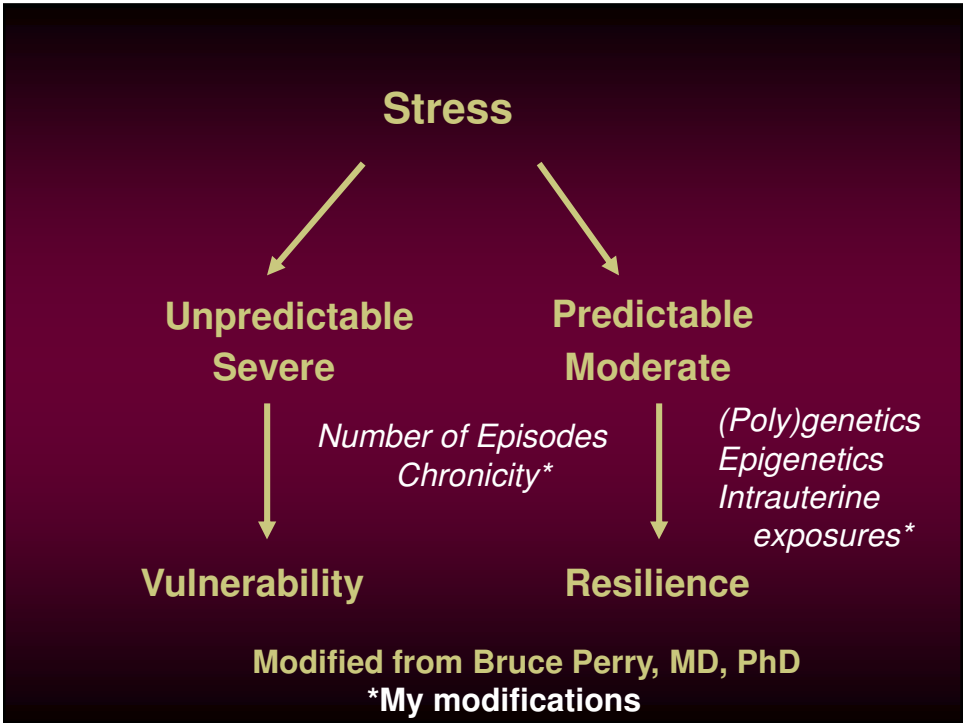


*Limits of
Understanding*

by Paul Klee
(1879-1940)

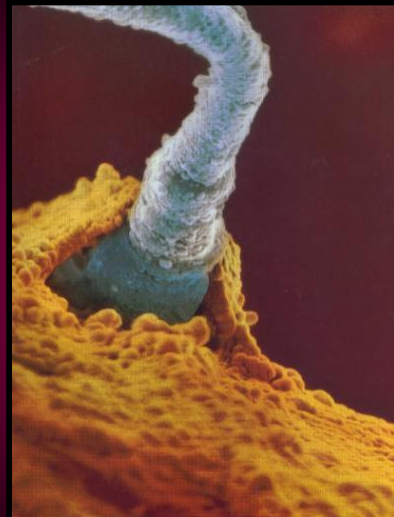


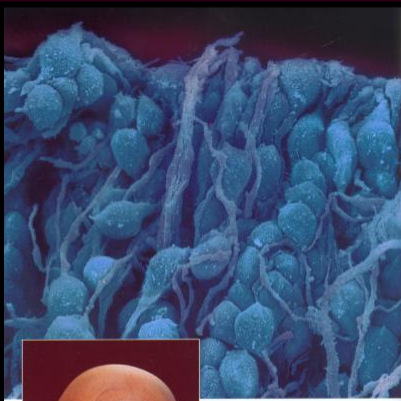
The Walk to
Paradise Garden
W. Eugene Smith





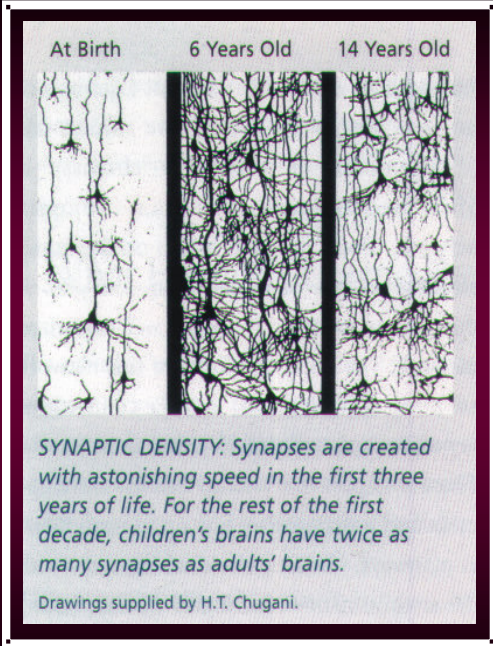
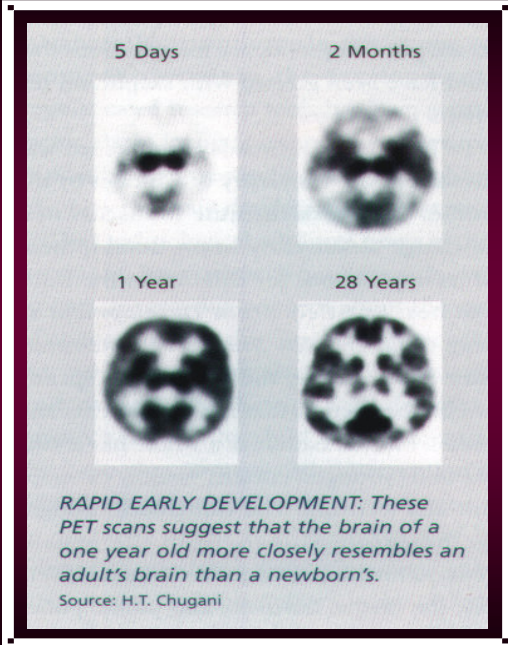
"The Creation of Adam"
Michelangelo 1508-1512

