

Promote Health & Well-being from Birth to Adolescence through Key Dietary Strategies

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Disclosures

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Owner	
Speakers Bureau	National Cattlemen's Beef Association
Stock Shareholder	
Employee	
Other	

- Speaker honorarium provided by the Kansas Beef Council and Midwest Dairy.
- Presentation content, thoughts, and opinions are my own.

Health Across the Lifespan

Establishing
Healthy Lifestyles

Optimizing
Healthy Lifestyles

Preserving
Healthy Lifestyles



*Physical, mental, & emotional health are priorities at every life stage
but even more so during adolescence*

The Perfect Storm:

Nutrient Needs:



The Perfect Storm: Nutrient Requirements

Narrative Review of nutrient needs during adolescents

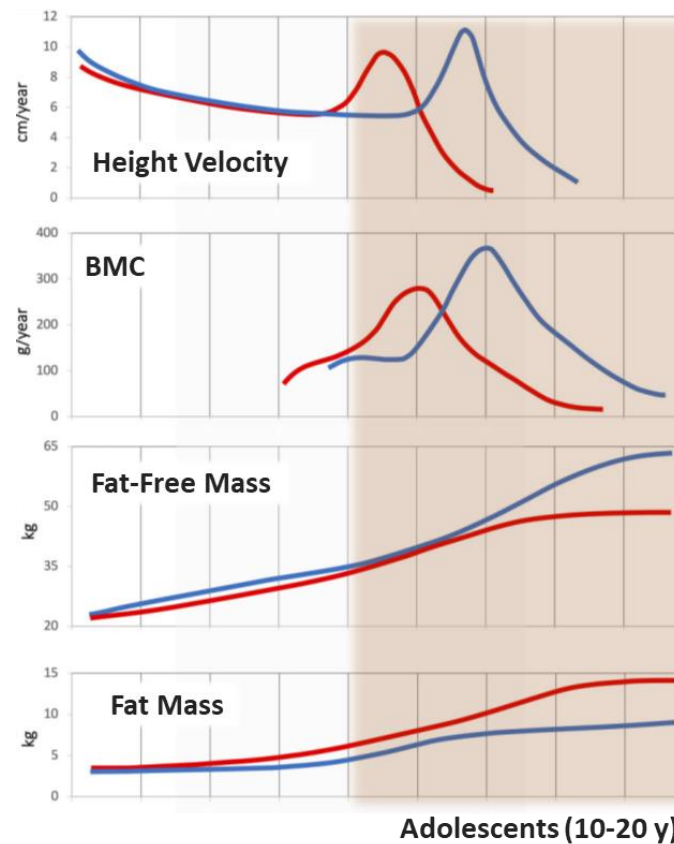
JM Saavedra & AM Prentice (2022)

Nutrient Needs:

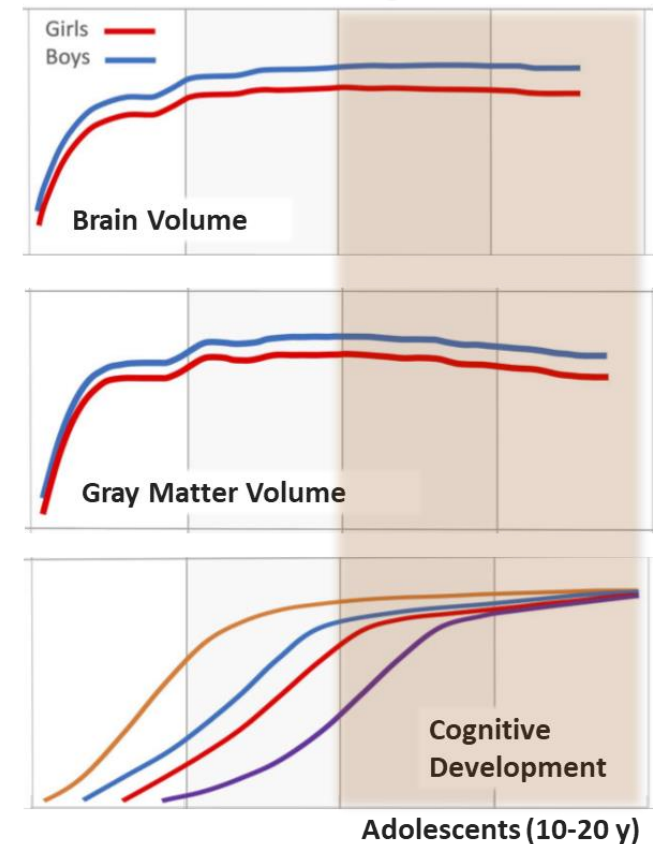


- Energy
- Protein
- Iron
- Calcium
- Zinc
- Vit D
- Folate
- Phosphorous
- Vit A
- Vit B12
- Omega-3s

Growth



Neural-Cognitive



The Perfect Storm:

Nutrient Needs:

>

- Energy
- Protein
- Iron
- Calcium
- Zinc
- Vit D
- Folate
- Phosphorous
- Vit A
- Vit B12
- Omega-3s



