Developmental Approach to Childhood Obesity: Impact of Toxic Stress

Alan Mease, MD FAAP

Medical Director
Child/Adolescent Health

Learning Objectives

1

Apply the life course health development framework to better understand childhood obesity

2

Identify epigenetic-mediated relationships between exposure to toxic during sensitive periods of development (gestation through 3 years) and subsequent obesity-related outcomes

3

Examine the translation of epigenetic science to guide early childhood obesity prevention and interventions to reverse obesity risk

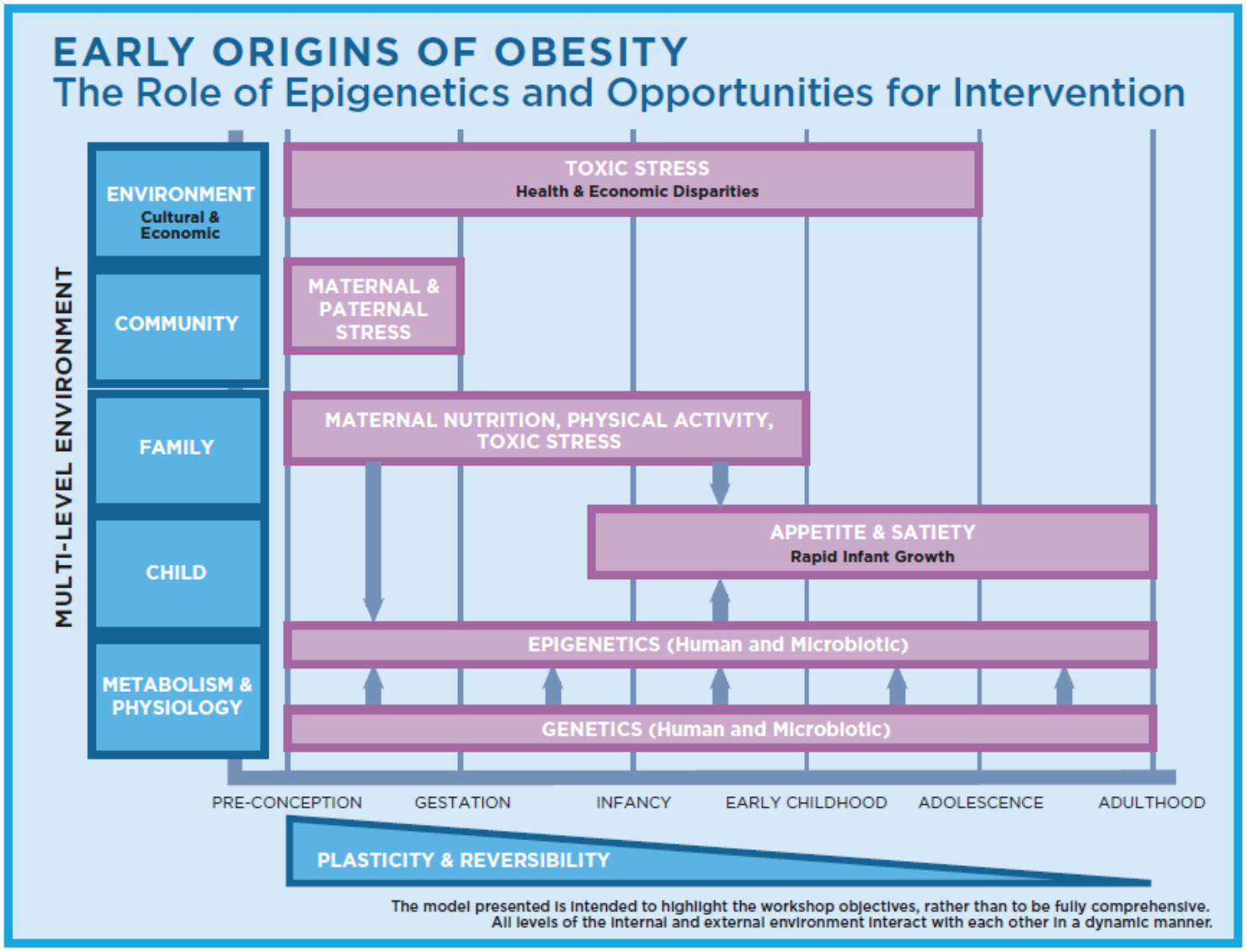
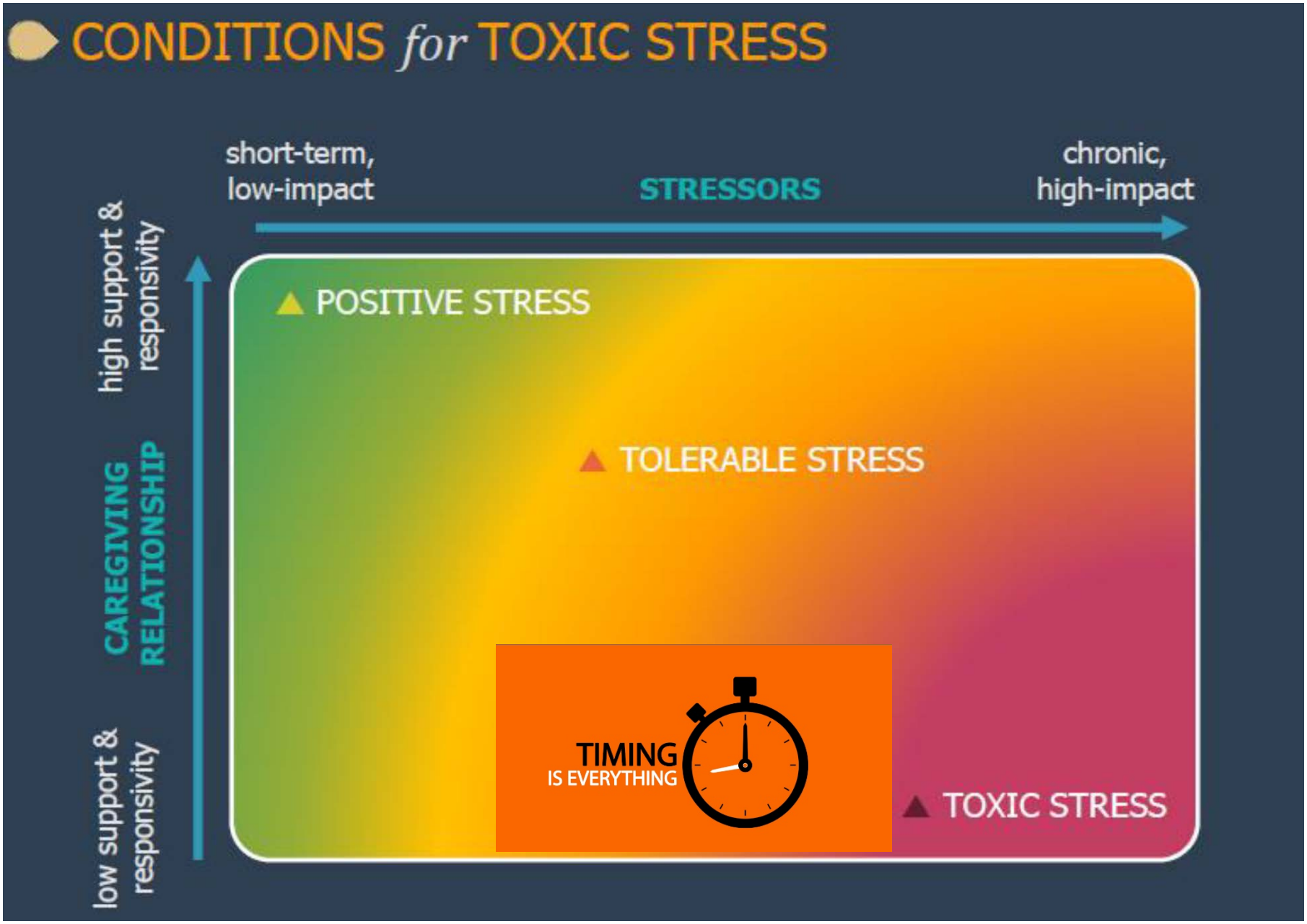


FIGURE 1-1 Early origins of obesity: Multiple external and internal factors interact to cause childhood obesity.
SOURCE: Distributed by the workshop planning committee on February 26–27, 2015.


