Nutrition and Health: Issues and Insights

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DATES: Tuesdays and Thursdays, June 18, 20, 25, 27; July 9, 11
TIME: 10:00 a.m.–11:30 a.m.
LOCATION: Scarritt Bennett Center, Laskey Hall, 1008 19th Ave S
Nutrition: FOR A CHANGING WORLD
SECOND EDITION
Spotlight C
Plant-Based Diets

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Early vegetarians returning from the kill
# Types of Vegetarian Diets

<table>
<thead>
<tr>
<th>Vegetarian Diet Type</th>
<th>Vegan</th>
<th>Lacto-vegetarian</th>
<th>Lacto-ovo-vegetarian</th>
<th>Pescatarian</th>
<th>Quasi-vegetarian</th>
<th>Flexitarian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Foods Eaten</td>
<td>None</td>
<td>Dairy products</td>
<td>Eggs and dairy products</td>
<td>Fish</td>
<td>Poultry and fish</td>
<td>Limited amounts of meat, fish, and poultry</td>
</tr>
</tbody>
</table>

Vegetarians do not consume gelatin (a primary component of Jell-O) because it is a protein that has been isolated from the skin and bones of animals.


Photo credits (left to right): fcafotodigital/Getty Images, DustyPixel/Getty Images, ajafoto/Getty Images, Valery Evlakhov/Shutterstock, Valery Evlakhov/Shutterstock
True vegetarian diets exclude all animal foods (vegan), but variations are common

- **Lacto-vegetarian**
  - Plant foods plus dairy
- **Lacto-ovo vegetarian**
  - Plant foods plus dairy products and eggs
- **Semi-vegetarian (quasi-vegetarian)**
  - Only exclude red meats but eat other animal products
- **Pescatarians**
  - Plant based with fish and shell fish
- **Flexitarian**
  - Mostly plant based but occasionally eat meat
Plant-based diets emphasize whole plant foods

- Emphasize vegetables and fruits
- Include whole grains, beans, legumes, nuts and seeds
- Minimal processed foods
- Limit or omit animal foods
- Vegetarian diets are plant-based diets
American Society for Nutrition: Mounting evidence suggests a plant-based diet lowers heart disease risk

- **Eating more plant protein, less animal-derived protein associated with a lower risk of coronary heart disease**
  In a study of nearly 6,000 people based in the Netherlands, those who ate more plant protein at the expense of animal-derived protein showed a lower risk of developing coronary heart disease during a median follow-up period of more than 13 years. ([abstract](#)).

- **Eating more plant protein, less animal-derived protein associated with less plaque in the arteries**
  A study of 4,500 Brazilian adults finds that people who regularly consumed more plant-based protein were nearly 60 percent less likely than those consuming more animal-based protein to show evidence of plaque in the heart's arteries based on coronary artery calcium scoring, a measure of plaque buildup commonly used to assess heart disease risk. ([abstract](#)).

- **Vegetarian diet associated with reduced risk factors for heart disease and diabetes**
  Among South Asians living in the US, people following a vegetarian diet were found to have a lower number of risk factors for heart disease and diabetes, including a lower body mass index, smaller waist circumference and lower amounts of abdominal fat, lower cholesterol and lower blood sugar compared to people in the same demographic group who ate meat. ([abstract](#)).
The quality of plant-based foods impacts health

- **Eating healthful plant-based foods associated with less weight gain**
  An analysis of changes in body weight among more than 125,000 adults over 4-year periods shows plant-based diets rich in high-quality plant-based foods (such as whole grains, fruits, vegetables and nuts) were associated with less weight gain, while a higher intake of unhealthful plant-based foods (such as sweets, refined grains and fries) was associated with significantly greater weight gain. *(abstract).*

- **Eating higher quality plant-based foods associated with lower risk of death**
  A study of nearly 30,000 US adults bolsters evidence that a higher quality diet helps you live longer and suggests that the quality of plant-based foods in the diet is more important than the quality of animal-based foods. Better choices in the plant-based components of the diet lowered mortality by 30 percent while higher quality animal-based components had little effect on mortality. The beneficial effect of high-quality plant-based foods was even more pronounced among people with chronic health conditions. *(abstract).*
Plant-Based Diets for Cardiovascular Disease Prevention: All Plant Foods Are Not Created Equal.

Hemler EC1, Hu FB2,3,4.

