UNDER P.A.R.:

The Biology Underlying Poverty, Adversity and Resilience

Andrew Garner, M.D., Ph.D., F.A.A.P.

University Hospitals Medical Practices

Clinical Professor of Pediatrics,

CWRU School of Medicine

President, Ohio Chapter, AAP

CME Disclosures

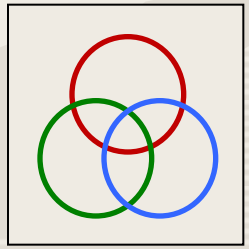
- I do **NOT** intend to discuss off-label uses for FDA-approved products

- I do **NOT** have any financial relationships to disclose

My 3 Objectives For Today

- Explain how **toxic stress** mediates the relationship between childhood adversity and poor adult health

- Describe an "**ecobiodevelopmental** framework" and list its advantages



- Discuss the **implications** for:
  - **family-centered pediatric medical home** in an era of healthcare transformation

CHILD DEVELOPMENT:
a basic science for
PEDIATRICS

NOT A NEW IDEA!!

Julius Richmond

October 23, 1966

C. Anderson Aldrich Award

Advances in Development

Life-Course Science

Epigenetics

Developmental Neuroscience

Have we translated what we **KNOW** into what we actually **DO**?

Dramatic Advance #1

Life-Course Science

Experiences in childhood

(both good and bad)

are **strongly** associated

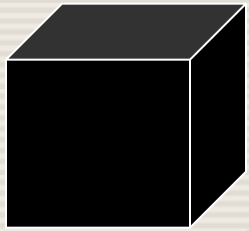
with **behaviors, health** and **economic productivity** …

… DECADES LATER!

Linking Childhood Experiences and Adult Outcomes

Parent Engagement
Quality Childcare
Play

Healthy Lifestyles
Academic Success
Economic Stability

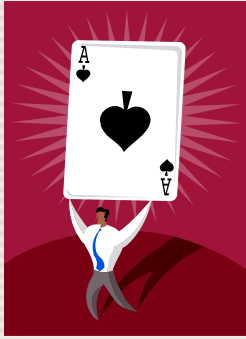
Childhood Experience →  → Adult Outcomes

ACEs
Poverty ←
Violence ←

?

Poor Health
Academic Failure
Economic Hardship

ACE Categories

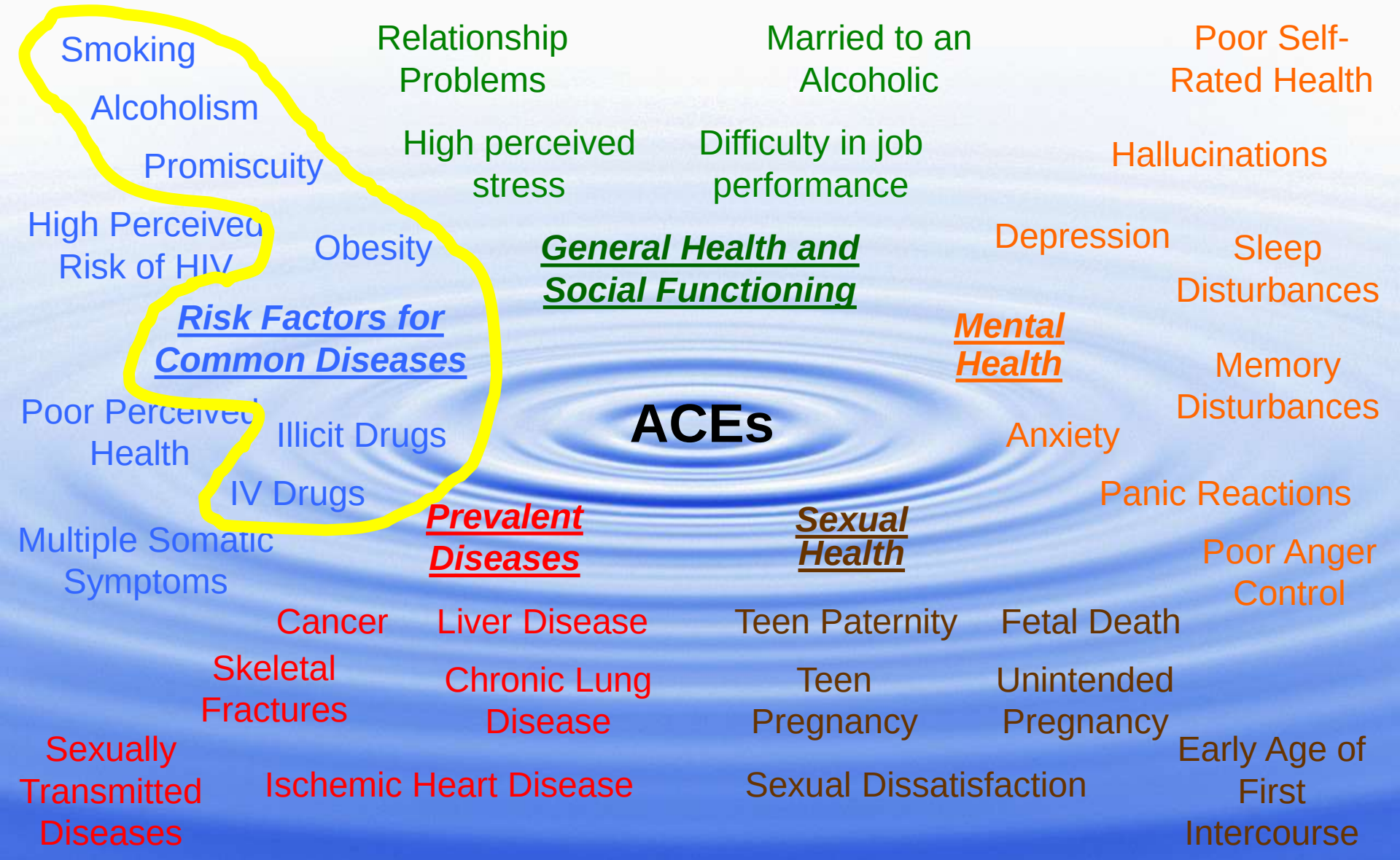


	Women (n=9,367)	Men (n=7,970)	Total (17,337)	
• **Abuse**				
– Emotional	13.1%	7.6%	10.6%	
– Physical	27.0%	29.9%	28.3%	1:4!
– Sexual	24.7%	16.0%	20.7%	←
• **Household Dysfunction**				
– Mother Treated Violently	13.7%	11.5%	12.7%	
– Household Substance Abuse	29.5%	23.8%	26.9%	1:4!
– Household Mental Illness	23.3%	14.8%	19.4%	←
– Parental Separation or Divorce	24.5%	21.8%	23.3%	←
– Incarcerated Household Member	5.2%	4.1%	4.7%	
• **Neglect***				
– Emotional	16.7%	12.4%	14.8%	
– Physical	9.2%	10.7%	9.9%	

* Wave 2 data only (n=8,667)

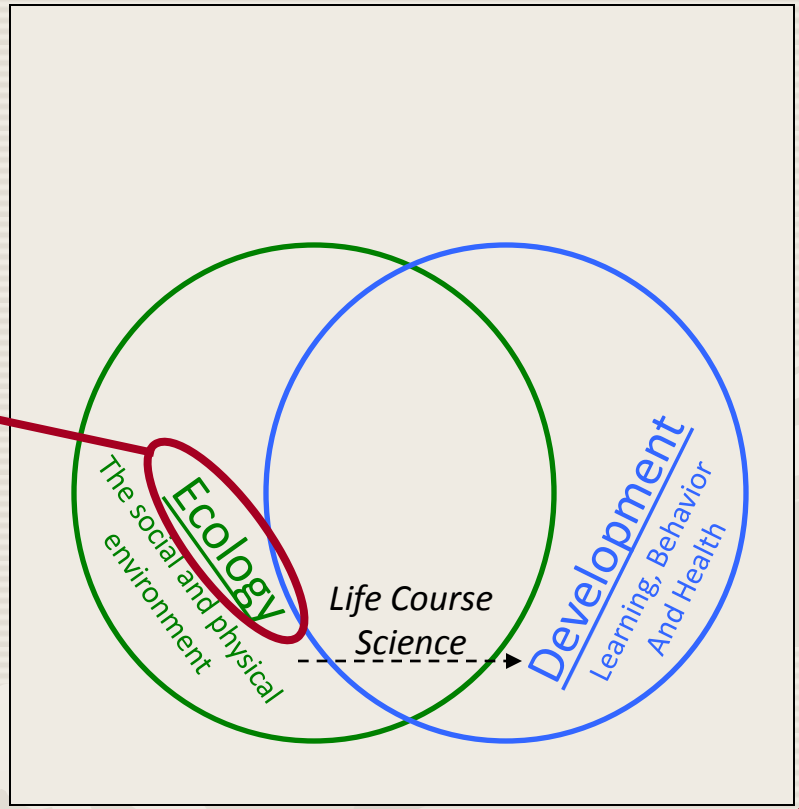
Data from www.cdc.gov/nccdphp/ace/demographics

ACEs Impact Multiple Outcomes



Developing a Model of Human Health and Disease

How do you begin to define or **measure** the ecology?



What are the **mechanisms** underlying these well-established associations?

