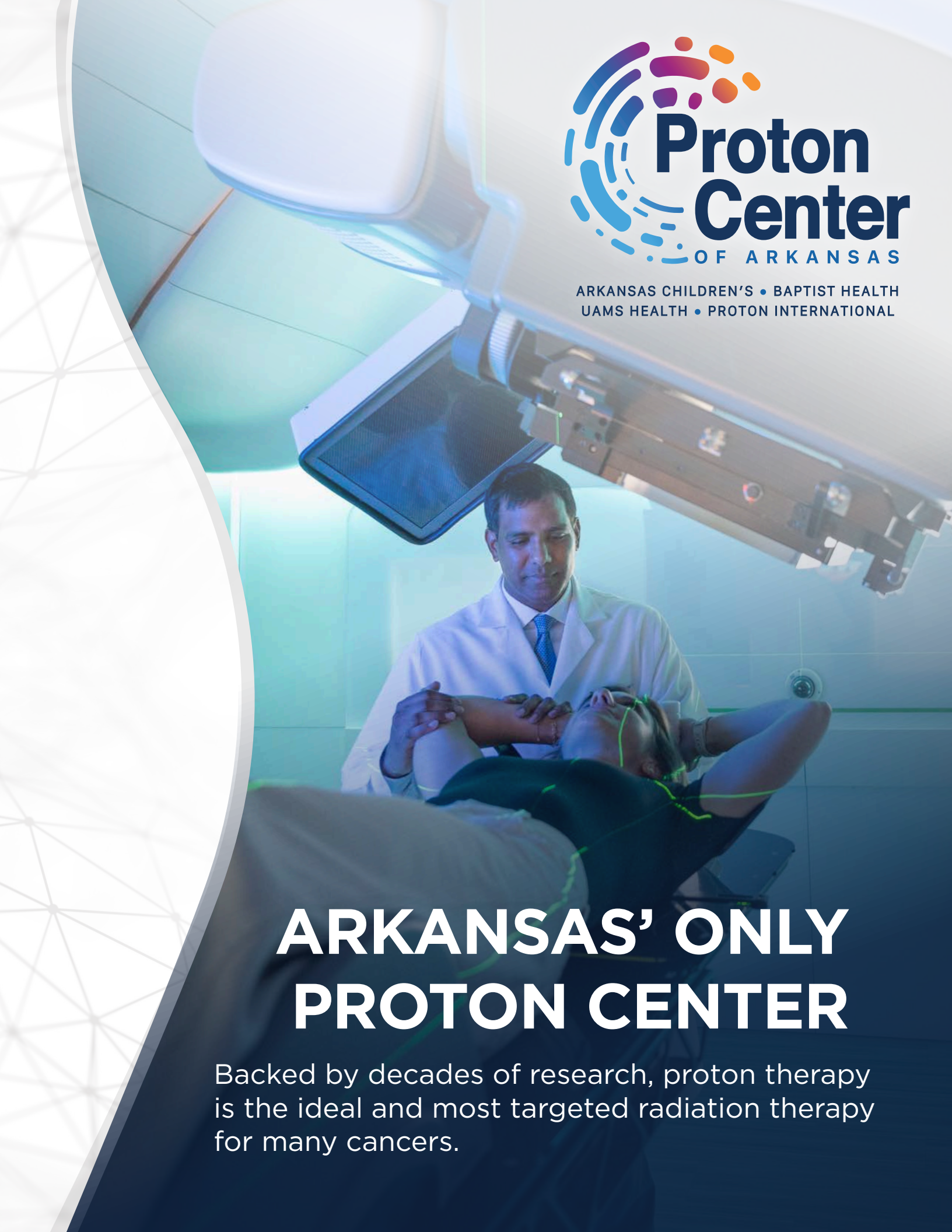


Proton Center
OF ARKANSAS

ARKANSAS CHILDREN'S • BAPTIST HEALTH
UAMS HEALTH • PROTON INTERNATIONAL

ARKANSAS' ONLY PROTON CENTER

Backed by decades of research, proton therapy is the ideal and most targeted radiation therapy for many cancers.

The Proton Center of Arkansas is a collaboration of UAMS Health, Arkansas Children's, Baptist Health and Proton International.

