

Optimizing Health With Age: What is Nutrition's Role? Cognitive Decline

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- No conflicts of Interest to declare

Goals of this Talk

- **Define, characterize and provide:**

- The preventive and public health context of food, nutrition and dementia
- Overview of nutritional and some related associations with dementing illnesses
- The social and clinical context of nutrition for dementia patients
- The interface of aging and nutrition issues in older people
- Some recent, intriguing research findings on nutrition and dementia

The Preventive and Public Health Context of Cognitive Decline—A Few Lifecourse Issues

- Many children approach adulthood with cognitive problems, including developmental disabilities
- Exposure to environmental and social issues that effect brain function often not available (e.g., environmental, occupational, traumatic)
- It is extremely difficulty to understand Alzheimer's disease and other 250+ dementias, and their clinical presentations
- US Preventive Services Task Force does not recommend screening elders for dementia
- *Proposal*: Lifelong brain health prevention programs, including diet.



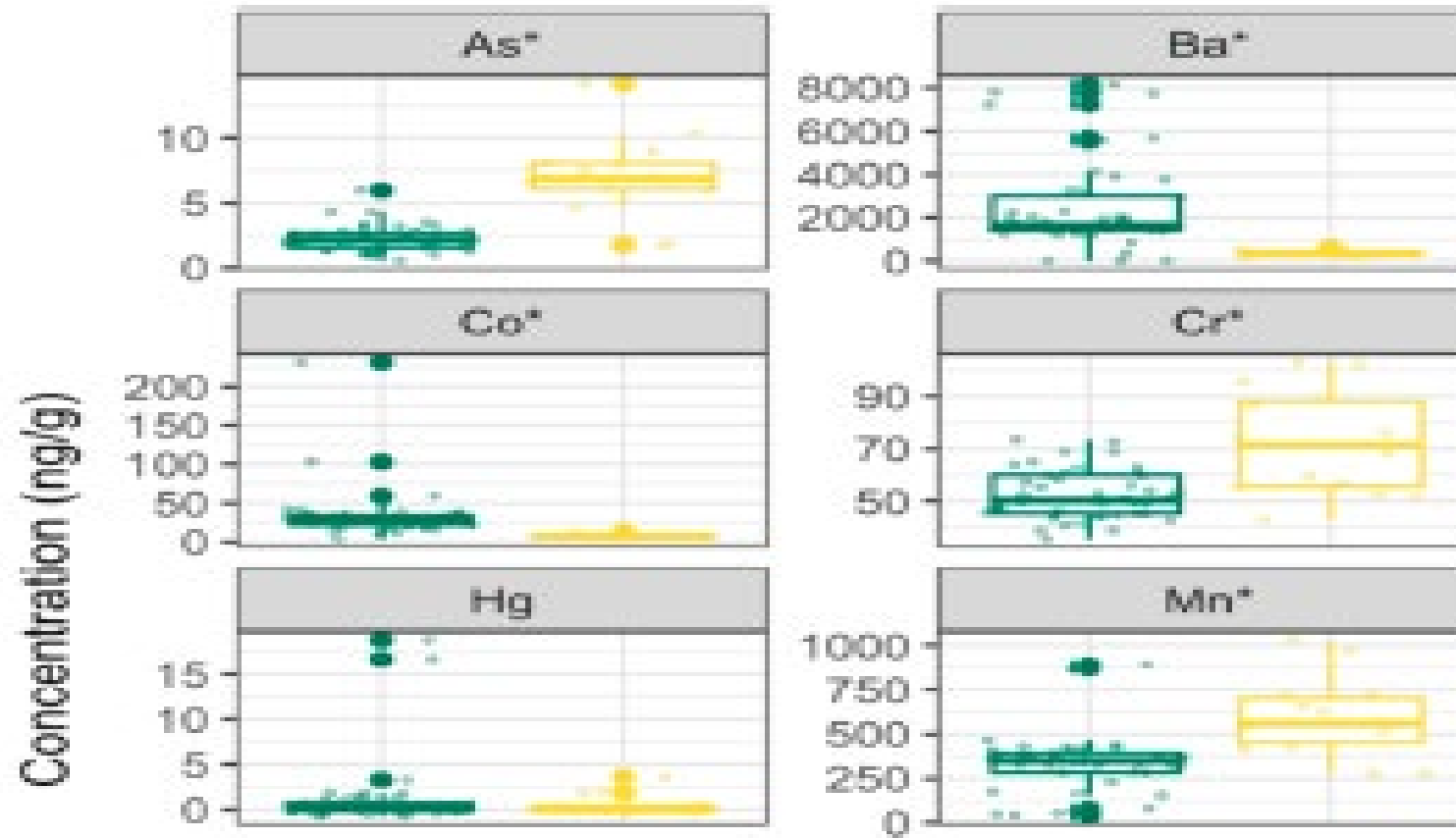
Shingles and Other Vaccines Associated with Dementia Protection (JAMA Oct. 18, 2024)



