Plant-based Kids
How to support your patients and families who eat a plant-based diet

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Speaker Introduction

- Dr. Kate Watkins is a DNP-prepared primary care PNP as well as a certified nurse educator. Her clinical area of interest is in functional GI disorders and nutrition. In 2018, she earned a certificate in plant-based nutrition from the online arm of Cornell University and the Center for Nutrition Studies. Dr. Watkins is excited to help providers become more knowledgeable on plant-based nutrition to enable them to offer the best evidence to their patients and families.

Disclosures

No disclosures.

Learning Objectives

- Define whole food plant-based diet and differentiate from vegan, vegetarian
- Recognize the reasons that families and individuals choose to eat a plant-based diet
- Describe three nutritional facts related to plant-based diets regarding macro- and micro-nutrients and their sources
- List plant-based choices for infants, children, and adolescents

Definitions

- Whole Food Plant Based: https://nutritionstudies.org/what-is-a-whole-food-plant-based-diet/
- Vegan: https://www.vegan.com/info/
- Vegetarian diets: do not include meat, poultry or fish
  - Lacto – allows dairy products
  - Ovo-vegetarian – allows eggs
  - Lacto-ovo – allows eggs and dairy
  - Pesctarian – not strictly vegetarian, allows fish and usually eggs, dairy

Plant-based vs. Vegan

- Primarily health-focused
- Individuals eat only plant-based foods, avoiding all meat, fish, dairy, eggs, poultry
- Improve cardiovascular health
- Improve ‘gut’ health - microbiome

- Primarily a philosophical and ethical stance focused on animal rights and environmental health
- Individuals exclude all forms of exploitation of and cruelty to animals for food, clothing, or any other purpose
- Promotes development of animal-free alternatives
- Ethical vegan; Vegan for the environment
Choosing Plant-based Nutrition

- Personal Health – the #1 reason
  - Avoid or improve:
    - Obesity
    - Diabetes
    - Hypertension
    - Cholesterol
    - Heart health
    - Gut health

- Secondary gains: animal and environment health
Industrial farming practices harm animals and cause degradation and pollution of the environment.

Plant-based Nutrition for Every Age

- Newborns & Infants
- Toddlers & Preschoolers
- School Age
- Adolescents

Special Considerations

- Supplementation
- Calories and Fiber
- Protein

Consider Supplementation

Increase foods high in Omega-3 fatty acids: walnuts, ground flaxseed, and soybeans are good sources of essential fatty acids. Consider supplementation or fortified products.

Required Supplementation

- Vitamin B-12: is only found in animal-based food sources or fortified foods
  - The RDA for vitamin B‐12 (cobalamin) is:
    - 0.4 mcg for neonates and infants
    - 0.9 mcg for children 1 to 3 years of age
    - 1.2 mcg for those 4 to 8 years
    - 1.8 mcg for 9 to 13 years
    - 2.4 mcg for 14 to 18 years
    - 2.6 mcg for pregnant adolescents

- Consider Supplementation (in all children)
  - Vitamin D – 400 IU daily for infants (breast or formula-fed); 600 IU daily for children over 1 year.
  - Calcium – 1-3 years 700 mg; 4-8 years 1,000 mg; 9-13 years 1,300 mg
  - Iron – 1 mg/kg per day for some form of iron supplementation (iron-fortified infant cereal, iron-enriched vegetables; liquid iron supplements) beginning at four months of age to meet their iron requirement. Older children who receive iron-fortified formula do not require additional iron supplementation. Older children should consume iron-fortified cereals, high iron foods, and supplement orally if indicated with CBC.

Protein and Calories

- Protein: All plant-based foods contain protein. Pea soy products such as tofu, tempeh; as well as wheat, legumes, lentils, nuts, seeds, and whole grains are particularly high in protein intake.

