The University of Texas at Austin

Promote Health & Well-being from *Birth to Adolescents* through Key Dietary Strategies:

The Importance of Dietary Protein & Breakfast

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Disclosures

AFFILIATION/FINANCIAL INTERESTS *(prior 24 months)*	ENTITIES
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Speakers Bureau	National Cattlemen's Beef Association

Commercial support has been provided by the Indiana Beef Council

Health Across the Lifespan

Establishing Healthy Lifestyles → Optimizing Healthy Lifestyles → Preserving Healthy Lifestyles

Healthy Dietary Patterns

Physical, Mental, & Emotional Health are Priorities at Every Life Stage but Critical in Young People

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2914631/pdf/nihms191573.pdf; https://www.hhs.gov/ash/oah/facts-and-stats/picture-of-adolescent-health/index.html; https://www.cdc.gov/nchs/data/hestat/obesity-child-17-18/obesity-child.htm#table1

(Are We) Growing up Healthy? (Teens)

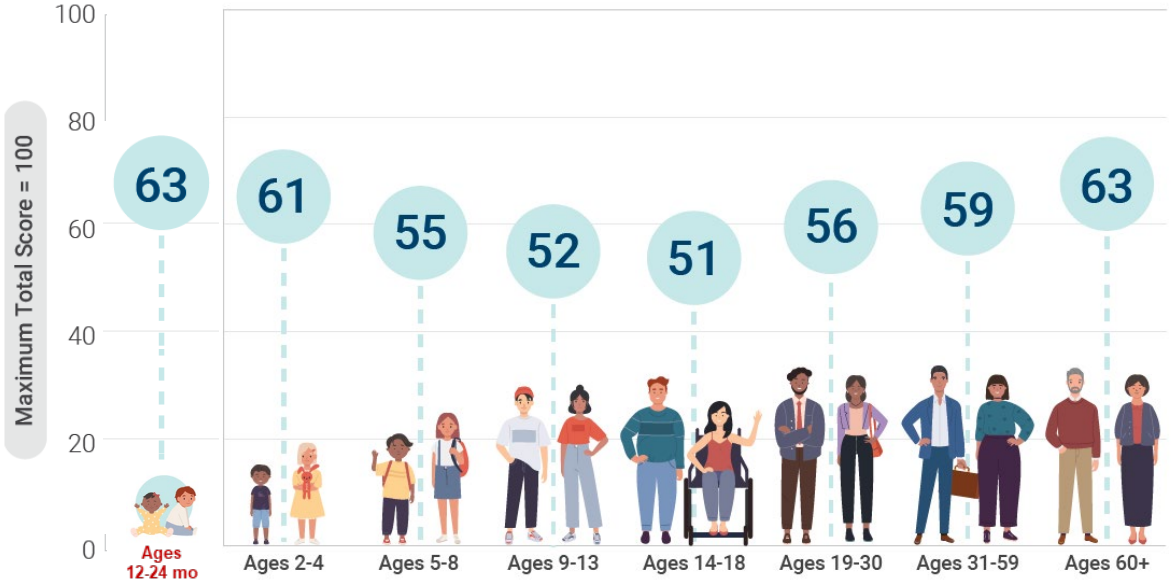
Implications

- 80% young people with unhealthy body fat become adults with obesity
- Depression in young people is the leading cause of adult:
  - *Anxiety*
  - *Substance Use Disorders*
  - *Poor Health*
  - *Reduced Overall Well-being*

https://www.cdc.gov/childrensmentalhealth/data.html

Diet as a Primary Contributor of Poor Health

Healthy Eating Index (HEI) (2018)



The Healthy Eating Index Score

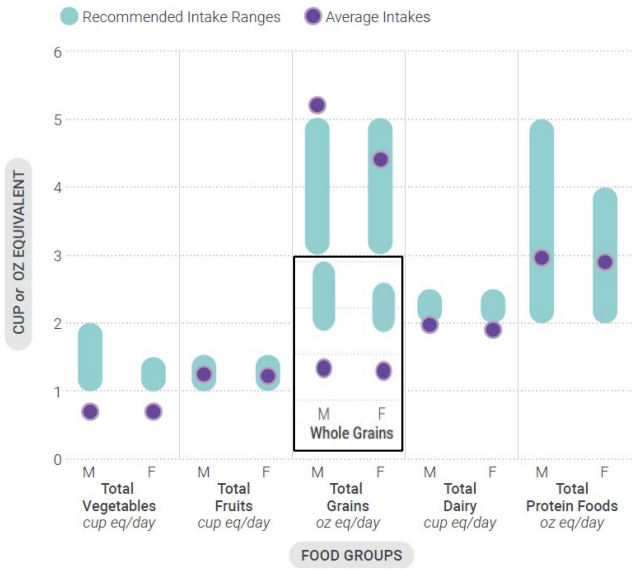
A measure of *Diet Quality* used to assess how well Americans follow the current DG recommendations (on a scale from 0-100)

