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## Comprehensive Cancer Information for Patients, Families and Medical Professionals Printed from CancerHelp®

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## Nutrition 02/03

### -- Introduction --

This patient summary on nutrition is adapted from the summary written for health professionals by cancer experts. This and other credible information about cancer treatment, screening, prevention, supportive care, and ongoing clinical trials, is available from the National Cancer Institute. Cancer and its treatment can lead to malnutrition, a common problem in cancer patients. This brief summary describes the effects of cancer and its therapy on nutrition, as well as methods for maintaining nutrition in cancer patients.

### -- Overview --

Cancer patients frequently have problems getting enough nutrition. Malnutrition is a major cause of illness and death in cancer patients.

Malnutrition occurs when too little food is eaten to continue the body's functions. Progressive wasting, weakness, exhaustion, lower resistance to infection, problems tolerating cancer therapy, and finally, death may result.

Anorexia (the loss of appetite or desire to eat) is the most common symptom in people with cancer. Anorexia may occur early in the disease or later, when the tumor grows and spreads. Some patients may have anorexia when they are diagnosed with cancer; and almost all patients who have widespread cancer will develop anorexia. Anorexia is the most common cause of malnutrition and deterioration in cancer patients.

Cachexia is a wasting syndrome characterized by weakness and a noticeable continuous loss of weight, fat, and muscle. Anorexia and cachexia often occur together. Cachexia can occur in people who are eating enough, but who cannot absorb the nutrients. Cachexia is not related to the tumor size, type, or extent. Cancer cachexia is not the same as starvation. A healthy person's body can adjust to starvation by slowing down its use of nutrients, but in cancer patients, the body does not make this adjustment.

Some cancer patients may die of the effects of malnutrition and wasting.

-- Effects of the Tumor --

Many malnutrition problems are caused directly by the tumor. Tumors growing in the stomach, esophagus, or intestines can cause blockage, nausea and vomiting, poor digestion, slow movement through the digestive system, or poor absorption of nutrients. Cancer of the ovaries or genital and urinary organs can cause ascites (excess fluid in the abdomen), leading to feelings of early fullness, worsening malnutrition, or fluid and electrolyte imbalances. Pain caused by the tumor can result in severe anorexia and a decrease in the amount of foods and liquids consumed. Central nervous system tumors (such as brain cancer) can cause confusion or sleepiness; patients may lose interest in food or forget to eat.

Changes in the body's metabolism can also cause nutritional problems. Tumor cells often convert nutrients to energy in different, less efficient ways than do other cells.

Tumors may produce chemicals or other products that can cause anorexia and cachexia. For example, tumors can produce a substance that changes a person's sense of taste, so that the patient does not want to eat. Tumors can affect the receptors in the brain that tell the stomach if it is full. Tumors can also produce hormone substances, which can change the amount of nutrients eaten, the way they are absorbed, and the way they are used by the body.

#### -- Effect of Cancer Therapies --

Nutrition problems can be caused by cancer therapies and their side effects. The treatment may have a direct effect, such as poor protein and fat absorption after certain types of surgeries, or an indirect effect, such as an increased need for energy due to infection and fever. Severe malnutrition is defined in two ways: as an increased risk of illness and/or death and as a defined amount of weight loss over a specified amount of time.

#### -- Surgery --

Head and neck surgery may cause chewing and swallowing problems or may cause mental stress due to the amount of tissue removed during surgery. Surgery to the esophagus may cause stomach paralysis and poor absorption of fat. Poor absorption of protein and fat, dumping syndrome (rapid emptying of the stomach) with low blood sugar, and early feelings of fullness may follow stomach surgery. Surgery to the pancreas may also cause poor protein and fat absorption, poor absorption of vitamins and minerals, or diabetes. Small bowel and colon surgery may cause poor absorption of protein and fat, vitamin and mineral shortages, diarrhea, and severe fluid and electrolyte losses. Surgery to the urinary tract can cause electrolyte imbalances. Other side effects of surgery that can affect nutrition include infection, fistulas (holes between two organs or between

an organ and the surface of the body), or short-bowel syndrome. After a colostomy, patients may decrease the amount they eat and drink.

