

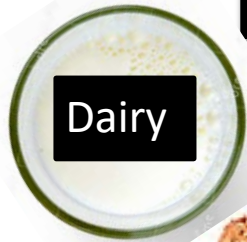
The Magic of Breakfast

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Robert Murray MD FAAP



2010 Dietary Guidelines

A Quality Dietary Pattern = Health



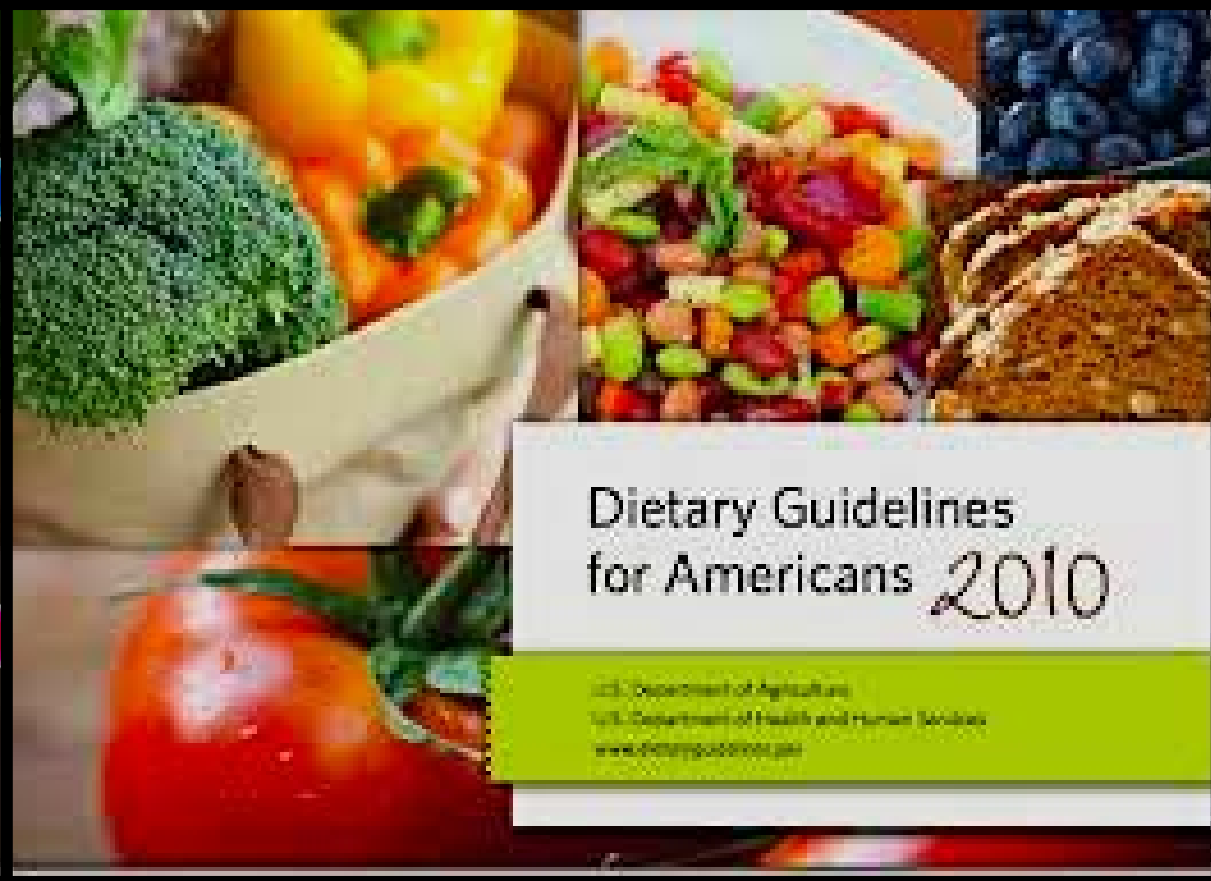
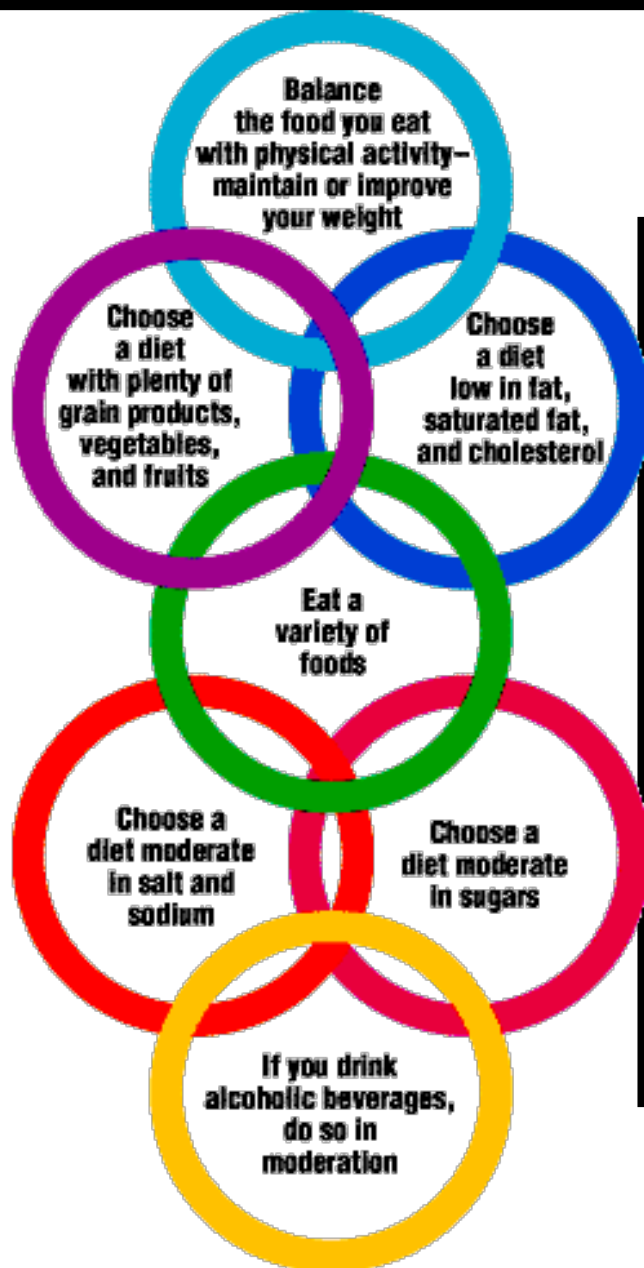
- Heart Disease
- Stroke
- Diabetes
- Obesity
- Hypertension
- Metabolic diseases
- Osteoporosis
- Cancers
- Alzheimer's
- Depression

