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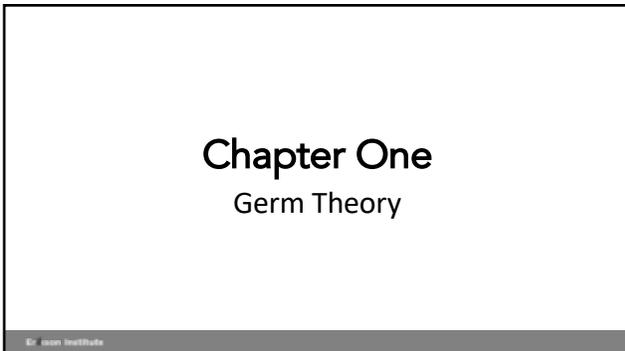
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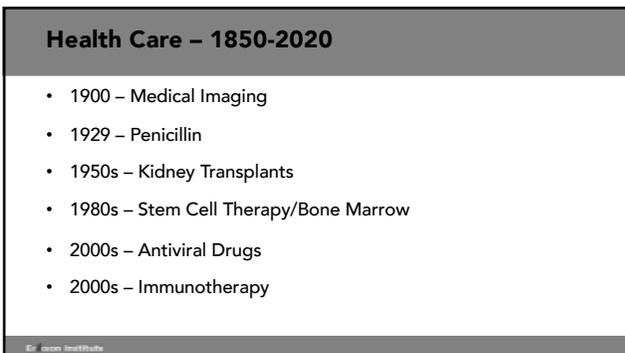
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## Chapter Two

### The Road to Educational Success and Long-Term Health

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### Early Experience

- Early experience is the “smoking gun” for both **education** success and long-term **health**.
  - Things that happen early in life leave biological memories in your body.
    - “Gets under your skin”

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### Brain Architecture

- Major Stages of Brain Development
  - Neural tube formation
  - Cell proliferation
  - Cell differentiation
  - Cell migration
  - Cell connections
  - Synaptic pruning
  - Myelination



© Pearson & MacKenzie © 2008

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### Synapse Formation

Birth      2 Years Old      6 Years Old



- Synapse formation peaks at the rate of 40,000 per second between 3 and 15 months of age.

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### The Brain Changes its Structure and Function in Response to Experience

- Plasticity
  - The brain is adaptable and can be influenced by positive experiences.
  - The brain is vulnerable and can be harmed by negative experiences.

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### Toxic Stress

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### The Body's Response to Stress

- Increase in heart rate
- Increase in blood pressure
- Increase in breathing rate

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### Cortisol

- Suppresses the immune system
- Impairs memory/shrinks hippocampus
- Impairs selective attention
- Creates anxious behavior

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### Cortisol

- If exposed to chronic stress, an elevated level of hormone production becomes "normal."



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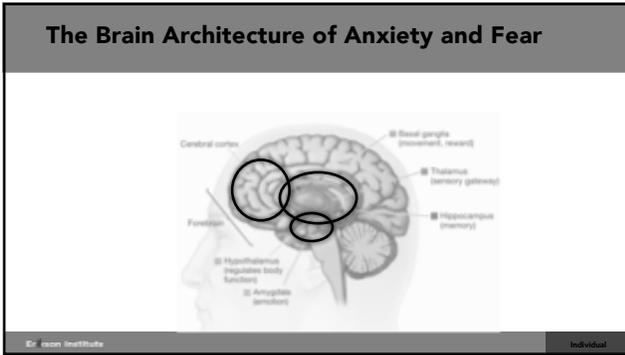
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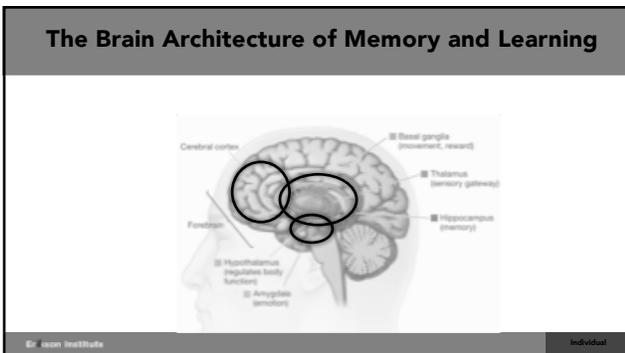
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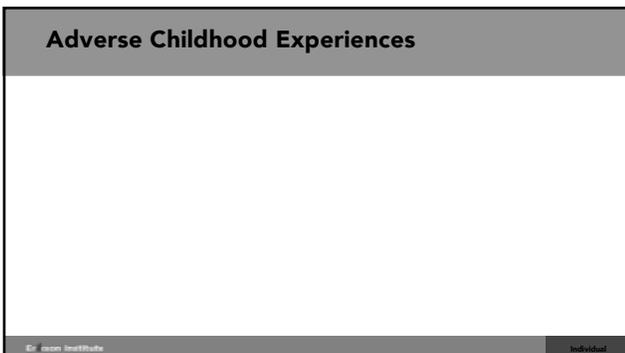
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Prevalence of ACEs in Study Group			
Physical Abuse	28%	Substance Abuse	27%
Emotional Abuse	11%	Parental Divorce	23%
Sexual Abuse	21%	Mental Illness	19%
Physical Neglect	10%	Incarcerated Family Member	5%
Emotional Neglect	15%	Mother Treated Violently	13%