Early childhood **ecology** strongly associates with lifelong **developmental** outcomes

Defining Adversity or Stress

- How do you define/**measure** adversity?
- Huge **individual variability**
  - **Perception** of adversity or stress (subjective)
  - **Reaction** to adversity or stress (objective)
- National Scientific Council on the Developing Child (Dr. Jack Shonkoff and colleagues)
  - **Positive** Stress
  - **Tolerable** Stress
  - **Toxic** Stress

Based on the **REACTION**
(objective physiologic responses)

Defining Adversity or Stress

- **Positive** Stress
  - Brief, infrequent, mild to moderate intensity
  - Most normative childhood stress
    - Inability of the 15 month old to express their desires
    - The 2 year old who stumbles while running
    - Beginning school or childcare
    - The big project in middle school
  - **Social-emotional buffers** allow a return to ***baseline***

    (responding to non-verbal clues, consolation, reassurance, assistance in planning)
  - **Builds motivation and resiliency**
  - Positive Stress is **NOT** the **ABSENCE** of stress

Defining Adversity or Stress

- **Toxic** Stress
  - Long lasting, frequent, or strong intensity
  - More extreme precipitants of childhood stress (**ACEs**)
    - Physical, sexual, emotional abuse
    - Physical, emotional neglect
    - Household dysfunction
  - **Insufficient social-emotional buffering**
    (Deficient levels of emotion coaching, re-processing, reassurance and support)
  - Potentially permanent changes and long-term effects
    - **Epigenetics** (there are life long / intergenerational changes in how the genetic program is turned **ON** or **OFF**)
    - **Brain architecture** (the mediators of stress impact upon the mechanisms of brain development / **connectivity**)

Dramatic Advance #2

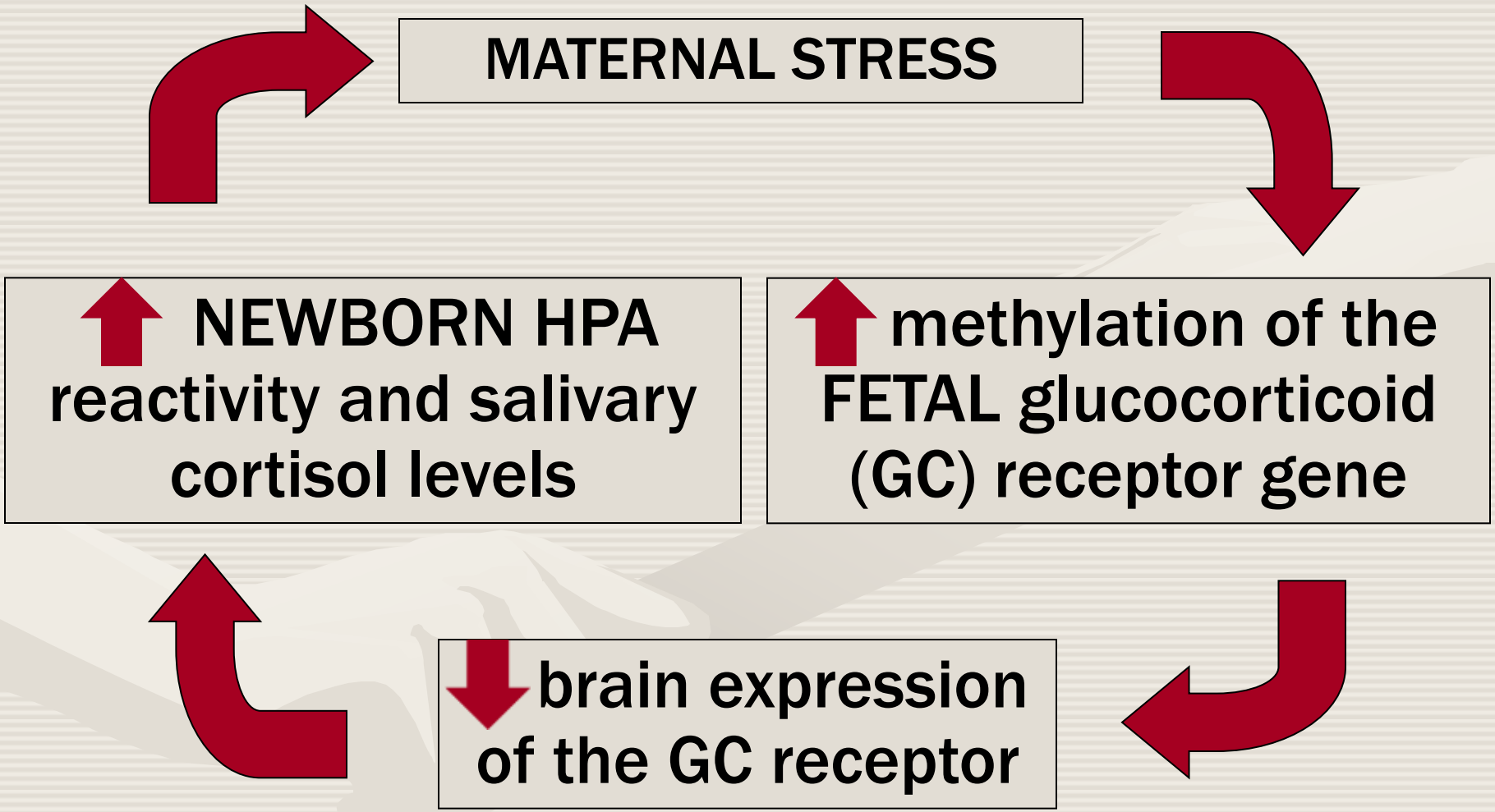
EPIGENETICS

- "Above the genome"
- Change in gene expression/no change in DNA sequence
- Larger revolution in genomic science
  - OLD VIEW = STATIC; NEW VIEW = PLASTIC (environ. input)
- Complex set of SWITCHES
  - Some are: Master; Dynamic; Programmed Early and Stabile

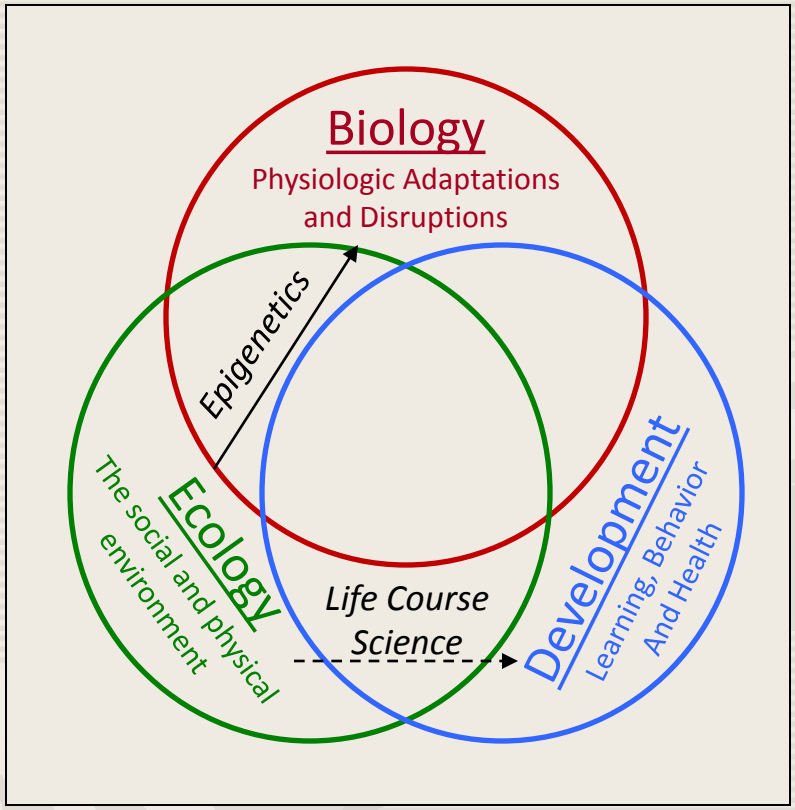
"Genes load the gun; the environment pulls the trigger"

"Epigenetics: NOT your parents' genome!"

