

Adverse Childhood Experiences Impact in Kentucky

**Kentucky Summit
on Access to Care
for Children and Youth with Special Health
Care Needs**

May 25, 2016



Kentucky Public Health
Prevent. Promote. Protect.



Jane Ellen Stevens [Become a fan](#)
 Founder, AcesTooHigh.com/ACEsConnection.com



The Adverse Childhood Experiences Study -- the Largest Public Health Study You Never Heard Of

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126



80

5



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"Adverse childhood experiences" has become a buzzword in social services, public health, education, juvenile justice, mental health, pediatrics, criminal justice, medical research and even business. The ACE Study - the CDC's Adverse Childhood Experiences Study -- has recently been featured in the New York Times, This American Life, and Salon.com. Many people say that just as you should what

your cholesterol score is, so you should know your ACE score. But what is this study? And do you know your own ACE score?



Adverse Childhood Experiences (ACE Study)

- **Public/Private Partnership**
- **Started in 1985 – Ongoing**
- **1995 CDC Partnership - Ongoing**
- **Largest of kind – 17,000**

Changed Nation's Views on Children's Behavioral Health



Dr. Vincent J. Felitti, MD
Internist, Kaiser Permanente



Dr. Robert F. Anda MD (plus MS in Epidemiology)
Centers for Disease Control (CDC) & Prevention

The Adverse Childhood Experiences

When you were growing up, during your first 18 years of life, did you experience:

- Physical abuse
- Emotional abuse
- Sexual abuse
- Domestic violence (mother treated violently)
- **Substance abuse in home**
- Mental illness in parent
- Lost parent due to separation or divorce
- Household member in jail

Did you live with anyone who was depressed, mentally ill, or suicidal?

Did you ever see your mother hit, slapped, kicked, punched, or beat up?

Did a parent or adult in the home ever swear at you, insult you, or put you down?

[never, once, more than once, don't know, refused to answer]

Adverse Childhood Experiences (ACE) Score

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

<i>ACE score</i>	<i>Prevalence</i>
0	36.4%
1	26.2%
2	15.8%
3	9.5%
4	6.0%
5	3.5%
6	1.6%
7 or more	0.9%

64% reported experiencing one or more

37% reported experiencing two or more

One ACE → 87% chance of having more than one

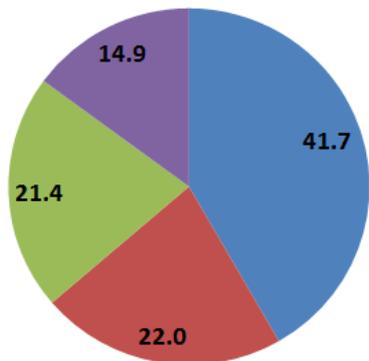
ACE Prevalence US Adults - BRFSS

State	% of adults with > 1 ACE	% of adults with > 4 ACEs
California	61.7%	16.7%
Iowa	55%	14%
Minnesota	55%	13%
Montana	61%	17%
Vermont	57%	13%
Washington	61.9%	17%
Wisconsin	56%	14%

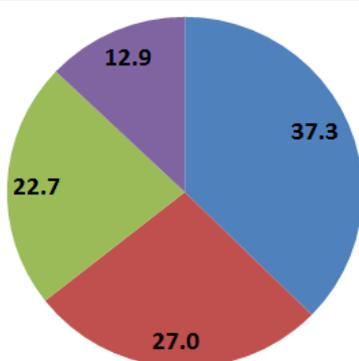
Kentucky

Number of ACEs by Race/Ethnicity

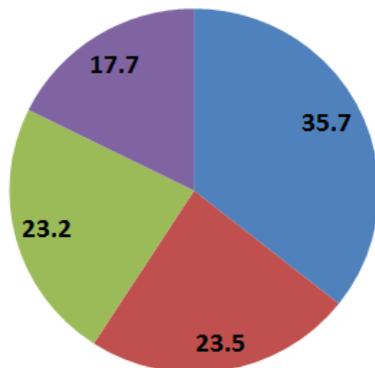
White



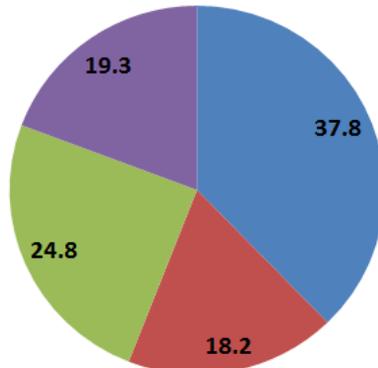
Black



Hispanic



Other



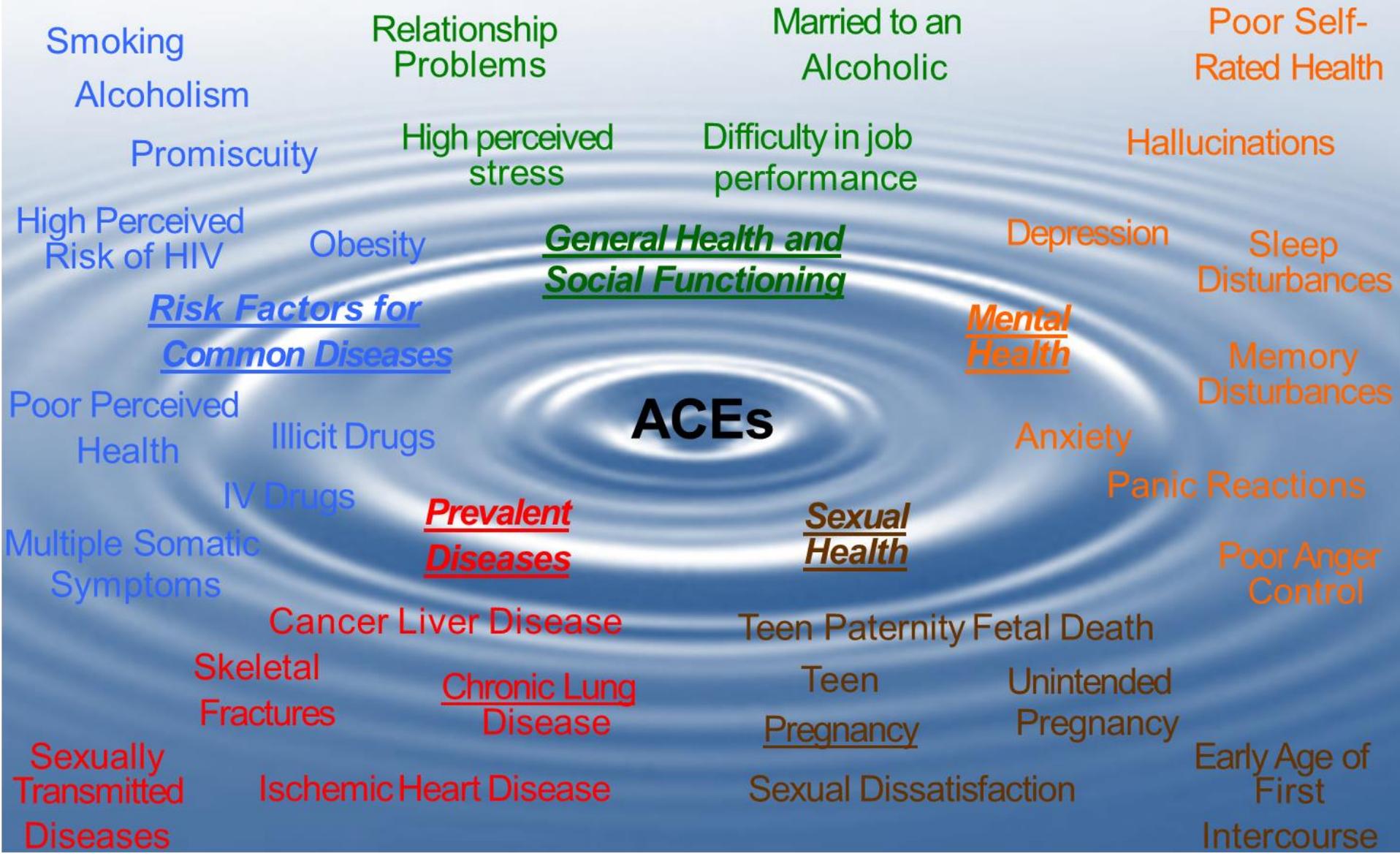
Percentage of adults aged ≥ 18 years reporting adverse childhood experiences (ACEs), by number of ACEs reported and race— Behavioral Risk Factor Surveillance System (BRFSS), five states, 2009. MMWR Dec 17, 2010
AK, LA, TN NM, WA

*“For us, one of the most compelling results of the research is that **trauma doesn’t discriminate.**”*