Felton et al., (1998)

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Lifelong Trajectory of Increasing Risks	
• Correlated with increased risk of:	
• Heart disease	• Suicide
• Chronic lung disease	• Injuries
• Stroke	• HIV and STDs
• Diabetes	• School failure
• Cancer	• Teen pregnancy
• Liver disease	• Criminality

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Lifelong Trajectory of Increasing Risks	
• ACE scores of 4 or higher	
– 2x as likely to have cancer	
– 7x as likely to be alcoholics	
• ACE score > 6	
– 30x more likely to have attempted suicide	
• ACE score > 6 (no drinking, smoking, or overweight)	
– 360% higher risk of heart disease	

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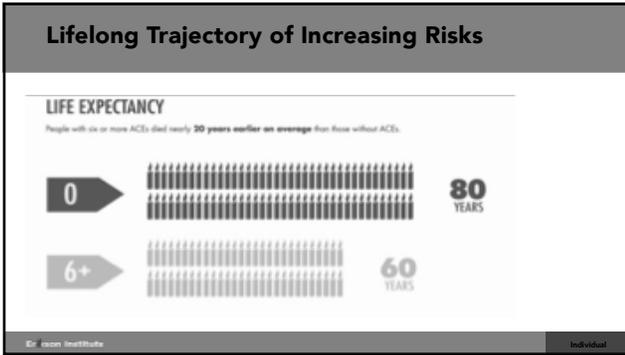
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### Many chronic diseases of adults are determined decades earlier, in childhood.

- Not by disease but by life experiences

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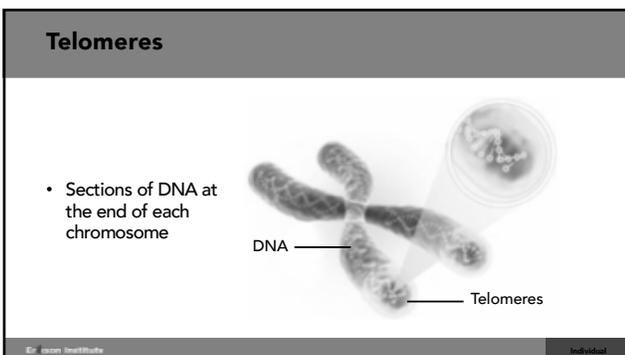
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### Cortisol & Telomeres

- Increased cortisol exposure
- ▼
- Reduced telomere length
- ▼
- Higher risk for cardiovascular disease, stroke, cancer, cognitive decline, diabetes, obesity, and all-cause mortality

(Baklum et al., 2015; Rode et al., 2015)