Impact of Early Stress



Developing a Model of Human Health and Disease



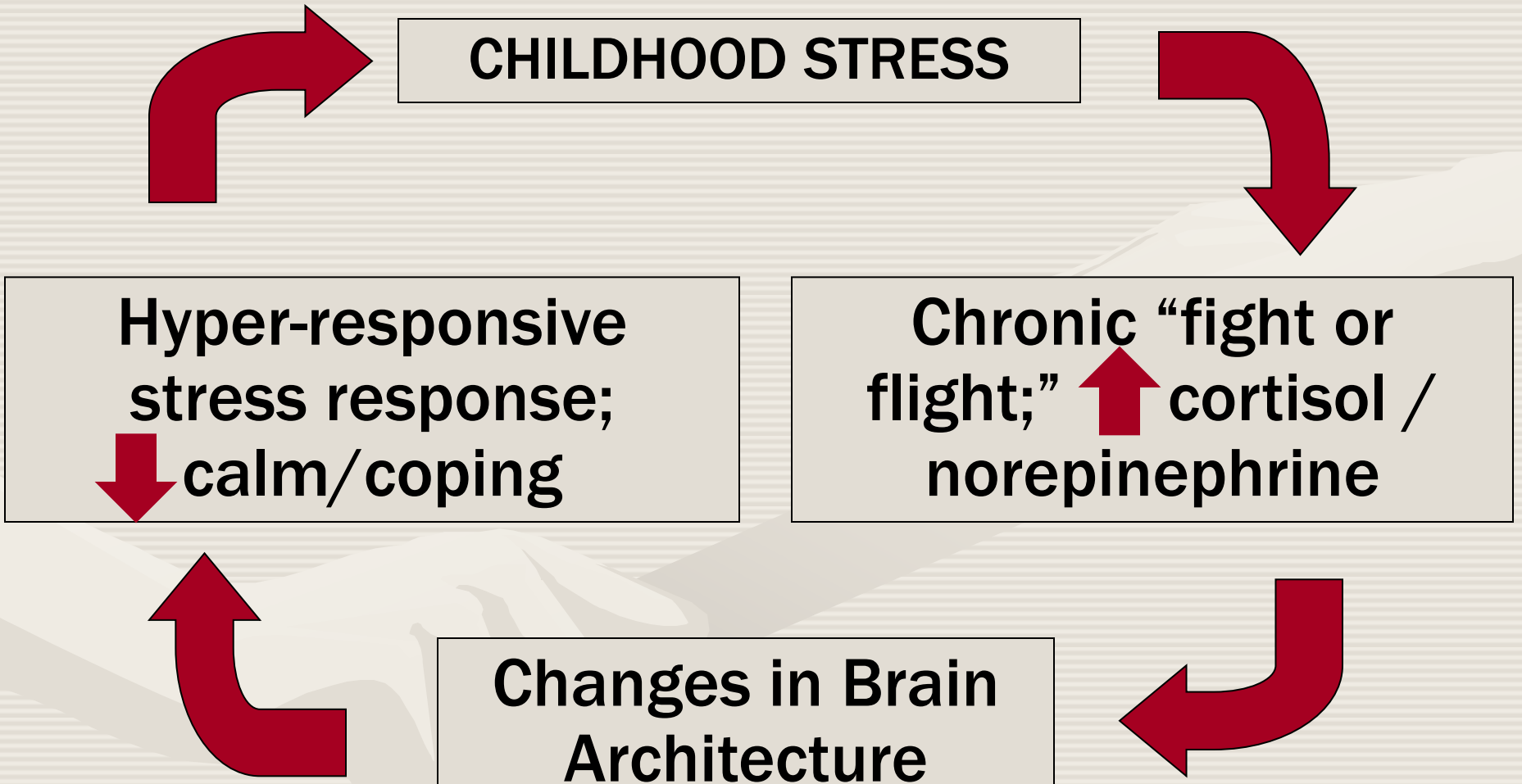
Through epigenetic mechanisms, the early childhood ecology becomes biologically embedded, influencing how/which genes are used

Dramatic Advance #3

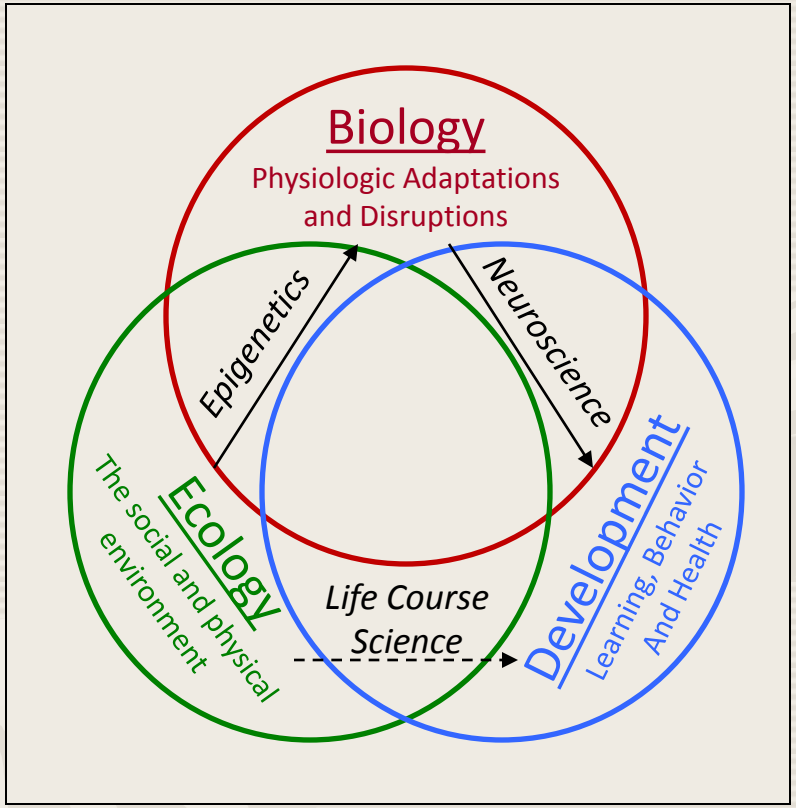
Developmental Neuroscience

- **Brain Architecture** is experience dependent
  (individual connections or "synapses" and complex circuits of connections or "pathways" are both dependent upon activity)
- **Ecology** (environment/experience) influences how brain architecture is **formed** and **remodeled** (plasticity)
- **Diminishing cellular plasticity** limits remediation
- Differential Maturation + Significant Adversity -> **Vicious Cycle of Stress**
- **Early Experiences** create **potentially permanent** alterations in brain **architecture** and **functioning**

Impact of Early Stress



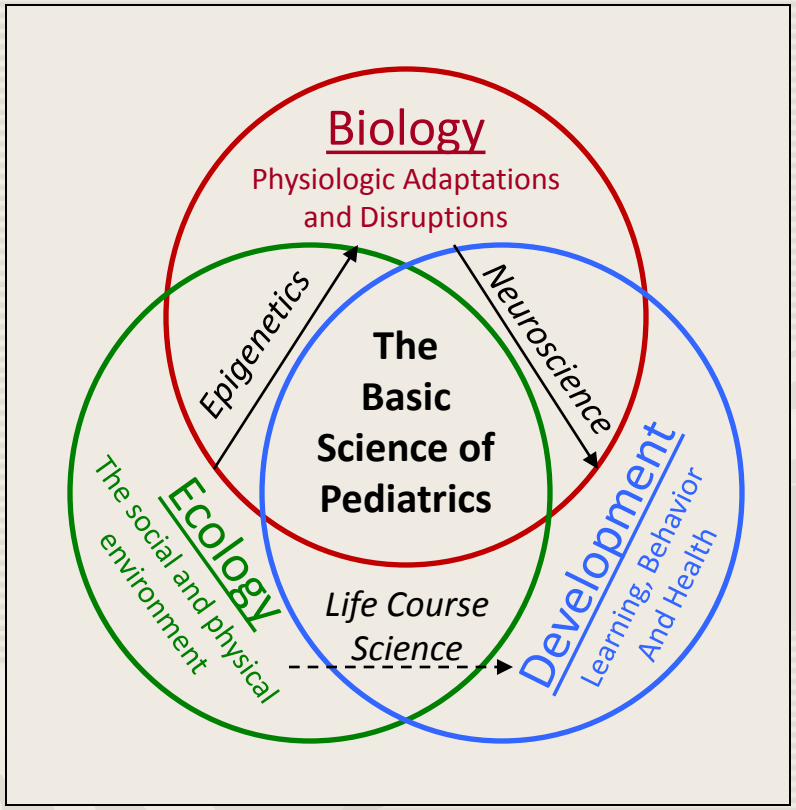
Developing a Model of Human Health and Disease



Declining plasticity in the developing brain results in potentially permanent alterations in brain functioning and **development**

Eco-Bio-Developmental
Model of Human Health and Disease

NOT:
"What's
WRONG
with you?

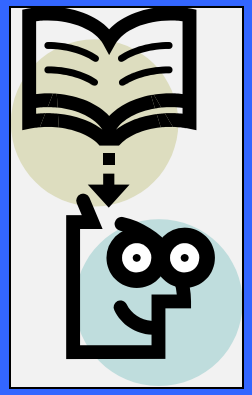


BUT:
"What's
HAPPENED
to you?

