

**ACE This:**  
The Impact of Adverse  
Childhood Experiences on  
Early Childhood Development

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Learning objectives

- Define Adverse Childhood Experiences (ACEs)
- Summarize the Epidemiology of ACEs
- Describe the impact of ACEs on health
- Recognize key features of early brain development
- Identify the key scientific connections between early brain development and ACEs impact

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“It is easier to build strong children than to repair broken men.”  
-Fredrick Douglass

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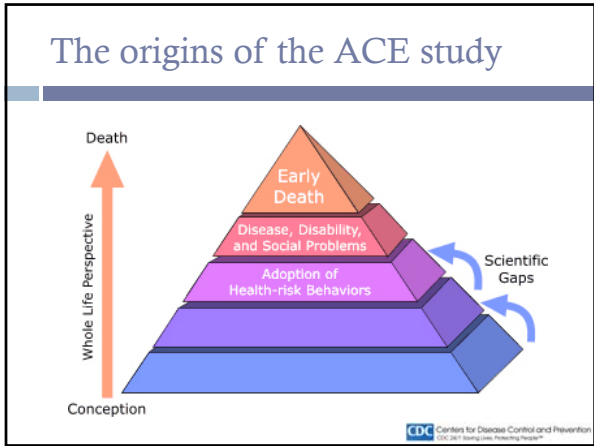
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### The ACE study

**Research Article**

**Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults**

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

Vincent J. Felitti, MD, FACP, Robert F. Anda, MD, MS, Dale Nordenberg, MD, David F. Williamson, MS, PhD, Alison M. Spitz, MS, MPH, Valerie Edwards, BA, Mary F. Koss, PhD, James S. Marks, MD, MPH

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### Demographics of original ACE study

- 54% Female, 46% Male
- 75% White, 11% Latino, 7% Asian, 5% African-American
- 46% 60yrs or older, 40% 40-59yrs, 10% 30yrs, 5% 19-29yr
- 39% Graduated College (or higher), 36% Some College, 17% HS graduate, 7% did not graduate HS

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### ACEs are common

- Very common: 67% adults have at least one
- If you have one, there's a good chance you have another one
  - For any 1 ACE exposure, the chance of an additional exposure was 65-93%
  - 1 out of 8 people (13%) have 4 or more ACEs

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### Initial ACE data has proven consistent

Prevalence of ACEs	Original study (1995-7)	Five State study (2010)	Iowa (2012-4)
<b>Household Dysfunction</b>	17,337 adults	26,229 adults	6361 adults
Substance Abuse	27%	29%	26%
Parental Divorce/Separation	23%	27%	23%
Mental Illness	17%	19%	18%
Domestic Violence/Battered mother	13%	16%	15%
Criminal Behavior (Incarceration)	6%	7%	7%
<b>Abuse</b>			
Psychological	11%	28%	27%
Physical	28%	16%	16%
Sexual	21%	10%	10%
<b>Neglect</b>			
Emotional	15%		
Physical	10%		