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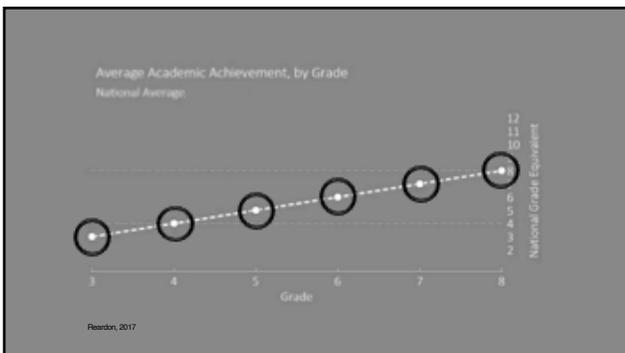
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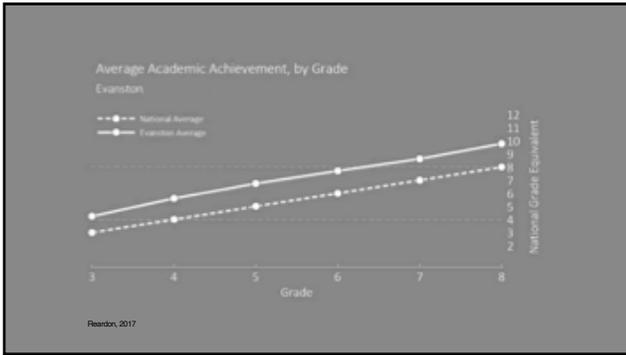
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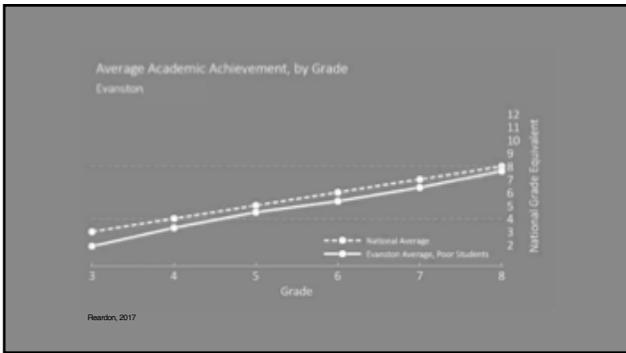
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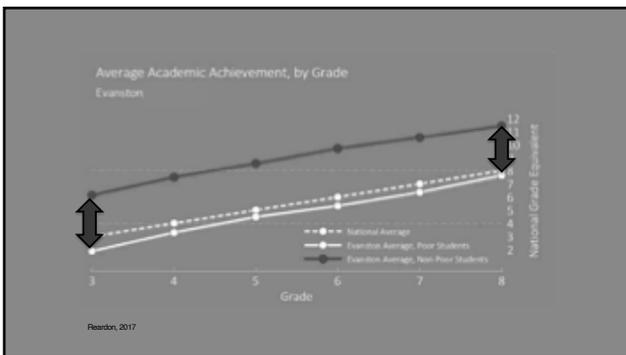
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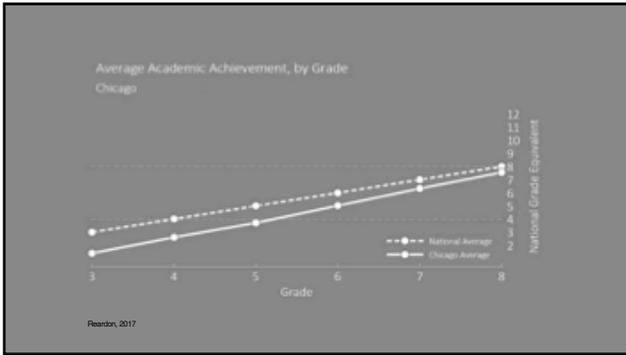
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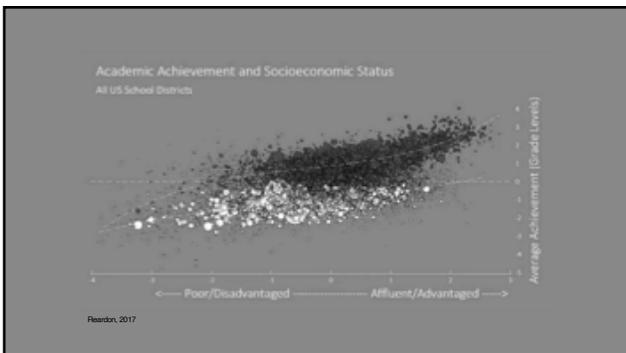
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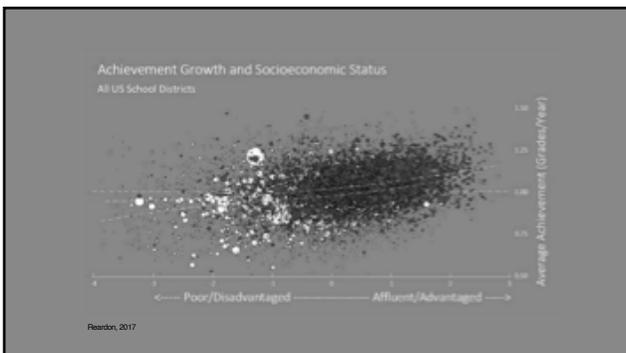
