## Early Life Influences and Movement to a Healthy Adult Diet

David R Jacobs, Jr Mayo Professor of Public Health School of Public Health University of Minnesota Presented in a NASEM workshop HOW NUTRITION AND HEALTH CHANGE OVER A PERSON'S LIFE COURSE November 16, 2022

#### Disclosures

- Primarily funded by NIH grants
- Work with General Mills in the late 1990s on Whole Grains
- Consultant to the California Walnut Commission, 2002-2019

#### My Framework

- Food Synergy
  - Concerted action of all constituents of a food and a diet pattern
  - Think Foods First
- Holistic view of dietary behavior
  - Personal control
  - Genes and environment matter
  - Societal influence
  - Life is connected across ages
- Focus on usual diet, not diet as treatment

#### Agenda

# What is a "good" adult diet? Is a good diet advantageous in youth?

3. What determines what children eat?

#### What is a "good" adult diet?

- A Priori Diet Quality Score (APDQS)
- A priori rating of available food groups: "beneficial", "adverse", "neutral" in 2007 by Lyn Steffen and me (done independently in 5 minutes)
- Makes a statement about each aspect of the whole diet
- A priori judgments consistent with other nutritional epidemiologic experts
- Strong tracking (within person correlation) ~ 0.6 over 20 years
- Increasingly similar to recommended in more recent DGA editions
- Highly correlated with other scores: HEI-2015, AHEI 2010, DASH, Mediterranean Diet
- In middle aged and older adults, consistently related to reduced chronic disease (all cause death, CVD, diabetes, CKD), lower BMI, better fitness. higher cognitive function scores

### High APDQS: "nutritionally rich plant"centered diet pattern

- 0-132 points, typical range 30-95, mean±SD: 65±13
- Food groups in quintiles, 1 point is a 1 quintile shift
- Positive points for beneficially rated food groups
- Reversed points for adversely rated food groups
- High score implies varied diet: no single food group gets >4 points

Beneficially rated: Nutritionally rich plant foods: up to 60 points Animal: 20 other points

Diet category	20 Food groups	
Plant Products	Beneficially rated foods	Points (low –high intake)
Vegetables and Fruit	Avocado; beans, legumes; green veg; yellow veg; tomato; other veg; fruit	0 - 28
Nuts, seeds	Nuts and seeds; soy products	0-8
Grains, desserts, snacks	Whole grain	0-4
Beverages		
Beverages	Coffee; tea	0-8
Alcohol	Moderate amounts of beer; wine; liquor	0-12
Other	None	
Animal Products		
Fish, Meat, and Poultry	Fatty Fish; Lean Fish; Poultry	0-12
Dairy foods and fats Low fat milk, cheese, yoghurt; Vegetable oil		0-8

Adversely rated: 52 points for low consumption, many nutritionallypoor plant foods

Diet category	13 Food groups		
Plant Products	Adverse	Points (low –high intake)	
Vegetables and Fruit	egetables and Fruit Fried potato		
Nuts, seeds	None		
Grains, desserts, snacks	Grain dessert; salty snacks; pastries; sweets	16-0	
Beverages			
Beverages	Soft drink	4-0	
Alcohol	None		
Other	Sauces	4-0	
Animal Products			
Fish, Meat, and Poultry	High fat meat; processed meat; organ meat; fried fish, poultry	16-0	
Dairy foods and fats	Full fat milk, cheese, yoghurt; Butter	8-0	

Neutrally rated: 0 points, uncertain a priori health effects

Diet category	13 Food groups		
Plant Products	Neutral	Points (low –high intake)	
Vegetables and Fruit	Potato	0	
Nuts, seeds	None		
Grains, desserts, snacks	Refined grain	0	
Beverages			
Beverages	Diet drinks; Fruit juice	0	
Alcohol	None		
Other	Soups; meal replacements; pickled food; sugar substitutes	0	
Animal Products			
Fish, Meat, and Poultry	Lean meat; shellfish	0	
Dairy foods and fats	Eggs; margarine; Chocolate	0	

# There are outstanding adult diet patterns, but no perfect diet pattern, APDQS is one way to express the target for children

- We have kept the APDQS constant over years, but change might be considered
  - Diet soda: to adverse
  - Eggs?
  - Chocolate: to beneficial
  - Refined grain: to adverse
  - Dairy: Reclassify in terms of fermentation or otherwise, rather than fat?
  - Alcohol: to moderate intake (≤ 1 drink/day in drinkers only)
- Do adverse or neutral foods make for a more pleasurable diet?
- How much adverse or neutral food can a person eat and still have dietary protection from chronic disease?
- "Low Fat" and "Low Carb" don't work: Both fat and carbohydrate occur in all rating classes

#### Is a good diet advantageous in youth?

#### Childhood Nutrition and Weight: People in Training for a Plant Centered Diet

Project EAT adolescents recruited from middle or high school in Minneapolis, St. Paul, MN in 1998-99, Mean age 15, range 11-18 y N = 4,746



