



Pancreatic Cancer Kit

Introduction

We created the *Pancreatic Cancer Kit* to highlight some key principles for you as you manage the cancer decision-making process. In it, you will find tools designed to present you with insightful information you as a patient or caregiver will find helpful in your own search for the best cancer treatment available.

Undoubtedly, many unfamiliar issues surface after a cancer diagnosis—questions and concerns you never imagined you would have to face. It's OK to feel overwhelmed, angry or upset. Your situation requires you to make a multitude of tough decisions, often immediately. But you *do* have the power to make sharp, informed decisions. You have the power to take charge of your situation—but to do so, you need to sort through all of the emotions—yours and those of your loved ones—assess all of the facts and identify a solution to help you get back on track.

As you flip through the following pages, you will find five sections. “Understanding Pancreatic Cancer,” “Overview of Treatment Options,” “Questions to Ask Your Doctor,” “Selecting Your Treatment Hospital,” and, most importantly, the final piece entitled the “Decision Guide.”

The Decision Guide is a workbook we offer you, to help you gain control and take a more active role in the decision-making process. It requires you to begin asking questions—hard questions—that ask what you are looking for in a hospital and a physician, the goals and expectations you bring to the treatment process and the steps you need to take to make your goals a reality. If this sounds different to you, it's because it **is** different! We believe *you* must be a key player and a decision-maker.

At the very least, the *Pancreatic Cancer Kit* contains useful information about hospitals, treatment options and questions you may use to assess the doctors and hospitals you visit throughout this experience. We wish you the best on your journey ahead and would be happy to hear from you if we can be of service in any way.

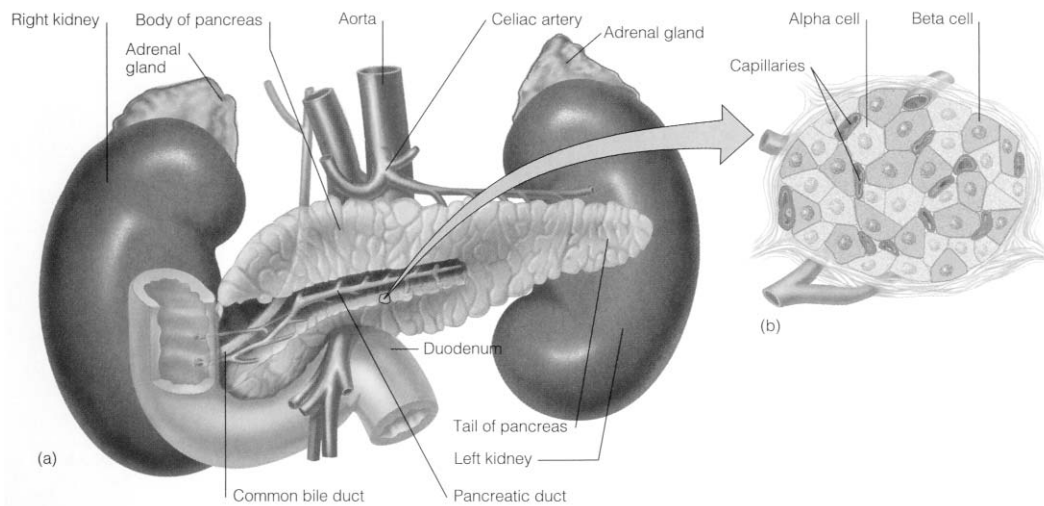
Understanding Pancreatic Cancer

The American Cancer Society estimates over 30,000 people will receive a pancreatic cancer diagnosis this year. Understanding pancreatic cancer requires you to become familiar with some *basic* information regarding how and why this disease develops in the body. Like all cancers, pancreatic cancer originates at the cellular level.

Your body consists of *countless* numbers of cells. Generating new cells to replace old or damaged cells allows the body to continually restore itself through this natural maintenance process. But sometimes, normal cells change and begin growing and dividing at uncontrollable rates. This uncontrolled cellular growth is called *cancer*.

The Pancreas: An Overview

To provide some perspective on how and why pancreatic cancer develops, it may be helpful to first gain insight into the *anatomy*, or the structure, of the pancreas.



The pancreas is made up of three key segments: the **head**, the **body** and the **tail**. The *head* of the pancreas rests inside the C-shaped *duodenum*—the first and widest portion of the small intestine. Following the head, the *body* of the pancreas stretches behind the stomach before tapering into the final segment, called the *tail*.

Six inches long and two inches wide, the wing-shaped pancreas extends horizontally from right to left across the abdomen. Draped by the liver, stomach, small intestine, bile ducts, gallbladder and the spleen, the pancreas resides deep within the belly. This hidden but industrious organ actually serves as a large *gland*—a group of highly specialized cells responsible for producing and secreting substances that regulate bodily functions.