A Healthful Diet Pattern

- Plant oils
- Fish & seafood
- Lean meats
- Legumes
- Nuts & seeds
- Vegetables
- Fruits and 100% juices
- Dairy & yogurt
- Whole grains
- Wine
- Dark chocolate
- Coffee



Dietary Patterns are personal—
preferences, experiences, culture.
Improvements are *incremental*



Healthy, Hunger-Free Kids Act of 2010

(Pub.L. 111–296)

- Meals based on Dietary Guidelines / IOM
 - *More*: whole grains, fruits/veggies, protein, H₂O
 - *Less*: saturated fat, sodium, added sugar
- New standards for child-care sites
- Local farm-to-school efforts
- Improved commodity food quality
- Food safety standards and rules
- Education for school nutrition staff
- ***USDA given authority over all foods****

School Meals (USDA, 2018)

School Lunch (NSLP)

- 30 million/ day
- \$13.8 billion investment
- 4.9 billion lunches/ year
 - 20.2 million free
 - 1.8 million reduced price (student pays \$0.40)
 - 7.7 million full price

School Breakfast (SBP)

- 14.6 million/ day
- \$4.4 billion investment
- 2.4 billion breakfasts/ year
 - 11.7 million free
 - 0.77 million reduced price
 - 2.1 million full price



Over 50% of America's Children Qualify for Free/ RP Meals at School

Component	Maximum points	Standard for maximum score	Standard for minimum score of zero
Adequacy:			
Total Fruits ²	5	≥0.8 cup equivalent per 1,000 kcal	No Fruit
Whole Fruits ³	5	≥0.4 cup equivalent per 1,000 kcal	No Whole Fruit
Total Vegetables ⁴	5	≥1.1 cup equivalent per 1,000 kcal	No Vegetables
Greens and Beans ⁴	5	≥0.2 cup equivalent per 1,000 kcal	No Dark-Green Vegetables or Legumes
Whole Grains	10	≥1.5 ounce equivalent per 1,000 kcal	No Whole Grains
Dairy ⁵	10	≥1.3 cup equivalent per 1,000 kcal	No Dairy
Total Protein Foods ⁴	5	≥2.5 ounce equivalent per 1,000 kcal	No Protein Foods
Seafood and Plant Proteins ^{4,6}	5	≥0.8 ounce equivalent per 1,000 kcal	No Seafood or Plant Proteins
Fatty Acids ⁷	10	(PUFAs + MUFAs) / SFAs ≥2.5	(PUFAs + MUFAs)/SFAs ≤1.2
Moderation:			
Refined Grains	10	≤1.8 ounce equivalent per 1,000 kcal	≥4.3 ounce equivalent per 1,000 kcal
Sodium	10	≤1.1 grams per 1,000 kcal	≥2.0 grams per 1,000 kcal
Added Sugars	10	≤6.5% of energy	≥26% of energy
Saturated Fats	10	≤8% of energy	≥16% of energy