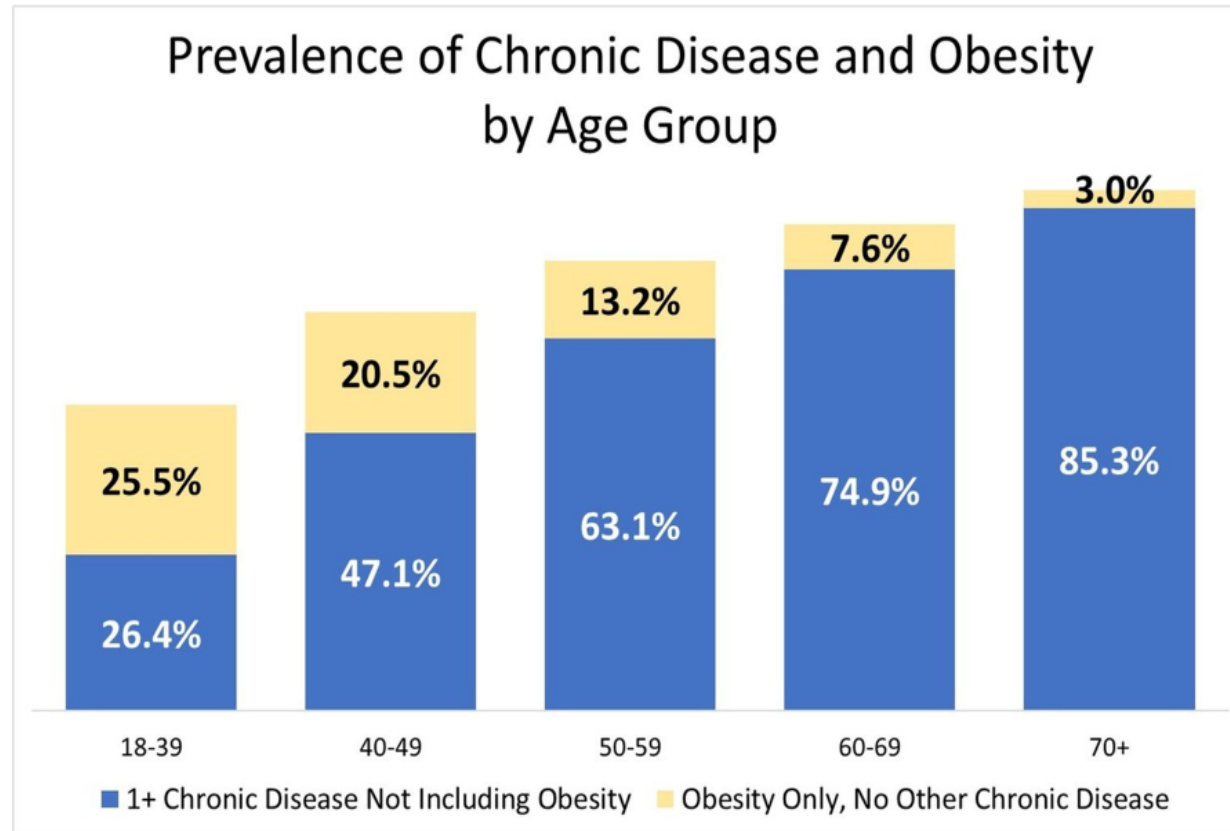
Environmental Sources of Cognitive Impairment

Metals in Tampons; Air Pollution

(Env. Intl 2024, 190:108849)

