DIET AND NUTRITION

PANCREATIC CANCER ACTION NETWORK®

NUTRITIONAL CONCERNS WITH PANCREATIC CANCER

Good nutritional care improves outcomes and is critical for your quality of life. The Pancreatic Cancer Action Network (PanCAN) strongly recommends that patients have access to pancreatic enzymes and see a registered dietitian.

ABOUT THIS BOOKLET

Proper nutrition is important for maintaining a good quality of life, especially after being diagnosed with pancreatic cancer. Nutritional needs will change during the course of treatment, and patients may experience concerns like loss of appetite, weight loss, diarrhea and diabetes. Choosing the right foods before, during and after treatment can help a patient better tolerate treatment and feel healthier and stronger.

The Pancreatic Cancer Action Network aims to answer many of the diet and nutrition questions frequently asked by patients and families dealing with pancreatic cancer.

- This booklet is designed to serve as a general reference guide. It should not be the sole resource for patients with diet and nutrition concerns.
- Before making diet changes, please talk to the doctor or registered dietitian. If a registered dietitian has not been consulted, see page 7 for ways to find one.

If you have additional questions about diet and nutrition or other topics relating to pancreatic cancer, contact PanCAN Patient Services toll-free at 877-2-PANCAN or email **patientservices@pancan.org**. Hablamos español. The PanCAN Patient Services Help Line is available Monday – Friday, 7 a.m. – 5 p.m. Pacific Time.

The glossary at the end of this booklet provides definitions for **bold** words in the booklet's text.

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DIET AND NUTRITION CHANGES AFTER DIAGNOSIS

The nutrition goal for people with pancreatic **cancer** should be to consume an adequate amount of fluids, **calories**, **protein**, **vitamins** and minerals each day to maintain a healthy weight and activity level. Making healthy choices to maintain good nutrition can help minimize the **side effects** of treatment, recover from surgery faster and/or maintain the best quality of life. Eating frequent, small portion, high protein meals throughout the day is usually easy to tolerate. Individual preferences should guide daily healthy food choices.

The primary goals of dietary changes are to:

- Prevent or reverse poor nutrition
- Maintain dose and schedule of cancer treatments
- Manage **symptoms**
- Maintain or improve weight and strength

During treatment, or when starting a new treatment, continue talking to the doctor and **dietitian** about necessary or helpful dietary changes.

EATING RECOMMENDATIONS FOR PEOPLE WITH PANCREATIC CANCER

- Eat 6–8 small meals/snacks throughout the day (see page 3 for healthy eating recommendations).
- Eat balanced and nutritious meals and snacks that include protein sources. It is important to eat enough protein, especially after surgery, **chemotherapy** and/or radiation.
- Choose lean sources of meat such as turkey, chicken and fish. Limit intake of red meat and processed meats.
- Aim for at least 2.5 cups of fruits and vegetables per day.
- Eat healthy high-calorie foods such as avocados, olives and nuts (eat as tolerated).
- Choose whole grains (eat as tolerated).
- Drink at least 6–12 cups (48–96 ounces) of non-alcoholic fluids per day. Fluids may include water, 100% juice beverages, lower calorie sports drinks (e.g., G2 – Gatorade®), children's **electrolyte** drinks (e.g., Pedialyte®), caffeine-free soft drinks, tea or coffee, popsicles, gelatin, soup/broth, smoothies or nutritional supplement drinks (see page 3).
- Drink liquids an hour before or after eating to avoid feeling full too quickly.
- Limit **refined/simple carbohydrates** as long as weight and proper nutrition can be maintained without eating them.
- Keep alcohol intake low.
- Eat slowly and chew food thoroughly.
- Engage in light exercise before eating to stimulate appetite.
- Rest sitting upright for at least one hour after eating to prevent acid reflux (heartburn).
- Plan to eat the largest meal of the day when typically most hungry. It may be helpful to refrain from eating 2–3 hours before going to bed.
- Eat with family and friends to make mealtimes more pleasant.

HEALTHY EATING RECOMMENDATIONS

Protein

Eat 5–6 ounces of protein daily and include up to 3 cups of low-fat or fat-free dairy products. Limit meat cooked at high temperatures (grilled, fried, broiled). Instead, try baking, roasting and poaching meat.

- Skinless poultry
- Fish and shellfish
- Lean cuts of beef, pork and other red meats (round or loin cuts)
- Soy products such as tofu, soy milk or edamame
- Beans, peas, lentils
- Eggs, egg whites, egg substitute
- Nuts, seeds, nut-butters (use as tolerated)
- Protein powders from whey, rice, soy, pea and/or egg whites

Whole Grains

Eat 3–6 servings of whole grains (breads, cereals, rice and pastas) daily.

- Look for products labeled as whole grain rather than enriched. Enriched products have lost much of their nutrient value through processing, and have less fiber, vitamins and minerals.
- Add wheat germ or ground flaxseed to foods to increase fiber.

Fruits and Vegetables

Eat 2–3 cups of vegetables (2–6 servings) and 1–2 cups of fruit (1–4 servings) daily.

- Fresh, frozen or canned fruits and vegetables are all acceptable.
- 100% juice beverages

- Select low-sodium canned vegetables and fruits canned in juice, not syrup.
- Maintain nutrient value of vegetables by lightly steaming them. Overcooking vegetables results in the loss of nutrients. If lightly steamed vegetables are not tolerated, it is better to eat soft cooked vegetables than none at all.
- Juicing fruits and vegetables can complement a regular diet. Juicing provides variety in texture and taste, helps when swallowing is difficult and can be less bulky than raw fruits and vegetables. Use a juicer that does not eliminate the pulp. Half a cup of juice = 1 serving of fruit or vegetables. Be careful not to fill up on juice.

Healthy High-calorie, High-fat Food Sources

For patients at a healthy weight, eat no more than 5–6 teaspoons of added oils daily (as tolerated).

- Olive, canola and peanut oils
- Nuts, seeds, nut-butters
- Olives, avocados
- Other sources of additional calories from fats to use less often include corn and other vegetable oils, butter or margarine.

CULTURAL CONSIDERATIONS

Food is sentimental and nostalgic for many individuals. People use foods as a way to retain and remain connected to their cultural identity. When people are diagnosed with cancer, they may feel overwhelmed by the changes that a cancer journey can bring. It is important for people with cancer to maintain a level of normalcy and that includes eating foods that they enjoy and that have cultural significance for them. While it is important to understand the dietary changes that occur after a diagnosis of pancreatic cancer, it is also important for **caregivers** and family members who are assisting with meal preparation to continue to use foods that the patient feels connected to. It is possible to maintain the main ingredients of a traditional dish or meal that holds cultural significance for the patient, but with a few modifications to ensure the patient is able to tolerate them. See page 3 for a list of general eating recommendations that can provide ideas for substituting specific ingredients while retaining the integrity of dishes and meals that hold cultural significance for patients.

THE ROLE OF A DIETITIAN

WHAT IS THE DIFFERENCE BETWEEN A DIETITIAN AND A NUTRITIONIST?

A dietitian is someone who holds the title of Registered Dietitian (RD). A registered dietitian has completed an undergraduate and/or graduate degree in the study of nutrition and an internship that has been certified by the Academy of Nutrition and Dietetics. Upon completion of their studies, dietitians must pass a national registration exam administered by the Commission on Dietetic Registration. Some states require licensure; therefore, some dietitians may be both registered and licensed.

Technically, anyone who has studied or has an interest in nutrition can be called a "nutritionist." The title "nutritionist" is not professionally regulated and does not signify an individual's level of knowledge.

Since all dietitians are nutritionists, some are now using the credential Registered Dietitian/Nutritionist (RDN). Keep in mind, however, that not every nutritionist is a dietitian. Only a Registered Dietitian can provide credible and reliable nutritional information.

HOW CAN A REGISTERED DIETITIAN HELP?

A registered dietitian is a healthcare professional who can help manage the side effects of treatment that affect the patient's ability to eat well. Registered dietitians can help with questions about the role of diet in cancer care and cancer prevention. Since each patient is different, a dietitian can work with patients to meet their individual dietary needs.

ARE THERE DIETITIANS WHO SPECIALIZE IN CANCER AND NUTRITION?

Yes. The Commission on Dietetic Registration offers a specialty certification in oncology nutrition. Dietitians must complete at least 2,000 hours of work in the oncology field and pass an examination in oncology nutrition to receive board certification. These dietitians have the additional credential "CSO" to indicate that they are a "Certified Specialist in Oncology" nutrition.

WHERE CAN I FIND A REGISTERED DIETITIAN?

- Ask the patient's oncologist for a recommendation.
- Contact a local hospital or cancer treatment center.
- Refer to the Academy of Nutrition and Dietetics' website, eatright.org, for more information and to search for a local dietitian.
- Visit the website for the Commission on Dietetic Registration, cdrnet.org, for a list of Board-Certified Specialists in Oncology Nutrition by state.
- Contact PanCAN Patient Services. Patient Services can also give you a list of questions to ask the dietitian.

Contact Patient Services toll-free at **877-2-PANCAN** or email **patientservices@pancan.org.**
Hours: Monday – Friday, 7 a.m. – 5 p.m. Pacific Time

SUGGESTED MEAL PLAN

This meal plan is appropriate for patients with and without diabetes ***or*** patients who have or have not had pancreatic surgery.

