

<b>Title</b>	Cancer and Nutrition
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## Purpose

The purpose of this course is to provide an overview of the role that a balanced nutritious diet can play in the prevention, treatment, cure or palliative care of cancer.

## Objectives

1. To enable the nurse to understand the significance of dietary intake as it relates to the diagnosis of cancer.
  2. To present the advantages of a nutritious balanced diet for healthy individuals as well as compromised patients.
  3. To encourage nurses to adopt a proactive approach regarding nutritional screening and counseling.
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One in two men and one in three women will develop a major cancer in their lifetime, a thought provoking and frightening average. Despite the many advances in the treatment of cancer, the road to survival remains very costly, physically, psychologically and financially. Cancer is complex, the therapy challenging and the cure elusive. Definitely, the time has come to shift the focus a bit from detection, treatment and palliation to prevention. We do have some power to avoid cancer, however it may very well require a lifetime commitment to not smoking, maintaining a moderate weight, exercising and eating plenty of fruits and vegetables. Does the research support that commitment and are the results really worth the life style changes required? The answer to that question can be complicated and controversial however we can look at the research in order to draw some conclusions and perhaps make some decisions.

Epidemiological, laboratory and controlled trial studies have been conducted and the compelling evidence demonstrates an association between certain foods and a lowered risk of cancer. The majority of the research suggests that eating fruit, vegetables, whole grains and beans will play a major role in cancer prevention. The foods that have been studied extensively by the American Institute for Cancer Research are listed below.

**LEGUMES** - This category includes peas, lentils, and many other bean varieties. The active ingredients in beans that seem to have a role in cancer prevention include saponins, protease inhibitors and phytic acid. These phytochemicals appear to protect cells from the type of genetic damage that can lead to cancer. Beans are also rich in fiber, and diets high in fiber have been repeatedly linked to lower risk of colorectal, pancreatic and breast cancers.

In laboratory studies, saponins have shown the ability to inhibit the reproduction of cancer cells and slow the growth of tumors in several different tissues. Protease inhibitors have slowed the division of cancer cells and helped to prevent tumors from releasing substances called proteases that destroy nearby cells. Phytic acid has shown the ability to slow the progression of tumors significantly. One recent case-controlled study involving 3237 men of different ethnic

backgrounds found that those subjects who consumed the most beans had a 38 percent lower risk of prostate cancer than subjects who consumed the least amount.

**BERRIES** – Delicious, an excellent source of vitamin C and fiber and berries are consistently linked to lower cancer risk. All berries, particularly strawberries and raspberries are especially rich in a substance called ellagic acid, which has shown the ability to prevent cancers of the skin, bladder, lung, esophagus and breast in laboratory studies. This phytochemical seems to utilize several different anti-cancer methods at once. It acts as an antioxidant, it helps the body deactivate specific carcinogens, and it helps slow the reproduction of cancer cells. Strawberries also contain a wide range of other flavonoids, each of which seems to employ a similarly wide array of anti-cancer strategies. Blueberries contain a family of phenolic compounds called anthocyanosides, which appears to be among the most potent antioxidants yet discovered.

**TOMATOES** - Antioxidants can help protect against the kind of damage that promotes cancer and the antioxidant nature of compounds within tomatoes has long been known. Recent evidence from laboratory studies suggests that tomatoes may combat cancer in additional ways and at later stages of the process. Tomato components have stopped the proliferation of several cancer cell types, including breast, lung and endometrium. Tomatoes have attracted particular attention from prostate cancer researchers because lycopene and its related compounds tend to concentrate in tissues of the prostate. In animal models, consumption of tomato products has been linked to large decreases in prostate cancer risk. In fact studies that compare the diets of a large group of men for six years found that those who ate the most tomato products had a 35% lower risk of early prostate cancer and a 53% lower risk of advanced prostate cancer than men who ate the least of these foods. A few small clinical studies have investigated how tomato rich diets influence the prostate health of patients who have been treated for prostate cancer. The results are preliminary however encouraging.