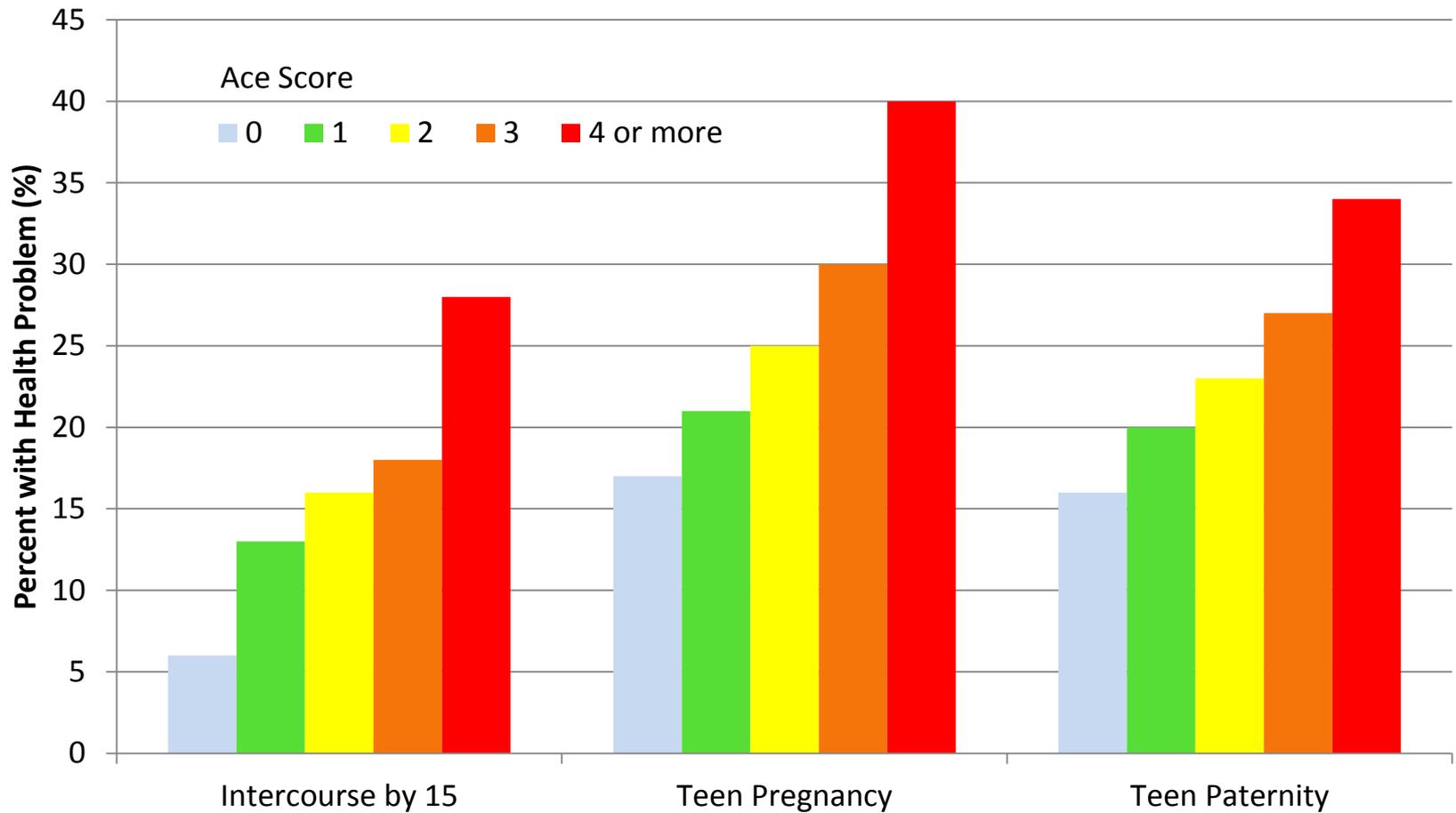
Suzanne Mineck, Mid Iowa Health Foundation, source: the Community Resilience Cookbook