The Proton Center of Arkansas at the University of Arkansas for Medical Sciences (UAMS) brings proton therapy to Arkansas for the first time. Part of the expanded Radiation Oncology Center at the UAMS Winthrop P. Rockefeller Cancer Institute, proton therapy is a vitally important treatment for your patients as part of a comprehensive, multidisciplinary cancer treatment approach.

We believe cancer care in Arkansas must move forward.

Until now, too many Arkansans with cancer have been forced to travel out of state for the lifesaving treatment they need – at least those with the resources to venture beyond the state's borders for help.

Imagine you or your child have cancer. The most effective treatment — proton therapy — requires daily treatment for six to eight weeks. You have family and work responsibilities. Your child may be at a critical point in school. Imagine the stress of being treated miles away from what feels familiar and safe, in a strange city where you have no support system. And you're sick.

That was the experience of hundreds of Arkansas families who had to travel out of state for proton therapy, an advanced form of radiation therapy known for its effectiveness in destroying solid tumors with fewer debilitating side effects than conventional X-ray radiation.

> **As the state's leading health care systems, our eyes are wide open to the devastating impact of rising cancer rates and deaths in Arkansas. We take our shared responsibility to improve patient health seriously and recognize that no area of health care needs our attention more than cancer.**

That's why we came together to build the Proton Center of Arkansas. A collaboration of visionary leaders from UAMS Health, Arkansas Children's, Baptist Health and Proton International, the Proton Center is a marvel in innovative cancer treatment with therapies that rival any cancer center in the world.

Located in the UAMS Radiation Oncology Center, the Proton Center of Arkansas is a testament to our state's health care leadership and our commitment to making higher quality, enhanced care more accessible here at home. It's a giant leap forward in the quality of care we can provide to our collective 2.5 million patients in Arkansas and surrounding areas.

We welcome the opportunity to talk to you about proton therapy and how it can benefit your patients. See it for yourself and come for a tour.

Give us a call at 501-664-4568 or visit ProtonCenterofArkansas.com.

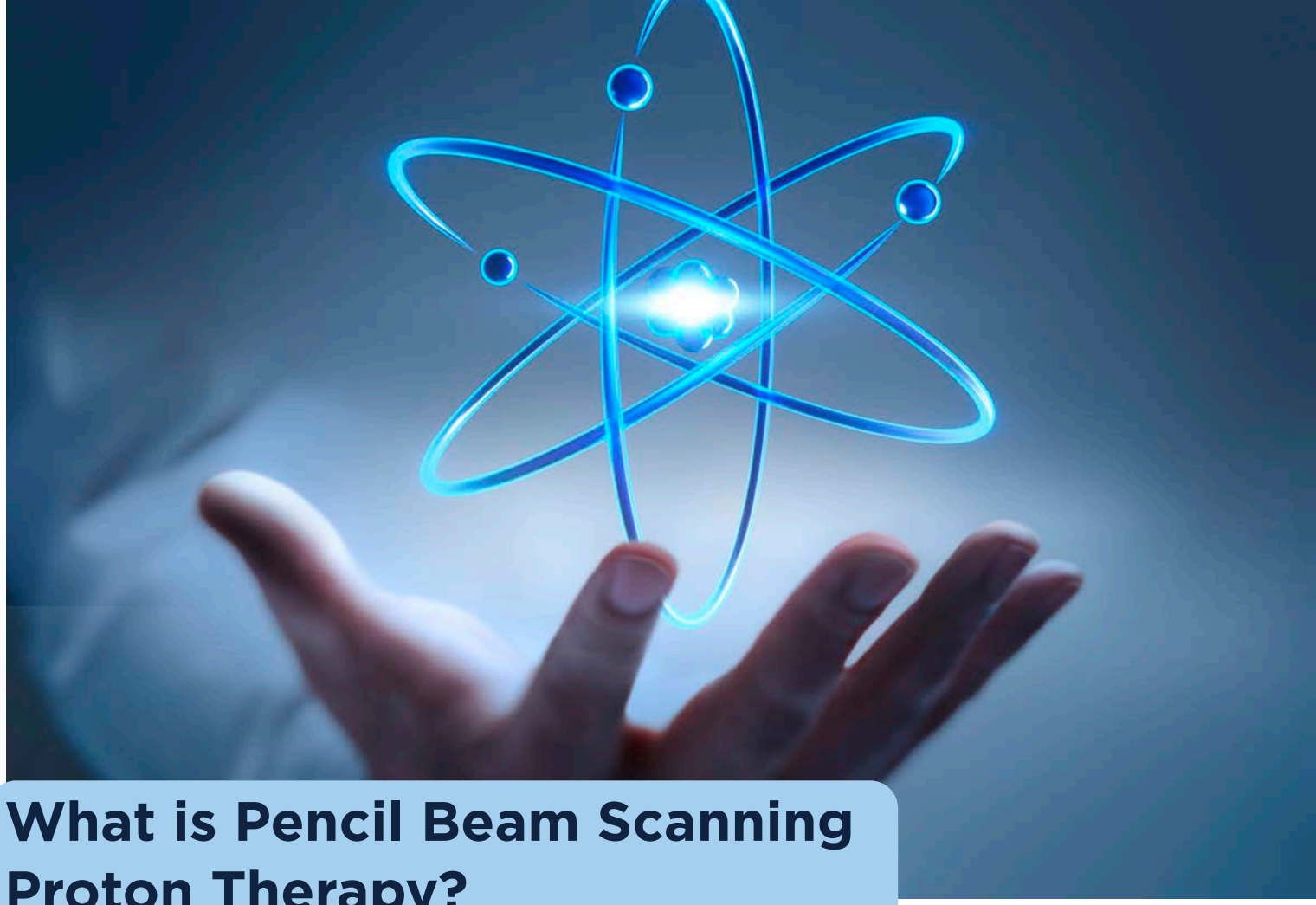
Proton Therapy. Precision. Protection. Peace of Mind.