	General *Provides 1700–2200 calories and 70–110g of protein*	Meal Example *Provides 1700 calories and 70g of protein*
Breakfast	• ½ cup canned fruit – soft or peeled fruit or 100% juice • 1–2 oz meat/meat substitute • 1 slice bread or • ½ cup cooked cereal • 1 tsp butter/margarine or 1 Tbsp coffee creamer/sour cream/salad dressing/gravy • 1 Tbsp fruit preserves	• ½ cup orange juice • 1 scrambled egg • 1 slice toast • 1 pat margarine • 1 Tbsp no-sugar-added jelly
Mid-morning Snack	• ¾ cup dry cereal/1 serving crackers/1 slice bread • ½ cup low-fat milk, soy milk or yogurt	• ¾ cup cornflakes • ½ cup low-fat milk
Lunch	• 2–3 oz meat/meat substitute • ½ cup cooked potato/rice/pasta • ½ cup soft cooked vegetable • ¾ cup dry cereal/1 serving crackers/1 slice bread • 1–2 tsp butter/margarine or 1–2 Tbsp coffee creamer/sour cream/salad dressing/gravy • ½ cup fluid	• 2 oz roast beef tenderloin • ½ cup mashed potatoes • ½ cup cooked carrots • 1 small roll • 1 pat margarine and 1 Tbsp brown gravy • ½ cup iced tea

	General *Provides 1700–2200 calories and 70–110g of protein*	Meal Example *Provides 1700 calories and 70g of protein*
Mid-afternoon Snack	• 1–2 oz meat/meat substitute • ½ cup canned fruit – soft or peeled fruit or 100% juice	• ½ cup low-fat cottage cheese • ½ cup peeled peaches
Dinner	• 2–3 oz meat/meat substitute • ½ cup cooked potato/rice/pasta • ½ cup soft cooked vegetable • ¾ cup dry cereal/1 serving crackers/1 slice bread • 1 tsp butter/margarine or 1 Tbsp coffee creamer/sour cream/salad dressing/gravy • ½ cup canned or peeled soft fruit or 100% juice • ½ cup low-fat milk, soy milk or yogurt	• 2 oz sliced turkey • ½ cup rice • ½ cup green beans • 1 slice bread • 1 pat butter • ½ cup orange sections • ½ cup low-fat milk
Evening Snack	• 1–2 oz meat/meat substitute • ¾ cup dry cereal/1 serving crackers/1 piece bread • 1 tsp butter/margarine or 1 Tbsp coffee creamer/sour cream/salad dressing/gravy • ½ cup canned fruit – soft or peeled fruit or 100% juice	• ½ turkey sandwich (1 piece bread) • 1 tsp mayonnaise • ½ cup grape juice

The National Cancer Institute (cancer.gov, 800-4CANCER) and the American Cancer Society (cancer.org, 800-ACS-2345) both offer free educational booklets that provide additional recipes and suggestions for maximizing calories and protein intake during the cancer journey.

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CONTROLLING WEIGHT LOSS

Weight loss is a common problem for people with pancreatic cancer. It can be associated with treatment or with the cancer itself. The cause of weight loss may be due to three different factors: **anorexia**, **malabsorption** and **cancer cachexia**. Depending on the type of weight loss, it may or may not be reversible with dietary changes and side effect management.

WEIGHT LOSS DUE TO INSUFFICIENT CALORIE INTAKE

Pancreatic cancer and/or treatment usually causes an increased need for calories and protein above and beyond a person's normal intake. If patients do not increase their intake to meet these increased needs, they may experience anorexia-induced weight loss. The side effects of treatment or the symptoms of the cancer can cause a patient to consume fewer calories than the body needs to maintain an appropriate weight. Other sections of this booklet, such as Coping with Loss of Appetite (pages 21-23), and Overcoming **Nausea** and Vomiting (page 35), provide strategies for dealing with this type of weight loss.

WEIGHT LOSS DUE TO MALABSORPTION

Pancreatic cancer and/or treatments may also cause changes in digestion or absorption of food, preventing patients from getting the full caloric value of their food. Strategies are outlined elsewhere in Malabsorption and Pancreatic **Enzymes** (pages 13–20) and Preventing or Reducing **Diarrhea** (pages 24–29) chapters of this booklet.

TUMOR-INDUCED WEIGHT LOSS

Tumor-induced weight loss, also called cancer cachexia, is a complex problem. It affects the way the body uses calories and protein. Cancer cachexia can cause the body to burn more calories than usual, break down muscle protein and decrease appetite. If a person is consuming regular meals and snacks but is losing weight, they may be experiencing cancer cachexia.

Most pancreatic tumors release compounds called **cytokines** into the blood. These cytokines change the way the body **metabolizes** proteins, **carbohydrates** and fats. Cytokines also cause the body to burn calories faster than they are replaced and suppress the patient's appetite. The weight loss and malnutrition can have a negative impact on quality of life, daily functioning, the ability to receive treatment, response to treatment, length of hospital stays and complications such as infections.

Though knowledge about cancer cachexia is increasing, little is known about how to control or stop the process. Nutritional counseling, use of oral nutritional supplements, physical activity and the use of appetite-stimulating medications may help patients with tumor-induced weight loss. Controlling tumor growth with cancer treatment can also help control this type of weight loss.

Possible treatments for cancer cachexia are being studied in clinical trials. These drugs may help prevent or reverse tumor-induced weight loss, which can help patients stay strong and healthy before, during and after cancer treatment. Contact PanCAN Patient Services for updates about these drugs and for information about clinical trials near you.

The following tips may help control weight loss:

- Plan to eat 6–8 times per day, including snacks in between meals.
- Eat calorie-rich, nutrient-dense foods and try not to consume foods or liquids with little nutritional value, such as soft drinks.
- Restrict or avoid any foods that may cause or worsen diarrhea.
- Use nutritional supplement drinks, such as Boost®, Ensure®, Carnation Breakfast Essentials®, Orgain® and ENU™, as snacks or drink with medications that can be taken with food.
- Ask the doctor or dietitian whether pancreatic enzyme replacement products may be helpful (see pages 13-20) and take them as directed.
- Check with the doctor to see if appetite-stimulating medications would help. See page 23 for a list of medications to stimulate appetite.
- Maintain adequate hydration.
- Physical activity supports lean body mass and may enhance appetite and decrease fatigue. Incorporate light physical activity into the day:
  - Aim for a total of 30 minutes of light activity per day such as walking.
  - Break activity into small increments of 5–10 minute periods totaling 30 minutes per day.
- Consult with a registered dietitian for nutrition counseling (see pages 6-7).
- Get plenty of rest.

MALABSORPTION AND PANCREATIC ENZYMES

A healthy **pancreas** normally produces about 8 cups of pancreatic juice every day. Pancreatic juice is secreted into the portion of the **small intestine** that connects to the stomach, called the **duodenum**. It contains **pancreatic enzymes** and bicarbonate. Enzymes help with digestion by breaking down fats, proteins and carbohydrates, and bicarbonate helps neutralize stomach acid.

The three most common types of pancreatic enzymes are **lipase**, **protease** and **amylase**. Lipase breaks down fat, and **bile** "packages" molecules so the body can absorb and use them. A shortage of lipase may cause diarrhea and/or fatty stools. Protease breaks down proteins and helps keep the intestine free of parasites such as bacteria, yeast and protozoa. A shortage of protease can lead to incomplete digestion of proteins. Amylase is an enzyme required to digest carbohydrates (starches) into sugars that are more easily absorbed by the body. Since amylase is also secreted by the salivary glands, the body begins carbohydrate digestion in the mouth. Lack of pancreatic amylase may cause diarrhea.

REASONS TO TAKE PANCREATIC ENZYMES

Pancreatic insufficiency is the inability of the pancreas to make or secrete the enzymes needed for digestion. Having an insufficient amount of pancreatic enzymes or a blockage preventing the enzymes from mixing with food is a very common problem for pancreatic cancer patients. Insufficient enzyme production may be related to the cancer itself or treatments for the cancer. People who have had surgery to remove a pancreatic tumor usually do not have normal fat absorption because the pancreas can no longer produce a sufficient amount of enzymes. Pancreatic insufficiency occurs in up to 94% of patients undergoing pancreatic surgery. Patients who have undergone a total **pancreatectomy** (complete removal of the pancreas), for example, always experience pancreatic insufficiency, because the pancreas is no longer in the body to produce pancreatic enzymes.

The healthcare team can help determine which tests are appropriate to check for pancreatic insufficiency. A fecal elastase test, for example, measures the amount of elastase (an enzyme produced in the pancreas) in the stool to help determine whether a person's pancreas is functioning properly.

When the pancreas is not producing enough enzymes to help with digestion, pancreatic enzyme products (pancrelipase) will be needed. Digestive enzymes, including pancreatic enzymes, are prescribed to patients who have conditions that cause poor absorption. These products help improve digestion and absorption of food. Some of the conditions or treatments that may cause pancreatic insufficiency are:

- **Whipple procedure**
- **Distal pancreatectomy**
- Blockage or narrowing of the pancreatic or biliary duct (the tubes that carry pancreatic juice or bile)
- Tumors of the pancreas or duodenum (the first part of the small intestine)
- Cystic fibrosis
- **Pancreatitis**
- Monthly octreotide treatments

Some of the symptoms associated with pancreatic enzyme insufficiency include:

- Feelings of indigestion
- Cramping after meals
- Large amounts of gas
- Foul smelling gas or stools
- Floating or greasy/fatty stools
- Light-colored, yellow or orange stools
- Frequent stools
- Loose stools
- Unexplained weight loss

Patients with these symptoms should discuss with their medical team whether taking supplemental pancreatic enzymes may be beneficial for them.

Some patients who have the Whipple procedure will have long-term malabsorption and will need to take supplemental enzymes for life. Other patients may only need enzymes for a few months or years after surgery. Patients who have **radiation therapy** along with the Whipple procedure are much more likely to have long-term malabsorption. Fat absorption usually does not return to normal in these patients, even if they are taking enzyme replacement products. In this case, the goal is to eliminate diarrhea, restore adequate nutrition and prevent weight loss.

Medium Chain Triglyceride (MCT) oil may help control weight loss in patients with uncontrolled malabsorption. MCT oil is a calorie-rich type of fat that bypasses usual fat absorption and is rapidly absorbed by the body. It is found naturally in coconut oil, palm kernel oil and butter. MCT oil is added to some medical

nutritional supplements and can also be purchased alone as a nutritional supplement. The use of oral nutritional supplements may promote weight gain, help increase strength and physical activity, and improve quality of life. For patients choosing to add MCT oil to their diet, limit to 1–4 tablespoons per meal or snack.

