

## Diet and Cancer Prevention

Fact Sheet 9.313

Food & Nutrition Series | Health

By J. Clifford and C. Didinger\* (12/19)

### What is Cancer?

Cancer refers to the rapid formation of abnormal cells. Cancer can affect any part of the body, and it represents a complex interaction between genetics and external agents. However, some cancer is also highly preventable through healthy lifestyle choices.

### What Increases the Risk for Cancer?

Risk factors for cancer are often associated with lifestyle, behavioral, and environmental exposures; these risk factors are usually preventable. Key risk factors to avoid to lower the risk of developing cancer include:

1. Overweight or obesity
2. Unhealthy diet high in processed foods
3. Lack of physical activity
4. Tobacco use
5. Alcohol use
6. Infections (hepatitis, HPV)
7. Environmental pollution (air, water, and soil)
8. Occupational carcinogens (asbestos)
9. Radiation (UV light, radon gas)

### Obesity and Cancer: What is the Relationship?

The American Cancer Society (ACS) reports that one out of every five cancer deaths in the United States is attributable to the preventable factors of overweight or obesity, sedentary behavior, excess alcohol intake, and/or poor diet. Indeed, overweight or obesity is linked to an increased risk of at least 13 types of cancer.

Approximately two-thirds of Americans are overweight or obese. However, one of the most important factors in cancer prevention is *healthy weight maintenance* throughout life. Weight maintenance can be achieved by balancing caloric intake from food and beverages with physical activity. The ACS recommends avoiding excess weight gain by decreasing food portion sizes and limiting snacks between meals. It is also important to limit foods and beverages that are high in calories, added sugars, and/or fat but lack healthful nutrients, like sugary drinks. Furthermore, engaging in regular physical activity promotes a healthy weight.



### Quick Facts

- Lifestyle choices such as poor diet, lack of physical activity, obesity, tobacco, and alcohol use are all associated with an increased risk for cancer.
- More than half of cancer cases could be prevented using current knowledge.
- Key cancer organizations recommend a primarily plant-based diet, with limited consumption of red meat, processed meat, and alcohol.
- Obesity associates with cancer risk. Consuming whole foods as part of a healthy diet, controlling calorie intake, and being physically active will help maintain a healthy weight and reduce the risk for cancer.

\*J. Clifford, Extension Nutrition Specialist, Department of Food Science Human Nutrition; C. Didinger, Graduate Student, Department of Food Science Human Nutrition. Previously updated by: Bellows and R. Moore.

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## Key Dietary Guidelines for Cancer Prevention

A healthful diet, healthy weight maintenance, and minimization of exposure to carcinogens present in food can help with cancer prevention. The following list contains key dietary factors to support these goals.

1. Increase consumption of whole grains, legumes, fruits, and vegetables
2. Reduce intake of processed meat and red meat
3. Limit intake of salty, smoked, and charred foods
4. Limit consumption of alcoholic beverages and avoid sugary drinks

These cancer recommendations generally conform to the USDA Dietary Guidelines for Americans and may help decrease risk for cancer, particularly if there is an increased risk due to other factors such as genetics. These guidelines may also lessen the risk for other chronic diseases. For more information on the USDA Dietary Guidelines, see the website [www.choosemyplate.gov](http://www.choosemyplate.gov), and for coping with the effects of cancer on eating behaviors, see fact sheet [9.332 Diet and Cancer Treatment – Tips for Healthy Eating](#).

### 1. Increase Consumption of Whole Grains, Legumes, Fruits, and Vegetables

The World Cancer Research Fund and the American Cancer Society recommend a plant-based diet, with limited meat and alcohol consumption. Specific nutrients and food constituents of whole grains, legumes, fruits, and vegetables may act as anti-cancer substances when consumed in amounts found in a varied diet. Consuming these plant foods

may also aid in healthy weight maintenance, which is key in cancer prevention.