CONDITIONS for TOXIC STRESS
short-term, low-impact
STRESSORS
chronic, high-impact
high support & responsivity
CAREGIVING RELATIONSHIP
low support & responsivity
POSITIVE STRESS
TOLERABLE STRESS
TIMING
IS EVERYTHING
TOXIC STRESS

Toxic Stress Damages the Stress Response System

Toxic Stress Changes Epigenome (regulation of DNA expression)

Toxic Stress Shortens Telomeres

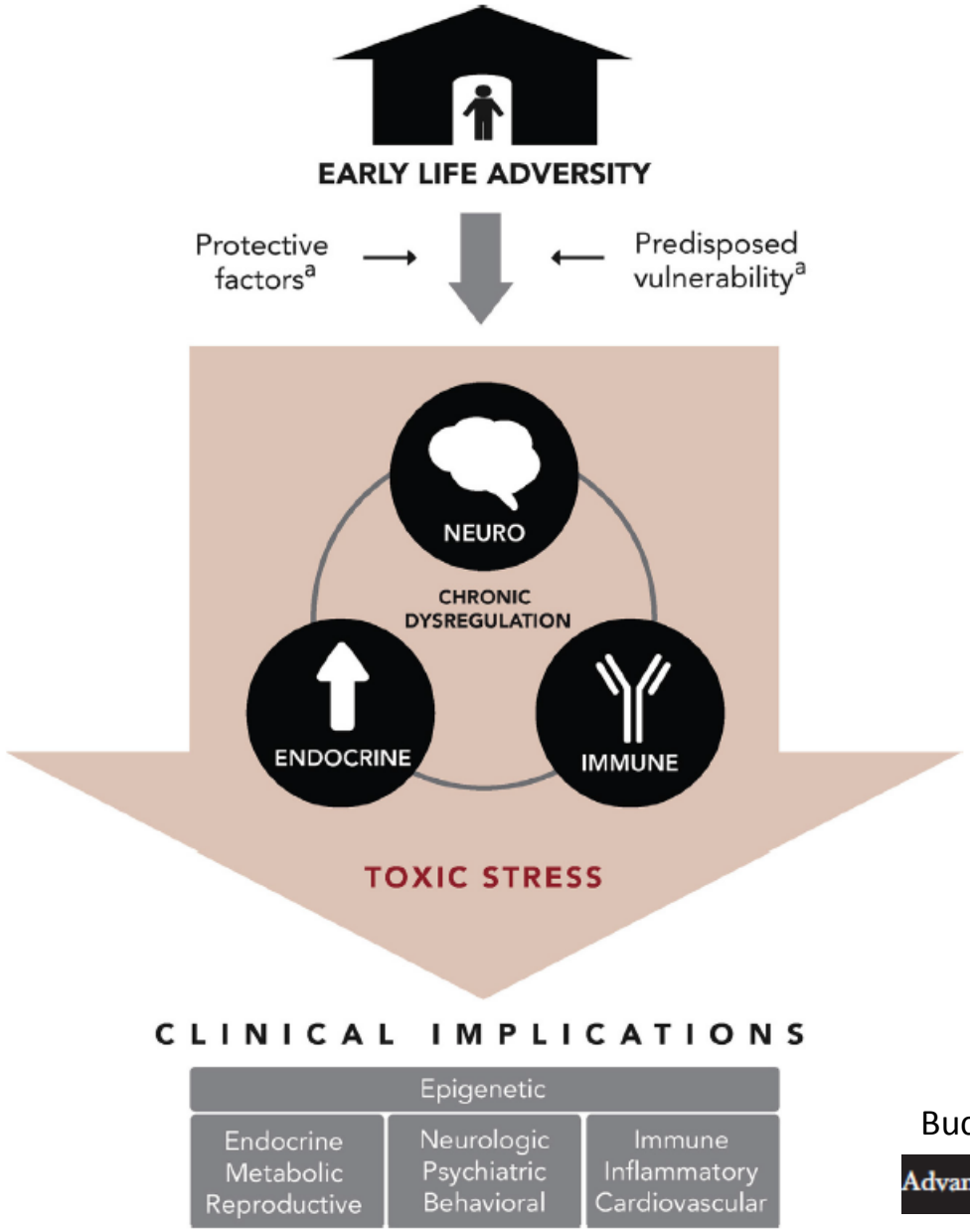


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Fig. 4. Overview of toxic stress. [a]Social, biological, genetic factors.

Sources of Toxic Stress in Early Childhood

Adverse Childhood Experiences (ACEs)

Socioeconomic-Related Factors

- Poverty itself: High level of adversity & stress with limited opportunities to buffer effects
  - Built-environment disadvantages
- Food Insecurity: unhealthy in-home & community food environments, poor diet quality, obesogenic feeding practices
  - Associated household chaos
  - Lack of meal time planning
  - Maternal stress

Parenting & Primary Caregiver Relationships

- Loving & stable relationships with primary caregiver buffer effects of early life stress
- Unpredictable relationships alter both behavioral & biological pathways
- Parental stress
- Parental mental health

Alterations in Behavioral Pathways

In early infancy both how and what the child eats shapes obesity risk

Chronic stress associated with decreased physical activity and increased sedentary activity

Chaotic homes, screen time and lack of bedtime routine lead to disruption of sleep with shorter sleep duration leading to dysfunction of hormones controlling appetite and obesity promoting behaviors

Maternal Care: Feeding

Sensory Stimuli (neurologic)	Touch
	Serve and return
Transfer of nutrition (neurologic)	
Transfer of hormones (endocrinologic)	
Transfer of antibodies (immunonlogic)	