2-5 yr olds: 59.9

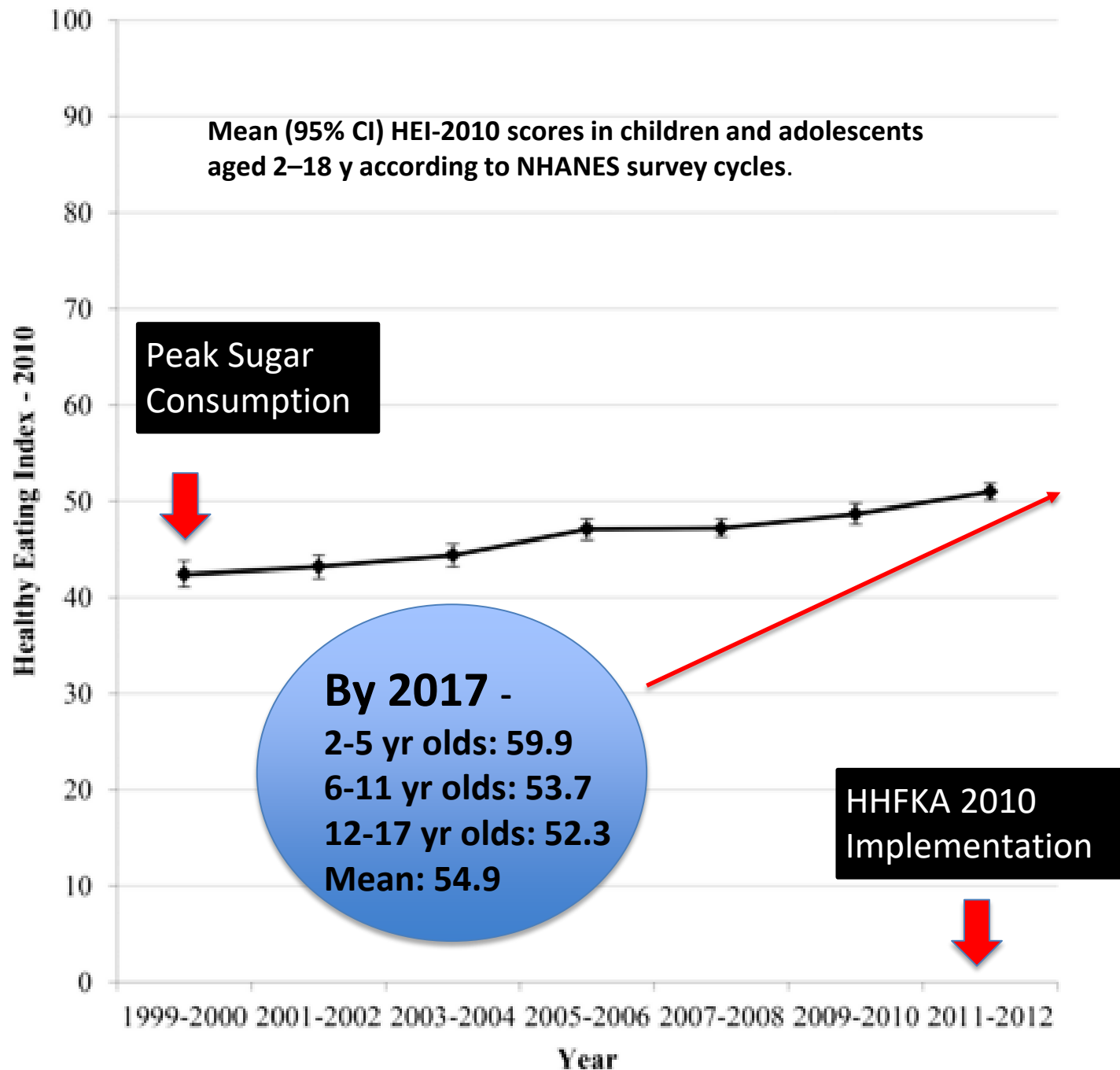
6-11 yr olds: 53.7

12-17 yr olds: 52.3

>65 yrs: 68

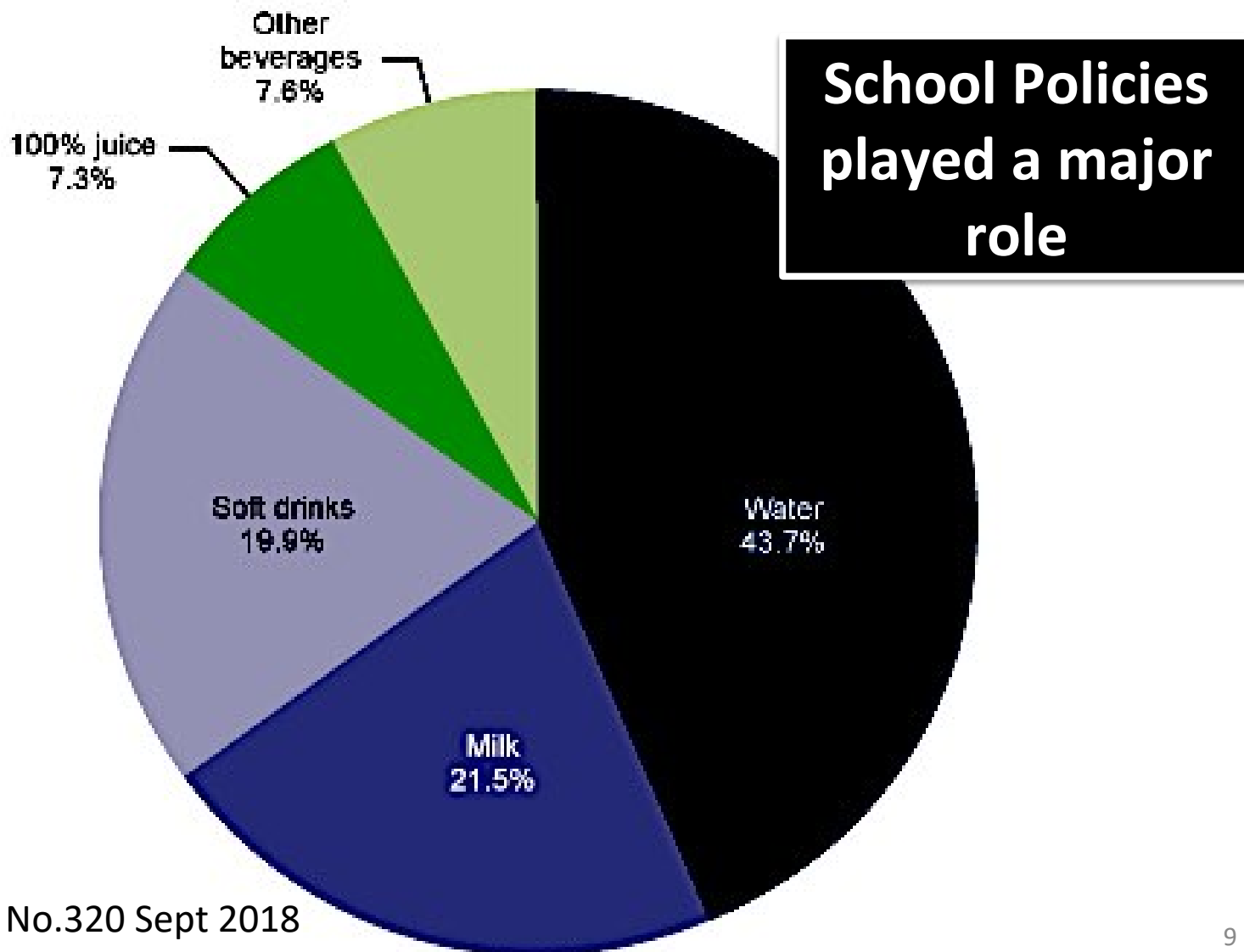


Trends in HEI 1999- 2012



Beverages: 2-19 yr olds, U.S.

NHANES 2013-2016





School Meals are *Quality Meals*

**Between SY 2009-10 and SY 2014-15
The total HEI-2010 meal scores increased:**

**School Lunches: from 58 to 82 out of 100 ideal
School Breakfasts: from 50 to 71 of 100 ideal**

Gearan and Fox, JAND, 2020:363-70

Rising School Breakfast Quality

National School Breakfast Program