Average Score

Diet Quality Among US Young People

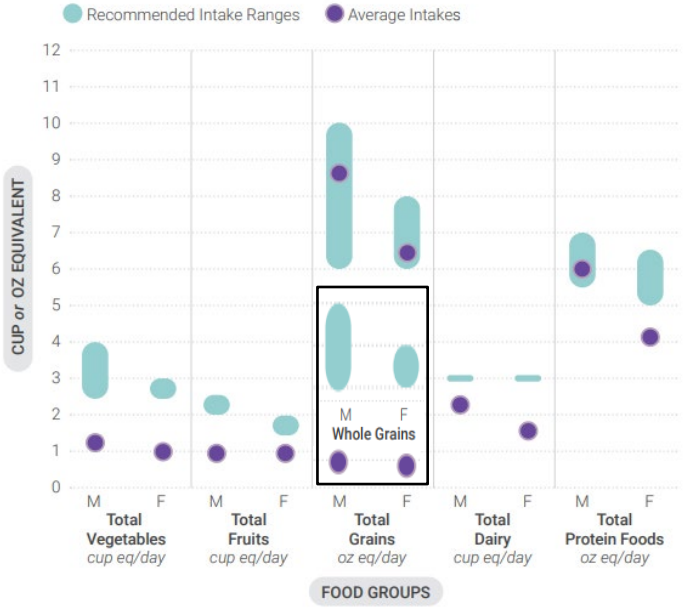
‘Best’ Diet Quality

(Age 2-4 y; HEI: 61)

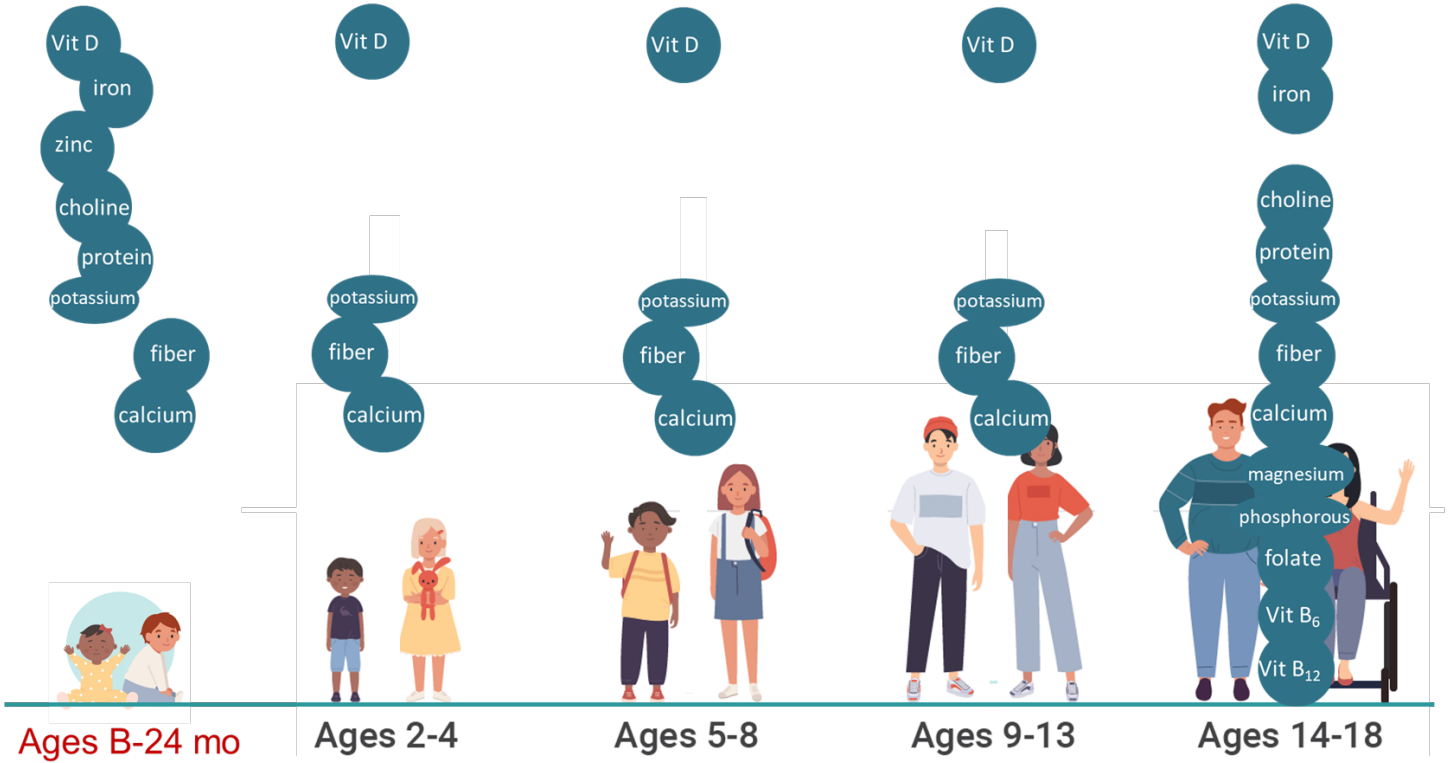


‘Worst’ Diet Quality

(Age 14-18 y; HEI: 51)



