Using Developmental Science to Promote Child Health

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Momentum Center
Driving discovery to end childhood obesity

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HUMAN GROWTH & DEVELOPMENT
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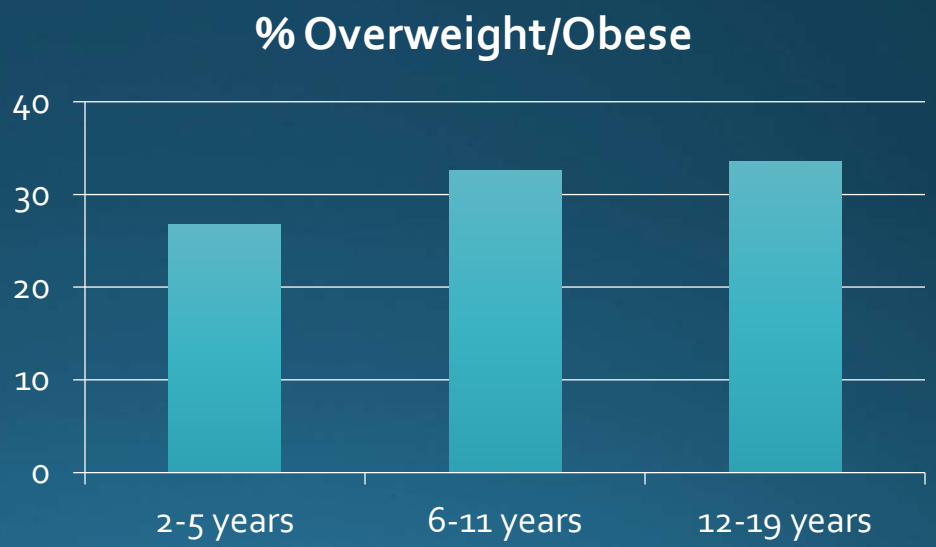
Today's Talk

- Child health in social context
- Why a developmental perspective is important
- Childhood Obesity research and implications for intervention
- Child environmental health and community partnerships in Grand Rapids / Kent County
- Future Directions

Health and Well-Being of US Children

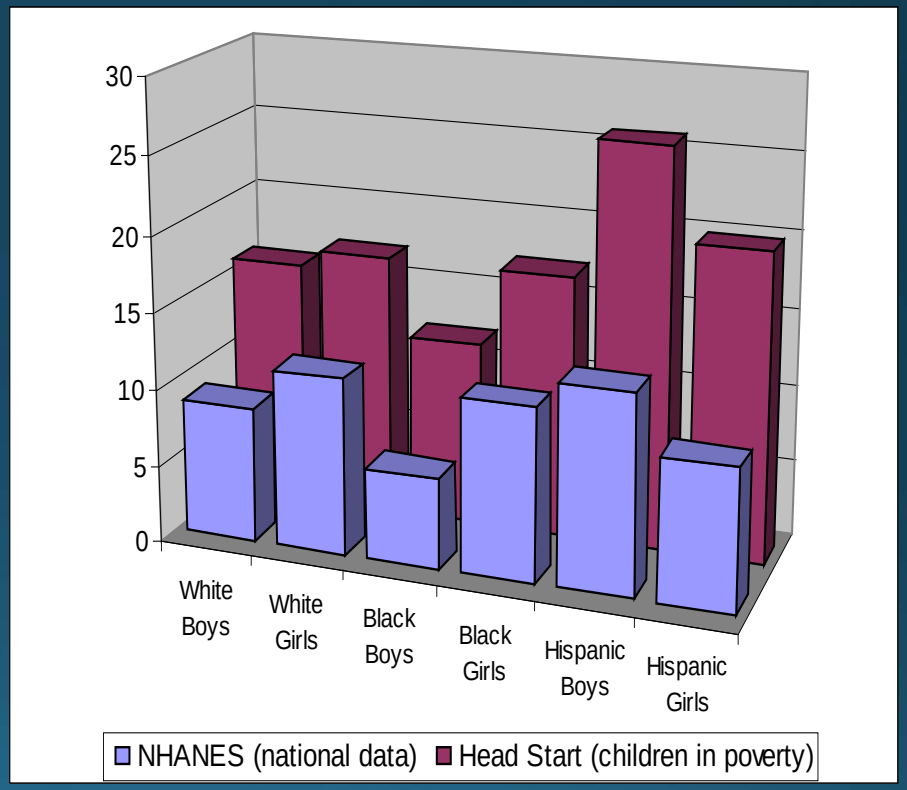
- **1 in 14** children/adolescents w/chronic health conditions
- **1 in 6** children/adolescents w/behavioral, mental health difficulties
- 1 in 3 children ages 5-19 overweight (2009-2010); 1 in 4 preschoolers
- Child health shapes adult health; prevention is essential