-- Chemotherapy --

Chemotherapy can cause anorexia, nausea and/or vomiting, diarrhea or constipation, inflammation and sores in the mouth, changes in the way food tastes, or infections. Symptoms that affect nutrition and last longer than 2 weeks are especially critical. The frequency and severity of these symptoms depends on the type of chemotherapy drug, the dosage, and the other drugs and treatments given at the same time. Nutrition may be seriously affected when a patient has a fever for an extended period of time since fevers increase the number of calories needed by the body.

-- Radiation therapy --

Radiation therapy to the head and neck can cause anorexia, taste changes, dry mouth, inflammation of the mouth and gums, swallowing problems, jaw spasms, cavities, or infection. Radiation to the chest can cause infection in the esophagus, swallowing problems, esophageal reflux (a backwards flow of the stomach contents into the esophagus), nausea, or vomiting. Radiation to the abdomen or pelvis may cause diarrhea, nausea and vomiting, inflammation of the intestine or rectum, or fistula formation. Radiation therapy may also cause tiredness, which may lead to a decrease in appetite and a reduced desire to eat. Long-term effects can include narrowing of the intestine, chronic inflamed intestines, poor absorption, or blockage of the gastrointestinal tract.

-- Immunotherapy --

Immunotherapy (for example, biological response modifier therapy) can cause fever, tiredness, and weakness, and can lead to loss of appetite and an increased need for protein and calories.

-- Mental and Social Effects --

Eating is an important social activity. Anorexia and food avoidance lead to social isolation when people cannot be with others during meal times. Many mental and social factors can affect a person's desire and willingness to eat. Depression, anxiety, anger, and fear are often felt by cancer patients and can lead to anorexia. Feeling a loss of control or helplessness can also reduce the desire to eat. Refusing to eat even when begged to eat by family, friends, and care givers may be one way a patient (who may not feel able to refuse treatment) feels able to have some control in life. Learned food dislikes may also cause less eating or drinking, nausea, and/or vomiting. People who have an unpleasant experience after eating a certain food may avoid that food in the future.

Factors such as living alone, an inability to cook or prepare meals, or an inability to walk to the kitchen because of physical disabilities may lead to eating problems. A social worker or nurse can evaluate the patient's home and recommend changes to help improve eating habits.

Diagnosing the cancer and treating it often means that the patient has to spend much time away from home and the normal routine, including having meals. Favorite foods may not be available in the hospital, or may not be tolerated well because of treatment side effects. For example, a person who enjoys hot, spicy food and has inflammation of the esophagus may not like the taste of bland food and may eat very little. Changes in taste can affect a person's appetite and desire for food.

The less a cancer patient eats, the weaker he or she becomes, and the more it seems that the cancer is progressing. This wasting is a constant reminder to the patient, family, and care givers of the cancer diagnosis and expected poor outcome. This can affect quality of life, social participation, and attitude. Also, with continued wasting, and the resulting tiredness, the person socializes even less. Since food and eating have such an important role in society, the inability to eat well and the consequences of inadequate nutrition isolate the patient even more.

Exercise (such as walking or mild aerobics) has a positive effect on the patient's sense of well-being, alleviating nausea and vomiting, and the patient's ability to eat. Patients who must have artificial feeding methods

may show depression, changes in body image, and stress caused by feeding tubes and equipment. To cancer patients, problems with nutrition are more important to their sense of well-being than their sexuality and their ability to remain employed.