In patients with **unresectable** (non-operable) tumors in the head of the pancreas, bile or **pancreatic duct**, obstructions are common. For these patients, a combination of pancreatic enzyme replacement therapy, nutritional counseling and drainage of the bile duct can prevent weight loss and improve symptoms.

SOURCES OF PANCREATIC ENZYME PRODUCTS

Pancreatic enzyme products are available in both prescription and non-prescription forms. The different brands of pancreatic enzyme products are not identical. All prescription pancreatic enzyme products are regulated by the United States **Food and Drug Administration (FDA)** to ensure their **effectiveness**, safety and manufacturing consistency.

There are five prescription pancreatic enzyme products available on the market, including CREON®, Pancreaze®, Pertzye®, Viokace® and Zenpep®. Consult with a doctor or dietitian to find out which pancreatic enzyme product may be right for the patient.

Over-the-counter pancreatic enzyme supplements are available without a prescription. Since they are classified as dietary supplements, the FDA does not control their production. While manufacturers of over-the-counter supplements are required to ensure the safety of their products, there are no controls on manufacturing consistency from one batch to the next. **Therefore, these products are not recommended for use in people with pancreatic cancer.** Contamination may also be a concern for over-the-counter pancreatic enzymes made from animal products, as pig/porcine is used in the preparation of prescription enzymes.

DOSAGE OF PANCREATIC ENZYMES

The units of lipase each pill contains determine the strength of pancreatic enzyme products. The amount of lipase in each pill is listed in the written information that is included with each prescription.

The recommended brand and **dosage** of pancreatic enzymes must be individualized for each person. When a patient finds a brand that works, it is recommended to continue using that brand. To find the right dosage, patients should adjust the dose to minimize or eliminate symptoms of pancreatic enzyme insufficiency. Some patients will need different doses of enzymes throughout their different stages of treatment and care.

Be sure to keep the doctor and dietitian regularly updated on:

- Any continued digestive problems that may mean the type or dosage of pancreatic enzymes should be adjusted.
- When the enzymes are being taken (before all meals and snacks).
- If there are enough pills to last until the next refill.

Don't forget there are more ways to keep your healthcare team updated beyond in-person appointments, including telehealth visits and secure patient portal messaging.

The doctor may prescribe an acid-reducing medication to help improve the effectiveness of some pancreatic enzyme products. Acid-reducing medications include proton pump inhibitors such as Nexium® (esomeprazole) or Prilosec® (omeprazole), and H2 blockers such as Pepcid® (famotidine), Tagamet® (cimetidine) or Zantac® (famotidine). Not all pancreatic enzyme products require an acid-reducing medication for optimal activity. Talk to a doctor, dietitian or pharmacist for advice about whether an acid-reducing medication may be beneficial.

Tips to get the best results from pancreatic enzyme products:

- Take enzymes with every meal or snack that contains fat, especially meat, dairy, bread, desserts and supplement drinks.
- Start with the smallest dose necessary. Adjust according to the severity of the pancreatic insufficiency symptoms. As dose changes may be needed from time to time, it is important to keep an open dialogue with the doctor or dietitian.
- Take the enzymes at the beginning of the meal or snack, as this is very important for proper enzyme functioning. When taking multiple enzymes, take some at the beginning of the meal and the rest at various points throughout the meal. Enzymes generally do not work well if only taken at the end of the meal.
- Swallow intact tablets and capsules with liquid at mealtimes. Some enzyme products have a special coating to prevent breakdown in the stomach. The tablets and capsule contents (microspheres) should not be crushed or chewed, unless directed by a member of the medical team.
- If repeatedly held in the mouth for a length of time, certain pancreatic enzyme products may begin to digest the mucous membranes and cause irritation. This can lead to sores in the mouth, lips and tongue. If swallowing a capsule is difficult, open the capsule and add its contents to a spoonful of soft food that does not require chewing and can be swallowed immediately. Some recommended foods are applesauce, gelatin, pureed apricot, banana or sweet potatoes.
- To promote enzyme function, do not mix the microspheres with milk, custard, ice cream or other dairy products before swallowing. These foods have a higher pH that may dissolve the microspheres' coating and destroy enzyme activity before they reach the stomach.
- Pancreatic enzymes may have reduced effectiveness if taken at the same time as iron supplements and calcium – or magnesium – containing antacids, such as Maalox®, Mylanta®, Tums®, Rolaids® and others.
- Use enzymes prior to their expiration date; otherwise, they may lose their effectiveness.

- If the patient is receiving multiple medications, including medications for **diabetes**, these should be discussed with the healthcare team to ensure the proper use of enzymes with other medications.

SIDE EFFECTS OF PANCREATIC ENZYMES

It is important to note that many of the possible side effects of pancreatic enzymes can also be signs of not taking enough enzymes. Supplemental pancreatic enzyme products may cause nausea, abdominal cramps or diarrhea. Taking more enzymes than needed may lead to **constipation**.

Discontinue the use of pancreatic enzymes if any signs of hypersensitivity or allergic reaction appear. Because pig/porcine products are used to prepare prescription enzymes, people with allergies or religious guidelines related to pig products should work with their pharmacist, dietitian or doctor to find an appropriate enzyme preparation. Pancreatic enzymes may decrease the absorption of some iron salts. Tell the doctor and registered dietitian about all current medications and medical conditions while discussing the use of pancreatic enzymes.

The information given by the pharmacy with the prescription may discuss a risk of **fibrosing colonopathy**. Do not be alarmed by this. Reported cases were found in a small number of individuals who took much more than the maximum dose (10,000 lipase units per kilogram of body weight per day), and no cases have been reported in individuals with pancreatic cancer.

If taken properly, pancreatic enzymes can help prevent weight loss and control symptoms associated with pancreatic enzyme insufficiency. Ask the doctor to prescribe the proper pancreatic enzymes.

FINANCIAL CONSIDERATIONS

Insurance coverage, including Medicare, may vary for pancreatic enzymes. Some insurance companies will have one "preferred" brand for which there is a lower copay amount. Even those with insurance may find themselves in the "donut hole," resulting in a large copay for a month or two. For those struggling with the cost of enzymes, we suggest the following:

- Check your prescription formulary to find out if one brand is preferred over another.
- Learn about patient assistance programs by visiting the drug manufacturer's website or **NeedyMeds.org**.
- If you are on Social Security, apply for the Extra Help plan.
- Contact PanCAN Patient Services for additional resources.

FDA APPROVED PRESCRIPTION PANCREATIC ENZYMES

Approved by the United States FDA:

- **CREON® capsules** *manufactured by AbbVie Pharmaceuticals*
- **Pancreaze® capsules** *manufactured by VIVUS*
- **Pertzye® capsules** *manufactured by Digestive Care, Inc.*
- **Viokace® tablets** *manufactured by Nestle HealthScience*
- **Zenpep® capsules** *manufactured by Nestle HealthScience*

All prescription enzymes come from a porcine/pig source. If a person has allergies related to pig products, consult a doctor or dietitian for alternative options. If a person has a religious guideline related to pig products, they may speak to their faith leader, as most religions have exceptions for health reasons.

COPING WITH LOSS OF APPETITE

Poor appetite is a common nutritional challenge for people with pancreatic cancer. Sometimes surgery, prescription drugs or the cancer itself can decrease appetite or change the way food tastes.

The following tips may help increase appetite and improve interest in eating:

- Plan meals the day before eating them. Have someone help plan and prepare meals, especially if sensitive to cooking smells.
- Eat meals and snacks at scheduled times, even if not hungry.
- Stay well hydrated. Drink 6–12 cups (48–96 ounces) of fluid throughout the day. Use a straw to make this easier if gas is not an issue.
- Aim for 6–8 small meals and snacks per day. Take advantage of the time of day when most hungry.
- Place small bowls of nutritious snacks, such as nuts and fruit, in frequently used areas of the home to encourage healthy snacking between meals.
- Substitute a meal with a nutritional supplement drink or a homemade smoothie made with protein powder. If prescribed pancreatic enzyme replacement products (see pages 13–20), be sure to take them with these drinks.
  - Boost®, Ensure®, Carnation Breakfast Essentials®, Orgain® and ENU™ nutritional drinks add calories and protein.

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  - Glucerna®, Boost Glucose Control®, Ensure® High Protein, and Boost® High Protein products may be appropriate for people with diabetes, or if other supplements cause diarrhea.
  - Benecalorie®, Beneprotein®, and Unjury® add calories or protein when accompanied by regular meals.
- Marinate red meats before cooking if they taste strong. Or replace red meat with fish, chicken, eggs, low-fat cheese or vegetarian alternatives.
- High-protein foods such as cheese, tuna, chicken, lean ham, eggs, milkshakes, eggnog, puddings and custards may taste better at room temperature. Eat high-protein foods within an hour of taking them out of the refrigerator.
- Add fresh fruits to milkshakes, puddings and custards to add flavor.
- Perk up the taste and smell of food with seasonings or spices such as lemon juice, mint, basil and other herbs. If not limiting intake, add sugar and salt to foods.
- Take anti-nausea medication at the first sign of queasiness or nausea (see page 36). Delay eating favorite foods if feeling nauseous.
- Manage taste changes if they are contributing to decreased appetite (see pages 30-31).
- Get plenty of rest.
- Exercise lightly before meals to stimulate appetite – even a short walk may be energizing.
- Select enjoyable foods and foods that have a pleasant aroma.
- Use a large plate and put small portions on it to help food look less overwhelming.
- Arrange food attractively:
  - Vary the colors of foods on a plate.
  - Use garnishes such as lemon or lime wedges.
- Make mealtimes pleasant:
  - Add color to a place setting.
  - Watch a favorite television show or movie.
  - Play music in the room.
- Suppressing the feelings of nausea can increase appetite. See page 35 for tips to reduce nausea.

