

Life Course Perspective:

Evidence for the Role of Nutrition

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(“Ideas and Slides Freely Adapted
From My Colleagues”, Dena Herman, et al.)



Overview

- Why focus on nutrition?
- The T2E2 Model (Fine and Kotelchuck)
- What can the life course perspective offer to address childhood nutrition and long term health risks differently?

What we know

- Good nutrition is essential for health
- Pathway to health begins early in life
- Diets that provide optimal energy and beneficial nutrients have positive health effects.
- Health and developmental outcomes are compromised by excess energy and inadequate nutrients.

Questions

- To what extent do events during early human development affect nutrition-related health outcomes over a lifetime?
- What can we do to alter these events to improve health?

Life Course Perspective

Framework to:

1. Understand & explain
2. Improve

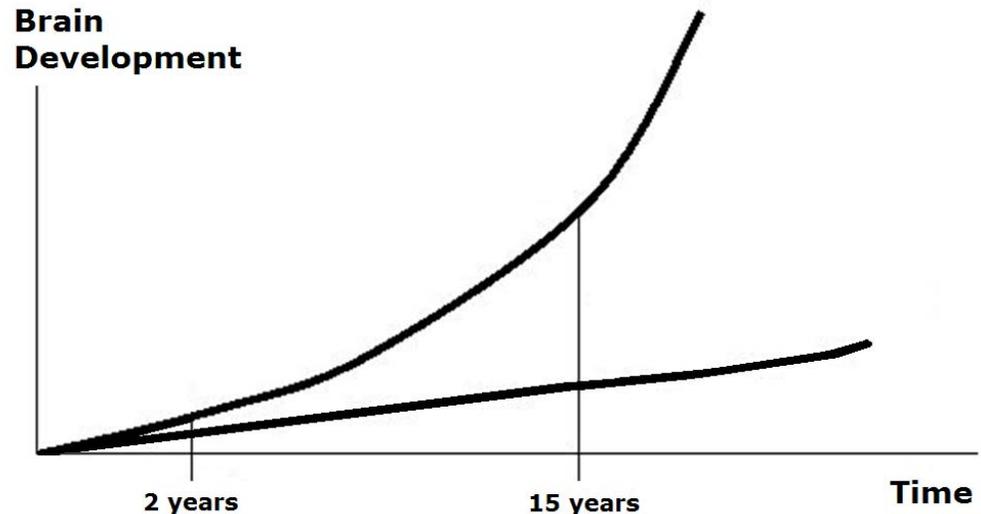
Health & Health disparities

| Stage of Growth or Reproduction | Individual-Level Interventions | Policy-Level Interventions |
|---|--|---|
| Fetal | Encourage maternal smoking cessation. Prevent and treat maternal diabetes. Prevent excessive and inadequate maternal weight gain. | Advocate for policies that assure that all pregnant women have access to culturally competent, high-quality medical care. Support policies that deter tobacco use and limit exposure to second-hand smoke, such as bans on smoking in public places. |
| Infant | Assure access to lactation consultants. Provide ongoing, developmentally appropriate information about the introduction of complementary foods and the infant-caregiver feeding relationship. | Establish hospital policies that have been shown to increase initiation and duration of breastfeeding. Advocate for family-friendly work and child-care environments that provide flexible schedules and equipment, space, and support for mothers to nurse or express milk. |
| Child | Provide information about feeding relationships, and the importance of regular family meals and snacks, daily physical activity, and limiting sedentary behaviors, such as television viewing. | Advocate for child-care and school environments that support healthful eating by providing only health-promoting foods in settings that encourage their consumption. Advocate for child-care and school environments that support physical activity throughout the day by encouraging active transportation to school, recess time, and high-quality physical education. |
| Puberty | Implement a comprehensive school health education curriculum for children and adolescents that includes nutrition, physical activity, and limiting sedentary behavior and tobacco use. | Support changes in communities that make it easier and safer for all youth to be physically active as part of their daily lives. Support changes in communities that make it easier for all youth to have access to health-promoting foods. |
| Pregnancy | Provide ongoing individual support for appropriate physical activity, energy intake, and dietary adequacy during pregnancy. | Establish worksite policies that encourage consumption of health-promoting foods in meetings, cafeterias, and break rooms. Support policies that encourage active transportation to work, shopping, and other community destinations. |
| Lactation | Assure access to lactation consultants. Screen for postpartum depression and provide opportunities to join support groups. | Establish policies that support breastfeeding mothers in hospitals, worksites, and child care. |
| <p align="center">Advocate for food assistance and education programs that prevent food insecurity, increase access to health-promoting foods, and provide nutrition education. These programs include:</p> <ul style="list-style-type: none"> Food Stamp Program National School Lunch and Breakfast Programs Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Child and Adult Care Food Program Expanded Food and Nutrition Education Program Summer Food Service Program | | |