http://www.niddk.nih.gov/health-information/health-statistics/Pages/overweight-obesity-statistics.aspx

Early-Emerging Income Disparities in Obesity

- 40% of low-income children overweight by 3 years of age
  - Tracks strongly over time
- Chronic poverty: a 'toxic stress' pathway to obesity
- **In Michigan:**
  - over 1 in 5 children ages 0-17 live in poverty
  - almost 1 in 3 of children ages 0-5 eligible for food assistance



M Feese et al. Prevalence of Obesity in Children in Alabama and Texas Participating in Social Programs. *JAMA 289*. 1780 – 1781; 2003.

Kids Count Michigan 2014 data

How can a Developmental Perspective Inform Childhood Obesity Prevention?

- By determining how child health is influenced by social-environmental contexts *of children* *and their parents*
- By guiding when, where, and how to intervene:
  - **Early intervention -> later benefits**
- By discovering **new pathways to risk** that can inform intervention

Head Start and Childhood Obesity Study

- Whole-Child Approach:
  - Promotes parent involvement; provides nutritious meals & physical activity; builds social-emotional and school readiness skills
- Partnered with 13 Head Start agencies in Michigan to examine BMI over time (over 40,000 children ages 3-5 years)
- Compared 3 groups:
  - Head Start
  - UM Health System Medicaid
  - UM Health System not Medicaid

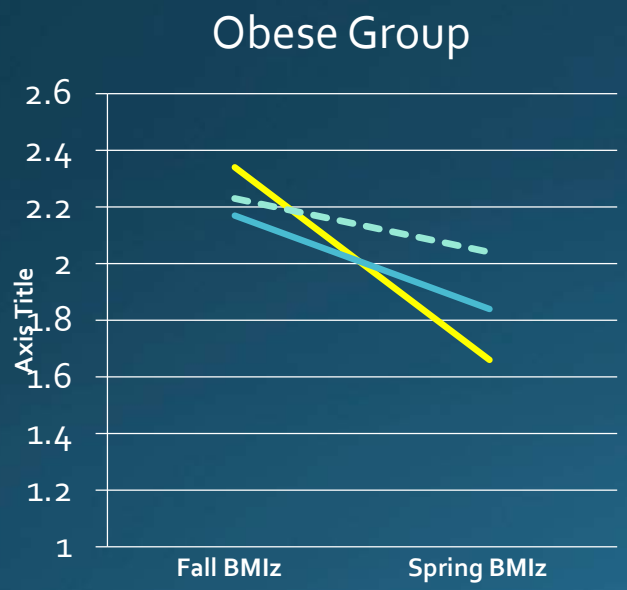
Head Start for Kent County
Connecting Families and Community Resources