If poor appetite and weight loss persist, the doctor may prescribe medication to increase appetite. Some of these medications are listed below. It can take several weeks of use before appetite enhancement occurs, so take these medications as prescribed for at least a month to determine their effectiveness. Many of these medications have side effects that should be discussed with the doctor.

- Megace® (megestrol acetate) or Megace® ES come in liquid form. They are hormone-based drugs that increase appetite when given in high doses.
- Marinol® (dronabinol) comes in capsule form and is used to stimulate appetite and prevent nausea and vomiting following chemotherapy.
- Steroids such as prednisone or dexamethasone come in tablet, liquid and injectable forms. There are many name brands for these steroids. Most contribute to increased appetite and weight gain.
- Anti-depressants such as Remeron® (mirtazapine) come in tablet and orally disintegrating forms. Many have the side effect of increasing appetite.
- Medical cannabis is legal in some states. It may be available in edible, inhalable and topical forms. It may be used to stimulate appetite and/or prevent nausea and vomiting.

PREVENTING OR REDUCING DIARRHEA

Diarrhea is a common side effect experienced by many patients with pancreatic cancer. Causes may include:

- **Lactose intolerance** (see page 34)
- Bacterial infection
- Damage to the intestinal wall
- **Hormone** producing tumors (including certain types of **pancreatic neuroendocrine tumors**)
- Inflammation or ulceration of the bowel
- Malabsorption (see pages 13–20)
- Pancreatic enzyme insufficiency
- Chemotherapy
- Radiation therapy to the lower **abdomen**
- **Dumping syndrome**
- Certain medications

Diarrhea is a condition marked by abnormally frequent bowel movements that are more fluid than usual. Patients describe it based on their past and present experiences. Therefore, what one person considers normal may be considered diarrhea to another. Often, health professionals characterize diarrhea as three or more loose stools per day.

People may experience different types of diarrhea. Clay-colored stools are often a result of problems with the biliary tract. The biliary tract is the drainage system for the **gallbladder**, pancreas and **liver**. Biliary tract blockages are common for patients with pancreatic cancer. Floating stools often result from poor absorption of nutrients or changes in the diet, such as an increase in fiber. Malabsorption is common for patients with pancreatic cancer because the pancreas may not be able to produce or release enough pancreatic enzymes to aid in food digestion.

- Keep a journal of bowel movement habits and share with the doctor or dietitian to help create a management plan.
  - The journal can be used to track time, frequency, duration, and stool consistency or bowel movements. It can also be used to keep track of fluid intake, since diarrhea can cause dehydration.
- Discuss pancreatic enzyme replacement therapy (PERT) with the doctor.
  - If the pancreas is unable to create enough enzymes to digest food, doctors can prescribe the right type and dosage based on individual need. See Malabsorption and Pancreatic Enzymes section on pages 13–20 for a more detailed description.

Regardless of the cause of diarrhea, the following diet modifications may help decrease the volume and frequency of stools.

FOODS THAT MAY WORSEN DIARRHEA

- Fatty, greasy or fried foods, including high-fat meats or cheeses, whole or 2% milk, rich desserts, many fast foods and foods with added oil, butter, margarine, gravy, sour cream, cream cheese or salad dressing.
- High intake of **insoluble fiber,** such as whole grain breads/cereals, raw fruits with thick peels, raw vegetables and nuts. These can make foods move faster through the intestines. See page 29 for more examples of foods that contain insoluble fiber.
- Gas-forming foods including vegetables in the cabbage or onion family, dried beans, corn, popcorn and chewing gum. If carbonated beverages are consumed, leaving them open for at least 10 minutes prior to drinking may help reduce diarrhea.
- Hot liquids.
- Products made with milk, if lactose intolerant.
- Foods high in sugar may cause dumping syndrome. The symptoms of dumping syndrome include watery diarrhea and/or feelings of low blood sugar (flushness, faintness or sweating) that occur within 30 minutes to 2 hours after eating high-sugar foods.
- Foods sweetened with sugar alcohols (types of reduced-calorie sweeteners such as sorbitol, mannitol and xylitol).

FOODS LESS LIKELY TO AGGRAVATE DIARRHEA

- Low-fat food choices.
- Foods that contain **soluble fiber** such as oat fiber, and high-pectin foods like applesauce and bananas. See page 29 for examples of foods that contain soluble fiber.
- If lactose intolerance is present or develops, it may help to consume plant-based milk alternatives, such as soy or rice milk, or dairy products with added Lactaid® (lactase). Lactaid® Fast Act caplets or chewable tablets can also be taken with dairy products instead of milk alternatives. See the Lactose Intolerance section on page 34.

OTHER SUPPORTIVE CARE TECHNIQUES

- Plan to eat 6–8 small meals and snacks each day.
- Talk to the healthcare team about pancreatic enzyme replacement products (see pages 13–20) or anti-diarrhea medications that may be appropriate.
- Over-the-counter anti-diarrhea medicines:
  - Loperamide – Slows down the movement of food through the intestinal tract (e.g., Imodium A-D® and Imodium®).
  - Adsorbents – Attract diarrhea-causing substances from the digestive tract (e.g., Pepto-Bismol® and Kapectolin®).
  - Absorbents – Make stools more solid by adding bulk (e.g., Metamucil®, Benefiber® and Konsyl®).
- Prescription anti-diarrhea medicines:
  - Opioids – Slow down the movement of food through the intestinal tract (e.g., Lomotil® and tincture of opium).
  - Anticholinergics – Relieve spasms and cramping (e.g., atropine, belladonna and scopolamine).
  - Somatostatin analogues – Reduce the secretion of extra fluid and help the body reabsorb valuable water and electrolytes. They also slow down the movement of food through the intestinal tract (e.g., Sandostatin®).
- Drink plenty of fluids.
- The use of probiotics appears helpful in improving tolerance of treatment and radiation-related diarrhea. Further research is needed to confirm the effects of probiotics in patients with

pancreatic cancer. Sources of probiotics include foods with live, active cultures such as yogurt, kefir, buttermilk, tempeh, sauerkraut and cottage cheese. Therapeutic foods such as DanActive™, Yakult®, and dietary supplements such as Align®, Culturelle® and Florastor® also contain probiotics. If choosing to use a probiotic supplement, look for a product with more than 1 billion colony forming units (CFUs) per dose.

DIARRHEA AND DEHYDRATION

Diarrhea can cause dehydration. Dehydration causes the loss of fluids and electrolytes, such as sodium and potassium, from the body. Here are some suggestions to avoid dehydration:

- Drink 6–12 cups (48–96 ounces) of mild, clear liquids throughout the day. Liquids are best tolerated at room temperature.
- Avoid beverages that contain caffeine such as coffee, tea and sodas.
- Drink an additional cup of fluids for each loose bowel movement.
- Check with the doctor to see if sports drinks or electrolyte replacement drinks (e.g., G2®, Pedialyte®, Drip Drop® or CeraLyte70®) may be beneficial.
- Replace lost sodium by consuming warm broth or soup, crackers, pretzels and sports drinks or electrolyte replacement drinks.
- Replace lost potassium by drinking fruit juices, sports drinks or electrolyte replacement drinks. Peeled potatoes and bananas are also good sources of potassium.

SOURCES OF FIBER

Type	Notes	Examples
Soluble Fiber	Recommended for individuals experiencing diarrhea. Eat foods with fewer than three grams total fiber per serving, with at least 1 gram of soluble fiber.	Cereal grains – oats, oat cereal, pumpernickel bread.
		Fruits and fruit juices – apricots, mangos, citrus fruits, nectarines, peaches, peeled apples, apple sauce, figs, plums, pears, bananas, strawberries.
		Vegetables – cooked asparagus, cooked carrots.
Insoluble Fiber	Recommended for individuals experiencing constipation.	Whole grain foods – quinoa, whole wheat products, wheat and corn bran, granola.
		Nuts and seeds.
		Skins of fruits and vegetables – tomatoes, apples, plums, potatoes, flaxseed.
		Fruits – cherries, pineapple, rhubarb.
		Vegetables – green beans, cauliflower, zucchini, celery, dark green leafy vegetables.

MANAGEMENT OF TASTE CHANGES

Changes to a person's sense of taste and smell can accompany the onset of pancreatic cancer or treatments for it, particularly chemotherapy. The reason for these changes is not known but they are especially common with platinum drugs, such as Eloxatin® (oxaliplatin) and **Platinol AQ® (cisplatin)**. Some foods may taste overly strong, salty or metallic, while others may have little taste at all. Foods that were once enjoyable may become unpleasant.

Here are some suggestions to improve the taste of food:

- Focus on foods that the individual likes and avoid those that are unappealing.
- Try foods that the individual normally does not find appealing. Changes to the taste buds may also change preferences.
- Use plastic cutlery to minimize metallic tastes.
- Sweeten foods that taste overly salty.
- Add salt, vinegar and/or lemon juice to overly sweet foods. However, if mouth sores are present, avoid using vinegar or lemon juice.
- Marinate meat in sweet or tart fruit juices to make it taste less strong.
- If red meat tastes or smells strong, replace it with chicken or fish.
- Replace meats with beans, lentils or soy-based meat alternatives.
- Season foods with herbs and spices such as basil, oregano, rosemary, mint, thyme or curry.
- Eat cold or room-temperature foods. Hot foods tend to have a strong smell and taste.
- Prepare foods ahead of time so fewer odors are present while eating.
- Freeze fruits to make them taste more refreshing.
- Blend fruits with yogurt or other dairy products to make smoothies.
- Keep the mouth clean:
  - Don't use mint-flavored toothpaste.
  - Rinse the mouth with a solution of baking soda, salt and water prior to eating. Mix 1 teaspoon baking soda and 1 teaspoon salt in 1 quart of water.
  - Avoid alcohol-containing mouthwash.

Every person is different, so not all suggestions will work for everyone. Medications are not available to address drug-induced taste changes. Zinc deficiency and/or an oral infection, such as **thrush**, may also cause taste changes. A doctor should rule these out before offering suggestions. Individuals with pancreatic cancer should work with their caregiver and dietitian to find foods that taste pleasant and are rich in nutrients.