4 Basic Life Course Concepts

1. Today's experiences and exposures determine tomorrow's health.
2. Health **trajectories** are particularly affected during critical or sensitive periods.

Trajectory: a path, progression, or line of development



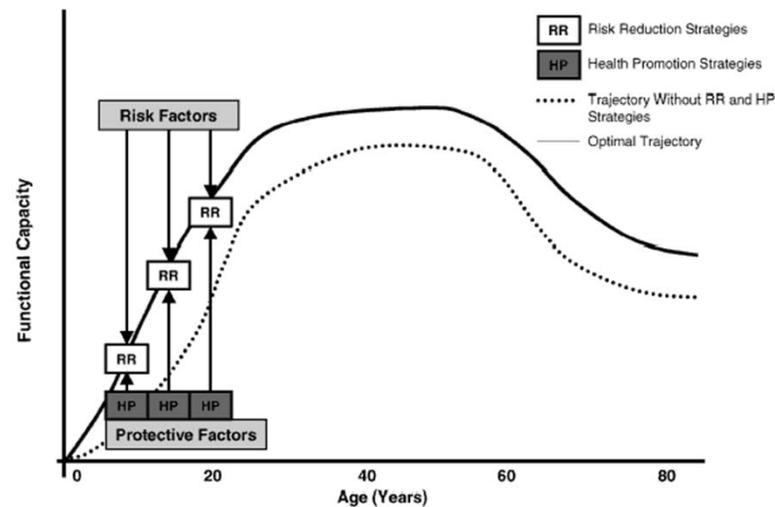
4 Basic Life Course Concepts

3. The broader environment – biologic, physical, and social – strongly affects the capacity to be healthy.
4. Inequality in health reflects more than genetics and personal choice.