UAMS Health

Arkansas Children's
HOSPITALS · RESEARCH · FOUNDATION

Baptist Health

PROTON INTERNATIONAL



What is Pencil Beam Scanning Proton Therapy?

Proton therapy uses a high-energy beam of charged particles to deliver cancer-killing energy precisely to a tumor site.

Different from conventional X-ray or photon radiation — in which external beam energy damages tissue along its entire course as it passes through the body — protons can be fine-tuned to deliver maximum dose and energy at the target site, regardless of its size, shape or depth - within millimeters of accuracy.

Compared to X-rays, proton therapy can limit toxicity to normal tissues, which allows for higher radiation doses to tumors and higher cure rates in some cancers. There is virtually no exit dose with proton therapy, permitting maximal sparing of normal tissues and reducing this cancer treatment's associated side effects. Less toxicity to healthy tissues is important and simply better for patients in the short and long term.

There are more than 800 published clinical studies on proton therapy. Recent research published in JAMA Oncology found that patients receiving proton therapy are two-thirds less likely to experience side effects requiring hospitalization than those receiving traditional X-ray or photon radiation.

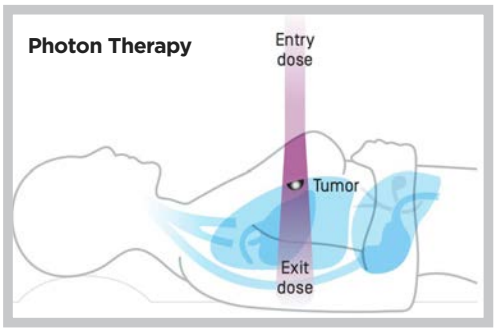
Pencil Beam Scanning Proton Therapy vs. Other Radiation Therapies

The two main differences between proton therapy and other radiation treatments are the beam types used and the precision they offer.

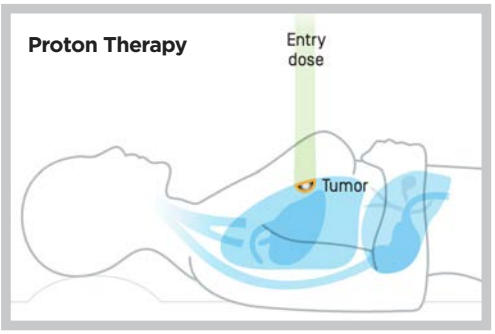
Proton therapy uses high-energy, accelerated particles instead of X-ray beams to treat cancer. Proton beams are more precise than X-ray beams, allowing more dose to be delivered with minimal damage to nearby healthy tissue and vital organs.