“There is no biologic basis for racial differences.” Dr. Kim Wyche-Ethridge

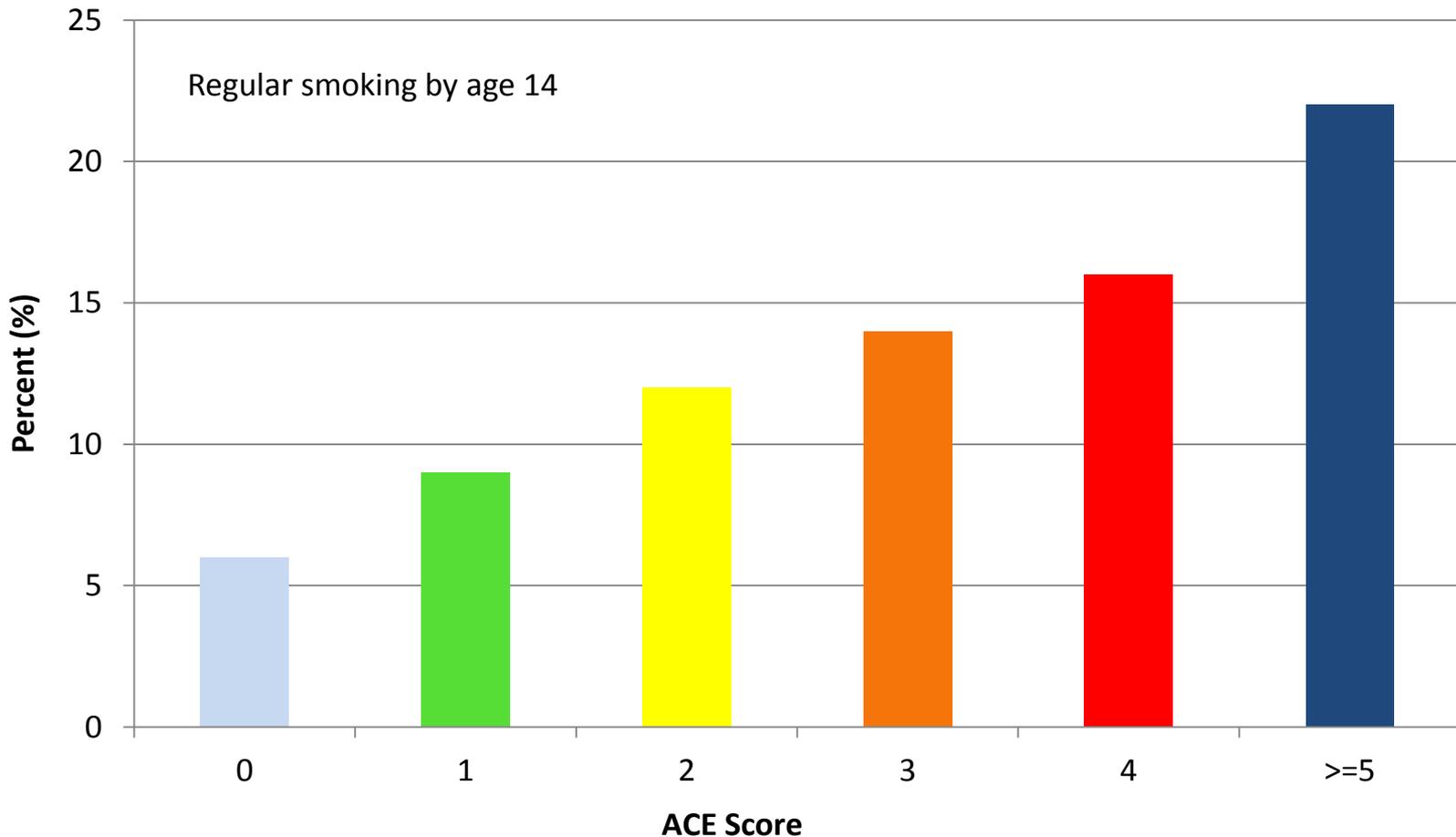
ACEs Impact Multiple Outcomes



Ace Score and Teen Sexual Behaviors

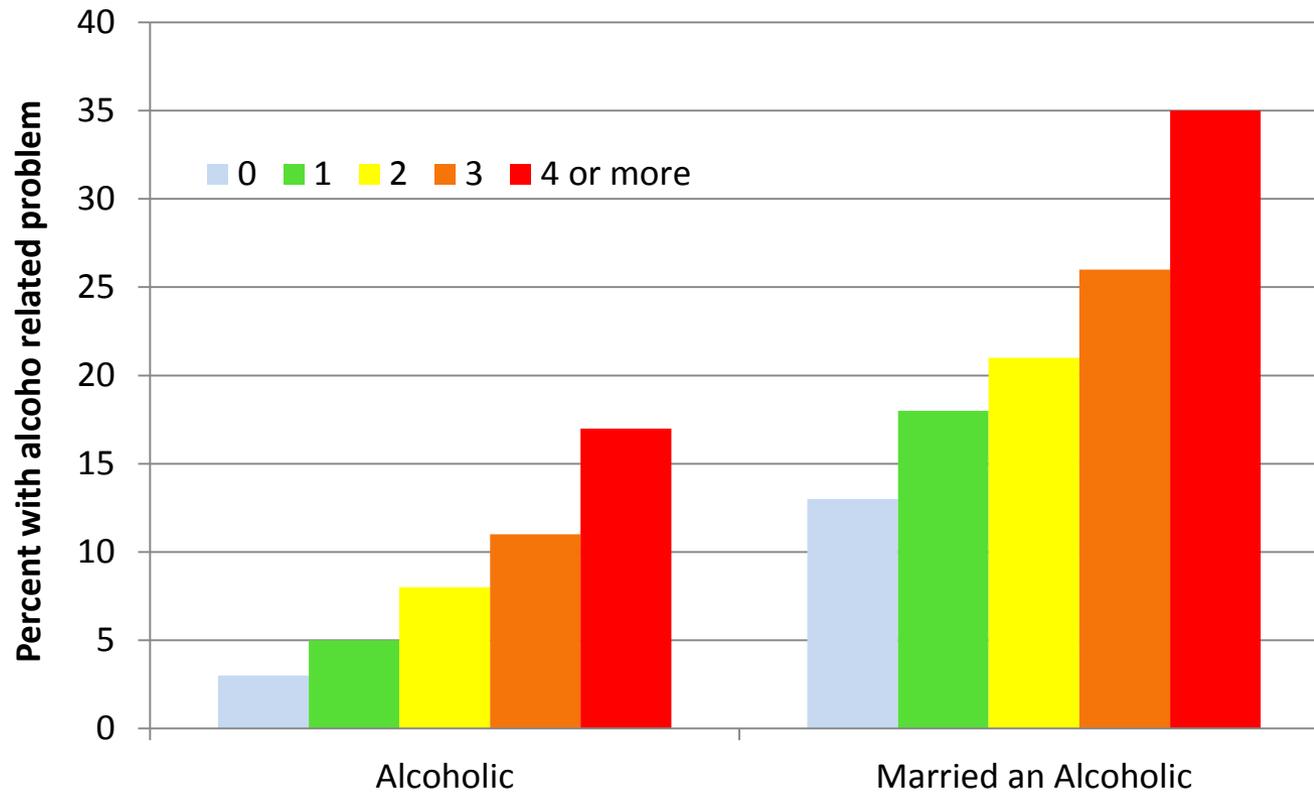


Relationship Between ACE Score and Early Initiation of Smoking Cigarettes

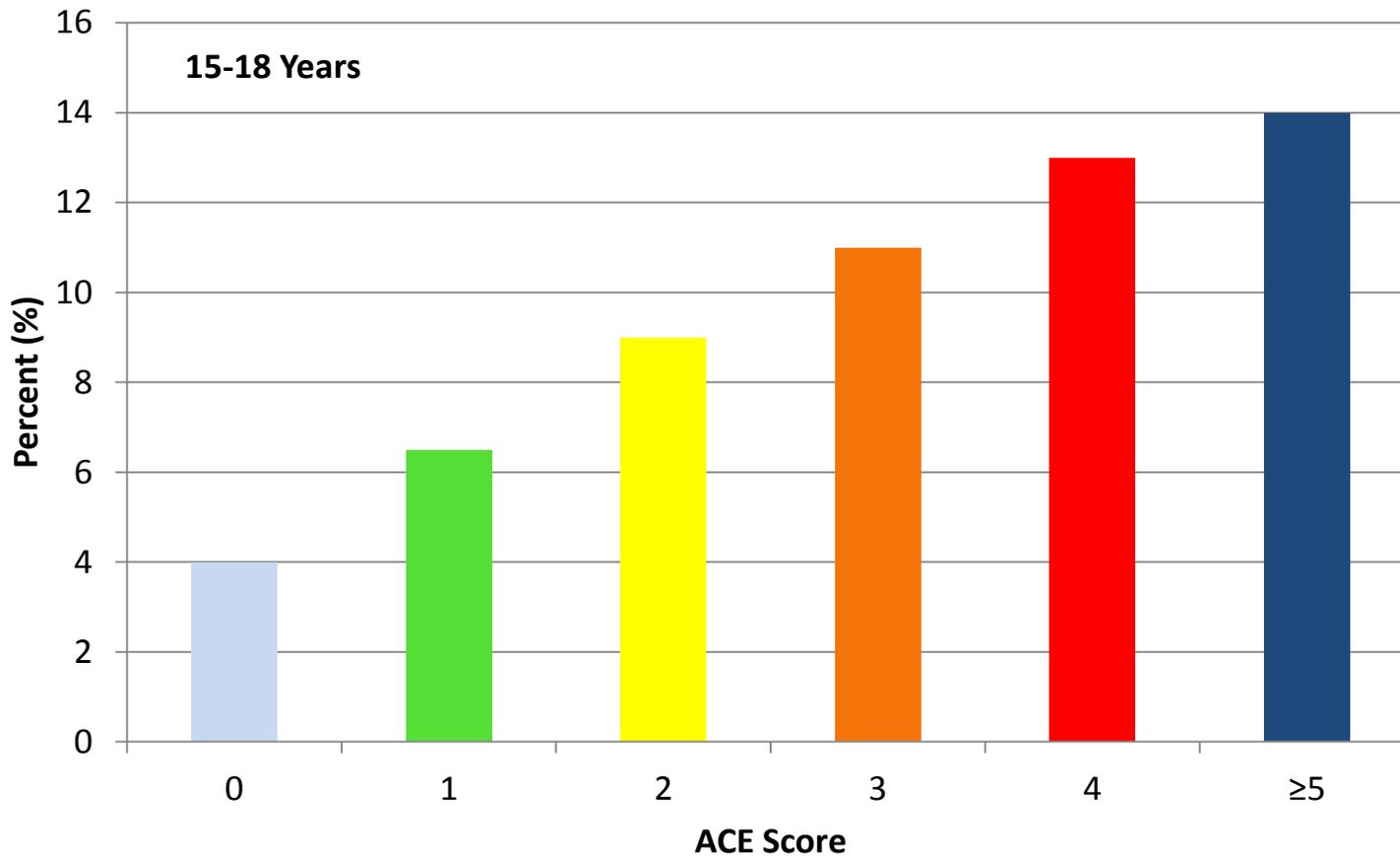


The ACE Score

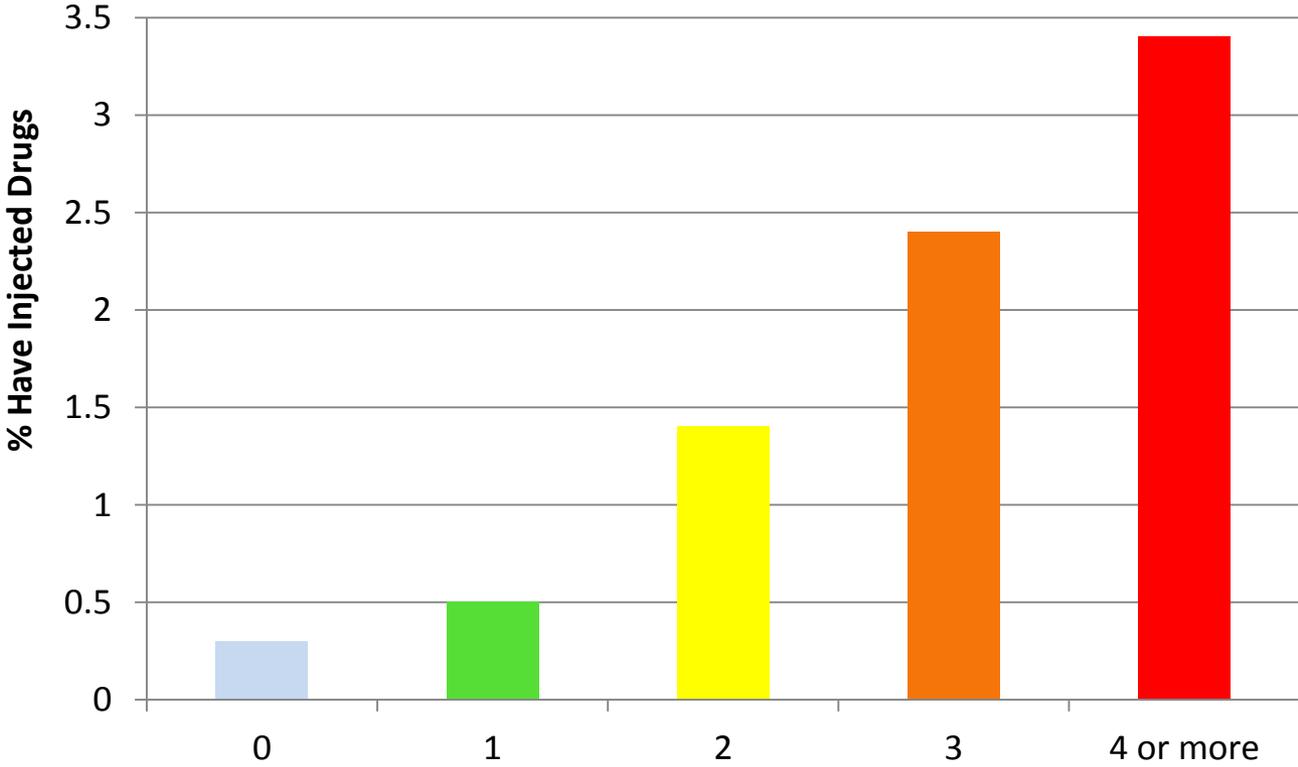
Alcohol Use and Abuse



Relationship Between Number of ACEs and the Age at Initiation of Illicit Drugs



ACE Score and Intravenous Drug Use

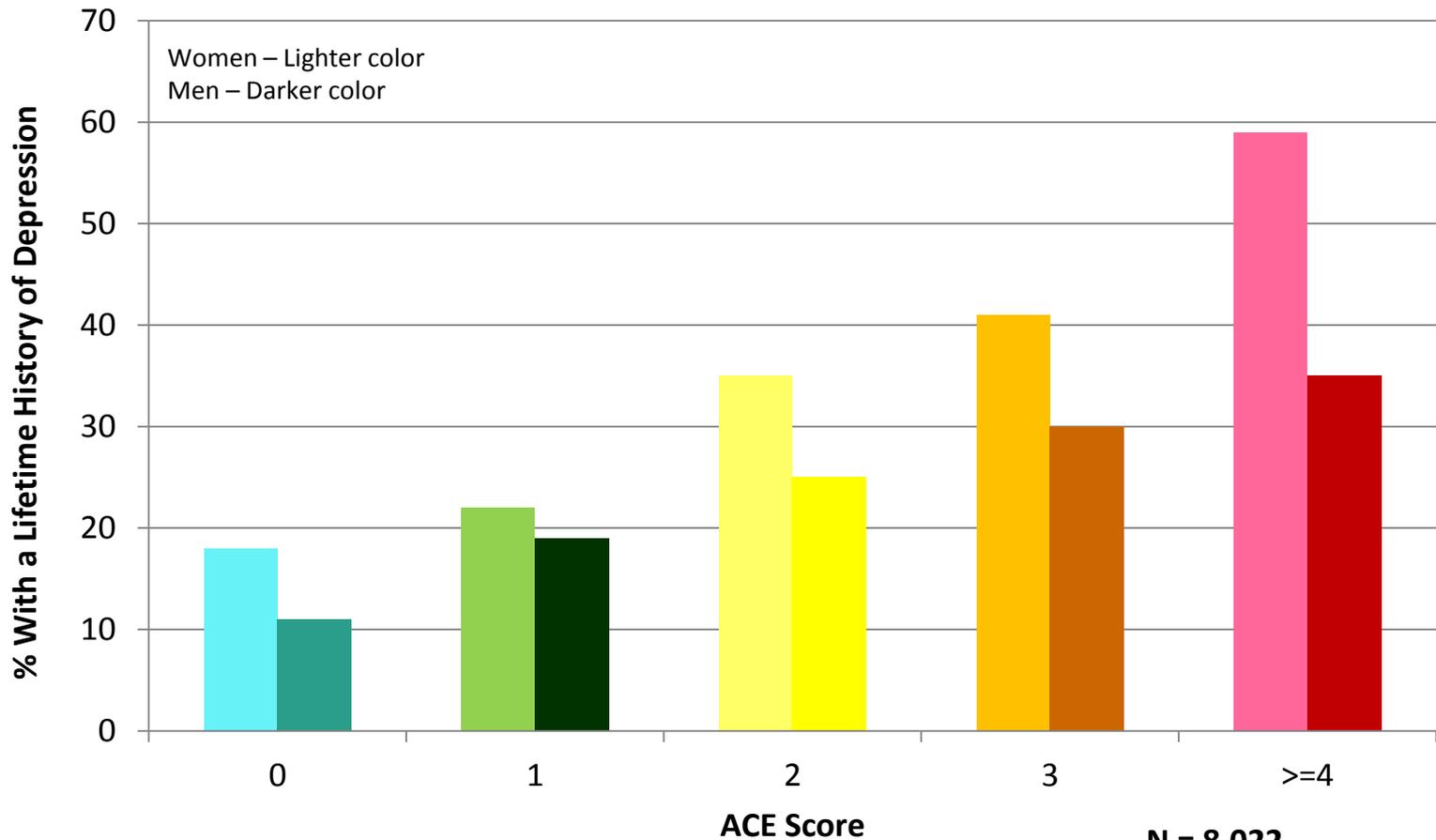


ACE Score

N = 8,022

p < 0.001

ACE Score and Chronic Depression as Adult

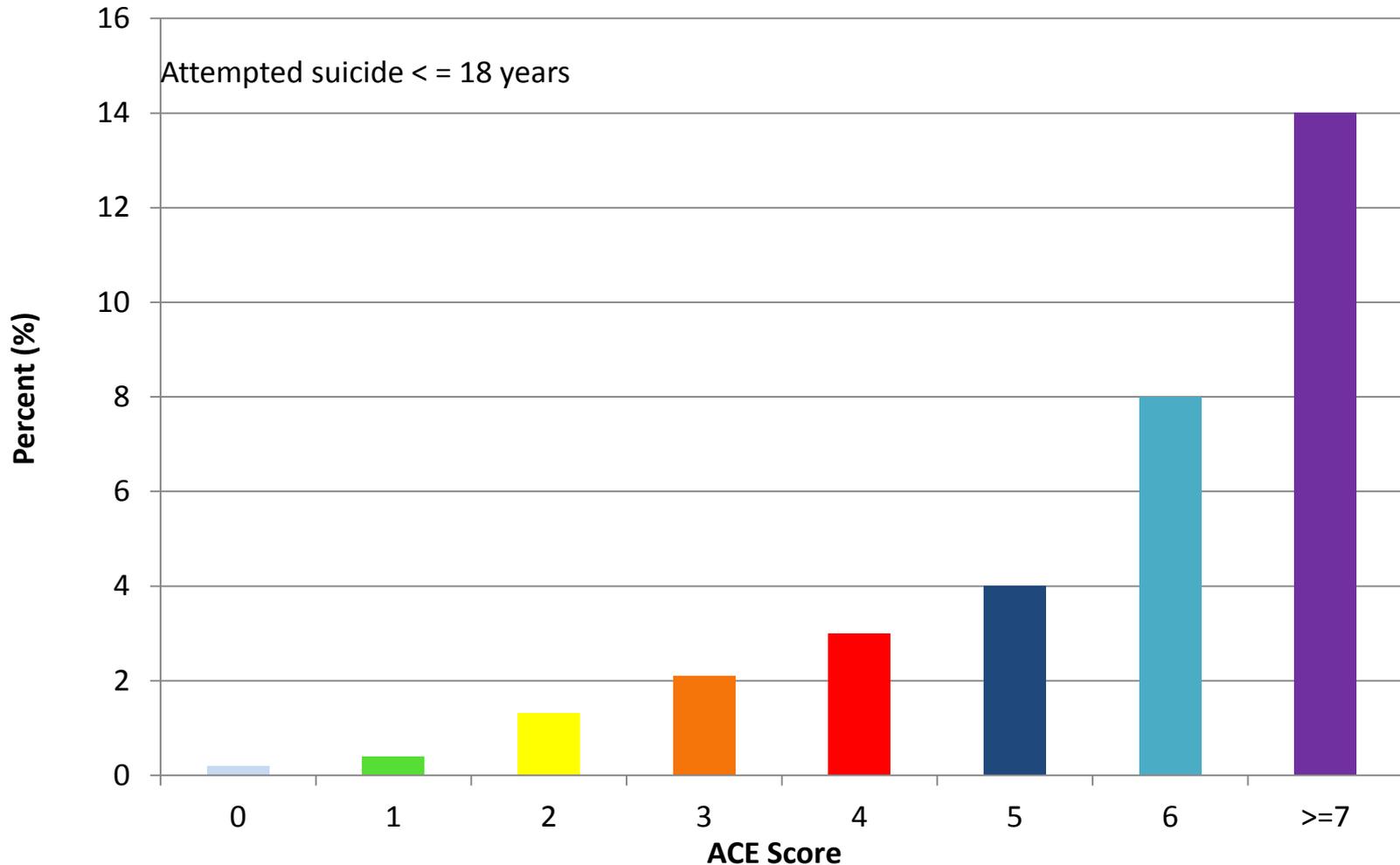


N = 8,022

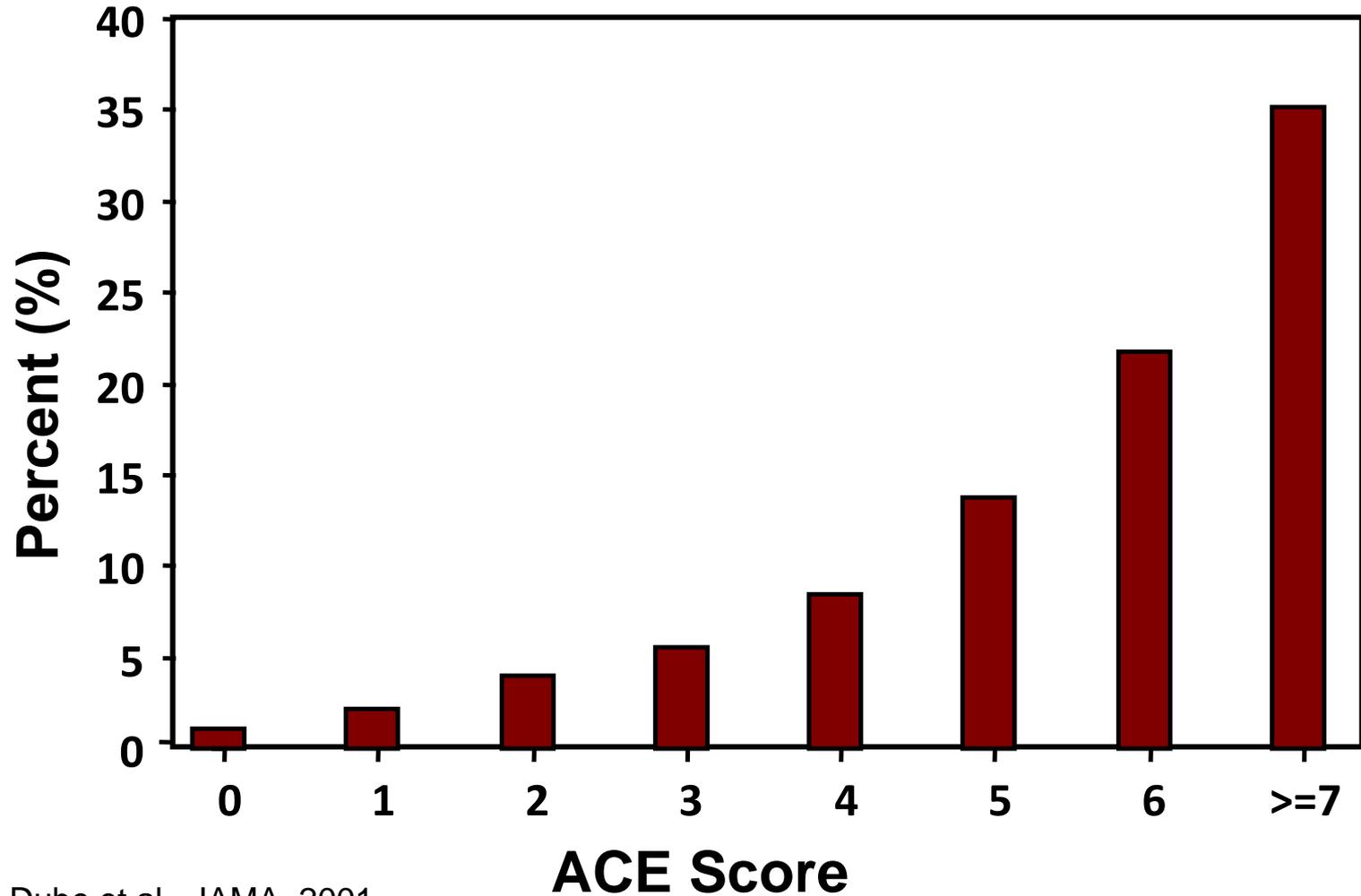
p<0.001

Dube, 2003, Pediatrics

Relationship Between the ACE Score and Attempting Suicide During Adolescence