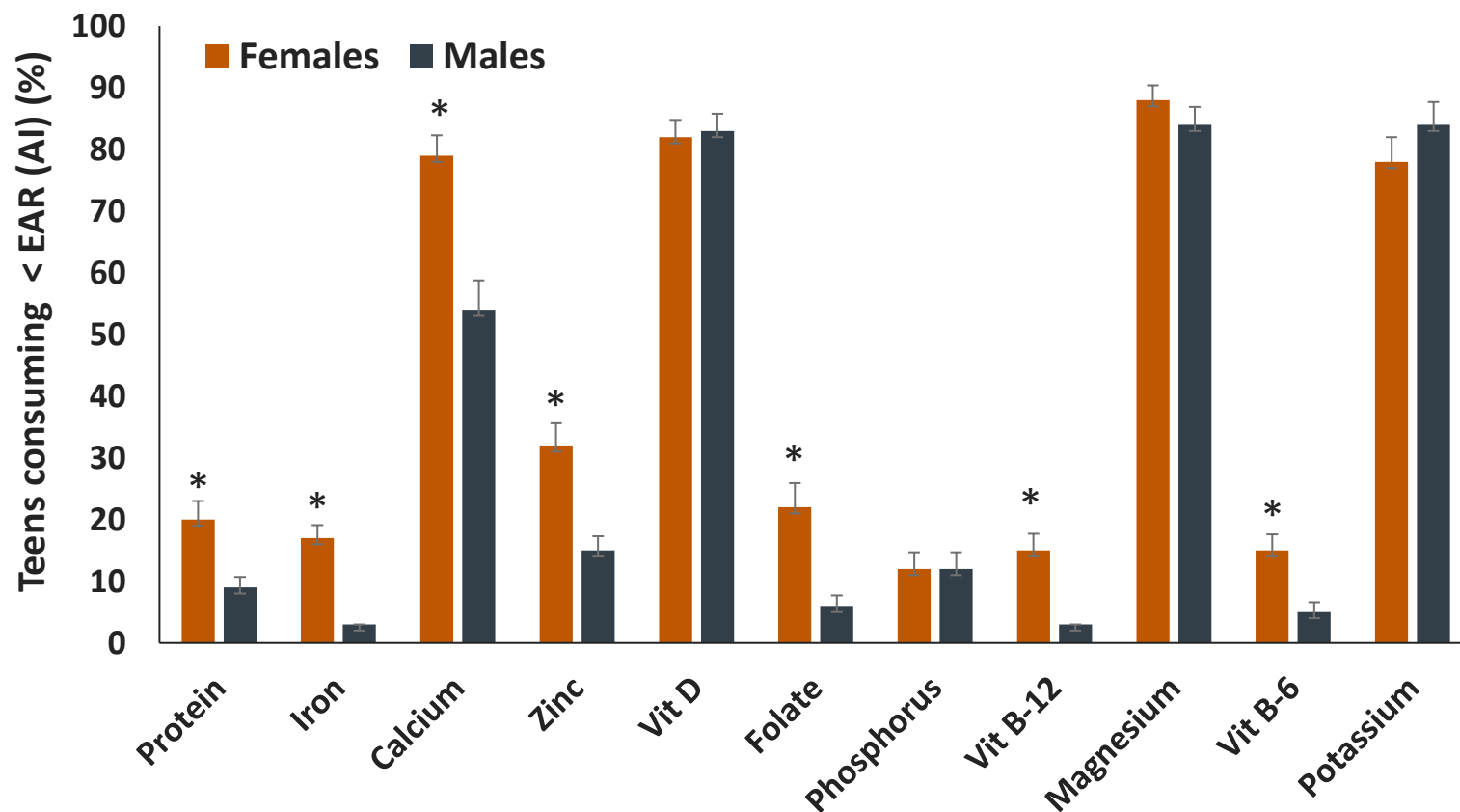
Nutrient Inadequacy:

>

- Protein (f)
- Iron (f)
- Calcium
- Zinc
- Vit D
- Folate (f)
- Phosphorous
- Vit A
- Vit B12 (f)
- Omega-3s
- Magnesium
- Potassium
- Fiber
- Vit B-6 (f)
- Choline

The Perfect Storm: Nutrient Inadequacy

What We Eat in America (NHANES 2015-2018) identifies key nutrients that are largely under-consumed in older teens ages 14-19 years of age



Older teens, especially females, have a high probability of nutrient inadequacy of key nutrients needed for growth during adolescence

The Perfect Storm:

Nutrient Needs:

>

Energy
Protein
Iron
Calcium
Zinc
Vit D
Folate
Phosphorous
Vit A
Vit B12
Omega-3s

Consumption of foods
to limit: >

Nutrient Inadequacy:

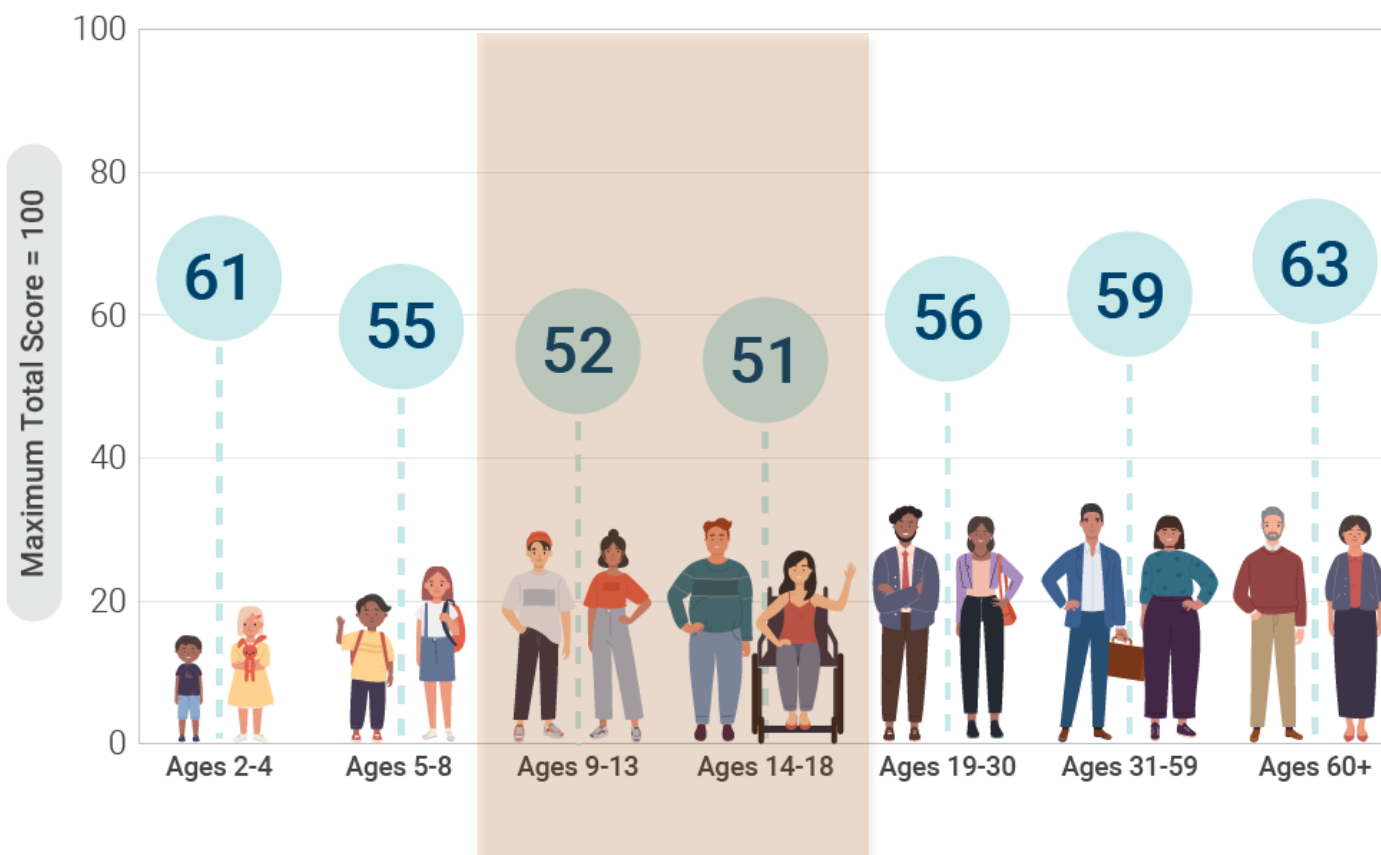
>

Protein (f)
Iron (f)
Calcium
Zinc
Vit D
Folate (f)
Phosphorous
Vit A
Vit B12 (f)
Omega-3s
Magnesium
Potassium
Fiber
Vit B-6 (F)
Choline



The Perfect Storm: Diet Quality

Healthy Eating Index (HEI)



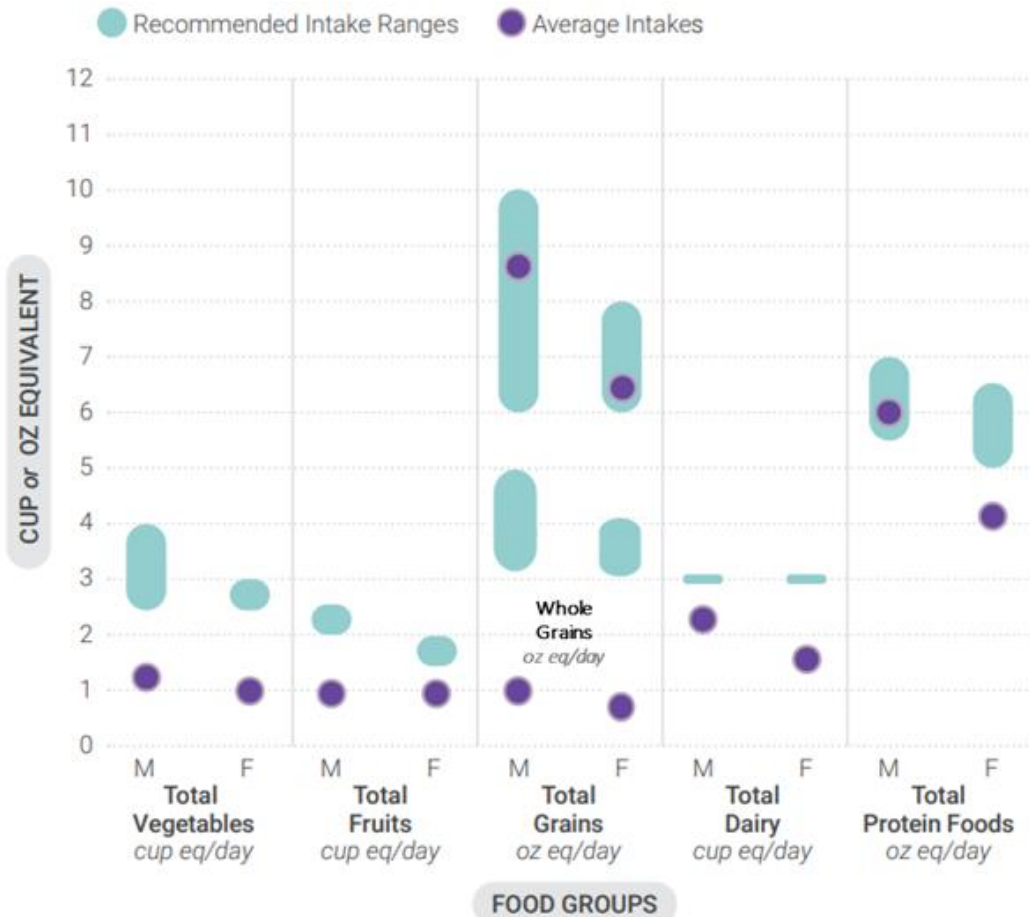
The Healthy Eating Index Score

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

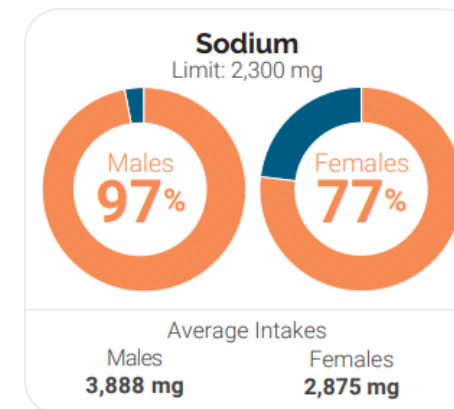
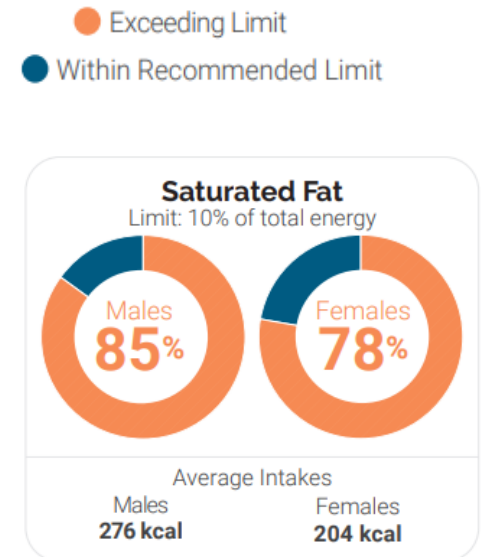
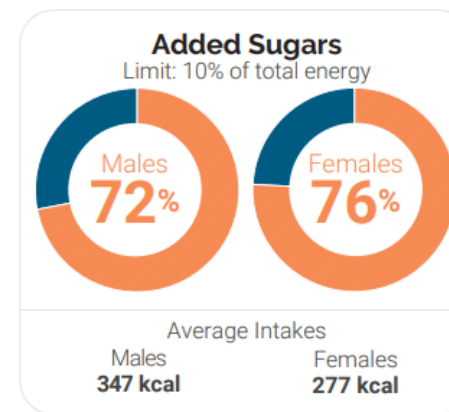
Older teens exhibit the lowest diet quality among all life stages

