10 Things You Must Know About Pediatric Nutrition

R Murray MD
Center for Healthy Weight & Nutrition
Nationwide Children’s Hospital
#1. WHAT IS QUALITY NUTRITION?
U.S. Dietary Guidelines

- Consume **meals and snacks** from the 5 food groups
  - Fruits
  - Vegetables
  - Whole grains
  - Low-fat milk and dairy
  - Lean meats, quality protein

- Balance food intake with **daily activity**

- Get nutrition from every calorie consumed
  - **nutrient rich foods**
# 2.

## Activity = Calories

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age (years)</th>
<th>Sedentary</th>
<th>Moderately Active</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td>2-3</td>
<td>1,000</td>
<td>1,000-1,400</td>
<td>1,000-1,400</td>
</tr>
<tr>
<td>Female</td>
<td>4-8</td>
<td>1,200</td>
<td>1,400-1,600</td>
<td>1,400-1,800</td>
</tr>
<tr>
<td></td>
<td>9-13</td>
<td>1,600</td>
<td>1,600-2,000</td>
<td>1,800-2,200</td>
</tr>
<tr>
<td></td>
<td>14-18</td>
<td>1,800</td>
<td>2,000</td>
<td>2,400</td>
</tr>
<tr>
<td></td>
<td>19-30</td>
<td>2,000</td>
<td>2,000-2,200</td>
<td>2,400</td>
</tr>
<tr>
<td></td>
<td>31-50</td>
<td>1,800</td>
<td>2,000</td>
<td>2,200</td>
</tr>
<tr>
<td></td>
<td>51+</td>
<td>1,600</td>
<td>1,800</td>
<td>2,000-2,200</td>
</tr>
<tr>
<td>Male</td>
<td>4-8</td>
<td>1,400</td>
<td>1,400-1,600</td>
<td>1,600-2,000</td>
</tr>
<tr>
<td></td>
<td>9-13</td>
<td>1,800</td>
<td>1,800-2,200</td>
<td>2,000-2,600</td>
</tr>
<tr>
<td></td>
<td>14-18</td>
<td>2,200</td>
<td>2,400-2,800</td>
<td>2,800-3,200</td>
</tr>
<tr>
<td></td>
<td>19-30</td>
<td>2,400</td>
<td>2,600-2,800</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>31-50</td>
<td>2,200</td>
<td>2,400-2,600</td>
<td>2,800-3,000</td>
</tr>
<tr>
<td></td>
<td>51+</td>
<td>2,000</td>
<td>2,200-2,400</td>
<td>2,400-2,800</td>
</tr>
</tbody>
</table>
PORTION SIZE IS THE KEY

= 1 cup, so 1/2 is one serving for fruits, veggies

= the fist a serving for starchy foods (potatoes, rice, mac n cheese)

= 2 tablespoons of peanut butter

= 1.5 ounce serving of cheese

= the palm is an age-appropriate meat portion
#3. Nutrient Rich Foods

“Consume a variety of nutrient-dense foods and beverages within and among the basic food groups while choosing foods that limit the intake of saturated and trans fats, cholesterol, added sugars, salt and alcohol.”

Dietary Guidelines for Americans, 2005
**TEN Power Foods!**

- **Sweet Potatoes/ Squash**
  - Carotenoids, Vit C, potassium, fiber
- **Spinich**
  - Vit A,C,K, folate, potassium, mag., iron, phytochemicals
- **Tomatoes**
  - Vit A,C, fiber, phytochem
- **Salmon**
  - Omega-3 fatty acids
- **Blueberries**
  - Vit C, fiber, folate, potassium
- **Broccoli**
  - Vit C, folate, carotenoids
- **Rye crackers**
  - Whole grain, fiber
- **Brown rice**
  - Whole grain, fiber, vit E, B-6, zinc, magnesium
- **Citrus fruits**
  - Vit C, fiber, folate
- **Nuts**
  - Fiber, protein, MUFA/ PUFA, omega-3 FA (walnuts), vit E (almonds), folate (peanuts)
#4. The Health Benefits of Whole Grains

- Stroke
- Type II Diabetes
- Heart disease
- Hypertension
- Weight management
- Asthma, inflammation
- Colorectal cancer
- Gum and tooth disease

