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 St. Luke's Cancer Center

**St Luke's**  
Cancer Center

cancer.sluhn.org  
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## St. Luke's Radiation Oncology

The radiation oncology technologies at St. Luke's Cancer Centers are cutting edge, allowing tighter tumor margins and minimizing injury to surrounding tissues. Radiation oncology services are available at St. Luke's Cancer Centers in Allentown, Bethlehem, Easton and Stroudsburg for all patients from St. Luke's University Health Network hospitals.

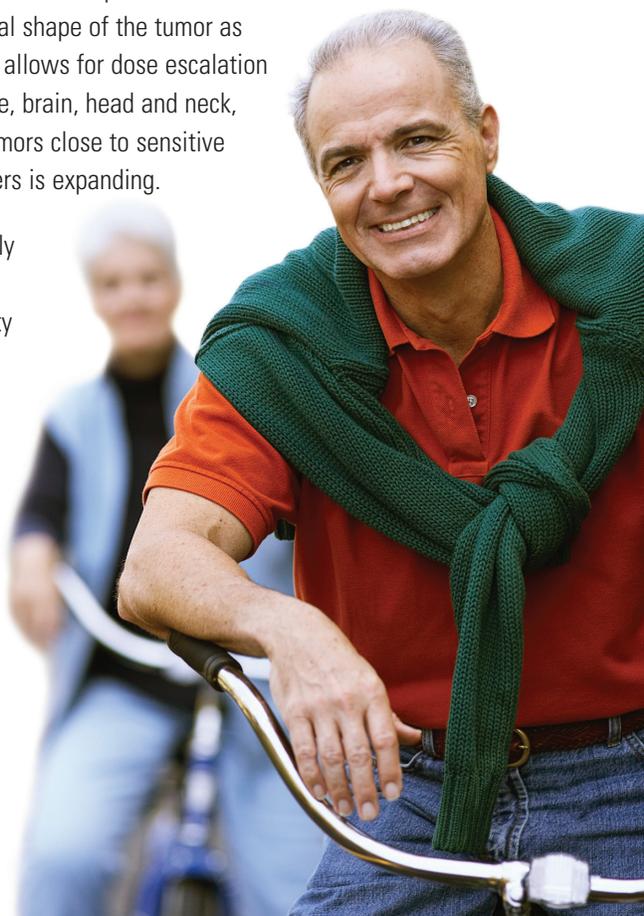
**At St. Luke's, radiation oncologists work closely with a leading team of surgical oncologists, medical oncologists, neurosurgeons, regional physicians, oncology nurses and cancer support staff to ensure patients receive the most up-to-date treatment to allow for the best chance for survival in a time-sensitive manner.**

**External Beam Radiation Therapy (EBRT).** EBRT delivers a beam of high-energy X-rays into the tumor site to destroy cancer cells while sparing surrounding normal tissues. EBRT is typically administered daily for two to eight weeks depending on diagnosis.

**Intensity Modulated Radiation Therapy (IMRT)** with Multileaf Collimation utilizes computer-generated images to plan and deliver more tightly focused radiation beams to tumors than is possible with conventional radiotherapy. This multileaf collimator uses 120 computer-controlled mechanical "fingers" to shape the beam of radiation so that it conforms to the three-dimensional shape of the tumor as defined by the IMRT plan. This technology allows for dose escalation at the tumor site. IMRT is used for prostate, brain, head and neck, and GI cancers and the re-irradiation of tumors close to sensitive organs. IMRT's role in treating other cancers is expanding.

**RapidArc™ Radiotherapy** is an extremely fast, highly precise technology capable of treating more difficult tumors with intensity modulated radiotherapy (IMRT). With RapidArc, beams can be delivered at any angle, so the dose is conformed more closely to the size, shape and location of the tumor while sparing surrounding healthy tissue.

RapidArc is capable of providing a full-circle high-dose deposit in a single rotation. This makes treatment with RapidArc up to eight times faster than other forms of radiation therapy,



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maximizing patient comfort. Applications for RapidArc at St. Luke's Cancer Center have included tumors of the gastrointestinal tract, head and neck, lung, prostate and spine.

Faster treatment time can be especially important for patients who are elderly or physically compromised. Tumor motion is minimized allowing a more efficient and precise treatment with this technique.

**Image-guided Radiation Therapy (IGRT).** St. Luke's was the first hospital in Pennsylvania to offer this fully robotic Dynamic Targeting™ IGRT system which includes real-time radiographic and cone-beam CT images that track motion to ensure the target is in the same position for each treatment session. With IMRT, the radiation beam is shaped so that it closely matches the shape of the tumor. Now, by adding IGRT, the beam will be precisely targeted at the time of daily treatment. This means that, in many cases, margins around the tumor can be reduced, higher doses of radiation can be delivered to the tumor, and more surrounding healthy tissue can be spared. This increases the likelihood of controlling the cancer and helps reduce complication rates.



**Frameless Stereotactic Radiosurgery (SRS).** SRS is considered the most precise method of administering a high dose of radiation to a focal area while minimizing dose to surrounding tissue. This is primarily used for malignant and benign brain tumors. The frameless system uses surface mapping – tracking a patient's facial features during treatment – allowing SRS to be performed without using traditional frame-based immobilization devices. This provides a more comfortable and faster treatment and recovery experience.