The Perfect Storm: Diet Quality

Average Daily Food Group Intakes (14-18 y)



% Teens (14-18 y) Exceeding Limits:



The Perfect Storm:

Physical Activity: >

Physical Inactivity: >

Sleep Needs: >

Poor Sleep Health: >

Psychosocial Needs: >

Self-Image/Worth: <

Nutrient Needs: >

Consumption of foods to limit: >

Nutrient Inadequacy: >

Energy
Protein
Iron
Calcium
Zinc
Vit D
Folate
Phosphorous
Vit A
Vit B12
Omega-3s

Protein (f)
Iron (f)
Calcium
Zinc
Vit D
Folate (f)
Phosphorous
Vit A
Vit B12 (f)
Omega-3s
Magnesium
Potassium
Fiber
Vit B-6 (F)
Choline



(Are We) Growing up Healthy?



Implications

- 80% teens with unhealthy body fat become adults with obesity
 - Older teens have a 41% lower odds of successful weight loss/maintenance than younger teens
- Depression in young people was the leading cause of adult:
 - Anxiety
 - Substance Use Disorders
 - Poor Health & Reduced Well-being
- Critical need for behavioral strategies personalized for teens.

The Perfect Storm:

Physical
Activity: >

Physical
Inactivity: >

Sleep
Needs: >

Poor Sleep
Health: >

Psychosocial
Needs: >

Self-
Image/Worth: <

Nutrient Needs:
>

Nutrient Inadequacy:
>

Consumption of foods
to limit: >

Energy
Protein
Iron
Calcium
Zinc
Vit D
Folate
Phosphorous
Vit A
Vit B12
Omega-3s

Protein (f)
Iron (f)
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Vit A
Vit B12 (f)
Omega-3s
Magnesium
Potassium
Fiber
Vit B-6 (F)
Choline

<1.5% of RCTs
include children & adolescents

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
- Macronutrients/Energy

Specific Foods & Breakfast

- Healthy eating plans
- School-based

Compared to control, interventions elicited:

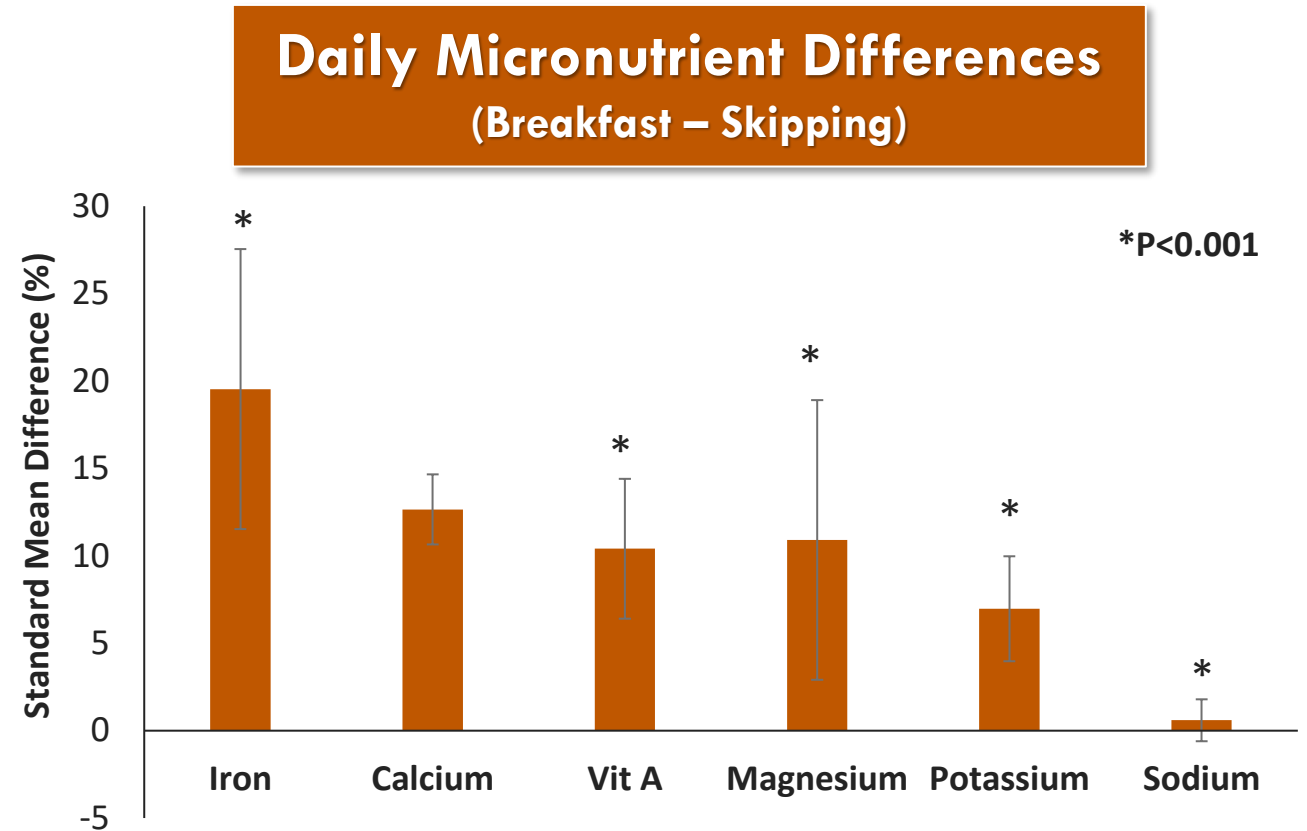
- ↓ Daily Energy
- ↑ Fruit & Vegetable Intake
- ↓ SSB Intake
- ↓ Energy-dense, Nutrient-poor Foods

up to 12 months

Nutrition Intervention Strategies: Breakfast

Systematic Reviews & Meta-analyses examining breakfast interventions on micronutrient intakes in children & adolescents

