Approved by: Optum Medical and Pharmacy Subcommittee	**Effective Date:** 10/01/25
Clinical Policy Document: Radiation Therapy, Particle Beam	**Date Approved:** 09/10/25
Reference #: MC/L024	**Replaces Effective Clinical Policy Dated**: 09/28/24

TABLE OF CONTENTS

Plans In Scope 1

Background & Purpose: 1

Proton Beam 2

Neutron Beam 2

Coverage Indications: 2

Proton Beam Therapy 2

Exclusions 3

Neutron Beam Therapy 3

Exclusions 3

Medical Records Documentation 3

Definitions 3

Applicable Codes 3

Proton Beam Therapy 4

Neutron Beam Therapy 4

Policy/Revision History 5

References: 5

Proton Beam 5

Neutron Beam 6

PLANS IN SCOPE

Aspirus Health Plan

BACKGROUND & PURPOSE:

Particle beam therapy is a form of radiotherapy where beams of protons or neutrons are used for cancer treatment. Proton therapy is the most common type of particle beam therapy. At this time neutron beam therapy has extremely limited applications.

Proton Beam

Proton beam therapy (PBT) is a type of cancer treatment that uses protons (positively charged particles found in the nucleus of an atom) to target tumors in the body. PBT delivers radiation to a tumor with less collateral damage than traditional radiation therapy. The majority of the energy is delivered just below the tissue surface and the remainder delivered across the beam path to the target and then out of the body. PBT can be scattered (broadened beam energy) or scanning (swept laterally). Scanning can be combined with magnets to vary the energy and extent of the beam, and this is called Intensity Modulated Proton Therapy (IMPT).

Neutron Beam

Neutron beam therapy is a radiotherapy that uses neutrons (neutrally charged particles) to target tumors. Neutrons beam therapy is used for tumors with low oxygen levels and a slower cell division cycle. Neutrons produce 20-100 times more energy than photon radiation but may cause more damage to surrounding tissues than traditional photon (x-ray) radiation.

Studies have shown that better local control of salivary cancers was achieved from neutron vs photon therapy; however, the risk of late effects is high and increases over time. Neutron therapy is no longer routinely recommended for treatment of salivary gland cancers and there is only one center in the United States that continues to offer this treatment.

The intent of this policy is to provide coverage guidelines for PBT and NBT.

Please refer to the member's benefit document for specific information. To the extent there is any inconsistency between this policy and the terms of the member's benefit plan or certificate of coverage, the terms of the member's benefit plan document will govern.

COVERAGE INDICATIONS:

General coverage indications

- All healthcare services must be ordered by a provider
- All healthcare services must be medically necessary
- All applicable conservative treatments must have been tried

Proton Beam Therapy

PBT is appropriate for multiple body sites (head and neck, breast, thoracic, abdominal, liver, genitourinary, and pelvic) and should be used in cases when sparing surrounding normal tissue provides extra clinical benefit. Populations must meet one of the following (I-III):

I. The target volume is near one or more critical structures AND a steep dose gradient is needed to avoid exceeding the tolerance dose to the critical structure(s).
II. A proton-based technique would reduce the total radiation dose delivered to the target and lowering the dose would place the target or organs at risk and/or a higher dose would be associated with toxicity.
III. The same or an immediately adjacent area has been previously irradiated, and the dose distribution must be adjusted to avoid exceeding the cumulative tolerance dose of nearby normal tissue

Exclusions

Cases are dependent on location and potential toxicity. There is inadequate safety or efficacy information in lymphoma at this time.

Neutron Beam Therapy

Treatment with neutron beam therapy is only medically necessary for any of the following salivary gland tumors:

I. Inoperable tumor
II. Locally advanced tumor especially in persons with gross residual disease
III. Recurrent neoplasms
IV. Unresectable tumor

Exclusions

There is inadequate safety and/or efficacy data in the following populations:

I. Colon cancer
II. Dermatofibrosarcoma protuberans
III. Ghost cell odontogenic carcinoma
IV. Glioma
V. Kidney cancer
VI. Laryngeal cancer
VII. Lung cancer
VIII. Pancreatic cancer
IX. Prostate cancer
X. Rectal cancer
XI. Soft tissue sarcoma.

Medical Records Documentation

Benefit coverage is determined by review of member specific benefit plan information and all applicable laws. Medical records documentation may be required to assess if the member meets criteria; however, provision of records does not guarantee coverage.

DEFINITIONS

Cumulative tolerance dose: The maximum amount of radiation that tissue can tolerate without damage across the planned treatments or exposure

Radiation therapy: Use of high-energy particles or waves to destroy or damage cancer cells. Radiation therapy works by injuring DNA inside the cancer cells to keep them from growing and dividing. Radiation therapy can also damage surrounding normal or healthy cells.

APPLICABLE CODES

Note: The code list below is provided for guidance. Not all procedures will contain these codes. Code coverage will depend on coverage guidelines above. All intrauterine procedure coverage requests will require medical review.