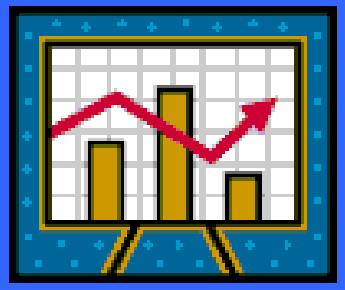
Ecology
Becomes biology,
And together they drive development across the lifespan

Critical Concept #1

Epigenetics | Physiology of Stress | Neuroscience



The Science of Early Brain and Child Development

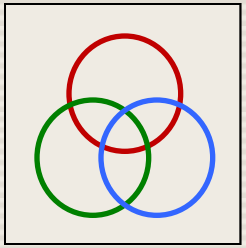


Education | Health | Economics

One Science – Many Implications

The critical challenge now is to translate game-changing advances in developmental science into effective policies and practices for families w/ children to improve education, health and lifelong productivity

Advantages of an EBD Framework

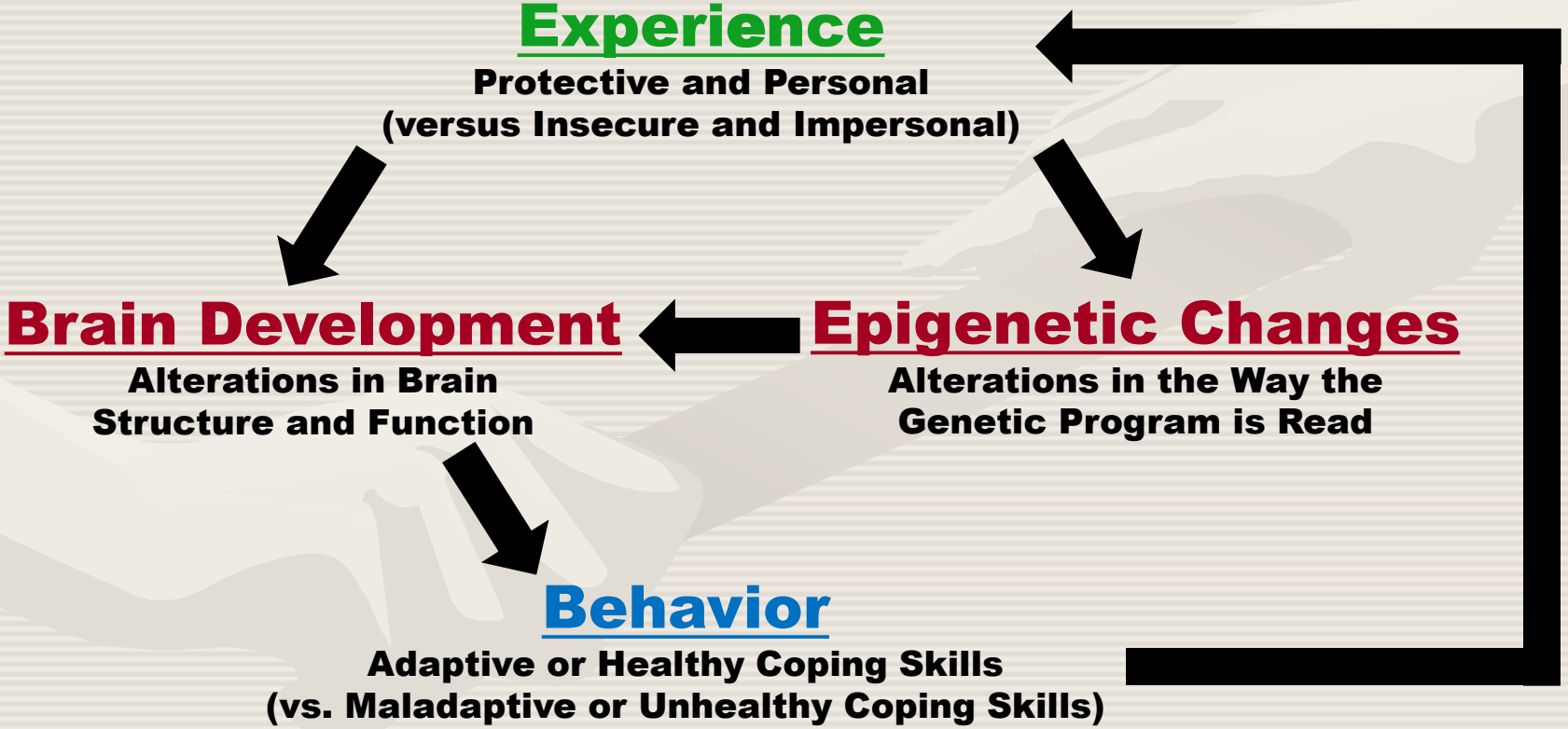


- Though grounded in developmental science, the simplicity of the EBD framework may promote understanding as well as support for translation (early investments are the right thing to do biologically)

- Psychosocial stressors and other salient features of the ecology are every bit as biological as nutrition or lead (no distinction between mental and physical health, just healthy vs. unhealthy development)

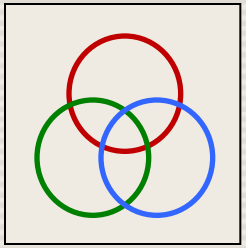
- Emphasizes the dimension of time – to reflect the on-going, cumulative nature of benefits and threats to health, educational success, and economic productivity

Development results from an on-going, re-iterative, and cumulative dance between nurture and nature

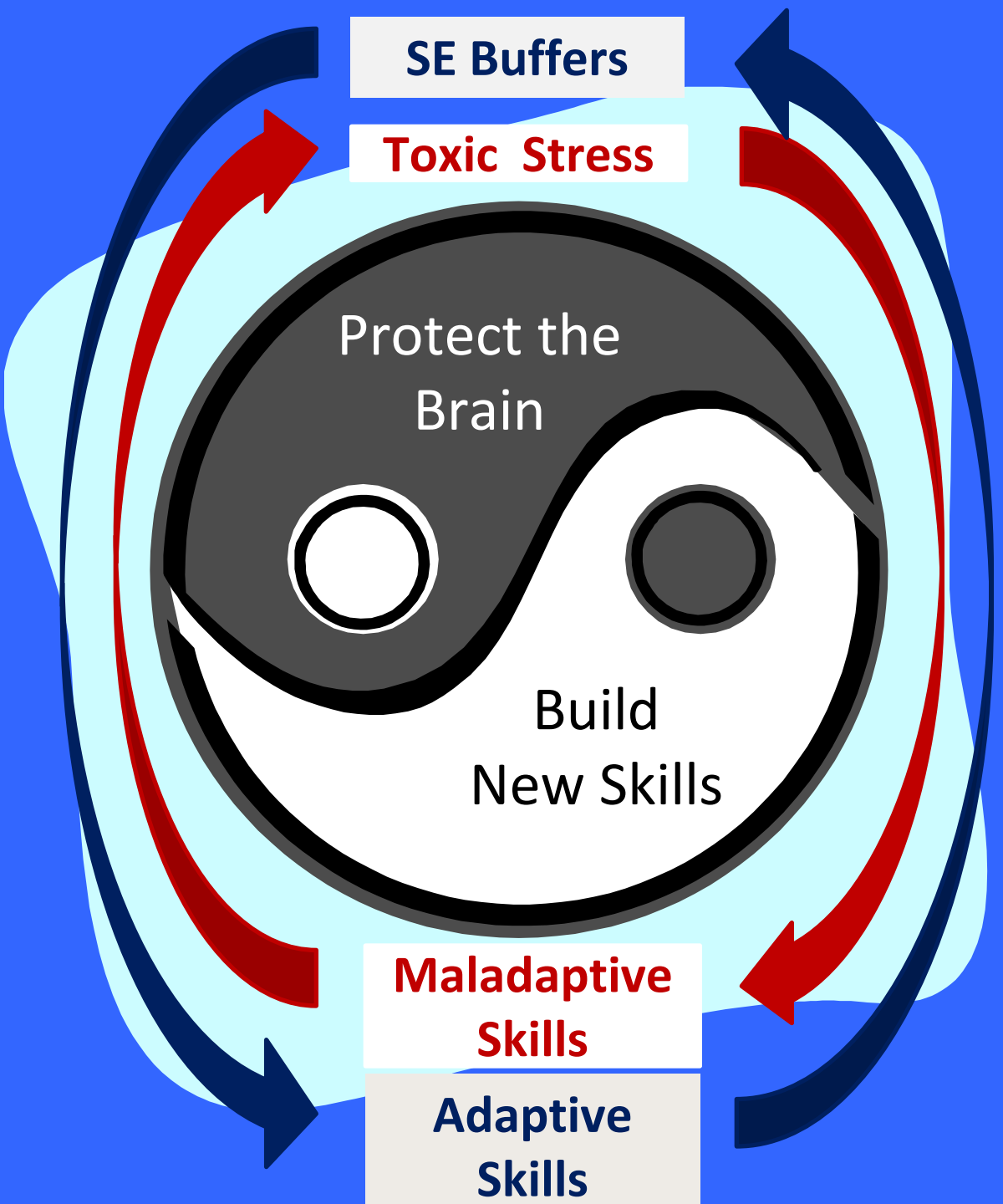


Adapted from: Helping Foster and Adoptive Families Cope with Trauma

Advantages of an EBD Framework



- Underscores the need to improve the early childhood **ecology** in order to:
  - Mitigate the **biological** underpinnings for educational, health and economic **disparities**
  - Improve **developmental**/life-course trajectories
    - ***Changing the early childhood ecology will require a PUBLIC HEALTH approach ... and collaboration!!***
- Highlights the pivotal role of **toxic stress**
  - Not just "**step on the gas**" / enrichment (Ed model)
  - But "**take off the brake**" by treating, mitigating or immunizing against toxic stress (Med model)



Critical Concept #2

Yin/Yang of Early Childhood:

- Protect the Brain — Release the Brake!!
- Build New Skills — Step on the Gas!!

Reinventing the Wheel - All over again?