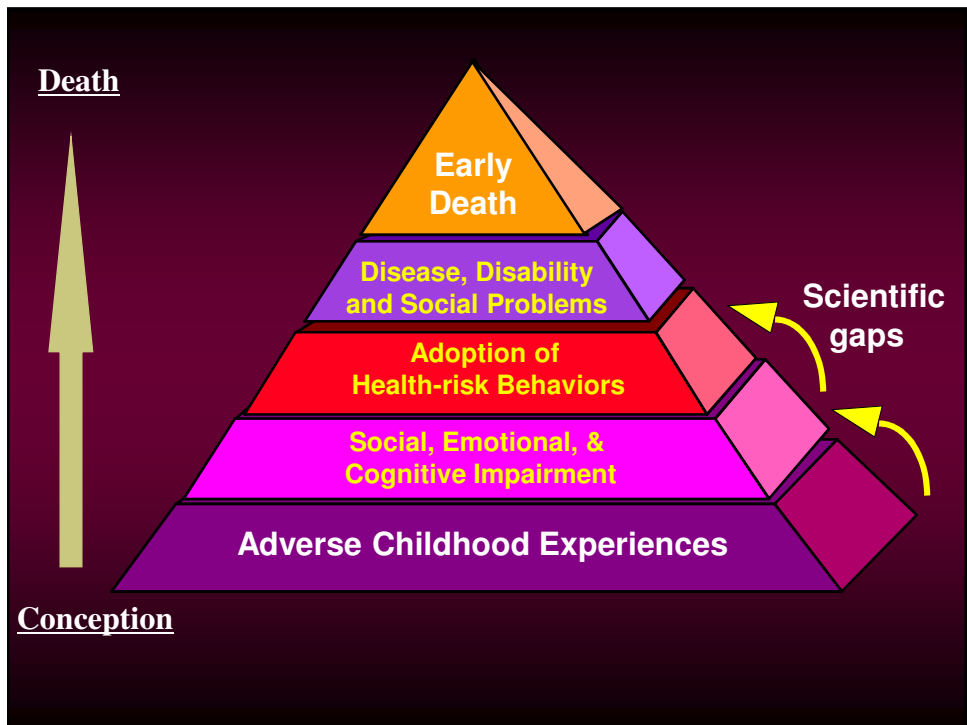
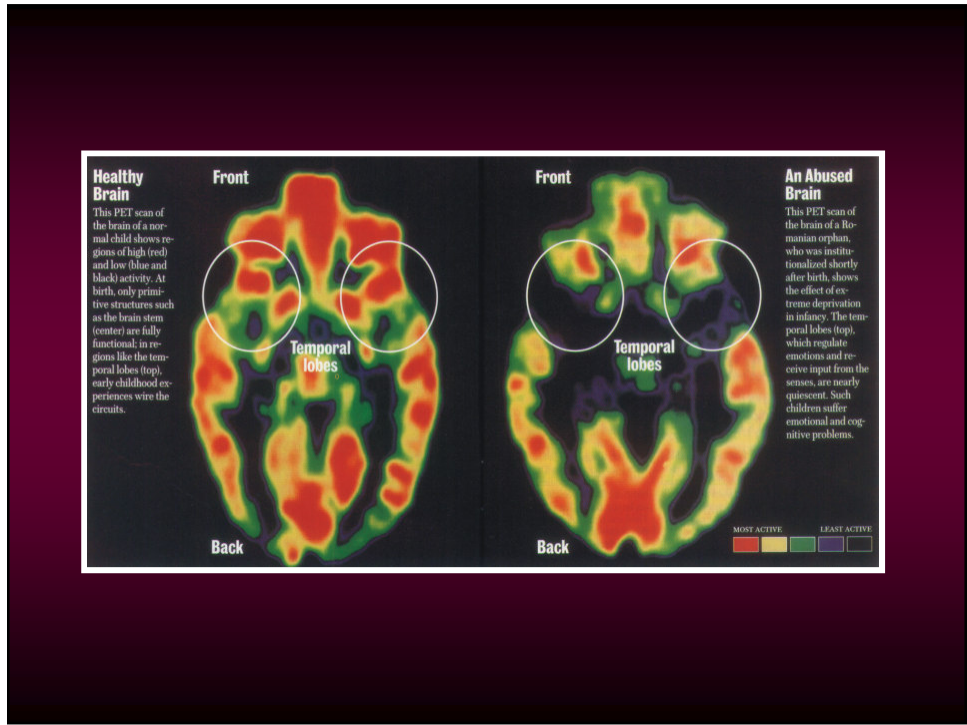




Early connections in the brain

The brain is undoubtedly one of nature's most remarkable creations: cells that can react to impulses, analyze and control behavior. As early as in the seventh week, nerve cells in the brain have begun to touch one another by means of projections, and some have even become connected in primitive nerve paths. The picture also shows nerve cells at this time, greatly enlarged. The rate of production is tremendous: 100,000 new nerve cells are created every minute, and by the time the baby is born, there will be some 100 billion. Left, the posterior lobes of the cerebrum shimmer through the skin of the forehead.