Nutrient Inadequacies Among Young People



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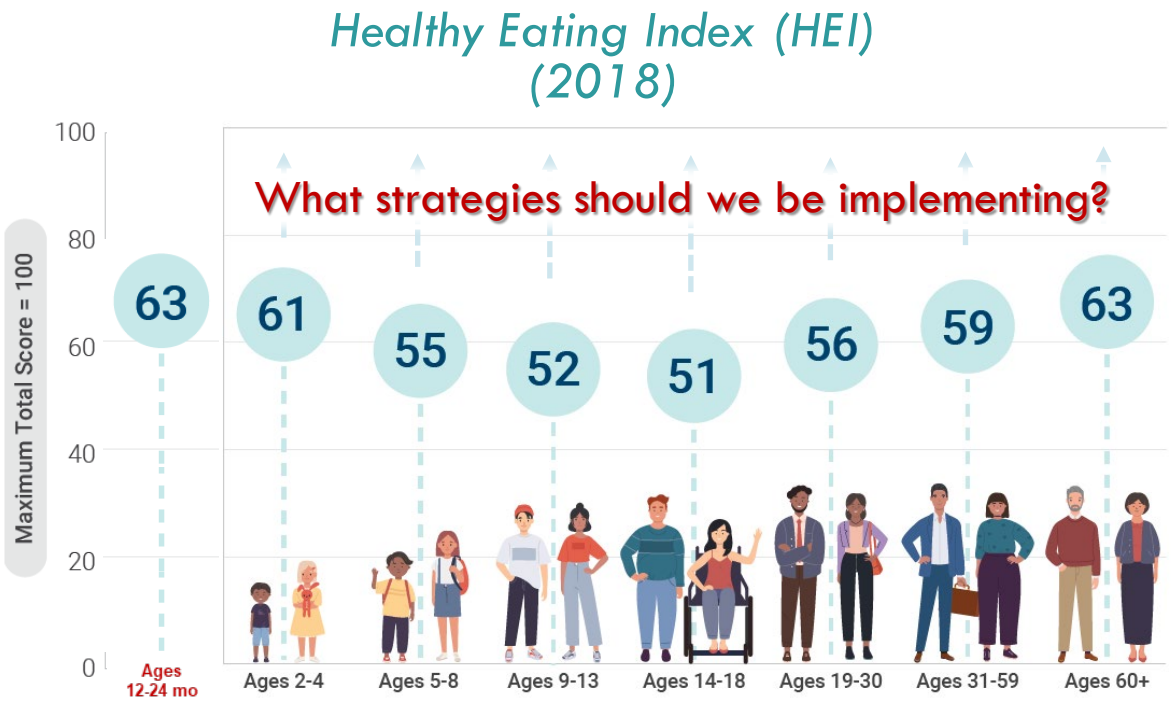


<u>Underconsumption</u>:

- Fruits
- Vegetables
- Whole Grains
- Dairy
- **Protein (females)**

<u>Overconsumption</u>:

- Energy (total)
- Saturated Fats
- Sodium
- Added Sugars

Review of Nutrition Intervention Strategies

Systematic Review & Meta-analysis including 109 dietary RCTs (3 mo to 3 y)
in 12,000 children & adolescents with Ow/Ob assessing diet quality & nutrient adequacy

Interventions

- Family
- Multi-intervention
- Mentoring/Peer
- Technology
- Cognitive/Motivational
- Primary Care
- Protein Foods
- Breakfast
- Healthy eating plans
- School-based

Compared to control, interventions elicited:

↓ Daily Energy

↑ Fruit & Vegetable Intake

↓ SSB Intake

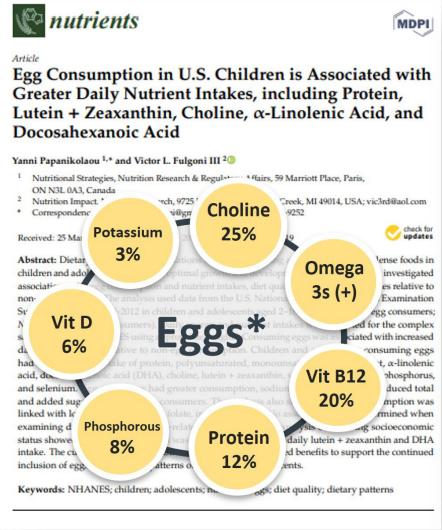
↓ Energy-dense, Nutrient-poor Foods

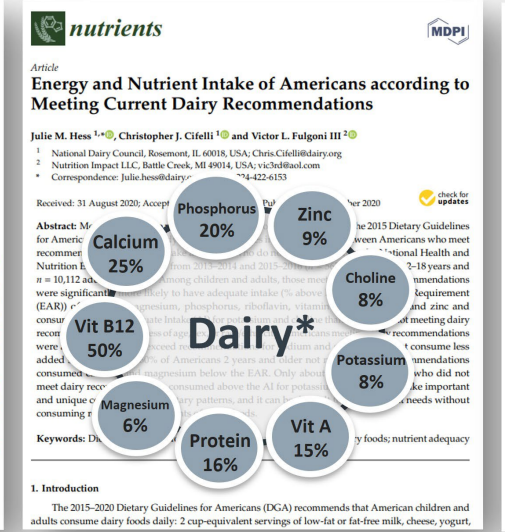
up to 12 months

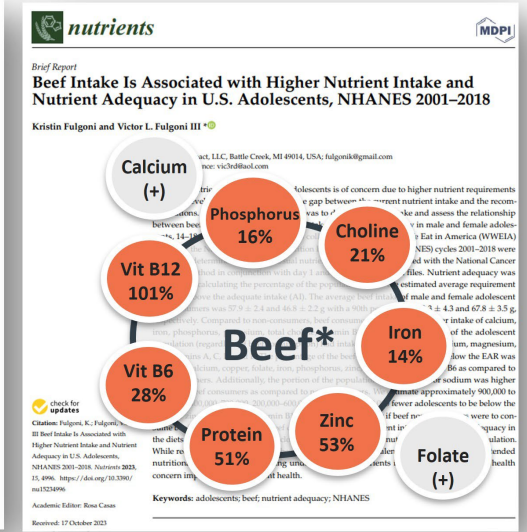
https://pubmed.ncbi.nlm.nih.gov/31121847/; https://pubmed.ncbi.nlm.nih.gov/33007917/; https://pubmed.ncbi.nlm.nih.gov/38068854/