PURPOSE OF REVIEW:
Plant-based diets have been widely promoted for cardiovascular disease (CVD) risk reduction. This review discusses the various definitions of plant-based diets and summarizes their associations with CVD risk, specifically distinguishing between healthy and unhealthy plant-based diets.

RECENT FINDINGS:
Despite wide variation in definition, most studies suggest that plant-based diets are generally beneficial for cardiovascular health. Many previous studies have defined plant-based diets by the complete exclusion of meat or animal products, while others have accounted for plant-based diets including moderate amounts of animal-source foods. Only a few studies have considered the healthfulness of the specific plant foods included in these dietary patterns. In these studies, plant-based diets containing higher amounts of healthy foods such as whole grains, fruits, vegetables, nuts, legumes, oils, tea, and coffee are associated with lower CVD risk. However, plant-based diets including higher amounts of less healthy plant foods, such as refined grains, potatoes/fries, and foods and beverages high in added sugar, are linked to increased risk. A wide spectrum of plant-based diets can be nutritionally adequate and confer cardiovascular benefits, as long as they are planned appropriately and include high-quality foods. Contrary to popular belief, plant-based diets do not have to be vegan or vegetarian. For most people, complete elimination of meat or animal products is unrealistic and not necessary for cardiovascular health. Quality of the specific components of plant-based diets is also important to consider, as not all plant-source foods have beneficial cardiovascular effects. Healthy plant-based diets can be customized to fit individual and cultural preferences and, with large-scale adoption, could concurrently mitigate threats to both human and environmental health.

KEYWORDS:
Cardiovascular disease; Diet quality; Healthy plant-based diets; Plant-based dietary patterns

PMID: 30895476 DOI: 10.1007/s11883-019-0779-5
Plant-based diets have multiple health benefits

• Lower total blood cholesterol levels
• Lower low-density lipoprotein (LDL) levels
• Lower blood pressure
• Reduced cardiovascular risk
• Lower risk of obesity, heart disease, cancer, type 2 diabetes, and mortality
When a variety of plant-based foods are consumed in adequate amounts, vegetarian diets have nutritional benefits

• Higher intake of
  • Dietary fiber
  • Vitamins C, E, and folate
  • Magnesium and potassium
  • Antioxidants and phytochemicals

• Fewer overall calories

• Lower proportion of calories from fat

• Decreased consumption of processed meats
Mediterranean diet in the news....
The traditional Mediterranean diet is rich in vegetables, fruits, fish, and olive oil.
The traditional Mediterranean diet has health benefits

• Different lifestyle and different diets
• High in monounsaturated fats
• Healthy ratio of omega-6 to omega-3 fats
• High in fiber, antioxidants, and polyphenols
• Moderate consumption of wine with food
• Consumption of fish and less other meat

• Lower incidence of heart disease, diabetes, Parkinson’s disease, allergies in children, cancer, and maybe Alzheimer’s disease
The 2015 Dietary Guidelines for Americans include a Healthy Mediterranean-Style Eating Pattern

• Designed "to more closely reflect eating patterns that have been associated with positive health outcomes in studies of Mediterranean-Style diets."
  • Contains more fruits and seafood and less dairy than the U.S.-Style, and with the exception of calcium and vitamin D, has similar nutrient content.
  • The Guidelines state that "the healthfulness of the Pattern was evaluated based on its similarity to food group intakes reported for groups with positive health outcomes in studies rather than on meeting specified nutrient standards."
ABSTRACT

Many studies have reported that higher adherence to Mediterranean diet may decrease cardiovascular disease (CVD) incidence and mortality. We performed a meta-analysis to explore the association in prospective studies and randomized control trials (RCTs) between Mediterranean diet adherence and CVD incidence and mortality. The PubMed database was searched up to June 2014. A total of 17 studies were extracted and 11 qualified for the quantitative analysis. Individuals in the highest quartile of adherence to the diet had lower incidence (relative risk (RR): 0.76, 95% confidence intervals (CI): 0.68, 0.83) and mortality (RR: 0.76, 95% CI: 0.68, 0.83) from CVD compared to those least adherent. A significant reduction of risk was found also for coronary heart disease (CHD) (RR: 0.72, 95% CI: 0.60, 0.86), myocardial infarction (MI) (RR: 0.67; 95% CI: 0.54, 0.83), and stroke (RR: 0.76; 95% CI: 0.60, 0.96) incidence. Pooled analyses of individual components of the diet revealed that the protective effects of the diet appear to be most attributable to olive oil, fruits, vegetables, and legumes. An average reduced risk of 40% for the aforementioned outcomes has been retrieved when pooling results of RCTs. A Mediterranean dietary pattern is associated with lower risks of CVD incidence and mortality, including CHD and MI. The relative effects of specific food groups should be further investigated.