-- Nutritional Assessment --

The patient's medical history and physical examination are the most important factors in determining the nutritional status of a cancer patient. This assessment should include a weight history; any changes in eating and drinking; symptoms affecting nutrition (including anorexia, nausea, vomiting, diarrhea, constipation, inflammation and sores in the mouth, dry mouth, taste/smell changes, or pain); medications that affect eating and the way the body uses nutrients; other illnesses or conditions that could affect nutrition or nutritional treatment; and the patient's level of functioning. The cancer patient should be asked about changes in eating and drinking compared to what is normal for him or her, and how long this change has lasted. The physical examination should look for weight loss, loss of fat under the skin, muscle wasting, fluid collection in the legs, and the presence of ascites.

Finding out how much the person likes to eat, as well as what he or she likes to eat, can help when making changes to a cancer patient's diet. Knowing the patient's specific food likes, dislikes, and allergies is also helpful.

-- General Treatment Guidelines --

The type of treatment needed to improve a cancer patient's nutrition is chosen based on the following factors:

- \* The presence of a working gastrointestinal tract.
- \* The type of cancer therapy, such as where and how much surgery has been done, the type of chemotherapy used, where and how much of the

body was irradiated, the use of biological response modifiers, and the combinations of therapies used.

- \* The quality of life, how well the patient is functioning, and the expected outcome of the cancer.

- \* The cost of the care.

Keeping the body looking well and maintaining good nutrition can help the cancer patient feel and look better and help improve his or her daily functioning. It may also help patients tolerate cancer therapy. The type of treatment chosen for nutritional problems depends on the cause of the problems. Problems caused by the tumor may end when the tumor responds to therapy.

Food odor frequently causes anorexia in cancer patients. Patients with anorexia should avoid odors caused by food preparation. Cancer patients may be able to tolerate food with little odor. For example, they may be able to eat at breakfast, since many breakfast foods have little odor.

The following suggestions can help cancer patients manage anorexia:

1. Eat small frequent meals (every 1-2 hours).
2. Eat high-protein and high-calorie foods (including snacks).
3. Avoid foods low in calories and protein and avoid empty calories (like soda).
4. Avoid liquids with meals (unless needed to help dry mouth or swallowing) to keep from feeling full early.
5. Try to eat when feeling best; use nutritional supplements when not feeling like eating. (Cancer patients usually feel better in the morning and have better appetites at that time.)
6. Try several different brands of nutritional supplements or high-calorie, high-protein drinks or pudding recipes. If it tastes too sweet or has a bitter aftertaste, adding the juice of half a freshly-squeezed lemon may help.
7. Work up an appetite with light exercise (such as, walking), a glass of wine or beer if allowed, or appetite stimulants.

8. Add extra calories and protein to food (such as butter, skim milk powder, honey, or brown sugar).

9. Take medications with high-calorie fluids (like nutritional supplements) unless the medication must be taken on an empty stomach.

10. Make eating a pleasant experience (for example, try new recipes, eat with friends, vary color and texture of foods).

11. Experiment with recipes, flavorings, spices, types, and consistencies of food. This is important, since food likes and dislikes may change from day to day.

12. Avoid strong odors. Use boiling bags, cook outdoors on the grill, use a kitchen fan when cooking, serve cold food instead of hot (since odors are in the rising steam), and take off any food covers to release the odors before entering a patient's room. Small portable fans can be used to blow food odors away from patients. Order take-out food, to avoid preparing food at home.

Suggestions for helping cancer patients manage taste changes include:

1. Use plastic utensils if the patient complains of a metallic taste while eating.

2. Cook poultry, fish, eggs, and cheese instead of red meat.

3. Marinate meats with sweet marinades or sauces.

4. Serve meats cool instead of hot.

5. Use extra seasonings, spices, and flavorings, but avoid flavorings that are very sweet or very bitter. A higher sensitivity to the taste of food may cause them to taste flavorless or boring.

6. Substitute milk shakes, puddings, ice cream, cheese, and other high protein foods for meats if the patient does not want to eat meat.

7. Rinse the mouth before eating.

8. Use lemon-flavored drinks to stimulate saliva and taste, but do not use artificial lemon and use very little sweetener.