Fine and Kotelchuck, 2010

Risk & Protective Factors

- Add up over time → cumulative
- Offer opportunities for nutrition intervention



Source: Halfon, Inkelas and Hochstein, 2000

Lifelong Development/ Lifelong Intervention

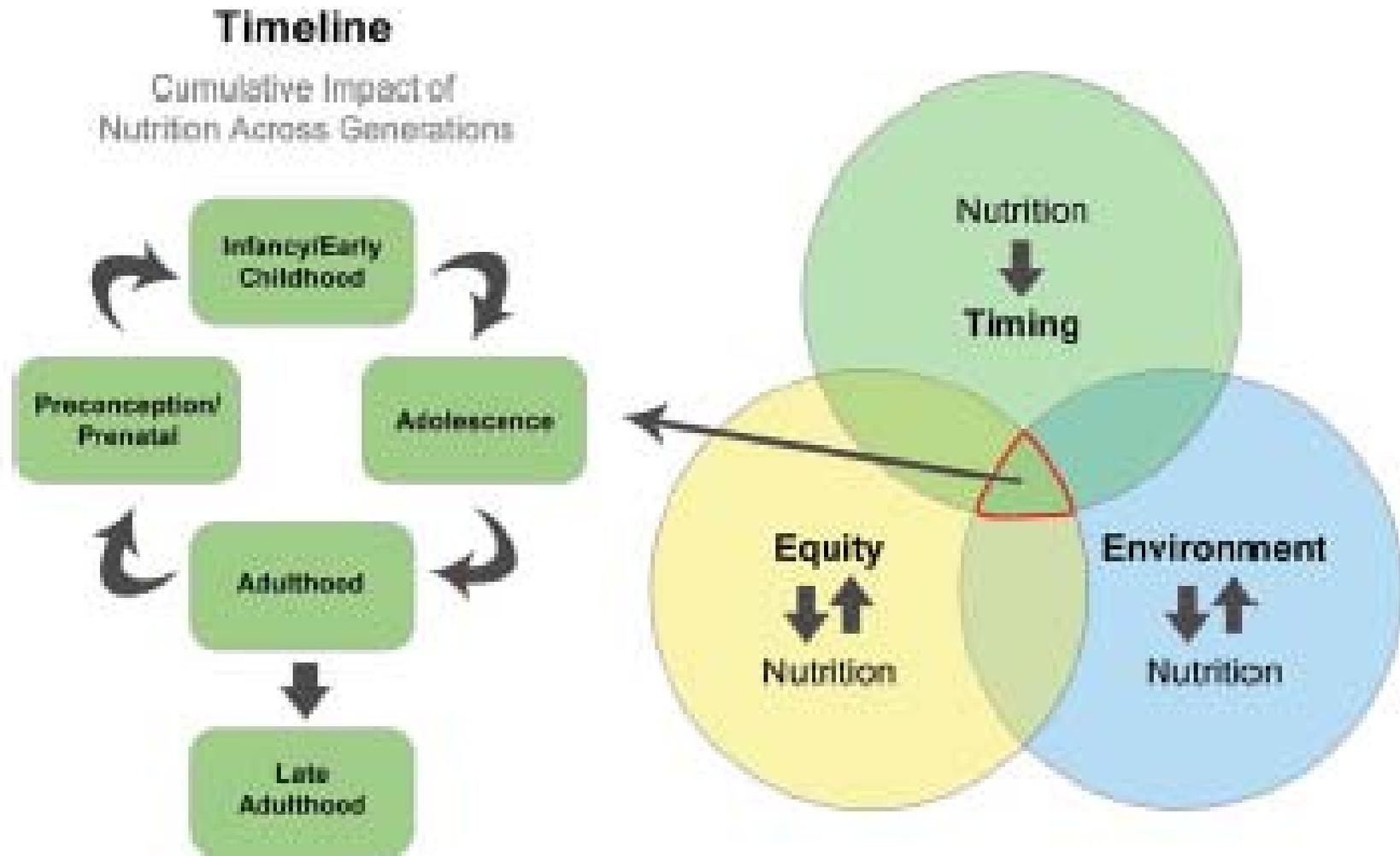
“...even for those whose trajectories seem limited, risk factors can be reduced and protective factors enhanced, to improve current and subsequent health and well-being.”

