



TrueBeam

Frequently Asked Questions

What is the Varian TrueBeam system?

The TrueBeam® system is an advanced cancer treatment system from Varian Medical Systems that uses high-energy X-rays or electrons to deliver a broad array of powerful cancer treatments with pinpoint accuracy and precision. TrueBeam treatment modalities include radiotherapy, stereotactic radiosurgery (SRS), stereotactic body radiotherapy (SBRT) and RapidArc® radiotherapy, a form of volumetric-modulated arc therapy (VMAT).

TrueBeam uniquely integrates and automates advanced imaging and treatment technologies within a unified architecture. It can monitor and compensate for patient and tumor motion. In many cases, with its high dose delivery rates and integrated RapidArc system, TrueBeam can deliver treatments more quickly, so a patient can potentially spend less time in treatment.

Together these features open the door to new possibilities for the treatment of lung, breast, prostate, head and neck, and many other cancers.

Why would a patient want to be treated with Varian TrueBeam?

The TrueBeam system has become a new standard of care, recognized by medical professionals for giving them the ability to treat a wide range of cancers in numerous ways, many of which were not possible just a few years ago. Here are some of its advantages:

- *Non-invasive.* TrueBeam treatments require no surgery, no incisions, and no post-surgical healing.
- *Speed.* TrueBeam is fast. Some treatments that once took 10 to 30 minutes can now be completed in less than two minutes. That makes for a more comfortable treatment experience, and helps patients get back to normal life quickly each treatment day.
 - The TrueBeam system's faster delivery time can also reduce the chance of tumor motion during treatment, which helps protect nearby healthy tissue and critical organs.
- *Accuracy.* The TrueBeam system treats tumors with pinpoint precision. This accuracy is made possible by the system's sophisticated architecture, which automatically

synchronizes imaging, beam shaping and dose delivery, performing internal accuracy checks every ten milliseconds throughout the entire treatment.

- *Enhanced imaging.* TrueBeam imaging technology can produce the three-dimensional images used to enhance tumor targeting in 60% less time than previous Varian imaging technology. These images can be used to fine-tune a patient's position prior to and even during the treatment process.
- *Motion compensation.* For lung and other tumors subject to respiratory motion, TrueBeam offers respiratory gating and Gated RapidArc®, which make it possible to monitor the patient's breathing and compensate for movement of the tumor during treatment by activating the radiation only when the tumor is in the optimal position for treatment.
- *Designed for patient comfort.* In addition to its impressive technical specifications, TrueBeam has also been designed with patient comfort in mind. It operates quietly and provides built-in music capabilities so patients can listen to music during their treatments. Closed-circuit television systems with two-way audio allow the radiotherapist to monitor the patient continuously and comprehensively from outside the treatment room, and to interact with the patient throughout treatment.

How does radiotherapy work?

An effective treatment for cancer, radiotherapy has been used successfully for many years; currently, nearly two out of every three cancer patients in the U.S. receive some type of radiotherapy during their treatment, according to the American Society for Radiation Oncology (ASTRO).

Radiotherapy works by limiting the ability of cancer cells to grow and spread, disrupting the DNA of these fast-growing cancer cells and preventing them from replicating. If cancer cells can't reproduce, they die and so tumors shrink.

The radiation is generated by a machine called a medical linear accelerator. This machine generates high-energy X-ray beams of varying intensities, which TrueBeam can conform to the three-dimensional shape of a tumor. This allows TrueBeam to maximize the dose to the tumor while minimizing exposure of the surrounding healthy tissue.

Does radiotherapy expose people to radioactive substances?

Many people, when they hear the word “radiation,” think immediately of radioactive substances. However, no radioactive substances are involved in the creation of the beam by a medical linear accelerator. When a linear accelerator is switched “on,” radiation is produced in the form of high-energy X-rays, or photons, and aimed directly at cancer cells. Then, like a flashlight, when the system is switched off, the photon beam disappears.

What happens when a person is treated with radiotherapy?

TrueBeam treatment involves several basic steps: diagnosis, the planning of the individual treatment and the delivery of the treatment.

After the diagnosis, the radiation oncologist takes three-dimensional diagnostic images (usually CT or MRI scans) of the tumor and the area around it and uses them to create a prescription that specifies the dose of radiation needed to treat the tumor, plus constraints to be considered for avoiding nearby tissues and organs. The radiation oncologist then works with a medical physicist to plan the individualized treatment.

After a treatment plan is finalized, the patient receives individualized TrueBeam treatments according to the schedule prescribed in the plan. The total dose of radiation is usually divided into smaller doses (called fractions) that are given daily over a specific time period (e.g., five days a week for six weeks).

During a TrueBeam treatment, the linear accelerator can rotate around the patient to deliver the radiation. The radiation is shaped and reshaped continuously as it is delivered from virtually every angle in a 360-degree revolution around the patient. Sometimes an optical camera is used to monitor breathing patterns to compensate for breathing motion during the treatment. Most treatments usually take only a few minutes a day.

- *Treatment Preparation.* X-rays and/or CT scans may be taken in preparation for planning the treatment. Following these scans, the treatment planning process can take several days, during which the patient need not be present. When the treatment plan is complete, TrueBeam radiotherapy treatments can begin.

