

A PATIENTS GUIDE TO RADIATION THERAPY



About Radiation Therapy

Radiation therapy (also called radiotherapy) is a treatment for cancer that uses high doses of radiation to kill cancer cells and stop them from spreading. Low doses of radiation are used in common activities such as X-rays of your teeth or bones, yet when given in high doses, radiation kills or slows the growth of cancer cells.

Radiation therapy may be used at different times during your cancer treatment and for different reasons:

Before surgery, to shrink a cancerous tumor (neoadjuvant therapy)

After surgery, to stop the growth of any remaining cancer cells (adjuvant therapy)

In combination with other treatments, such as chemotherapy, to destroy cancer cells

In advanced cancer to alleviate symptoms caused by the cancer

Radiation is delivered differently depending on the nature of the cancer. It can be delivered by an external beam using a linear accelerator (linac) or internally, where a source of radiation is placed inside the body (often called brachytherapy). This brochure addresses external beam treatment.

External Beam Radiation Therapy

Radiation therapy is a well-proven treatment for cancer and new advances have made it safer and more effective than ever.

External beam radiation therapy comes from a linear accelerator that aims radiation at your cancer. Most people get external beam radiation therapy once a day, five days a week, Monday through Friday. Treatment lasts for two to 10 weeks, depending on the type of cancer you have and the goal of your treatment. The time between your first and last radiation therapy sessions is called a course of treatment. Radiation may also be given in smaller doses twice a day (hyperfractionated radiation therapy).

YOU SHOULD KNOW:

About 60 percent of people with cancer receive radiation therapy.

Your Radiation Oncology Team

During your treatment, you will have a radiation therapy team made up of people with different specialties and skills. This team will create a specialized treatment plan that is designed to meet your specific needs. Your team may include:

Radiation oncologist

A doctor who specializes in using radiation therapy to treat cancer. He or she prescribes how much radiation you will receive, plans how your treatment will be given, closely follows you during your course of treatment, and prescribes care you may need to help with side effects. After your radiation therapy, you'll see him or her for follow-up visits, and the oncologist will assess how well the radiation has worked.

Radiation nurse

Provides nursing care during radiation therapy, working with all the members of your radiation therapy team. He or she will talk with you about your radiation treatment and help you manage side effects.

Radiation therapist

Works with you during each radiation therapy session to position you for treatment and operate the system to ensure you get the dose of radiation prescribed by your radiation oncologist.

Other health care providers

Your team may also include a dietitian, physical therapist, social worker and others.

You are also part of the radiation therapy team! Radiation treatments are extremely time-sensitive, and adherence to the schedule increases the likelihood of success, improves the efficiency of the department and is considerate of other patients' schedules. Your role is to:

Strictly follow the schedule of treatments and examinations prescribed by your physician

Ask questions and talk about your concerns

Let someone on your radiation therapy team know when you have side effects

Tell your doctor or nurse if you are in pain or if you have other symptoms that may be related either to your cancer or treatment

Follow the advice of your doctors and nurses about how to care for yourself at home



YOU SHOULD KNOW:

Radiation therapy does not hurt while it is being given.

The Treatment Procedure



Planning

Your treatment begins with the planning stage. Before planning your treatment, the radiation oncologist may ask for some diagnostic procedures and imaging to be done. During the planning session with the radiation oncologist and radiation therapist, you will be asked to lie very still while X-rays or scans are taken to define the treatment area. The doctor will use these to make a treatment plan for you.

The treatment plan is created using special software that calculates the beam angles and radiation dose needed for the most effective treatment. Each treatment plan is unique based upon the type, size and location of your cancer.

The total dose of radiation needed to treat the cancer is carefully calculated. The total dose is then divided into many 'fractions' which are delivered as your radiation therapy plan – usually short sessions of radiotherapy treatment on most days each week, for several weeks.

Treatment sessions continue until you have had the total dose of radiation. By having a small fraction of the total dose on many sessions, it is more likely to work better than having the whole dose at one session and it also reduces the severity of side effects.

YOU SHOULD KNOW:

Radiation therapy may be used alone or in conjunction with other forms of treatment.

Preparation

Like planning, you will only need to go through preparation one time. In order to ensure that the radiation hits the selected target with absolute precision you need to be positioned in a secure and comfortable way on the treatment table. There are different types of frames and devices that can be used to help you get into the correct position and hold completely still during the treatment.

The radiation therapist may put tattoos or dots of colored ink on your skin to mark the treatment area, then use them each day to make sure you are in the correct position.