Fine and Kotelchuck, 2010

Summary: T2 – E2

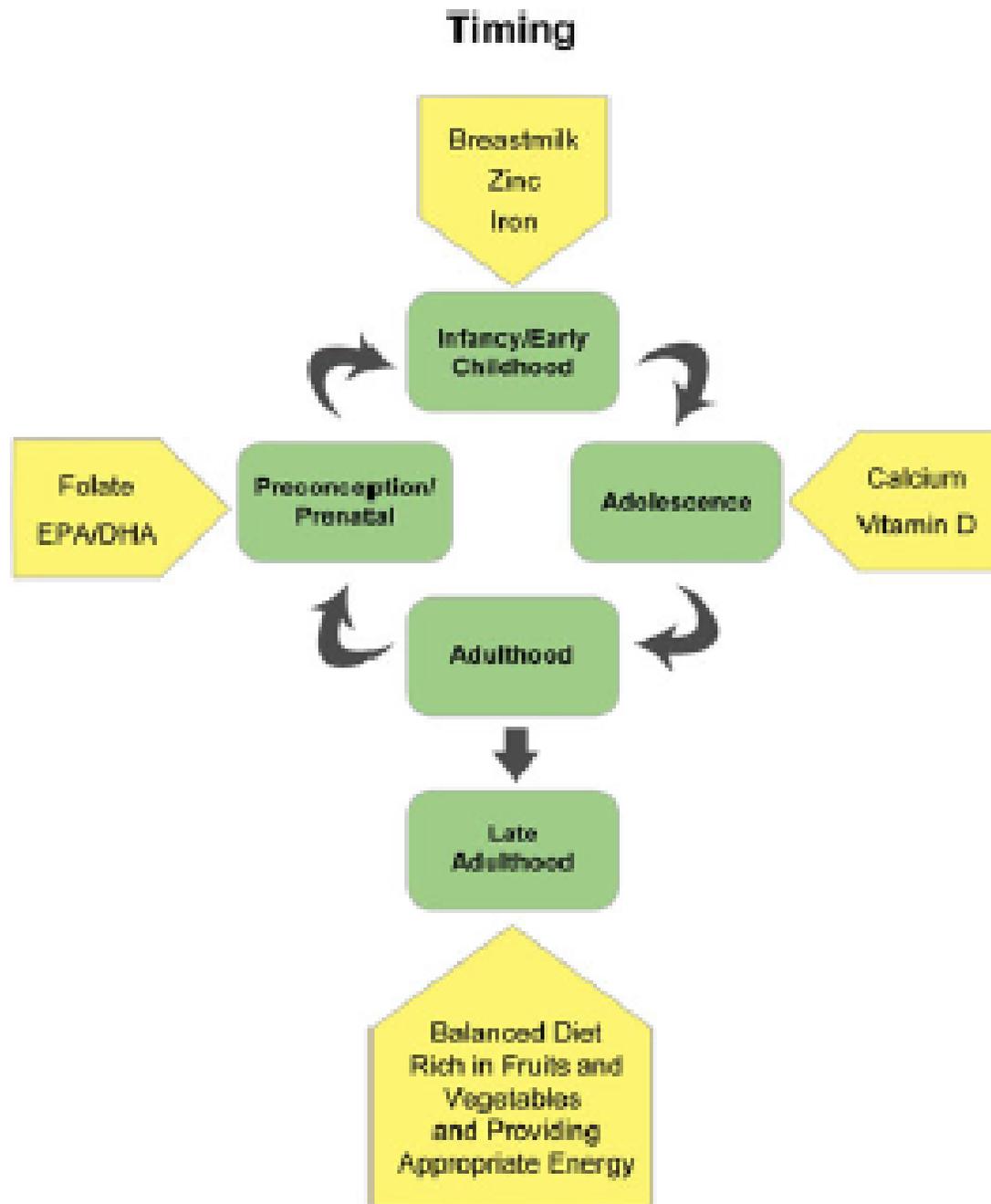
- **Timing:** health trajectories are particularly affected during critical periods
- **Timeline:** today's exposures influence tomorrow's health
- **Equity:** inequality in health reflects more than genetics and personal choice
- **Environment:** the broader community environment strongly affects the capacity to be healthy

Illustration of the Life Course Perspective Applied to Nutrition



Herman DR, Taylor Baer M, Adams E, Cunningham-Sabo L, Duran N, Johnson DB, Yakes E. *Matern Child Health J* 2013.