KEYWORDS: Prevention, randomized controlled trials, prospective cohort studies, olive oil, vegetables, fruit, legumes
The Mediterranean diet may also reduce the risk of Alzheimer disease and dementia

- A 2017 systematic review of 31 studies revealed that while more research is warranted, results indicate that the Mediterranean Diet could play a major role in cognitive health and risk reduction of Alzheimer’s disease and dementia
The 2015 Dietary Guidelines for Americans include the Healthy Vegetarian Eating Pattern

- Similar in meeting nutrient standards to the Healthy U.S.-Style Pattern
  - Increased amounts of soy products, legumes, nuts and seeds, and whole grains and eliminates meats, poultry, and seafood
  - Reflects the habits of most U.S. vegetarians thus dairy foods and eggs are included, but a vegan variation is provided
  - Site reduced risk of cardiovascular disease, lower rates of obesity and lower total mortality
Position of the Academy of Nutrition and Dietetics: Vegetarian Diets

- [https://www.eatrightpro.org/~/media/eatrightpro%20files/practice/position%20and%20practice%20papers/position%20papers/vegetarian-diet.ashx](https://www.eatrightpro.org/~/media/eatrightpro%20files/practice/position%20and%20practice%20papers/position%20papers/vegetarian-diet.ashx)

ABSTRACT

It is the position of the Academy of Nutrition and Dietetics that appropriately planned vegetarian, including vegan, diets are healthful, nutritionally adequate, and may provide health benefits for the prevention and treatment of certain diseases. These diets are appropriate for all stages of the life cycle, including pregnancy, lactation, infancy, childhood, adolescence, older adulthood, and for athletes. Plant-based diets are more environmentally sustainable than diets rich in animal products because they use fewer natural resources and are associated with much less environmental damage. Vegetarians and vegans are at reduced risk of certain health conditions, including ischemic heart disease, type 2 diabetes, hypertension, certain types of cancer, and obesity. Low intake of saturated fat and high intakes of vegetables, fruits, whole grains, legumes, soy products, nuts, and seeds (all rich in fiber and phytochemicals) are characteristics of vegetarian and vegan diets that produce lower total and low-density lipoprotein cholesterol levels and better serum glucose control. These factors contribute to reduction of chronic disease. Vegans need reliable sources of vitamin B-12, such as fortified foods or supplements.
Academy of Nutrition and Dietetics: Recommendations for Vegetarians

• Choose a variety of foods: whole grains, vegetables, legumes, nuts, seeds, low-fat dairy products and eggs in moderation
• Minimize intake of highly sweetened, fatty, and heavily refined foods
• Strict vegans may need supplements or fortified foods to get adequate nutrients, especially vitamins $B_{12}$ and $D$
• Consult with a health provider or registered dietitian for dietary planning and advice on dietary supplement needs
AICR RECOMMENDATIONS FOR CANCER PREVENTION

To prevent cancer, people should aim to follow as many of the 10 Cancer Prevention Recommendations as possible. However, any change you make that works toward meeting the goals set out in the Recommendations will go some way to reducing your cancer risk.

EAT A DIET RICH IN WHOLE GRAINS, VEGETABLES, FRUITS AND BEANS
Make whole grains, vegetables, fruits and pulses (legumes) such as beans and lentils a major part of your usual daily diet.

LIMIT CONSUMPTION OF RED AND PROCESSED MEAT
Eat no more than moderate amounts of red meat, such as beef, pork and lamb. Eat little, if any, processed meat.

LIMIT CONSUMPTION OF “FAST FOODS” AND OTHER PROCESSED FOODS HIGH IN FAT, STARCHES OR SUGARS
Limiting these foods helps control calorie intake and maintain a healthy weight.

LIMIT ALCOHOL CONSUMPTION
For cancer prevention, it’s best not to drink alcohol.

BE A HEALTHY WEIGHT
Keep your weight within the healthy range and avoid weight gain in adult life.

BE PHYSICALLY ACTIVE
Be physically active as part of everyday life – walk more and sit less.

LIMIT CONSUMPTION OF SUGAR-SWEETENED DRINKS
Drink mostly water and unsweetened drinks.

DO NOT USE SUPPLEMENTS FOR CANCER PREVENTION
Aim to meet nutritional needs through diet alone.