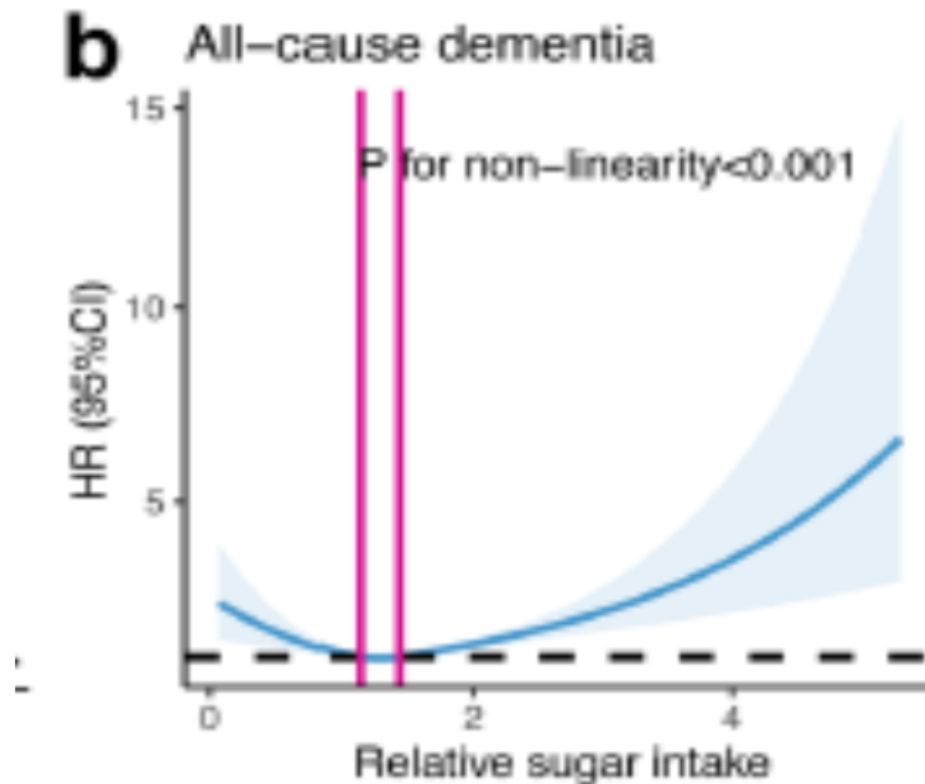


Prevalence of One or More Chronic Illnesses Across the Lifespan



Sugar Intake and All-Cause Dementia Rates in the UK Biobank Cohort Study: Women and Men

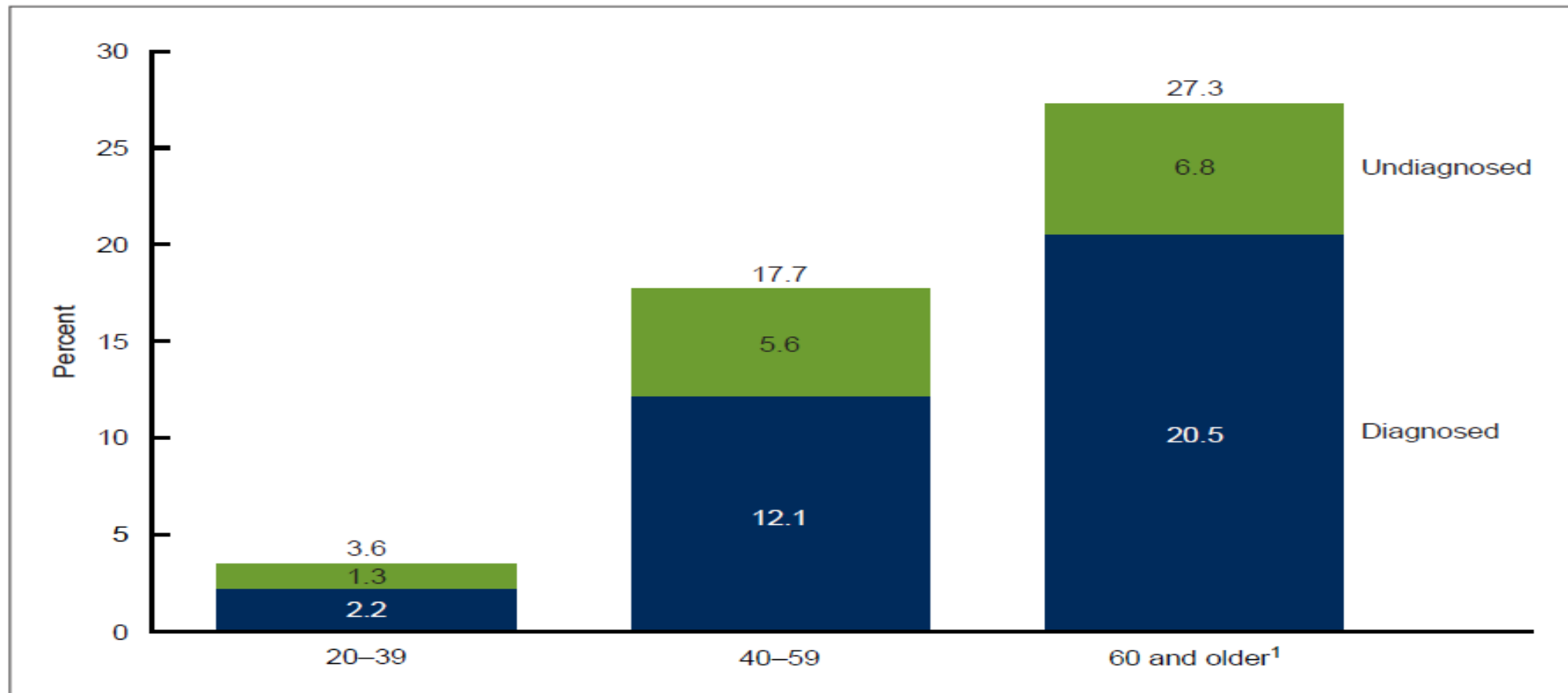
(*BMC Medicine* 2024,22:298)