As the X-ray radiation beams enter and exit the body, tissues along the path of the beams are exposed. The "entrance dose" and "exit dose" are necessary evils when X-rays are used since they pass right through the body, delivering dose along the way. The desire for a less harmful treatment prompted physicists and radiation oncologists to explore radiation therapy using protons.

An additional benefit to the nature of proton beams is the ability to customize the beam to attack a tumor's unique shape and size. Using a millimeters wide proton beam directed by powerful magnets, the dose is painted inside the target area - much like 3-D printing inside the patient's body. This Pencil-Beam Scanning proton therapy technique - utilized at the Proton Center of Arkansas - is only available at the most sophisticated and cutting-edge proton centers worldwide.



Deposits most of its energy outside the tumor



Deposits most of its energy inside the tumor

Proton therapy - as compared to even conformal X-ray/photon treatments - substantially reduces exposure of normal tissues like the heart and lungs during a course of radiotherapy. The sparing achieved is often dramatically better than IMRT (conformal X-rays) while delivering the same or higher dose to the tumor.

Scan to review the latest clinical studies on proton therapy

protoncenterofarkansas.com

Clinical Benefits

Better precision, fewer side effects in the same or fewer treatments.

Advantages of proton therapy over conventional X-ray therapy include:

- The ability to conform to the size, shape and depth of a tumor
- The ability to stop within the targeted area with virtually no exit dose
- Less damage to nearby healthy tissue
- Fewer short- and long-term side effects
- Lower risk of secondary cancers caused by treatment
- Improved quality of life during and after radiation
- Effective against recurring tumors even if radiation has been given before

Better Clinical Outcomes

69%	**two-thirds reduction in acute side effects for patients treated with chemotherapy and radiation therapy together.**[1]
33%	**relative reduction in requirement of a feeding tube during and after treatment for patients receiving chemoradiotherapy for oropharyngeal cancer.**[2]
31%	**increase in disease control for aggressive tumors at the base of the skull at five years.**[3]
30.5%	**increase in overall survival at two years for patients with hepatocellular carcinoma.**[4]
26%	**increase in ability to perform normal daily work activities even at 2 years post-treatment for patients receiving chemoradiotherapy for oropharyngeal cancer.**[5]
24.6%	**increase in overall survival at five years in patients with head and neck paranasal sinus and nasal cavity cancer.**[6]
10%	**increase in overall survival at five years in stage I-III esophageal cancer.**[7]
9%	**increase in overall survival at five years in stage II-III non-small cell lung cancer.**[8]

[1] Baumann, BC et. al. *JAMA Oncology,* 2020: 6:237-246.

[2] Steven J. Frank et al., Phase III randomized trial of intensity-modulated proton therapy (IMPT) versus intensity-modulated photon therapy (IMRT) for the treatment of head and neck oropharyngeal carcinoma (OPC). JCO 42, 6006-6006(2024).

[3] Ares, C. et. al. *International Journal of Radiation Oncology, Biology, Physics,* 2009: 75(4) 1111-1118.

[4] Sanford, NN et. al. *International Journal of Radiation Oncology, Biology, Physics*, 2019: 105(1) 64-72.

[5] Smith, G. L., Fu, S., Ning, M. S., Nguyen, D. K., Busse, P. M., Foote, R. L., Garden, A. S., Gunn, G. B., Fuller, C. D., Morrison, W. H., Chronowski, G. M., Shah, S. J., Mayo, L. L., Phan, J., Reddy, J. P., Snider, J. W., Patel, S. H., Katz, S. R., Lin, A., ... Frank, S. J. (2021). Work outcomes after intensity- modulated proton therapy (IMPT) versus intensity-modulated photon therapy (IMRT) for oropharyngeal cancer. International Journal of Particle Therapy, 8(1), 319-327.

[6] Patel, SH et. al. *Lancet Oncology,* 2014: 15(9) 1027-38.

[7] Xi, M et. al. *International Journal of Radiation Oncology, Biology, Physics,* 2017: 99(3) 667-676.

[8] Higgins, KA et. al. *International Journal of Radiation Oncology, Biology, Physics,* 2017: 97(1) 128-137.

