EVIDENCE-BASED CARE SHEET

Cancer Prevention: Diet

What We Know

› Globally, cancer is the second leading cause of death.In 2018, 1 of every 6 deaths was from cancer (9.6 million persons Cancer type and prevalence vary widely from country to country. The effect of environment—including culture, diet, and geography—on cancer incidence is difficult to study because genetic and economic influences are also involved. It is estimated that diet contributes to 35% of all cases of human cancer. It has also been speculated that 10–70% of cancer-related deaths may be preventable by alterations in diet. However, dietary influence on cancer risk varies widely depending on the type of cancer and type of food eaten. Additional factors such as food cultivation, method of food preparationandpreservation, as well as personal habits (alcohol consumption, smoking, level of physical activity, etc.) contribute to the effect of diet on cancer risk[11,18,20]

- According to the American Institute for Cancer Research, annually more than 100,000 cases of cancer in the United States are associated with excess body fat. The National Cancer Institute reports that there is consistent evidence that excess body fat is associated with an increased risk of several cancers, including endometrial, esophageal, gastric, liver, kidney, multiple myeloma, meningioma, pancreatic, colorectal, gallbladder, breast, ovarian, and thyroidcancers[1,2,15]
  - Chronic low-level inflammation, elevated estrogen levels, hyperinsulinemia, and alteration of natural killer cells in the immune system are all associated with cancer risk and are present in obesity[2,4]
  - Investigators of an obesity-related cancer risk study of Norwegian women reported a positive association between excess body weightand increased risk cancer withpancreatic cancer and post-menopausal breast cancer being the most prevalent type diagnosed[8]
- High dietary fat intake has been associated with an increased incidence of cancer. There are many variables associated with the contribution of fat intake to cancer risk, including type of fat (saturated, unsaturated, polyunsaturated, etc.), preparation of fat (heating, hydrogenating, etc.), and source of fat (animal or plant). Multiple study results show a correlation between animal fat intake and increased cancer risk; fat from plant sources has not proven to be as significant a risk. Because unsaturated fats are generally in liquid form at room temperature, food manufacturers sometimes hydrogenate them (that is, add hydrogen to the fat compound) to achieve a solid form of fat similar to that of saturated fat (such as forming margarine out of vegetable oil). This process of hydrogenation results in the creation of trans fats, which raise low-density lipoprotein (LDL; that is, "bad" cholesterol) levels in blood and have exhibited carcinogenic properties[6,17]
- Regular intake of fruits and vegetables has the potential to protect against oral, esophageal, stomach, pancreatic, breast, ovarian, and colorectal cancer. The mechanisms of this protective effect are not fully understood. Study results have shown a protective benefit of folate intake as well as strong evidence for the anticancer properties in raw, green, and cruciferous vegetables. The antioxidant vitamins (such as E, C, and A), vitamin D, magnesium, and calcium have demonstrated anticancer activity but are still being investigated. Regardless of whether a direct preventive relationship exists, higher fruit and vegetable consumption is associated with such lifestyle habits as higher fiber

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March 25, 2022

and lower fat intake, lower body weight, and increased physical activity, all of which are associated with cancer prevention[3,12,13]

› Dietary and lifestyle recommendations for the prevention of cancer[6,7,9,10,11,17,18,20,22,23]

- In general, the best recommendation for a diet focused on cancer prevention is to eat a high-fiber diet that includes a wide variety of fruits, vegetables, lean proteins, and unsaturated fats
- Balance calorie intake and physical activity to achieve or maintain a healthy body weight
  - Calculate BMI, which is a measure of body weight in relation to height
    - BMI = (body weight [pounds]/height [inches]^2) x 703
    - Desirable BMI is 20–24.9; overweight is a BMI of 25–30; obese is a BMI of > 30
- Consume a diet rich in vegetables and fruits
  - Eating a variety of deeply colored fruits and vegetables (spinach, carrots, berries, etc.) should be emphasized
  - Drinking fruit juice should not be encouraged because juice does not provide the fiber of whole fruit and has a higher calorie content per serving
- Choose whole-grain, high-fiber foods
  - Research results show that high dietary fiber intake is associated with a lower risk for all-cause mortality
  - At least half of the grains consumed should be whole grains
- Minimize intake of foods and beverages that contain added sugar
- Consume fish, especially oily fish, at least twice a week
  - Fish is a source of the unsaturated fat omega-3, which has many health benefits, including reduced risk for cancer
- Limit intake of saturated fat, trans fat, and cholesterol
  - It is recommended that dietary fat and cholesterol intake should be limited as follows:
    - Total dietary fat: < 35% of total caloric intake but not less than 20%
    - Saturated fat: as low as possible while consuming a nutritionally adequate diet
    - Trans fat: as low as possible while consuming a nutritionally adequate diet
    - Cholesterol: as low as possible while consuming a nutritionally adequate diet
  - Choose lean meats
  - Choose dairy products that are fat-free (also called skim), 1% fat, and low-fat (2% fat)
- Include regular physical activity of at least 30 minutes, 5 times per week
- For those who consume alcohol, do so in moderation
  - It is recommended that men limit alcohol to 2 drinks/day and women limit alcohol to 1 drink/day, preferably to be consumed with meals
    - 1 drink = 12 oz of beer, 4 oz of wine, or 1.5 oz of 80-proof liquor
- Do not smoke

› Research findings on cancer prevention and diet

- Evidence suggests that lifestyle behaviors such as achieving and maintaining a healthy weight, engaging in regular physical activity, consuming a diet that is rich in fruits and vegetables and low in saturated fat, limiting alcohol intake, and not smoking can reduce the risk of developing cancer[18,20]
- High dietary fiber intake is associated with a decreased risk of endometrial, ovarian, colorectal, and bladder cancer. Higher total intakes ofwhole grain and vegetable fiber havebeen shownto reduce the risk of these cancers, but a higher intake of cereal fiber alone has not[7,9,10,22,23]
- Consumption of certain foods rich in nutraceuticals, such as stilbenes from red grapes and red wine, isoflavones from soy, carotenoids from tomatoes and vegetables, curcuminoids from turmeric, and catechins from green tea, has been shown to reduce the risk of GI cancers and have anticancer effects[21]
- Research results have shown a relationship between the inflammatory potential of dietary intake and cancer. Pro-inflammatory diets (foods high in processed sugars, animal fat, preservatives) are associated with a higher risk of cancer compared to anti-inflammatory diets (high in fruits and vegetables)[5,14,16,19,24]

What We Can Do

› Become knowledgeable about the influence of diet on cancer prevention so you can accurately assess your patients' personal characteristics and health education needs; share this information with your colleagues

› Assess your patients' health and diet history for risk factors for cancer

› Educate your patients regarding eating a balanced diet that includes a wide variety of fresh fruits and vegetables, fish and other sources of unsaturated fats, lean proteins, and complex carbohydrates

Coding Matrix

References are rated using the following codes, listed in order of strength:

M	Published meta-analysis	**RV**	Published review of the literature	**PP**	Policies, procedures, protocols
SR	Published systematic or integrative literature review	**RU**	Published research utilization report	**X**	Practice exemplars, stories, opinions
RCT	Published research (randomized controlled trial)	**QI**	Published quality improvement report	**GI**	General or background information/texts/reports
R	Published research (not randomized controlled trial)	**L**	Legislation	**U**	Unpublished research, reviews, poster presentations or other such materials
C	Case histories, case studies	**PGR**	Published government report	**CP**	Conference proceedings, abstracts, presentation
G	Published guidelines	**PFR**	Published funded report		

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