FOR MOTHERS: BREASTFEED YOUR BABY, IF YOU CAN
Breastfeeding is good for both mother and baby.

AFTER A CANCER DIAGNOSIS: FOLLOW OUR RECOMMENDATIONS, IF YOU CAN
Check with your health professional about what is right for you.

American Institute for Cancer Research
www.aicr.org

Not smoking and avoiding other exposure to tobacco and excess sun are also important in reducing cancer risk.

Following these Recommendations is likely to reduce intakes of salt, saturated and trans fats, which together will help prevent other non-communicable diseases.
Risk of cancer is influenced by multiple factors

- Genetic factors
- Environmental factors
  - Lifestyle choices like diet can increase or decrease risk
  - Diet rich in fruits, vegetables, legumes, and whole grains decrease risk
    - Rich in phytochemicals

- Both the American Cancer Society (ACS) and the American Institute for Cancer Research (AICR) encourage a plant-based diet as an important cancer risk reduction strategy
Modifiable Factors to Reduce Cancer Risk

Achieve or Maintain a Healthy Body Weight
Increased body fat is strongly linked to an increased risk of cancers of the colon and rectum, esophagus, endometrium, pancreas, kidney, breast, and gallbladder.

Limit Consumption of Energy-Dense Foods and Avoid Sugary Drinks
Overconsumption of these foods likely contributes to weight gain and therefore cancers associated with increased body fat.

Limit Consumption of Red Meat and Avoid Processed Meat
Overconsumption of red and processed meats is strongly linked to an increased risk of colorectal cancer. Limit red meat intake to no more than 18 ounces a week.

Limit Salt Intake
Salt and salt-preserved foods are likely a cause of stomach cancer.

Encourage Infant Breastfeeding
Having been breastfed as an infant reduces the risk of children becoming overweight and obese, which are cancer risks. Mothers who breastfed their infants have a lower risk of breast cancer.

Be Physically Active
Physical activity protects against colon, endometrial, and postmenopausal breast cancer. Because physical activity also protects against weight gain, it indirectly protects against those cancers associated with obesity.

Eat Mostly Foods of Plant Origin
Most diets that protect against cancer are composed primarily of foods of plant origin. Nonstarchy vegetables and/or fruit probably protect against cancers of the mouth, esophagus, stomach, and lung. Foods containing fiber protect against colorectal cancer.

Limit Alcoholic Drinks
There is no amount of alcohol consumption that does not increase the risk of cancer. Alcohol consumption increases the risk of mouth, pharynx, larynx, esophagus, and colorectal cancers.

Aim to Meet Nutritional Needs through Diet Alone
High-dose supplements may increase the risk of some cancers. In others cases, intake of nutrients from foods is found to be protective but nutrient supplements are not.

Avoid Consuming Moldy Grains, Legumes, and Other Foods
Some molds produce aflatoxins that are potent cancer-causing compounds.


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Diet and cancer....

- [http://www.aicr.org/cancer-research/dietandcancerreport/](http://www.aicr.org/cancer-research/dietandcancerreport/)
Recommendations to reduce the risk of cancer

- Achieve or maintain a healthy body weight
- Limit consumption of energy-dense foods and avoid sugary drinks
- Limit consumption of red meat and avoid processed meat
- Limit salt intake
- Encourage infant breastfeeding
- Be physically active
- Eat mostly foods of plant origin
- Limit alcoholic drinks
- Aim to meet nutritional needs through diet alone
- Avoid consuming moldy grains, legumes and other foods

Nutrient Benefits of a Plant-Based Diet

• High intake of
  • Dietary fiber
  • Vitamins C, E, and folate
  • Magnesium and potassium
  • Antioxidants and phytochemicals

• Fewer overall calories
• Lower proportion of calories from fat
• Decreased consumption of processed meats
Phytochemicals are found in plant foods and have many health benefits

• Plant pigments are a rich source

• Provide color, aroma, and flavor
  • “Eat a rainbow” of foods

• Health benefits
  • Chemicals have antioxidant, anti-inflammatory, or hormone-like actions
Polyphenols Are a Class of Phytochemicals

Flavonoids are the largest family of phenolic compounds.