- HEI 2010 Scores (2009-16)
 - increased from 50 to 71 pts per meal served
 - Lower in:
 - Refined grains: 95%
 - Sodium: 93%
 - Empty calories: 83%
 - Perfect scores (>95%) for:
 - **Total Fruit (whole & juice)**
 - **Whole Grains**
 - **Dairy**



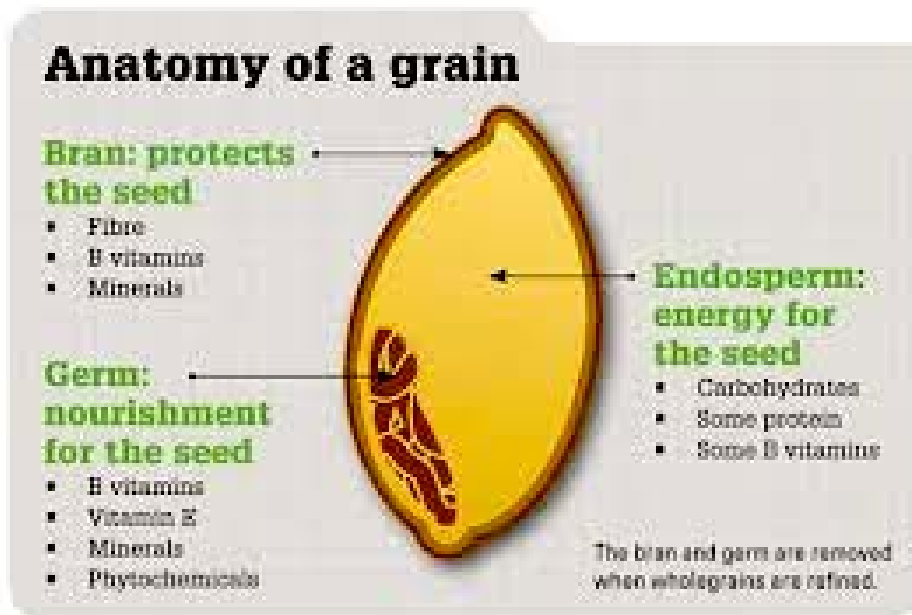
Gearan and Fox, JAND, 2020:363-70

Whole Grains @ Breakfast



14% energy
40% folate
35% iron
22% fiber

- Oatmeal, hot cereals
- Cold cereals
- Buckwheat pancakes
- Breads, quick breads
- Muffins
- Bagels
- Tortillas
- Crackers
- Brown rice