The red or pink color of several other fruits, watermelon, papaya, and pink grapefruit also comes from the carotenoid called lycopene. These fruits have not been as extensively studied as tomatoes but may be as instrumental in preventing the cell damage that leads to cancer.

**SOY** - Active ingredients in soy that appear to have anti-cancer effects are isoflavones, saponins, phenolic acids, phytic acid, phytosterols and protein kinase inhibitors. Soy appears to contain some components that resemble very weak forms of the natural hormones of the body. Therefore soy foods can mimic the actions of hormones under certain conditions and counteract these hormonal actions at other times. Because of such complexities, most of the studies that have investigated soy's role in cancer development have dealt with hormone-related cancers such as those of the breast and prostate.

Soy apparently inhibits the growth of prostate cancer cells in a variety of laboratory conditions. In a large human study, men who said they drank soymilk more than once per day for 20 years were found to have 70% lower prostate cancer risk than men who never drank soymilk. More recent human studies that have sought to determine the effect of soy foods on hormones linked to prostate cancer have produced inconsistent evidence. Soy has been associated with the inhibition of breast cancer cells in some, but not all laboratory experiments. Diets rich in soy appear to alter the metabolism of breast tissue in animal subjects in ways that may translate into added anti-cancer protection. Several human and laboratory studies have suggested that consumption of soy early in life may help protect against breast cancer later in life. Results are less encouraging for post-menopausal women; it appears that soy consumption may have little or no effect on either breast cancer risk or the survival of breast cancer patients. However, it is important to note that preliminary evidence suggests that diets high in soy may help make breast, cervical, ovarian, head and neck cancer cells more sensitive to the effects of chemotherapy and radiation therapy.

GREEN TEA - For centuries tea has been enjoyed as a beverage and respected as a medicine. Both black and green teas contain numerous active ingredients, including polyphenols and flavonoids, which we have already learned, are potent antioxidants. One class of flavonoids called catechins has recently become the focus of widespread study for their anti-cancer potential. Tea is the best source of catechins in the human diet and interestingly green tea contains about three times the quantity than that found in black tea.

In laboratory studies, green tea slows or completely prevents cancer development in colon, liver, breast and prostate cells. Other studies involving green tea have shown similar protective effects in tissues of the lung, skin and digestive tract. Studies that have tracked the diets of human subjects over several years have associated regular tea consumption with a lower risk for bladder, colon, stomach, and pancreatic and esophageal cancers. The lure of good health from drinking several cups of the world's most popular drink have helped drive the sales from \$2 billion a year in 1990 to over \$5 billion in 2003 according to the Tea Council.

Current clinical research is exploring the advantages of consumption of green tea among cancer survivors. Preliminary results suggest that an intake of three or more cups of green tea a day may reduce the recurrence of early breast cancer. Evidence for prevention of Stage II and III breast cancer recurrence is less consistent.

GRAPES - Both grapes and grape juice are rich sources of resveratrol, a specific type of natural plant chemical that belongs to a much larger group of plant chemicals called polyphenols. The skin of the grape contains the most resveratrol and red and purple grapes contain significantly more than green grapes. Wine also contains the substance however wine has been associated with increased risk for breast and several other types of cancer so wine is not a recommended source.

Polyphenols in general and resveratrol in particular seem to possess potent antioxidant and anti-inflammatory properties. Resveratrol has been able to prevent the kind of damage known to trigger the cancer process in cell, tissue and animal models. It also seems to slow the growth of cancer cells and inhibit the formation of tumors in lymph, liver, stomach and breast cells. Resveratrol has also triggered the death of leukemia and colon cancer tumors. In another series of studies, the chemical blocked the development of skin, breast and leukemia cancer at all three stages of the disease (initiation, promotion, and progression).