The pancreas contains two distinct gland types—*exocrine glands* and *endocrine glands*. Ninety-five percent of pancreatic cells form exocrine glands and ducts; thus, this segment of the pancreas is commonly referred to as the *exocrine pancreas*. Exocrine glands work by secreting a digestive enzyme called *pancreatic juice* into a network of small, tubular passageways called *ducts*. These tiny ducts transport pancreatic juice into the *main pancreatic duct*, a vessel one-sixteenth of an inch in diameter that spans the length of the pancreas. The main pancreatic duct converges in the head of the pancreas with the *common bile duct*—the highway linking the pancreas to the small intestine. A mixture of pancreatic juice and bile flows across the common bile duct into the small intestine. Here, the two enzymes combine to enhance digestion by breaking down proteins, fats and carbohydrates into basic nutrients the body can absorb.

Opposite the exocrine pancreas, the smaller *endocrine pancreas* produces and releases the hormones insulin and glucagon. Insulin and glucagon help the body use and store energy. Tiny clusters of pancreatic cells, called *islets of Langerhans*, release insulin or glucagon directly into the bloodstream. This hormone-producing section of the pancreas, called the *endocrine pancreas*, makes up the *tail* section of the organ.

Hopefully, this information presents you with a clear vision of the pancreas. Once you feel confident with your understanding of how the pancreas functions, you may begin to assess the environmental, genetic and lifestyle risk factors associated with pancreatic cancer.

Pancreatic Cancer Risk Factors

Seven factors increase a person's pancreatic cancer risk—**age**, **gender**, **race**, **diet**, **genetic disorders**, **lifestyle** and **personal medical history**. What follows is a brief description of each risk factor. While the six risk factors do **not** provide *absolute* evidence to decipher exactly *when* **or** *if* a person will develop pancreatic cancer, population studies illustrate a strong link between each risk factor and increased risk for disease.

Age – As a person ages, the immune system diminishes, reducing its ability to recognize, attack and kill damaged or abnormal cells. Left untouched, these abnormal cells can take root and multiply, resulting in cancer. In pancreatic cancer, the *incidence*, or the rate at which the disease is diagnosed, significantly increases in both men *and* women over age 50.

Gender – Men carry a higher risk of developing pancreatic cancer than women.

Race – People with African American heritage carry a higher risk of developing pancreatic cancer than white, Hispanic or Asian Americans.

Diet – Diet, too, plays a role in pancreatic cancer risk. Studies link a diet high in saturated fats—particularly fats derived from red meat—to a greater frequency of pancreatic cancer.

Genetic Disorders – Some people carry a genetic predisposition for developing pancreatic cancer. The American Cancer Society estimates 5% to 10% of all pancreatic cancer cases result from a *genetic disorder*—a condition that arises as a result of an error in a person’s DNA sequence. Two genetic disorders commonly linked to pancreatic cancer include:

Hereditary Non-Polyposis Colon Cancer (HNPCC) – HNPCC represents a hereditary disorder linked to colorectal cancer. However, people who carry the HNPCC gene are more likely to develop other cancers, including pancreatic cancer.

BRCA2 Gene Mutation – BRCA2 is a type of *tumor suppressor gene*—a special gene responsible for producing proteins that protect cells from abnormal development. Men and women with a dysfunctional BRCA2 gene carry a risk of developing pancreatic cancer that is 10 to 20 times higher than the average member of the population.

Lifestyle – A study published by the National Cancer Institute in 2001 links lifestyle factors such as smoking, alcohol consumption and body weight directly to increased pancreatic cancer risk.

Personal Medical History – Any person with a personal history of cancer—regardless of the disease type—faces an increased risk for developing pancreatic cancer. The following conditions may contribute to a person’s pancreatic cancer risk.

Chronic Pancreatitis – Excessive alcohol consumption may lead to chronic pancreatitis, an inflammatory disorder of the pancreas. Chronic pancreatitis develops when digestive enzymes from the pancreas attack healthy pancreatic tissue, resulting in tissue inflammation and, in severe cases, infection.

A small percentage of people carry a genetic tendency to develop *familial chronic pancreatitis*—a hereditary form of chronic pancreatitis. The American Cancer Society estimates familial chronic pancreatitis elevates a person’s life time risk of developing pancreatic cancer by 40% to 75%.

Long-Term Diabetes – Diabetes develops when the endocrine pancreas, the portion of the pancreas responsible for manufacturing insulin and glucagon, no longer produces sufficient levels of insulin. Without insulin, the body cannot convert glucose into energy. Ten to twenty percent of people diagnosed with pancreatic cancer have diabetes.

Risk factors provide a series of *general* guideposts you may utilize to assess some of the *contributing factors* behind the onset of this disease. Experts develop risk factors based upon studies of *large segments* of the general population. Since each person’s body presents such a unique set of variables, it is inaccurate to flag one or more of these risk factors as “the reason” cancer developed in the body.

A team of medical specialists, including a Gastroenterologist and a Medical Oncologist, can perform an in-depth assessment of your situation. If you have questions about any of these risk factors, review this listing with your doctor.