To prevent the development of taste dislikes:

1. Try new foods and supplements when feeling well.

2. Eat lightly on the morning of, or several hours before receiving chemotherapy.
3. Do not introduce new tastes when bad odors are present.

To help dry mouth or trouble swallowing:

1. Eat soft or moist foods.
2. Process foods in a blender.
3. Moisten foods with creams, gravies, or oils.
4. Avoid rough, irritating foods.
5. Avoid hot or cold foods.
6. Avoid foods that stick to the roof of the mouth.
7. Take small bites and chew completely.

The cancer patient should be encouraged to keep a positive attitude towards treatment and try to take in enough calories and protein. Individual calorie and protein requirements can be calculated so that realistic goals can be set with the patient and his or her care givers. The actual amount of calories and protein needed by each cancer patient varies. The following formula can be used to determine how many calories are needed to maintain a cancer patient's body weight:

General guidelines of calories required (assuming light activity):

- \* Underweight adults - multiply weight in pounds by 18
- \* Normal weight adults - multiply weight in pounds by 16
- \* Overweight adults - multiply weight in pounds by 13

Some cancer patients need more calories and protein. A cancer nutritionist (dietician, diet technician, nurse, or doctor with special training in nutrition) can help determine the nutritional needs and options of each patient. General guidelines for grams of protein needed by cancer patients: multiply weight in pounds by 0.5.

-- Enteral/Parenteral Support --

Sometimes it may be necessary to maintain nutrition using other methods than eating. Enteral nutrition (infusions through the intestinal tract, usually the stomach) may be used. The factors that indicate enteral nutrition is needed are:

1. Upper gastrointestinal blockage that prevents eating or drinking (difficulty swallowing, esophageal narrowing, tumor, stomach weakness or paralysis).
2. Treatment with both chemotherapy and radiation therapy (especially with radiation therapy to the esophagus) with side effects that limit eating or drinking.
3. Anorexia and/or other problems such as severe depression, confusion, or disorientation that keep the patient from eating or drinking sufficiently.
4. Problems eating or drinking (for example, pain when eating).

Enteral nutrition should not be used when the following are present:

1. Bowel obstruction.
2. Nausea and vomiting that does not respond to standard treatment.
3. Severe short gut (inability of the large or small intestine to absorb nutrients due to its removal or damage) with diarrhea that does not respond to standard treatment.
4. Fistula (a hole) in the stomach or esophagus.

Parenteral nutrition (usually an infusion into a vein) should be given for the following reasons:

1. The gastrointestinal tract is not working because of:
  - a. Temporary problems with oral or enteral nutrition for longer

than 10 days, especially if nutritional problems were already present.

b. Obstruction or other problems caused by the tumor that are expected to get better after chemotherapy or surgery.

c. Multiple and/or uncorrectable obstructions or other problems caused by a slow-growing cancer.

2. Severe short gut (see #3 above) following surgery, radiation side effects, fistula, and problems maintaining body weight and muscle with enteral nutrition.

3. Severe and/or continuous decline in nutrition in a person with a slow-growing cancer or any cancer in which malnutrition, not the cancer, is the main problem.

Parenteral nutrition should not be used when the following are present:

1. Functioning digestive system.
2. The patient is not expected to live at least 40 days.
3. There are no good veins to use.
4. There is no severe nutritional problem (for example, a temporary problem eating after surgery).

It is believed that cancer patients who have enough nutrition are better able to stand therapy and its side effects. The type of nutritional support used should be chosen based on the patient's physical needs, degree of nutritional problem, disease, the amount of time that support will be needed, and the resources available. If the gastrointestinal tract is working and will not be affected by the cancer therapy, then enteral support is best. Enteral nutrition can be given through a tube in the nose or by tubes placed during surgery.

Medications can also be used to improve nutrition. Medications may

include those for pain management, treatment of constipation or diarrhea, stimulation of the stomach, or the use of appetite stimulants.