Nutrient Adequacy & Protein-rich Foods

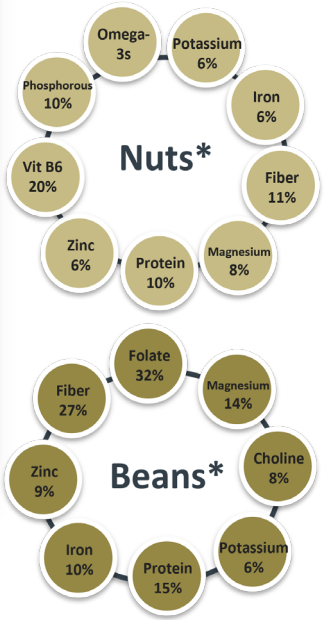
**1 serving, % Daily Value (DV)*







Potential Role of Plant-based Protein Sources



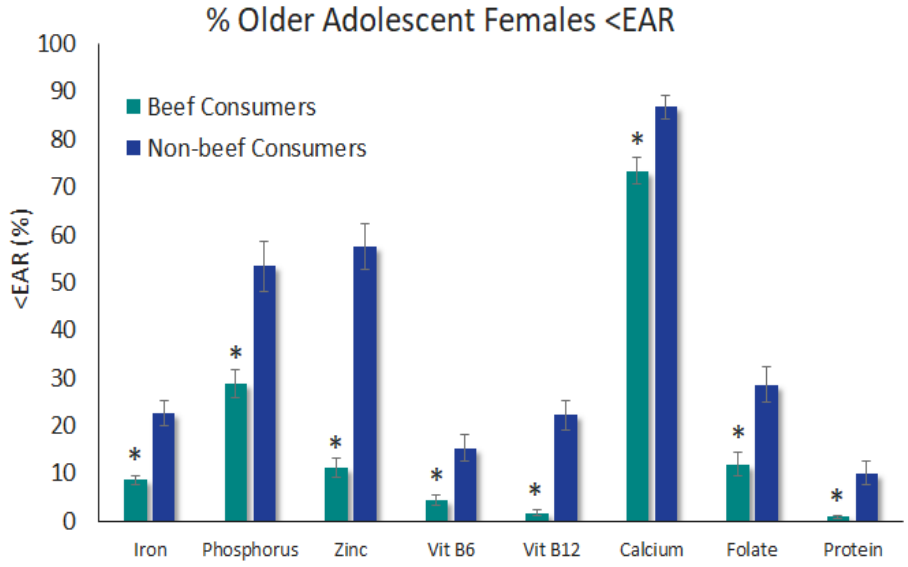
Nutrient adequacy improves with the inclusion of protein-rich animal-source foods in adolescents

https://pubmed.ncbi.nlm.nih.gov/31121847/; https://pubmed.ncbi.nlm.nih.gov/33007917/; https://pubmed.ncbi.nlm.nih.gov/38068854/

Nutrient Adequacy & Protein-rich Foods

NHANES analyses in adolescent girls

consuming high quality protein-rich food



Synergies exist when including protein

of mixed plant and animal-source foods

- *Systematic Review in young people:*

Dietary Pattern	Risk of Inadequacy	Favorably High
Vegan	Vit B12, Vit D Calcium, Iron, Zinc	PUFA, Fiber Vit C, Vit E, Folate
Vegetarian	Vit B12, Vit D, PUFA, Fiber, Calcium, Iron, Zinc	Vit E, Folate
Omnivorous (meat)	Vit D, Vit E, Folate, PUFA, Fiber, Calcium	Vit B12, Zinc

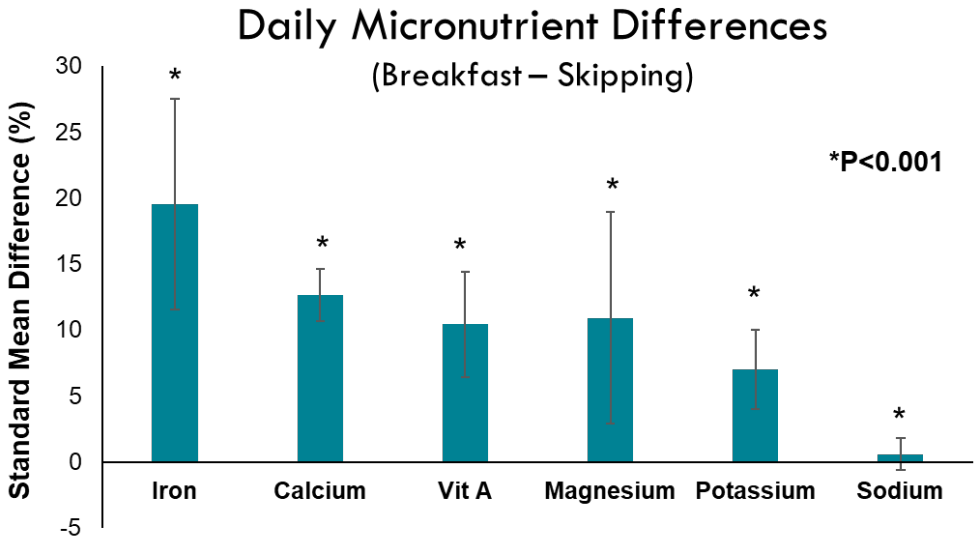
- *NHANES analyses proposes a 1:1 ratio of animal to plant*

https://pubmed.ncbi.nlm.nih.gov/33092061/

Importance of Breakfast

Systematic Reviews & Meta-analyses examining breakfast interventions

on micronutrient intakes in children & adolescents



Breakfast increases daily micronutrient intake & may help in meeting nutrient needs in this vulnerable life stage

https://jissn.biomedcentral.com/articles/10.1186/s12970-019-0272-0; Leidy HJ, et al.. AJCN, 2015; Leidy HJ, et al.; Obesity Sept 23(9): 1761-4; 2015; Bauer L; Int J Obesity; Sept 39(9): 1421-4, 2015