Pancreatic Cancer: How it Develops

Your anatomical knowledge of the pancreas now includes an understanding of the organ's separate functions. The enzyme-producing portion of the pancreas, called the *exocrine pancreas*, relies on a unique set of cells that differ from the hormone-producing *islet cells* present in the *endocrine pancreas*. The different cell types allow the pancreas to perform two very diverse roles. These unique differences are **especially** important when discussing pancreatic cancer because the diagnostic testing, treatment options and prognosis of exocrine cancers bear little resemblance to the medical treatment of cancers of the endocrine pancreas. **The remainder of this kit focuses upon exocrine pancreatic cancers .**

Pancreatic cancer may develop in any of the cells that make-up the exocrine pancreas; however, the most common pancreatic malignancies develop inside the tiny pancreatic ducts, or within the surrounding *acinar cells*—special cells responsible for producing pancreatic enzymes. A description of the two most common forms of exocrine pancreatic cancer follows:

Adenocarcinoma – According to the American Cancer Society, 95% of pancreatic cancers are adenocarcinomas. This type of cancer forms tiny pockets of cancerous cells called *glands*. As adenocarcinomas grow, the abnormal cells may invade nearby nerve endings, causing back pain.

Acinar Cell Carcinoma – Acinar cell carcinomas represent the second most common form of exocrine pancreatic cancer. Cancers of the acinar cells may lead to an *overproduction* of pancreatic enzymes. Excessive enzyme levels can cause symptoms such as boosted white blood cell counts, skin rash and joint pain.

Detecting pancreatic cancer in its earliest, most treatable stages remains an elusive task. The organ's isolated location, combined with vague symptoms and the absence of reliable screening procedures and blood tests contributes to the high percentage of people who experience a late-stage diagnosis. When symptoms do arise, it usually indicates advanced disease.

The listing below briefly summarizes six common symptoms. Once you review this section, we recommend sharing this knowledge with your family and other loved ones to help raise awareness of pancreatic cancer amongst your circle of friends.

Jaundice – Jaundice is a condition characterized by the yellowing of the skin and eyes due to an excessive build-up of a pigment called *bilirubin*. This pigment is a component of *bile*, a yellowish-green enzyme produced by the liver and transported across the common bile duct into the small intestine. Tumors located on the head of the pancreas may press against the common bile duct, obstructing the normal flow of bile. As bile continues to accumulate, it may enter the bloodstream. Common symptoms of jaundice include itchy skin, dark brown or tan urine and light, clay-colored stools.

Back Pain – Above the *body* of the pancreas exists a network of nerves called the *celiac plexus*. A tumor pressing against this nerve center may cause pain in the middle to lower portion of the back. This pain can be constant or it may come-and-go.

Weight Loss – Enzymes produced by the pancreas play a critical role in digesting proteins, fats and carbohydrates. A disruption in the quantity of pancreatic enzymes may reduce the body's ability to break down and absorb the vital nutrients needed to maintain a healthy weight.

Gallbladder Enlargement – The gallbladder is a tiny pouch, three-to-four inches long and one inch wide. Located underneath the right lobe of the liver, the gallbladder stores *bile*, an enzyme produced by the liver. Sometimes, a tumor may crimp the common bile duct, causing the gallbladder to swell as it fills with excess bile. A physician may feel the enlarged gallbladder during a routine physical examination.

Digestive Problems – A tumor constricting the common bile duct limits the amount of pancreatic juice entering the small intestine. The decrease in pancreatic juice inhibits the body's ability to digest proteins, fats and carbohydrates. Incomplete fat digestion may lead to pale-colored, greasy, bulky stools that float in the toilet.

Belly Enlargement – A *distended*, or swollen, belly may indicate a buildup of fluid between the abdominal tissues. In advanced stages of pancreatic cancer, this fluid may contain cancerous cells.

Communicating the symptoms of pancreatic cancer with your friends and loved ones may be the best way for you to plant seeds of knowledge for the future.

| An Important Note on Pancreatic Cancer Staging

Deciding upon a course of treatment may be the hardest, yet most important life choice you make during this time. Making educated treatment decisions begins by learning about the **stage**, or *progression*, of pancreatic cancer in the body. A properly staged pancreatic cancer, backed by second or third opinions from a different Medical Oncologist, presents you with a more clear-cut picture of where the cancer exists in your body—the first important step you can take in determining the best treatment options available to help you fight pancreatic cancer.

Since the stage of the disease plays such a large role in shaping both the *type* of treatment and the *number* of potential treatment options you may choose from, it is *critical* for you to understand the latest methods for accurately staging pancreatic cancer.

The American Joint Commission on Cancer (AJCC), in collaboration with the International Union Against Cancer (IUAC), recommends the **TNM System** to stage cancer. TNM stands for “**T**umor,” “**N**ode” and “**M**etastasis.” Properly staging pancreatic cancer requires the know-how of a *Pathologist*—a doctor with special training and expertise in analyzing human cell structure. Using a microscope, the Pathologist closely examines your tissue samples, documenting cell structure, tumor size and evidence of lymph node involvement.

Before handing this *pathologic information* to the Oncologist, the Pathologist assigns a tumor **Grade (G)**. The tumor grade reflects the *appearance* of the cancer cells under the microscope. A cancer cell that appears very similar to a normal, healthy cell is said to be *well-differentiated (G1)*. In contrast, a *poorly or undifferentiated (G4)* cancer cell might have an altogether different size, shape or appearance than a normal cell. As a result, these poorly differentiated or undifferentiated cancer cells cannot complete the normal functions of a healthy cell. More aggressive tumors generally contain a high number of poorly differentiated cancer cells.