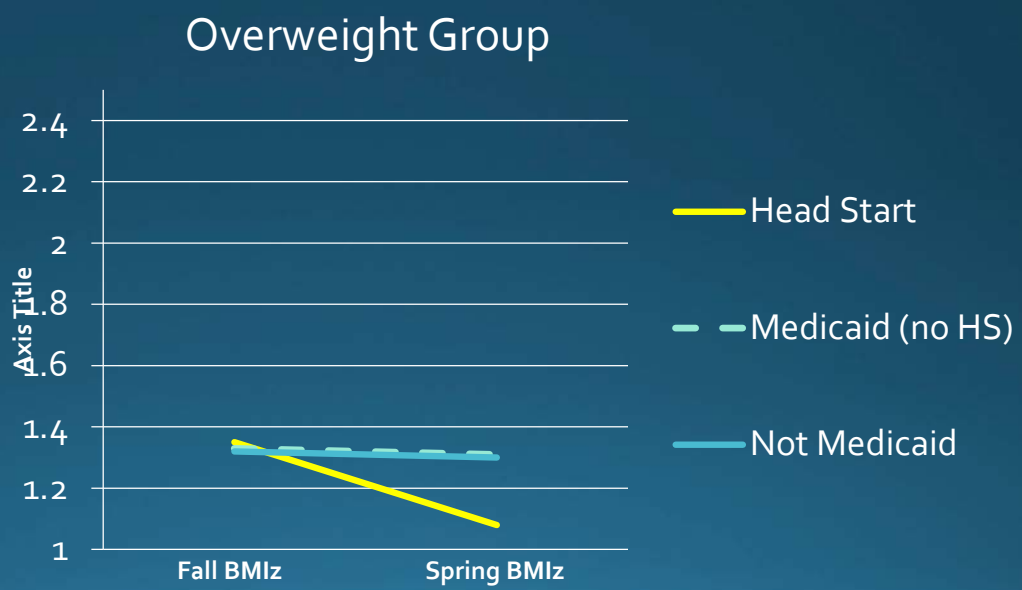
NHSA
NATIONAL HEAD START ASSOCIATION

NICHD/NIDDK R21 DK095695

Results

Obese and Overweight children attending Head Start had healthier weight trajectories than children in other groups





Lumeng et al. (2015) Changes in Body Mass Index Associated with Head Start Participation, *Pediatrics 135*, e449-56.

Child and Family Stress, Health And Development Lab

Identifying Pathways to Inform Early Childhood Intervention

"Toxic Stressors" Associated with Poverty:

Child trauma
Parent stress, trauma
Low social support

Chaotic home life
Housing instability
Limited resources

Unhealthy food environment
Unsafe neighborhoods
Environmental exposures

BIOBEHAVIORAL STRESS

Biological Stress Disrupts Metabolism

Stress Alters Behavior (sleep; stress-eating)

Obesity

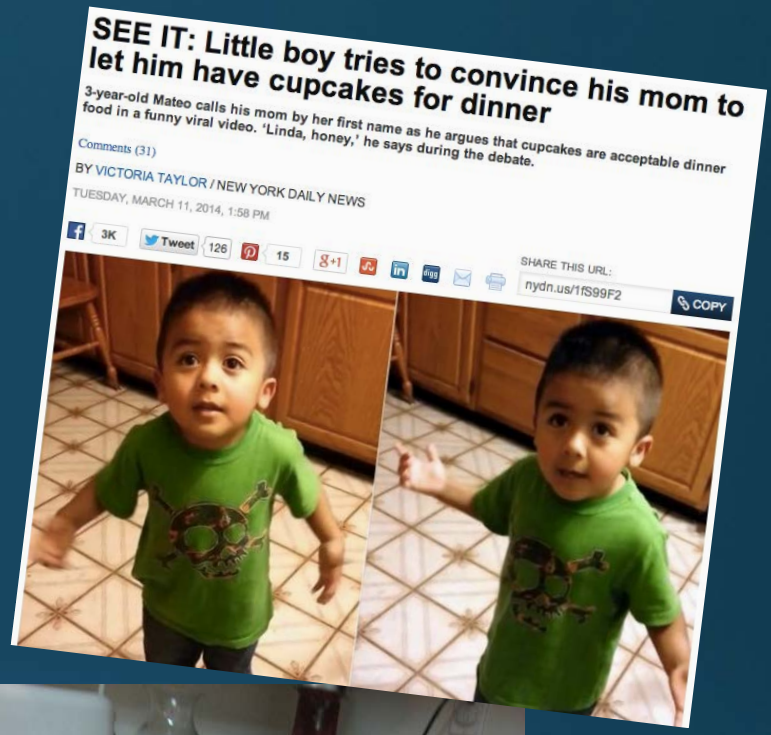
Miller et al., (2013). Blunted cortisol response to stress is associated with higher body mass index in low-income preschool-aged children. *Psychoneuroendocrinology*, 38, 2611-2617.