Importance of Protein @ Breakfast

Nutrient Adequacy

Breakfast Intervention Studies

Acute & Long-term Breakfast Studies in Teens

Providing Normal Protein, High Protein, or No Breakfasts

	BREAKFAST SKIPPING (SKIP)	NORMAL-PROTEIN BREAKFAST (NP)	HIGHER-PROTEIN BREAKFAST (HP)
ENERGY (kcal/d)	0	350	350
PROTEIN (g)	0	10	30
CARBOHYDRATES (g)	0	55	35
TOTAL FAT (g)	0	10	10
SATURATED FAT(g)	0	3	3
ADDED SUGAR (g)	0	10	0
FIBER (g)	0	8	8

Daily Value%

- 61% Protein
- 29% Fiber
- 25% Calcium
- 15% Iron
- 40% Niacin
- 45% B_6
- 20% B_{12}
- 45% Zinc

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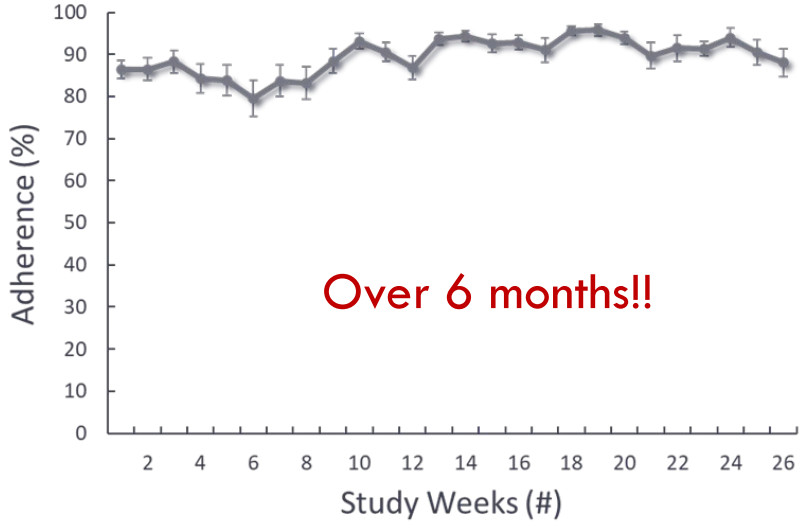

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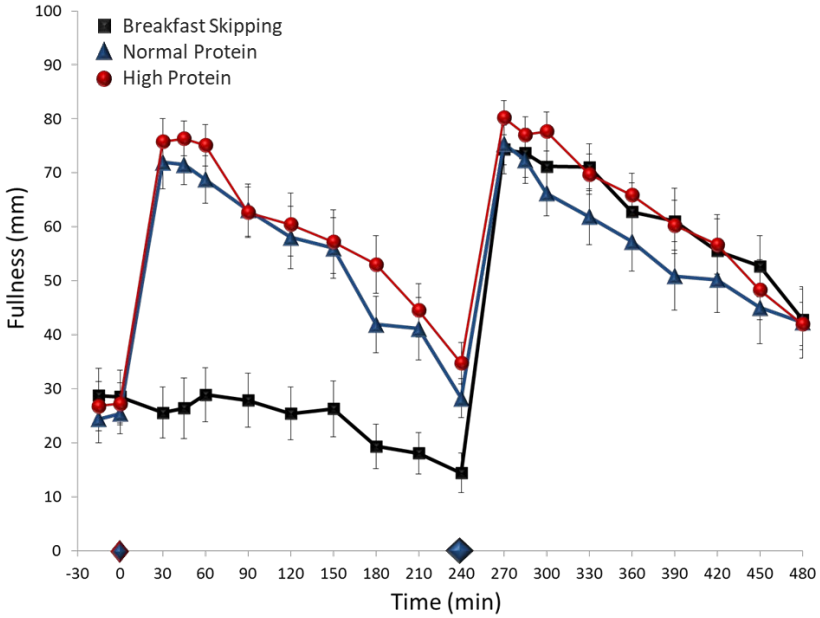
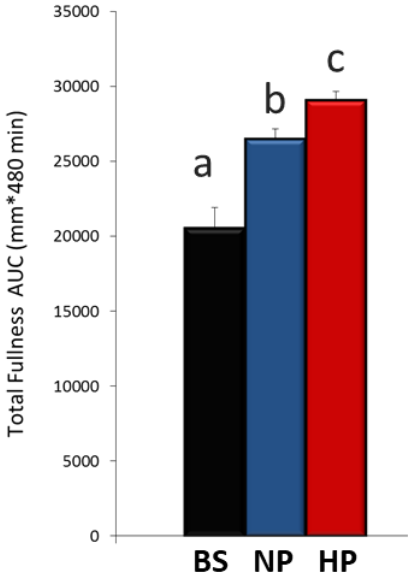