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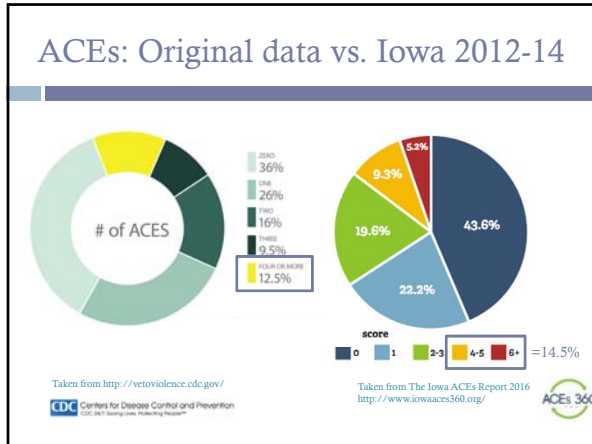
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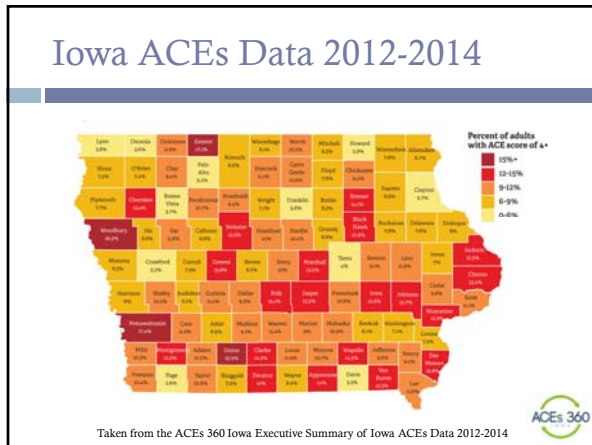
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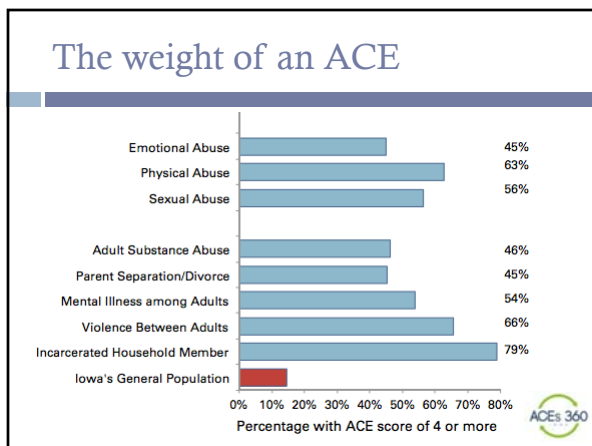
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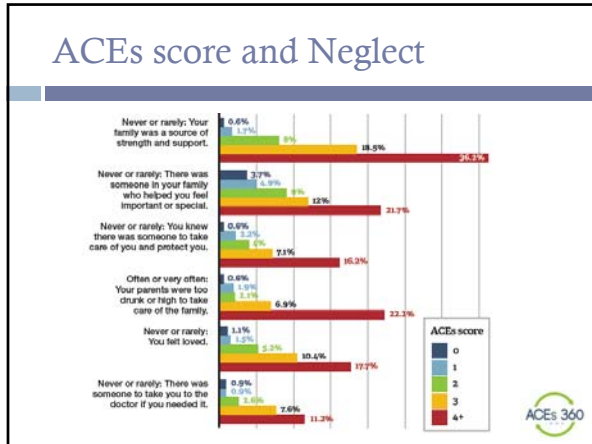
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### Why are ACEs important?

The more ACEs that a person has, the greater their risk for\*:

- Alcoholism & alcohol abuse
- COPD
- Depression
- Fetal death
- Health-related quality of life
- Illicit drug use
- Liver disease
- Poor work performance
- Financial stress
- Risk for intimate partner violence
- Multiple sexual partners
- Sexually transmitted diseases
- Smoking
- Suicide attempts
- Unintended pregnancies
- Early initiation of smoking
- Early initiation of sexual activity
- Adolescent pregnancy
- Risk for sexual violence
- Poor academic achievement

\*this list is NOT exhaustive

CDC Centers for Disease Control and Prevention

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### The Impact of an ACE

Given 100 American Adults:

33 have NO ACEs	51 have 1-3 ACEs	16 Have 4-8 ACEs
1 in 16 smokes	1 in 9 smokes	1 in 6 smokes
1 in 69 are alcoholics	1 in 9 are alcoholics	1 in 6 are alcoholics
1 in 14 has heart disease	1 in 7 has heart disease	1 in 6 has heart disease
1 in 480 uses IV drugs	1 in 43 uses IV drugs	1 in 30 uses IV drugs
1 in 96 attempts suicide	1 in 10 attempts suicide	1 in 5 attempts suicide

Suicide ever attempted:  
 3x more likely ACE score 2  
 6.6x more likely ACE score 3  
 12x more likely ACE score 4 or greater