Models

Maslow's Hierarchy of Needs
(Theoretical - 1943)

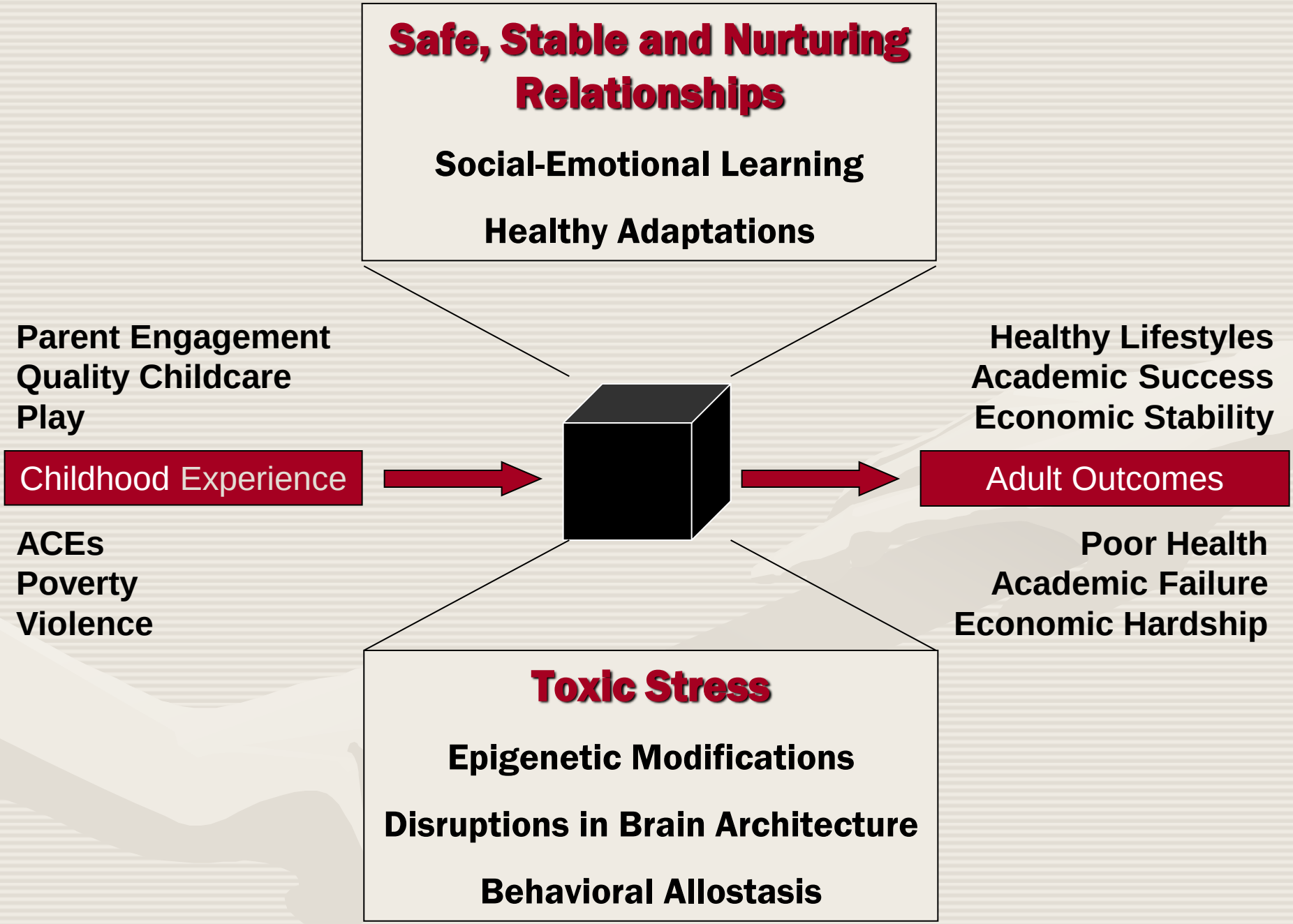
Needs

Self-Actualization — Need to know, explore and understand

Unmet needs are potential sources of STRESS!!

Adversity & Resilience

- **Adversity** leads to physiologic stress
  - Positive (if buffered by S/S/N relationships)
  - Toxic (if unmitigated by S/S/N relationships)
- **Resilience** is the ability to handle adversity in a healthy manner
  - In the absence of S/S/N relationships, toxic stress leads to maladaptive responses
  - In the presence of S/S/N relationships, positive stress builds motivation & resilience
  - It's all about "**relational health**"


Safe, Stable and Nurturing Relationships
Social-Emotional Learning
Healthy Adaptations
Parent Engagement
Quality Childcare
Play
Childhood Experience
ACEs
Poverty
Violence
Healthy Lifestyles
Academic Success
Economic Stability
Adult Outcomes
Poor Health
Academic Failure
Economic Hardship
Toxic Stress
Epigenetic Modifications
Disruptions in Brain Architecture
Behavioral Allostasis

The BIG Questions are…

Since **TOXIC STRESS** mediates the association between **ACE exposure** and **poor adult outcomes**, it raises the following BIG questions:

- Are there ways to:
  - **Treat,**
  - **Mitigate,** and/or
  - **Prevent** toxic stress?

But the corollary is …

The BIG Questions are…

Since **RELATIONAL HEALTH** is the antidote to **toxic stress**, it raises the following BIG questions:

- Are there ways to:
  - **Repair,**
  - **Eliminate barriers to,** and/or
  - **Promote** relational health?

- If so:
  - What does this mean for the **FAMILY-CENTERED PEDIATRIC MEDICAL HOME** during an era of healthcare transformation?

Decrease Toxic Stress / Promote Relational Health

- **Treating TS / Repairing RH**
  - Consequences are **Biological Mal-adaptations** ("what's wrong with you," vs "what's happened to you")
  - **PCIT** and **CPP** are evidence-based tx (RH)
  - Efficacy linked to age / chronicity (**brain plasticity**)
  - **REACTIVE** – mal-adaptations are happening!
  - **ACCESS** – interventions must be local
    - More **providers** / better **reimbursement / advocacy**
    - Need a **universal** but **local platform** (Medical homes? Schools?)
      - **Better identification**
      - **Better coordination / communication between HC/ED/SS**

Early Brain and Child Development
BUILDING BRAINS, FORGING FUTURES
A Program of the American Academy of Pediatrics

New AAP Resource:

Trauma Toolbox for Primary Care

www.aap.org/TRAUMAGUIDE

1) Adverse Childhood Experiences and the Lifelong Consequences of Trauma
2) Addressing Adverse Childhood Experiences and other types of Trauma in the Primary Care Setting
3) The Medical Home Approach to Identifying and Responding to Exposure to Trauma
4) Bring Out the Best in Your Children
5) When Things aren't Perfect: Caring for Yourself and Your Children
6) Protecting Physician Wellness: Working with Children Affected by Traumatic Events
7) Helping Foster and Adoptive Families Cope with Trauma

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Decrease Toxic Stress / Promote Relational Health

- **Mitigating TS / Reducing RH barriers**
  - Focused, targeted interventions for those deemed to be **"at high"** or the **"highest risk"**
  - Home Visiting Programs (NFP, PAT, Child First, etc.)
  - Parenting Programs (PPP, Nurturing Parenting, Legacy)
  - Still issues with **stigma**; **numbers** of/**access** to providers/programs
  - Who is "at high risk?" Requires **screening**

    (Not perfect! No 'OMNI-screen! Child vs Family? Dysfunction vs Risk?)

Early Brain and Child Development
BUILDING BRAINS, FORGING FUTURES
A Program of the American Academy of Pediatrics

WHOM and WHAT are we screening for?

	MEASURES of dysfunction or behavioral maladaptation	
The Child	Behavioral measures (e.g., Baby Pediatric Symptom Checklist, ECSA)	

How Far UPSTREAM Do We Want To GO?

Decrease Toxic Stress / Promote Relational Health

- **Preventing TS / Promoting RH**
  - Proactive, universal preventions to make stress **positive**, or tolerable instead of toxic
  - Acknowledges that preventing all childhood adversity is **impossible** and even **undesirable**
  - **Models:** 5Rs (EL), 7Cs (Resilience), Optimism, VIP
  - **SE Buffers** allow the physiologic stress response to return to baseline
    - **SEL** skills for older children (**www.casel.org**)
    - **Parenting/Caregiving** skills for younger children

Social-Emotional Skills are Taught / Learned

THESE ARE THE RUDIMENTS OF RELATIONAL HEALTH

Illinois Learning Standards for Social/Emotional Learning(SEL) - Windows Internet Explorer provided by University Hospitals

http://www.isbe.state.il.us/ils/social_emotional/standards.htm

File Edit View Favorites Tools Help

Favorites | Illinois Learning Standards for Social/Emotional Learni... | Page | Safety | Tools

Illinois State Board of Education

Gery J. Chico, Chairman
Dr. Christopher Koch, State Superintendent

ISBE Home | Site Map | Funding Opps | IWAS | ECS | FRIS Inquiry | Programs

Search ISBE:

- Administrator Info
- Board
- Calendar
- Contact ISBE
- Division Descriptions
- Division Links
- Education Vacancies
- Employment at ISBE
- Forms
- Glossary
- ISBE Info
- Learning Standards
- Press Releases
- Programs
- School Info
- Send ISBE a file
- Student & Parent Info
- Teacher Info

Superintendent's Weekly

Illinois Learning Standards

Social/Emotional Learning (SEL)

The standards describe the content and skills for students in grades K - 12 for social and emotional learning. Each standard includes five benchmark levels that describe what students should know and be able to do in early elementary (grades K - 3), late elementary (grades 4 - 5), middle/junior high (grades 6-8), early high school (grades 9-10), and late high school (grades 11-12). These standards build on the Illinois Social/Emotional Development Standards of the Illinois Early Learning Standards.

These standards have been developed in accordance with Section 15(a) of Public Act 93-0495. This Act calls upon the Illinois State Board of Education to "develop and implement a plan to incorporate social and emotional development standards as part of the Illinois Learning Standards."