-- To Learn More --

### Call

For more information, U.S. residents may call the National Cancer Institute's (NCI's) Cancer Information Service toll-free at 1-800-4-CANCER (1-800-422-6237) Monday through Friday from 9:00 a.m. to 4:30 p.m. Deaf and hard-of-hearing callers with TTY equipment may call 1-800-332-8615. The call is free and a trained Cancer Information Specialist is available to answer your questions.

### Web sites and Organizations

The NCI's Cancer.gov Web site provides online access to information on cancer, clinical trials, and other Web sites and organizations that offer support and resources for cancer patients and their families. There are also many other places where people can get materials and information about cancer treatment and services. Local hospitals may have information on local and regional agencies that offer information about finances, getting to and from treatment, receiving care at home, and dealing with problems associated with cancer treatment.

### Publications

The NCI has booklets and other materials for patients, health professionals, and the public. These publications discuss types of cancer, methods of cancer treatment, coping with cancer, and clinical trials. Some publications provide information on tests for cancer, cancer causes and prevention, cancer statistics, and NCI research activities. NCI materials on these and other topics may be ordered online or printed directly from the NCI Publications Locator. These materials can also be ordered by telephone from the Cancer Information Service toll-free at 1-800-4-CANCER (1-800-422-6237), TTY at 1-800-332-8615.

## LiveHelp

The NCI's LiveHelp service, a program available on several of the Institute's Web sites, provides Internet users with the ability to chat online with an Information Specialist. The service is available from 9:00 a.m. to 10:00 p.m. Eastern time, Monday through Friday. Information Specialists can help Internet users find information on NCI Web sites and answer questions about cancer.

## Write

For more information from the NCI, please write to this address:

- \* NCI Public Inquiries Office
- \* Suite 3036A
- \* 6116 Executive Boulevard, MSC8322
- \* Bethesda, MD 20892-8322

-- About PDQ --

PDQ is a comprehensive cancer database available on [Cancer.gov](http://Cancer.gov).

PDQ is the National Cancer Institute's (NCI's) comprehensive cancer information database. Most of the information contained in PDQ is available online at [Cancer.gov](http://Cancer.gov), the NCI's Web site. PDQ is provided as a service of the NCI. The NCI is part of the National Institutes of Health, the federal government's focal point for biomedical research.

PDQ contains cancer information summaries.

The PDQ database contains summaries of the latest published information on cancer prevention, detection, genetics, treatment, supportive care, and complementary and alternative medicine. Most summaries are available in two versions. The health professional versions provide detailed information written in technical language. The patient versions are written in easy-to-understand, nontechnical language. Both versions provide current and accurate cancer information.

The PDQ cancer information summaries are developed by cancer experts and reviewed regularly.

Editorial Boards made up of experts in oncology and related specialties are responsible for writing and maintaining the cancer information summaries. The summaries are reviewed regularly and changes are made as new information becomes available. The date on each summary ("Date Last Modified") indicates the time of the most recent change.

PDQ also contains information on clinical trials.

Some patients have symptoms caused by cancer treatment or by the cancer itself. Patients who have symptoms related to cancer treatment may want to take part in a clinical trial. A clinical trial is a study to answer a scientific question, such as whether one method of treating symptoms is better than another. Trials are based on past studies and what has been learned in the laboratory. Each trial answers certain scientific questions in order to find new and better ways to help cancer patients. During supportive care clinical trials, information is collected about new treatment methods, the risks involved, and how well they do or do not work. If a clinical trial shows that a new treatment is better than one currently being used, the new treatment may become "standard."

Listings of clinical trials are included in PDQ and are available online at [Cancer.gov](http://Cancer.gov). Descriptions of the trials are available in health professional and patient versions. Many cancer doctors who take part in clinical trials are also listed in PDQ. For more information, call the Cancer Information Service 1-800-4-CANCER (1-800-422-6237); TTY at 1-800-332-8615.

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