The Ready-to-eat Cereal Question

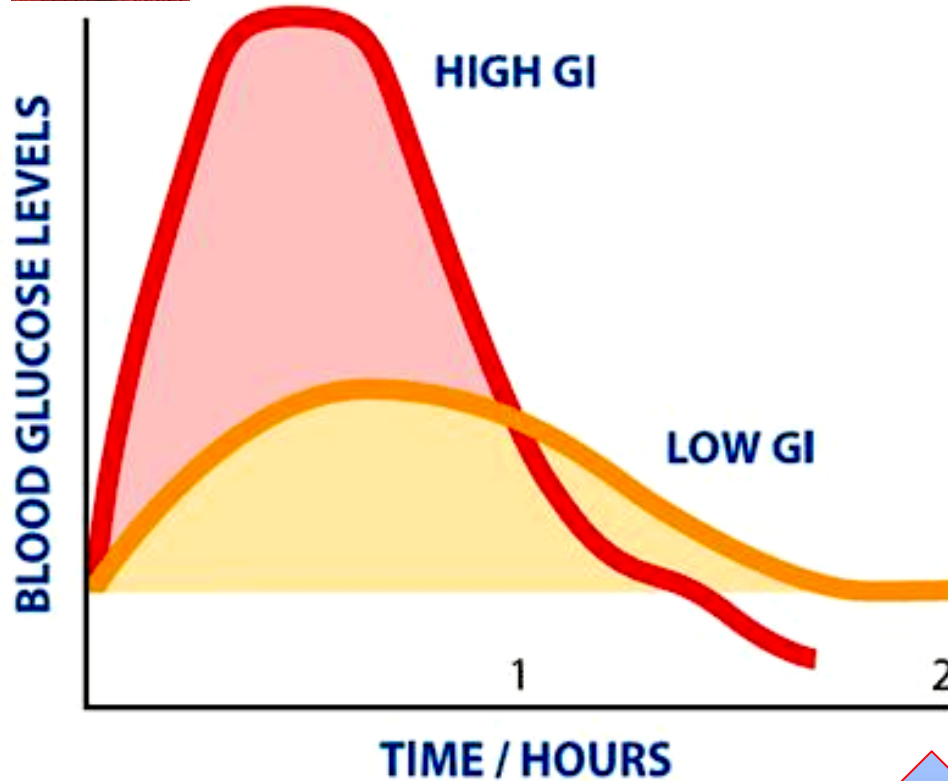
- Improves nutrients, milk, and fruit intake in toddlers, children, and adolescents
- Better diet quality
- Lower risk of obesity
- More calcium, Vit D, iron, magnesium, Vit A, phosphorus, and zinc
- Fortified: folic acid, iron



Michels et al. Eur J Nutr 2016; 55:771-9
Michels et al. Eur J Nutr 2015; 54: 653-64
Barr et al, Br J Nutr 2014; 112:1373-83
De la Hunty et al. Obes Facts, 2013;6:70-85



Food to Glucose to Brain



Glycemic Index:
*How fast the carbs
are digested and
raises the blood sugar*

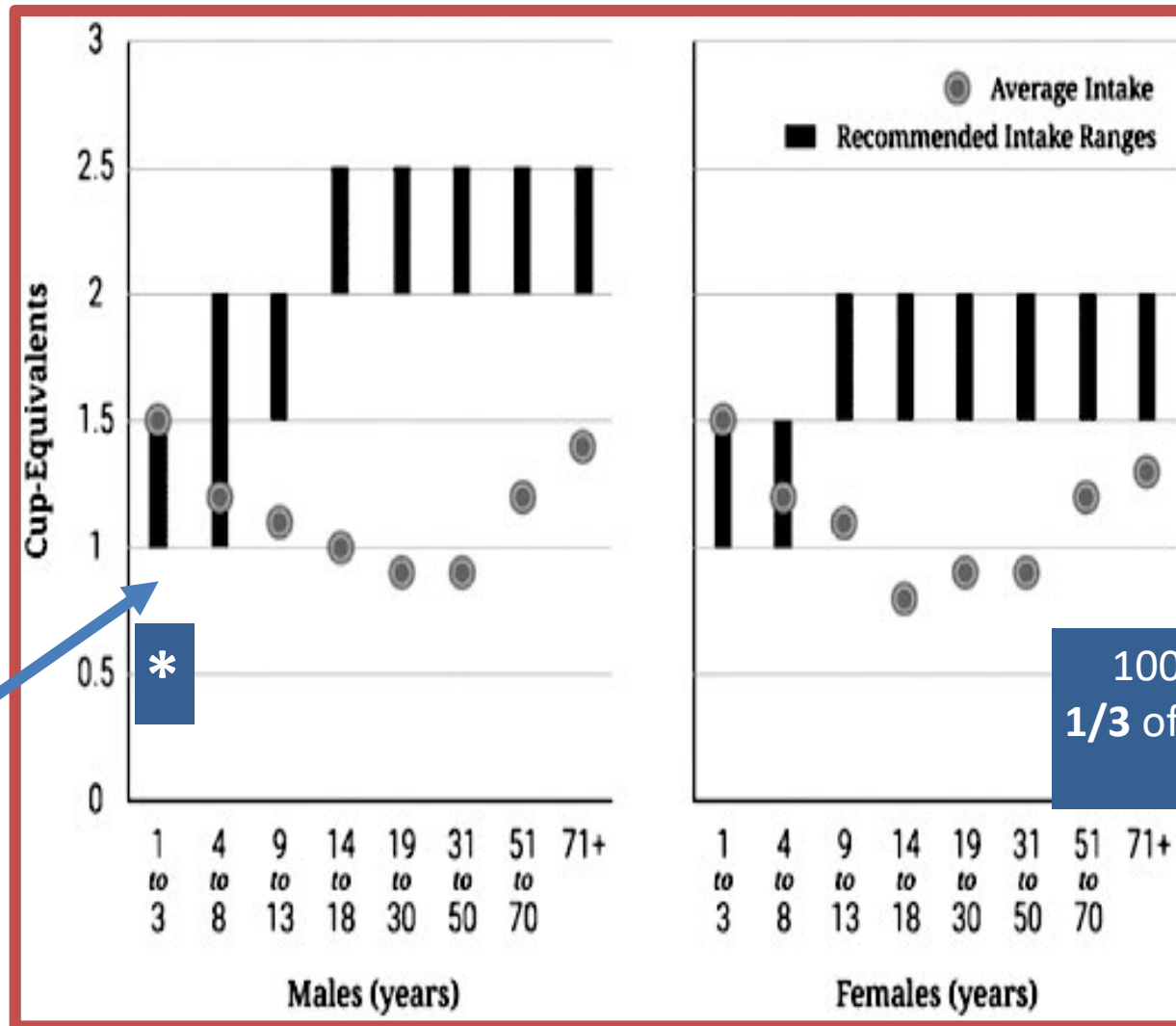


More Whole Fruit

- Vitamins / Minerals
 - Vits A, C, E, zinc, magnesium, phosphous
- Fiber
- Phytonutrients
- Carbohydrates
- Natural sugar
- Low in kcals
- Filling



Fruit intake vs Recommendations (*DGA 2015*)



100% Juice =
 $\frac{1}{2}$ of fruit intake

100% Juice =
 $\frac{1}{3}$ of fruit intake

Does 100% Fruit Juice *DISPLACE* or *AUGMENT* fruit?