Introduction

Goals

- Goal 1 - Develop self-awareness and self-management skills to achieve school and life success. RTF PDF
- Goal 2 - Use social-awareness and interpersonal skills to establish and maintain positive relationships. RTF PDF

Navigation

- Social/Emotional Learning Goals & Standards
- Social/Emotional Learning Descriptors
- Social/Emotional Learning Resources
- Illinois Assessment Frameworks
- ILS Home

Critical Concept #3

SOCIAL-EMOTIONAL SKILLS…

(a.k.a – Affect Regulation, Non-Cognitive Skills, Mindfulness)

…Are **learned** (they can be **modeled**, **nurtured**, **taught**, **practiced**, and **reinforced**)

…Effectively **buffer** against **toxic stress**

(by helping to turn **off** the physiologic stress response)

…Increase **test scores**

(an average of **11 points** by meta-analysis!)

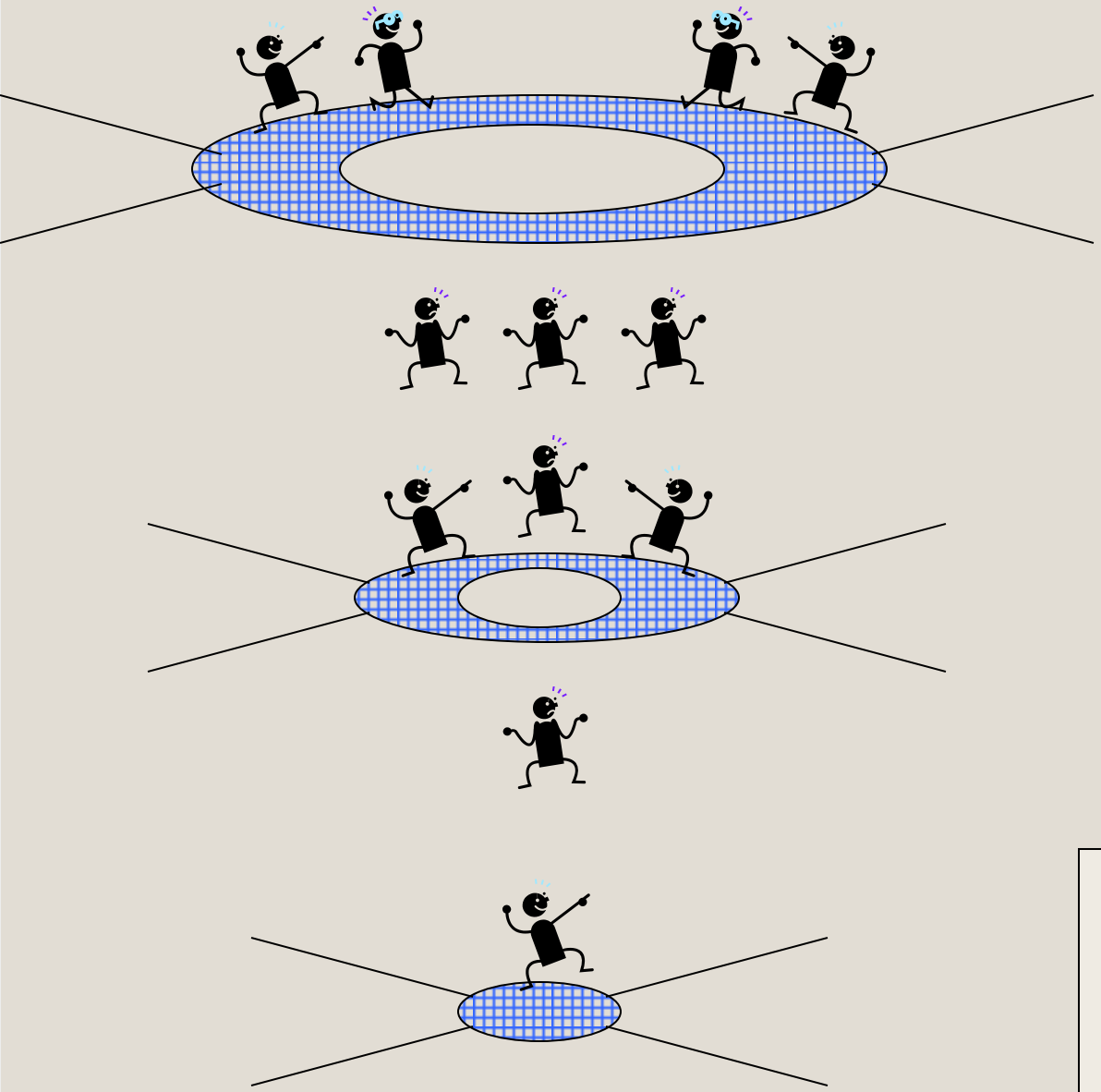
Parenting as Primary Prevention

- Promoting **PARENTING SKILLS** in the first 1000 days
  - Parenting is personal – makes pediatricians **NERVOUS!**
  - "Positive/Nurturing/Supportive" Parenting
  - A Poor investment?
    - Are parenting skills "**TEACHABLE**?" YES!!
    - Is there a "**CEILING EFFECT**" on returns? What is "OK?"
  - Or the "**GOLD STANDARD?**"
    - Shouldn't **SAFE, STABLE,** and **NURTURING RELATIONSHIPS** be THE reference point (NOT routine, general, or control populations)

- Significant Challenges:
  - Consensus re: what the basic, **BIOLOGICAL NEEDS** of children are
  - Utilize a **TWO GENERATION APPROACH** to meet those needs
  - Utilize a **PUBLIC HEALTH APPROACH** to match the **FAMILY'S NEEDS** with the indicated, local services

Social-Emotional Safety Nets

A Public Health Approach to "Toxic Stress"



ALL are necessary – NONE are sufficient!

Universal Primary Preventions

AG "Plus" (ROR / PFR / BF Grid)

Consistent messaging (CTC)

No identification

No stigma

Ceiling effects =

Limited evidence base

Targeted Interventions

(for those "at risk")

Home visiting (NFP/PAT)

Parenting programs (Legacy/PPP)

Early Intervention (Ideally!)

Less ceiling=More evidence

Requires screening

Issues with stigma

Evidence-Based Treatments

(for the symptomatic)

PCIT; TB-CBT; Pharmacotx

Treatment works!

Screening / stigma / access

A Broader Vision for Pediatrics?

NOT just about **children** ...

But about their **families** and **communities**

NOT just about **physical health** ...

But about **social-emotional** or **relational health**

NOT just about **child development** ...

But about **life course trajectories**

NOT just about **acute** or **chronic care** ...

But about proactively building **WELLNESS** ...

... NOT a new idea!!

Will it be "BACK TO THE FUTURE?"

"The study of psychopathology and the management of disturbed children is a legitimate and socially necessary function.

But pediatricians are concerned primarily with the **developmental process** and **prevention**, which I submit is a quite different frame of reference ..."

JULIUS RICHMOND, receiving the AAP's Aldrich Award, October 23, 1966

Will it be "BACK TO THE FUTURE?"

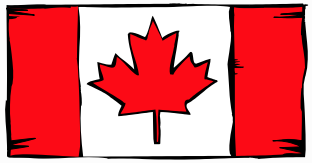
"I refer to the dynamic development of individual differences in behavior patterns,

the observation of child rearing practices and their consequences,

the emergence of curiosity, learning patterns, coping behavior, and personality, and

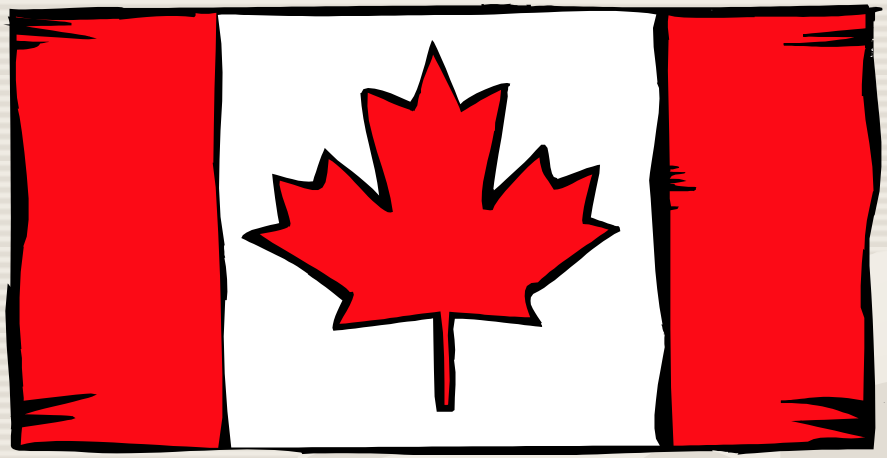
the capacities of children and families to master adversity."