OTHER SIDE EFFECTS

Pancreatic cancer and/or its treatments may cause some uncomfortable side effects. Some side effects may be controlled through dietary changes.

FOODS THAT MAY CAUSE OVERALL DISCOMFORT

- High-fat foods, including whole or 2% milk (reduced fat), high-fat meats or cheeses, rich desserts, many fast foods, fried foods and foods with added oil, butter, margarine, sour cream, cream cheese or full-fat salad dressing
- Vegetables in the cabbage and onion families
- Spicy foods, especially those containing garlic, onions or hot peppers
- Refined/simple carbohydrates, such as those containing high fructose corn syrup, or sucrose, especially if the patient is experiencing dumping syndrome
- High-fiber foods
- Milk and dairy products if lactose intolerant
- Caffeine (coffee, tea, soft drinks, chocolate)

RELIEVING CONSTIPATION

- Drink plenty of liquids, especially water. Prune juice and hot fluids, such as tea or coffee, can help stimulate the lower bowel.
- Be active. Engage in light exercise.
- Eat regular meals of moderate portions for proper digestion rather than overwhelming the digestive system with a few large meals.
- Slowly increase the sources of dietary fiber. It is generally recommended to have 25–35 grams of fiber per day from fruits, vegetables, legumes and whole grains. If taking pain medications, make sure bowels are moving before adding additional fiber to the diet. It is important to drink plenty of water when consuming high-fiber foods and supplements. See page 29 for a list of additional sources of fiber.
- Talk with the doctor about adjusting the type or dosage of pain medications, as they can cause constipation.
- Talk with the doctor about a proactive bowel management plan, which may include the use of a laxative and/or a stool softener.

PREVENTING GAS

- Eat small, frequent meals.
- Avoid carbonated drinks, chewing gum and highly-spiced foods.
- Use caution with the following foods, which may cause more gas: dried beans, corn (including popcorn), nuts, fatty foods, and gas-producing fruits and vegetables such as cantaloupe, watermelon, broccoli, cauliflower, cabbage, onion and brussels sprouts.
- If the diet is low in fiber, gradually increase the sources of dietary fiber or fiber supplements while drinking plenty of water or other fluids. Examples of foods rich in fiber are:
  - Whole-grain foods (such as bran cereals)
  - Fresh fruits
  - Dried or stewed fruits (such as prunes, raisins or apricots)
  - Root vegetables (such as carrots, turnips or potatoes)
- Do not talk and chew at the same time. Talking and chewing together can result in swallowing extra air.
- Do not use a straw to drink beverages. This can also result in swallowing extra air.

- When eating foods that are known to cause gas, consider taking an over-the-counter supplement such as Beano® and/or a product containing **simethicone**, such as Gas-X®.
- If consuming milk and dairy products leads to excess gas, see the section below about lactose intolerance for additional tips.
- Avoid foods sweetened with sugar alcohols. These usually end in "-ol" such as maltitol, sorbitol or xylitol; also, isomalt.

CONTROLLING LACTOSE INTOLERANCE

Patients may become lactose intolerant after pancreatic surgery, antibiotic use or ongoing diarrhea. Lactose intolerance occurs when the body is not able to completely digest or absorb **lactose**, which is a type of natural sugar found in milk and dairy products. Lactose intolerance often occurs when the body does not make enough **lactase**, the enzyme needed to digest lactose. A lactose intolerant individual may experience bloating, abdominal pain, diarrhea, cramping and/or gas after eating foods containing lactose.

The following tips/products may help control lactose intolerance:

- Lactaid® (lactase) is available in pill or liquid form over-the-counter. Lactase helps digest lactose in milk, ice cream, cheese and other dairy products.
- Specially marked dairy products already containing lactase are available and labeled as "lactose free."
- Substitute non-cultured dairy products with cultured dairy products such as yogurt and buttermilk. Cultured dairy products are low in lactose.

DEALING WITH FATIGUE

- Schedule meals and snacks 6–8 times per day.
- Consume foods that are easy to chew and do not require a lot of energy to prepare.
- Maintain adequate hydration.
- Avoid using caffeine as it can cause more fatigue later in the day.
- Be active:
  - During different points of treatment, the amount of activity the patient engages in might decrease. Any activity, including walking, is good exercise. While the optimal amount is 30 minutes per day, any activity is beneficial.
  - Break activity into small increments of 5–10 minutes, totaling 30 minutes per day.
  - Increase activity over time, as tolerated.

OVERCOMING NAUSEA AND VOMITING

- Eat small, frequent meals of easily digestible food, such as rice, broth and soda crackers. A very full stomach can contribute to feelings of nausea.
- Keep a little bit of food in the stomach at all times. An empty stomach can contribute to feelings of nausea.
- Eat on the days that chemotherapy is given to avoid receiving treatment on an empty stomach.
- Do not eat favorite foods when nauseated.
- Try crackers or dry toast, especially if it has been several hours since a previous meal or snack.
- Try cool temperature foods. They have fewer odors and are more easily digested.
- Avoid spicy, greasy, hot or very sweet foods.
- Limit fluids with meals but be sure to drink plenty of fluids between meals.
- Slowly sip cold, clear liquids, ginger ale or other carbonated beverages.
- Try peppermint or ginger tea to reduce nausea.
- Wear loose clothing. Many people find that this helps reduce feelings of nausea.
- Talk to the doctor about antiemetic (anti-nausea) medications and take them as directed.

ANTIEMETIC (ANTI-NAUSEA) MEDICATIONS

Proper nutrition should accompany any medications the doctor prescribes to help reduce nausea.

There are several medicine types that doctors can use to treat nausea and vomiting. Some of these drugs are commonly used to treat other issues, like allergies or mental conditions, but have also shown benefit for nausea and vomiting. Prior to use, talk with the doctor about side effects of the medications listed here.

All medicines are separated into **drug classes**, which help describe how each drug works. Some common classes and drugs used to treat nausea and vomiting include:

Drug Class	Commonly Used Drugs
Serotonin receptor blockers	Aloxi® (palonosetron) Anzemet® (dolasetron) Zofran® (ondansetron) Kytril®, Sancuso® (granisetron)
Glucocorticoids	Decadron® (dexamethasone)
Neurokinin receptor blockers	Emend® (aprepitant)
Dopamine receptor blockers	Haldol® (haloperidol) Inapsine® (droperidol) Reglan® (metoclopramide)
Antihistamines	Benadryl® (diphenhydramine)
Cannabinoids	Marinol® (dronabinol)
Benzodiazepines	Ativan® (lorazepam)
Phenothiazines	Phenergan® (promethazine) Compazine® (prochlorperazine) Thorazine® (chlorpromazine)
Other	Medical Cannabis (legality and availability varies by state)

DIETARY CHANGES FOLLOWING SURGERY

Patients with pancreatic cancer who undergo surgery often have many questions and concerns about postoperative nutritional care. Patients and their caregivers should understand that each patient has individualized nutritional needs. Therefore, it is important to consult with a registered dietitian or doctor before making any dietary changes. The dietitian or doctor can help create an appropriate dietary plan.

Because part of the pancreas is removed during surgery, the part that remains after surgery may not be able to produce enough enzymes to properly aid with the digestion of food, and patients may not be able to digest or absorb the fat from the food they eat. When undigested fat remains in the stool, it causes diarrhea and poor nutrition. Patients may also experience bloating, excessive gas production and abdominal cramping. Consequently, the goal for these patients is to eliminate or reduce diarrhea, restore adequate nutrition, prevent weight loss and manage bloating, cramping and gas.

Patients who have had the Whipple procedure, the most common type of surgery for pancreatic cancer, are more likely than those who have had a distal pancreatectomy (another type of pancreatic surgery) to have insufficient enzyme production.

GENERAL RECOMMENDATIONS FOLLOWING PANCREATIC CANCER SURGERY

- Eat 6–8 small meals and snacks daily to prevent feeling overly full. Small meals are easier to digest. Space meals 2–3 hours apart.
- Take the prescribed amount of pancreatic enzyme replacement products with all meals and snacks (see pages 13–20).
- Gradually start adding solid foods. The timing of this varies from person to person.
- Avoid high-fat, greasy or fried foods.
- Increase the intake of nutrient-rich foods (see the Healthy Eating Recommendations on page 3).
- Drink at least 6–12 cups (48–96 ounces) of fluids each day. Lack of fluids may lead to fatigue, light-headedness and nausea.
- Take small sips of liquids with meals. Drinking too much fluid at mealtime may cause feelings of fullness more quickly or increase nausea. Drink liquids an hour before or after eating to avoid feeling full.
- Drink beverages that contain calories, nutrients and protein, such as juices, milk, milk alternatives, smoothies or nutritional supplement drinks (see page 2). It is acceptable to drink small amounts of these at mealtimes or to use nutritional supplement drinks or protein smoothies as meal/snack replacements.
- Avoid alcoholic beverages.
- If the patient is nauseated and has an empty stomach, small bites of dry foods are often better tolerated than liquids.
- Avoid eating concentrated refined/simple carbohydrates if symptoms of **glucose intolerance** or dumping syndrome are present. Glucose intolerance symptoms include increased thirst, frequent urination, blurry vision and fatigue. Dumping symptoms usually occur within 2 hours after eating and include flushed skin, dizziness/lightheadedness, weakness, abdominal pain, nausea, vomiting and diarrhea.
- Discuss with your doctor or dietitian the use of a multivitamin or individual vitamin supplements. Calcium and the fat-soluble vitamins A, D, E and K may be necessary if diarrhea caused by malabsorption is present. Ask a healthcare professional for the proper dosage of individual vitamin supplements.
- If the patient has **anemia**, ask the doctor whether iron supplements or injections of vitamin B12 may be helpful. See pages 41–42 for more information on vitamins.
- Keep a daily journal of the patient's diet after surgery. In addition to the foods and the amounts eaten, also record daily weight, amount of pancreatic enzymes used, frequency and consistency of bowel movements, and blood **glucose** readings (if applicable). This information can be useful in tracking nutritional progress and can help the doctor or dietitian make further recommendations.