Combining this pathologic information with data obtained from surgery and other scans, helps the Medical Oncologist determine the overall progression, or *stage*, of cancer in your body. Your Medical Oncologist will collect information on your **T**umor size, **N**ode involvement, **M**etastasis and **G**rade. Inserting this information into a comparative table allows your Medical Oncologist to consolidate this data into a simple Roman numeral that indicates the extent of your disease. The Roman numerals I, II, III and IV represent the various stages of pancreatic cancer, with Stage I representing an *early stage* cancer and Stages III and IV representing *late stage* cancers. Different stages of pancreatic cancer call for different treatments.

| Diagnostic Testing for Pancreatic Cancer

A listing of the tools needed to diagnose and stage pancreatic cancer follows:

- **Physical Exam** – A physical exam consists of a one-on-one examination between you and your physician. Throughout the exam, the physician will ask questions designed to clarify your current level of health and identify any symptoms and/or risk factors pointing to potential areas requiring further examination. These questions present your doctor with your *case history*.

The physician will examine your abdominal area by feeling for fluid buildup and any unusual masses or enlargements in the abdominal organs. Apart from the abdominal region, your physician will also check the region surrounding your collarbone for evidence of swollen lymph nodes.

- **Diagnostic Tests** – Diagnostic tests provide images of the human body. X-rays, high-powered magnets, radioisotopes, special video equipment or actual tissue samples collected during surgery present your physicians with an “inside” view of the pancreas.
 - **Computerized Tomography (CT) Scans** – Computerized tomography scans utilize x-rays to create detailed cross-sectional images of the body. CT scans work by fusing x-ray technology with sophisticated computer imaging

systems. Recent technological advances in CT scanning—speed and imaging capabilities—can produce precise four-dimensional images in a fraction of the time older CT machines require. This new CT technology is called *Spiral CT*.

Spiral CT scans produce high-resolution images of the entire abdominal area in 20 to 30 seconds, allowing the physician to study surrounding organs such as the liver and lymph nodes for evidence of metastasis.

- ***Magnetic Resonance Imaging (MRI)*** – Magnetic resonance imaging uses a powerful magnetic field and computer-generated radio waves to produce cross-sectional images of the inside of your body. Unlike traditional x-ray driven imaging systems, MRI scans work by taking advantage of the *water molecules* present inside each of your cells. By stimulating the water molecules with computer-generated radio waves, your cells respond by emitting a very faint signal. The MRI machine picks up on this signal and a special computer program creates high-resolution images of the pancreas and surrounding tissues.

For people living with pancreatic cancer, MRI scans play an important role in identifying conditions such as jaundice. Apart from fluid build-up, MRI scans help physicians study blood flow in the two main blood vessels that feed into the pancreas.

- ***Fine Needle Aspiration (FNA)*** – Fine needle aspiration utilizes a thin needle to collect a small sample of pancreatic tissue. During the procedure, the physician relies upon a CT or MRI scan to guide the needle once it is inserted into the body. With the needle positioned properly, the physician extracts a small amount of pancreatic tissue for laboratory analysis.
- ***Endoscopic Retrograde Cholangiopancreatography (ERCP)*** – Cancer of the exocrine pancreas commonly originates inside the pancreatic ducts and may spread to the adjoining bile ducts. ERCP imaging employs a thin, flexible tube called an *endoscope* to introduce a contrast dye into the pancreatic ducts prior to x-ray. The dye creates a crisp, distinctive outline of the ducts on x-ray film. A high-definition x-ray helps the physician identify areas where the pancreatic ducts appear blocked or constricted by an abnormal growth.

Usually, a *Gastroenterologist*—a physician who specializes in diagnosing and treating digestive disorders—will perform the ERCP. The Gastroenterologist places the endoscope inside the mouth before gently advancing the tube down the esophagus, through the stomach and into the C-shaped portion of the small intestine, called the *duodenum*.

With the endoscope positioned properly, the Gastroenterologist locates the *papilla*—the opening in the duodenum where bile and pancreatic juices drain into the small intestine—and inserts a tiny catheter to deliver the dye. A series of x-rays will be taken to study the pancreatic and bile ducts. Should the x-ray reveal any abnormalities, the Gastroenterologist may utilize the endoscope to obtain tissue samples of the pancreas and collect pancreatic juice. If an obstruction exists, the Gastroenterologist can also place a plastic device, called a *stent*, inside the pancreatic duct to alleviate any buildup of pancreatic juice. A stent can also be placed inside of the bile duct to relieve *jaundice*, a condition caused by the excessive build-up of bile.

- ***Percutaneous Transhepatic Cholangiography (PTC)*** – PTC utilizes a fine needle filled with a special contrast dye to make a *percutaneous*, or “through the skin,” injection into the bile ducts. The dye enhances the outline of the bile ducts on x-ray film, producing crisp images the Radiologist uses to study the ducts for evidence of tumor-related blockage or dilation. Your physician may recommend this procedure to help relieve jaundice.
- ***Endoscopic Ultrasound (EUS)*** – Endoscopic ultrasound combines two common diagnostic tests—*endoscopy* and *ultrasonography*—to produce a clear image of the pancreas. The physician uses a modified *endoscope* equipped with a light and a camera to obtain video images of the hollow portion of the digestive organs.