Protein @ breakfast improves appetite control & satiety

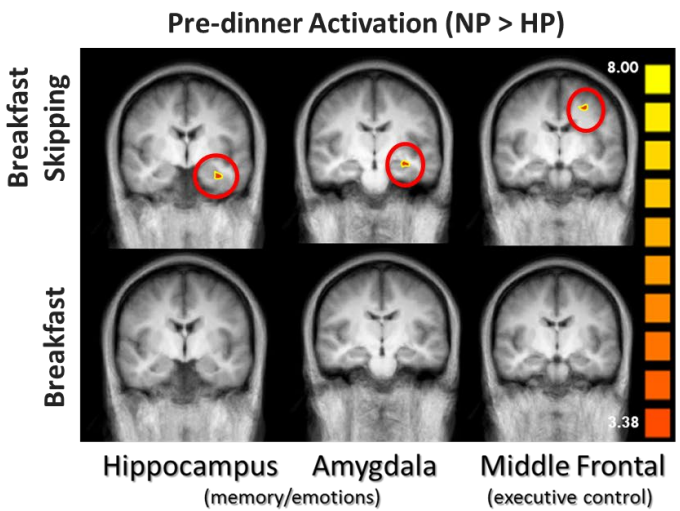
https://jissn.biomedcentral.com/articles/10.1186/s12970-019-0272-0; Leidy HJ, et al.. AJCN, 2015; Leidy HJ, et al.; Obesity Sept 23(9): 1761-4; 2015; Bauer L; Int J Obesity; Sept 39(9): 1421-4, 2015

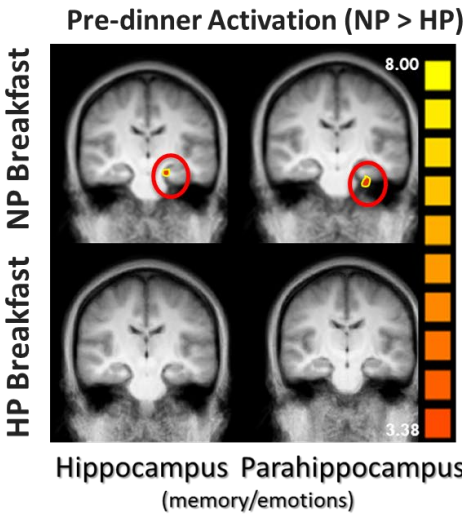
Breakfast Intervention Studies

Acute & Long-term Breakfast Studies in Teens

Providing Normal Protein, High Protein, or No Breakfasts

fMRI Brain Imaging





Protein @ breakfast reduces food cravings & reward

https://jissn.biomedcentral.com/articles/10.1186/s12970-019-0272-0; Leidy HJ, et al.. AJCN, 2015; Leidy HJ, et al.; Obesity Sept 23(9): 1761-4; 2015; Bauer L; Int J Obesity; Sept 39(9): 1421-4, 2015

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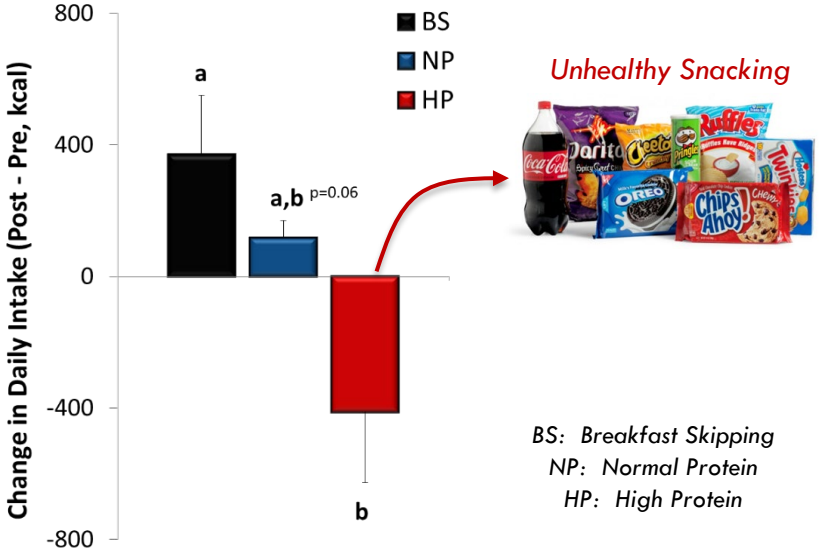

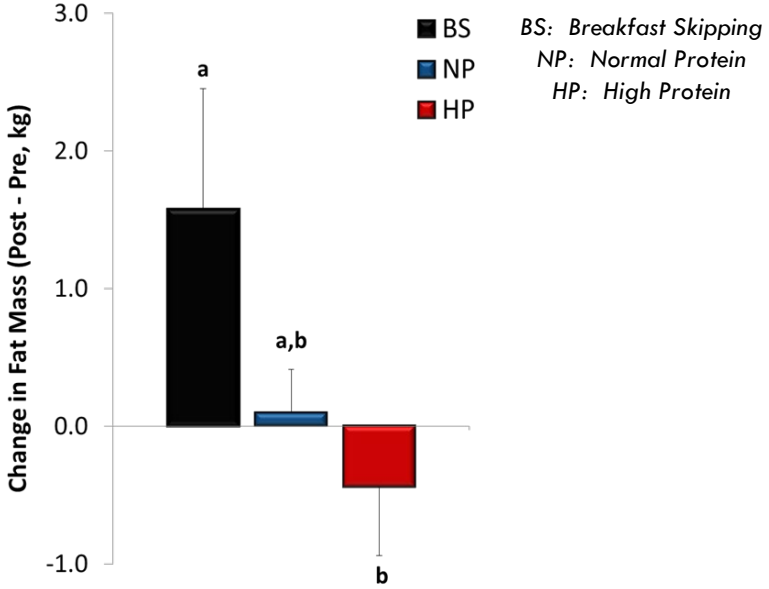

Protein @ breakfast improves indices of weight management

https://jissn.biomedcentral.com/articles/10.1186/s12970-019-0272-0; Leidy HJ, et al.. AJCN, 2015; Leidy HJ, et al.; Obesity Sept 23(9): 1761-4; 2015; Bauer L; Int J Obesity; Sept 39(9): 1421-4, 2015