**What do we mean by
Adverse Childhood Experiences?**

10 categories of experience up to 18 years old

- childhood abuse**
emotional, physical, or sexual
- childhood neglect**
emotional or physical
- growing up with:**
 - domestic violence
 - substance abuse (alcohol or drugs)
 - mental illness
 - parental discord
 - crime

**The Adverse Childhood
Experiences (ACE) Study**

- 1) Examines the health and social effects of ACEs throughout the lifespan**
- 2) Studied among 17,421 members of the Kaiser Health Plan in San Diego County**

ACE Study Design

Survey Wave I
(N=9,508)

Survey Wave II
(N=8,667)

Follow-up

N = 17,421

Mortality
National Death Index
Morbidity
Hospital Discharge
Outpatient Visits
Emergency room
visits
Pharmacy Utilization

*All medical evaluations
abstracted from both waves*

Adverse Childhood Experiences Are Common

Household dysfunction:

Substance abuse	27%
Parental sep/divorce	23%
Mental illness	17%
Battered mother	13%
Criminal behavior	6%

Abuse:

Psychological	11%
Physical	28%
Sexual	21%

Neglect:

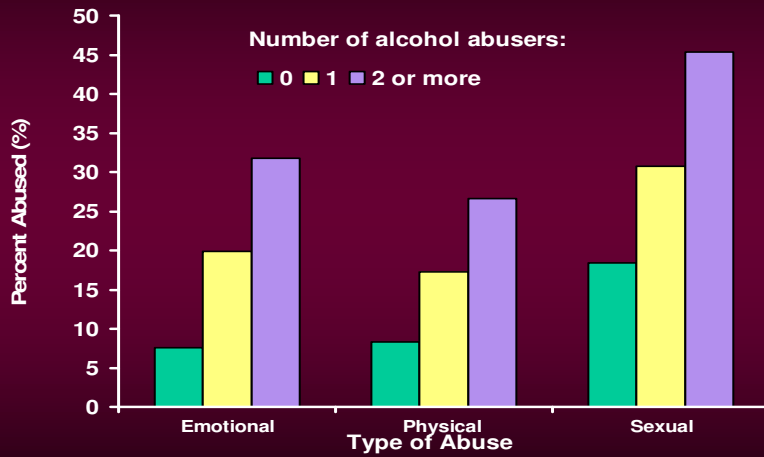
Emotional	15%
Physical	10%

**Adverse Childhood Experiences Rarely
Occur in Isolation...**

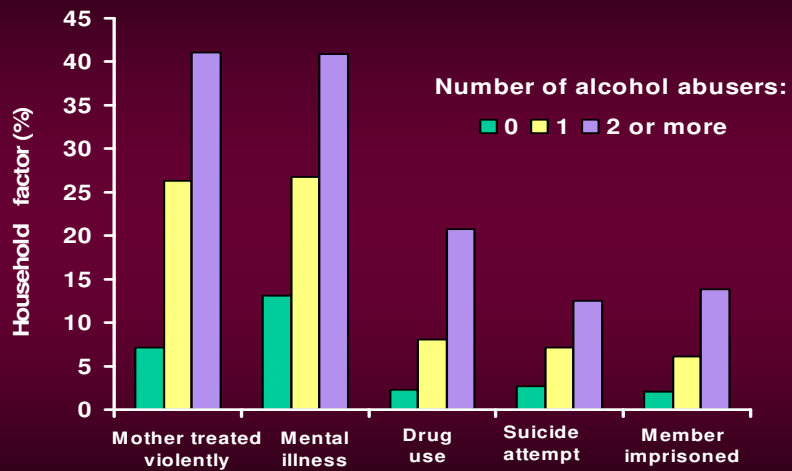
They come in **groups.**

**Alcohol Abuse in the Home
and the Risk of Other ACEs...**

Alcohol Abuse in the Home and the Risk of Childhood Abuse

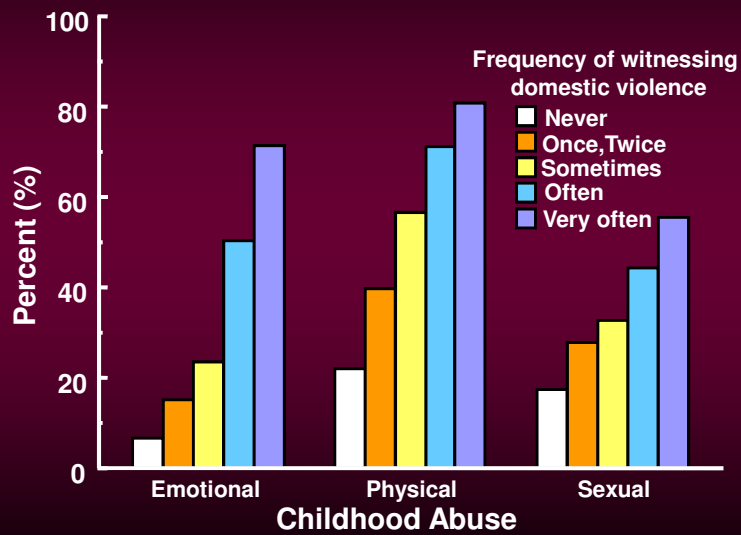


Alcohol Abuse in the Home and the Risk of Other Household Exposures During Childhood



Domestic Violence and the Risk of Other ACEs...

Prevalence of Childhood Abuse by Frequency of Witnessing Domestic Violence



ACEs tend to come in groups...