Treatment

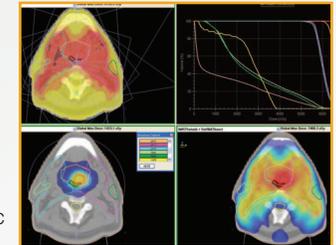
When you begin your treatment program, you will take your place in the fixation device that has been selected and customized for you. Data from the planning and imaging sessions is used to make sure you are in the correct position, and imaging may take place to confirm placement and target information.

When all is ready, the treatment will begin as the linac begins to rotate around you. The movement may be continuous or step by step. The radiation itself is invisible and painless, and you will be fully awake.

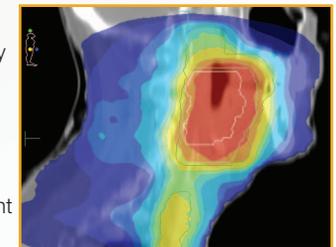
One or more members of your treatment team will monitor everything from outside the treatment room. You can easily communicate with them via intercom, and you have the ability to release your fixation at any time if necessary.

Each session of treatment usually only lasts a few minutes (although it may take several minutes to position you and the machine correctly each time). By emitting the treatment in short bursts from different angles, each burst will pass through different parts of your body on the way to the target. This helps to reduce damage to normal tissues.

Treatment planning



Beam shaping





Follow Up

Most patients attend follow-up clinics following their course of radiation therapy treatments, typically for up to five years. These are held to help manage any post-treatment side effects and to monitor the disease regression or progression.

Always consult your doctor or a member of your medical team if you have any questions.

Possible Side Effects

Side effects can occur with radiation therapy because the high doses of radiation used to kill cancer cells may have also damaged healthy cells in the treatment area. Side effects are different for each person, with some people having more and others barely noticing any. Side effects may be more severe if you also receive chemotherapy to treat your cancer.

Most side effects occur gradually, usually beginning to appear by the second or third week into treatment. They are temporary, but some may continue for weeks or months after your treatment before they subside. Talk to your radiation therapy team about your chances of having side effects and let them know if you have any problems.

Many people who get radiation therapy have skin changes and some fatigue. Other side effects depend on the part of your body being treated and may disappear after about two months of the completion of your treatment.

YOU SHOULD KNOW:

Hair loss generally only occurs at the site of the radiation therapy and is usually temporary.

During radiation therapy, your body will use up more energy than it normally does, causing feelings of fatigue. Additionally, the stress of coping with a serious illness, trips for treatment and the effects of radiation on the body all can cause fatigue. It is common for fatigue to last for 4-6 weeks after your treatment has been completed, after which it will begin to improve.

Skin changes may include dryness, itching, peeling, or blistering. These changes, which are generally temporary, occur because radiation therapy damages healthy skin cells in the treatment area. You will need to take special care of your skin during radiation therapy.

We Chose Elekta

We chose an Elekta system because the company offers the world's most advanced linear accelerators, enabling faster, more accurate treatments. Your radiation therapy treatment will be performed using technology that sets international standards for accuracy and integrated imaging. We will be able to image your tumor at the time and place of treatment. Seeing the tumor at the time of treatment allows for more precise delivery of the radiation beam to the tumor, with less impact on healthy tissue.

Elekta's unique technology supports your physician's ability to safely monitor the delivery of radiation using a highly advanced, fully digital control system which matches the radiation beam to the precise shape of your tumor using an advanced multi-leaf collimator (MLC). Elekta's integrated, ultra low dose imaging technology reduces the total amount of unnecessary radiation you receive.





Glossary of Common Terms in Cancer Treatment:

4-D Radiation Therapy: 4DRT employs advanced technology to track and compensate for target motion during radiation treatment, minimizing normal tissue injury, especially to adjacent critical structures, while maximizing radiation dose to the target.

Adjuvant Therapy: A cancer treatment that comes AFTER your first (or primary) treatment. For example, you may have an operation (surgery), followed by radiation or chemotherapy. The radiation or chemotherapy would be called an adjuvant therapy.

Anemia: A decrease in the number of red blood cells. Signs and symptoms include tiredness, pale skin, shortness of breath.

Biological Response Modifiers: Drugs used to change the body's immune response to cancer cells.

Bone Marrow Transplant: Injecting bone marrow into a patient from either a donor or stored marrow from the patient. This helps people to grow new bone cells after very high doses of chemotherapy and/or radiation therapy.

Brachytherapy: Wires, seeds or needles that have a source of radiation inside them. These wires, seeds or needles are put into a cancer tumor, or into a place where a cancer tumor used to be. They are left there for a period of time.