Nutrition Research Rev 2004; 17:99
The Whole Grain

• **Bran**
  – Outer kernel
  – Antioxidants, B vits, fiber

• **Germ**
  – Embryo
  – B vits, proteins, minerals, good fats

• **Endosperm**
  – Energy for plant
  – Starchy carbs, proteins

*Bran & germ = 25% protein & 17 key nutrients*
The Language of Whole Grain

**YES:**
- Whole grains
- Whole wheat
- Whole [grain]
- Stoneground whole [grain]
- Brown rice
- Oats, oatmeal
- Wheatberries

**NOT:**
- Bran
- Wheat germ

**Maybe:**
- Wheat flour
- Semolina
- Durum wheat
- Organic flour
- Multigrain
5. We Have A Pediatric Problem

**US Dietary Guidelines**

**Current Children’s Diet**

- **Focus on fruits.**
- **Vary your veggies.**
- **Get calcium-rich foods.**
- **Make half your grains whole.**
- **Go lean with protein.**

*Know the limits on fats, salt, and sugars.*

- **Focus on fruits.**
- **Vary your veggies.**
- **Get calcium-rich foods.**
- **Make half your grains whole.**
- **Go lean with protein.**

*Know the limits on fats, salt, and sugars.*
Children are Overweight but Undernourished

Early Nutrition
Women, Infants & Children Program

• 8.7 million participants/ month
  – 25% infants
  – 50% children to age 5 years
  – 25% pregnant and lactating females

• 50% of all U.S. infants are on WIC

• A more nutrient rich diet than non-WIC peers and equal to higher income infants

www.fns.usda.gov/wic
### Missing Nutrients

#### High School Students

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Vit A, Vit C, Vit E</td>
<td>• Vit A, Vit C, Vit E</td>
</tr>
<tr>
<td>• Magnesium, potassium</td>
<td>• Magnesium, potassium</td>
</tr>
<tr>
<td>• Fiber</td>
<td>• Vit B-6</td>
</tr>
<tr>
<td>• Calcium</td>
<td>• Folate</td>
</tr>
<tr>
<td></td>
<td>• Thiamin</td>
</tr>
<tr>
<td></td>
<td>• Iron</td>
</tr>
<tr>
<td></td>
<td>• Phosphorous</td>
</tr>
<tr>
<td></td>
<td>• Zinc</td>
</tr>
<tr>
<td></td>
<td>• Fiber</td>
</tr>
<tr>
<td></td>
<td>• Calcium</td>
</tr>
</tbody>
</table>

Clark, Fox, JADA 2009; s44
#6. the problem starts in infancy
From 12-24 months the child assumes the eating habits of the family –

The Feeding Infants And Toddlers Study

J Amer Diet Assoc, supplement Jan 2004
## Cereals

### Infants & Toddlers

<table>
<thead>
<tr>
<th></th>
<th>Any Grain</th>
<th>Infant Cereal</th>
<th>Non-Sweet</th>
<th>Sweet Cereal</th>
<th>Cereal Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-6 mo</td>
<td>65.8 %</td>
<td>64.8 %</td>
<td>0.5 %</td>
<td>0.0 %</td>
<td>0.0 %</td>
</tr>
<tr>
<td>7-8</td>
<td>91.5</td>
<td>81.2</td>
<td>17.0</td>
<td>1.8</td>
<td>1.1</td>
</tr>
<tr>
<td>9-11</td>
<td>97.5</td>
<td>63.8</td>
<td>37.0</td>
<td>9.0</td>
<td>3.4</td>
</tr>
<tr>
<td>12-14</td>
<td>97.8</td>
<td>23.9</td>
<td>44.5</td>
<td>17.7</td>
<td>9.8</td>
</tr>
<tr>
<td>15-18</td>
<td>98.6</td>
<td>9.2</td>
<td>40.6</td>
<td>26.4</td>
<td>10.0</td>
</tr>
<tr>
<td>19-24</td>
<td>99.2</td>
<td>3.1</td>
<td>31.9</td>
<td>22.7</td>
<td>9.7</td>
</tr>
</tbody>
</table>
## What Infants & Toddlers Drink