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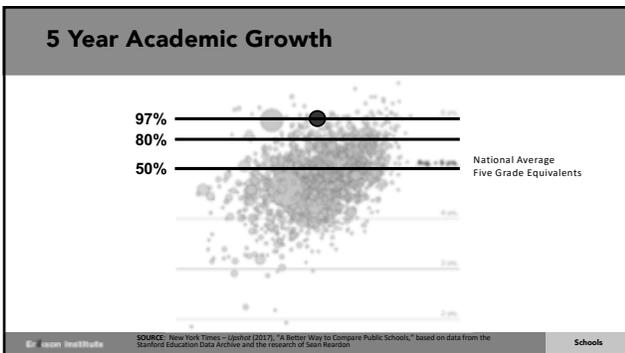
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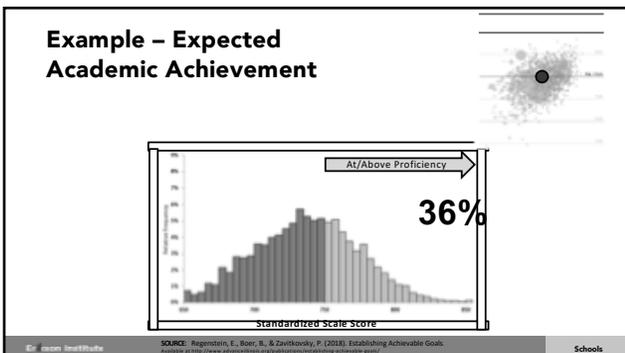
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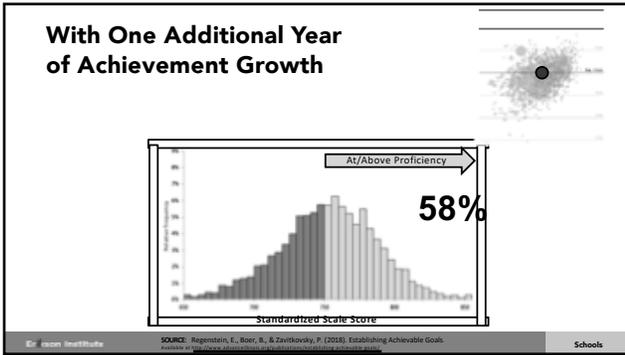
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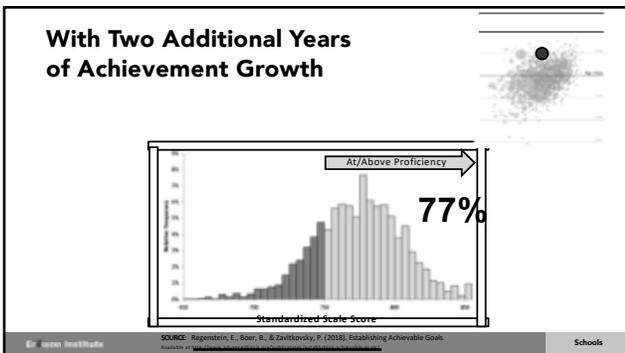
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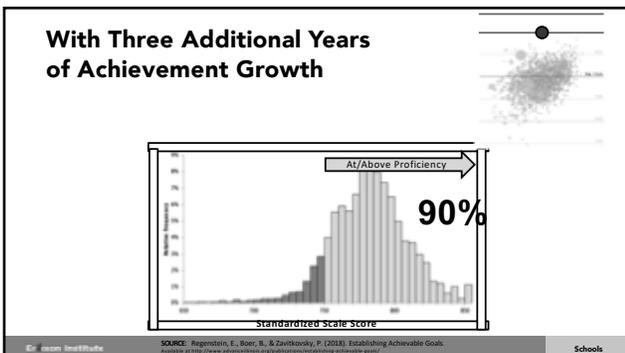
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**Chapter Three**  
It is Time to Innovate