Prevalence of Diabetes in the US

(NCHS Data Brief No. 516, Nov. 2024)

Figure 2. Prevalence of total, diagnosed, and undiagnosed diabetes in adults age 20 and older, by age group: United States, August 2021–August 2023



A Closer Look at Diet and Dementia

The Social and Clinical Context of Dementias

(Google Images)

- Social Determinants of Health
- Food: access (security-economics); safety
- Family support; loneliness*
- Elder mistreatment (head injury)
- Mental illness and its treatments
- Incarceration
- Addiction
- Homelessness



Association Between Food Insecurity and Probable Dementia (PSID Cohort) (J. Gerontol. Series B. Vol. 79 Publ. 7Sept24)

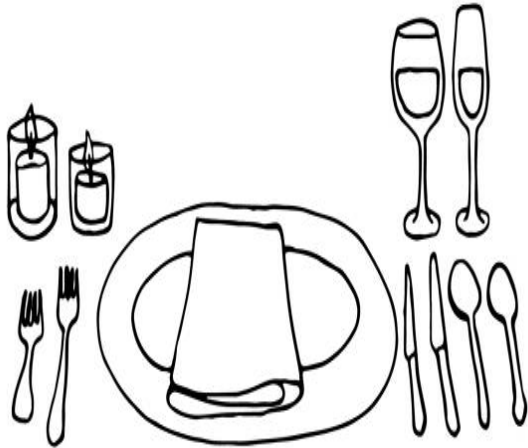
	<u>OR</u>	<u>95%CI</u>
Food Insecurity (self-rep.)	2.0	1.1-3.6
Food Insecurity (observer rep.)	2.0	1.1-3.5

Overview of Diet/Nutrition Interventions and Cognitive Decline

- Classical dementing illnesses—deficiencies in low folate, B6, B12 (e.g., pernicious anemia)
- Many hypotheses (e.g., low sodium; omega-3 fatty acids; iron accumulation in the brain (complex issue))
- Large literature on polyphenols (anti-oxidants), and related dietary supplements (e.g. genistein)
- Various diet patterns, tested to varying extent for long term cognitive change. Mediterranean Diet; DASH Diet; MIND Diet, etc.
- Time-interrupted (fasting) diets
- Diabetes/ obesity metabolism; “heart healthy” diets

The Clinical Challenges of Feeding Dementia Patients

(Google Images)