- **Flavonoids**
  - Flavonols
  - Flavanols
  - Flavones
  - Flavanones
  - Anthocyanins
  - Isoflavones

- **Phenolic compounds**
  - Hesperidin
  - Rutin
  - Myricetin
  - Quercetin
  - Luteolin
  - Kaempferol

- **Examples of foods containing polyphenols**
  - Onions, kale, leek, broccoli
  - Green tea, grapes, apples, cocoa
  - Parsley, thyme, celery
  - Lemons and other citrus fruits
  - Berries, red cabbage, cherries
  - Soy products such as miso

Examples of Polyphenols

• Resveratrol
  • In grapes and red wine

• Isoflavones and lignans
  • In soy and flaxseed
  • Have hormone-like effects
    • Phytoestrogen

• Carotenoids
  • Lutein and zeaxanthin in spinach and kale are important to eye health
  • Lycopene in tomatoes and watermelon lowers risk of prostate and ovarian cancer
# Sources and Benefits of Phytochemicals

<table>
<thead>
<tr>
<th>Phytochemical</th>
<th>Lycopene</th>
<th>Epigallocatechin gallate (EGCG)</th>
<th>Quercetin</th>
<th>Curcumin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class/Subclass</strong></td>
<td>Carotenoid</td>
<td>Polyphenol Flavonoid/Flavanol</td>
<td>Polyphenol Flavonoid/Flavanol</td>
<td>Polyphenol Diferuloylmethane</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td><img src="image1.png" alt="Lycopene Structure" /></td>
<td><img src="image2.png" alt="EGCG Structure" /></td>
<td><img src="image3.png" alt="Quercetin Structure" /></td>
<td><img src="image4.png" alt="Curcumin Structure" /></td>
</tr>
<tr>
<td><strong>Excellent Sources</strong></td>
<td>Tomatoes, watermelon, pink grapefruit</td>
<td>White and green tea</td>
<td>Red and yellow onions, hot yellow peppers, kale, capers, cranberries</td>
<td>Turmeric spice</td>
</tr>
<tr>
<td><strong>Possible Benefits</strong></td>
<td>Diets high in lycopene may reduce the risk of developing cataracts, and prostate and ovarian cancers.</td>
<td>EGCG is the most abundant flavonoid in green tea. Green tea may have anti-cancer, anti-obesity, anti-atherosclerotic, and anti-diabetic effects.</td>
<td>Quercetin has been shown to have anti-inflammatory effects, and it may reduce the risk of heart disease and cancer.</td>
<td>Curcumin may have antioxidant and anti-inflammatory effects. It may also reduce the risk of cancer, and slow the progression of Alzheimer disease.</td>
</tr>
</tbody>
</table>
Frequently Consume These Phytochemical-Rich Foods

- Apples
- Apricots
- Berries
- Bok choy
- Broccoli
- Brussels sprouts
- Cabbage
- Cantaloupe
- Carrots
- Celery
- Garlic
- Green tea
- Horseradish
- Kale
- Leeks
- Lentils
- Olives
- Onions
- Pears
- Seeds
- Soy nuts
- Spinach
- Tomatoes
- Turnips

Photo credit: Eli Ensor
Use These Tips to Help Consume More Plant-Based Foods

- Plan to eat at least 5 portions of fruits and vegetables every day. Start with breakfast. Aim for 3 servings by lunchtime.
- Start your morning with fruit in plain yogurt, cereal, or sliced fruit on whole wheat toast.
- Add nuts to yogurt, cereal, or salads.
- Scramble your eggs with diced vegetables.
- Go for color. Prepare tomato-based soup and include a vegetable of every color.
- Add steamed vegetables or legumes to your favorite pasta.
- Add vegetables to pizza to increase nutritional punch.
- Drink black, green, or herbal teas.
- Add spices to your meals such as garlic, basil, oregano, sage, turmeric, thyme, or ginger.
- Keep frozen vegetables on hand to add to casseroles and soups and to stretch takeout stir fry and pasta dishes.
- Try soy products such as tofu and vegetable protein meat substitutes.
- Make your sandwiches more interesting with cabbage, carrots, cucumber, peppers, and a rainbow of lettuce colors and textures.

Photo credit: Eli Ensor
### What’s in your glass?

Choices are great, but they can be overwhelming. This at-a-glance chart can help you understand what’s in your 8-ounce glass of milk.