The Importance of Dairy

- Osteoporosis
- Hypertension
- Cardiovascular disease
- Stroke
- Type II diabetes
- Cancers
 - breast, colon, prostate
- Obesity
- Metabolic syndrome



Calcium	(30% DV*)
Potassium	(11% DV*)
Phosphorus	(20% DV)
Protein	(16% DV)
Vitamin A	(10% DV)
Vitamin D	(25% DV*)
Vitamin B12	(13% DV)
Riboflavin	(24% DV)
Niacin	(10% DV)

The 4 Nutrients of Concern

Potassium★

★
Vitamin D

★
Calcium

Fiber

★ = liquid milk #1 source in U.S. food supply



What's So
Special
about
Breakfast?

Nutrition & Academic Achievement

Positive Effects

- Breakfast Consumption
- Diet Quality



Negative Effects

- Energy-Dense, Nutrient-Poor Foods/ Snacks

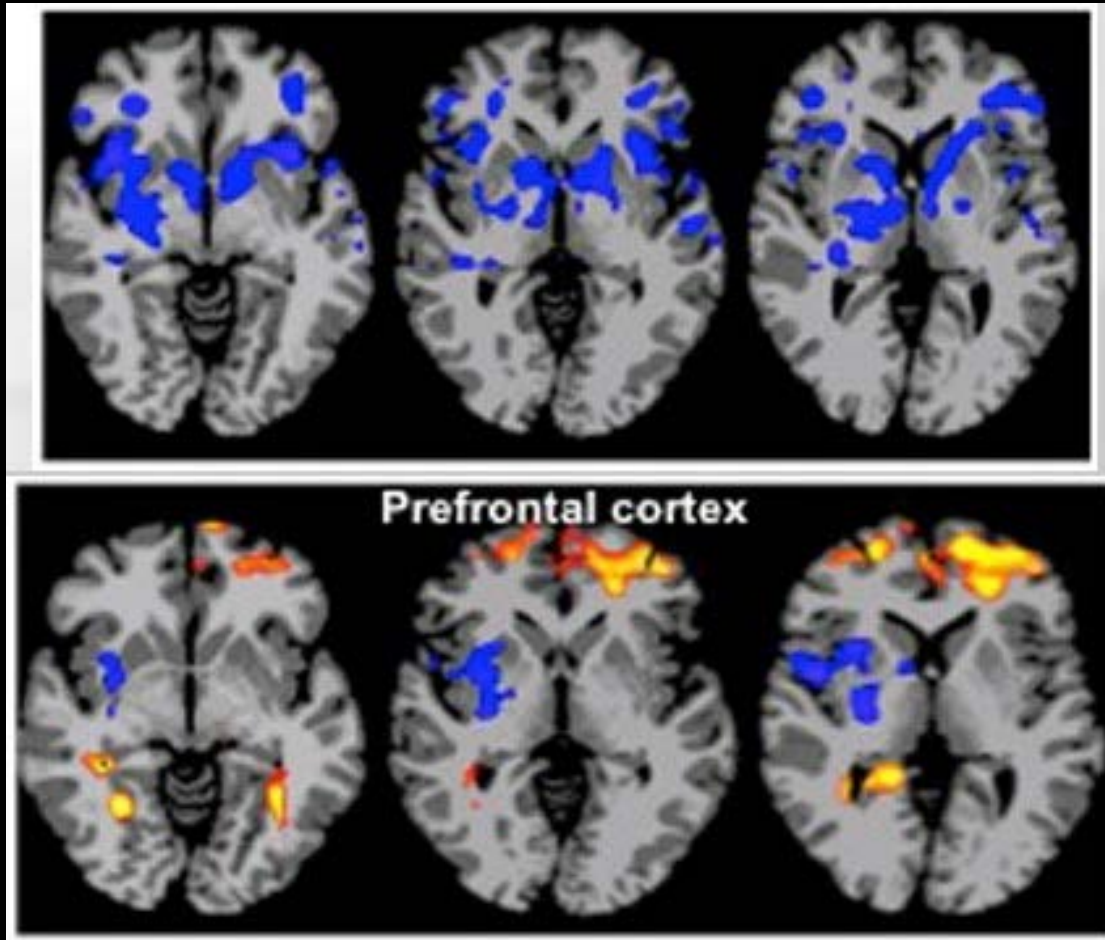
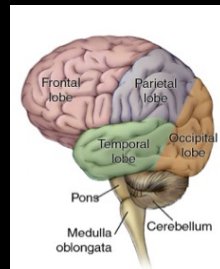
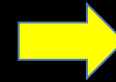