Examples of Key Nutrients Affecting Critical Periods



Timing: Critical Nutrients during Critical Periods of Development

Example: Essential Fatty Acids (EPA, DHA)

- Preconception
 - Improved ***embryo morphology***
- Pregnancy
 - Important structural components of cell membranes, central nervous system, retinal cell membranes
 - ***Increased length of gestation, more AGA birthweights***
- Infancy
 - Improved visual and cognitive development, maturity in sleep patterns, ***motor activity in infants***



Timing: Critical Nutrients during Critical Periods of Development

Infancy: Zinc

- Essential for protein synthesis, cell division and ***human growth***
- Deficiencies result in impaired immune function, neurosensory disorders, growth retardation, ***short stature*** and delayed puberty

Timing: Critical Nutrients during Critical Periods of Development

Infancy: Breastfeeding

- Exclusive BF for up to 3-6 months is associated with reduced risk for childhood **overweight**.
- Reduces the risk of obesity by 4% for each month of exclusive breastfeeding.
- Early exposure to flavors shapes later **preferences**

Ip, AHRQ, 2007.
Miralles, Obesity, 2006.
Mennella, AJCN, 2013

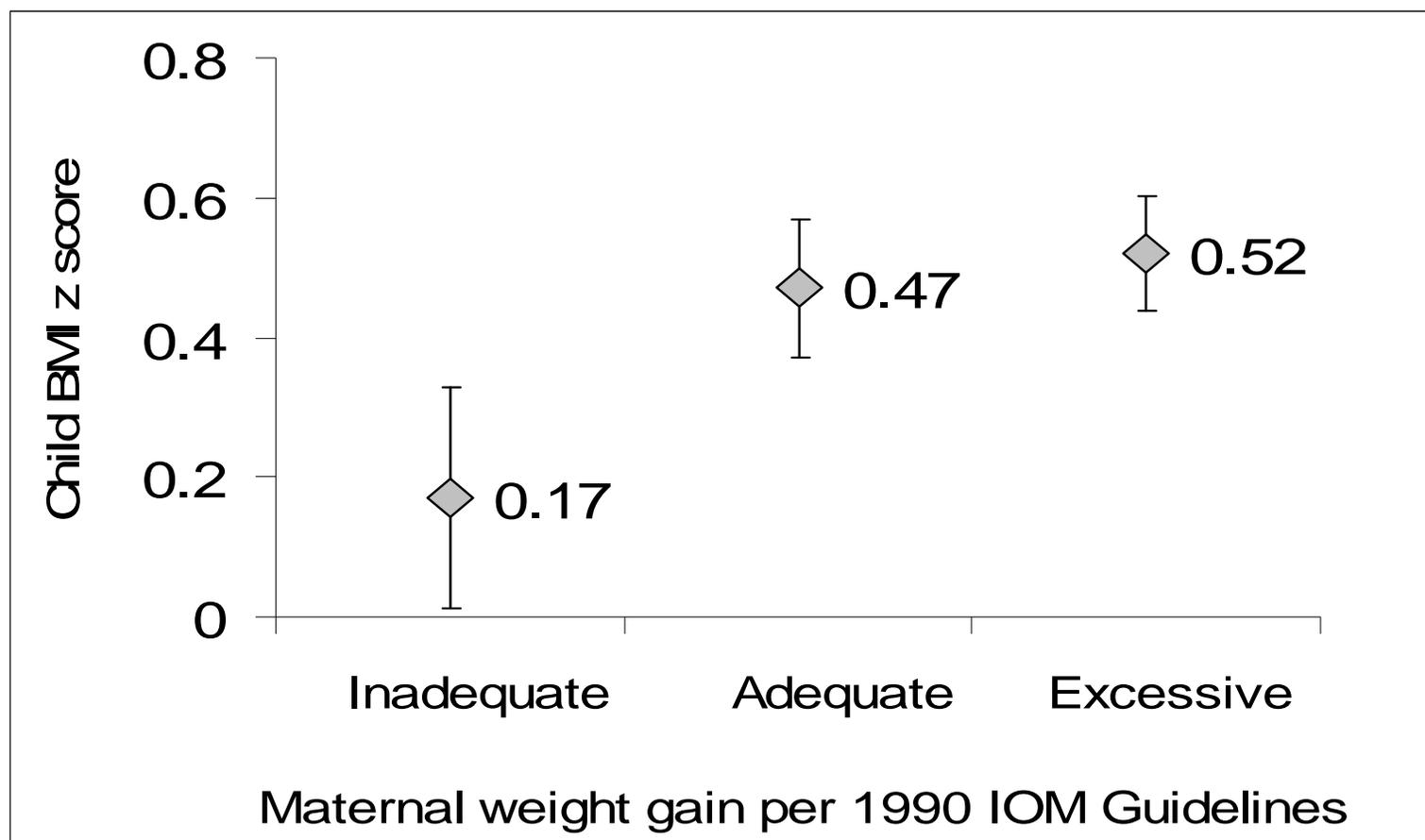


Timeline: Maternal Weight Gain

- More U.S. women are entering pregnancy overweight or obese
- Increasing proportion of U.S. women are gaining too much weight during pregnancy
- The more weight women gain during pregnancy, the more weight retained in postpartum period
- Excess pre-pregnancy and prenatal weight gain is associated with child obesity



More gestational weight gain associated with higher BMI at 3 y



Oken et al., Am J Obstet Gynecol 2007; 196:322e1



Post Partum Weight Retention (PPWR) among Oregon Mothers of Children with Special Health Care Needs

- Oregon 2005 PRAMS and 2007 PRAMS2
- Logistic regression used to quantify relationship between having a child with special health care needs (CSHCN) and high PPWR (> 4.5 kg)
- Of women responding to PRAMS-2
 - 11.4% reported having a CSHCN
 - 41.3% reported high PPWR
- Mothers of CSHCN were more likely to have high PPWR (OR: 1.98 95% CI: 1.07, 3.66)