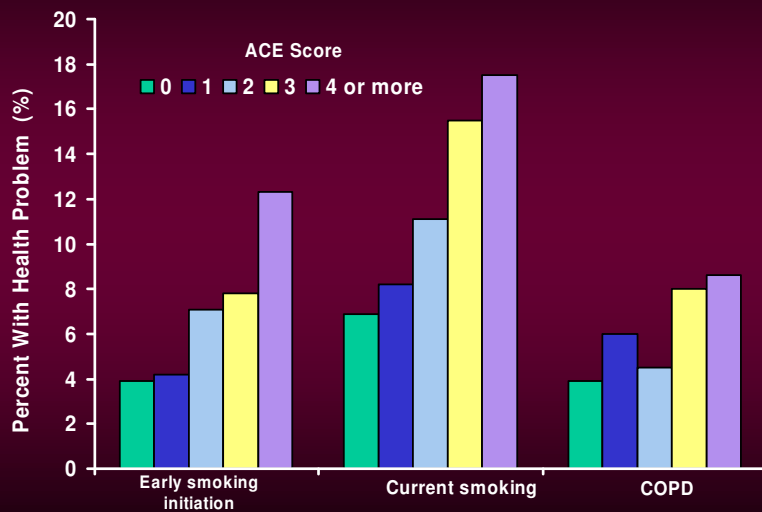
	Additional ACEs (%)				
	1	2	3	4	≥5
<i>If you had:</i>					
A battered mother	95	82	64	48	52

Adverse Childhood Experiences Score Complex Trauma--Trauma "Dose"

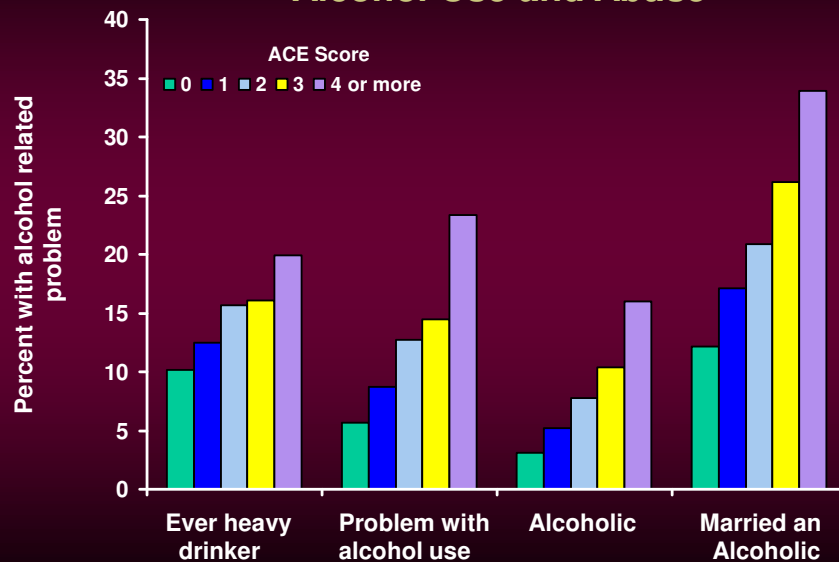
Number of individual types of adverse childhood experiences were summed...

<u>ACE score</u>	<u>Prevalence</u>
0	33%
1	26%
2	16%
3	10%
4 or more	16%

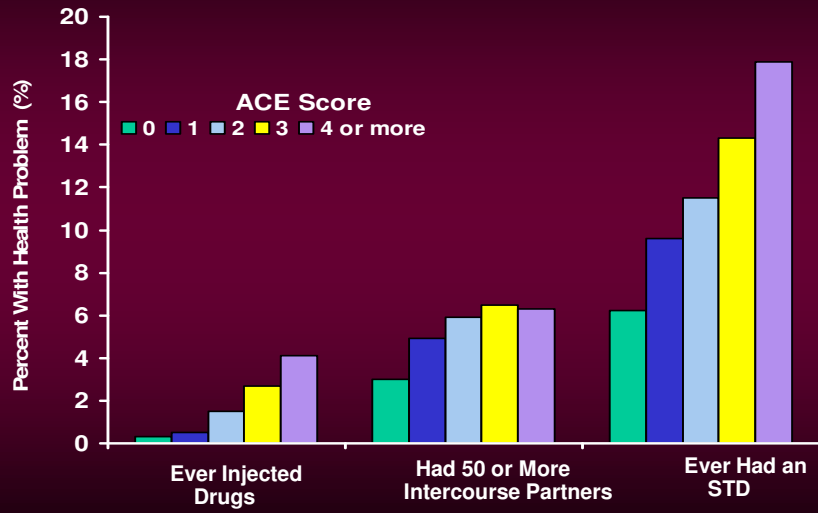
The ACE Score, Smoking, and Lung Disease