<table>
<thead>
<tr>
<th>Age Range</th>
<th>All milks</th>
<th>100% juice</th>
<th>Fruit drinks</th>
<th>Soft drinks</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-6 mo</td>
<td>100 %</td>
<td>21.3 %</td>
<td>1.6 %</td>
<td>0.1 %</td>
<td>33.7 %</td>
</tr>
<tr>
<td>7-8</td>
<td>100</td>
<td>45.6</td>
<td>7.1</td>
<td>1.1</td>
<td>56.1</td>
</tr>
<tr>
<td>9-11</td>
<td>99.7</td>
<td>55.3</td>
<td>12.4</td>
<td>1.7</td>
<td>66.9</td>
</tr>
<tr>
<td>12-14</td>
<td>98.2</td>
<td>56.2</td>
<td>29.1</td>
<td>4.5</td>
<td>72.2</td>
</tr>
<tr>
<td>15-18</td>
<td>94.2</td>
<td>57.8</td>
<td>38.6</td>
<td>11.2</td>
<td>74.0</td>
</tr>
<tr>
<td>19-24</td>
<td>93.4</td>
<td>61.6</td>
<td>42.6</td>
<td>11.9</td>
<td>77.0</td>
</tr>
</tbody>
</table>

Skinner et al 2004, 104:s45
## Desserts and Sweets

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Any Dessert</th>
<th>Baby Desserts</th>
<th>Cakes, pastries, cookies</th>
<th>Candy</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-6 mos</td>
<td>10.4 %</td>
<td>4.2 %</td>
<td>4.3 %</td>
<td>0.0</td>
</tr>
<tr>
<td>7-8</td>
<td>45.8</td>
<td>17.7</td>
<td>27.0</td>
<td>1.1%</td>
</tr>
<tr>
<td>9-11</td>
<td>61.1</td>
<td>17.0</td>
<td>40.9</td>
<td>3.2</td>
</tr>
<tr>
<td>12-14</td>
<td>78.8</td>
<td>6.0</td>
<td>50.5</td>
<td>10.2</td>
</tr>
<tr>
<td>15-18</td>
<td>88.8</td>
<td>2.3</td>
<td>60.2</td>
<td>15.2</td>
</tr>
<tr>
<td>19-24</td>
<td>90.5</td>
<td>0.0</td>
<td>61.6</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Fox et al. JADA, Jan 2004
We Don’t Promote Vegetables

Dark Green Vegetables
consumed by fewer than
10% of toddlers

Deep yellow vegetables
Fall from 39% at 9 mos
to 14% at 18 mos

• Potatoes
  – 4-6 mos 3.6%
  – 7-8 mos 12.4%
  – 9-11 mos 24.1%
  – 12-14 mos 33.2%
  – 15-18 mos 42.0%
  – 19-24 mos 40.6%
  – By 24 mos 25% of toddlers consumed fried potatoes on any study day

Source: Fox et al. 2004
Naturally Nutrient Rich
the basics of nutrition
#7. Snack Foods are Sabotaging Nutrition

- Snack foods, beverages = 30% of daily energy
- Total daily calories increased
- Energy from carbohydrates increased
- Energy from fat increased

- **Displace**: Protein, fiber, vitamins, folate, calcium, magnesium, iron, zinc

Kant Arch Ped Adolesc Med 2003; 157:789
Kids & Snack Foods

Snack foods and drinks = 1/3 of daily calories

2/3 comes from added sugar

1/2 of sugar comes from sweetened drinks

which account for 10% of daily calories

NHANES III, Kant Arch Ped Adol Med 2003; 157:789
Sweetened Beverages & 100% Juice

• Consumption is rising
  – 1988-94 242 kcal/day
  – 1999-2004 270 kcal/day

• Rising fastest among
  – 6-11 yr olds, Hispanics, African Americans

• Energy/ day
  – 148 kcal 2-5 yr olds
  – 136 kcal 6-11 yr olds
  – 184 kcal 12-19 yr olds

  – Accounts for 10-15% of total daily calories

Wang, Pediatrics 2008; 121:e1604
PER CAPITA BEVERAGE CONSUMPTION

Source: USDA, NMPF
Sweet Drink’s Nutrients

- Sugar (10 teaspoons)
- Water
- Caffeine
- Artificial Colors and Flavors
- 150 kcals/ 12 oz
Milk’s Nutrients

• 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)
• 90 kcal/ 8 oz
## More Snacks, More Calories