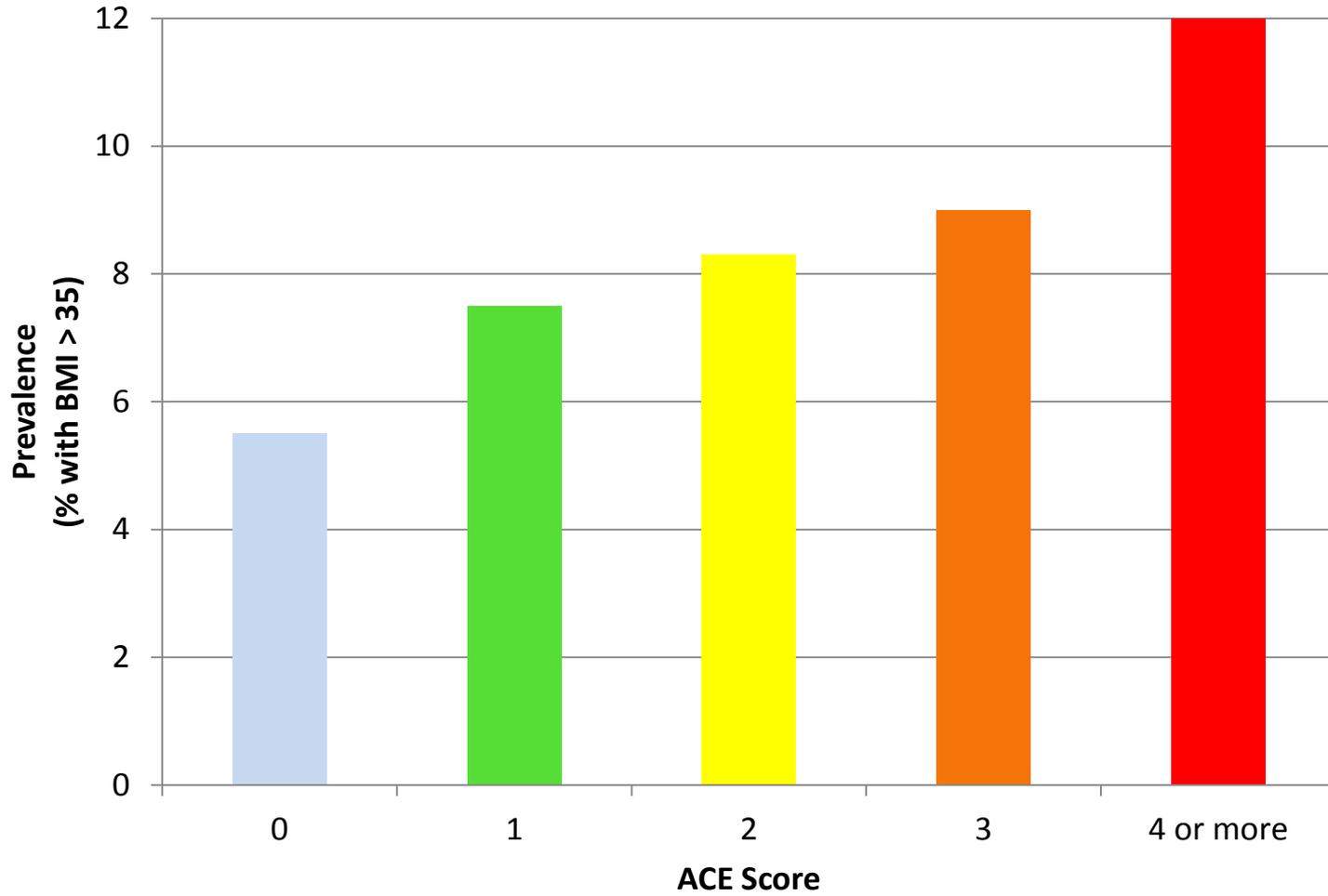


Relationship Between the ACE Score and the Risk of Ever Attempting Suicide

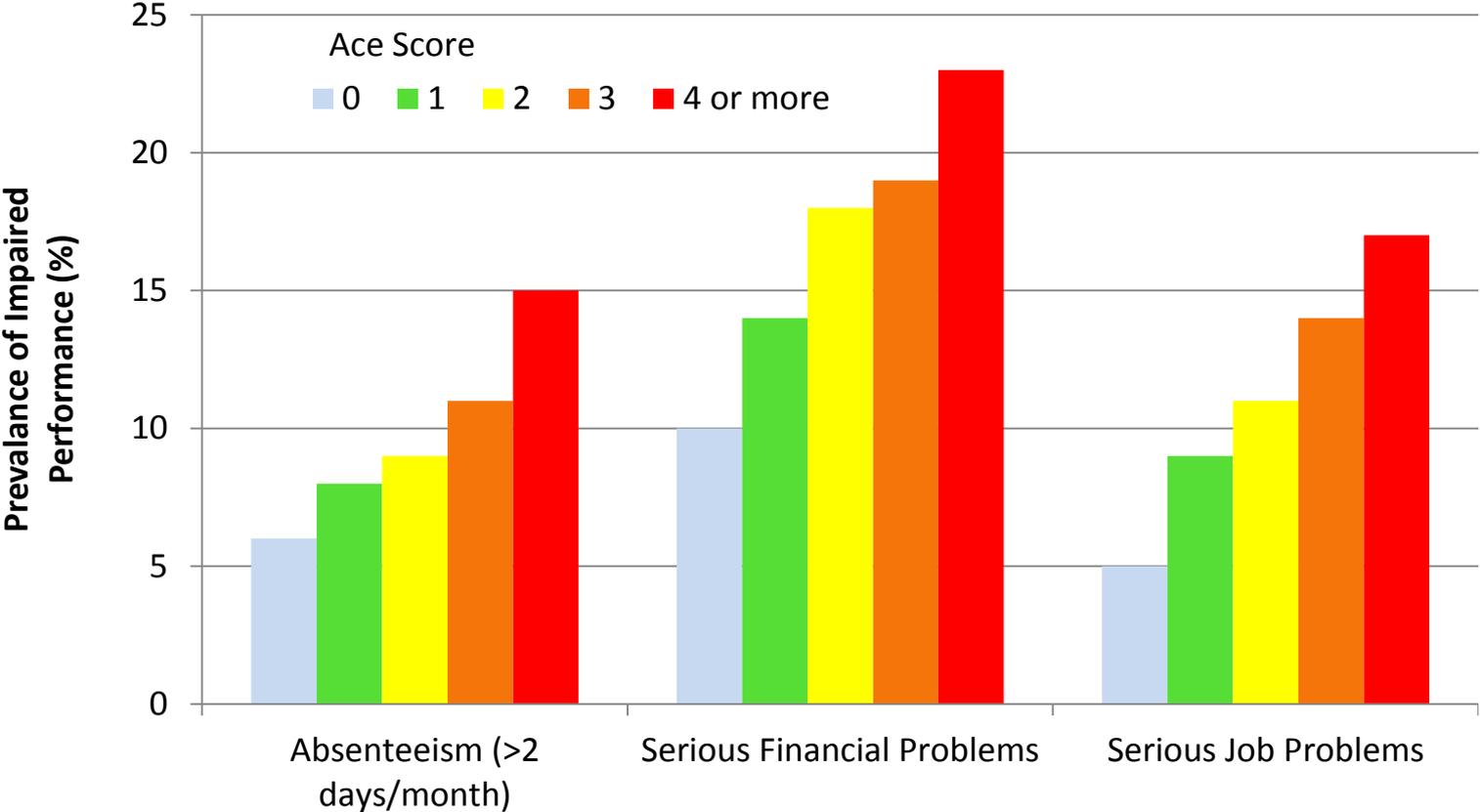


Dube et al., JAMA, 2001

ACEs and Obesity



ACE Score and Indicators of Impaired Worker Performance



ACE Study---Early Death

- ❖ Compared childhood trauma and mortality
- ❖ Identified 1,539 deaths within the cohort between 1995 and 2006
- ❖ **People with 6 or more ACE's died nearly 20 years earlier** than those without ACE's-60.6 yrs versus 79.1

Seeking to Cope

- The risk factors/behaviors underlying these adult diseases are actually effective coping devices.
- **What is viewed as a problem by the health care provider is actually a solution to bad experiences for the patient.**
- Dismissing these coping devices as “bad habits” or “self destructive behavior” misses their source of origin.