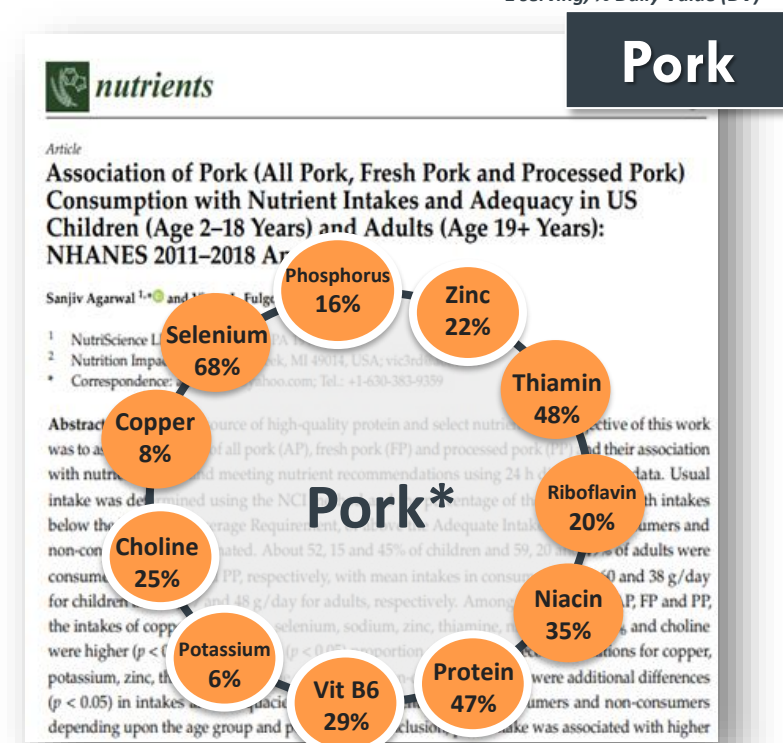
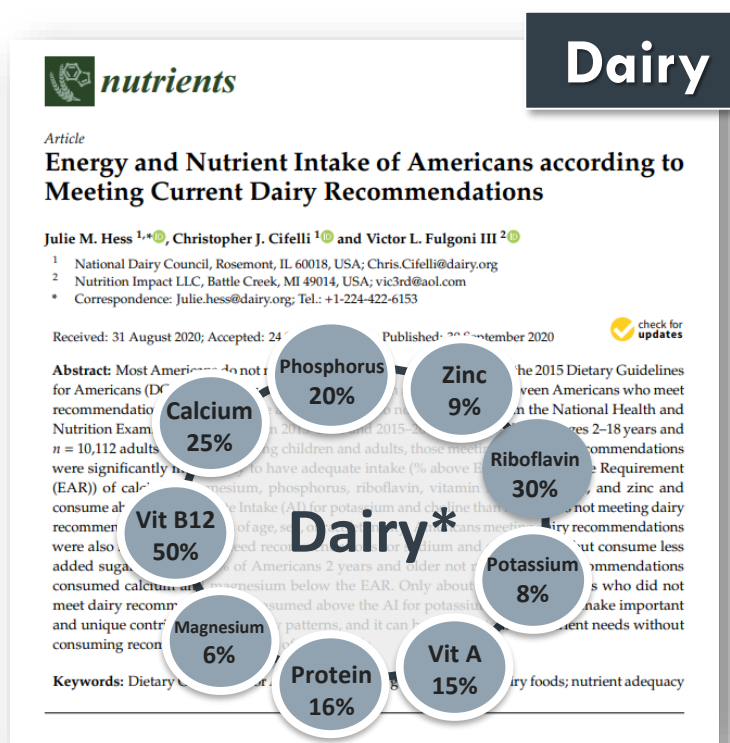
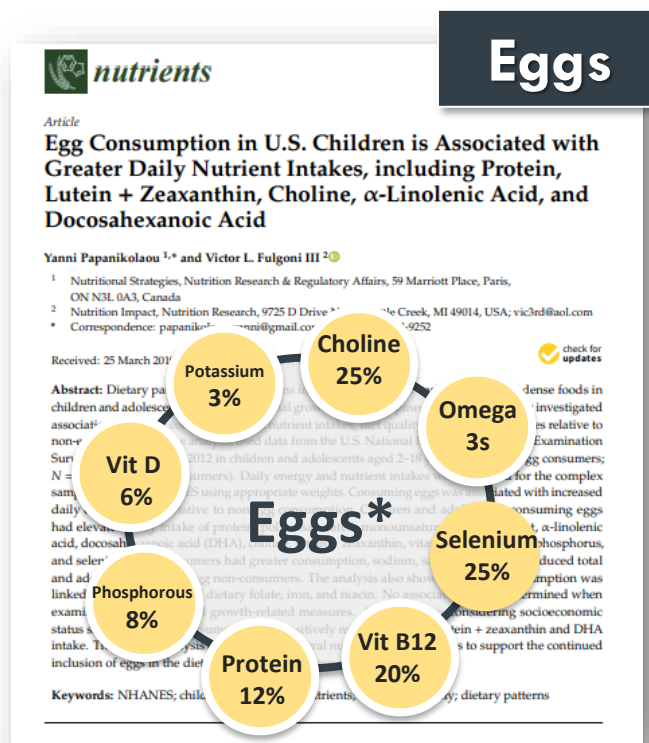
- Gimenez-Legarre, N., et al., 2020
- 33 studies in systematic review
 - 33% were in the USA
 - 12% were adolescents
 - 67% ready-to-eat cereal (RTEC)
 - 91% cross-sectional studies
- 7 studies in meta-analysis



Nutrition Intervention Strategies: Animal-source Foods

NHANES analyses examining eating habits among teens that include animal source foods and nutrient adequacy