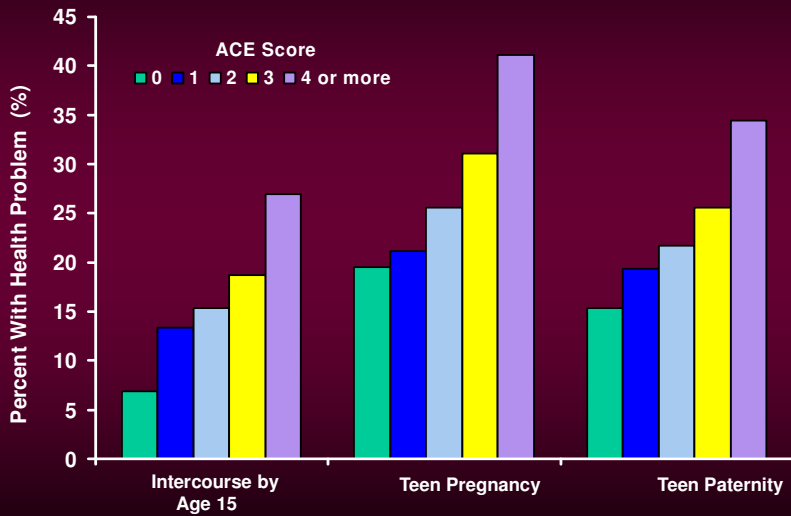
The ACE Score... Alcohol Use and Abuse



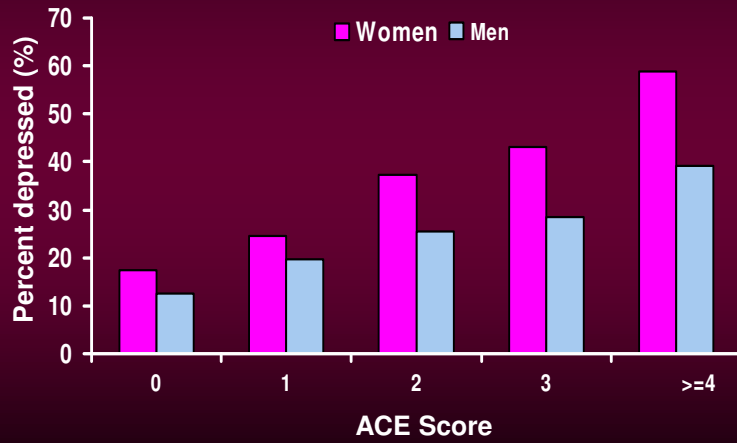
ACE Score and HIV Risks



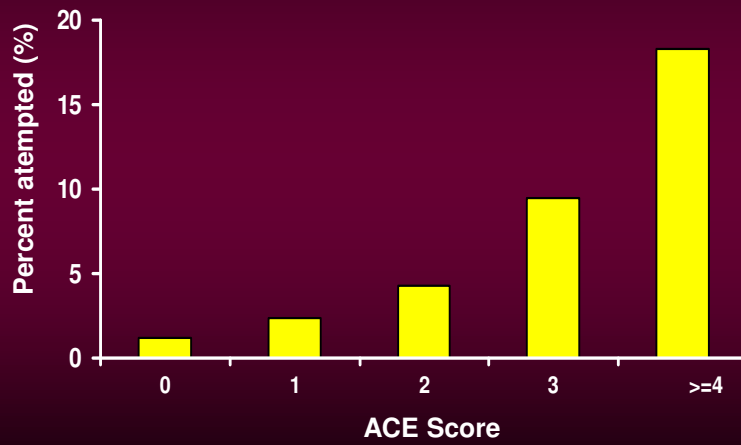
ACE Score and Teen Sexual Behaviors



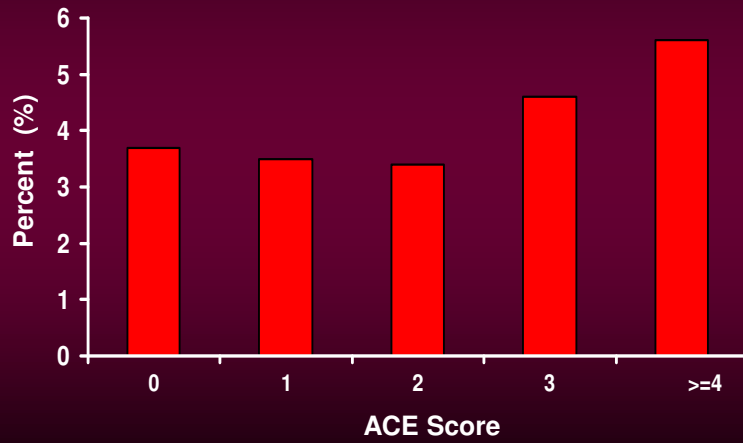
The ACE Score and a Lifetime History of Depression



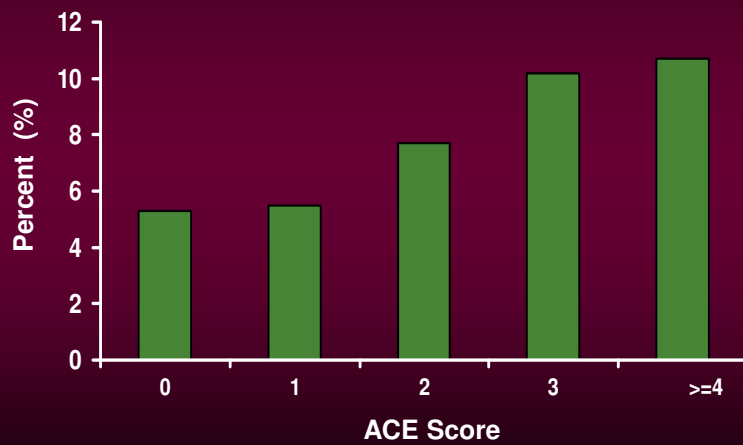
The ACE Score and the Prevalence of Attempted Suicide



The ACE Score and the Prevalence Ischemic Heart Disease



The ACE Score and the Prevalence of Liver Disease (Hepatitis/Jaundice)

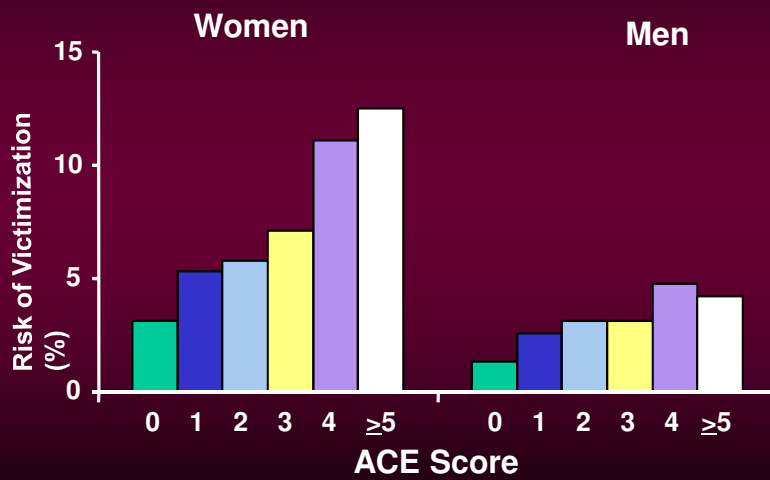


“The Kiss”