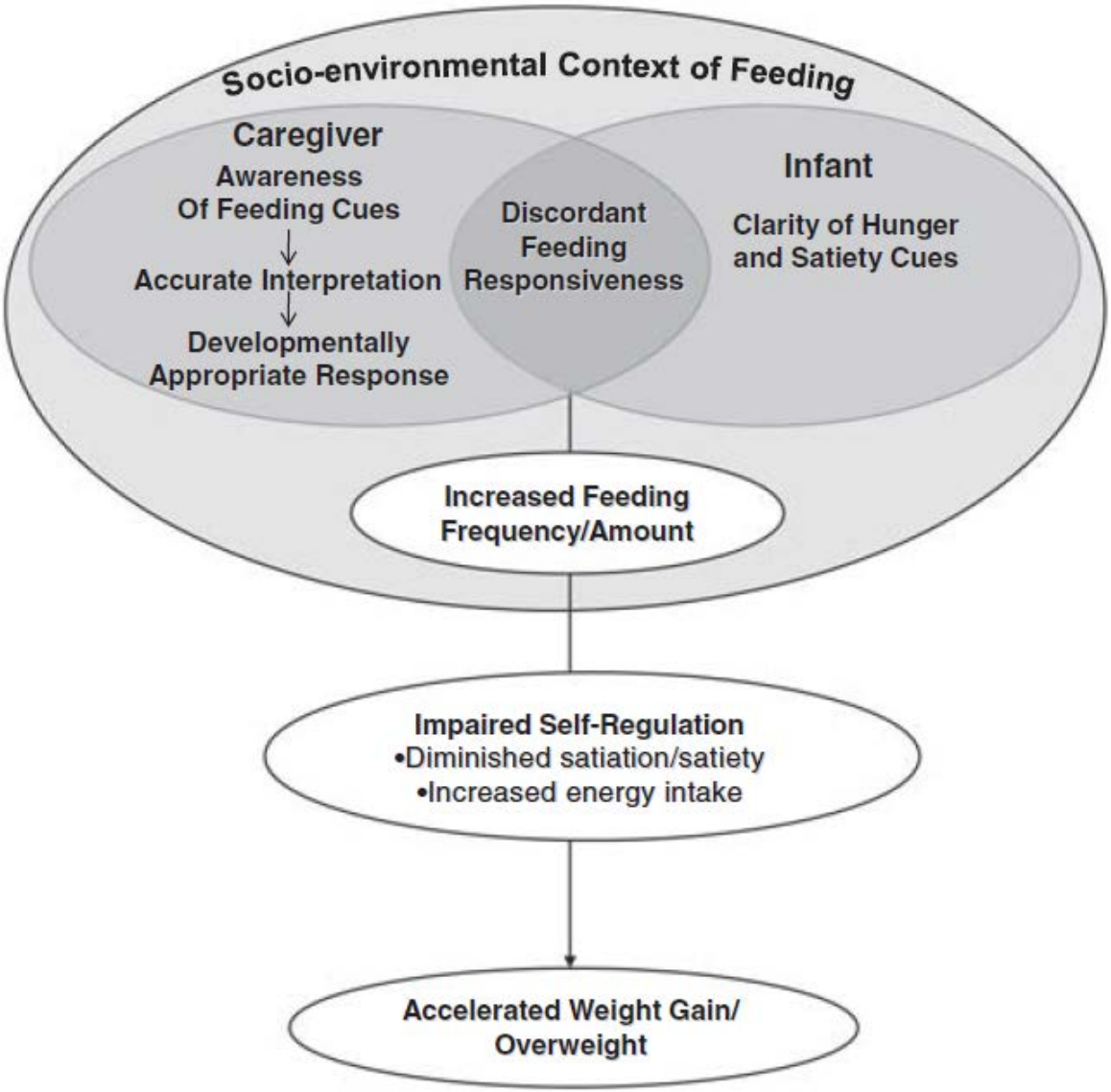