ADVERSE CHILDHOOD EXPERIENCES AND ADULT DISEASE:

54% of depression

58% of suicide attempts

39% of ever smoking

26% of current smoking

65% of alcoholism

50% of drug abuse

78% of IV drug abuse

48% of promiscuity (>50 partners)

are attributable to ACE's.

The ACE Study is evidence that....

ADVERSE CHILDHOOD EXPERIENCES are
the most basic and long lasting cause
of : health risk behaviors,
mental illness,
social malfunction,
disease, disability, death,
and healthcare costs



Center on the Developing Child
HARVARD UNIVERSITY

Science Tells Us that Early Life Experiences Are Built Into Our Bodies

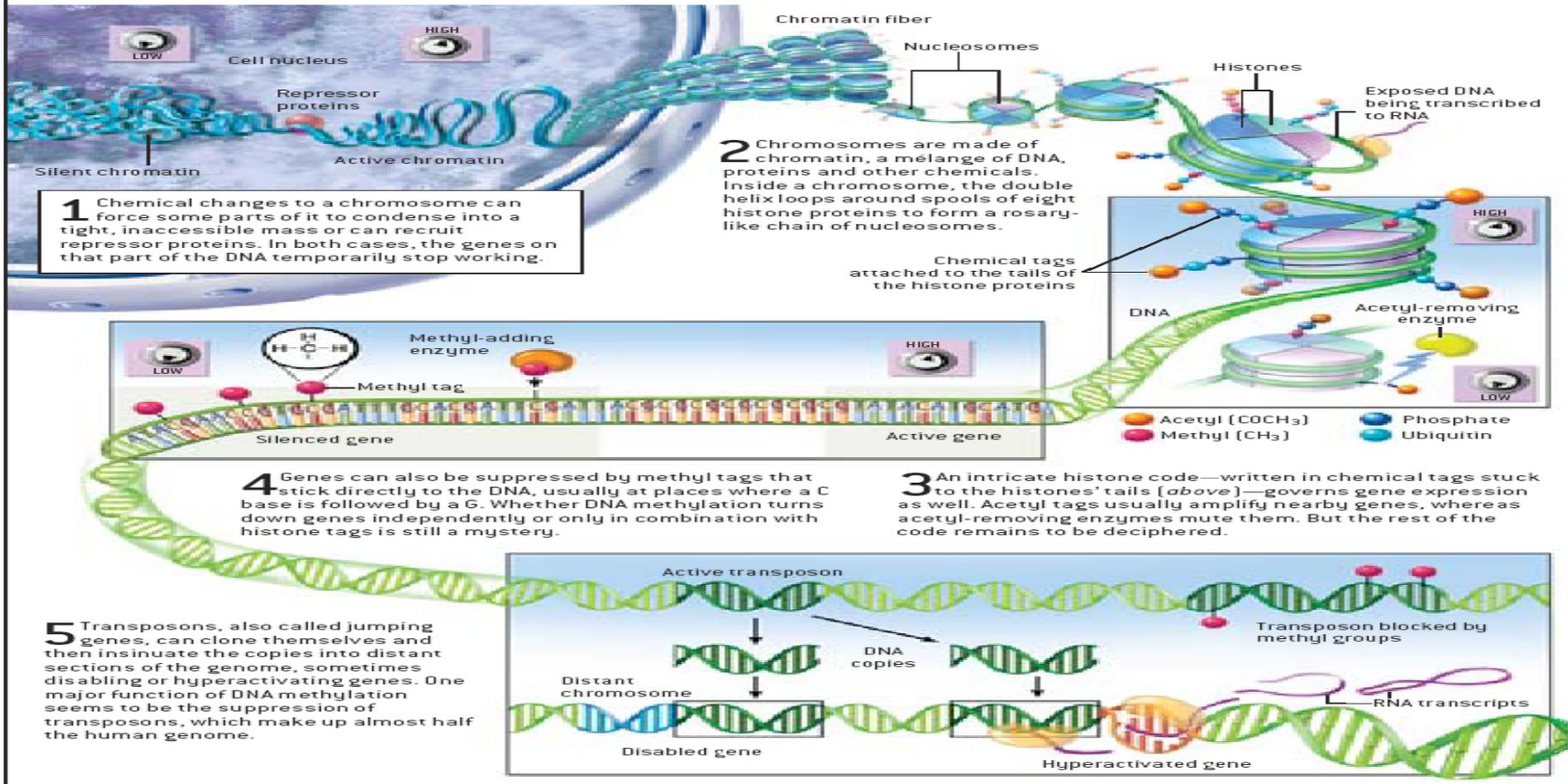
Research on the biology of stress illustrates how threat raises heart rate, blood pressure, and stress hormone levels, which can impair brain architecture, immune status, metabolic systems, and cardiovascular function.