To complete the EUS, an ultrasound probe, called a *transducer*, is fitted onto the end of the endoscope. By passing the endoscope into the mouth, down the esophagus, through the stomach and into the duodenum, the physician can position the ultrasound-equipped endoscope against the wall of the duodenum, adjacent to the pancreas.

During the ultrasound, high-energy soundwaves echo off of the pancreas and the surrounding blood vessels. A computer analyzes the frequency of these echoes to create an image of the pancreas called a *sonogram*. This internal method of ultrasonography can identify pancreatic abnormalities as small as *one centimeter* (four-tenths of an inch) in diameter.

Using the EUS image as a guide, the Radiologist may complete a *fine needle aspiration (FNA)* of the suspect area and submit the tissue sample to the pathology laboratory for analysis. This procedure helps you and your physician understand the *stage*, or extent of the disease.

- **Positron Emission Tomography (PET) Scans** – Positron emission tomography differentiates normal cells from rapidly dividing cancer cells by measuring cellular *activity*. Prior to the PET scan, the Radiologist will inject a small amount of a sugar-bound radioisotope into a vein. The radioisotope helps the PET scan distinguish normal cellular activity from abnormal cellular activity by measuring how fast different cells within the body burn sugar. Rapidly dividing cancer cells burn sugar at a faster rate than normal cells, distinguishing the cancer cells from healthy tissue.

PET scans enable doctors to identify distant metastatic cancer sites, giving you and your physicians a level of pinpoint accuracy not achieved by CT scans or x-rays. Very few facilities offer this technology; consider the benefits of PET scan technology as you assess different treatment hospitals.

- **Complete Blood Count (CBC)** – A common test completed for many different types of cancer, the complete blood count calculates the *quantity, type* and *form* of red blood cells, white blood cells and platelets in your bloodstream. This information is important because it helps you and your physician monitor how your body responds to certain forms of treatment like chemotherapy. The following section highlights the eight tests that make up a CBC analysis:

- **White Blood Cell (WBC) Count** – White blood cells help your body fight infections. A white blood cell count measures the number of WBCs present in a *one-microliter* drop of blood. A “normal” white blood cell count may range from 4,100 to 10,900 WBCs per microliter of blood. Exercise habits, stress level and disease status can fluctuate these numbers.
- **White Blood Cell Differential** – A white blood cell differential measures the percentage of the five major types of WBCs—*neutrophils, lymphocytes, monocytes, eosinophils* and *basophils*—present in a *one-microliter* drop of blood. The percentages represent the *volume* of a specific type of WBC in the blood sample. Neutrophils represent the bulk of the WBC army, comprising 50 to 60% of the body’s total number of WBCs.
- **Red Blood Cell (RBC) Count** – Red blood cells help your body transport oxygen from the lungs throughout the rest of the body. A red blood cell count measures the number of RBCs present in a *one-microliter* drop of blood. Red blood cell counts vary with a patient’s age and sex. Men typically exhibit from 4.5 to 6.2 *million RBCs* per microliter of blood, whereas women normally range from 4.2 to 5.4 million RBCs per microliter of blood.
- **Hematocrit (HCT) Assay** – Hematocrit assay measures the percentage of RBCs present in a *one-microliter* drop of blood. The percentage represents the *volume* of RBCs in the blood sample.
- **Hemoglobin (Hgb) Testing** – Hemoglobin is an iron-rich protein in the red blood cells that binds to and carries oxygen. Hemoglobin testing assesses the body’s ability to effectively transport oxygen from the lungs throughout the body by measuring the level of hemoglobin per *deciliter* (100 milliliters) of blood.
- **Platelet Count** – Platelets help your body prevent bleeding or bruising. A platelet count measures the number of platelets, or *thrombocytes*, present in a *one-microliter* drop of blood. A “normal” platelet count may range from 150,000 to 400,000 platelets per microliter of blood.

The “normal” level of hemoglobin varies between men and women. Generally, men register 14 to 18 grams of hemoglobin per deciliter of blood; women usually measure between 12 to 16 grams of hemoglobin per deciliter of blood.

- **Red Blood Cell Indices** – Red blood cell *indices* (plural for “*index*”) reflect three core measurements of red blood cell functionality:
 - *Mean Corpuscular Volume (MCV)* measures the size of the red blood cells in the sample.
 - *Mean Corpuscular Hemoglobin (MCH)* measures the hemoglobin content present in the average RBC.
 - *Mean Corpuscular Hemoglobin Concentration (MCHC)* measures the average *concentration* of hemoglobin in the red blood cells.
- **Blood Morphology and Staining** – Blood morphology and staining illustrates the blood cell shape and structure, as well as the appearance of the cell’s nucleus under a microscope. Applying a special stain to the blood sample allows the physician to note abnormalities or deficiencies exhibited by the cells.
- **Carbohydrate Antigen 19-9 (CA 19-9)** – CA 19-9 is a *tumor marker*—a unique protein found in the bloodstream of people living with pancreatic cancer. CA 19-9 testing is ***NOT*** used to diagnose pancreatic cancer; rather, this measurement helps your Oncologist more thoroughly understand the overall involvement of the disease in the body ***after*** the diagnosis is officially confirmed.