Miller et al., (2015). Sleep patterns and obesity in childhood. *Current Opinion in Endocrinology and Diabetes.* 22, 41–47.

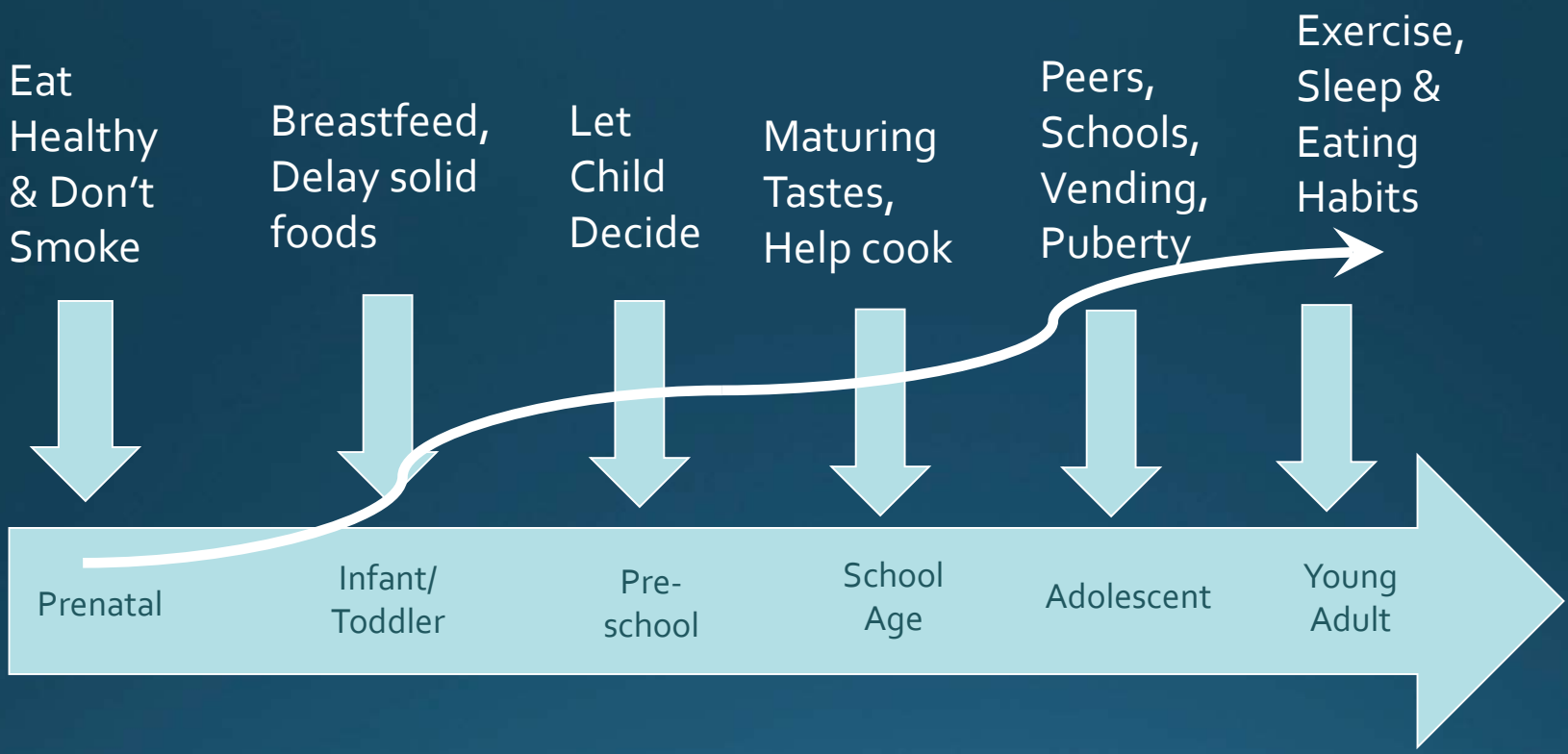
Asta, Miller et al. (2016) Eating in the absence of hunger as a predictor of weight gain in low-income toddlers. *Pediatrics,* 137, e20153786

Eating Behavior: Early Risk Factor?