Many patients find it takes several months after surgery to find their "new normal." Many experience excessive gas for months after surgery. Even after a few months or years, there may still be foods that patients do not find tolerable.

POST-SURGICAL NUTRITIONAL GUIDELINES

Short-term (first several weeks)

- If the patient has a **jejunostomy tube (j-tube)**, feeding will initially be provided around-the-clock and will eventually be cycled to only nighttime.
- Start oral diet with clear liquids and add solid foods when the doctor indicates.
- Eat small, frequent meals.
- Avoid greasy and fried foods.
- Limit consumption of raw fruits and vegetables and gradually increase as tolerated.

Long-term (at least a few months after surgery)

- Consume fat (as tolerated) from healthy sources such as olive oil, canola oil, peanut oil, nuts, seeds and avocados.
- The patient may need to continue to avoid or limit fried, greasy and high-fat foods.
- Aim for at least 2.5 cups of fruits and vegetables per day.
- Take pancreatic enzyme replacement products if needed.
- Take acid-reducing medications as prescribed.
- Engage in physical activity for at least 30 minutes per day. Under the advice of the surgeon, weight training may be considered.

VITAMINS

Common vitamin and mineral deficiencies in people with pancreatic cancer include vitamins A, B12, C, D, E, beta-carotene and folate; and minerals selenium, magnesium, iron and zinc. These deficiencies may be caused by reduced food intake, increased nutrient needs and/or increased nutrient losses. Healthy foods and/or nutritional supplement drinks (see page 2) can help replace vitamins and minerals. A daily multivitamin and mineral supplement may be appropriate for some individuals. For individuals with dumping syndrome or those who have had part of their stomach removed during the Whipple procedure, vitamins in liquid or chewable form are suggested. In addition, taking pancreatic enzyme replacement products with every meal and snack can improve nutrient digestion and absorption. Vitamin and mineral deficiencies are less likely for patients who do not have malabsorption or who are taking adequate pancreatic enzyme replacement.

Fat malabsorption, which can cause diarrhea, may contribute to deficiencies of calcium, iron, zinc and the fat-soluble vitamins A, D, E and K. Fat-soluble vitamins along with fat are absorbed by the digestive system. So, people with fat malabsorption may be unable to absorb enough fat-soluble vitamins. Ask the doctor if taking supplements for these nutrients could be

helpful. The doctor may prescribe fat-soluble vitamins in a form that can be absorbed by the body without dietary fat (this form is called water miscible) such as AquADEKs® or MVW Complete®.

Vitamin B12 is necessary for making new cells, including red blood cells. It is bound to the protein in food and is released during digestion of these foods. Vitamin B12 is naturally found in meat, poultry, shellfish, milk, cheese and eggs. Some vegetarian yeast products are also fortified with B12. To be adequately absorbed, vitamin B12 requires an enzyme that is released by the pancreas. After surgery, this enzyme may be significantly reduced or absent, leading to B12 deficiency and anemia. Ask a doctor if the patient needs to take oral or injectable supplements of vitamin B12 or if the dietary intake along with pancreatic enzyme replacement medication is sufficient.

If vitamin, mineral or other supplements are advised, it is important to obtain these from reputable sources. Since this market is not regulated by the FDA, it is on an honor system that companies market products free of contaminants and with standardized ingredients and potency. Some resources are available to consumers to help ensure safety and potency. The US Pharmacopeial Convention offers a verification process. ConsumerLab.com is an independent testing group that reviews products after manufacturing to check for potency and contaminants. For any patient prescribed or choosing to take supplements, we recommend thoroughly researching the products and always communicating with the healthcare team regarding the products.

DIABETES

Diabetes may be either a **risk factor** or a symptom of pancreatic cancer. Pancreatic cancer is more likely to occur in people who have long-standing (over 5 years) diabetes than in people who do not have diabetes. In pancreatic cancer patients who have had diabetes for less than five years, it is unclear if the diabetes contributed to the cancer or if the precancerous cells caused the diabetes.

Research studies suggest new-onset diabetes in people over the age of 50 may be an early symptom of pancreatic cancer. A sudden change in blood sugar levels in diabetics who previously had well-controlled diabetes may also be a sign of pancreatic cancer.

People with diabetes and cancer have special nutritional needs.

People with pancreatic cancer are at risk for diabetes or glucose intolerance. Our body uses glucose for fuel. **Insulin**, a hormone secreted by the pancreas, helps the body use glucose efficiently. Normally, insulin allows glucose to enter cells and be used for energy. In the case of diabetes, the body either does not produce enough insulin or the amount that is produced is not fully effective. Instead of entering cells, the glucose remains in the blood, resulting in high blood glucose levels.

Diabetes can cause major health problems. Long-term high blood glucose levels can lead to cell damage and long-term complications. However, an individual can have a positive influence on their blood glucose levels and overall health by choosing foods wisely.

By eating well-balanced meals, individuals can help improve the effectiveness of their medications to keep their blood glucose level as close to normal (non-diabetes level)

as possible. The proper balance of nutrients from food, medication, physical activity and nutritional supplementation is needed to improve blood glucose control, physical healing, weight maintenance and quality of life. No single food will supply all the nutrients the body needs, so good nutrition means eating a variety of foods.

Glucose comes from carbohydrates. If a person does not consume enough carbohydrates, their body will turn protein and fat into glucose. Carbohydrates come in the form of grains, fruits, dairy products, starchy vegetables and foods with added sugar. The faster a carbohydrate food is digested, the more blood glucose will rise. Fiber, fat and protein can slow down the digestion of carbohydrates and how quickly glucose is absorbed in the bloodstream to help keep blood sugars from getting too high.

To help control blood sugar, try:

- Choosing foods with complex carbohydrates, like starches and fibers.
- Eating plant-based foods with plenty of fiber.
- Eating high-protein foods and small amounts of healthy fat with each meal.
- Including foods from each food group with meals, including whole grains, fruits and vegetables, protein, and dairy if tolerable (see pages 8-9).
- Eating meals and snacks at around the same time each day.

Sometimes it is difficult for individuals with pancreatic cancer to modify their diet to control their diabetes. During these times, they may be more reliant on medication and/or insulin instead of diet to control blood glucose levels. If the patient is finding it difficult to eat, work with the healthcare team to discuss possible adjustments to any blood glucose medication or insulin regimen.

If a patient with pancreatic cancer has diabetes and/or glucose intolerance, they should consider consulting a registered dietitian who understands diabetes and cancer. A registered dietitian can teach the patient how food affects blood glucose levels and how to coordinate diabetes medications and meal schedules.

There are also certified diabetes care and education specialists that are well versed in the disease and can provide guidance for patients living with diabetes. See the below resources for more information.

American Diabetes Association

https://diabetes.org/tools-resources/diabetes-education-programs

Certification Board for Diabetes Care and Education

https://www.cbdce.org/living-with-diabetes

International Diabetes Federation

https://idf.org

SUGAR AND CANCER

Many people question if there is a link between sugar and cancer. It is difficult to understand and it can cause a lot of anxiety.

Glucose is a sugar and one of the building blocks of carbohydrates. Every cell in our body uses glucose for fuel. Because cancer cells are just normal body cells growing abnormally, they also use glucose. There is no clear evidence that sugar in the diet specifically feeds tumor cells over other cells in the body.

Cutting all forms of sugar or carbohydrates out of the diet will not result in the death of cancer cells, because cancer cells cannot be starved. If a diet is lacking carbohydrates, the body will convert protein and fat into glucose. This can be especially harmful to individuals with cancer because it may contribute to unwanted breakdown of body muscle and healthy fat to make energy.

It is important to include complex carbohydrate foods in the diet because they contain important cancer fighting nutrients such as fiber, vitamins, minerals and phytochemicals. Foods that provide complex carbohydrates include fruits, vegetables, whole grains, beans, peas and lentils. Carbohydrate foods that have been stripped of fiber and other nutrients are often called refined carbohydrates and include high-fructose corn syrup, granulated sugar, sucrose and syrups. The term "refined carbohydrates" may also refer to foods that use these as ingredients and have little nutritional value such as cake, pie, cookies, other desserts and sugar-sweetened beverages.

Based on what we know about the role sugar plays in obesity and other **chronic** diseases, for individuals who can maintain a healthy weight, it is advisable to limit sources of added sugar and refined carbohydrates in the diet. However, with pancreatic cancer it can sometimes be difficult to eat enough to maintain weight while strictly limiting these refined carbohydrates or added sugars. The healthcare team may favor a more unrestricted diet to cater to food preferences, especially when appetite is low. Some foods fall in the middle, such as white rice, white bread and white pasta. These foods have had the fiber removed but they are still more complex than sugars. These foods are important for individuals with an impaired **gastrointestinal** tract because they are more easily digestible and are therefore less likely to contribute to diarrhea, nausea and early satiety. We know that patients who maintain their weight are more likely to stay on the dose and schedule of cancer treatments, have fewer side effects and are generally better able to function and maintain a good quality of life.

It is important to consume nutritious foods most of the time, but it is okay to sometimes include refined carbohydrates. People should not be afraid to eat the occasional piece of birthday cake or enjoy their favorite sweetened beverage once in a while.

Sources of (and other names for) refined/simple carbohydrates:

- Sugar (beet, brown, cane, palm, raw)
- Sucrose
- Turbinado
- High fructose corn syrup (also: corn syrup, corn syrup solids)
- Honey
- Syrup (maple, malt, brown rice, carob)
- Anhydrous dextrose
- Brown sugar
- Dextrose
- Corn syrup
- Corn syrup solids
- Fructose
- Cane juice
- Nectar (fruit, agave)
- Barley malt
- Maltose
- Glucose
- Molasses

INTEGRATIVE, COMPLEMENTARY OR ALTERNATIVE MEDICINE

Integrative, complementary or alternative medicine (ICAM) refers to therapies that extend outside of the normal practices of conventional medicine used by either a medical doctor (MD) or a doctor of osteopathy (DO). **Integrative medicine** is a coordinated approach using both conventional and complementary medicine for treatment. This is done through the same treatment center or system. To be considered integrative medicine, the approach must have shown significant effectiveness and safety when combined with conventional medicine. **Complementary medicine** is used with conventional medicine, whereas **alternative medicine** is used in place of conventional medicine.