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**Education – 1850-2020**



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**Health Care – 1850-2020**

- 1880s – Germs cause disease
- 1900 – Medical Imaging
- 1929 – Penicillin
- 1950s – Kidney Transplants
- 1980s – Stem Cell Therapy/Bone Marrow
- 2000s – Antiviral Drugs
- 2000s – Immunotherapy

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### Education – 1850-2020

- 1946 – National School Lunch Act
- 1954 – Brown vs. Board of Education
- 1965 – Elementary and Secondary Education Act
- 1975 – Education for All Handicapped Children Act
- 1990 – Individual with Disabilities Education Act
- 2002 – No Child Left Behind Act
- 2015 – Every Student Succeeds Act

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### Education – 2020 – The Big Question

If you were building the system today,  
would you start at age 5???

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### Closing Thoughts

- Invest in in early experience, not just early education
  - Risk stays with you your entire life
  - Be comprehensive (0-5)
- Need to build from prenatal/birth up
  - Not from K-12 down

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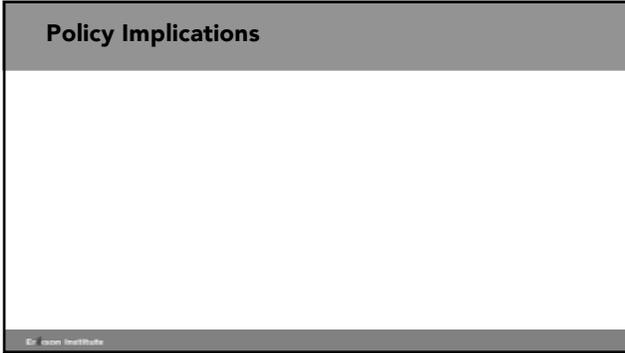
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**Policy Implications**



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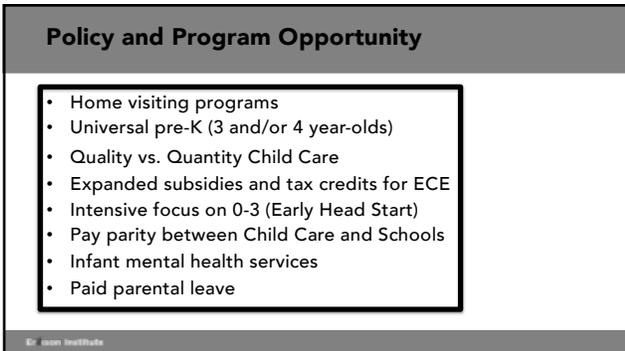
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**Policy and Program Opportunity**

- Home visiting programs
- Universal pre-K (3 and/or 4 year-olds)
- Quality vs. Quantity Child Care
- Expanded subsidies and tax credits for ECE
- Intensive focus on 0-3 (Early Head Start)
- Pay parity between Child Care and Schools
- Infant mental health services
- Paid parental leave



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**1,100 Days**



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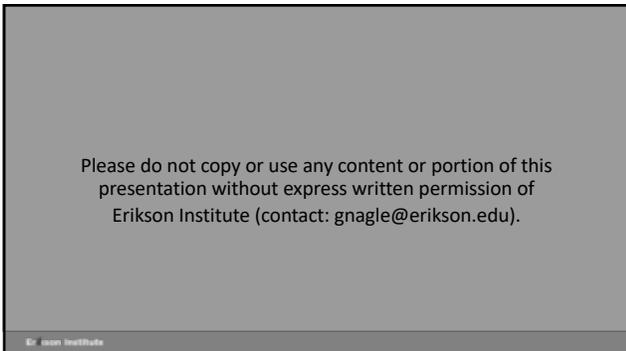
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