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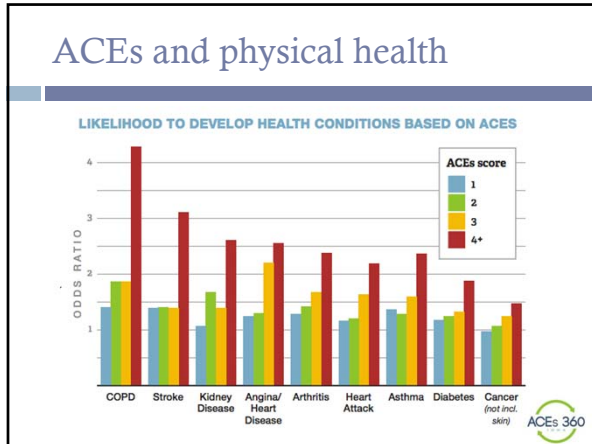
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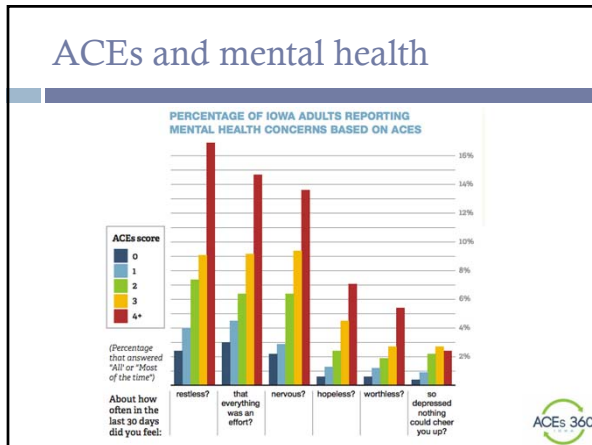
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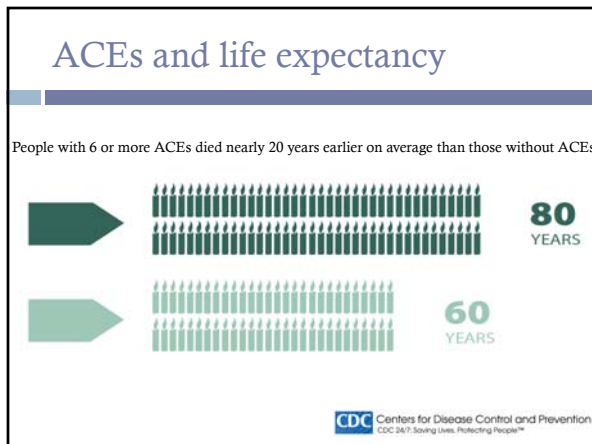
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## Revised ACEs scale

ACE Scale Adversities (Lifetime)	
Original	Revised
Emotional abuse	Emotional abuse
Physical abuse	Physical abuse
Sexual abuse	Sexual abuse
Physical neglect	Physical neglect
Emotional neglect	Emotional neglect
Mother treated violently	Household mental illness
Household substance abuse	Property victimization (nonsibling)
Household mental illness	Peer victimization (nonsibling)
<del>Incarcerated household member</del>	Exposure to community violence
<del>Parental separation or divorce</del>	Socioeconomic status
	Someone close had a bad accident or illness
	Below-average grades
	Parents always arguing
	No good friends (at time of interview)

Taken from "Improving the Adverse Childhood Experiences Study Scale" by Finkelhor, et al *JAMA Pediatr* 2013

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## "The decade of the brain"



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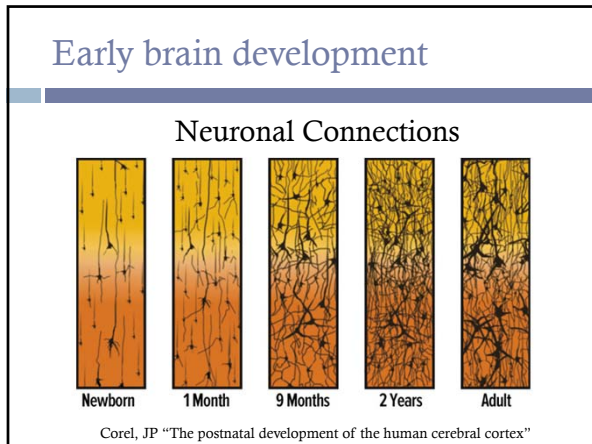
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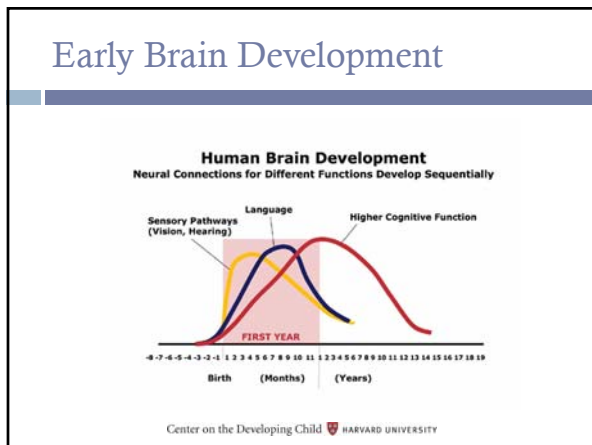
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- ### Factors influencing early brain development and function
- Sensory and motor experiences
  - Parent-child relationships
  - Peer relationships
  - Stress
  - Diet
  - Intestinal flora
  - Psychoactive drugs
  - Gonadal hormones