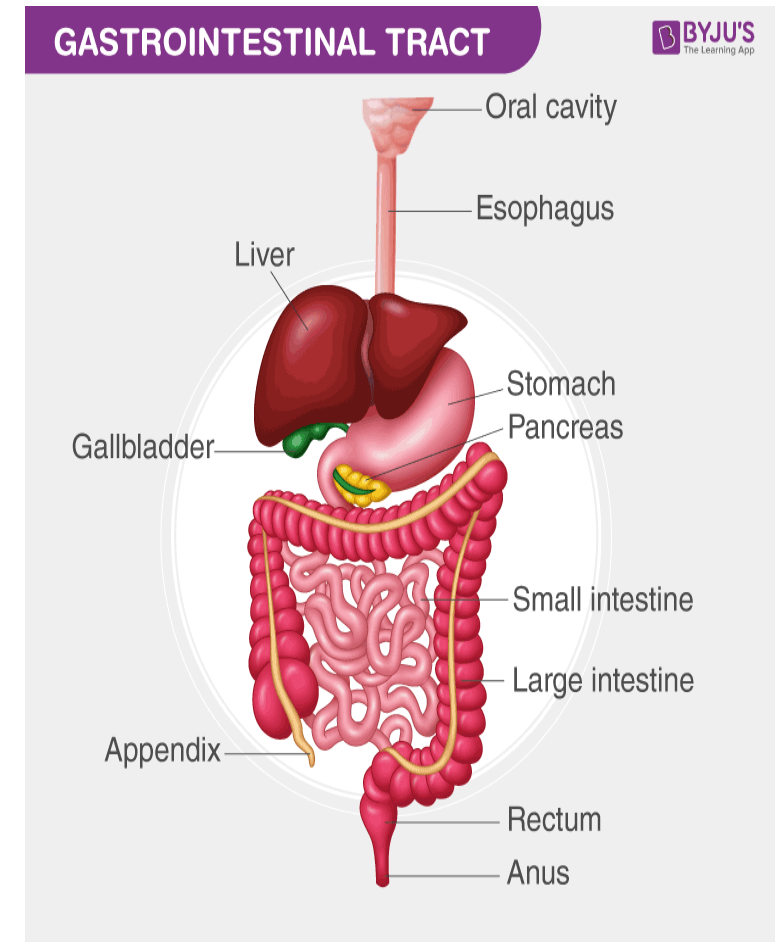


- Patient lack of interest/ attention
- Taste and smell deficits
- Dentition (teeth and gums)
- Swallowing difficulty; aspiration
- Bodily symptoms hard to assess (e.g., food allergy; adverse safety effects)
- Inability to express food preferences
- Dietary decisions due to multi-morbidity and, sometimes costs
- Malnutrition-an important problem

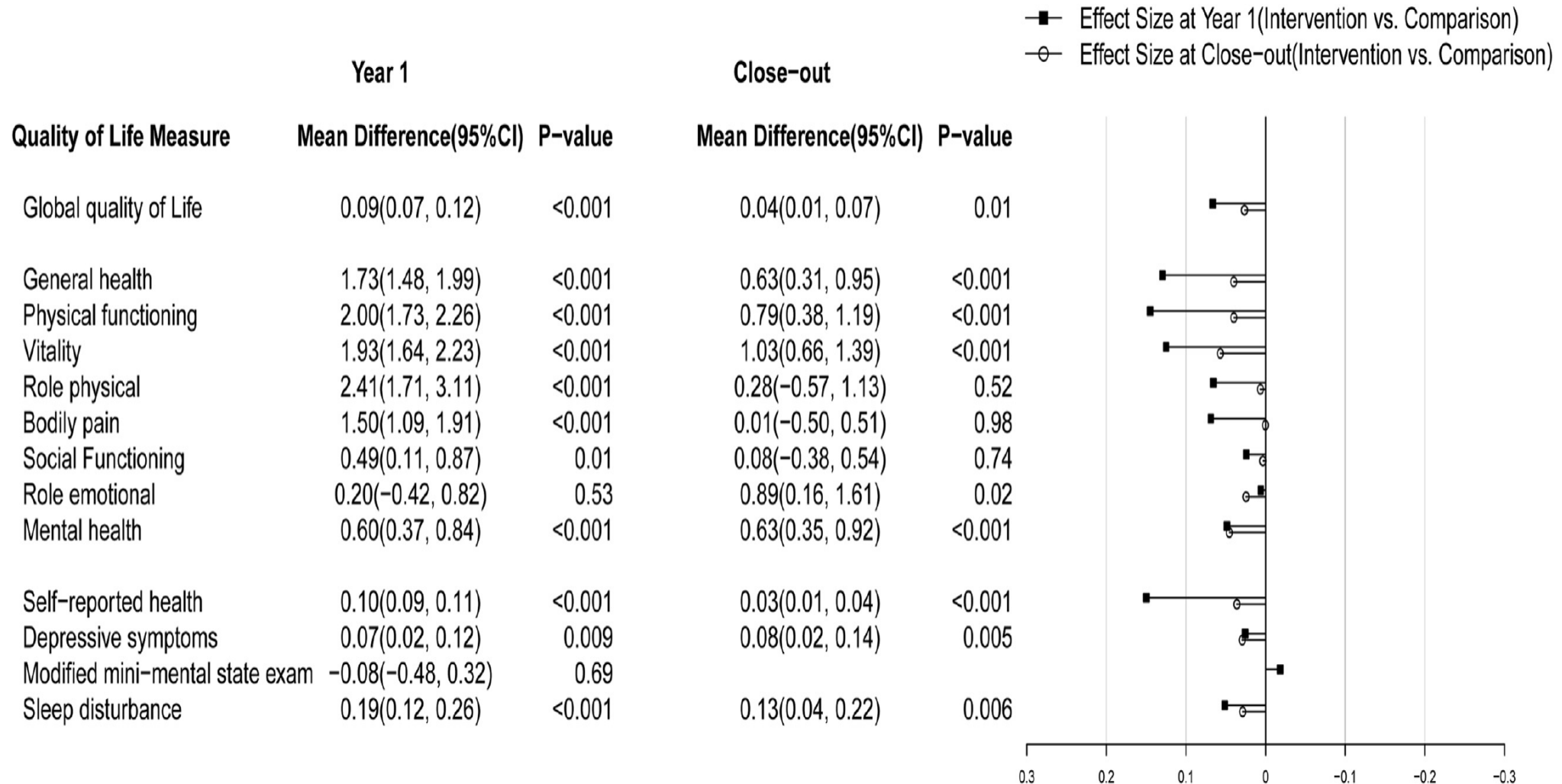
But... Not All Dementia-Related Food and Nutrition Problems are Due to Dementing Illnesses: **The GI Tract and Aging**

