62nd Annual Greenville Postgraduate Seminar
Spotlight: Primary Care

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Thinking Developmentally: Nurturing wellness in childhood to promote lifelong health

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PRISMA HEALTH
Disclosures

• No conflicts of interest to disclose
Questions

• Does what happens in early childhood affect health in adulthood? T/F
• Are adult-onset diseases “determined” by issues in childhood? T/F
• What’s more important for health of our citizens and our society – SSRIs or SSNRs?
Objectives

1. Understand how “thinking developmentally” is critical for health intervention, maintenance and prevention
2. Integrate the ecobiodevelopmental model for childhood development
3. Understand the importance of safe, stable nurturing relationships (SSNRs) and how to identify, encourage and nurture them
4. Understand intra-office and extra-office approaches to TD
5. Review the multi-generational approach to intervention
6. Understand the distinction between adult-onset and adult-manifest
Acknowledgment

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Critical Concept

Life-Course Science tell us that...

Experiences in childhood (both affiliative and adverse) are strongly associated with behaviors, health and economic productivity ...

... DECADES LATER!
Safe, Stable and Nurturing Relationships

Social-Emotional Learning

Healthy Adaptations

Childhood Experience

ACEs

Poverty

Violence

Parent Engagement

Quality Childcare

Play

Healthy Lifestyles

Academic Success

Economic Stability

Adult Outcomes

Poor Health

Academic Failure

Economic Hardship

Toxic Stress

Epigenetic Modifications

Disruptions in Brain Architecture

Behavioral Allostasis

STOP
Early exposures affect—

• Brain architecture
• Brain wiring
• Gene expression (epigenetic changes)
Brain development

- Experience dependent
- Cumulative
- Integrated
- Dynamic
- Asynchronous
Turned on

Modulating factors—
histone deacetylation, histone methylation, CpG methylation, RNA interference

Turned off

Epigenetics

• Change in genes without changing the genetic code
• Now shown to be related to
  – Stress
  – Abuse
  – Nurturing
  – Maternal depression
  – Prenatal exposures
  – Nutritional changes prenatally
• Alters gene expression
• Can be passed from generation to generation
Epigenetics

These Two Mice are Genetically Identical and the Same Age

While pregnant, both of their mothers were fed Bisphenol A (BPA) but DIFFERENT DIETS:

- The mother of this mouse received a normal mouse diet
- The mother of this mouse received a diet supplemented with choline, folic acid, betaine and vitamin B12
Epigenetic Influences

- Epigenetic changes can occur in utero
- Changes affect postnatal development of the infant/child and occur in germ cells (sperm or ovum)
- Changes can be secondary to environmental influence and passed on to subsequent generations
- Trans-generational effects may emerge in 1-2 generations
- Monozygous twins demonstrate some divergence in methylation rates of certain genes (in about 1/3 of MZ twins)
Epigenetics: Human disease

• Early life stress (loss of parent, maltreatment, low parental care) can lead to methylation changes in glucocorticoid receptor (GR) (Tyrka et al. 2012)

• Similar findings for maternal depression in the third trimester (Oberlander et al. 2008)
Epigenetics: Human disease

• Postmortem analysis in child abuse cases show abnormal methylation and decreased GR mRNA (McGowan et al. 2019)

• Critical Importance
  – Shows that constant stress affects CNS cortisol regulation and disrupts the ability to modulate stress reactivity
Epigenetics: Human disease

• Maternal stroking at 5 and 9 weeks after birth can reverse some negative effects (methylation) of maternal depression – direct evidence of parental nurturing and affiliative (vs. adverse) experiences (Murgatroyd et al. 2015)

• Critical Importance
  – CNS cortisol regulation can be modulated and potentially disrupt the negative effect of environmental influences
Implication and primary care applicability

- Adult-onset diseases are adult-manifest diseases from childhood exposures and events
- Through epigenetic mechanisms, early childhood ecology is biologically embedded and potentially leads to changes in the way the genetic blueprint is expressed
Implication and primary care applicability

- Dynamic changes over time—positive and negative
- Not a fixed state but not easily malleable either
- Multiple exposure points
- Potential lifetime effects
- Potential multi-generational effects
- Trauma-informed care can potentially ameliorate some effects and their transgenerational passage
- Never too late to make a difference!
Ecobiodevelopmental model

• Driven by science
  – Developmental neuroscience
  – Epigenetics

• Understanding of
  – Ecology (physical, nutritional, and psychosocial milieu)
  – Biology (genome, brain)
  – Health as a dynamic continuum between disease and wellness
  – Early experiences play a pivotal role
ACE study—Felitti et al, 1998