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## Parent-Child Relationships

### Serve and Return:

- Adult responses to a child's behaviors
- Absence poses a serious threat to a child's development
- Teaching adults how to respond to a child's behaviors can promote development



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## Still Face Experiment



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## The Importance of Stress

- Learning how to respond to stress is critical to normal healthy child development
- Triggers: social, environmental, biologic
- Lasting impact of stress is related more closely to the child's response rather than the type or number of stressful events

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## Types of stress

<b>POSITIVE STRESS</b> Mild/moderate and short-lived stress response necessary for healthy development	<b>TOLEERABLE STRESS</b> More severe stress response but limited in duration which allows for recovery	<b>TOXIC STRESS</b> Extreme, frequent, or extended activation of the body's stress response without the buffering presence of a supportive adult
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→ Intense, prolonged, repeated and unaddressed  
← Social-emotional buffering, parental resilience, early detection, and/or effective intervention

CENTER FOR **YOUTH WELLNESS**  
Health begins with you.

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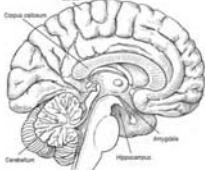
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## The impact of stress on the brain

**5 main brain structures negatively affected by stress:**

1. **Hippocampus:** central for learning and memory
2. **Corpus Callosum:** responsible for inter-hemispheric communication
3. **Cerebellum:** coordinates motor behavior and executive function
4. **Amygdala:** regulates emotional responses
5. **Prefrontal Cortex:** "air traffic control system"—supports the development of a wide range of executive functions



Credit: Teyani, S. F., Cahoon, L., & Burke, C. (2004/2005). Alcohol and the adolescent brain: Human studies. *Alcohol Research & Health*, 28(2), 205-212.

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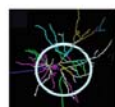
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## Toxic stress on the developing brain

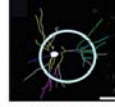
**Persistent Stress Changes Brain Architecture**

Normal



Typical neuron—many connections

Toxic stress



Damaged neuron—fewer connections

Prefrontal Cortex and Hippocampus

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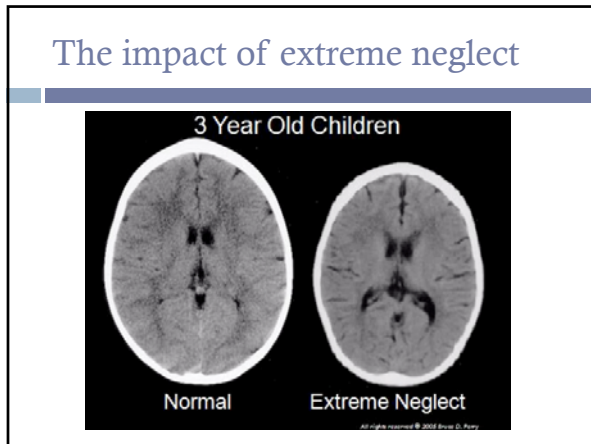
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### Ecology and its Epigenetic impact

- Epigenetics refers to mechanisms by which the expression of our DNA is changed without altering the DNA sequence
  - Many epigenetic mechanisms are activated by stress response hormones (ie: cortisol and adrenaline)
  - The chemicals influence which proteins are produced
  - The differences in gene expression can directly lead to fundamental changes in our brain and influence how our bodies develop

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### Epigenetic influences

- The changes in the blueprint of our DNA can be passed on to the next generation
  - Explains the multi-generational nature of ACEs commonly seen
- Some genes can only be epigenetically modified during critical windows in development; others can be changed at any time.
- New research is emerging that some epigenetic changes once thought to be permanent might be reversible under certain conditions.
  - Could be the key to unlocking ways to help not only the ACE-exposed person but also prevent intergenerational passage of affected DNA