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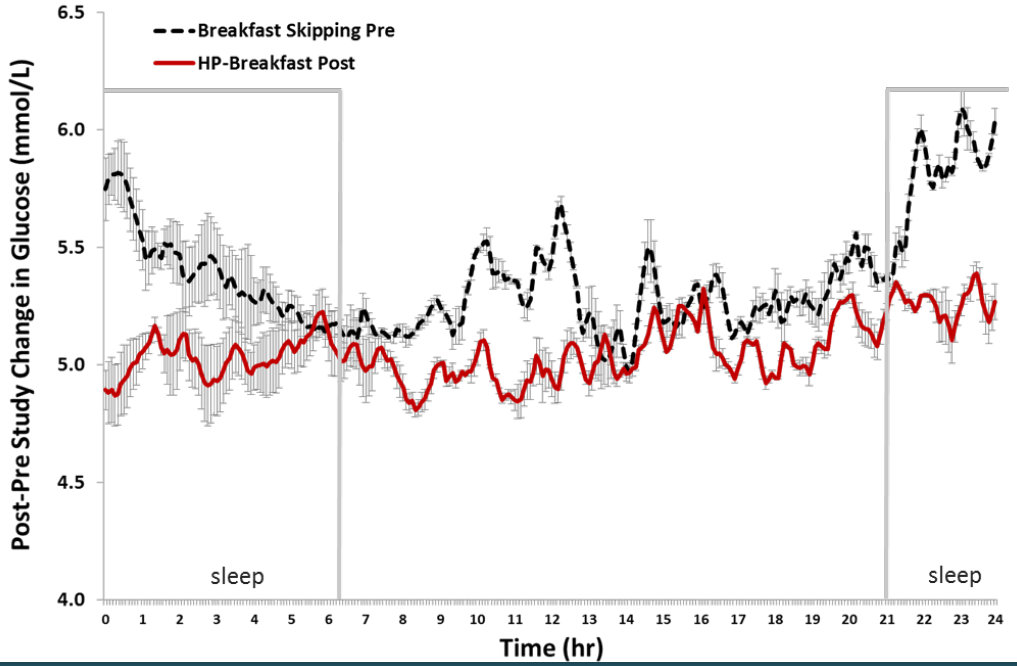

Protein @ breakfast improves glucose control

https://jissn.biomedcentral.com/articles/10.1186/s12970-019-0272-0; Leidy HJ, et al.. AJCN, 2015; Leidy HJ, et al.; Obesity Sept 23(9): 1761-4; 2015; Bauer L; Int J Obesity; Sept 39(9): 1421-4, 2015

Importance of Protein @ Breakfast

- Weight Management
- Nutrient Adequacy
- Appetite Control
- Glucose Control
- Satiety
- Acceptability
- Sleep Health
- Strength
- Food Choice/ Snacking

Translating the Evidence: 6 months – 2 years

- Human milk continues to be the best as main source of (most) nutrients
- Incorporation of 1-2 oz meat/day as 1st (complementary) food

  - *Nutrient-rich: Iron, Zinc, B12*
  - *Flavors & Textures:*
    - ✓ *Supports oral & motor development*
    - ✓ *Enhances discovery & learning – food acceptance*

Translating the Evidence: 2+ Years

- Dairy & protein needs remain high so capitalize on that!
- 1 ½ - 2 servings of high quality protein/eating occasion
  - 15-20 g protein in children
  - 24-30 g/breakfast in teens
- Include protein variety & healthier options
- Include spices & cultural preferences
- Mindful of time & convenience
- Additional benefits with protein @ breakfast, especially family-based

Image Credit: Shutterstock #114544615

https://www.wabeef.org/recipes/recipe/5748/beef-sausage-egg-muffin-cups

Example Breakfasts

Beef Sausage & Egg Muffin Cups

Recipe:

- 1 lb Beef Breakfast Sausage*
- 4 ½ ounces green chilis
- ½ cup shredded reduced-fat Monterey Jack cheese
- 5 large eggs
- ¼ cup reduced-fat milk
- 1-2 teaspoons hot sauce

Toppings (optional):
Chopped green onions, tomato, salsa

Nutrition Facts

12 servings per container

Serving size	2 muffins
Amount Per Serving	
Calories	**220**
	% Daily Value*
Total Fat 12g	**15%**
Saturated Fat 5g	**25%**
Trans Fat 0.2g	
Cholesterol 220mg	**73%**
Sodium 450mg	**20%**
Total Carbohydrate 3g	**1%**
Dietary Fiber 1g	**4%**
Total Sugars 2g	
Includes 0g Added Sugars	**0%**
Protein 25g	**50%**