Epigenetics

VOLUME CONTROLS FOR GENES

THE DNA SEQUENCE is not the only code stored in the chromosomes. So-called epigenetic phenomena of several kinds can act like volume knobs to amplify or mute the effect of genes. Epigenetic information is encoded as chemical attachments to

the DNA or to the histone proteins that control its shape within the chromosomes. Among their many functions, the epigenetic volume controls muffle parasitic genetic elements, called transposons, that riddle the genome.



Epigenetics

- Changes in DNA (methylation, histone modification) affecting function without a change in sequence
- Environmental triggers
- Can lead to gene silencing
- Can be passed on through generations



Agouti mice from same genetic strain.

2 groups:

- (1) Mothers fed normal diet while pregnant
- (2) Mothers fed extra folic acid during pregnancy (methyl groups)

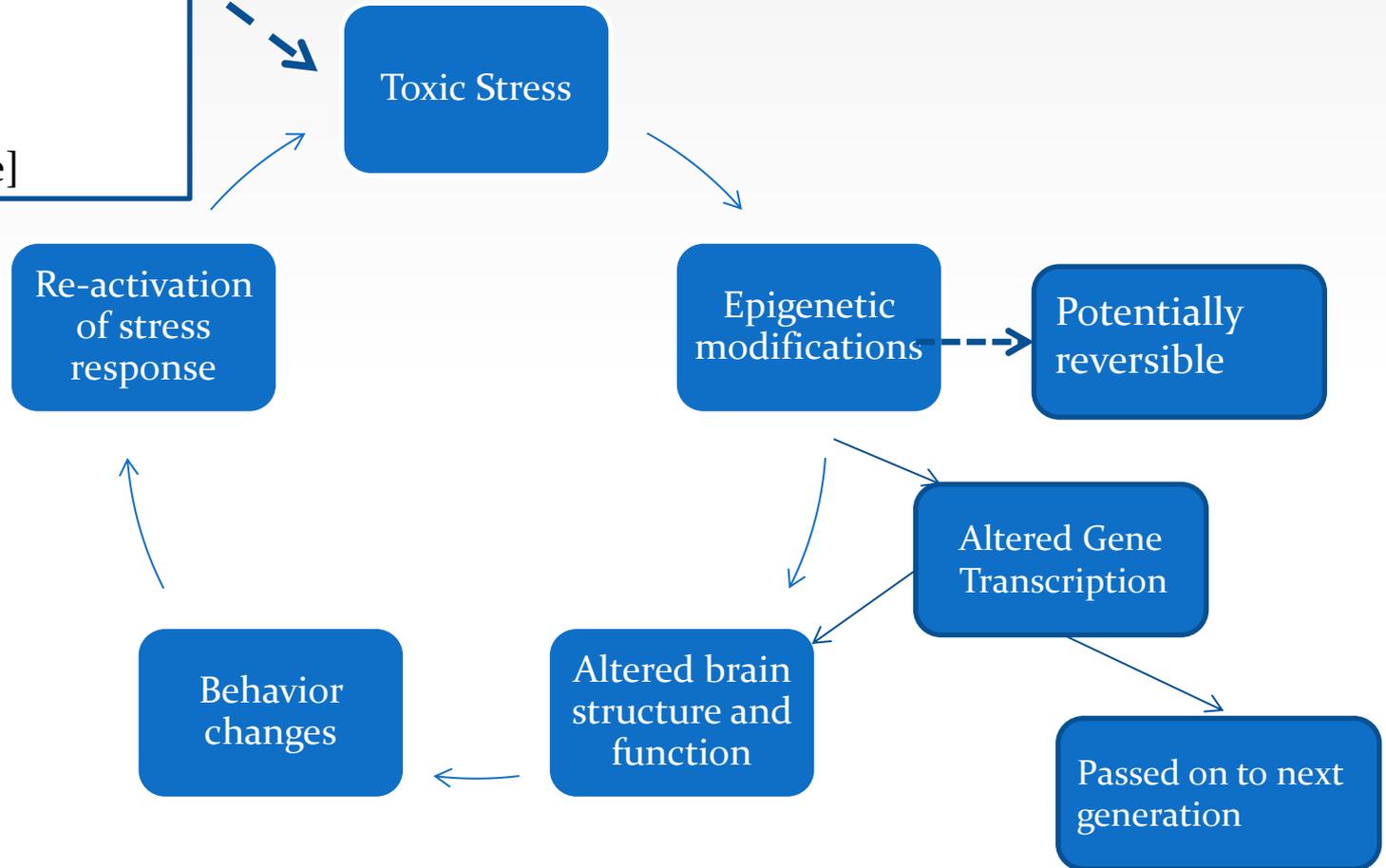
www.pbs.org/wgbh/nova/body/epigenetic-mice.html

Dr. Randy Jirtle
Duke University

Epigenetics

Environmental Stressors:

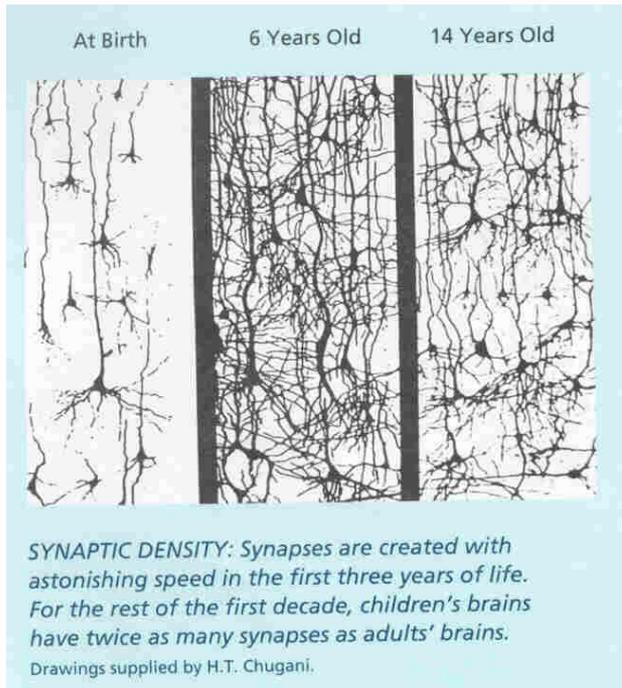
- Hormonal (glucocorticoids)
- Nutritional
- Toxins
- [maternal care]



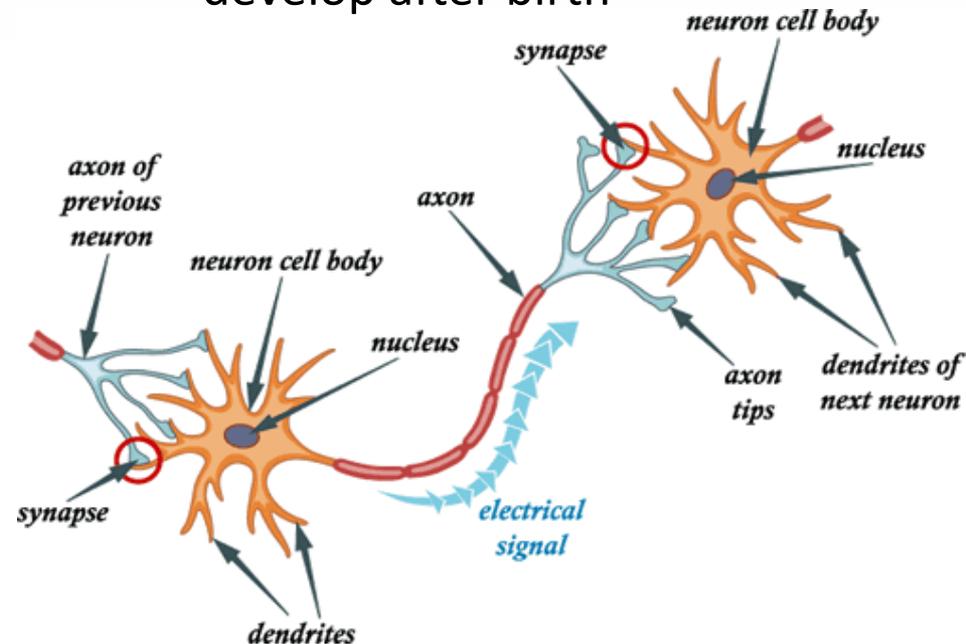
Critical Period of Brain Development

➤ The Brain is not structurally complete at birth.²

- The period after birth is a critical period where experiences permanently alter brain structure and function



- Synaptic connections, myelination, and glial and circulatory support systems all develop after birth