GARLIC - Garlic belongs to the family of vegetables called Allium, which also includes onions, scallions, leeks, and chives. These vegetables contain many substances now being studied for their anti-cancer effects. Laboratory research shows that one garlic component exerts potent preventive effects against cancers of the skin, colon and lung. Recently this compound proved able to kill leukemia cells in the laboratory. Components of garlic have shown the ability to slow or stop the growth of tumors in the prostate, bladder, colon and stomach tissue. In animal studies, components in Allium vegetables have slowed the development of cancer in several stages and at various body sites including stomach, breast, colon, and lung. Two large studies in China and Italy have linked garlic consumption in humans to lower mortality from stomach cancer. The Iowa Women's Health Study found that women who ate garlic consistently had a lower risk for colon cancer. Another article found that garlic consumption was linked to lower risk of stomach cancer in Korea. Case controlled studies have associated high garlic and Allium vegetable consumption with lower risk of stomach cancer, endometrial cancer and prostate cancer.

So what is all this research telling us? With one third of all cancer deaths related to what we eat it is important to carefully consider the advantages of a healthy diet that includes the foods listed above. Making careful diet choices every day promotes good nutrition, good health and will reduce the risk of cancer. What impact can food choices have for the patient already

diagnosed with cancer? Whether patients are undergoing active therapy, recovering from cancer therapy or in remission and striving to avoid recurrence, the benefit of optimal diet choices cannot be overestimated. Nutrition plays an integral role for individuals whose cancer has been cured as well. A healthy diet helps prevent or control comorbidities such as heart disease and hypertension; also, wise food choices may help prevent another malignancy from developing.

Nutrition in cancer care embodies prevention of disease, treatment, cure, or supportive palliation. Patient nutrition not only influences the risk of developing cancer but also the risk of therapeutic toxicity and unwanted medical outcomes once cancer has been diagnosed. Whether the goal of cancer treatment is cure or palliation, assessment of nutritional problems and prompt intervention are essential. The original principles of nutrition care for cancer victims developed in 1979 are still relevant today. Proactive nutritional care can prevent or reduce the complications typically associated with cancer treatment.

Patients that enter cancer treatment with anorexia, weight loss or other symptoms of nutritional problems will encounter a more difficult course and recovery. The nutritional prognostic indicators most recognized as being predictive of poor outcome include weight loss, wasting, and malnutrition. In addition, significant weight loss at the time of diagnosis is associated with decreased survival and reduced response to surgery, radiation therapy, and chemotherapy. In addition, those same anti-cancer treatments, surgery, chemotherapy and radiation can have a direct or indirect negative effect on nutritional status. The success of the anticancer therapy is influenced by the patient's ability to tolerate the therapy. This ability is directly related to the nutritional status preceding and throughout the treatment.

Optimal nutrition status is an important goal in the management of individuals with cancer. Nutrition therapy recommendations may vary throughout the continuum of care in order to achieve these goals:

- Prevent or reverse nutrient deficiencies.
- Preserve lean body mass.
- Help patients better tolerate treatments.
- Minimize nutrition-related side effects and complications.
- Maintain strength and energy.
- Protect immune function, decreasing the risk of infection.
- Aid in recovery and healing.
- Maximize quality of life.

Patients with advanced cancer should receive nutrition support even when such therapy cannot produce weight gain as such support may:

- Lessen side effects.
- Reduce risk of infection.
- Reduce asthenia.
- Improve well being.
- Provide comfort and symptom relief.

The advantages and disadvantages of the various methods of providing nutritional support must be considered once the degree of malnutrition has been assessed and the decision made to offer such support. Of course, the function of the gut, ease of delivery of the system, the diagnosis and the prognosis will influence the choice of nutritional support system.

Enteral Nutrition: The benefits of enteral nutrition or tube feeding, are that it continues to use the gut, has fewer complications such as infection and organ malfunction, is often easier to

administer and is safer than parenteral nutrition. Also nutrients are metabolized and utilized more efficiently than with other methods.

Parenteral Nutrition: Select patients, such as those with obstruction, intractable nausea and/or vomiting, or a non-functioning gut may require parenteral nutrition. Additional indications for parenteral nutrition are severe diarrhea/malabsorption, severe mucositis or esophagitis, and high-output gastrointestinal fistula.

Because nutritional status can quickly become compromised from illness and decreased intake, because nutritional well-being, plays an important role in treatment and recovery from cancer, screening and intervention as well as close monitoring and evaluation throughout all phases of treatment and recovery are imperative in the pursuit of health and for the individual with cancer.