Balanced Nutrients Build a Brain



- **Vit B1** – utilize glucose, modulate cognition, language development, neurotransmitter synthesis
- **Vit B6, B12, choline, tryptophan, tyrosine, phenylalanine, copper, histidine, threonine** – synthesis of neurotransmitters
- **Vit B12** – cognition, language, myelination
- **Vit C** – antioxidant, cognition, memory, myelination
- **Vit D** – prevents neurodegenerative disease
- **Vit E** – cell membrane integrity, antioxidant, protection of DHA
- **Iron** – oxygenation, synthesis of myelin & neurotransmitters, brain development, IQ
- **Magnesium** – energy and ion regulation, neural plasticity
- **Zinc** – neuromotor transmission, cell proliferation, taste
- **Iodine** – (via thyroid) cellular energy metabolism
- **Omega 3 PUFA (DHA)** – cognition, visual development
- **Lutein** – macular protection
- **Flavonoids** – protect & enhance neurons, anti-inflammatory, cognition

Fasting vs Breakfast



FASTING

The Mid-Brain
Food Seeking Mode

** Distracted,
irritable, Restless,
anxious*

Glucose-rich
The Front Brain
Working Mode

** Calm, focused,
organized,
thoughtful*



45 Studies

Breakfast Science

- **Nearly all studies were positive**
 - Vulnerable kids had the most effect
 - *In-School* BF was most effective
- Math & Memory better
- Satiety, attention, memory better
 - Late morning especially
 - Better on more demanding tests
- **High-risk children = best outcomes**
 - Verbal skills
 - Memory
 - Matching tests

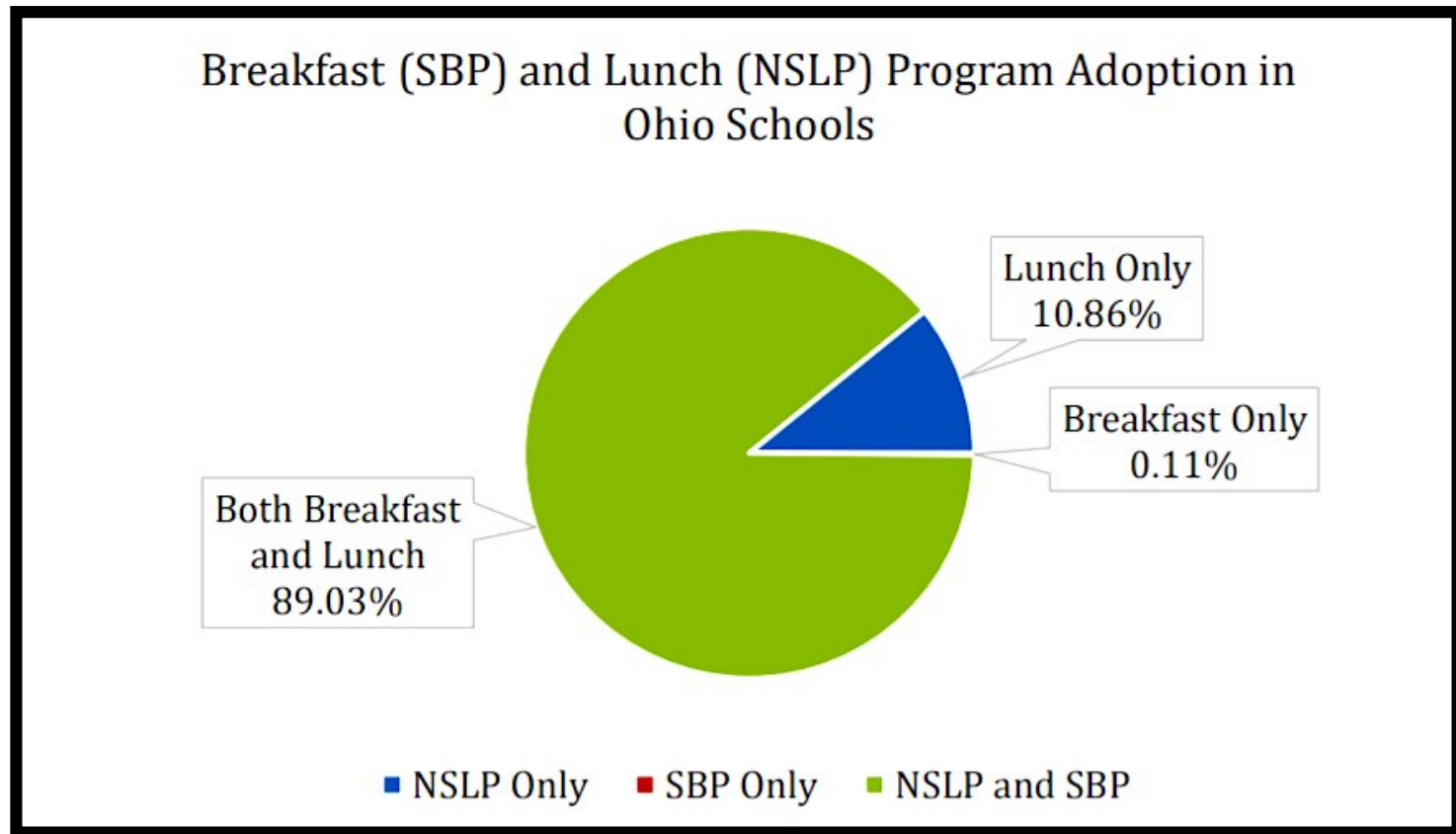


School Breakfast Matters

Year	BF (millions)	% Free/ RP
2000	7.5	84%
2007	10.1	80%
2012	12.8	85%
2017	14.6	85%