JULIUS RICHMOND, **receiving the AAP's Aldrich Award,** October 23, 1966

	Chronic Care
Type of Prevention	Tertiary
Population	Indicated (those who are diagnosed)
Primary Objective	To reduce negative impact of known disease by restoring function and reducing disease-related complications
Essential Elements	• On-going disease education and management • Minimizing disease progression
Example Resources	Health Supervision for Tri-21, Asthma, DM
Possible Venues	• Medical Homes • Specialty Care Clinics 

	Wellness Care	Acute, "Sick" Care	Chronic Care
Type of Prevention	Primary	Secondary	Tertiary
Population	Universal	Selective or Targeted (those who are symptomatic)	Indicated (those who are diagnosed)
Primary Objective	To avoid the occurrence of disease	To diagnose and treat disease in the early stages - before it causes significant morbidity or mortality	To reduce negative impact of known disease by restoring function and reducing disease-related complications
Importance of Continuity (Therapeutic Partnership)			
Importance of Context (Social + Family Histories)			
Amenable to Algorithms			
Addressed in Training			
Incentivized Through Reimbursements			
Long Term Returns on the Initial Investment			

A Pivotal Point for Pediatrics:



"Back to the Future?" ... or "Oh, Canada!"

Pediatrics:

1) Reclaims "wellness care"
2) Embraces a broader vision
3) Collaborates and even coordinates local efforts to proactively build wellness

Pediatrics:

1) Is relegated to consult care
2) Surrenders "wellness care"
3) Remains "silo-ed" – with little connection to social and educational services

A Broader Mission for Pediatrics?

To support and empower
parents, caregivers and communities
as they nurture their children's development

<u>This mission will require</u>:

- A nested/layered/tiered/'public health' approach
- A "train the trainer" or 2GEN approach
  (it's all about relationships!)
- A grass-roots, community-based, team approach

CONCLUSION

To **remain relevant** and to **bring value** to an emerging "well-care" system, **pediatrics must:**

- **Bridge the gap** between what **we know** and what **we do** (translate the science) **INNOVATION**
- **Give parents what they want** (developmental reassurance and guidance) **2 GENERATION**
- **Focus on WELLNESS** – and that demands a public health approach and medical homes that are integrated into (if not actually **coordinating**) the broader efforts of their local communities **INTEGRATION**

CONCLUSION:

It is easier to **build strong children** than to **repair broken men**.

Frederick Douglass

TABLE DISCUSSIONS: I

- IN THE NEXT 10 MINUTES:
- INTRODUCTIONS around your table:
  - Name, Organization, Position
- Share 1 INITIAL THOUGHT from the talk:
  - Was there one item or comment that struck you?
  - Was there something that you did not know?
  - Did you begin to view something in a different manner?

TABLE DISCUSSIONS: II

- **IN THE NEXT 20 MINUTES:**
- **IDENTIFY A RECORDER/REPORTER:**
  - To keep track of all the good ideas being shared at your table
  - To briefly report out to the larger group at the end
- **DISCUSS THE FOLLOWING, IN ORDER:**
  1. What are the precipitants of childhood toxic stress / barriers to relational health in your particular community?
  2. What is your practice already doing to address these precipitants / barriers? What more could you probably do?
  3. Recognizing that the FCPMH cannot address these issues alone, who are the groups, stakeholders and individuals that need to be engaged to move forward on at least 1 issue? What might that issue be (e.g., cyberbullies, maternal depression, NAS)?

TABLE DISCUSSIONS: III

- IN THE NEXT 20 MINUTES:
- EACH TABLE GIVES A BRIEF REPORT
  - 2-3 MINUTES
- REPORTERS:
  - PLEASE SHARE NOVEL COMMENTS THAT HAVE NOT BEEN MADE BY THE OTHER TABLES
  - PLEASE TURN IN YOUR NOTES AT THE END

Developing a Shared "VISION"

Public Health Implications

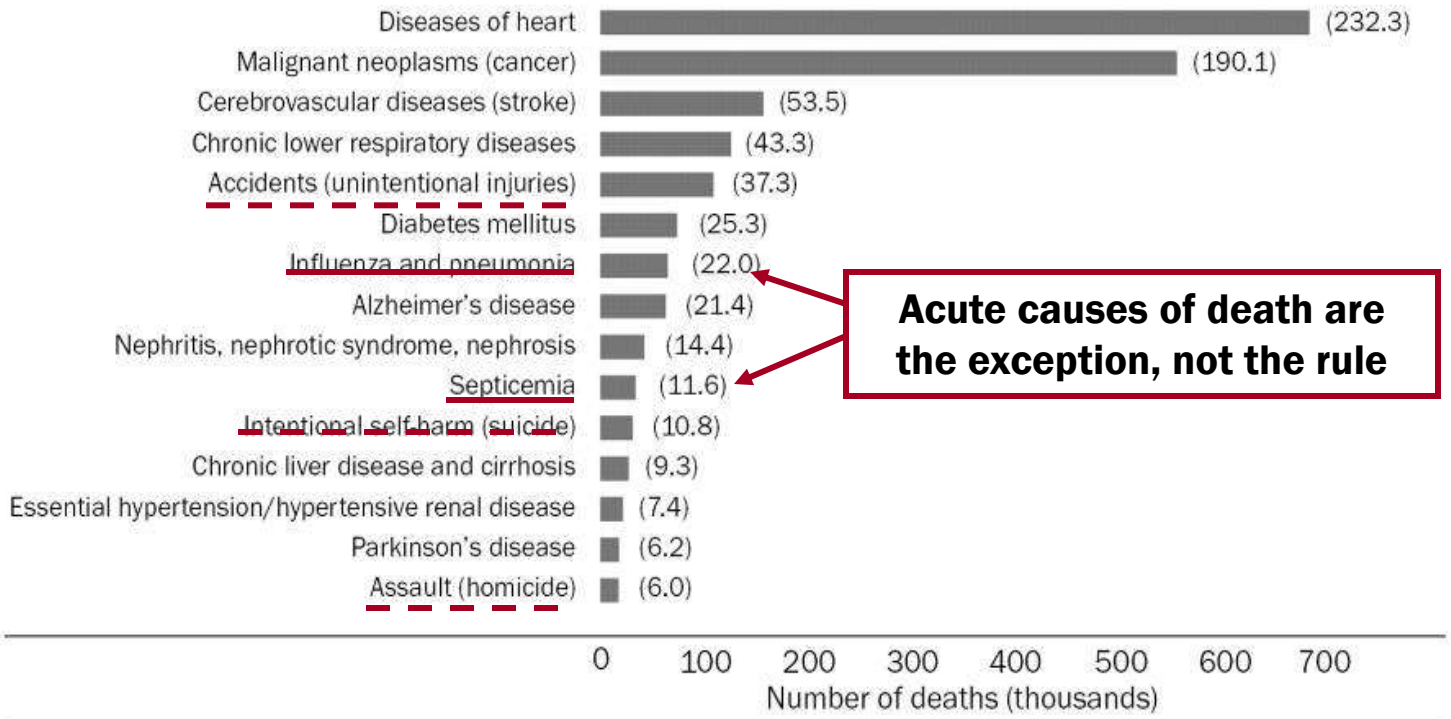
- What we **DO**:
  - 95% of the trillions of dollars that we spend on health is on **treatment** and **NOT prevention**
- What we **KNOW**:
  - That **70% of early deaths** are **preventable**, with…
  - The **majority (40% overall)** due to **behavioral patterns** that lead to **chronic disease**.
  - Is this **Behavioral Allostasis** due to toxic stress?

McGinnis, Williams-Russo and Knickman, 2002

Proximal Causes of Death: Chronic Disease

EXHIBIT 2

Total Deaths And Age-Adjusted Death Rates (Per 100,000 Population) For The Fifteen Leading Causes Of Death In The Total U.S. Population, 2003



SOURCE: D.L. Hoyert et al., "Deaths: Final Data for 2003," *National Vital Statistics Report* 54, no. 13 (2006): 1–120.
NOTE: Numbers in parentheses are age-adjusted death rates per 100,000 population.

Distal Causes of Death: Unhealthy Lifestyles

Table 2. Actual Causes of Death in the United States in 1990 and 2000

Actual Cause	No. (%) in 1990*	No. (%) in 2000
Tobacco	400 000 (19)	435 000 (18.1)
Poor diet and physical inactivity	300 000 (14)	400 000 (16.6)
Alcohol consumption	100 000 (5)	85 000 (3.5)
Microbial agents	90 000 (4)	75 000 (3.1)
Toxic agents	60 000 (3)	55 000 (2.3)
Motor vehicle	25 000 (1)	43 000 (1.8)
Firearms	35 000 (2)	29 000 (1.2)
Sexual behavior	30 000 (1)	20 000 (0.8)
Illicit drug use	20 000 (<1)	17 000 (0.7)
Total	**1 060 000** (50)	**1 159 000** (48.2)

*Data are from McGinnis and Foege.[1] The percentages are for all deaths.

If these unhealthy lifestyles are manifestations of behavioral allostasis, a **FUNDAMENTAL** cause of death is **TOXIC STRESS**!