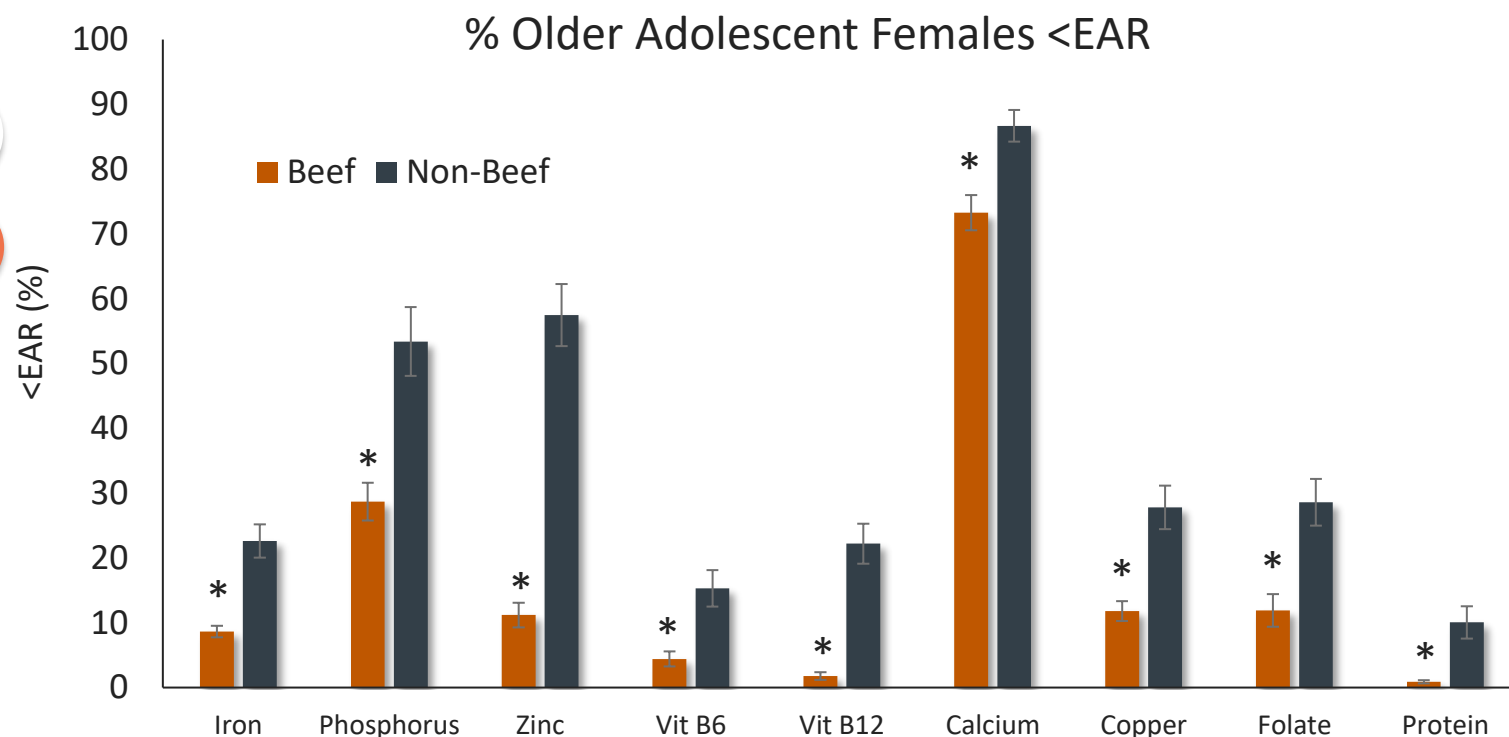
*1 serving, % Daily Value (DV)



Nutrient adequacy improves with the inclusion of high-quality animal-source foods

Nutrition Intervention Strategies: Animal-source Foods

NHANES analyses examining eating habits among teens that include animal source foods and nutrient adequacy



Research: “Power of Protein” @ Breakfast in Teens

Summary of intervention studies (7d - 6mo) highlighting the benefits of increased dietary protein at breakfast on health outcomes in teens ages 13-21 y

	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

- 60% Protein
- 29% Fiber
- 25% Calcium
- 15% Iron
- 40% Niacin
- 45% B₆
- 20% B₁₂
- 45% Zinc

Research: “Power of Protein” @ Breakfast in Teens

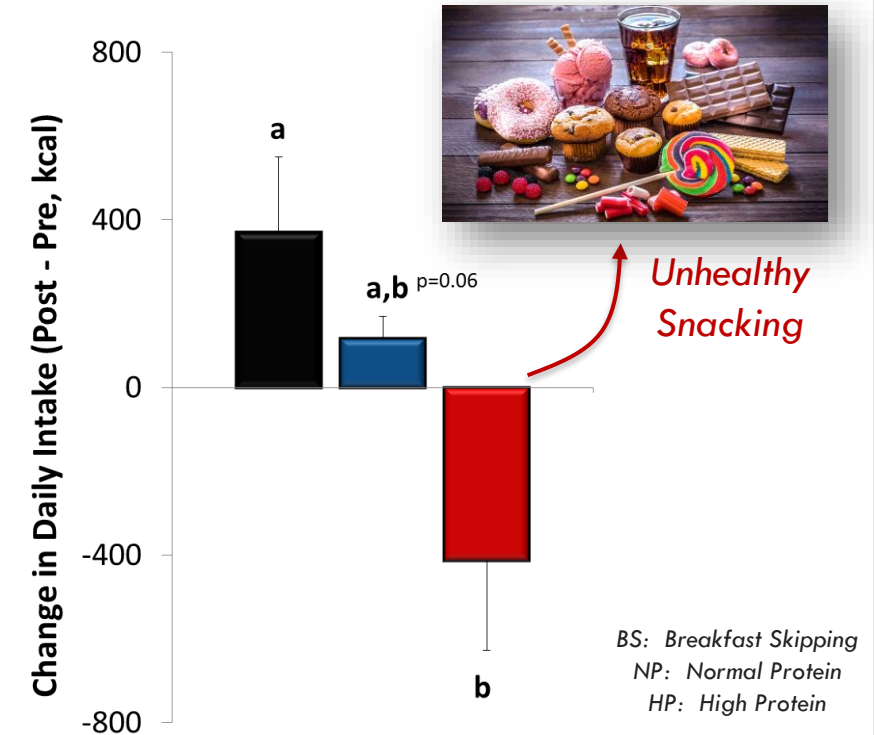
Summary of intervention studies (7d - 6mo) highlighting the benefits of increased dietary protein at breakfast on health outcomes in teens ages 13-21 y