Not a significant source of vitamin D, calcium, iron, and potassium

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

https://www.wabeef.org/recipes/recipe/5748/beef-sausage-egg-muffin-cups

Example Breakfasts

Steak & Eggs Breakfast Tacos

Recipe:

- 12 oz Top Sirloin Steak)
- 2 tsp vegetable oil
- 6 small whole-wheat tortillas
- 1 ½ cups egg substitute
- 6 tsp reduced-fat shredded cheddar cheese
- 6 tbsp guacamole
- 6 tbsp salsa
- 6 tbsp plain Greek yogurt

Nutrition Facts

6 servings per container

Serving size	1 tacos
Amount Per Serving	
Calories	**240**
	% Daily Value*
Total Fat 8g	10%
Saturated Fat 4g	20%
Trans Fat 0g	
Cholesterol 225mg	75%
Sodium 520mg	23%
Total Carbohydrate 18g	7%
Dietary Fiber 2g	7%
Total Sugars 0g	
Includes 0g Added Sugars	0%
Protein 30g	60%

Not a significant source of vitamin D, calcium, iron, and potassium

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https://www.wabeef.org/recipes/recipe/5748/beef-sausage-egg-muffin-cups

Example Breakfasts

Apple Pie Overnight Oats

Recipe:

- ¼ cup oats
- ¼ cup cottage cheese
- ½ cup ultra-filtered milk
- ½ honeycrisp apples
- 1 tbsp maple syrup
- 1 tbsp peanut butter powder
- ½ tsp cinnamon
- pinch nutmeg

Nutrition Facts

1 servings per container

Serving size	1 container
Amount Per Serving	
Calories	**320**
	% Daily Value*
Total Fat 4g	5%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 15mg	5%
Sodium 260mg	11%
Total Carbohydrate 47g	17%
Dietary Fiber 6g	21%
Total Sugars 27g	
Includes 9g Added Sugars	18%
Protein 25g	50%

Not a significant source of vitamin D, calcium, iron, and potassium

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Example Breakfasts

Greek Yogurt Parfait

Recipe:

- 6 oz plain Greek yogurt
- ¼ cup frozen wild blueberries
- 3 tbsp high protein granola
- ½ honeycrisp apples
- 1 tsp almonds

Nutrition Facts

1 servings per container

Serving size	1 parfait
Amount Per Serving Calories	230
	% Daily Value*
Total Fat 6g	8%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 10mg	3%
Sodium 160mg	7%
Total Carbohydrate 18g	7%
Dietary Fiber 2g	7%
Total Sugars 5g	
Includes 0g Added Sugars	0%
Protein 26g	52%

Not a significant source of vitamin D, calcium, iron, and potassium

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Translating the Evidence: 2+ Years

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  - 15-20 g protein in children
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- Include protein variety & healthier options
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- Mindful of time & convenience
- Additional benefits with protein @ breakfast, especially family-based

Is it an unrealistic expectation of teens & most parents to have a high-quality breakfast?

Image Credit: Shutterstock #114544615

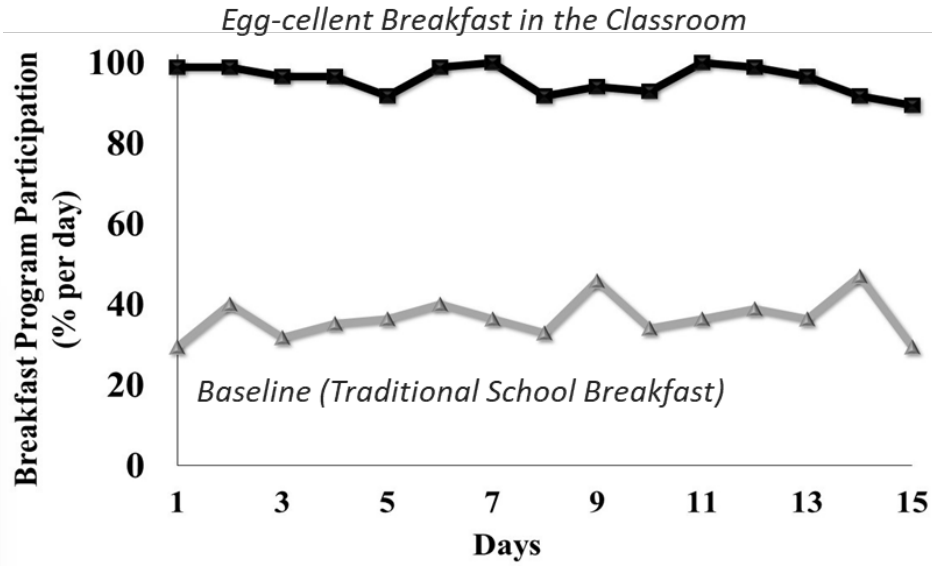
Translating the Evidence: 2+ Years - Alternative

School-based 'Breakfast in the Classroom' Intervention

Providing 'Egg-cellent Breakfasts to 585 middle school teens (Kansas City, KS)

Egg-cellent Breakfasts

Traditional



Summary

- From Birth thru adolescence, we continue to fall short of meeting all dietary recommendations and have nutrient inadequacy.
  - *Adolescents experience the greatest inadequacies as a result of poor diet quality & poor food choices*
- Successful nutrition interventions focusing on protein-rich breakfasts improve diet quality, nutrient adequacy, and health-related outcomes

Q & A

Funding:
The Beef Checkoff
Egg Nutrition Center
The Pork Checkoff
Kellogg
NIH

"The Leidy Lab"