### Dietary fiber

Dietary fiber is a non-digestible carbohydrate found in plants. Whole foods of plant origin – such as legumes, vegetables, fruits, whole grains, nuts, and seeds – are rich in fiber. Fiber satiates hunger, helps move food through the intestines and out of the body at regular intervals, and supports a healthy gut microbiota. Moreover, higher fiber intakes associate with lower body weight and a reduced risk for chronic diseases, like some cancers. Accordingly, the Academy of Nutrition and Dietetics encourages people to consume adequate fiber from plant foods, but fiber supplements are not recommended.

### Whole grains and legumes

Plants such as wheat, oats, brown rice, and barley contain vitamins, minerals, and dietary fiber, which may help prevent cancers of the gastrointestinal tract, such as colon and rectal cancer. Also, whole grains can be a rich source of antioxidants, which may have anti-cancer properties. Moreover, legumes like black beans, chickpeas, and lentils are particularly rich sources of fiber and plant-based protein.

## Fruits and vegetables

Plants contain many beneficial compounds such as vitamins, minerals, antioxidants, phytochemicals, and fiber, which may act to reduce the risk for various cancers. The different colors of fruits and vegetables reflect specific phytochemicals, thus eating a variety of fruits and vegetables of various colors is encouraged. Researchers are still examining the effects of these complex interactions.

## Antioxidants, phytochemicals, and cancer

Antioxidants are compounds present in many plant foods which help protect tissues from being damaged. Tissue damage is linked to increased cancer risk, thus antioxidants may play a role in cancer prevention. Types of antioxidants include vitamin C (ascorbic acid), vitamin E, and beta-carotene. Many studies have demonstrated the role that antioxidants play in reducing the risk for cancer. Notably, their protective effect is only observed when one consumes whole foods that naturally contain antioxidants, and not from supplements.

Phytochemicals (or phytonutrients) are chemicals made by plants, and some act as natural antioxidants, modulating damage by free radicals. Flavonoids are one widely studied subgroup of phytochemicals that associate with reduced cancer risk. Overall, there is an association with a high consumption of whole foods of plant origin and a decrease in risk for cancer.



## Tips to Eating a Plant-Based Diet:

- Include plant foods with every meal, and as snacks.
- Eat a variety of whole grains, legumes, fruits, and vegetables.
- Choose whole grain products instead of refined grains.
- Swap animal protein with plant-based protein sources, like legumes, nuts, seeds, and tofu.

## 2. Reduce Intake of Processed Meat and Red Meat

Increased consumption of processed meat and red meat have been shown to raise the risk for cancer, possibly through contact with carcinogenic substances during cooking and processing methods. Consumption of these foods may also lead to weight gain, which is also a risk factor for cancer.

### Processed meat and red meat

The cancer agency of the World Health Organization classifies processed meat as carcinogenic to humans and red meat as probably carcinogenic. High intakes of processed meat (e.g. lunch meat, bacon, and hot dogs) and red meats (e.g. beef, pork, and lamb) may be associated with an increase in stomach, pancreatic, and overall cancer mortality. For instance, evidence suggests that colorectal cancer risk increases in a dose-response relationship, with each 50 g/day of processed meat resulting in an 18% increase and each 100 g/day of red meat in a 17% increase. Thus, red meat intake should be limited, and processed meat should be avoided or only be consumed in very small quantities.

Red meat contains compounds such as heme iron, which can result in elevated iron storage in the body that may be cytotoxic and cause

free radical damage. Processed meats can contain nitroso compounds due to the curing process, and these compounds cause cancer in laboratory animals and are suspected to cause cancer in humans. Consumption of processed meat also increases exposure to carcinogenic chemicals from methods of preservation that involve smoke or salt. Furthermore, processed meat and red meat can be high in fat and saturated fat, which associate with obesity and cancer risk.

### **Tips to Reduce Consumption of Processed Meat and Red Meat:**

- Eat alternative protein sources, such as legumes and nuts.
- Use meat to flavor a dish or as a side dish, instead of as a main course.
- Consume smaller portions of lean meats, like fish and skinless poultry.



### **3. Limit Intake of Salty, Smoked, and Charred Foods**

Carcinogens are present in certain foods, and evidence suggests that eating salt-cured, smoked, pickled, and charcoal-broiled foods increases the risk for cancer. Rates of stomach and esophageal cancer cases are higher in parts of the world where food is often prepared using these methods.