ICAM therapies include the use of dietary supplements, special teas, vitamins, herbal preparations and practices such as massage therapy, acupuncture, spiritual healing and meditation. While some scientific evidence exists regarding some ICAM therapies, for most there is little evidence to support their effectiveness. Well-designed scientific studies are needed to determine if ICAM therapies are safe and whether they work for the diseases or medical conditions for which they are used. ICAM therapies are not regulated by the Food and Drug Administration (FDA). Their reported benefits are often unproven.

It is important to tell the healthcare team about any complementary and alternative therapies used. Give them a full picture of what is done to manage the patient's health. This will help ensure coordinated and safe care and help to avoid negative interactions with ongoing medical treatment.

For more information on types of ICAM therapies, credible resources, cost considerations and questions patients should ask about them, contact PanCAN Patient Services.

The National Center for Complementary and Integrative Health, a division of the National Institutes of Health (NIH), also provides reliable information on their website, **https://nccih.nih.gov**.

QUESTIONS TO ASK ABOUT ICAM

Questions to Ask Yourself:

- Why am I considering this ICAM therapy?
- Do I have all the information I need to feel comfortable taking this ICAM therapy?
- Will I obtain the therapy from a reputable source?

Questions to Ask Your Healthcare Team:

- Is this ICAM therapy safe for me to take?
- Is there a dosage that you can recommend for me?
- Are there any side effects I should look out for?

GENERAL NUTRITION GUIDELINES

Anyone looking for information on diet and nutrition can find a wealth of resources available. These resources vary in the quality of information that they provide. Some teach people to choose healthy foods throughout their lives, while others give tips for specific dietary situations.

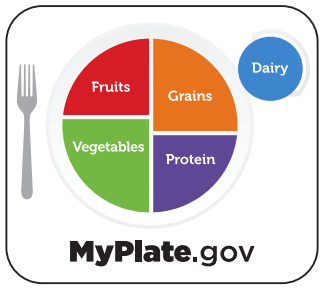
The American Cancer Society's Nutrition and Physical Activity Guidelines for Cancer Survivors, published in the May/June 2022 issue of *CA: A Cancer Journal for Clinicians*, may be used as a reliable source of information. (These guidelines have been used as a reference for the creation of this booklet.) Other reliable sources of information are the American Institute for Cancer Research and the USDA's MyPlate guidelines. These resources may all be used as reference tools while consulting with a doctor and dietitian on an individualized nutritional plan. Also, see pages 8–9 for a Suggested Meal Plan.

If problems occur with certain foods, a dietitian can suggest substitutions in the same food group. The need to make changes in an individual's diet after a diagnosis of pancreatic cancer is determined by the presence of symptoms and/or the planned treatment. Patients should check with their doctor or dietitian to determine if a specific diet will be beneficial.

MYPLATE

The United States Department of Agriculture and the Department of Human Services developed the food guide, **myplate.gov**, as a way to represent their Dietary Guidelines for Americans. The guidelines emphasize balancing calories with physical activity. They encourage the consumption of fruits, vegetables, whole grains, fat-free or low-fat milk and milk products. They include lean meats, lean poultry, fish, beans,

eggs and nuts. They recommend a diet that is low in saturated fats, trans fats, cholesterol, salt (sodium) and added sugars. They also include information on recipes from around the world. See **myplate.gov** and a dietitian for more details. The food guide MyPlate describes a healthy diet and is a good place to start; however, it is not specific to any health condition. A pancreatic cancer patient should only use it as a reference while consulting with a doctor and a dietitian.



AICR GUIDELINES

The American Institute for Cancer Research (AICR) also publishes nutrition and exercise recommendations for cancer prevention and cancer **survivors**. These guidelines recommend:

- Maintaining a healthy weight.
- Eating a variety of vegetables, fruits, whole grains and legumes, such as beans, daily.
- Being physically active for at least 30 minutes per day. Limiting sedentary habits.
- Limiting consumption of "fast foods" and other processed foods that are high in fats, starches or sugars.
- Limiting consumption of red meats (beef, pork, lamb) and avoiding processed meats.
- Limiting consumption of sugar-sweetened drinks.
- Choosing a balanced diet with a variety of foods rather than taking supplements for cancer prevention.
- Limiting consumption of salty foods and foods processed with salt (sodium).
- Limiting alcohol consumption to 1 drink per day for women and 2 drinks per day for men.
- Avoiding smoking or chewing tobacco.

For more information about the AICR nutritional guidelines, visit the American Institute for Cancer Research at **aicr.org**.

COOKBOOKS

Pancreatic cancer dietitians recommend the following cookbooks for stimulating interest in cooking and trying new foods and recipes:

- "Betty Crocker's Living with Cancer Cookbook" (2011) by Betty Crocker Cooking
- "One Bite at a Time" (2008) by Rebecca Katz
- "Eating Well Through Cancer: Easy Recipes & Recommendations During & After Treatment" (2006) by Holly Clegg
- "What to Eat During Cancer Treatment: 100 Great-Tasting, Family-Friendly Recipes to Help You Cope" (2009) by Jeanne Besser
- "The Essential Cancer Treatment Nutrition Guide and Cookbook" (2012) by Jean LaMantia
- "The Cancer-Fighting Kitchen: Nourishing, Big-Flavor Recipes for Cancer Treatment and Recovery" (2009) by Rebecca Katz
- "The New American Plate Cookbook: Recipes for a Healthy Weight and a Healthy Life" (2005) by The American Institute for Cancer Research
- "Nuestra Cocina Saludable: Recipes from Our Community Kitchen. Institute for Health Promotion Research" (2014). Ed. Dr. Amelie G. Ramirez, San Antonio, TX. **https://ihpr.uthscsa.edu/cookbook**.

Visit **pancan.org/dietandnutrition** for additional recipes. PanCAN Patient Services can also give you recipes developed for people with pancreatic cancer.

GLOSSARY

Abdomen: The part of the body between the ribs and the hips. It holds the stomach, liver, gallbladder, spleen, intestines, pancreas, kidneys and bladder.

Alternative medicine: Treatments and therapies that are not regulated or tested by the FDA for safety and efficacy. Alternative medicine is used instead of conventional medicine, and is often promoted erroneously as a cure. Examples include use of certain vitamins and supplements, homeopathy, special diets and/or untested interventions like Reiki or acupuncture.

Amylase: An enzyme secreted in saliva and by the pancreas that breaks down complex carbohydrates called starches.

Anemia: A condition in which the number of red blood cells is lower than normal.

Anorexia: The loss of appetite or aversion for food; may be experienced by patients with pancreatic cancer.

Bile: A fluid made by the liver and stored in the gallbladder. Bile is excreted into the small intestine, where it helps digest fat.

Calories: Energy available in food.

Cancer cachexia (pronounced kə-kĕk'sē-ə): A cancer-related condition marked by weight loss due to the body's improper use of calories and proteins. Cancer cachexia causes fatigue and weakness and may impair the body's response to treatment.

Carbohydrate: A nutrient found in food. Carbohydrates are the preferred fuel for most body functions. With the exception of milk, foods high in carbohydrates are derived from plant sources.

Caregiver: A term used to refer to the individual providing most of the patient's day-to-day care, whether that person is a spouse, partner, parent, child, sibling, relative, close friend or privately hired person. This person is also referred to as the primary caregiver.

Chemotherapy: A type of treatment that uses drugs to kill cancer cells.

Chronic: A chronic disease is a condition that lasts for a long period of time and recurs frequently. Chronic conditions are usually manageable but not curable.

Complementary medicine: A type of treatment in which alternative medicine is used in conjunction with conventional medicine.

Constipation: A condition characterized by hard, dry bowel movements. It is associated with discomfort in passing stools and/or infrequent passing of stools.

Cytokines: A group of compounds that allow cells to communicate with each other. Normally, cytokines help stimulate or suppress the immune system. In pancreatic cancer, cytokines can abnormally influence the rate energy is used in the body, causing weight loss and appetite suppression.

Diabetes: A chronic disease that affects the body's ability to produce or properly use the hormone insulin. In type 1 diabetes, the pancreas does not produce insulin. In type 2 diabetes, the pancreas does not produce enough insulin, or the body does not use it properly.

Diarrhea: A condition marked by frequent and loose bowel movements.

Dietitian: A healthcare professional trained in food, nutrition, biochemistry and physiology. A dietitian can provide guidance regarding an appropriate diet for each patient with pancreatic cancer.

Distal pancreatectomy: A type of pancreatic surgery where the body and tail of the pancreas and often the **spleen** are removed.

Dosage: A determined amount of a prescribed drug.

Drug classes: How experts divide all medicines based on how they work. Class names usually describe in scientific terms what the drug does or what it looks like.

Dumping syndrome: A condition in which there is rapid emptying of the stomach shortly after eating. It may be characterized by flushed skin, weakness, dizziness, abdominal pain, nausea, vomiting and/or diarrhea.

Duodenum: The first portion of the small intestine, located just below the stomach.

Effectiveness/Efficacy: The ability of a treatment to produce the desired beneficial response. The efficacy of a treatment is evaluated during Phase II and Phase III clinical trials.

Electrolytes: Electrically charged minerals that help to maintain (1) the proper amount and kind of fluid in every compartment of the body and (2) the acid-base (pH) balance of the body. Electrolytes include sodium, potassium, chloride and magnesium.

Enzyme: A protein that causes a chemical reaction in the body. Pancreatic enzymes help the body digest food.

Fibrosing colonopathy: Rare condition that causes the colon (the final part of the digestive system, where nutrients are absorbed before a bowel movement) to scar, swell and become less effective at absorbing nutrients.