- Protein requirements for children
  - Ages 1-3 years: approximately 1.05 grams/kg/day
  - Ages 3-13 years: 0.95 grams/kg/day
  - Adolescents: 0.85 grams/kg/day

- Calories:
  - Infants daily intake: 0.2 mo. – 100 to 110 kcal/kg; 3-5 mo. – 85 to 95 kcal/kg; 6-8 mo. – 80 to 85 kcal/kg; 9-11 mo. – 80 kcal/kg
  - Older Children – daily intake depends on age, gender, and activity level among other factors. Many tools available: for example “VegPlate Junior” or see - http://www.bcm.edu/cnrc/apps/bodycomp/energy/energyneeds_calculator.htm
**Infant Nutrition**

Recommend breastfeeding plus B-12, iron, vitamin D supplementation.

Options include soy-based infant formulas.

Complementary feeding (weaning or beikost): start at 4-6 months with pureed single ingredient – cereals, vegetables, fruits through age 6-8 months.

By 8-10 months may start finger foods such as small pieces of soft fruits, vegetables, cooked pasta, baby crackers, dry cereal.

By 12 months: drink from a cup, self-feeding of "regular food".

Attention to variety of foods.

**Toddler & Preschooler Foods**

- Focus on nutrient density
- Finger foods
- Variety

**Foods for School-age Children**

- Get kids involved in food selection & preparation
- Try new things frequently
- Focus on energy content
- Variety

**Adolescents**

- Plant-based alternatives for favorites
- Go-to foods and "to go" foods
- Independence

**Take-Aways**

- Plant-based nutrition is healthy for all ages
- Supplement: B-12
- Eat for omega-3s, iron, calcium
- Variety, variety, variety – color, fruits, veggies, grains, beans
- Give facts, evidence, and resources

Thank you for attending!
Selected Resources

Links and Books (in no particular order)
The Plantrician Project: plantricianproject.org
Plant-Based Pediatrician: plantbasedpediatrician.com
T. Colin Campbell Center for Nutrition Studies: nutritionstudies.org
Physicians Committee for Responsible Medicine: pcrm.org/good-nutrition/nutrition-for-kids
The China Study by T. Colin Campbell, PhD, and Thomas M. Campbell, MD
Prevent and Reverse Heart Disease by Caldwell B. Esselstyn, Jr. MD
Videos
What the Health (Netflix)
Forks Over Knives (Netflix)
Game Changers (Netflix)

References
Session Concurrent 218:  
**Plant-Based Kids: Supporting Families Who Choose Plant-Based Nutrition**  
**Session Date:** Thursday, March 26

**Supplements to recommend:** B-12 & foods rich in omega-3 fatty acids

**Potential supplements – all children**

- **Vitamin D:** soy and rice milk may be fortified; some cereals. Consider supplementation (choose plant-based).

- **Calcium:** dark green vegetables – “greens”, kale, broccoli; Calcium enriched and fortified products: juices, cereals, soy milk, soy yogurt, tofu, breads

- **Iron:** Dried beans and peas, lentils, enriched cereals, whole-grain products, dark leafy green vegetables, and dried fruit are good sources of iron. Because iron isn't as easily absorbed from plant sources, the recommended intake of iron for vegetarians is almost double that recommended for non-vegetarians.

- **Plant-based Protein:** Plant sources include soy products such as tofu, tempeh; seitan, legumes, lentils, nuts, seeds, and whole grains.

Protein requirements for children are approximately 1.05 grams/kg/day for those one to three years of age, 0.95 grams/kg/day for those 4 to 13 years of age, and 0.85 grams/kg/day for adolescents.

Proteins from legumes are 80 to 90 percent digestible, while proteins from grains and other plant foods are 70 to 90 percent digestible. Therefore, for vegetarians who rely on these protein sources, the protein requirement may be increased by 20 to 30 percent for children aged two to six years and by 15 to 20 percent for children aged six and older, in comparison with nonvegetarians.

**B-12**

- **Neonatal:** oral: 0.4 mcg/day (~0.05 mcg/kg/day) (IOM 1998); **Note:** Neonates born to vegan mothers should be supplemented with vitamin B12 from birth; they may have low vitamin B12 stores at birth and, if breastfeeding, may only receive a small amount of the vitamin from the mother’s milk (Mangels 2001).