Who Is a Candidate for Proton Therapy?

Proton therapy may be a treatment option for your patient depending on factors such as:

- The type and size of cancer
- The cancer's location and how close it is to other critical organs or tissues
- The nature of previous treatments the patient has received
- Patient age and overall health, including other health conditions

A UAMS radiation oncologist must evaluate all potential patients for proton therapy treatment.

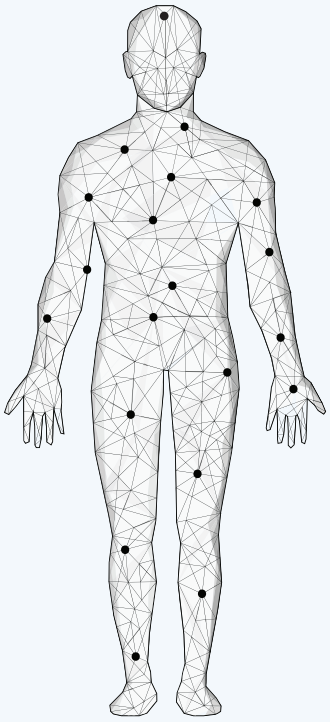
The Proton Center of Arkansas is one of only 45 proton centers nationwide.

Pediatric Cancers

Radiation therapy is an important component of the treatment for many pediatric tumors; however, it has side effects that are important to consider in children.

Normal cells, tissues and developing organs can also feel the effects of radiation. Children with cancer receive treatment while they are still growing and developing, and their cells are still dividing. Depending on the area treated, radiation can cause cognitive problems, hearing loss, lung scarring, kidney failure, infertility, hormonal problems, short stature, asymmetric bone growth, scoliosis, secondary cancers, and heart failure, among other side effects. Long-term side effects can happen many years after radiation. Therefore, pediatric cancer survivors are more likely to have minimal side effects from radiation - not only because their tissues may be more sensitive, but because they have the rest of their lives to be affected.

Pediatric cancers that can be treated with proton therapy include:



Brain Tumors:

- Atypical Teratoid Rhabdoid Tumor
- Craniopharyngioma
- Ependymoma
- Germ Cell Tumor
- Glioma
- Medulloblastoma
- Pineoblastoma
- Supratentorial Primitive Neuroectodermal Tumor

Head & Neck Cancers:

- Nasopharyngeal Carcinoma
- Neuroblastoma
- Parotid Carcinoma
- Retinoblastoma

Sarcomas:

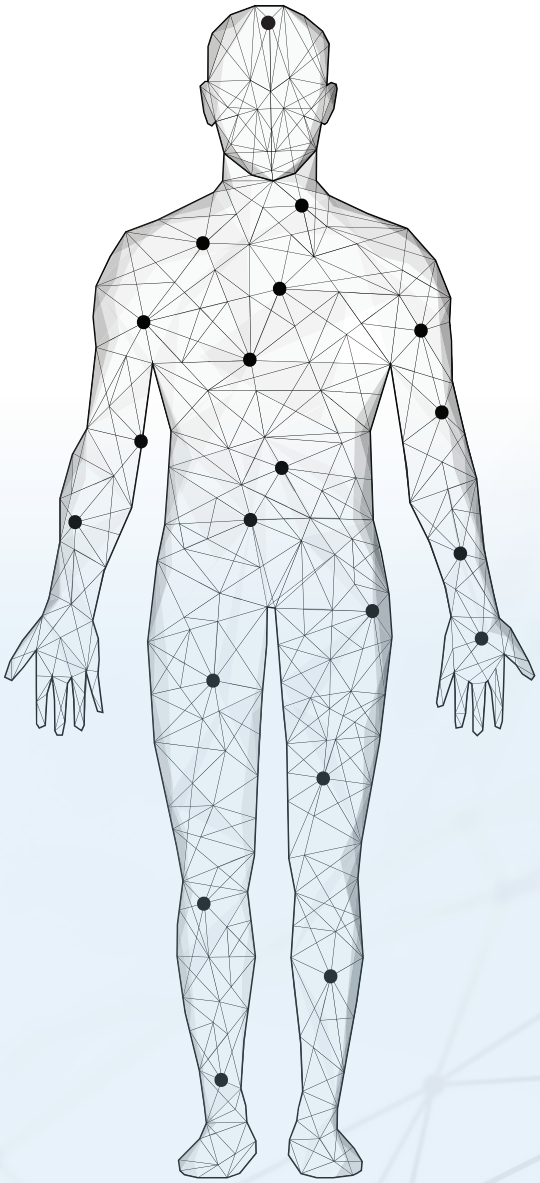
- Chondrosarcoma
- Ewing Sarcoma
- Fibrosarcoma
- Leiomyosarcoma
- Liposarcoma
- Osteosarcoma
- Rhabdomyosarcoma
- Synovial Sarcoma
- Wilms Tumor