Research: “Power of Protein” @ Breakfast in Teens

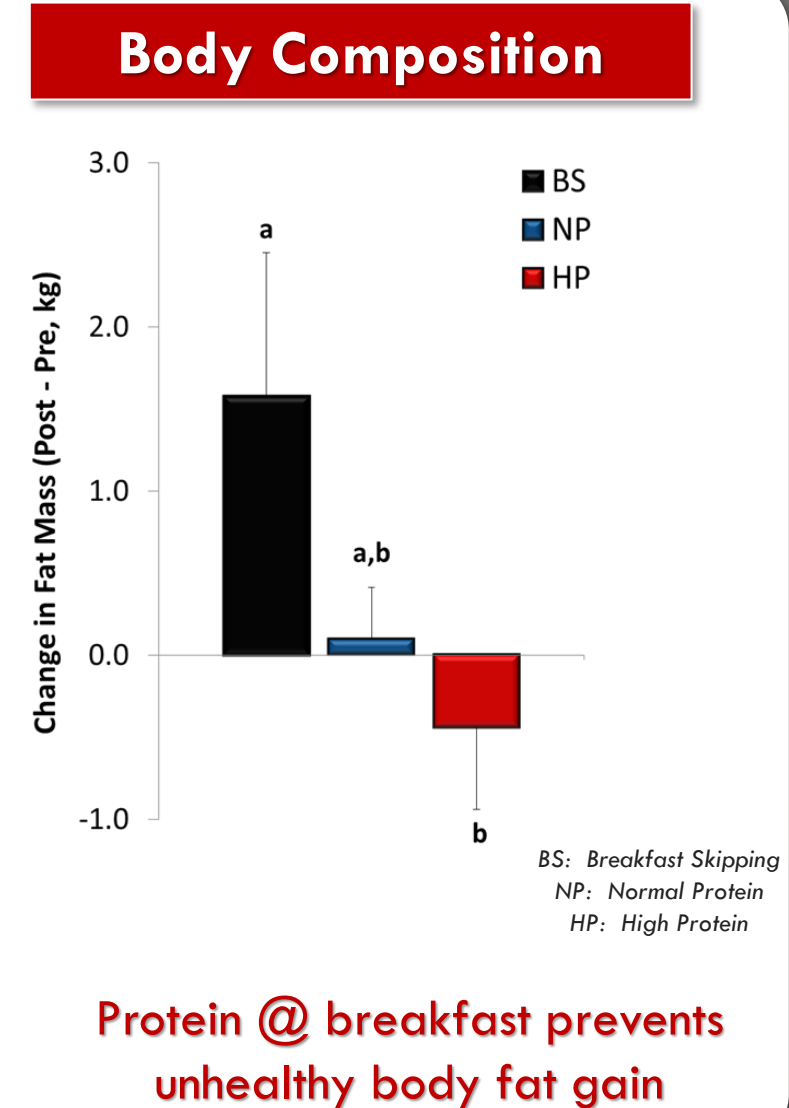


Daily Intake & Diet Quality

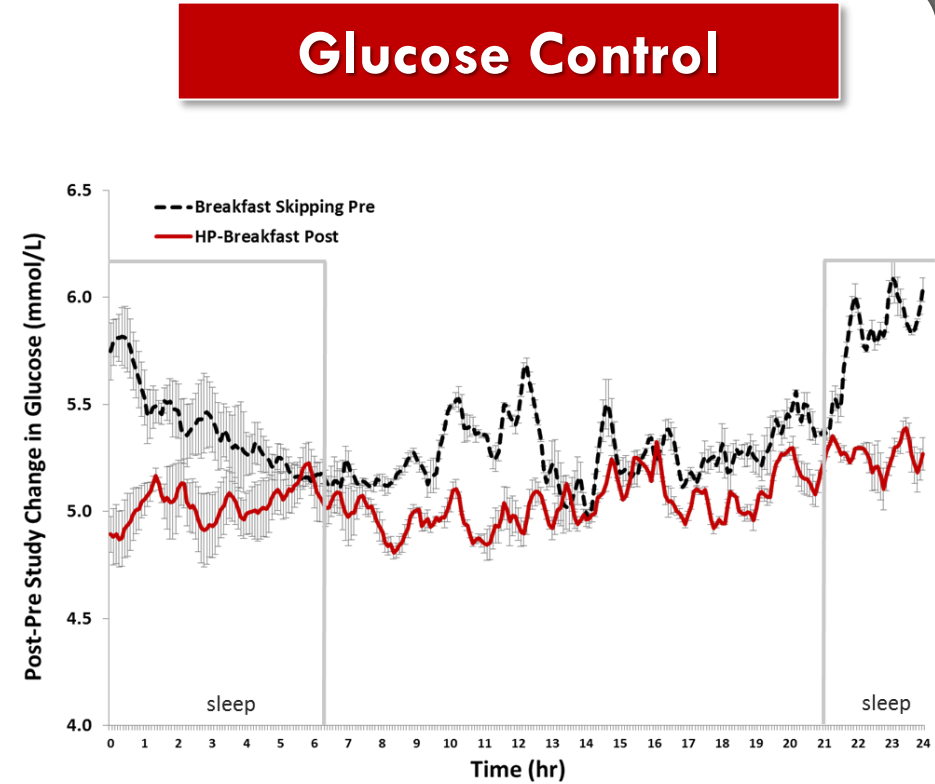


**Protein @ breakfast
decreased daily food intake
primarily evening snacking**

Research: “Power of Protein” @ Breakfast in Teens



Research: “Power of Protein” @ Breakfast in Teens

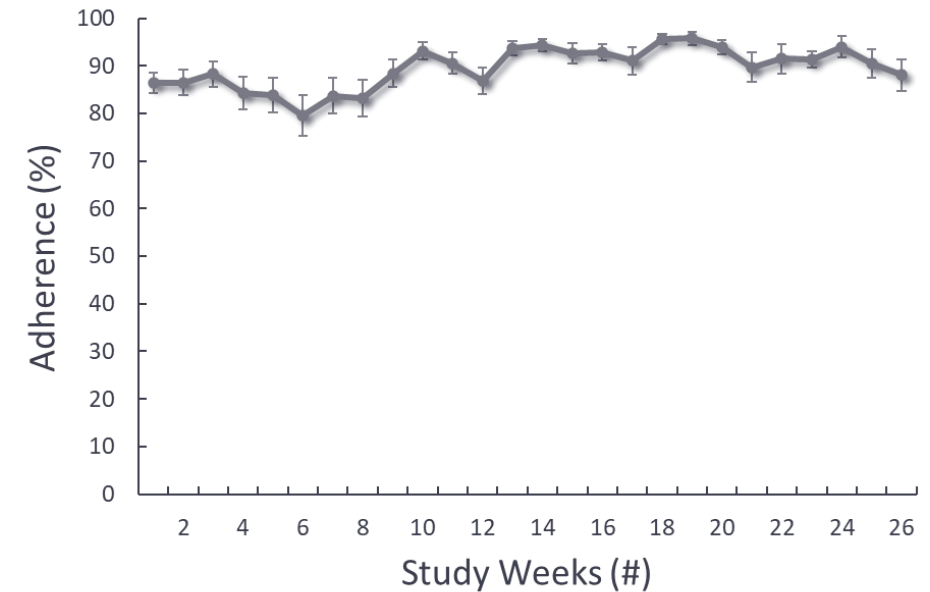


Protein @ breakfast improve glucose control throughout the day

Research: “Power of Protein” @ Breakfast in Teens



Adherence & Acceptability



**Protein @ breakfast is well-liked
& sustainable over the long-term!**
“if you built it.....”

From Research to Real-Eating

Recommendations:

- Dairy & protein needs remain high so capitalize on that!
- 1 ½ - 2 servings of high quality protein/eating occasion
- Include protein variety & healthier options
- Include spices & cultural preferences – taste & familiarity is key
- Mindful of time & convenience



- Additional benefits with protein @ breakfast, especially family-based

From Research to Real-Eating

Tasty AND healthy

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.	

From Research to Real-Eating

Tasty AND healthy

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

*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.

From Research to Real-Eating

Portable

Apple Pie Overnight Oats



Recipe:

- 1/4 cup oats
- 1/4 cup cottage cheese