The research clearly indicates that people can lower their risk of developing some cancers by not smoking, maintaining a moderate weight, eating a variety of fruits and vegetables, and exercising regularly. There is additional evidence that certain substances, such as soy, green tea, and berries can further decrease the risk of a diagnosis of cancer. What about supplements such as vitamins, herbal remedies, minerals and super fortified foods? While studies may eventually prove that particular supplements offer some cancer-fighting benefits, the largely unregulated industry remains controversial. Much of the scientific evidence supporting the efficacy of herbal preparations comes from Germany, where herbal medicine is better regulated than in the United States. Until regulations that are more consistent are in place, it is impossible to predict or study the results of an herbal product in the United States. Generally the American public is not vitamin deficient, adding vitamins and minerals is probably more or less worthless as far as cancer prevention is concerned. A prescription or over-the counter drug must be proven safe and effective before it can be sold. That is not the case with vitamins, minerals or herbal remedies, so different brands of the supposedly same substance are not always standardized and might not contain the same ingredients. Also there is a lack of large studies on human subjects using dietary supplements, these products simply may not work or they could cause harm. Mega-vitamin therapy can produce certain undesired side effects including nausea and lack of appetite. Another concern is that supplements and super-foods could give consumers a false sense of security leading to a disregard for standard screening tests and a healthy well balanced diet which includes the known cancer fighting foods.

The most compelling evidence demonstrating an association between a particular food and lowered cancer risk only emerges when several different types of studies confirm the same result. Controlled trials, laboratory studies and epidemiological studies throughout the world confirm the cancer prevention opportunities offered by daily food and lifestyle choices. With more than 1.2 million new cancer cases in the United States each year and more than 500,000 cancer deaths annually, options that can produce even a small reduction in cancer rates offer enormous savings in lives, suffering and medical expense. Nurses are in a unique position to provide the information that could impact the cancer rates and improve the quality of life of current cancer patients. Of course, there are no guarantees against cancer. However, the overwhelming scientific evidence indicates that the majority of cancers are directly related to lifestyle choices, (predominately smoking and diet). There for as nurses we are committed to assist patients to make life-enhancing choices.

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## References

1. Shils ME: Principles of nutritional therapy. Cancer 43 (5 Suppl): 2093-102, 1979
2. Eldridge B, Rock CL, McCallum PD: Nutrition and the patient with cancer. In: Coulston CL,

- Monsen ER, eds: Nutrition in the prevention and Treatment of Disease.
3. Ottery FD: Rethinking nutritional support of the cancer patient: the new field of nutrition. *Semin Oncol* 21 (6): 770-8, 1994.
  4. National Cancer Institute: Eating Hints for Cancer Patients: Before, During and After. Bethesda, Md: National Cancer Institute, 1998. Publication No. 98-2079.
  5. Stratton RJ: Summary of a systematic review on oral nutritional supplement use. *Proc Nutr Soc* 59 (3): 469-76, 2000.

### Course Exam

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1. Consuming foods that contain anti-oxidants can lower the risk of cancer.  
 True  False
2. Laboratory tests, controlled trials, and epidemiological studies have all shown that food choices influence cancer risk.  
 True  False
3. Papaya and watermelon contain lycopene, the same substance found in tomatoes.  
 True  False
4. A small percentage of all cancers are caused by life-style choices.  
 True  False
5. Berries are an excellent source of Vitamin C but have no cancer fighting properties.  
 True  False
6. Diets high in fiber have been repeatedly associated with a lower risk of colorectal, pancreatic and breast cancers.  
 True  False
7. Green tea contains three times the quantity of catechins as black tea.  
 True  False
8. Once cancer has been diagnosed, diet no longer is important if the patient is already well nourished.  
 True  False
9. Patients can tolerate chemotherapy, surgery and radiation more successfully if they are able to maintain a balanced healthy intake of food and fluids.  
 True  False
10. A daily vitamin is a good substitute for making healthy food choices.  
 True  False