PI: Dianne Neumark-Sztainer

#### **Study Sample**

Participated in follow-up visits in 2004 (mean age 20y) and/or 2009 (mean 25y), adequate diet data

1,226 male, 1,633 white, race diverse

N = 2,656

#### **Project EAT Results**

- Descriptives from mean age 15 to 25
  - mean (SD) weight increase: 15 kg
    mean (SD) APDQS increase: 8 pts
    mean energy intake: no significant change
- Within-person tracking correlation strengthened with age:
  - 0.50 from mean age 20 to 25
  - 0.31 from mean age 15 to 20
- No cross-sectional association of weight and APDQS at mean age 15

#### Project EAT Prospective Weight Gain

- Above median APDQS at age 15 and increased by age 25 crossed with
- Below median APDQS at age 15 and decreased by age 25 5.6 kg (12 pound) less weight gain

Body weight at average age 25 years						
Basalina ABDOS Madian Salit	10 year APDQS	10 year APDQS				
Dasenne Ar DQS Median Spirt	Decrease	Increase				
≤43	N = 242	N = 683				
	78.4 kg	75.9 kg				
≥44	N = 624	N = 357				
	76.5 kg	72.8 kg				

# Nutritionally-rich plant centered diet and other parameters during childhood

- Liberali, Obesity (2020) 15 cross-sectional and 1 case-control diet pattern in children, obesogenic foods related to obesity
- Luque, J Nutr (2018) EU Childh Obesity Proj, Early diet pattern persists from age 1 to 8
- Chen, Front Nutr (2022) greater grip strength and better fat distribution, Chinese meat eaters aged 6-9, Harvard healthy and unhealthy plant diet index, parent assisted FFQ
- Coheley, Current Osteoporosis Rep (2021) bone mineral density greater with plant-based diet
- Weaver, Osteoporosis Int (2016) Nat'l Osteoporosis Foundation focus on Vit D and Calcium
- Confortin, Nutr J (2022) Brazil grip strength age 18-19 > with culinary preparations, < with ultra
  processed food</li>
- Dimov, Nutr Neuroscience (2021) Australians age 8-9, Parent rated diet quality (6 items) and behavior and emotional issues (25 items), mental health better with higher diet quality
- Fraser, Med Sci Sports Ex (2020) age 10-15, remeasured age 26-36, diet guideline adherence related to better standing broad jump (child 24 h, adult FFQ)
- Du Toit, New Eng J Med (2015) Even younger: LEAP RCT, allergy prevention by early exposure to peanuts

#### Is a "good" adult diet necessary in childhood?

- Study designs are often not great, and especially during rapid growth energy needs are great
- Tastes, emotions, socialization, puberty all make childhood a time of great change
- Perhaps eating a "good" adult diet is less important for children than for adults
- But there may be some benefit to children, especially in learning to eat well as an adult

#### What determines what children eat: from Scaglioni, Nutrients 2018



#### Family Strategies to Improve Child Diet: adapted from Scaglioni, Nutrients 2018, similar to ideas of Loth and Neumark-Sztainer

		Family meals		
Covert control			- Expose to a variety of foods	
	Purchasing only healthy foods at home		- Repeatedly expose child to a food	
	Avoidance of unhealthy stores and fast food		<ul> <li>Allow child to have input into food choices</li> </ul>	
	Avoid the use of food rewards		- High frequency of shared family meals	
	<ul> <li>food maintains the behavior it depends on</li> </ul>		- Daily shared breakfast	
	Promoting self-regulation		- Socialization during mealtime	
	Recognition of fullness sense		- Turn off TV at meals	
	Serving moderate portions		Parent focused intervention	
	Help in organizing the feeding environment		- Educational interventions for parents and caregivers	
Authoritative parenting style			- Feeding-related advice	
	Encourage children to try new foods		- Empowering parents	
	Parents are the example		- Social support	
	Parent models healthy eating, food enjoyment		Family environment	
	Do not model disliking of foods in front of child		- Early-life experience healthy tastes and flavors	
	- in obesogenic environment, parental control needed		- Parental role in food shopping and preparation	
	- moderate children's intake of palatable snack foods		- Healthy food availability	
	Early responsive parenting intervention		- Reduce screen time and get adequate sleep	

### Perhaps most influential: Money and Societal Structure

- The public health goal is to get good food to everyone, automatically
- This may be impossible, but better policies exist that will serve the public, while operating within a system that emphasizes money
- There is a "push and pull" between individual and societal influences
- French Kids Eat Everything by Karen LeBillon, HarperCollins, 2012
- Great parable of the issues and possible solutions
  - Author and her French husband took their two small, picky eating children from Canada to France for 1.5 years.
  - The adults were invested in food. Home and school meals took time. Foods had names. There was conversation. Hands on preparation. Tablecloths. The parents were supportive. The children tried lots of things and enhanced their taste.
  - On return to Canada the older child expressed disappointment in the Canadian school lunch break: 15 minutes, food out of a sack, no respect for food, no socializing.
  - Note how much of society was involved in forming / changing children eating habits.