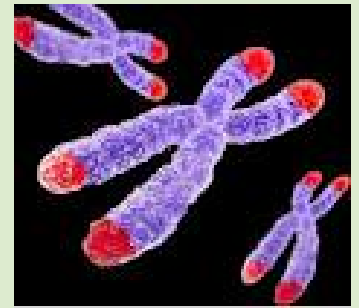
#4



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TELOMERES



- Telomeres are the ends of DNA strands which are shortened with each cellular division.
- With each replication, telomeres shorten until the “Hayflick limit” is reached and the cell enters senescence.
- Telomeres are thought to be a sign of cellular aging (and perhaps overall aging of the organism).



EXPOSURE TO VIOLENCE DURING CHILDHOOD IS ASSOCIATED WITH TELOMERE EROSION FROM 5 TO 10 YEARS OF AGE: A LONGITUDINAL STUDY

- Same children examined for telomere erosion between 5 and 10 years of age
- Physical abuse caused more erosion
- Combination of physical abuse, exposure to domestic violence, or bullying caused the most erosion
- Children will have decreased life span, earlier diseases



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FOUR LINES OF CONVERGENCE

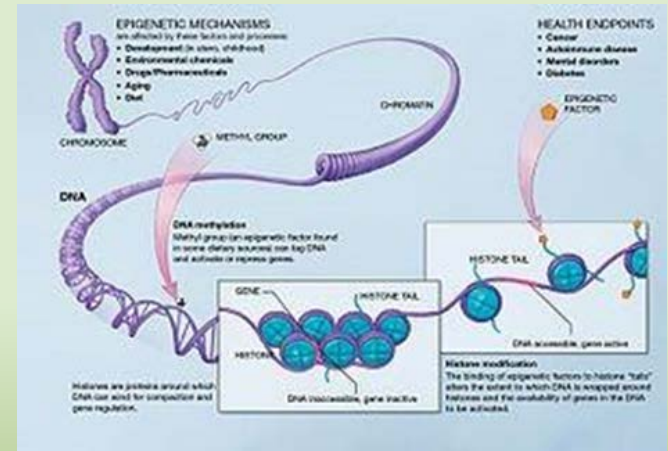


- Not only does abuse alter which neurons are selected, how different parts of the brain develop, and how neuro-hormonal pathways are altered but now it can be seen that it leaves its very footprints deep in the cells.
- Abuse creates **different** children



EPIGENETICS

- Epigenetics is the study of heritable changes in gene activity that are *not* caused by changes in the DNA sequence



**ADULTS TELL YOU ABOUT THEIR
BRAINS**

ADULTS TELL YOU ABOUT THEIR BRAINS

- How people react gives you clues about their life



ADULTS TELL YOU ABOUT THEIR BRAINS



- Example 1:
 - A guy goes into a bar and gets into a discussion with another guy
 - That guy suddenly hits him without warning
- What kind of brain behavior is he showing?
- Limbic-hypothalamic-pituitary-adrenal over-reactivity?



ADULTS TELL YOU ABOUT THEIR BRAINS



- Example 2:
 - A woman says that her 3 year old will not mind and she needs to hit him, but it doesn't work
 - You give alternatives, but she insists nothing works and doesn't really try
- What kind of brain behavior is she showing?



CHILDREN TELL YOU ABOUT THEIR BRAINS

CHILDREN TELL YOU ABOUT THEIR BRAINS

- They experience trauma
 - Prenatal substance exposure, mother's stress chemicals
 - Neglect
 - Physical abuse
 - Sexual abuse
 - Witnessing IPV, bullying



Response to Trauma: Bodily Functions

FUNCTION	CENTRAL CAUSE	SYMPTOM(S)
Sleep	Stimulation of reticular activating system	<ol style="list-style-type: none">1. Difficulty falling asleep2. Difficulty staying asleep3. Nightmares



Response to Trauma: Bodily Functions

Eating

Inhibition of
satiety center,
anxiety

1. Rapid eating
2. Lack of satiety
3. Food hoarding
4. Loss of appetite

Response to Trauma: Bodily Functions

Toileting

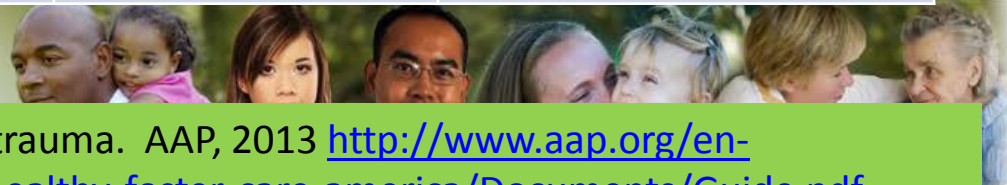
Increased sympathetic tone, increased catecholamines

1. Constipation
2. Encopresis
3. Enuresis
4. Regression of toileting skills



RESPONSE TO TRAUMA: BEHAVIORS

Category	More common with	Response	Misidentified as and/or comorbid with
Dissociation (Dopaminergic)	Females Young children Ongoing trauma/pain Inability to defend self	Detachment Numbing Compliance Fantasy	Depression ADHD inattentive type Developmental delay



Helping foster and adoptive families cope with trauma. AAP, 2013 <http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/healthy-foster-care-america/Documents/Guide.pdf>

RESPONSE TO TRAUMA: BEHAVIORS

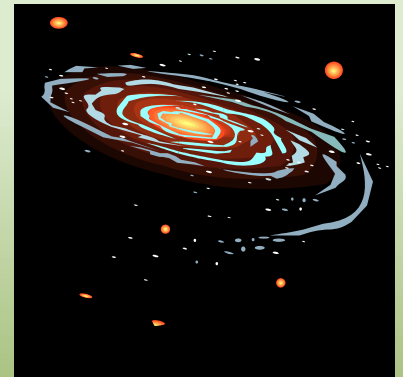
Category	More common with	Response	Misidentified as and/or comorbid with
Arousal (Adrenergic)	Males Older children Witness to violence Inability to fight or flee	Hypervigilance Aggression Anxiety Exaggerated response	ADHD ODD Conduct disorder Bipolar disorder Anger Management difficulties

Helping foster and adoptive families cope with trauma. AAP, 2013 <http://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/healthy-foster-care-america/Documents/Guide.pdf>

THERAPY –WHAT IS IT?

THERAPISTS ARE BRAIN CHANGERS

- If you go into a room with a therapist and come out with the exact same brain
- In this universe – nothing happened



THERAPISTS ARE BRAIN CHANGERS

- Therapy changes brains
 - Uses adaptation to diminish neuroendocrine responsiveness to a stimuli (e.g. touching another human being is not as associated with hurt)
 - Establishes techniques that release less toxic chemicals to stress situations



THERAPISTS ARE BRAIN CHANGERS

- Mentalistic terms are ok, but they reflect actual physical underpinnings
- 21st century therapists envision the brain they are seeing and treating – if not, you are in the previous century



ABUSE CHANGES THE BRAIN

- Primary prevention is vital
- All of us might help for what has occurred, but often we can't do enough



FAMILY VIOLENCE IS NOT OK IN MORRINSVILLE



IT IS
OK TO ASK
FOR
HELP

0800 456 450
www.areyouok.org.nz



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