• Over 17,000 middle class adults
• Retrospective reporting of adverse childhood events (10 in three categories of abuse, household dysfunction, and/or neglect)
• Higher ACE score – greater frequency in adulthood of common adult-onset diseases (hypertension, obesity, cancer, heart disease), decreased school performance and increased risk taking behaviors
• Increase in the BIG 5 – smoking, obesity, promiscuity, obesity and substance abuse
Why? Behavioral allostasis

• Compensatory behavioral changes for physiologic changes—to minimize physiologic stress response [like changes that occur with fever]
• Seems self-destructive but serves to dampen internal conflict
• Internal neurophysiologic changes and epigenetic changes have affected the ability to respond in a paradoxically ineffective way (in our estimation)
• Yet not irreversible!
Experiences

• Affiliative – positive, buffered
• Adverse – negative, unbuffered
A Spectrum of Adversity

Discrete, Threatening Events

Abuse  Bullying  Spanking  Homeless  Parental SA  Parental MI  Racism  Poverty  Neglect

On-going, Chronic Conditions

Individuals with the 
Highest Risk for a 
Toxic Stress Response

Physiologic Stress Response

Largest Number of 
Individuals at Risk for a 
Toxic Stress Response

They all make it more difficult to form SAFE, STABLE and NURTURING RELATIONSHIPS

SOCIAL ISOLATION IS BAD FOR THE HUMAN CONDITION
Stress

• Positive – brief, mild, infrequent and BUFFERED
  – Shots, falls
• Tolerable – sustained, moderate/severe and BUFFERED
  – Divorce, death
• Toxic – sustained, severe and UNBUFFERED
• BUFFER—SAFE, STABLE NURTURING RELATIONSHIPS (SSNRs)
Impact of Early Stress

MATERNAL STRESS

NEWBORN HPA reactivity and salivary cortisol levels

methylation of the FETAL glucocorticoid (GC) receptor gene

brain expression of the GC receptor
Impact of Early Stress

- Childhood Stress
- Hyper-responsive stress response; ↓ calm/coping
- Chronic “fight or flight;” ↑ cortisol / norepinephrine
- Changes in Brain Architecture
Critical Concept

SSNRs are the antidote for toxic stress responses
Critical Concept

Promoting SSNRs will require a 2-GEN APPROACH from providers
Parent in Survival Mode

STEP 1: Provide Social Supports, Meet Parental Deficiency Needs

Parent in Relational Mode

STEP 2: Develop Safe, Stable and Nurturing Relationship with Child

Healthy Child Attachment to Parent

Child in Relational Mode

STEP 3: Promote Developmentally Appropriate Play

Foundational Social, Emotional & Language Skills

Scaffolding of New Skills
Critical Concept

Promoting SSNRs will require POLICY CHANGES that reflect cultural / societal shifts.
SUMMARY: It’s all about Relationships!

Partner with Families and Communities to...

- Promote SSNRs
- Address Barriers to SSNRs
- Repair Strained Relationships

Then use those Relationships to...

- Buffer Adversity (turn Toxic Stress into Tolerable Stress)
- Build Resilience (nurture adaptive coping skills for future adversity)
Racism—AAP Policy Statement July 2019

• “A system of structuring opportunity and assigning value based on the social interpretation of how one looks that unfairly disadvantages some individuals and communities, and saps the strength of the whole society through the waste of resources”
• A social determinant of health
• Affects children, adolescents, adults and their families
• No biologic basis for race
Racism—AAP Policy Statement July 2019

• To be addressed through
  – Implicit bias
  – Explicit bias
  – Institutional structures
  – Interpersonal relationships
Racism—AAP Policy Statement July 2019

• How can physicians address and ameliorate the effects?
  – Optimize clinical practice
    • Culturally safe medical home
    • Assess for signs of stress
    • Cultural diversity
  – Optimize workforce development and professional education
  – Optimize systems through community engagement, advocacy, and public policy
  – Optimize research
Vignette

• 18 month old with fever and diagnosis of otitis media
Vignette

• 2 yr old female for well child visit
  – Identify strengths
  – Areas of improvement
  – Establish trust
    • Tough in the EHR era
    • Tough in the “box-checking” era
Vignette

• Advocacy—Have to advocate!
  – Clinic
  – Institution (not adequate investment in these issues)
  – Community
  – Professional association
Take home messages

• Adult-onset diseases are adult-manifest from childhood experiences
Take home messages

• When assessing, do not ask “what is wrong with you” but rather “what happened to you”
Take home messages

• Nurturing children and families
  – Through health care
  – Through policies
  – Through education
  – By community involvement
Take home messages

• SSNRs are crucial
  – Assess for
  – Encourage
  – Establish trust
  – Nurture them
  – Monitor for
  – Always dynamic and evolving
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