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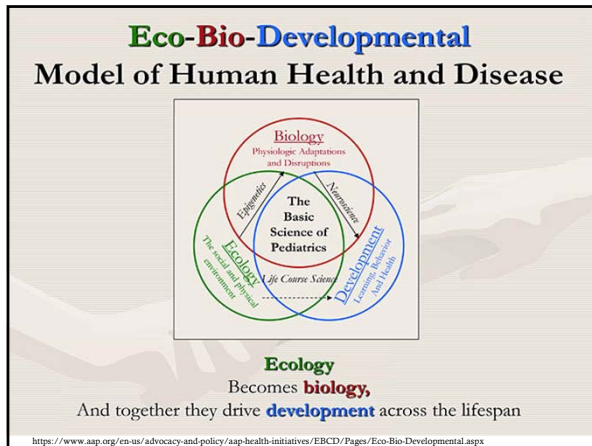
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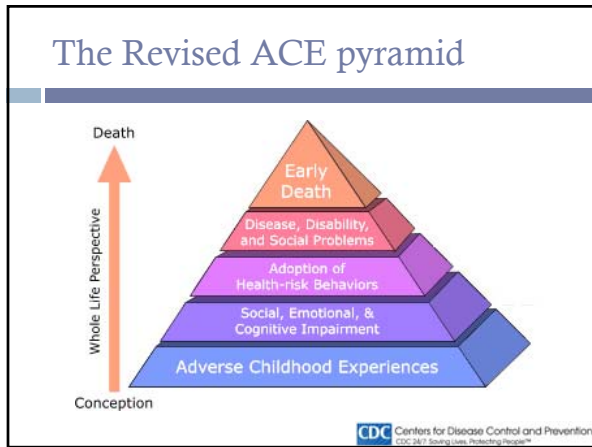
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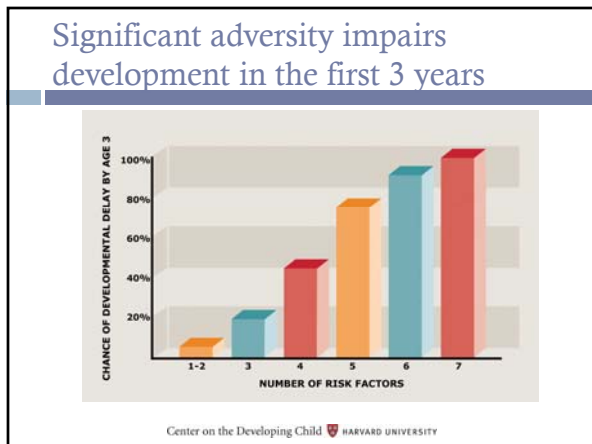
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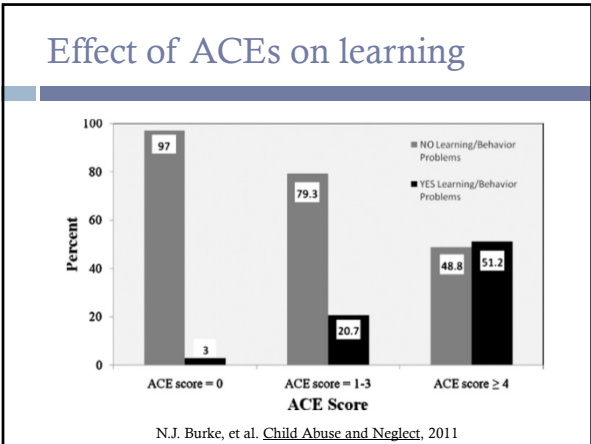
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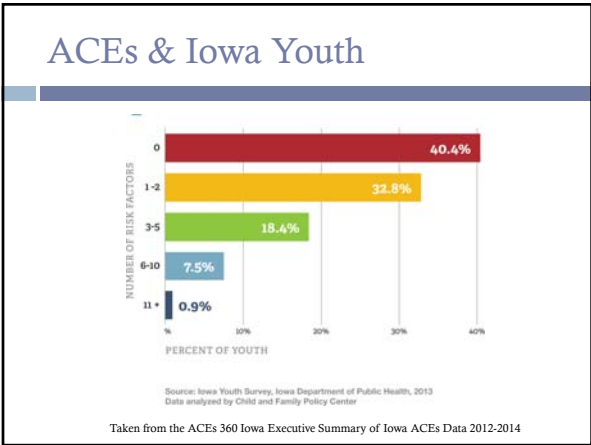
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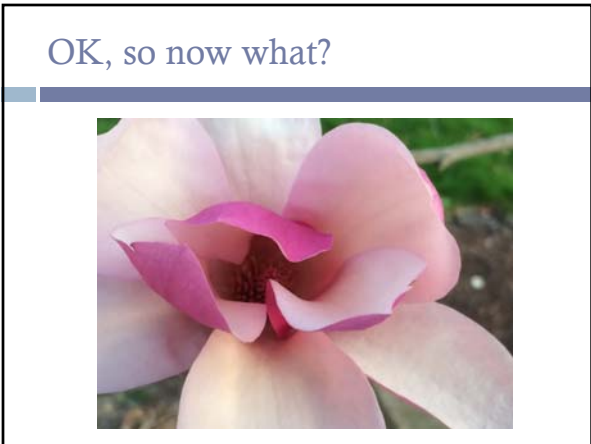
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## Resiliency