- Most cases require a treatment preparation session. If needed, special molded devices that help the patient maintain the same position every day are sometimes developed during preparation. The radiation oncologist may request that tattoos be applied to the patient's skin to assist in aligning the equipment with the target area.
- *Treatment Delivery.* The first TrueBeam treatment session may be longer than subsequent ones so that additional images can be acquired to check the position of the tumor on the day of the treatment. A typical TrueBeam treatment session lasts only a few minutes once the patient has been carefully positioned.
 - Once in the treatment room, the patient is positioned on the treatment table using the previously applied tattoos and any special molded devices that have been prepared. These are used to correctly position the patient and aid in keeping him or her still during treatment.
 - The radiation therapist can use the TrueBeam imager to fine-tune the patient's position very precisely. These conventional X-rays of the targeted area verify the patient is in optimal position before the treatment is administered.
 - The radiation therapist leaves the treatment room before the machine is turned on. TrueBeam rotates around the patient to deliver radiation beams shaped to match the size and shape of the tumor from any angle using a beam-shaping device called a multileaf collimator. This device has 120 computer-controlled mechanical "leaves" or "fingers" that can move to create apertures of different shapes and sizes.

Who are the professionals a patient may typically encounter?

1. A **radiation oncologist** is a doctor who has had special training in using radiation to treat diseases and prescribes the type and amount of treatment. The radiation oncologist may work closely with other doctors and the rest of the healthcare team.
2. A **medical physicist** participates in the planning process so that the machines deliver the right dose of radiation.
3. A **dosimetrist** plans the treatment with the oncologist and the physicist.
4. A **radiation therapy nurse** provides nursing care and may help the patient learn about treatment or how to manage any side effects.

5. A **radiation therapist** sets the patient up for treatment and operates the equipment that delivers the radiation.

What is the difference between radiotherapy (RT) and radiosurgery (SRS or SBRT)?

Radiotherapy is a treatment protocol that uses lower doses or smaller fractions of the total prescribed radiation over a longer period. Radiosurgery uses higher doses or larger fractions of radiation per treatment over a shorter period.

There are two kinds of radiosurgery:

- SRS stands for stereotactic radiosurgery and is mostly used to treat tumors in the brain.
- SBRT stands for stereotactic body radiation therapy, which is used to treat certain cancers throughout the body.

Your health professional will determine the treatment protocol most suited for your individual cancer and diagnosis.

How long is a course of treatments on the TrueBeam system?

Generally, radiotherapy is given five days a week over anywhere from two to six weeks or more. Stereotactic radiosurgery (SRS) or stereotactic body radiotherapy (SBRT) treatments are generally completed in just one to five daily sessions. The length of a course of treatment varies depending on the diagnosis, so patients should ask their radiation oncologists for more specific information.

Does a person become radioactive after treatment?

Not at all. External radiation therapy does not cause anyone's body to become radioactive. There is no need to avoid being with other people because of treatment. Even hugging, kissing or having sexual relations with others poses no risk to them of radiation exposure.

Side effects of radiation therapy most often are related to the area that is being treated. A patient should consult with his or her medical professional to discuss the specific diagnosis, prognosis and possible side effects* from radiation treatment.



*The TrueBeam system may not be appropriate for all cancers. Serious side effects can occur, including fatigue and skin irritation. Treatment times may vary. Patients should ask their doctor if TrueBeam is right for their particular case.

Is a TrueBeam treatment expensive?

The exact cost of radiation therapy will depend on the type and number of treatments a patient needs. Many health insurance policies cover charges for radiotherapy. It's a good idea for patients to talk with their insurers or with their doctor's office staff or the hospital business office about their policy and how expected costs will be paid.

What side effects can a patient expect from TrueBeam treatments?

Many people don't experience side effects from radiation treatments. However, serious side effects can occur, including but not limited to fatigue and skin irritation. Side effects most often affect the treatment site itself but can extend beyond. Patients should ask their doctor what to expect from their specific cancer treatment.

What is unique about treatment using Varian's TrueBeam technology?

Versatility. With its patented beam generation technology and pinpoint accuracy, TrueBeam offers an unmatched level of versatility allowing it to be used to treat many different types of tumors, including those in sensitive areas such as the abdomen, liver, lung, breast, and head and neck.

Ease of Use. Because of its integrated technologies and automation, TrueBeam is easier to use for the treatment team compared with earlier generations of technology. Ease of use makes the more precise types of radiotherapy, such as stereotactic radiotherapy, easier for clinical teams to master.

The Industry Innovation Tool. TrueBeam Developer Mode enables leading academic centers to try new regimens in a non-clinical mode to improve treatments. Developer Mode research projects can serve to incubate new functionality that can be further developed and eventually incorporated into TrueBeam software updates, so that all TrueBeam customers can benefit. It's an evolutionary tool that keeps getting better at treating cancer.



Flexible Architecture. TrueBeam was built with open architecture that allows it to interface easily with complementary technologies that improve disease-specific treatments, whether developed by Varian or by other manufacturers.

The Leader. Varian, the manufacturer of TrueBeam, has been a pioneer in the field of oncology for over 60 years. Varian was the first in the world to offer a linear accelerator for radiation therapy. Now its flagship product, TrueBeam has redefined the industry's standards.