CBC: (Complete Blood Count) A blood test that measures the number of white blood cells, red blood cells and platelets.

Chemotherapy: The use of drugs to treat cancer, often called chemo.

Clinical Trial: A clinical trial is a research study with cancer patients to learn about new treatments and to find better ways of giving current treatments.

Computed Tomography (CT): A CT scan uses X-rays to produce detailed pictures of structures inside the body. The process is also known as a computerized axial tomography (CAT) scan. The imaging works by using computer processing to generate an image of the absorption of X-rays in a field of view. The field of view is devised as a slice so that a complete examination of the brain or body may be obtained by taking a series of slices, one above the other.

Fractionation: A term used when the total dose of radiation is divided into smaller doses, generally given over a period of days to give normal healthy cells time to heal.

Gamma rays: A type of radiation of shorter wavelength and higher energy than kilovoltage X-rays used for diagnosis characterized by the fact it was generated by a radioactive isotope.

Hormone Therapy: The use of hormones (given as drugs) to treat some kinds of cancer.

Hypofractionation: Small doses of radiation delivered during multiple treatment sessions that extend over several days. Hypofractionation is necessary when the full dose cannot be confined to the target area; use of smaller doses helps to minimize the damage to the tissue around the target, and multiple days allows it to recover from the radiation dose it receives.

IGRT: Image-guided radiation therapy is a technology advancement that enables the use of frequent imaging during a course of radiation therapy to support precision and accuracy in areas prone to movement, such as lungs and prostate gland, as well as for tumors located close to critical organs and tissues.

IMRT: Intensity-modulated radiation therapy is an advanced mode of radiotherapy that allows computer-controlled radiation intensity to be changed (modulated) during treatment to support three-dimensional treatment precision and accuracy.

Isocenter: A point in space defined by the intersection of all the machine-based axis of rotation where radiation is directed in a highly reproducible and accurate way. The isocenter remains constant and therefore is easily quality-assured on a routine basis. A single isocenter consists of many simultaneously delivered beams of radiation.

Linear Accelerator: A machine that is used in radiation treatment that may also be called a linac. It uses high energy x-rays to treat cancer.

Magnetic Resonance Imaging (MRI or MR): MRI provides three-dimensional, or multiplanar, views of an internal organ or structure. MRI offers increased-contrast resolution, enabling better visualization of soft tissues such as the brain and spinal cord.

Metastasis: This is when cancer cells in one place (the breast, for example) spread to other parts of the body such as the liver, bones, lungs or brain.

Multi-leaf Collimator (MLC): A device within a linear accelerator made up of tungsten leaves that can move independently to provide conformal shaping of radiation beams.

Obs or Review Clinic: The weekly visit with the doctor or nurse while you are receiving radiation.

Oncologist: A physician who specializes in the diagnosis and treatment of cancer.

Orthovoltage: A machine used in radiation treatment to treat cancers that are on the surface, or close to the surface, of your body.

Palliative Care: The goal of palliative care is to improve the quality of life for people with cancer and their families.

Radiation Treatment (or therapy): This is the use of radiation to destroy cancer cells. The most common kinds of radiation used are high energy X-rays, gamma rays and electrons.

Radiosurgery: Radiosurgery is the delivery of a single high dose of radiation to a target in a single session by using multiple, focused, finely collimated radiation beams with surgical precision.

Radiotherapy or Radiation Therapy: The use of high-energy radiation from X-rays, gamma rays, neutrons and other sources to kill cancer cells and shrink tumors.

Red Blood Cells: The cells in the blood that carry oxygen to different parts of the body.

SBRT: Stereotactic body radiation therapy is a highly specialized form of external beam radiation therapy combining advanced technology and expert technique. In SBRT, exact localization of tumors enables delivery of precisely focused radiation at higher potency doses and over fewer treatments than conventional radiation therapy, to maximize achievable outcomes with minimal collateral damage.

Simulation (or sim): The initial planning of the radiation treatment that is done on a similar machine to the radiation machine.

Surgery: The use of operating procedures to correct deformities, repair injuries, or remove certain diseased tissues.

X-ray: A form of electromagnetic radiation that creates images as x-ray particles pass through the body.

Web Resources

There is a wealth of information online about cancer and treatment options. The following compilation is intended to help you research your medical condition, find support groups and locate treatment facilities.

Note: Inclusion of these websites and materials does not constitute or imply an endorsement or recommendation.