- Less hunger during school
- More attentive, fewer behavioral problems
- Increased attendance
- Less tardiness
- Fewer visits to school RN
- Lower obesity rates
- Math scores 17.5% higher
- Higher graduation rates

% NSLP Schools Offering SBP in OH





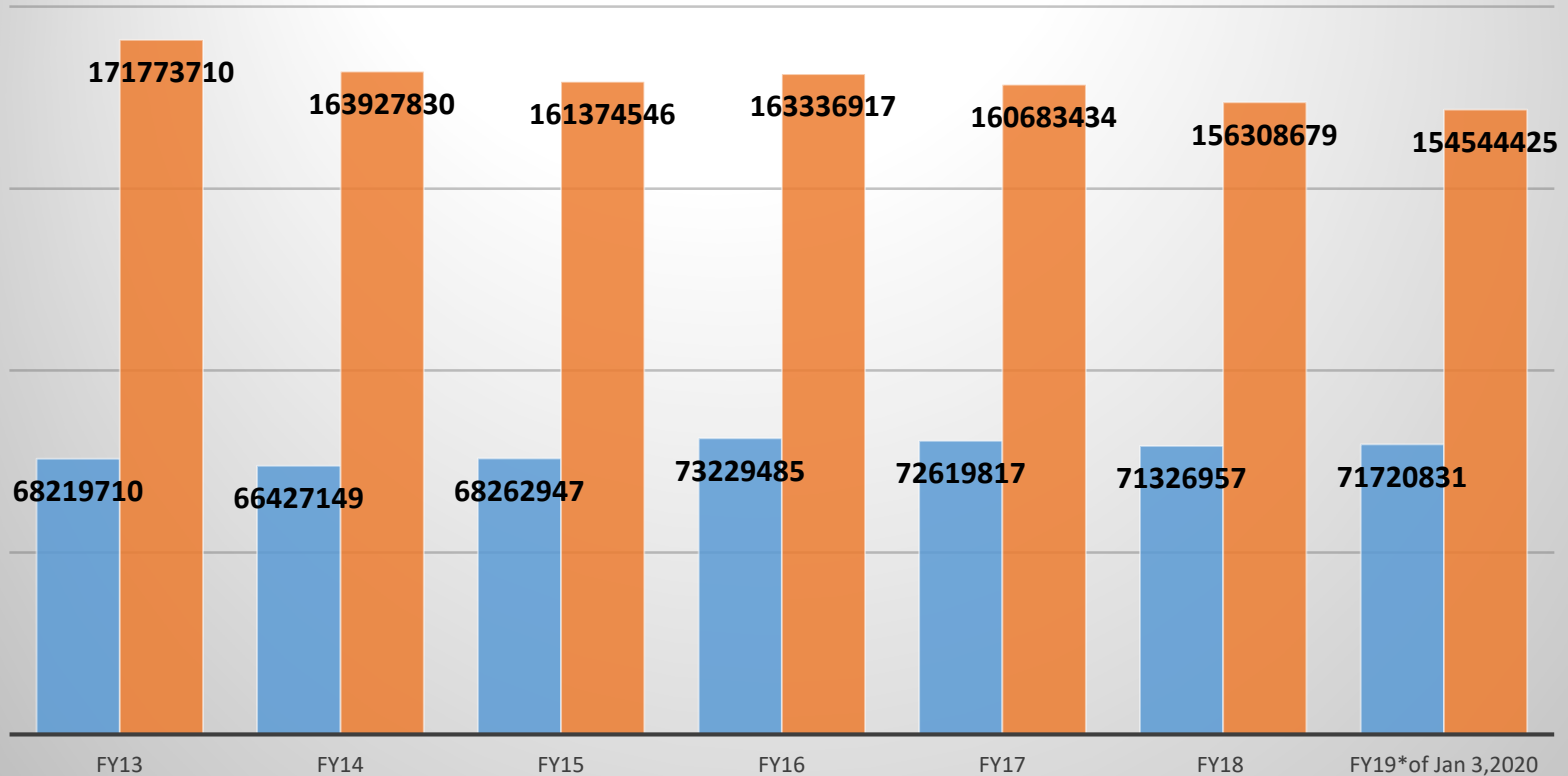
OH Average Daily Student Participation School Breakfast Program (SBP) *School Year 2017–2018*

Free	352,848	78.4%
Reduced	20,532	4.6%
Paid	76,440	17.0%

<https://frac.org/maps/sbp-state/tables/tab3-adp-by-price.html>

OHIO Meals Served

■ OH Breakfasts Served
■ OH lunches Served



Data source USDA FNS child nutrition tables

Breakfast Innovation in Ohio, 2019



- | | |
|---------------------------------|------------|
| • <i>Grab n' Go Cafeteria</i> | <i>12%</i> |
| • <i>Grab n' Go Classroom</i> | <i>11%</i> |
| • <i>BF In the Classroom</i> | <i>9%</i> |
| • <i>Late Breakfast Options</i> | <i>3%</i> |
| • <i>Satellite / Kiosk</i> | <i>2%</i> |
| • <i>Traditional</i> | <i>63%</i> |

ODE
&
The Ohio
School
BF
Coalition

The Community Eligibility Provision



*Schools that adopt CEP
are reimbursed using a formula
based on the percentage
of their students
categorically eligible for free meals*

Summer is a *Long* 3 Months



What happens in the summer?

Available Grants for Nutrition/ PA



Together, We Can Put a Better Student in the Chair