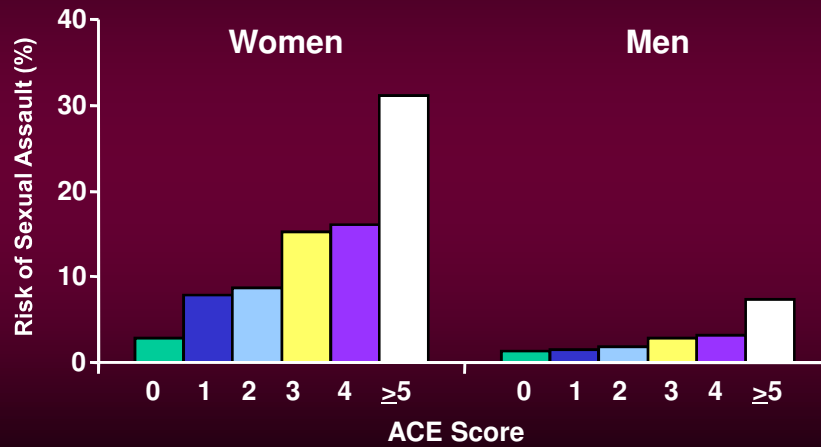
**Constantin Brancusi
1909**



ACE Score and the Risk of Being a Victim of Domestic Violence



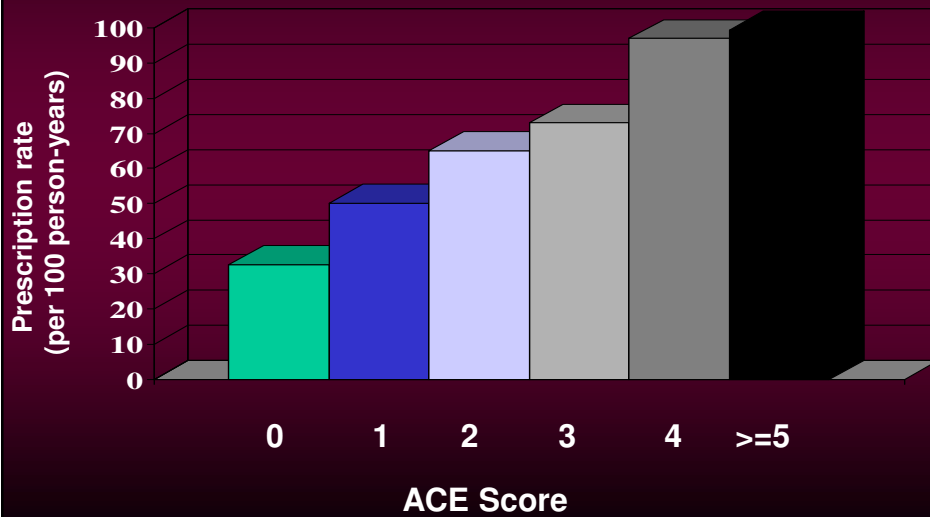
ACE Score and the Risk of Being Sexually Assaulted as an Adult



Prescription Drugs in the United States (2003)

- nearly \$180 billion spent
- 11% of total national health expenditures
- more than four times the amount spent in 1990

ACE Score and Rates of Antidepressant Prescriptions



Adverse Childhood Experiences Are Common In Washington

Household dysfunction:

Substance abuse	31%
Parental sep/divorce	23%
Mental illness	25%
Battered mother	16%
Criminal behavior	7%

Abuse:

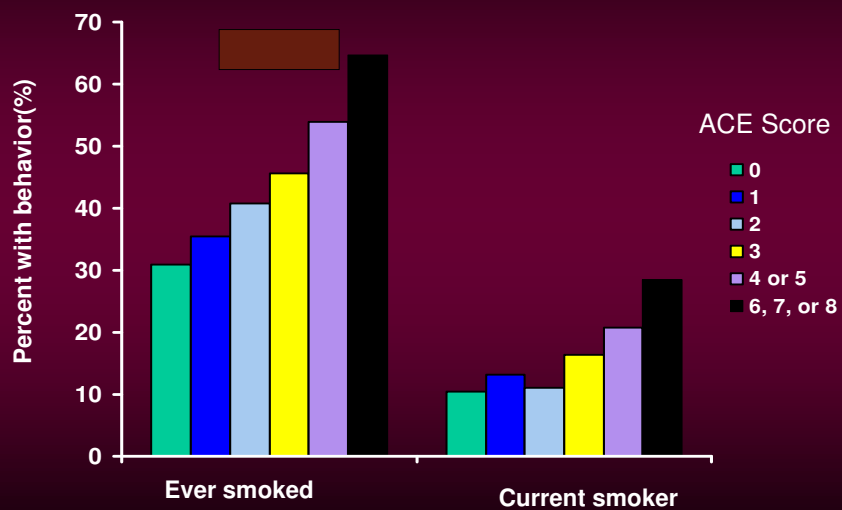
Verbal	33%
Physical	17%
Sexual	12%

Adverse Childhood Experiences Score In Washington--2009

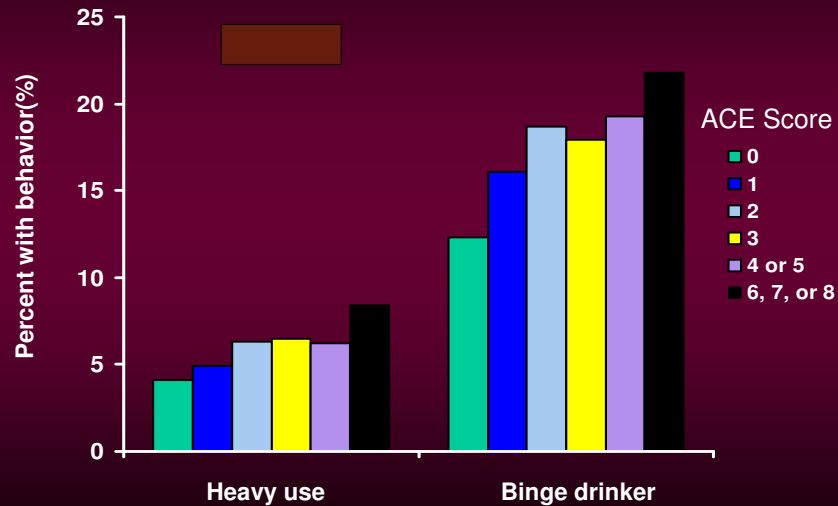
Number of individual types of adverse
childhood experiences were summed...

<u>ACE score</u>	<u>Prevalence</u>
0	38.1%
1	21.4%
2	13.8%
3	9.7%
4 or 5	11.5%
6, 7, or 8	5.5%

The ACE Score and Smoking in Washington, 2009



The ACE Score and Alcohol Use in Washington, 2009

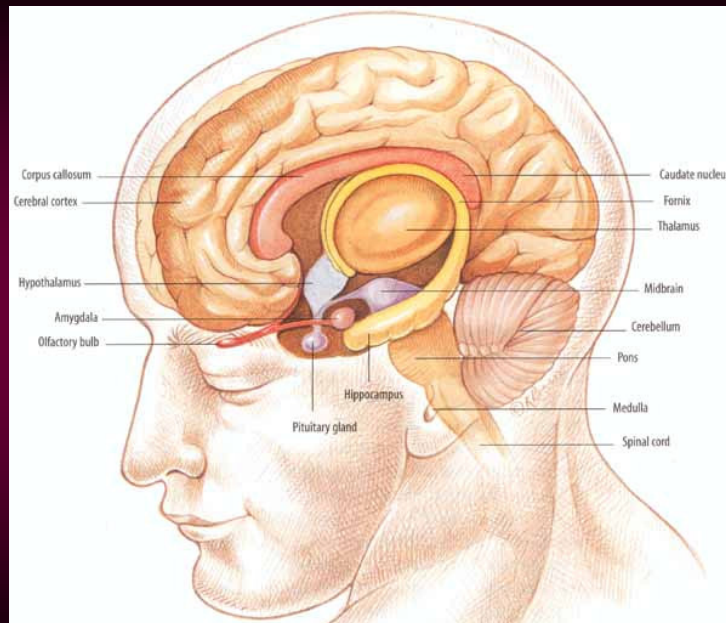


Brain Development Key Points

1. The brain develops from the most primitive functions to the most complex
2. Normal development of systems and functions they mediate requires specific signals at specific times
3. These critical periods are times of sensitivity to environmental input—including traumatic experience
4. Different functions (regulation of anxiety, mood, abstract thought) develop or mature at different times in the life of a child

Source: Bruce Perry, MD, PhD
www.ChildTrauma.org

Does the ACE Score Have a Graded Relationship
to the Number
of Neurobiological Manifestations?



ACEs Effect An Array of Brain Functions

Affect Regulation

Panic reactions, depression, anxiety, hallucinations

Somatic Issues

Sleep disturbances, severe obesity, somatization

Substance Use

Smoking, alcoholism, illicit drug use, IV drug use

Sexuality

Early intercourse, promiscuity, sexual dissatisfaction

Memory

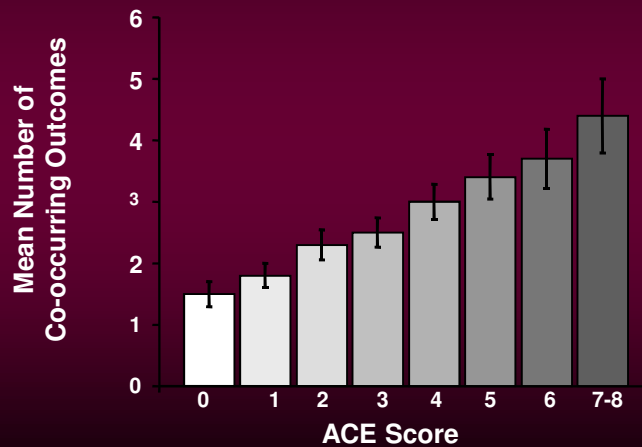
Amnesia (childhood)

Arousal

High stress, problems with anger, perpetrating domestic violence

Neurobiology and Epidemiology Converge

Complex Trauma—Trauma Spectrum Disorders and the mean number of a *variety of problems*



Implications:

ACEs appear to affect multiple brain systems and functions. This leads to multiple problems in different health and social domains.