Cancer

National Cancer Institute

The National Cancer Institute (NCI) is the federal government's principal agency for cancer research and training. Their website has a wealth of information on cancer causes, diagnosis, prevention and treatment. (www.cancer.gov)

American Cancer Society

The American Cancer Society is a nationwide community-based voluntary health organization dedicated to eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering from cancer through research, education, advocacy, and service. With more than two million volunteers nationwide, the American Cancer Society is one of the oldest and largest voluntary health agencies in the United States. (www.cancer.org)

cancerpage.com

cancerpage.com's mission is to inform and empower consumers to lead healthier and higher quality lives when confronted with any form of cancer. cancerpage.com is the most comprehensive website for information on all aspects of cancer and includes direct access to oncology nurses. (www.cancerpage.com)

National Comprehensive Cancer Network

The National Comprehensive Cancer Network (NCCN), an alliance of 19 of the world's leading cancer centers, is an authoritative source of information to help patients and health professionals make informed decisions about cancer care. (www.nccn.com)

Cancer News

Cancer News on the Net® is dedicated to bringing patients and their families the latest news and information on cancer diagnosis, treatment and prevention. (www.cancernews.com)

Brain

American Brain Tumor Association (ABTA)

The American Brain Tumor Association provides information about brain tumors, new treatments and help living with the diagnosis of a brain tumor. (www.abta.org)

The Brain Tumor Society

The Brain Tumor Society exists to find a cure for brain tumors. The organization seeks to improve the quality of life of brain tumor patients, survivors and their families by providing access to psychosocial support, information and resources. (www.tbts.org)

The National Brain Tumor Foundation (NABTC)

NBTF is a national non-profit health organization dedicated to providing information and support for brain tumor patients, family members, and healthcare professionals, while supporting innovative research into better treatment options and a cure for brain tumors. (www.braintumor.org)

North American Brain Tumor Coalition

There are 13 societies that compose the NABTC, a network of charitable organizations dedicated to eradicating brain tumors. (www.nabraintumor.org)

Breast

breastcancer.org

breastcancer.org is a nonprofit organization dedicated to providing the most reliable, complete, and up-to-date information about breast cancer. (www.breastcancer.org)

Susan G. Komen Breast Cancer Foundation

Working through a network of U.S. and international Affiliates and events like the Komen Race for the Cure®, the Komen Foundation is fighting to eradicate breast cancer as a life-threatening disease by funding research grants and supporting education, screening and treatment projects in communities around the world. (www.komen.org)

HER2Support

HER2 stands for human epidermal growth factor receptor 2. HER2 is a gene that helps control how cells grow, divide, and repair themselves. This unique support group seeks to promote education by maximizing the utilization of available resources. (www.her2support.org)

Colorectal

The Colon Cancer Alliance

CCA is an organization of colon and rectal cancer survivors, their families, caregivers, people genetically predisposed to the disease and the medical community. They are a non-profit organization dedicated to patient support, advocacy and education. (www.ccalliance.org)

Gynecologic

Women's Cancer Network

The Women's Cancer Network was developed by the Gynecologic Cancer Foundation and CancerSource for women and their families. (www.wcn.org)

The Gynecologic Cancer Foundation

The Gynecologic Cancer Foundation (GCF) was established by the Society of Gynecologic Oncologists in 1991 as a not-for-profit charitable organization to raise funds to support philanthropic programs to benefit women who have, or who are at risk for, developing a gynecologic cancer. (www.thegcf.org)

Kidney

Kidney Cancer Association

The Kidney Cancer Association funds, promotes and collaborates on research projects; educates physicians and patients about kidney cancer; and advocates at the federal and state levels on behalf of patients. (www.curekidneycancer.org)

Lung

The Lung Cancer Alliance

The Lung Cancer Alliance says they are the only national non-profit organization dedicated solely to advocating for people living with lung cancer or at risk for the disease. (www.lungcanceralliance.org)

Lung Cancer Online

The mission of The Lung Cancer Online Foundation (LCOF) is to improve the quality of care and quality of life for people with lung cancer by funding lung cancer research and providing information to patients and families via the website. Lungcanceronline.org is a comprehensive, annotated directory to Internet information and resources for patients and families. (www.lungcanceronline.org)

Prostate

Prostate Cancer Foundation

The Prostate Cancer Foundation, formerly CapCure, is the world's largest philanthropic source for support for prostate cancer research. The PCF has a single goal: find better treatments and a cure for recurrent prostate cancer. (www.prostatecancerfoundation.org)

Skin

Melanoma Patients Information Page

This page is part of cancerpage.com, a not-for-profit service provided by LifeMetrix Online. This e-health company provides information, systems and tools for patients battling chronic illness. All services are free to patients. (www.mpip.org)