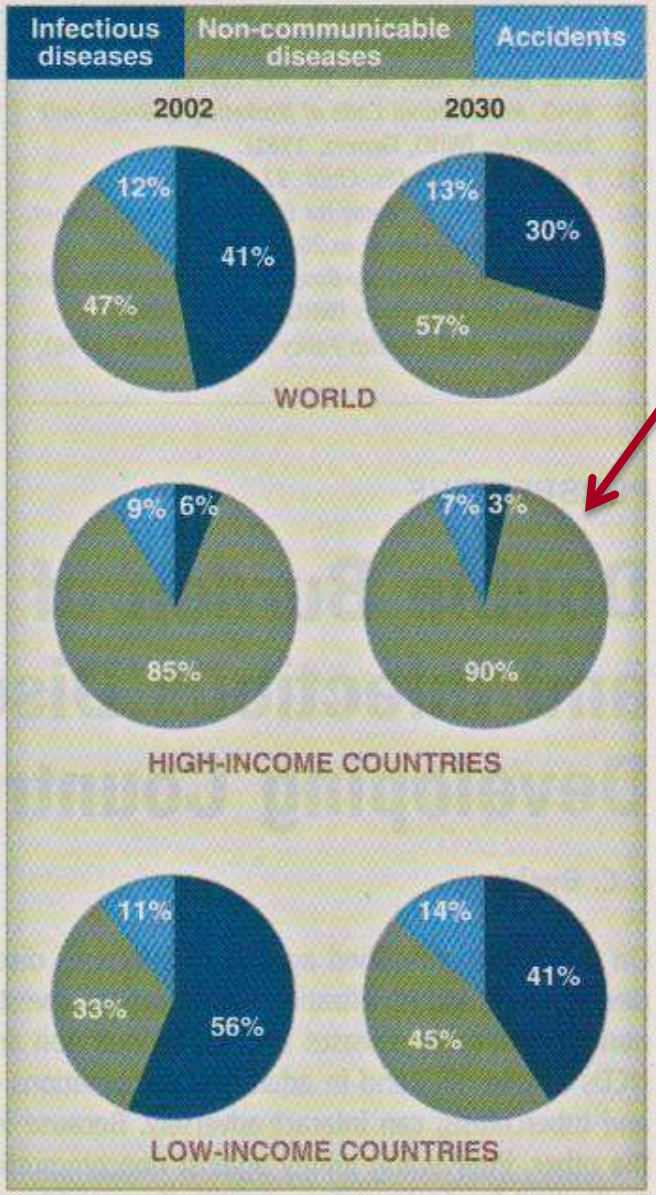


Fig. 1. The proportional distribution of disability-adjusted life years, contributable to infectious diseases and NCDs for (top) the world, (middle) high-income countries, and (bottom) low-income countries for 2002 and 2030 (*3*).

- By 2030, **90%** of the morbidity in high income countries will be due to **NCDs (Non-Communicable Diseases)**
- NCDs are due to **unhealthy behaviors** (overeating/inactivity, smoking, alcohol, and substance abuse)

PERSPECTIVE

Changing Human Behavior to Prevent Disease: The Importance of Targeting Automatic Processes

Theresa M. Marteau,[1]* Gareth J. Hollands,[1] Paul C. Fletcher[2]

Much of the global burden of disease is associated with behaviors—overeating, smoking, excessive alcohol consumption, and physical inactivity—that people recognize as health-harming and yet continue to engage in, even when undesired consequences emerge. To date, interventions aimed at changing such behaviors have largely encouraged people to reflect on their behaviors. These approaches are often ineffectual, which is in keeping with the observation that much human behavior is automatic, cued by environmental stimuli, resulting in actions that are largely unaccompanied by conscious reflection. We propose that interventions targeting these automatic bases of behaviors may be more effective. We discuss specific interventions and suggest ways to determine whether and how interventions that target automatic processes can enhance global efforts to prevent disease.

How/When do those automatic processes form in the first place!?

21 SEPTEMBER 2012 VOL 337 SCIENCE www.sciencemag.org

Critical Concept #4

Do we continue to treat **disease**,

the **unhealthy lifestyles** that lead to disease,

or the **TOXIC STRESS** that leads to the adoption of unhealthy lifestyles??

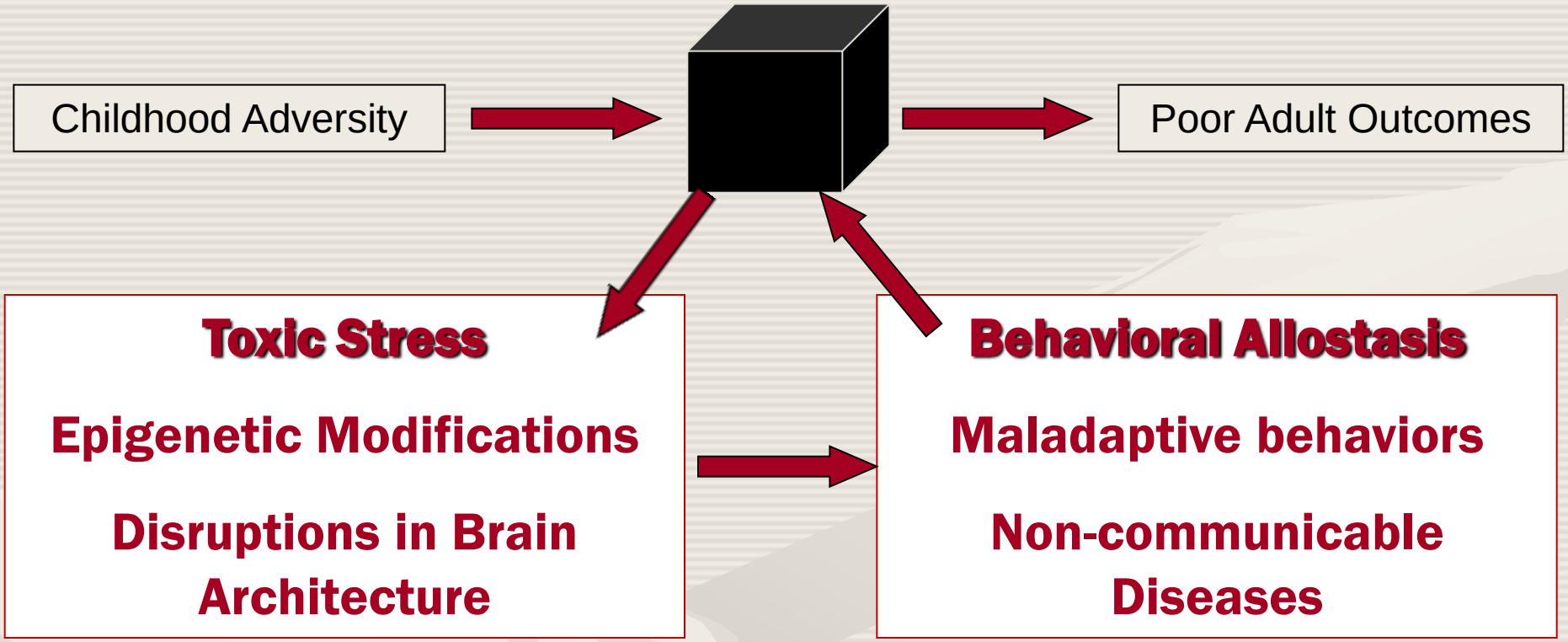
SUMMARY

- What is Toxic Stress?
  - **A physiologic stress response that is excessive or prolonged** (reflects an inability to "turn it off")
  - **Results in potentially permanent changes in:**
    - **Gene expression** (epigenetics)
    - **Brain development** (neuroscience)
    - **Behavior** (allostasis)

SUMMARY

- Why should we care?
  - **Toxic stress** is a **MEDIATOR** between early childhood **adversity** and less than optimal outcomes in **learning**, **behavior** and **health**
  - Understanding the **BIOLOGY** underlying these well established associations opens up new opportunities for **primary prevention** and **early intervention**

Linking Childhood Experiences and Adult Outcomes



Improve caregiver/community capacity to prevent or minimize toxic stress (e.g. – efforts to promote the safe, stable and nurturing relationships that turn off the physiologic stress response)

Improve caregiver/community capacity to promote healthy, adaptive coping skills (e.g. - efforts to encourage rudimentary but foundational SE, language, and cognitive skills)

SUMMARY

- What can we do about it?
  - **EDUCATION –** for providers, trainees, families, the general public and business/philanthropic communities (re: science, TS, and EBD frame)
  - **MESSAGING –** be a "convener" (ala CTC); develop a shared "vision" locally to support a public health approach towards toxic stress
  - **ADVOCACY –** partner with like-minded stakeholders to "incentivize" wellness/relational health, population health, and long-term outcomes
  - **RESEARCH – basic** (non-invasive biomarkers, personalized med), **clinical** (standardized screens – not just for the child, but the family; not just for dysfunction, but those at risk), and **translational** (medical homes, schools, communities are integrated vertically and horizontally)
  - **PRACTICE TRANSFORMATION –** promote wellness (over chronic/acute care), support families, develop QI/MOC Learning Collaboratives

POLICY MAKER INSIGHT:

YOU make the call!

	HEALTHCARE	SOCIAL SERVICES
OECD	$1	
U.S.A.	$1	

AN URGENT CALL FOR ADVOCACY!!

- Not all healthcare dollars are **the same**!
- This **distinction** is part of the problem!
- Who, at the local level, is able to begin **integrating** health and human services?
- New models of **payment** (population level wellness)
- New models of **collaboration** (Healthleads)

Since there are known, established ways to **treat**, **mitigate** and even **prevent** toxic stress,

WHY ARE WE NOT DOING THEM?!

- "They cost too much" or "TS is not my concern"

  When kids don't fulfill their potential, we ALL lose

- "Defensiveness" ("It's not MY fault" or "It's THEM!")

  Toxic stress is not restricted by race, wealth, zip code

- "Too complicated"

  The biology suggests that it is all about relationships

- "Too hard"

  1) understand the science, 2) advocate for a public health approach, 3) develop a shared language/vision