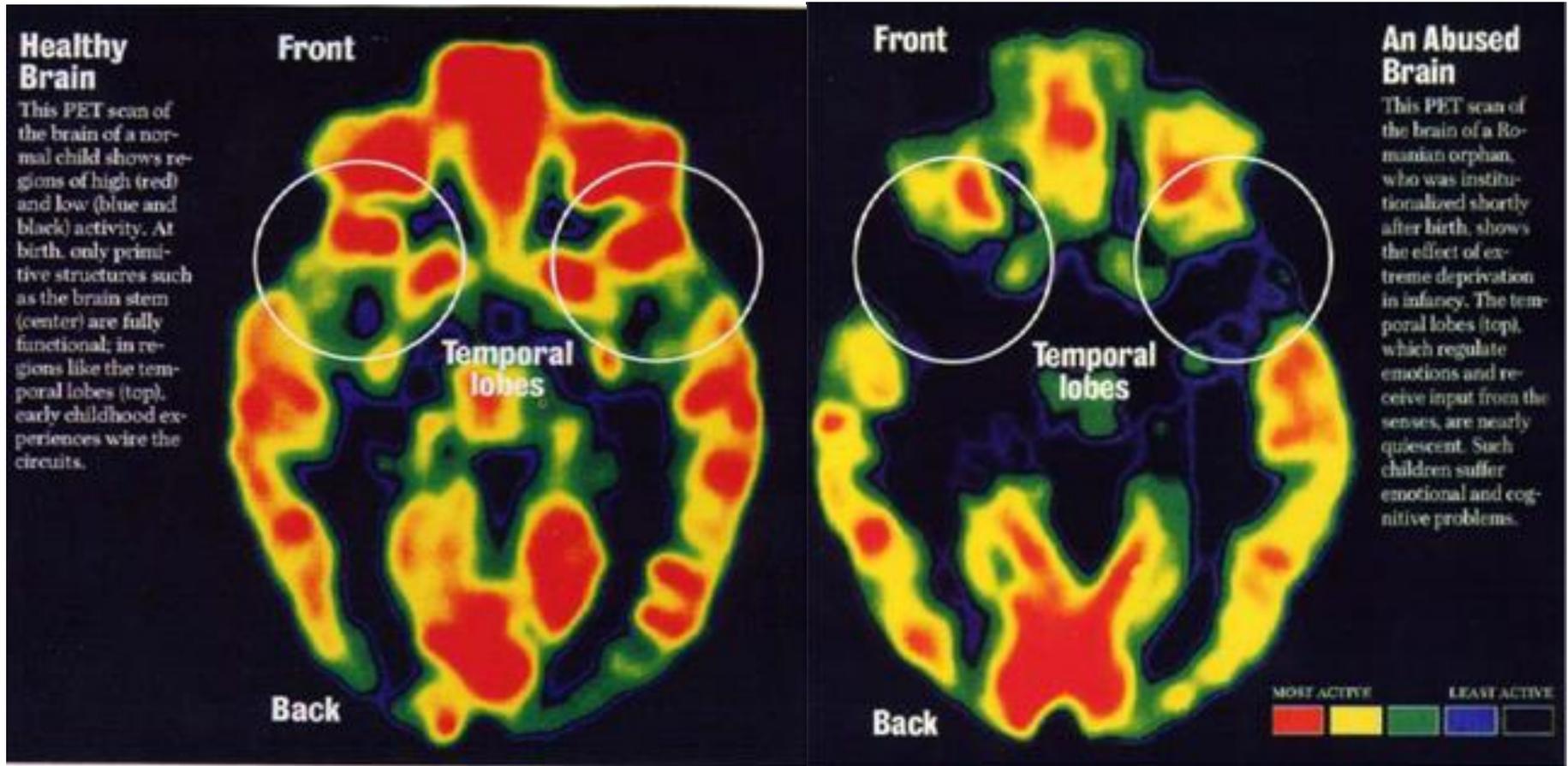


Critical Periods

- Structural Development is guided by environmental clues.
The brain is changed by experience --infant's brain adapts to what it sees, hears, and feels.
 - Neural connections are created through repeated experiences over time.
 - Synapses that are not used are “pruned” away
 - First experiences are all around **attachment** = foundation for brain development.



Early Experiences can Alter Brain Structure



Healthy Brain

Deprivation

“The Two Year Window”

Early Experiences Hardwire the Infant's Brain

Birth – 2 years; critical window for hardwiring the brain for social-emotional development.



- Attachment comes from a **Nurturing relationship** with a caregiver that is consistent and caring.
- **Secure Attachment** results in the hardwiring brain circuits for Social-Emotional development
- **Social-emotional** hardwiring becomes the foundation for cognitive development, sense of self-identity, empathy, and ability to learn and problem solve

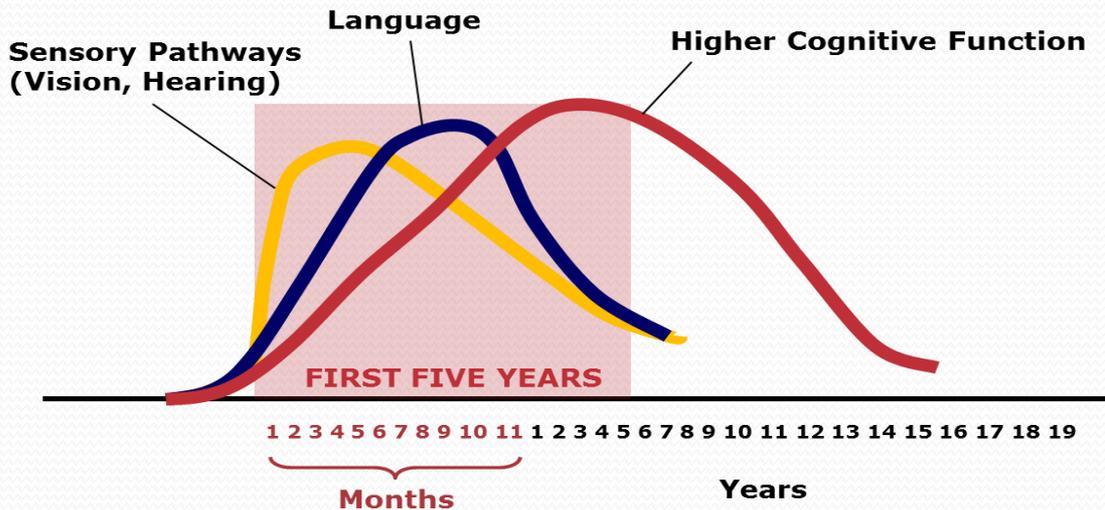
Critical Periods



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Neural Circuits are Wired in a Bottom-Up Sequence

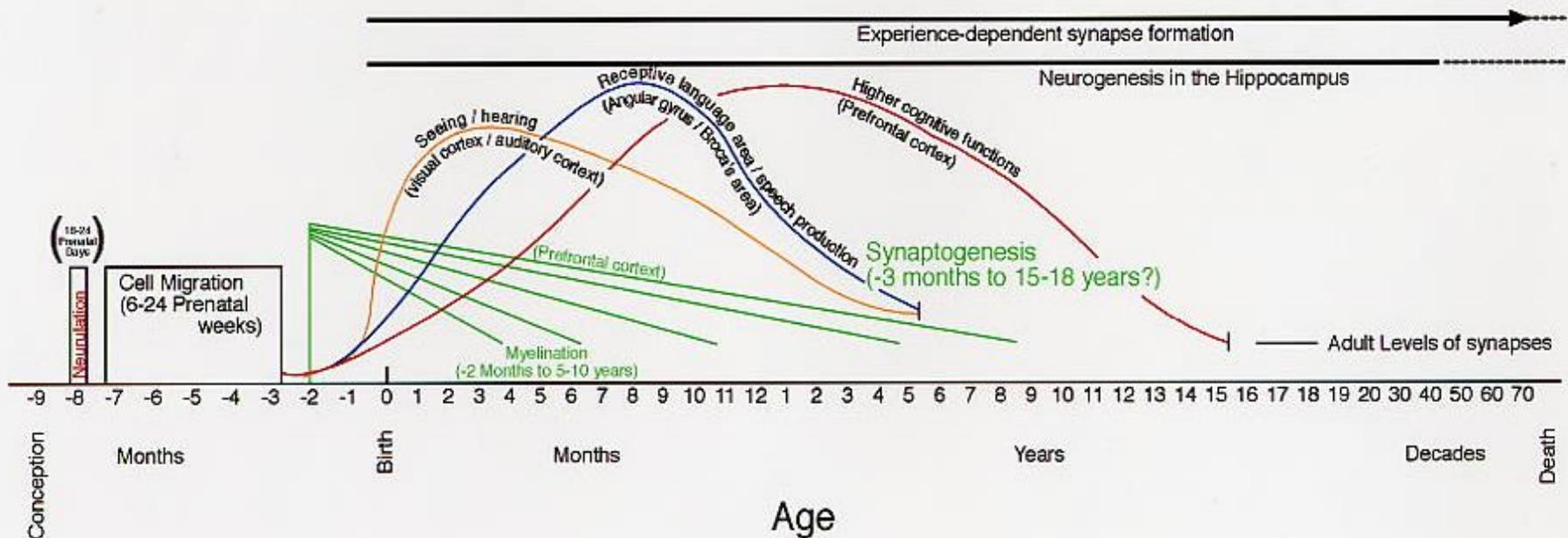
(700 synapses formed per second in the early years)



Source: C.A. Nelson (2000)

In building capabilities, skill builds upon skill; weak social-emotional pathways provide a weak foundation for other skills, including cognitive and executive function.

Sequence of Human Brain Development



Thompson, R. A., & Nelson, C. A. (2001). Developmental science and the media: Early brain development. *American Psychologist*, 56(1), 5-15.

We are not born with the skills that enable us to make plans, control impulses, and stay focused. We are born with the potential to develop these capacities...



Nurturing and stable relationships with caring adults are essential to healthy human development. Early, secure attachments contribute to the growth of a broad range of competencies, including love of learning, sense of one's self, positive social skills, successful relationships at later ages, and an understanding of emotions, commitment, morality, and other aspects of human relationships."

Emotional well-being and social competence provide a strong foundation for emerging cognitive abilities, and together they are the bricks and mortar that comprise the foundation of human development.

The emotional and physical health, social skills, and cognitive-linguistic abilities that emerge in the early years are all important pre-requisites for success in school and later in the workplace and community."