Food and Drug Administration (FDA): A United States government agency that promotes and protects public health by ensuring the safety and effectiveness of medical treatments and devices.

Gallbladder: A small organ located below the liver. It stores bile made by the liver.

Gastrointestinal: A term describing any body part related to the digestive tract. These organs and structures process and prepare food to be used for energy.

Glucose: A simple sugar that provides a major energy source for the body. Carbohydrates are broken down to form glucose for use by the body.

Glucose intolerance: A condition marked by elevated blood glucose levels. Symptoms include increased thirst, frequent urination and fatigue.

Hormone: A chemical made by a gland. Hormones travel through the blood and influence how cells or organs in a different part of the body act.

Insoluble Fiber: A tough, indigestible fiber that does not dissolve readily in water. Food sources include fruits, vegetables, seeds, nuts, legumes and whole grains. Possible health effects of consuming insoluble fiber include softened stools, regulation of bowel movements and lowered blood cholesterol.

Insulin: A hormone made by the islet cells of the pancreas. Insulin decreases the level of glucose (sugar) in the blood.

Integrative medicine: A coordinated approach using both conventional and complementary medicine for treatment, typically done through the same treatment center or system. To be considered integrative medicine, the approach must have shown to be effective and safe in clinical trials when combined with conventional medicine.

Islet cell: A pancreatic cell that produces hormones and secretes them into the bloodstream.

Jejunostomy (j-tube): A feeding tube inserted through the abdomen into the small intestine, bypassing the stomach. Special liquid food is given to the patient through the j-tube. Pancreatic enzymes may be added to the liquid to aid in the breakdown and absorption of nutrients.

Lactase: The enzyme necessary to break down the sugar lactose.

Lactose: The natural sugar found in milk and milk products.

Lactose intolerance: A condition in which the body's digestive system is unable to completely metabolize lactose. It is often caused by insufficient amounts of lactase.

Lipase: An enzyme secreted by the pancreas that breaks down fats.

Liver: A large, glandular organ located in the upper abdomen. It cleanses the blood and helps digest food by secreting bile.

Lymph nodes: Small organs that filter harmful substances in the body. They contain immune cells that fight infections and other diseases. Lymph nodes are part of the lymph system, which is formed by the tissues and organs that produce, store and carry white blood cells that fight infections and diseases. This system includes the bone marrow, spleen, thymus, lymph nodes and lymphatic vessels.

Malabsorption: A condition where the body is unable to absorb the nutrients it needs from food. This is usually due to digestive difficulties.

Medium chain triglyceride (MCT) oil: Medium Chain Triglyceride (MCT) oil: An easily absorbed form of fat added to medical nutritional products to increase caloric intake.

Metabolism (metabolize): All the chemical reactions occurring in the body that are necessary to maintain life.The human body metabolizes (breaks down and rebuilds) nutrients from food for use within the cells.

Nausea: A feeling of sickness in the stomach that prompts the urge to vomit.

Pancreas: A long, irregularly shaped gland located behind the stomach. It produces enzymes that help with digestion and secretes hormones that control the levels of sugar in the blood.

Pancreatectomy: The surgical removal of part, or all, of the pancreas.

Pancreatic duct: The main exocrine duct of the pancreas. Pancreatic enzymes from smaller ducts empty into the pancreatic duct, join the common bile duct and enter the upper part of the small intestine.

Pancreatic enzymes: The proteins made by the pancreas that aid in food digestion. The three types are amylase, lipase and protease. Together these enzymes are commonly referred to as pancreatic juice.

Pancreatic neuroendocrine tumors (PanNETs or PNETs): Rare tumors that account for around 8%* of all pancreatic tumors. These tumors develop from the abnormal growth of endocrine (hormone-producing) cells in the pancreas called **islet cells**.

**Source: 2026 Cancer Facts & Figures, American Cancer Society*

Pancreatitis: The inflammation of the pancreas. Pain is the primary symptom.

Platinol AQ® (cisplatin): A chemotherapy drug used to treat PNETs.

Protease: An enzyme secreted by the pancreas that breaks down proteins.

Protein: A nutrient found in foods such as meat, poultry, fish, eggs, peanut butter, nuts, dried beans, milk, cheese, yogurt and soy products. The body uses proteins to build muscles and make natural hormones and steroids.

Radiation Therapy: A type of local cancer treatment that uses powerful, high energy beams to kill cancer cells.

Refined/simple carbohydrates : Forms of sugar that have little or no nutritional elements such as vitamins, minerals, protein and fiber from the original plant products. Refined/simple carbohydrates include table sugar, brown sugar, raw sugar/ turbinado, molasses, confectioners/powdered sugar, high fructose corn syrup and honey. Concentrated refined/simple carbohydrates are generally found in desserts and sweet beverages.

Risk factor: "A characteristic or behavior associated with a higher chance of developing a disease. It is not necessarily the cause of the disease."

Side effect: An undesired effect of a treatment.

Simethicone: A medication used for the removal of excess gas in the intestinal tract. It helps the air in the stomach to be more readily expelled by burping or passing gas. The drug does not prevent the accumulation of gas created by intestinal bacteria or from swallowed air. It does not make intestinal gases dissolve.

Small intestine: The tube-shaped portion of the digestive (gastrointestinal) system, located between the stomach and the large intestine. Most nutrients are absorbed into the bloodstream through the small intestine.

Soluble fiber: A digestible fiber that dissolves readily in water. Food sources include fruits, vegetables, legumes, seeds, nuts, oats, barley and rye. Additionally, over-the-counter products that contain soluble fiber are available. Possible health effects of consuming soluble fiber include lowered blood cholesterol, slowed glucose absorption, slowing transit time of food through the upper gastrointestinal tract and bulking of stool.

Spleen: An organ in the upper left side of the abdomen that filters the blood. It is located near the tail of the pancreas.

Survivor: A term used to describe any person who has been diagnosed with cancer, no matter how long it has been since the diagnosis. Definitions vary throughout the cancer community and are best defined by the individual.

Symptom: A sign that a person has a condition or disease. Some examples of symptoms for pancreatic cancer include jaundice, weight loss, fatigue, nausea, vomiting and pain.

Thrush: A fungal infection that causes white patches in the mouth and on the tongue. These patches may bleed when scraped or during tooth brushing. Thrush is common in adults with weakened immune systems or as a side effect of chemotherapy.

Unresectable: A tumor or lesion that cannot to be removed by surgery.

Vitamin: A nutrient essential in small amounts to help the body's metabolic reactions occur properly.

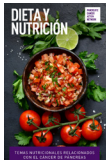
Whipple procedure: The surgical removal of the head of the pancreas, the gallbladder, the duodenum, surrounding **lymph nodes** and sometimes a small portion of the lower stomach called the pylorus.

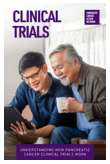
The Pancreatic Cancer Action Network thanks the Patient Services Committee members of our

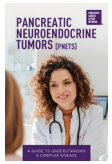
SCIENTIFIC AND MEDICAL ADVISORY BOARD

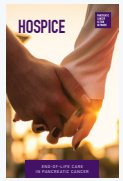
for providing their medical expertise in reviewing this booklet. These members are experts from such institutions as MD Anderson Cancer Center, Memorial Sloan-Kettering Cancer Center, Virginia Mason Medical Center, etc.

To see all of our Scientific and Medical Advisory Board members, visit **pancan.org/SMAB**.









These booklets are currently only available in English, but Spanish versions are coming soon.

Want to know more about any of the services we offer? Hablamos español. Contact PanCAN Patient Services, Monday through Friday, 7 a.m. to 5 p.m. Pacific Time.

Call toll-free **877-2-PANCAN**
Email **patientservices@pancan.org**

Because of the philanthropy of generous friends, we are able to provide all of our resources and services to you, ***free of charge.***

Information provided by the Pancreatic Cancer Action Network, Inc. ("PanCAN") is not a substitute for medical advice, diagnosis, treatment or other health care services. PanCAN may provide information to you about physicians, products, services, clinical trials or treatments related to pancreatic cancer, but PanCAN does not recommend nor endorse any particular health care resource. In addition, please note any personal information you provide to PanCAN's staff during telephone and/or email communications may be stored and used to help PanCAN achieve its mission of assisting patients with, and finding cures and treatments for, pancreatic cancer. Stored constituent information may be used to inform PanCAN programs and activities. Information also may be provided in aggregate or limited formats to third parties to guide future pancreatic cancer research and education efforts. PanCAN will not provide personal directly identifying information (such as your name or contact information) to such third parties without your prior written consent unless required or permitted by law to do so. For more information on how we may use your information, you can find our privacy policy on our website at https://www.pancan.org/privacy/.

PanCAN was the first organization dedicated to fighting pancreatic cancer in a comprehensive way, and for more than two decades, we've grown a nationwide movement tackling the disease from all angles.

RESEARCH

We fund transformative research - everything from early detection to innovative new treatment approaches.

PATIENT SERVICES

We provide information about treatment options, diet and nutrition, support resources and more, and we can answer all your questions along the way.

ADVOCACY

We work with thousands of grassroots advocates to urge Congress to increase federal research funding for pancreatic cancer, and we get results.

COMMUNITY

Be part of our movement! You can volunteer locally, participate in a PurpleStride community event or host your own fundraiser.

ACTION FOR PATIENTS BEGINS HERE

The mission of the Pancreatic Cancer Action Network (PanCAN) is to take bold action to improve the lives of everyone impacted by pancreatic cancer by advancing scientific research, building community, sharing knowledge and advocating for patients.

Our vision is to create a world in which all patients with pancreatic cancer will thrive.

Through our Patient Services program, we provide extensive individualized support and hope. PanCAN Patient Services connects patients, their caregivers and family members to reliable information and resources. Our highly educated and expertly trained staff's passion is equaled only by their depth of knowledge about pancreatic cancer.

To learn more about our free, personalized resources and services, visit pancan.org or call 877-2-PANCAN. Hablamos español.

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