<table>
<thead>
<tr>
<th>Number of Snacks</th>
<th>Total</th>
<th>MALES</th>
<th>FEMALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Snacks</td>
<td>11%</td>
<td>2156 kcal</td>
<td>1501 kcal</td>
</tr>
<tr>
<td>1 Snack</td>
<td>25%</td>
<td>2391 kcal</td>
<td>1812 kcal</td>
</tr>
<tr>
<td>2 Snacks</td>
<td>26%</td>
<td>2505 kcal</td>
<td>1944 kcal</td>
</tr>
<tr>
<td>3 Snacks</td>
<td>19%</td>
<td>2916 kcal</td>
<td>2136 kcal</td>
</tr>
<tr>
<td>4 Snacks</td>
<td>18%</td>
<td>3249 kcal</td>
<td>2437 kcal</td>
</tr>
</tbody>
</table>

“for teens GRAZING is the new norm”

Sebastian, J Adol Health 2008; 42:503
## Snack’s are Low Quality

<table>
<thead>
<tr>
<th>GROUP</th>
<th>SERVINGS</th>
<th>SNACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td>22%</td>
<td>chips, puffs, breads, cookies</td>
</tr>
<tr>
<td>Vegetables</td>
<td>15%</td>
<td>potato chips, pizza, french fries</td>
</tr>
<tr>
<td>Fruits</td>
<td>39%</td>
<td>OJ, apples, non-citrus juices</td>
</tr>
<tr>
<td>Milk</td>
<td>24%</td>
<td>white, flavored, frozen dairy</td>
</tr>
<tr>
<td>Meat/beans</td>
<td>12%</td>
<td>hot dogs, lunch meats</td>
</tr>
<tr>
<td>Oils</td>
<td>37%</td>
<td>corn chips, puffs, potato chips</td>
</tr>
<tr>
<td>Solid fats</td>
<td>24%</td>
<td>frozen dairy, cookies, milk</td>
</tr>
<tr>
<td>Added sugars</td>
<td>43%</td>
<td>soft drinks, fruit drinks, candies</td>
</tr>
<tr>
<td>Discretionary</td>
<td>35%</td>
<td>soft drinks, frozen dairy, candies</td>
</tr>
</tbody>
</table>

Sebastian, J Adol Health 2008; 42:503
#8. Our Consumer Messaging about Nutrition is Wrong.
“Avoidance” Messaging

Has created a dangerous misperception:

Fewer “bad” nutrients = a nutritious product
Less fat, fewer calories, but not more nutrients

Does it merit this?
The Baby with the Bathwater?
Calcium & Bone
Bone Grows Most in Teens

Bone Thickness

Active Growth
Slow Loss
Rapid Loss
Less Rapid Loss

Age in Years
10 20 30 40 50 60 70 80 90

2 6 10 20 years

1 m 2 y 18 y
**BUT**

Kids Don’t Get Enough **Calcium**

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-11 y</td>
<td>44%</td>
<td>58%</td>
</tr>
<tr>
<td>12-19 y</td>
<td>64%</td>
<td>87%</td>
</tr>
<tr>
<td>&gt;20 y</td>
<td>55%</td>
<td>78%</td>
</tr>
</tbody>
</table>
#9. Breakfast is Crucial
Vanishing Breakfast

- Preschool: 95%
- 8-10 yo: 91%
- Teens: 85%
- High school:
  - All: skip 3 x/ week
  - Girls: 1 of 3 skips daily
- Lowest: HS girls, low SES, Blacks & Hispanics

AM Siega-Riz, AJCN 1998; 67:s748
“I gave up breakfast because it makes me fat.”

Wrong answer.
Breakfast & Body Weight

Studies in children and adolescents show a link between regular breakfast and lower BMI

- Skippers: twice as likely to be overweight
- Overweight are more likely to skip
- Similar data for males and females

A Paradox: BF eaters consume more energy per day yet are less likely to be overweight
What is the Ideal Breakfast?

• 25% of daily energy
• All 3 macronutrients
• Sugars and fats drive nutrients
• Whole grain cereals, breads, nuts & seeds
• Low-fat milk and yogurt
• Fruit and/or 100% fruit juice
• and often…*Grab-n-Go*
Ready-to-Eat Cereal

- 92% fortified with essential nutrients
- Over 90% consumed with milk
- Opportunity for whole grains, fiber
- Lower daily fat, sat fat & cholesterol
- Improves “problem” nutrients:
  - Vit A, B-6, B-12, Vit C
  - Calcium, iron
  - Magnesium, phosphorus

Associated with lower BMI
Breakfast & Cognitive Performance

- Improves matching familiar figures (MMF), math, word recall, short term memory tests
- Improves spatial memory
- Improves mood, anxiety & irritability
- Strong subjective sense of physical and mental well-being
- An all morning effect

A Smith, Physiol & Behav 2000; 68:228
• BF increases alertness
• Fiber & carbs ideal
• High carb, low fat BF improved mood better than high fat, low carb BF
• Skipped energy at BF is not made up -- hunger, preoccupation with food and food cravings linger -- even at day’s end

Lluch, Physiol & Behav 2000; 68:515
#10. Diets don't work. Do they?
The DASH Diet Does!