(Curr Opin Nutr Metab Care 2016, 19:12-18)

- GI Motility, including gastric emptying
- Changing GI hormone and enzyme production
- Absorption of food and nutrients, including water
- Intestinal food digestion
- Degeneration of GI neurological function
- Immune function; incl. microbiota



The Women's Health Initiative Diet Modification Study:



Ferritin Iron Levels and Low Cognition: NHANES

(J. Peng, et al [RBW]. Aging Disease <http://dx.doi.org/10.14336/AD.2019.0064>, 2024

Categories of Serum Ferritin Concentrations					
	Low		Normal	High	
	OR ^a (95% CI)	<i>p</i> value	OR ^a (95% CI)	OR ^a (95% CI)	<i>p</i> value
Model 1	1.46 (0.96, 2.20)	0.07	1 (Ref)	1.46 (1.14, 1.87)	<0.01
Model 2	1.38 (0.86, 2.23)	0.23	1 (Ref)	1.40 (1.12, 1.76)	<0.01
Model 3	1.38 (0.86, 2.22)	0.23	1 (Ref)	1.39 (1.11, 1.74)	0.01

Model 1: Adjusted for age, gender, and race/ethnicity;

Model 2: Model 1+ education level, family income level, smoking status, alcohol consumption, and physical activity level;

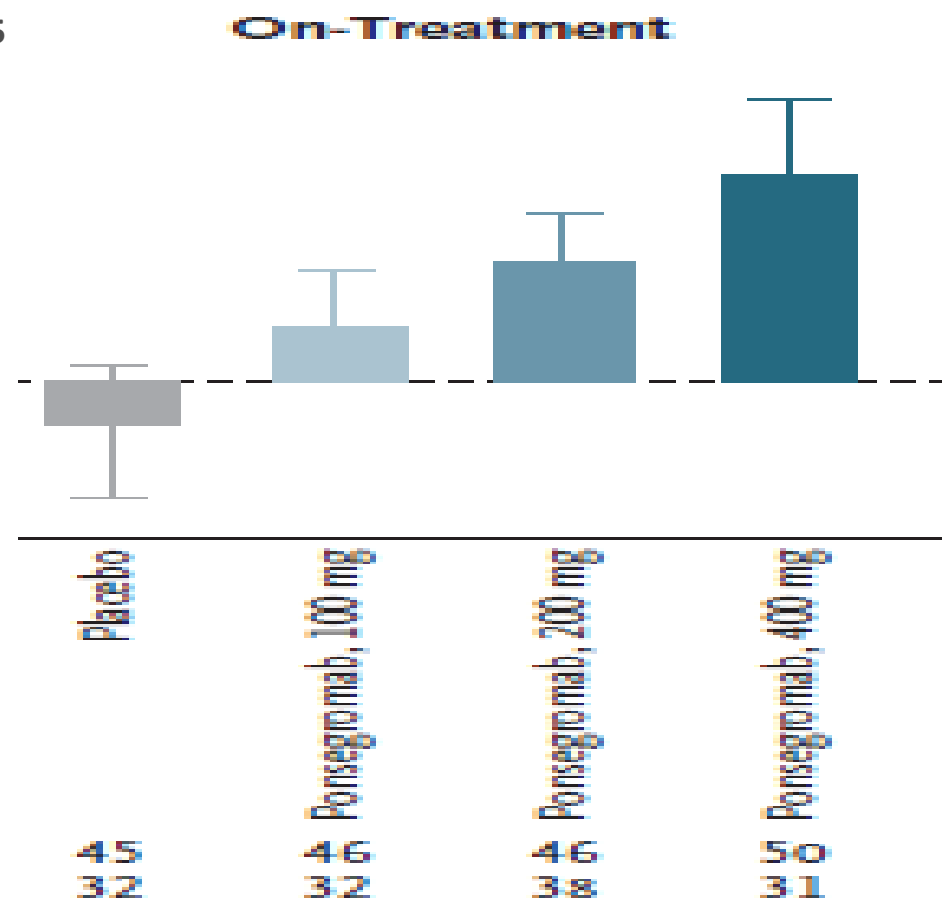
Model 3: Model 2+ CRP level.