Dosing of B-12: 0.4 mcg per day infants to 2.4 mcg per day adults

Commonly used vitamin B12-fortified foods include most ready-to-eat cereals, many meat substitutes, some milk alternatives, and fortified nutritional yeasts. Fortified soy milk is another good source of vitamin B12 for children. Vitamin B12 supplements typically provide 6 to 9 mcg per day. This dose is higher than the RDA to ensure adequate intake and because there are no adverse effects of the higher dose. Of note, only cyanocobalamin is the active form of the vitamin, and some listings of vitamin B12 content in foods do not differentiate between this form and its inactive analogs.
Iron

Breastfed infants require some form of iron supplementation (iron-fortified infant cereal, iron-rich vegetables, liquid iron supplements) beginning at four months of age to meet their iron requirement (1 mg/kg per day). Infants who receive iron-fortified formula do not require additional iron supplementation.

Cooked dried beans and dark green leafy vegetables are especially good sources of iron, even better on a per calorie basis than meat. Iron absorption is increased markedly by eating foods containing vitamin C along with foods containing iron. Vegetarians do not have a higher incidence of iron deficiency than do meat eaters.

<table>
<thead>
<tr>
<th>Food</th>
<th>Amount</th>
<th>Iron (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackstrap molasses</td>
<td>2 Tbsp</td>
<td>7.2</td>
</tr>
<tr>
<td>Lentils, cooked</td>
<td>1 cup</td>
<td>6.6</td>
</tr>
<tr>
<td>Tofu</td>
<td>1/2 cup</td>
<td>6.6</td>
</tr>
<tr>
<td>Spinach, cooked</td>
<td>1 cup</td>
<td>6.4</td>
</tr>
<tr>
<td>Kidney beans, cooked</td>
<td>1 cup</td>
<td>5.2</td>
</tr>
<tr>
<td>Chickpeas, cooked</td>
<td>1 cup</td>
<td>4.7</td>
</tr>
<tr>
<td>Soybeans, cooked</td>
<td>1 cup</td>
<td>4.5</td>
</tr>
<tr>
<td>Tempeh</td>
<td>1 cup</td>
<td>4.5</td>
</tr>
<tr>
<td>Black-eyed peas, cooked</td>
<td>1 cup</td>
<td>4.3</td>
</tr>
<tr>
<td>Swiss chard, cooked</td>
<td>1 cup</td>
<td>4.0</td>
</tr>
<tr>
<td>Bagel, enriched</td>
<td>1 medium</td>
<td>3.8</td>
</tr>
<tr>
<td>Black beans, cooked</td>
<td>1 cup</td>
<td>3.6</td>
</tr>
<tr>
<td>Pinto beans, cooked</td>
<td>1 cup</td>
<td>3.6</td>
</tr>
<tr>
<td>Veggie hot dog, iron-fortified</td>
<td>1 hot dog</td>
<td>3.6</td>
</tr>
<tr>
<td>Prune juice</td>
<td>8 ounces</td>
<td>3.0</td>
</tr>
<tr>
<td>Quinoa, cooked</td>
<td>1 cup</td>
<td>2.8</td>
</tr>
<tr>
<td>Tahini</td>
<td>2 Tbsp</td>
<td>2.7</td>
</tr>
<tr>
<td>Cashews</td>
<td>1/4 cup</td>
<td>2.0</td>
</tr>
<tr>
<td>Brussels sprouts, cooked</td>
<td>1 cup</td>
<td>1.9</td>
</tr>
<tr>
<td>Potato with skin</td>
<td>1 large</td>
<td>1.9</td>
</tr>
<tr>
<td>Bok choy, cooked</td>
<td>1 cup</td>
<td>1.8</td>
</tr>
<tr>
<td>Bulgur, cooked</td>
<td>1 cup</td>
<td>1.7</td>
</tr>
<tr>
<td>Raisins</td>
<td>1/2 cup</td>
<td>1.5</td>
</tr>
<tr>
<td>Soy yogurt</td>
<td>6 ounces</td>
<td>1.4</td>
</tr>
<tr>
<td>Watermelon</td>
<td>1/8 medium</td>
<td>1.4</td>
</tr>
<tr>
<td>Almonds</td>
<td>1/4 cup</td>
<td>1.3</td>
</tr>
<tr>
<td>Sesame seeds</td>
<td>2 Tbsp</td>
<td>1.2</td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>1/4 cup</td>
<td>1.2</td>
</tr>
<tr>
<td>Turnip greens, cooked</td>
<td>1 cup</td>
<td>1.2</td>
</tr>
<tr>
<td>Broccoli, cooked</td>
<td>1 cup</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Omega-3 fatty acids