Harvard Center for the Developing Child

Adversity Impacts Brain Development

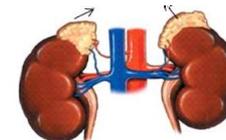
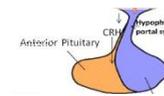
- Permanently alters brain structure and function
- Lack of stimulation results in pruning away of circuits
- Lack of social-emotional hardwiring provides weak foundation for later cognitive abilities
- Repetitive setting off a stress-survival response results in enlargement of the amygdala, smaller hippocampus, and smaller brain
- **Effects last for a lifetime, affecting health as an adult.**

Institute of Medicine, 2000

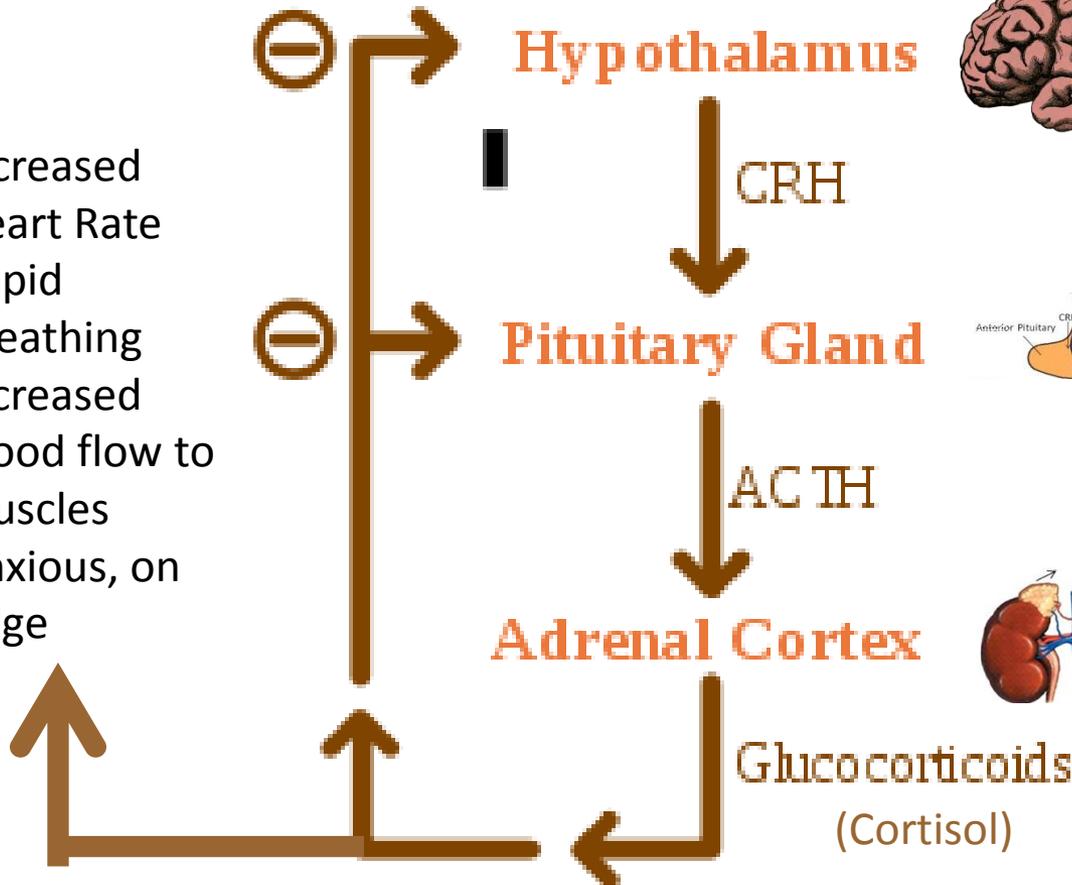


Body's Response to Stress

(Hypothalamic-Pituitary Axis)

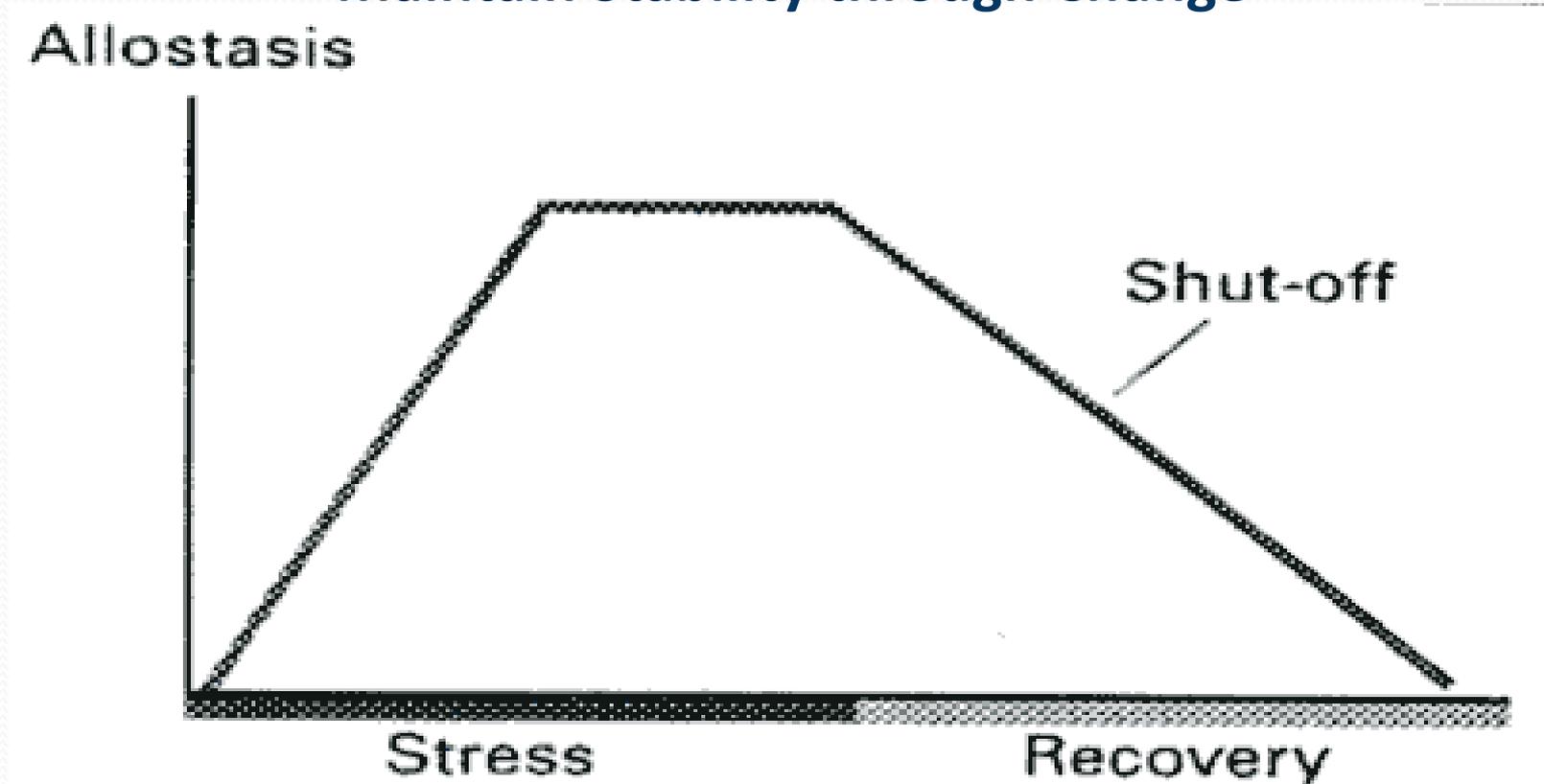


- Increased Heart Rate
- Rapid Breathing
- Increased Blood flow to muscles
- Anxious, on edge



Allostasis:

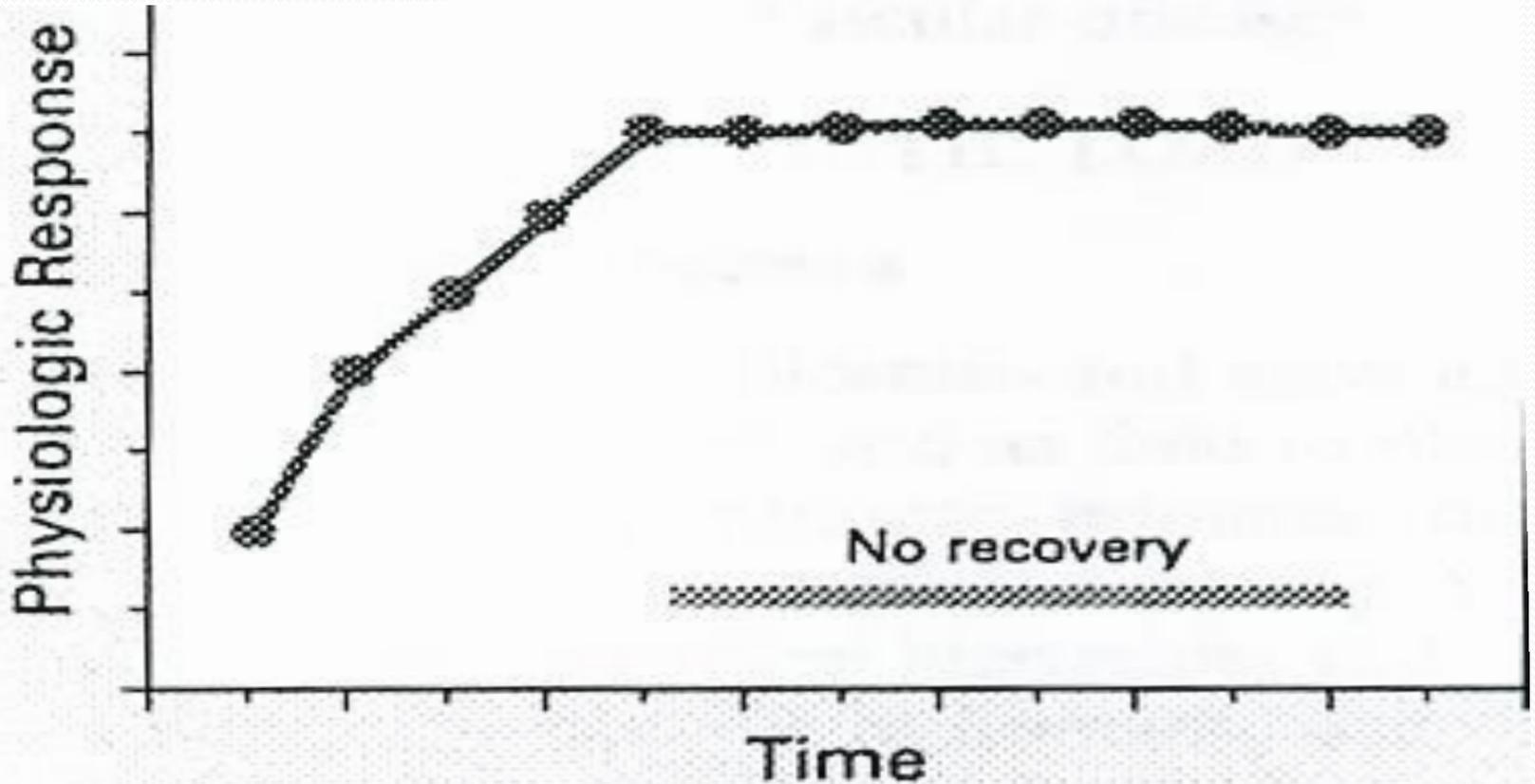
Maintain Stability through Change



McEwen BS. Protective and damaging effects of stress mediators. *N Eng J Med.* 1998;338:171-9.

Slide from Dr. Michael Lu

Allostatic Load



McEwen BS. Protective and damaging effects of stress mediators. *N Eng J Med.* 1998;338:171-9.

Slide from Dr. Michael Lu