After completing treatment, your doctor may recommend using a CA 19-9 test to monitor the *effectiveness* of a particular form of therapy. Decreasing levels of CA 19-9 indicate the current course of treatment is working; should CA 19-9 levels gradually *increase* after successful treatment ends, this may be a sign of recurrent cancer. Talk with your Oncologist to learn more about how CA 19-9 testing may work for your situation.

- **Carcinoembryonic Antigen (CEA) Testing** – CEA testing measures a blood sample for the presence of *carcinoembryonic antigen* (CEA). Normally, the blood of a healthy adult contains a low level of CEA. Although CEA is primarily associated with colorectal cancer, studies show heavy smokers and people diagnosed with pancreatic cancers may also exhibit unusual levels of CEA in their bloodstreams.

CEA testing is ***NOT*** used to diagnose pancreatic cancer. Like CA 19-9 testing, CEA testing allows you and your Oncologist to monitor your *response* to a particular form of therapy by measuring CEA levels in the blood. Since your case is unique, it’s important to talk with your Oncologist to learn more about CEA testing and how it might benefit you.

Overview of Treatment Options

Today, more than ever, you have access to an array of pancreatic cancer treatment options. The sheer number of available options makes understanding the basic treatments an extremely important component of your decision-making process. Exploring this wide range of treatment options requires a *general* understanding of three traditional treatment modalities—surgery, radiation therapy and chemotherapy. New, emerging therapies make up a fourth group of therapies you may examine prior to selecting a treatment option that’s right for you.

Here is some *basic* information about the four treatment categories. Keep in mind, selecting a treatment is not only important, it is a *highly personal* decision. Pancreatic cancer takes *years* to develop from a single cell into its present state. Taking extra time to review treatment options with family members or other close friends may help you feel more comfortable and confident before proceeding with treatment.

- **Surgery** – Surgery is the oldest form of pancreatic cancer treatment. Surgery is often used in conjunction with radiation therapy and/or chemotherapy. Before pursuing surgical treatment, you should always obtain a second medical opinion from a *different* specialist.

Two methods of surgical therapy exist—*potentially curative surgery* and *palliative surgery*. A *Surgical Oncologist*, a doctor who specializes in planning and performing cancer surgeries, performs *potentially curative surgery* when diagnostic testing indicates the surgery could likely remove *all visible cancer* during the operation.

A brief listing of **potentially curative surgical procedures** for pancreatic cancer follows:

- **Distal Pancreatectomy** – Distal pancreatectomy is a potentially curative surgical procedure involving the surgical removal of the body and tail of the pancreas, and usually the spleen. While it is rare for cancers of the exocrine pancreas to develop in the body or tail of the organ it is not impossible. Generally, a higher number of *islet cells*—the cells responsible for producing insulin and glucagon—exist in these endocrine regions of the pancreas.

Since distal pancreatectomy is a type of potentially curative surgery, the goal of the operation hinges upon successful removal of *all visible cancerous tissue*. To accomplish this goal, the Surgical Oncologist removes a small portion, or a *margin*, of *healthy* pancreatic tissue. During surgery, the Surgical Oncologist utilizes a microscope to carefully study the margin of healthy tissue bordering the cancer. Based upon this analysis, the Surgical Oncologist classifies the tissue sample in one of three ways:

1. *Negative Margin* – A negative margin means the cancer does not border the outer edge of the tissue sample. Surgical Oncologists typically prefer a 1 cm margin of healthy tissue between the cancer and the remaining healthy tissue.
2. *Positive Margin* – A positive margin means the cancerous growth *exceeds*, or extends beyond the outer edge of the tissue sample. Depending upon a person's condition and health status during surgery, the Surgical Oncologist will decide whether or not to remove additional pancreatic tissue.
3. *Close Margin* – A close margin means the cancer exists *near the edge* of the tissue sample. The Surgical Oncologist may *resect*, or remove, additional healthy tissue before reconnecting the two segments with special thread-like fibers called *sutures*.

After removing the diseased portion of the pancreas, the Surgical Oncologist focuses next upon the lymph nodes surrounding the surgical site. To ensure proper *staging* of the disease, the Surgical Oncologist samples and removes a number of lymph nodes and sends the nodes to the pathology laboratory for analysis. A specially trained physician, called a *Pathologist*, studies the lymph nodes for evidence of cancerous cells and produces a formal pathology report that highlights the details of the analysis.

Once you recover from surgery, talk with your doctor about the pathology analysis. This report plays a critical role in helping you and your Oncologist determine the most beneficial therapies to incorporate into your post-surgery treatment program.

- **Total Pancreatectomy** – Total pancreatectomy is a potentially curative surgical procedure involving the surgical removal of the entire pancreas, the first C-shaped portion of the small intestine, called the duodenum, the gall bladder and usually the spleen. Removal of the entire pancreas immediately halts the body's ability to produce pancreatic enzymes, insulin and glucagon. People who undergo this procedure take oral doses of pancreatic enzyme to assist with digestion as well as daily insulin injections to regulate blood sugar levels.
- **Pancreaticoduodenectomy (Whipple Procedure)** – Conceived in 1935 by Dr. Allen Whipple, this potentially curative surgical procedure involves the removal of the head of the pancreas, part of the stomach, the C-shaped portion of the small intestine, called the *duodenum* and part of the *jejunum*. The gallbladder and a segment of the common bile duct are also removed. During surgery, the Surgical Oncologist reconnects the remaining portion of the common bile duct to the small intestine, thereby preserving the pathway for bile to flow between the liver and the small intestine.