- Comfort foods are neurobiologically calming, and accessible to children
- Stress-eating -> weight gain in adults
- We find that…
  - *Prior to age 3*, eating behavior style is associated with higher weight
  - Early-life stress associates with "obesogenic" eating styles
  - Parents are asking for help to manage mealtime challenges, food demands
- Tailor intervention to children at risk?



Development Guides Obesity Prevention



- However, current approaches don't work for everyone
- Individual factors (e.g., eating behavior) may increase risk
- Stress, poverty can interfere

Broader Environmental Context and Community Outreach

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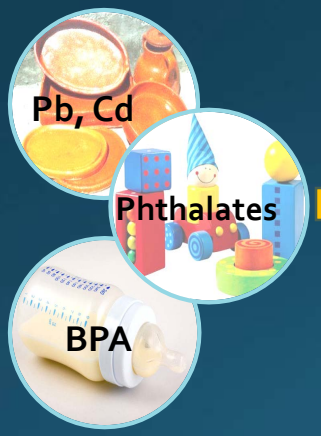
UM-CEHC: Lifecourse Exposures and Diet (K. Peterson, Director; A. Miller, Outreach)

Exposure to BPA, Phalates, Metals (prenatal, pubertal)

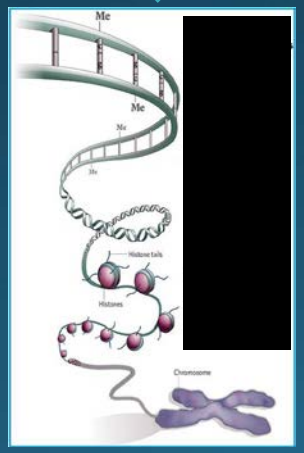
Biological Changes (studied in animals and humans)

How do exposures + diet shape growth, development over time?

Do prenatal, pubertal exposures + diet predict adult health?



Environmental Exposure



Epigenetic Changes

Weight Status Maturation

Chronic Health Conditions

NIH/EPA P20 ES018171/RD 834800 , P30 ES017885; P01 ES02284401/RD 83543601, P30 DK089503

UM-CEHC COMMUNITY OUTREACH

@UMCEHC

The Community Outreach and Translation Core (COTC) is an important part of the Children's Environmental Health Center (CEHC). Designed to offer input into the Center's activities and to benefit from cutting-edge research findings, the COTC provides the UM- CEHC a vehicle for sharing children's environmental health research to a range of audiences including parents, families, communities, public health professionals, and advocacy groups.

+ Outreach Initiatives

+ Links to Community Partners

+ Products

UM-CEHC-Grand Rapids Collaborative

"Healthy Environments, Healthy Children"

- Asthma Mapping Project
- Geography of child asthma in GR / Kent Co.
- Head Start children

NIH/EPA P20 ES018171/RD 834800 , P30 ES017885; P01 ES02284401/RD 83543601, P30 DK089503

Asthma Mapping Findings

HEAD START ASTHMA RATES

MAP DATA FINDINGS:

REGARDLESS OF RACE/ETHNICITY, ASTHMA CASES ARE CONCENTRATED AROUND HOUSING COMPLEXES.

Future Directions and Implications

- New Approaches to Obesity Prevention, Child Health Promotion
  - What drives different children to eat differently?
  - How can diet reduce effects of environmental exposures?
  - Intervene w/ parents to reduce their own stress, establish routines?
  - Future GR / Head Start collaborations?

- Early exposure to high-stress environments can increase child health risks, challenge parents, and promote health disparities
  - Research can help us identify where to focus limited intervention dollars
  - Community partnerships can help us implement cross-sector solutions

Thank You!

UM COLLEAGUES and COMMUNITY COLLABORATORS

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NIH/EPA P20 ES018171/RD 834800 , P30 ES017885; P01 ES02284401/RD 83543601, P30 DK089503