Dietary requirements for omega-3 fatty acids in infants, children, and adolescents have not been established. However, indirect evidence suggests that they have some health benefits.

**Potential deficits for a vegetarian diet**—Omega-3 fatty acids, which include docosahexaenoic acid (DHA) or eicosapentaenoic acid (EPA), or their precursor alpha-linolenic acid (ALA), are important for cardiovascular health and eye and brain development. Vegetarians, particularly vegans, have lower blood levels of EPA and DHA than nonvegetarians.

**Suggestions:** Children who eat a plant-based diet should include good sources of omega-3 fatty acids, such as ground flaxseed, walnuts, canola oil, and soy. Infant formulas, soy milk, and breakfast bars that are fortified with DHA also are available.

Fiber

Recommended fiber intake for children is approximately 19 g/day for ages 1 to 3 years, 25 g/day for ages 4 to 8 years, and 26 to 31 g/day for ages 9 to 13 years.

***The optimum level of dietary fiber for infants and children younger than two years of age is not known. For this age group, studies of weaning diets with increased fiber suggested that 5 g/day is beneficial and found no negative effect on the absorption of calories, zinc, and calcium or iron bioavailability. However, other studies have shown that growth is poor among infants and toddlers weaned onto very high-fiber, low-calorie diets that often are deficient in vitamins and minerals.

**Suggestions**—Most plant-based children have a healthy intake of fiber. Because a very high-fiber diet can compromise energy intake and mineral absorption, these children should be monitored to ensure that they have adequate growth and adequate intake of minerals such as iron, calcium, and zinc. Dietary fiber goals can be met best by eating a variety of fiber-rich fruits, vegetables, cereals, and grain products while consuming adequate energy intake for growth and development. Fiber supplements are not recommended to meet dietary fiber goals.

Calorie Intake – Energy requirements

Energy requirements for infants vary depending upon age; approximate requirements are as follows—**Infants:**

- 0 to 2 months – 100 to 110 kcal/kg per day
- 3 to 5 months – 85 to 95 kcal/kg per day
- 6 to 8 months – 80 to 85 kcal/kg per day
- 9 to 11 months – 80 kcal/kg per day

Actual energy requirements for an infant vary depending on individual characteristics including medical needs and catch-up growth. Energy intake is influenced by the number of eating occasions, number of foods consumed, energy density of foods consumed, and portion size. Infants have an innate ability to self-regulate energy intake (eg, they consume larger portions when they are fed less frequently; they consume smaller portions of energy-dense foods). However, innate self-regulation may be overcome by factors that diminish hunger-driven eating behavior (eg, coercive feeding, restriction of intake, environmental cues).
Calcium

Table 1: Recommended Dietary Allowances (RDAs) for Calcium

<table>
<thead>
<tr>
<th>Age</th>
<th>Calcium Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 months*</td>
<td>200 mg</td>
</tr>
<tr>
<td>7-12 months*</td>
<td>260 mg (*level for infants is considered “Adequate Intake”)</td>
</tr>
<tr>
<td>1-3 years</td>
<td>700 mg</td>
</tr>
<tr>
<td>4-8 years</td>
<td>1,000 mg</td>
</tr>
<tr>
<td>9-13 years</td>
<td>1,300 mg</td>
</tr>
<tr>
<td>14-18 years</td>
<td>1,300 mg</td>
</tr>
</tbody>
</table>

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References