If the Whipple procedure is an option for you, take special care to assess the skill and experience of your Surgical Oncologist. Several prominent studies conducted by National Cancer Institute Comprehensive Cancer Centers establish a link between surgical experience and five-year survival rates. If you're concerned with your current surgeon's level of Whipple procedure expertise, seek a second opinion.

Sometimes, pancreatic cancer spreads beyond the pancreas to remote areas in the body. When this occurs, surgical

strategies focus upon alleviating pain and restoring normal functionality to organs affected by the cancer. Called *palliative surgery*, these treatments are designed to support your quality of life by managing the symptoms of pancreatic cancer.

The following section highlights two *palliative surgery* options:

- ***Biliary Bypass Surgery*** – Biliary bypass surgery is a palliative surgical procedure used to reroute the tiny passageway that connects the gallbladder to the small intestine. Called the *common bile duct*, this passageway carries bile, a special fat-digesting enzyme, to the small intestine. Sometimes, pancreatic tumors can block or constrict the common bile duct, resulting in an excessive build-up of bile in the gallbladder. Biliary bypass surgery corrects this blockage and relieves symptoms such as *jaundice*.
- ***Gastrojejunostomy*** – Gastrojejunostomy is a palliative surgical procedure used to redirect the flow of partially digested food from the stomach directly to the jejunum. As pancreatic cancer develops, tumors may block the duodenum, the C-shaped portion of the small intestine that receives partially digested food from the stomach. Gastrojejunostomy surgery corrects this blockage by creating a surgical separation between the duodenum and the second portion of the small intestine, called the *jejunum*. The Surgical Oncologist *cauterizes*, or permanently seals the duodenum and reconnects the loose end of the jejunum directly to the stomach. This surgery restores normal digestive function and relieves pain and vomiting associated with blockage of the duodenum.
- ***Radiation Therapy*** – Radiation therapy works by utilizing high-powered x-rays, gamma rays or electron beam radiation to target and destroy rapidly dividing cancerous cells located in a very specific, *localized* site of the body.

Recent technological advances in diagnostic imaging machinery allow *Radiation Oncologists*—doctors who specialize in the planning and delivery of radiation therapy—to map a cancerous site and deliver precise beams of radiation right where you need it most. **Differences *do* exist in the quality of radiation equipment; therefore, patients should *always* look for a treatment facility with the latest diagnostic equipment and radiation machinery.** Radiation therapy is often used in conjunction with surgery and/or chemotherapy.

A brief listing of radiation therapy options follows:

- ***3-D Conformal Radiation Therapy*** – 3-D conformal radiation therapy is an *external* form of radiation therapy utilizing computed tomography (CT) planning to image and reconstruct the tumor and surrounding normal tissues in three dimensions using a computer program. This technology allows the Radiation Oncologist to *conform* the radiation beam(s) to specific target areas, such as the pelvis.
- ***Intensity Modulated Radiation Therapy (IMRT)*** – IMRT represents an advanced form of external 3-D conformal radiation therapy. Employing a powerful computer program to plan the precise dose of radiation in three dimensions, radiation oncologists may vary the *conformance* and *intensity* of ultra-thin radiation beams onto specific cancerous sites. Our cancer experts tell us they are able to use higher radiation doses than traditional methods would allow in these areas, and yet spare more of the surrounding healthy tissue, compared to standard radiation therapy.
- ***Chemotherapy*** – Chemotherapy is a broad term relating to a group of medications designed to damage a cancer cell's ability to grow. *Medical Oncologists*—doctors who specialize in treating cancer with different types of drugs and chemotherapy—oversee this aspect of cancer treatment. You may receive chemotherapy orally or through an intravenous (IV) administration. Chemotherapy may be administered throughout the treatment process. Sometimes, *neoadjuvant chemotherapy*—chemotherapy administered prior to a primary treatment like surgery—can increase the effectiveness of the primary treatment. Likewise, chemotherapy administered *after* a primary treatment, called *adjuvant chemotherapy*, can reduce the likelihood of tumor spread or cancer recurrence.

Unlike radiation therapy, conventional chemotherapy is a *systemic* treatment carried throughout the entire body by the bloodstream. New medications help to control side effects and, with the proper comprehensive team of experts, the side effects can usually be managed and minimized. Chemotherapy is often used in conjunction with surgery and/or

radiation therapy.

Today, you and your doctors may choose from an array of chemotherapies. Each unique case requires the Medical Oncologist to identify the *most effective* form of chemotherapy available to treat your particular form of pancreatic cancer.

Determining the appropriate chemotherapy sometimes requires Oncologists to test tissue samples for **chemosensitivity or chemoresistance**. Chemosensitivity and chemoresistance testing reveal how your cancer cells react to various chemotherapeutic agents *prior* to administering the actual dose. Information obtained via these two tests allows the Oncologist to select only those chemotherapeutic agent(s) that register positive results when delivered to your tissue samples.