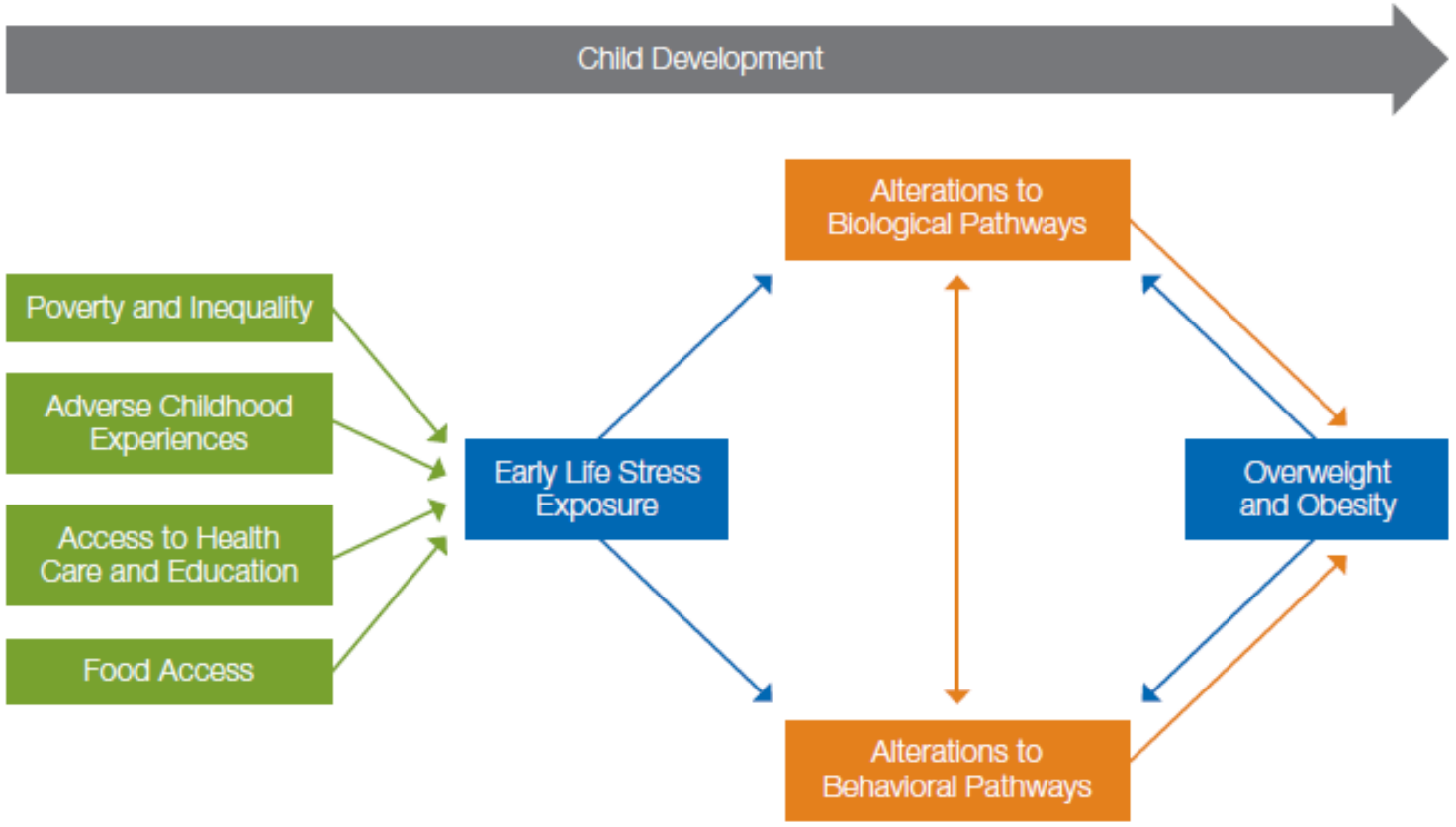