<table>
<thead>
<tr>
<th></th>
<th>COW'S MILK</th>
<th>SOY</th>
<th>ALMOND</th>
<th>COCONUT</th>
<th>RICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Calories</strong></td>
<td>110</td>
<td>110</td>
<td>60</td>
<td>80</td>
<td>120</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>8g</td>
<td>8g</td>
<td>1g</td>
<td>1g</td>
<td>1g</td>
</tr>
<tr>
<td><strong>Fat</strong></td>
<td>2.5g</td>
<td>4.5g</td>
<td>2.5g</td>
<td>5g</td>
<td>2.5g</td>
</tr>
<tr>
<td><strong>Carbohydrates</strong></td>
<td>12g</td>
<td>9g</td>
<td>8g</td>
<td>7g</td>
<td>23g</td>
</tr>
</tbody>
</table>

### Vitamins and Minerals (as % Daily Value)

<table>
<thead>
<tr>
<th></th>
<th>COW'S MILK</th>
<th>SOY</th>
<th>ALMOND</th>
<th>COCONUT</th>
<th>RICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>30%</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
<td>30%</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>25%</td>
<td>25%</td>
<td>N/A**</td>
<td>N/A</td>
<td>15%</td>
</tr>
<tr>
<td>Potassium</td>
<td>10%</td>
<td>10%</td>
<td>1%</td>
<td>1%</td>
<td>15%</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>25%</td>
<td>30%</td>
<td>30%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vitamin B-12</td>
<td>20%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>25%</td>
<td>30%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Notes:**
- **N/A:** Not applicable.
- **N/A**:** Not a naturally occurring nutrient.
- **Excellent Source:** ≥20% DV
- **Good Source:** ≥10% DV
- **Naturally Occurring:** ≥5% DV

### Price

<table>
<thead>
<tr>
<th></th>
<th>COW’S MILK</th>
<th>SOY</th>
<th>ALMOND</th>
<th>COCONUT</th>
<th>RICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per ½ Gallon</td>
<td>$2.05</td>
<td>$3.37</td>
<td>$3.28</td>
<td>$4.99</td>
<td>$3.46</td>
</tr>
<tr>
<td>Per 8oz Serving</td>
<td>$0.26</td>
<td>$0.42</td>
<td>$0.41</td>
<td>$0.62</td>
<td>$0.43</td>
</tr>
</tbody>
</table>
Individuals who infrequently consume animal products may need a plan to obtain these important nutrients.
Nutritional Considerations with Plant-Based Diets

• *Nutrients of possible concern when individuals avoid or restrict animal foods*
  
  • Protein
    • Generally sufficient with adequate and varied energy intake
  
  • Iron
    • RDA 80% higher for vegans
  
  • Vitamin D
  
  • Riboflavin
  
  • Vitamin $B_{12}$
  
  • Omega-3 fatty acids
  
  • Iodine
Protein

• Complete protein
  • Provides all nine essential amino acids in amounts to support protein synthesis
  • Includes meat, dairy, eggs, soy products, and quinoa

• Incomplete protein
  • Includes most plant foods

• Complementary proteins
  • Beans and grains
  • Beans and nuts
Individuals who exclude animal foods need to consume complementary protein foods to help meet protein needs

• **Complete protein**
  • Provides all nine essential amino acids in amounts to support protein synthesis
  • Includes meat, dairy, eggs, soy products, and quinoa

• **Incomplete protein**
  • Includes most plant foods

• **Complementary proteins**
  • Beans and grains
  • Beans and nuts
Vitamin $B_{12}$ is found only in foods of animal origin

- Vegans must obtain from
  - Fortified foods
  - Fortified nutritional yeasts
  - $B_{12}$ supplements
Iodine and Omega-3 Fatty Acids

• Found in high amounts in fish and seafood
• Iodine: found in non-animal sources
  • Iodized salt
• Omega-3 fatty acids: found in non-animal sources
  • No source of EPA and DHA in plants, but they are present in some fortified foods
  • ALA (alpha-linolenic acid) is found in walnuts, flaxseeds, soy, and algae
A diet rich in vegetables, fruits, legumes, and whole grains reduces the risk of cancer, heart disease, and other illnesses

- Plant-based diets, including traditional Mediterranean diets, have multiple health benefits
Vegetarian and Plant-based Resources
(just a few – many out there!)

• Vegetarian Resource Group
  • http://www.vrg.org/
• Nutritionfacts.org
  • https://nutritionfacts.org/topics/plant-based-diets/
• PlantBasedResearch.org
  • http://plantbasedresearch.org/
• Academy of Nutrition and Dietetics
  • http://www.eatright.org/resource/food/nutrition/vegetarian-and-special-diets/vegetarianism-the-basic-facts
• Harvard School of Public Health
  • https://www.health.harvard.edu/staying-healthy/becoming-a-vegetarian