Chemotherapy can also be delivered differently to enhance effectiveness:

- **Fractionated Dose Chemotherapy** – Fractionated dose chemotherapy utilizes a standard dose of chemotherapy and divides this standard dosage over a three-to-five day period. The smaller dosages minimize the side effects of this powerful medicine yet maximize the intensity of the treatment by exposing cancerous cells to chemotherapy for a longer period of time.
- **Emerging Therapies** – In the hands of a skilled physician, emerging therapies represent promising new treatment options available in select hospitals across the country. Immunotherapies, including *Monoclonal Antibody Technology (MoAb)*, represent one prominent emerging therapy now available to people with pancreatic cancer. Typically, you and your physicians may turn to an emerging therapy in three different situations: after exhausting all surgical, radiation and/or chemotherapy options; when your physician determines traditional therapies will no longer improve your condition; or when you may benefit from an emerging therapy used in conjunction with other conventional treatments

A brief listing of emerging therapies follows:

- **Monoclonal Antibody Technology (MoAb)** – Monoclonal antibody technology represents one prominent immunotherapy aimed at leveraging the body's natural immune response to recognize, attack and kill cancer cells.

Triggering this immune response requires the presence of a special protein called an *antibody*. Antibodies work like biological “fingerprints.” Upon detecting an *antigen*—a virus, a bacterium or a cancer cell—your immune system responds, deploying white blood cells, or *lymphocytes*, to mark the antigen with an antibody. The antibody clearly identifies the antigen as “FOREIGN” allowing the body to quickly and efficiently target and destroy the abnormality.

Using a laboratory process, scientists can bioengineer large quantities of *pre-programmed* antibodies to recognize and bind to a specific antigen, like a cancer cell. These laboratory-produced monoclonal antibodies can be used alone, or in combination with other therapies to deliver drugs, toxins or radioactive material directly to the cancer cell.

| Special Services

Apart from the four main treatment modalities, some hospitals offer special services such as Guided Nutritional Support and Pain Management programs designed to enhance the effectiveness of a person's therapy.

- **Guided Nutritional Support** – Guided Nutritional Support is a type of clinical nutrition program designed to accomplish three main objectives:
 1. *Address malnutrition* – Studies show fifty percent of people diagnosed with cancer have already lost weight at the time of diagnosis.
 2. *Prevent loss of lean muscle mass* – More than simply losing fat stores, people with pancreatic cancer often lose

lean muscle mass. Losing lean muscle can impact the body's capacity for tolerating chemotherapy and may reduce the body's ability to eliminate toxicities associated with powerful cancer therapies like chemotherapy and radiation.

3. *Enhance strength and quality of life* – Length of hospital stay, response to chemotherapy, wound healing and immune function can be directly linked to a person's nutritional status.

Malnutrition and the loss of lean muscle mass associated with undernourishment account for more than one-third of the annual cancer deaths in the United States. To reverse this trend, the nation's leading healthcare standards-setting organization, the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO), recommends a team approach for administering nutritional support to people living with cancer. Under JCAHO guidelines, a Dietician, together with a Nurse and an Oncologist, should work collaboratively to ensure a person's nutritional needs are met.

Pancreatic cancer impacts the body's normal production of pancreatic enzymes—the same enzymes your body needs to digest and absorb vital nutrients from fats, proteins and carbohydrates. Over time, poor nutrient absorption robs the body of essential vitamins and minerals and may lead to malnutrition and loss of lean muscle mass. The expertise of a Guided Nutrition Support Team can help you benefit from the following care:

1. *Diet Counseling* – During therapy, it's important to monitor the foods you eat. Decrease your consumption of foods high in saturated fats and refined sugars. A registered and licensed Dietician can help you build a customized meal plan rich in soy, fiber and antioxidant-rich foods like spinach, sweet potatoes and carrots.

2. *Vitamin/Mineral and Other Oral Supplementation* – Supplementing your diet with the right types of vitamins, minerals and oral supplements supports healthy cells and can help you better tolerate cancer therapies.

One oral supplement, called Eicosapentanoic acid, or EPA, is derived from oil found in cold water fish like salmon, mackerel and tuna. Studies show 1.5 to 2 grams of EPA per day can help decrease weight loss and, in some cases, help promote weight gain.

3. *Pancreatic Enzyme Replacement Therapy – Cachexia*, the clinical term for the progressive loss of body weight, fat and muscle, occurs when the body cannot absorb nutrients locked inside of the foods you eat. Oral pancreatic enzyme therapy can deliver the pancreatic enzymes needed to assist with proper digestion.

- **Pain Management** – Pain Management is a specialized form of medicine that focuses upon alleviating pain, nausea or any number of other side effects you may experience during treatment. Few hospitals offer a dedicated Pain Management Department—but regardless of this trend, effectively managing any pain a person experiences during therapy is necessary for optimal treatment. Unmanaged pain can interfere with your sleep patterns, lower your appetite and alter your treatment schedule.

Ask your doctor to discuss the Pain Management programs available at your current hospital or at the hospital where you are considering receiving a second opinion consultation