- Dietary Approaches to Stop Hypertension
- **Lowers BP, stroke, heart disease, weight**
- **Focus**: Veggies, fruits, low fat milk/dairy, whole grains, fiber, nuts, fish, poultry
- **Limits**: sodium, red meat, sweets, sugars

*Which is where we started …*

Emphasize Diet Quality

NOT DIETS
THINGS ABOUT NUTRITION

- Gold Standard = US Dietary Guidelines
- Activity = Calories
- Nutrient Rich Foods
- Whole Grains are healthy
- Nutrition is a Pediatric Problem
- The Problem Starts in Infancy

- Snacks are Sinking Pediatric Nutrition
- Nutrition Messaging is Wrong-Headed
- Breakfast is Crucial to quality nutrition
- And...the DASH Diet Works!
Obesity and Schools:
*Nutrition & Physical Activity*
Competitive Foods

A la Carte Sales
School Parties
Fundraisers
School Stores
Vending
Boosters
Athletics
Student Clubs

VERSUS
The Federally Regulated School Meal Program
School Policy

• A Wellness Advisory Council
• Nutrition and Physical Education
• Physical Activity
• School meals
• Vending, contracts & a la carte
• Curriculum

Obesity prevention within schools is critical

www.ActionForHealthyKids.org
Coordinated School Health
8 component Model

www.CDC.gov/HealthyYouth/
Introducing:
Fuel Up to Play 60

Students Leading the Way to
Eating Healthier and Moving More
Program Looks to Students for its Success

Students lead the effort

Partnering with adult stakeholders

Work toward positive, long-term changes in the school’s wellness environment.
How Fuel Up to Play 60 Works

School is enrolled in Fuel Up to Play 60

School creates Student Team with Adult Advisor(s)

Student Team /Adult Advisor(s) make Healthy Eating and Physical Activity Action Strategies

Student Team engages entire student body through:

- Displaying FUTP 60 signage around school
- Program Kick-off Event
- All students take Pledge: eat healthier & be active
- Students track healthy eating and physical activity

Student Team engages entire student body through:

- Displaying FUTP 60 signage around school
- Program Kick-off Event
- All students take Pledge: eat healthier & be active
- Students track healthy eating and physical activity
= Improving student and school wellness by encouraging healthy eating and physical activity
Fuel Up to Play 60

Nutrition Goal: Increase access & consumption of foods kids don’t get enough of.

Whole grains

Low-fat / fat-free dairy foods

Fruits

Vegetables
Fuel Up to Play 60

Physical activity goal:

Be physically active for 60 minutes a day, every day - before during and after school
Key Program Elements

Display Materials
Key Program Elements

Fuel Up to Play 60 Playbook

INTRO

Congratulations on making the choice to eat better and get more physical activity. You've taken a great first step in the right direction.

The Student Playbook is your guide to bringing Fuel Up to Play to your school. If you're a School Team member, the playbook contains tons of tools and resources to get everything up and running. If you're not on the School Team, find out who your school's Program Advisor(s) is and see what you can do to get involved. Your Program Advisor is the adult in your school leading Fuel Up to Play.
Key Program Elements

Tracking Progress

Personal Pledge

Lead the Way and join Fuel Up to Play 60!

Fuel: I will eat healthy and stay active for 60 minutes each day.

Play: I will be active for 60 minutes each day.

Run Up to Play 60: I will eat healthy, be active and take our school an even better place.

I pledge to Fuel Up to Play 60 by:

Our own ideas on how you will eat healthy and stay active for 60 minutes each day:

- Example: Have an apple with your lunch or a glass of low-fat milk with dinner.
- Example: Play football with your friends – it's up to you!
Key Program Elements
Get Started!

Ready to *Fuel Up to Play 60*?

www.FuelUpToPlay60.com

Questions:
Call UDIM at 1-800-241-MILK