Adverse Childhood Experiences As a National Health Issue

ACEs have a strong influence on:

- adolescent health**
- reproductive health**
 - smoking**
 - alcohol abuse**
 - illicit drug abuse**
 - sexual behavior**
 - mental health**
- risk of revictimization**
- stability of relationships**
- performance in the workforce**

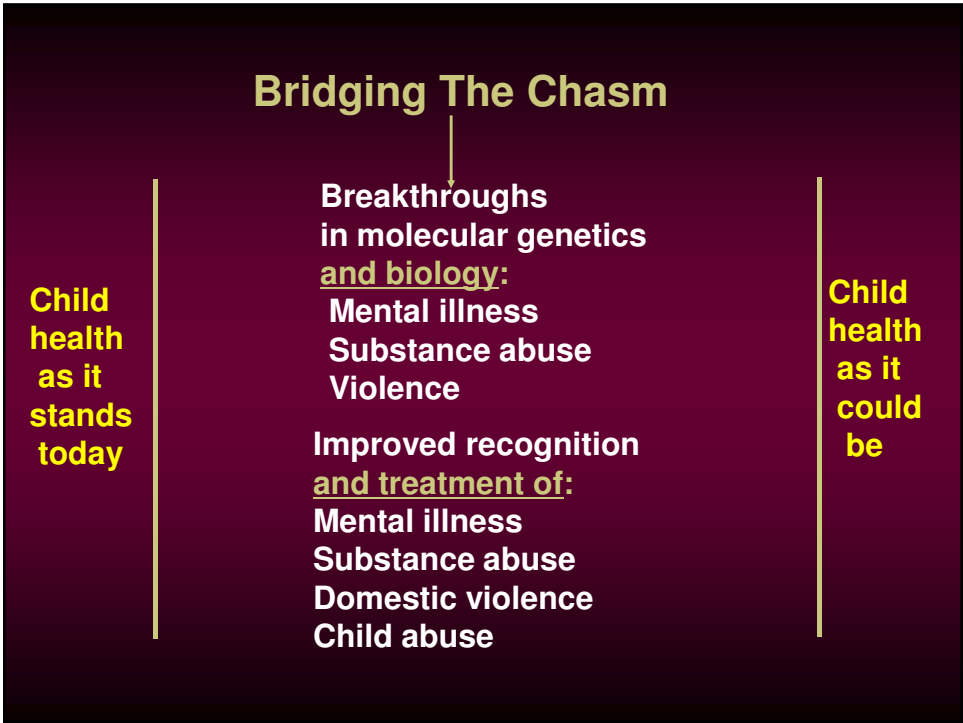
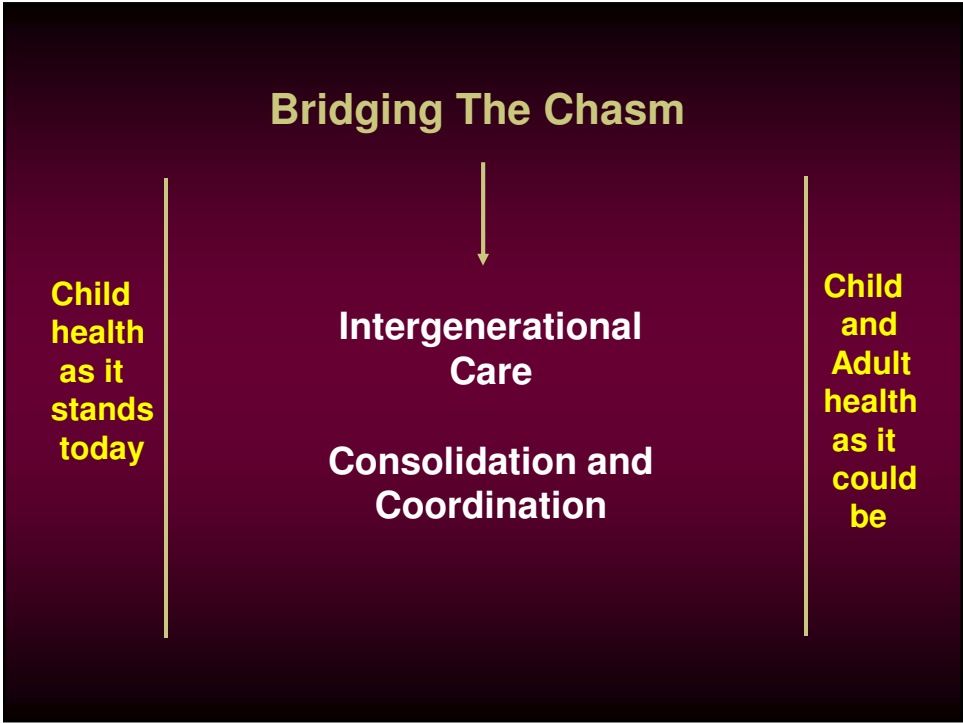
Adverse Childhood Experiences As a National Health Issue

ACEs increase the risk of:

- Early Death
- Heart disease
- Chronic Lung disease
- Liver disease
- Autoimmune Disease
- Suicide
- Injuries
- HIV and STDs
- and other risks for the leading causes of death



Beham, (Hans) Sebald (1500-1550): Hercules slaying the Hydra, 1545 from The Labours of Hercules (1542-1548).



Bridging The Chasm

Child health as it stands today

Mass education about child development & parenting:
Media
Schools

Promoting Healthy Neurodevelopment through better early childhood development
(Promoting Resilience)

Child health as it could be

Bridging The Chasm

Child health as it stands today

Harnessing Brain Plasticity To Overcome the Effects of Adversity
(Secondary Resilience or Recovery)

Documenting the societal burden of child health as it stands today

→
New directions in prevention, treatment, and policy

Child health as it could be



The Walk to
Paradise Garden
W. Eugene Smith

For More Information

acestudy.org
cdc.gov/nccdphp/ace