- 1/2 cup ultra-filtered milk
- 1/2 honeycrisp apples
- 1 tbsp maple syrup
- 1 tbsp peanut butter powder
- 1/2 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

*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.

From Research to Real-Eating

Portable

Greek Yogurt Parfait



Recipe:

- 6 oz plain Greek yogurt
- 1/4 cup frozen wild blueberries
- 3 tbsp high protein granola
- 1/2 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

*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.

From Research to Real-Eating

Available

- School-based 'Breakfast in the Classroom' (BIC)
 - 585 middle school teens (Kansas City, KS)
 - 'Egg-cellent' Breakfast vs. Traditional Foods

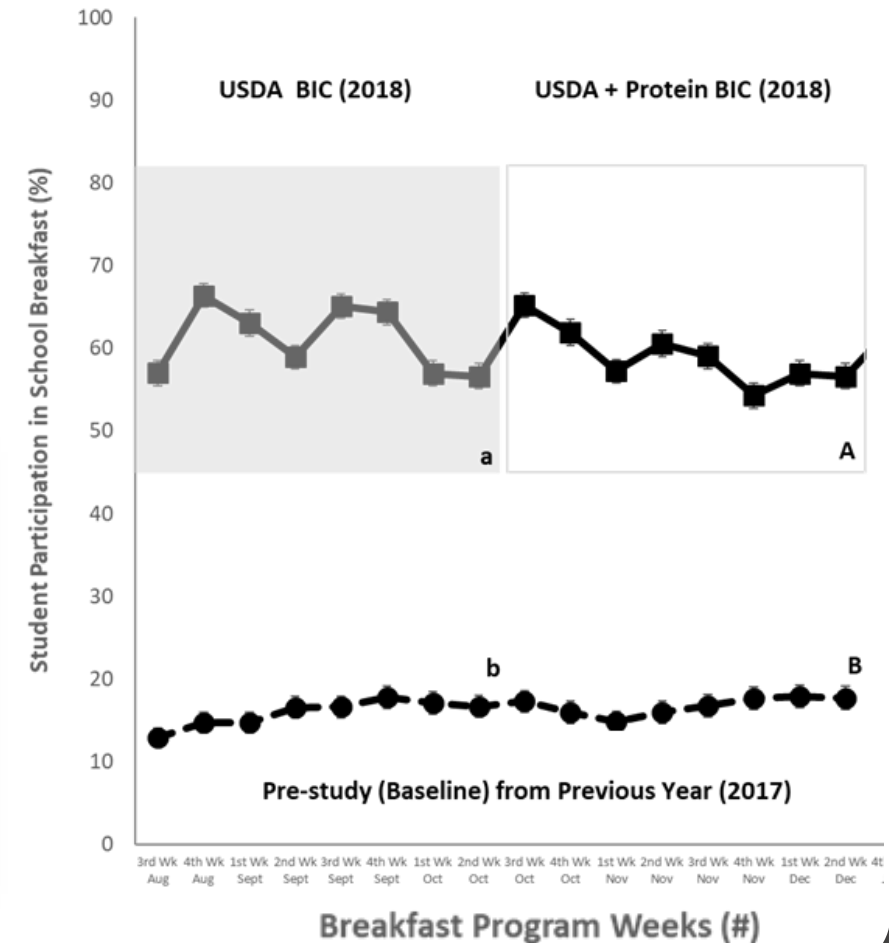
BIC Foods Offered



'Egg-cellent' BIC Foods Offered



Participation



Summary

- Adolescence is a critical life stage for growth & development, yet most US teens experience significant nutrient inadequacies as a result of greater nutrient needs in combination with poor diet quality & food choices
- Successful nutrition interventions need to be personalized & include whole-food approaches.
 - *High quality breakfast, particularly one rich in high-quality animal proteins, is one potential strategy*



Summary

Funding:

- *National Institutes of Health*
- *Beef Checkoff*
- *National Dairy Council*
- *Egg Nutrition Center*
- *National Pork Board*

“The Leidy Lab”