**Stereotactic Radiotherapy (SRT).** SRT is known as fractionated radiosurgery. This is because a fraction of the total radiation dose is delivered over the course of several treatments. In some cases of brain, spine and lung tumors, two to five fractionated stereotactic treatments are utilized.

**TrueBeam STX™ Linear Accelerator.** This technology can be utilized for Frameless Stereotactic Radiosurgery (SRS) and radiation therapy, opening the door to new possibilities in the treatment of challenging cancers throughout the body, including those in the brain, spine, lung, liver, pancreas and prostate with speed and accuracy. Treatments using TrueBeam have the potential to greatly enhance patient comfort, because the treatment time is significantly shorter than was possible with earlier industry-leading technologies. This means there is less time for tumor motion during dose delivery, making it possible to deliver more powerful cancer-fighting radiation to aggressive tumors with even greater precision.

**Trilogy™** is available through St. Luke's Cancer Center for the treatment of malignant and non-malignant brain tumors and tumors of the lung and spine. The Trilogy system is optimized for both conventional and stereotactic methods to treating cancer, including stereotactic radiosurgery (SRS).

**St. Luke's is first in the region to offer Frameless SRS for brain tumors, providing a more comfortable and faster treatment and recovery experience.**



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**Respiratory Gating** allows us to continually monitor the movement of a tumor during normal breathing, so radiation can be delivered when it is in position. The treatment turns off when the tumor is not on target.

**4D CT** technology provides a faster, more accurate scan of a tumor than ever before by capturing its location and movement. This allows us to design more accurate treatments for moving tumors during the breathing cycle. This is especially helpful for lung tumors.

**Optical Surface Monitoring System (OSMS).** St. Luke's was first in the region to bring surface monitoring system treatment integration to the area. With this technology, the machine is fully integrated with the movement of the patient and can stop the beam when the tumor is not on target. This technology is critical for delivery of frameless radiosurgery. It is also being used for left-sided breast cancer treatments for cardiac sparing.

**Partial breast irradiation** is a form of treatment that delivers radiation to the breast lumpectomy site only. This option offers fewer days of treatment and less radiation to normal tissue. This treatment is available to select patients who meet certain criteria. This technique can be used with external beam or breast brachytherapy.

**Brachytherapy** involves the placement of radioactive sources into a body cavity or malignant tumor/mass. Since the radiation penetrates short distances only, the surrounding healthy tissue is spared. The procedure is usually performed on an outpatient basis. Currently, St. Luke's offers high dose rate brachytherapy for gynecologic malignancies and certain types of breast cancer.

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**St. Luke's University Health Network has been recognized for high quality and safety in Radiation Oncology, earning a three-year accreditation by the American College of Radiology (ACR).**

To achieve ACR accreditation, a facility's personnel qualifications, equipment requirements, quality assurance and quality control procedures go through a rigorous review process and meet specific qualifications.

**Intraoperative Radiation Therapy (IORT) for breast cancer.** INTRABEAM® IORT technology spares some women with early stage breast cancer weeks of radiation therapy. It is appropriate for select patients with early stage breast cancer who are candidates for breast-conserving surgery. Using low-energy X-rays, INTRABEAM is administered to the tumor bed at the time of lumpectomy before the incision is closed.

Some early breast cancers may be treated with only a single treatment, while other breast cancers may require additional standard radiation therapy, but over a shorter time period. In either case, if women are candidates for IORT, they may get back to their life quicker.

**Selected Internal Radiation Therapy (SIR-Spheres)** for inoperable liver tumors is available through St. Luke's Interventional Radiology Department and St. Luke's Radiation Oncology Department. The U.S. Food and Drug Administration-approved therapy is for patients with primary colorectal cancer that has spread to the liver and has failed to respond to chemotherapy. Radioactive micro-spheres are inserted directly into the liver artery that supplies the tumor. The micro-spheres irradiate the tumor internally leading to the destruction of the tumor.

SIR-Spheres deliver much more radiation directly to the tumor than is possible with conventional external-beam radiation, and SIR-Spheres leave most of the normal liver tissue unaffected. Quality of life may improve and life expectancy may increase for patients who have the procedure. For a small number of patients, SIR-Spheres can cause significant shrinkage of the liver tumor, allowing for surgical removal at a later date.

**Radioimmunotherapy** is a promising new area of cancer treatment that combines the targeting power of antibodies with the therapeutic ability of targeted radiation. Zevalin, a radioimmunotherapy treatment for follicular, non-Hodgkin's lymphoma is offered through St. Luke's Nuclear Medicine Department. The therapy has shown an impressive rate of complete and durable remissions in patients who had relapsed following, or failed to respond to, both chemotherapy and Rituximab therapy. Zevalin is a dual-action treatment that pairs the tumor-targeting ability of a cancer-killing antibody with the therapeutic potential of radiation in patient-specific dosing. Zevalin is administered in a single, short course of therapy. The treatment initiates an immune response against the cancer and delivers a dose of radiation directly to the tumor cells.

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