^aOdds ratio for low cognitive performance, defined by the DSST score below the median (i.e., 42).

New Research Findings on Diet/Nutrition and Cognitive Function

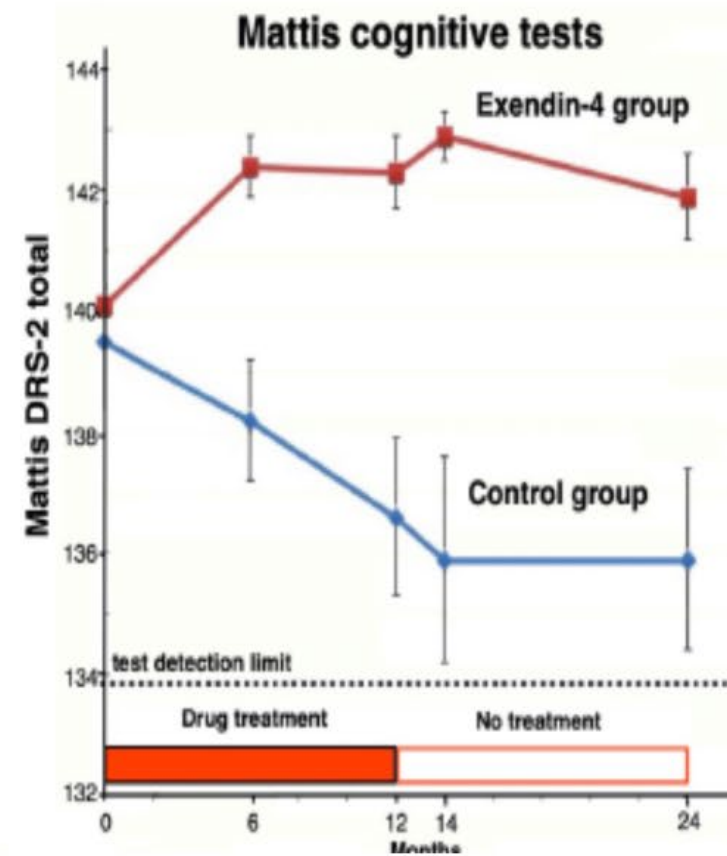
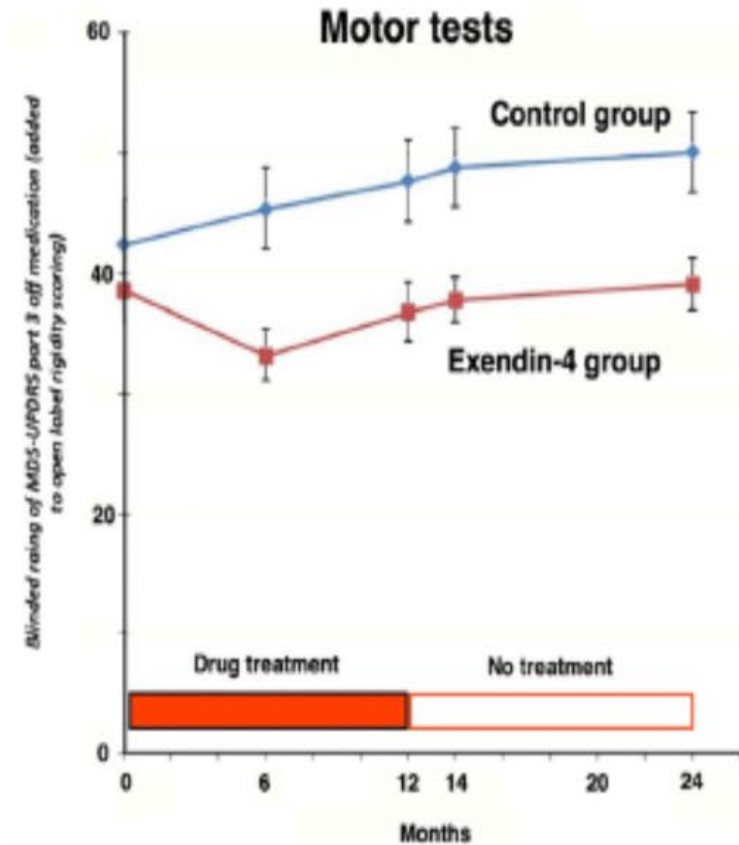
Anti-Growth Differentiation Factor-15 (GDF-15) in the Treatment of Cancer Cachexia