- Resiliency: adaptive response to serious hardship
  - Requires supportive adult-child relationship
  - Provides opportunities for skill-building
  
- Internal predispositions + External Factors
  
- Best to create when young but always able to enhance

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## Maximizing resiliency in children

The 7 Cs:

- Competence
- Confidence
- Connection
- Character
- Contribution
- Coping
- Control

“What we do to model healthy resilience strategies for our children is more important than anything we say about them.”

-Dr. Ken Ginsberg

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## Incorporating resiliency into care

- Acknowledge ACEs that are active in a patient’s life
- Highlight resilience factors present in families who are actively dealing with ACEs
- Partner with families to work on strategies to minimize ACEs impact, increase resilience
- Connect families with community resources
  - IDPH’s 1<sup>st</sup> Five Healthy Mental Development Initiative

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### Putting it all together

- Early brain development is influenced by ecology, not just biology
  - the Eco-Bio-Developmental Model of Human Health and Disease
- ACEs can have a lifelong impact many areas of our physical and mental health and well-being
- There is a strong graded relationship between exposure to ACEs and health-risk behaviors and chronic disease, **however not every one with a high ACE score suffers from these outcomes**

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### Putting it all together

- It is NOT adversity alone that produces unhealthy adults!
- Rather, it is the absence or insufficiency of protective relationships which, in the presence of significant adversity, leads to toxic stress that can produce biological memories
- Prevention and buffering of ACEs can be achieved through supportive relationships particularly caring parents or guardians

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### Further reading and viewing

- “The Adverse Childhood Experiences Study—the largest, most important public health study you never heard of—began in an obesity clinic”
  - <https://acestoohigh.com/2012/10/03/the-adverse-childhood-experiences-study-the-largest-most-important-public-health-study-you-never-heard-of-began-in-an-obesity-clinic/>
- TED talk by Nadine Burke-Harris, MD
  - [https://www.ted.com/speakers/nadine\\_burke\\_harris\\_1](https://www.ted.com/speakers/nadine_burke_harris_1)
- CDC.gov site on ACEs
  - <http://www.cdc.gov/violenceprevention/acestudy/index.html>
  - Includes links to ACE papers by subject
- The Film “Paper Tigers- One High School’s Unlikely Success Story”
  - <http://kpjrfilms.co/paper-tigers/>

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## Next Steps

- Refer families to your local First Five Site Coordinators
  - ▣ Provide intake for specific need (ie: developmental delay, parenting classes, transportation needs)
  - ▣ Complete thorough screening for the family's needs including assessment of ACE issues

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## Questions?




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- **ACEs Too High: <http://acetoohigh.com>**
  - ▣ "Most Californians have experienced childhood trauma: Early adversity a direct link to adult onset of chronic disease, depression, violence": <https://acetoohigh.com/2014/11/05/most-californians-have-experienced-childhood-trauma-early-adversity-a-direct-link-to-adult-onset-of-chronic-disease-depression-violence/>
  - ▣ "Got your ACE Score?": <https://acetoohigh.com/got-your-ace-score/>
- **Center for Youth Wellness: <http://www.centerforyouthwellness.org/>**
  - ▣ "Data Report: A HIDDEN CRISIS: Findings on Adverse Childhood Experiences in California" 2014: <https://app.box.com/s/tf7w369j5k5dfx49>

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- AAP Trauma Guide Toolkit: "The Medical Home Approach to Identifying and Responding to Exposure to Trauma" --<https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/healthy-foster-care-america/Pages/Trauma-Guide.aspx>
- The Urban Child Institute: <http://www.urbanchildinstitute.org/why-0-3/baby-and-brain>
- Reach out and Read: <http://www.reachoutandread.org>

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