“Proton therapy is the preferred treatment for children due to reduced secondary cancer and neurocognitive risks and decreased acute and chronic side effects.”

Kahalley Peterson, Ris. et al. Journal of Clinical Oncology, 2020

Adult Cancers

Proton therapy is a treatment option for adults with benign and malignant tumors in many different areas of the body. Only a radiation oncologist experienced in proton therapy can determine if it is right for an individual patient, but the most commonly treated tumors develop in these areas:



- Bone
- Brain
- Breast
- Esophageal
- Eye
- Head and Neck
- Liver
- Lung
- Lymphomas
- Pancreatic
- Prostate
- Sarcomas
- Skull
- Spine

“Proton therapy reduces radiation dose to the heart and lungs, preventing long term cardiac toxicity for patients with breast cancer.”

Kahalley Peterson, Ris. et al. Journal of Clinical Oncology, 2020

Proton Therapy Physician Referrals and Consults

Consults scheduled within 48 hours; patients seen within five working days

We want to work closely with you to answer your questions and ease the referral process. To schedule a physician-to-physician consult or make a referral:

- **Call 501-664-4568 or toll-free 800-371-7996**
- **Fax: 501-686-5753**

The Proton Center of Arkansas is located within the new UAMS Radiation Oncology Center on the UAMS campus at 3900 W. Capitol Ave. in Little Rock. The center is in a building connected to the UAMS Winthrop P. Rockefeller Cancer Institute. Visit maps.uams.edu for 3D and printable maps.

Hours: Monday-Friday, 7 a.m. to 4 p.m.

3900 W. Capitol Ave.
Little Rock, Arkansas 72205

Insurance Coverage

Proton therapy is covered by many federal and commercial insurance plans including coverage for certain conditions. A billing specialist is available to answer any questions and assist patients through the insurance process.

The Proton Center of Arkansas Team

We have an incredible team at the Proton Center of Arkansas. Our team of experienced medical physicists, dosimetrists, radiation therapists and nurses work closely with our physicians to ensure patients receive the most effective and safest care possible.

Our team of radiation oncologists specialize in certain cancer types. Many of them have more than 30 years of experience and training from the top medical schools in the country, including Harvard, Duke, Vanderbilt, MD Anderson, and the University of Kansas. They've held positions at the Cleveland Clinic, University of Florida Health Proton Therapy Institute, Maryland Proton Treatment Center, McLaren Proton Therapy Center and Shanghai Proton Center.

Director Fen Xia, M.D., Ph.D., is a fellow of the American Society of Radiation Oncology, a designation given to only 4% of the organization's 10,000+ members.

Why Choose The Proton Center of Arkansas?

Comprehensive care: What distinguishes our program from others is our expertise and ability to offer every cancer treatment option available. It is unique for a cancer center to offer both proton and photon radiation side by side, in addition to an array of complex treatment options that are relatively unique and are often not available at other cancer centers in Arkansas.

Advanced imaging technology: The Proton Center of Arkansas has the latest imaging technology integrated into proton therapy units. We have a Philips Spectral CT, also known as dual-energy CT, which provides greater tumor visibility and tissue information than a conventional CT and reduces the number of CTs required for a patient. Dual-energy CT works in tandem with proton therapy to improve dose calculation accuracy.

Access to clinical trials: We are committed to advancing the standard of proton therapy care through research. At the Proton Center of Arkansas, your patients have access to clinical trials examining the latest treatments not available at most other cancer centers.

Clinical research leadership: Providing this innovative treatment gives us unlimited opportunities to continue research and clinical trials on proton therapy for new and expanded uses in cancer treatment.

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