Socio-environmental Context of Feeding
Caregiver
Awareness
Of Feeding Cues
Accurate Interpretation
Developmentally
Appropriate Response
Discordant
Feeding
Responsiveness
Infant
Clarity of Hunger
and Satiety Cues
Increased Feeding
Frequency/Amount
Impaired Self-Regulation
•Diminished satiation/satiety
•Increased energy intake
Accelerated Weight Gain/
Overweight

Figure 1: Conceptual Model of Pathways Between Early Life Stress and Child Obesity Risk



We can mitigate the obesogenic effect of early life adversity with early identification and intervention!

A Dysregulated Stress-response System Causes:

Neurologic Disruptions

Endocrine Disruptions

Immune Disruptions

Toolkit of Clinical Interventions to Combat Toxic Stress and Decrease Obesity:
How to Balance dysregulated pathways

- Sleep
- Mental health: Integrated mental-health services (child parent psychotherapy); having mental health services in the pediatric office
- Healthy relationships
- Exercise
- Nutrition
- Focused Awarenss (actives the parasympathetic nervous system): Mind Body Awareness
  - https://www.mbaproject.org/resources/multimedia/

Conclusions

Diet is useful as foods that are high in omega-3 fatty acids, antioxidants, fiber from fruits, vegetables and whole grains help fight inflammation bringing the immune system into balance

Eating right improves brain function; breast feeding for at least the first 6 months

Moderate exercise helps regulate the stress response and is part of the solution to the obesity problem

Conclusions

- Sources of toxic stress during vulnerable periods early in life (conception to 3 years) must be identified and decreased if possible
- A secure relationship with primary care giver is essential and should be promoted as the most critical protective factor therefore we must support parents

Conclusions

- Recognize maternal toxic stress and high ACEs score as a risk factors
- Sleeping, feeding and crying issues in the infant are red flags
- Treat issues such as maternal depression, maternal toxic stress and sleep disturbances using child parent psychotherapy (CPP)

alan.mease@arkansas.gov