#### **Salty foods**

Salt-cured, pickled, and other salty foods may increase one's risk for stomach cancer, especially when eaten in large quantities. Both animal and human studies show an association between salt intake and gastric cancer.

#### **Smoked and charred foods**

Due to the cooking process, smoked, grilled, and charbroiled foods contain carcinogenic compounds, such as polycyclic aromatic hydrocarbons and nitrosamines.

#### **Tips to Limit Charred Food:**

- Cover grill with aluminum foil to protect the food from smoke and fire.
- Cook foods until done, but do not char.
- Remove charred portions before eating.
- Precook foods in the microwave to decrease grilling time.
- Prepare meat by techniques like baking or poaching, instead of frying or charbroiling.

### **4. Limit Consumption of Alcoholic Beverages and Avoid Sugary Drinks**

Alcohol consumption can increase the risk of many cancers, such as mouth, liver, pancreas, bladder, colorectal, and breast cancers. Furthermore, heavy alcohol consumption can replace healthful nutrient-dense foods in the diet, resulting in vitamin and mineral deficiencies. If someone drinks alcohol, it is important to practice moderation — no more than two drinks per day for men, and no more than one drink per day for women.

## Alcohol Abuse and the Cancer Connection:

The link between cancer and alcohol is complex because frequent alcohol consumption may result in many health problems.

- Ethanol is recognized as the predominant agent in alcohol that exercises a carcinogenic effect.
- Heavy drinking can result in liver cirrhosis, which increases the risk of liver cancer.
- Alcoholics commonly have nutritional deficiencies because alcohol contains empty calories, and can replace proper food intake. This may result in low consumption of health-promoting foods.
- Alcohol is high in calories and low in nutrients. Calories from alcohol can contribute to weight gain, which is a risk factor for cancer.
- If heavy drinkers also smoke cigarettes, the risk for cancer is compounded.
- Alcohol is the most regular dietary risk factor for breast cancer.

### Tips to Moderate Alcohol Consumption:

- Instead of alcohol, try non-alcoholic wine, beer, mineral or tonic water, or 100% fruit juice.
- Reserve alcohol for special occasions or celebrations.
- Always provide non-alcoholic beverages and healthful, nutrient-dense foods at social gatherings.

### Avoid Sugar-Sweetened Beverages

Sugar-sweetened beverages, such as soft drinks and energy drinks, are high in calories and added sugars but lacking in healthful nutrients, such as vitamins and minerals. These types of beverages can contribute to obesity, which is associated with an increased cancer risk. Try replacing sugar-sweetened drinks with water or other healthful beverages.

## Supplements

To protect against cancer, the World Cancer Research Fund recommends eating a healthy diet to meet nutrition needs, not relying on supplements. Studies have shown an inverse association between fruit and vegetable consumption and cancer risk, though studies have not found supplements to reduce cancer risk. In fact, some studies have shown adverse effects of supplement use on cancer risk.

Overall, obtaining necessary vitamins and minerals through food is preferable when possible. However, if you are unable to eat normally or have a medical condition, it is important to follow suggestions made by a doctor or registered dietitian.

## Summary

A plant-based diet high in fiber and a variety of whole plant foods and low in fat may reduce the risk of cancer, particularly in individuals at increased risk. Organizations like the World Cancer Research Fund and the American Cancer Society recommend maintaining a healthy weight throughout life. A healthful diet and regular physical activity are key for healthy weight maintenance. These dietary guidelines are intended for people who are healthy. If you have a condition that requires a special diet, consult a physician or registered dietitian before beginning any modified diet plan.



## Additional Resources

- Academy of Nutrition and Dietetics: [www.eatright.org](http://www.eatright.org)
- American Institute for Cancer Research: [www.aicr.org](http://www.aicr.org)
- American Cancer Society: [www.cancer.org](http://www.cancer.org)
- National Cancer Institute: [www.cancer.gov](http://www.cancer.gov) — or call the Cancer Information Service at: 1-800-4-CANCER

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