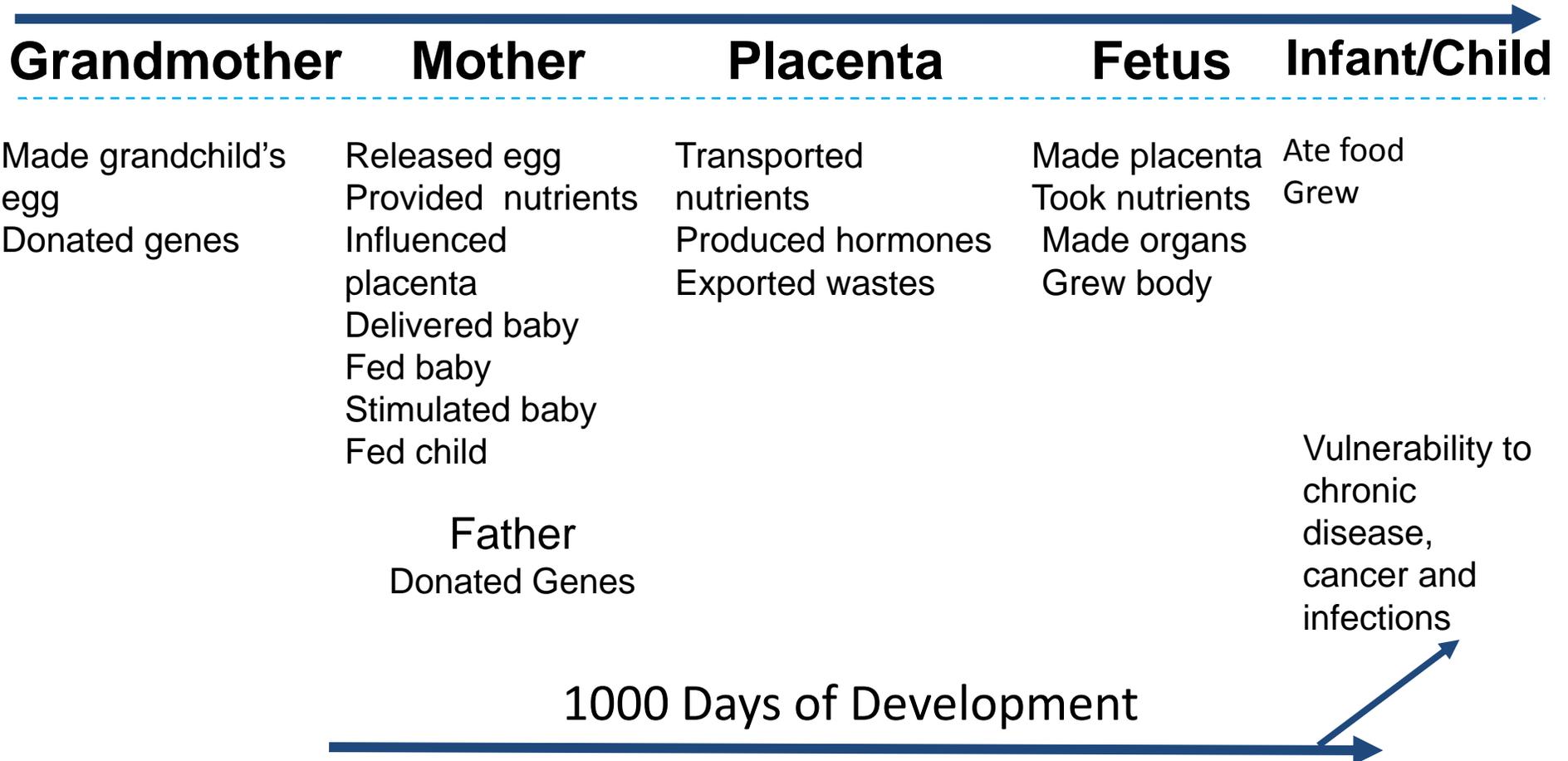
Timeline

Cumulative Impact of Nutrition Across Generations

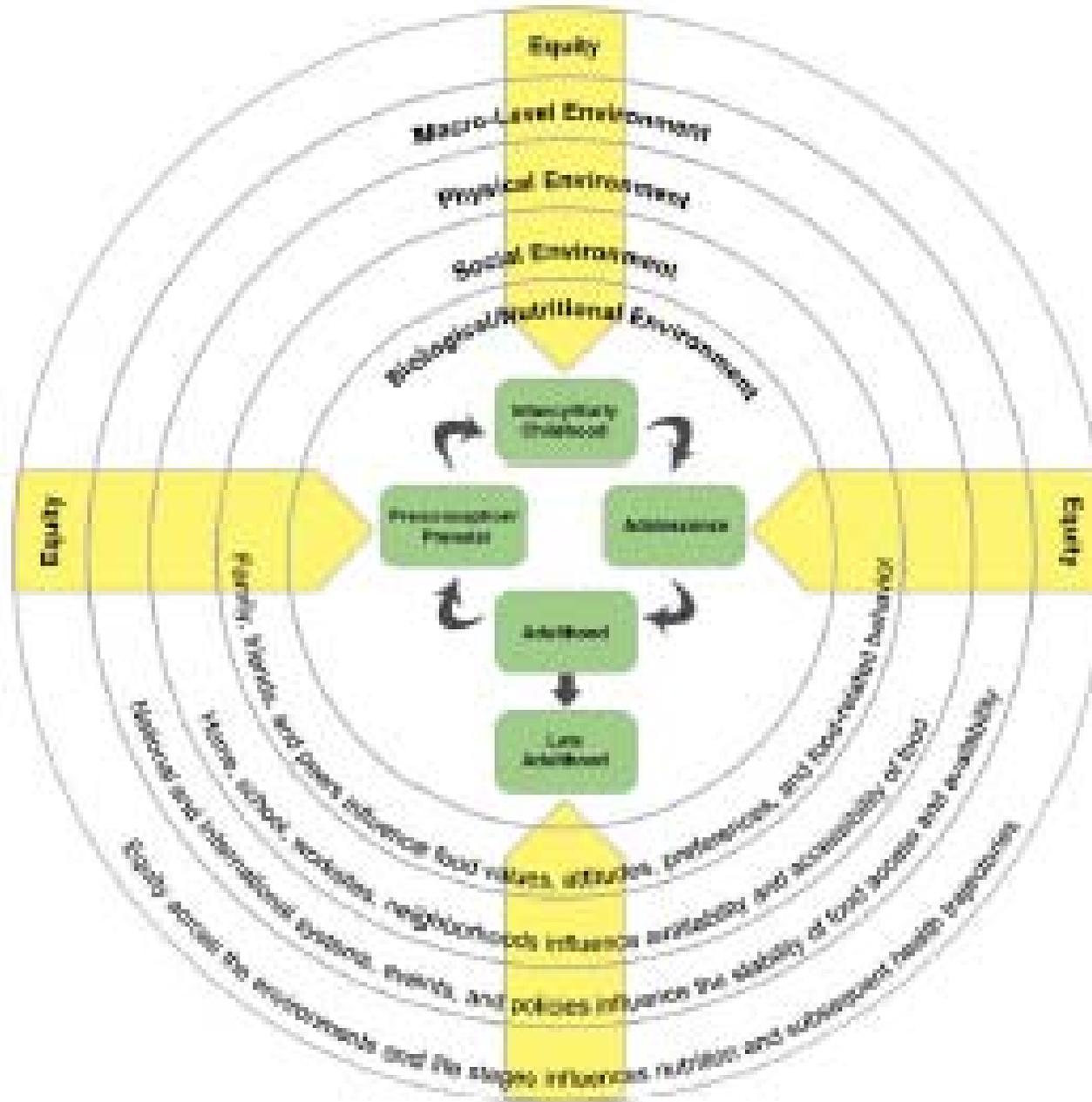


The Trans-generational Roots of Chronic Disease

100 Years of Nutritional Flow



Influence of Equity and Environment on Intergenerational Nutritional Status



Equity: Food Insecurity

- Inadequate intake of key nutrients; poor physical and mental health in children and adults
- Low-income, female- and Hispanic-headed households disproportionately affected
- More common for households that include children or people with special health care needs
- Overweight and weight gain (especially among women of marginal and low food security)
- Higher prevalence of gestational diabetes leads to adverse health outcomes for infants and toddlers

Environment: Family

- Influence food values, attitudes, preferences
- Food-related behaviors through role-modeling, social support, and reinforcement of norms
- Children emulate parental dietary, physical activity and media habits

→ Serve as risk or protective factors in shaping diet and nutrition and health outcomes.

Environment: Physical & Macro-level

- Considers home, childcare and school settings, worksites, neighborhoods, communities
 - Availability and accessibility of healthful, affordable foods
 - Macro-level environment reflects values, expressed as policies or practices
 - Commercial media strategies
 - Government regulations and programs
- Serve as risk or protective factors in shaping diet and nutrition and health outcomes.

Summary

- Efforts to promote optimal growth, development, and reduce obesity must span the life course
- Good nutrition is an essential part of comprehensive preventive strategies to reduce adverse health consequences including childhood obesity
- Some populations are at higher risk than others (e.g., low income and minority) for poor health outcomes

Summary

- Nutrition exposures and consequent health status do not result solely from individual biology and behavior
- They are result of complex interplay between the individual and the “environments” in which they come in contact (e.g., social, physical and macro-level)
- Health professionals and policy leaders should support programs, policies and services that address all aspects of the T2-E2 model to maximize preventative efforts to improve long term health



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<http://www.mchnutritionpartners.ucla.edu/>