DOI: 10.1056/NEJMoa2409515



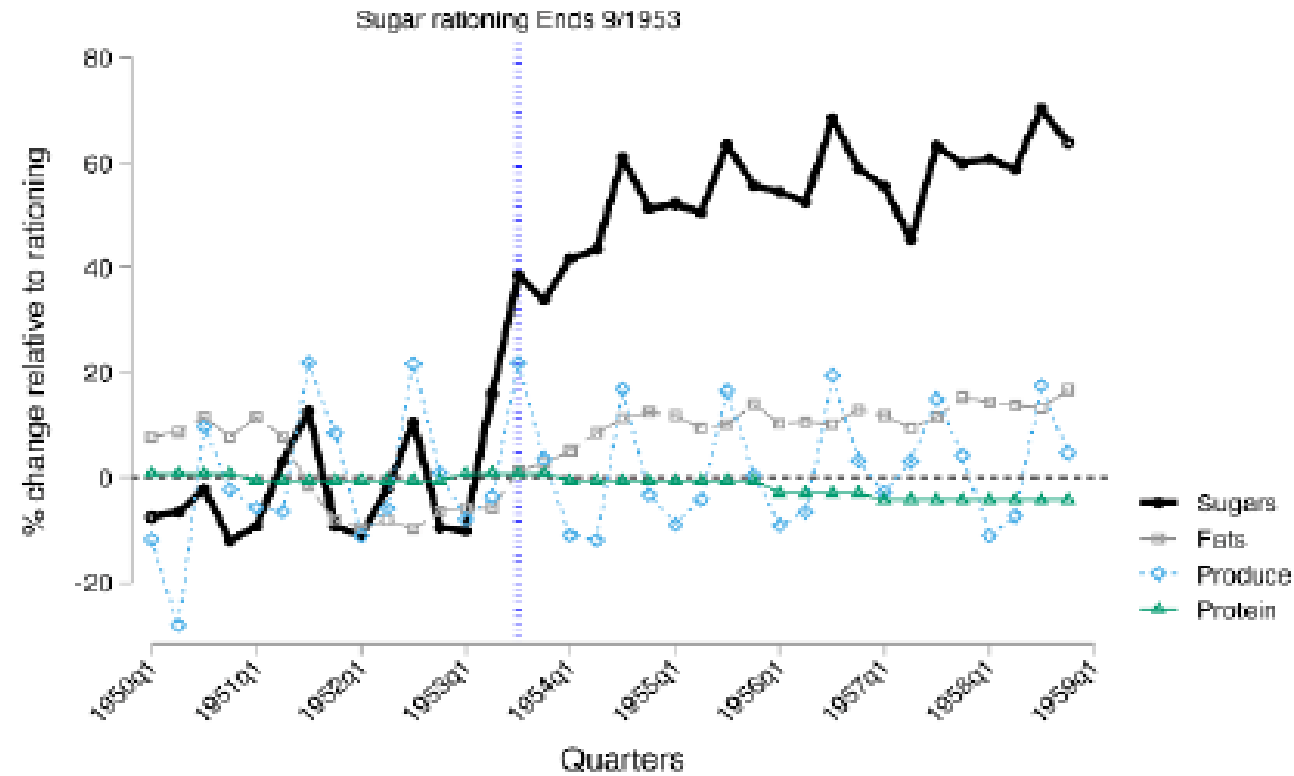
Glucagon-Like Peptide-1 Drugs: Effects on Motor and Dementia Tests

(Neuropharmacology 253 (2024) 109952)



Effect of Sugar Rationing *in Utero and* Infancy on Type 2 Diabetes Risk about 60 Years later

10.1126/science.adn5421 (2024)



Summary

- Nutrition and diet are very important for preventing dementia and managing dementia patients, as well as controlling other environmental exposures
- Brain health maintenance should be a higher public priority
- Co-morbid conditions and aging play important roles in all cognitive illnesses; *all need medical attention*
- Promote more heart health:
- “Heart health is brain health” -*Pauline Maki*



Thanks!

-National
Academies/Food Forum

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-Our audience

-my colleagues

-Research participants

-Funders