Proton Beam Therapy

Code Type	Code	Description
77014	CPT	Computed tomography guidance for placement of radiation fields
77263	CPT	Therapeutic Radiology Treatment Planning; complex
77290	CPT	Therapeutic radiology simulation-aided field setting; complex
77293	CPT	Respiratory motion management simulation (List separately in addition to code for primary procedure) .
77321	CPT	Special teletherapy port plan, particles, hemi body, total body
77295	CPT	Therapeutic radiology simulation-aided field setting; 3-dimensional
77301	CPT	Intensity Modulated Radiation Therapy (IMRT) plan, including dose-volume histograms for target and critical structure partial tolerance specifications.
77338	CPT	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan.
77387	CPT	Guidance for localization of target volume for delivery of radiation treatment delivery, includes intrafraction tracking, when performed
G6001	HCPCS	Ultrasonic guidance for placement of radiation therapy fields
G6002	HCPCS	KV imaging- Stereoscopic X-ray guidance for localization of target volume for the delivery of radiation therapy
G6017	HCPCS	Intra-fraction localization and tracking of target or patient motion during delivery of radiation therapy (e.g., 3-D positional tracking, gating, 3-D surface tracking), each fraction of treatment

**CPT® is a registered trademark of the American Medical Association*

Neutron Beam Therapy

Code Type	Code	Description
61796	CPT	Stereotactic radiosurgery (particle beam, gamma ray or linear accelerator); 1 simple cranial lesion
61797	CPT	each additional cranial lesion, simple (List separately in addition to code for primary procedure)
61798	CPT	1 complex cranial lesion
61799	CPT	each additional cranial lesion, complex (List separately in addition to code for primary procedure)
77423	CPT	High energy neutron radiation treatment delivery, 1 or more isocenter(s) with coplanar or non-hyphencoplanar geometry with blocking and/or wedge, and/or compensator(s)

**CPT® is a registered trademark of the American Medical Association*

POLICY/REVISION HISTORY

Date	Summary of Changes	Approval By
09/10/25	Initial Policy Development	Optum Medical and Pharmacy Subcommittee

REFERENCES:

Proton Beam

American Society for Radiation Oncology. (n.d.) Model policies: Proton beam therapy (PBT). www.astro.org. Accessed 08/27/25.

Araya, M., Ishikawa, H., Nishioka, K., Maruo, K., Asakura, H., Iizumi, T., Takagi, M., Murakami, M., Azuma, H., Obara, W., Aoyama, H., & Sakurai, H. (2023). Proton beam therapy for muscle-invasive bladder cancer: A systematic review and analysis with Proton-Net, a multicenter prospective patient registry database. Journal of radiation research, 64(Supplement_1), i49–i58. https://doi.org/10.1093/jrr/rrad027

Bae, S. H., Jang, W. I., Mortensen, H. R., Weber, B., Kim, M. S., & Høyer, M. (2024). Recent update of proton beam therapy for hepatocellular carcinoma: a systematic review and meta-analysis. Journal of liver cancer, 24(2), 286–302. https://doi.org/10.17998/jlc.2024.06.26

Bharathi R, P., Ms, A., & Kamath, A. (2023). A Systematic Review of the Economic Burden of Proton Therapy in Head and Neck Cancer. Asian Pacific journal of cancer prevention : APJCP, 24(11), 3643–3653. https://doi.org/10.31557/APJCP.2023.24.11.3643

Chen, Y., Luo, H., Liu, R., Tan, M., Wang, Q., Wu, X., Du, T., Liu, Z., Sun, S., Zhang, Q., & Wang, X. (2023). Efficacy and safety of particle therapy for inoperable stage II-III non-small cell lung cancer: a systematic review and meta-analysis. Radiation oncology (London, England), 18(1), 86. https://doi.org/10.1186/s13014-023-02264-x

Dong, M., Wu, J., Wu, R., Wang, D., Liu, R., Luo, H., Wang, Y., Chen, J., Ou, Y., Zhang, Q., & Wang, X. (2023). Efficacy and safety of proton beam therapy for rhabdomyosarcoma: a systematic review and meta-analysis. Radiation oncology (London, England), 18(1), 31. https://doi.org/10.1186/s13014-023-02223-6

Elkhamisy, S. A., Valentini, C., Lattermann, A., Radhakrishna, G., Künzel, L. A., Löck, S., & Troost, E. G. C. (2023). Normo- or Hypo-Fractionated Photon or Proton Radiotherapy in the Management of Locally Advanced Unresectable Pancreatic Cancer: A Systematic Review. Cancers, 15(15), 3771. https://doi.org/10.3390/cancers15153771

Holt, F., Probert, J., Darby, S. C., Haviland, J. S., Coles, C. E., Kirby, A. M., Liu, Z., Dodwell, D., Ntentas, G., Duane, F., & Taylor, C. (2023). Proton Beam Therapy for Early Breast Cancer: A Systematic Review and Meta-analysis of Clinical Outcomes. International journal of radiation oncology, biology, physics, 117(4), 869–882. https://doi.org/10.1016/j.ijrobp.2023.02.023

Kowalska, M., Sitarz-Kilian, E., Jaros, K., Koperny, M., Moćko, P., Siwiec, J., & Kawalec, P. (2024). Evidence for external beam radiotherapy in mediastinal Hodgkin and non-Hodgkin

lymphoma - systematic review. Annals of agricultural and environmental medicine : AAEM, 31(1), 47–56. https://doi.org/10.26444/aaem/168272

Gaito, S., Burnet, N. G., Aznar, M. C., Marvaso, G., Jereczek-Fossa, B. A., Crellin, A., Indelicato, D., Pan, S., Colaco, R., Rieu, R., Smith, E., & Whitfield, G. (2023). Proton Beam Therapy in the Reirradiation Setting of Brain and Base of Skull Tumour Recurrences. Clinical oncology (Royal College of Radiologists (Great Britain)), 35(10), 673–681. https://doi.org/10.1016/j.clon.2023.07.010

Li, Z., Li, Q., Tian, H., Wang, M., Lin, R., Bai, J., Wang, D., & Dong, M. (2024). Proton beam therapy for craniopharyngioma: a systematic review and meta-analysis. Radiation oncology (London, England), 19(1), 161. https://doi.org/10.1186/s13014-024-02556-w

Upadhyay, R., Yadav, D., Venkatesulu, B. P., Singh, R., Baliga, S., Raval, R. R., Lazow, M. A., Salloum, R., Fouladi, M., Mardis, E. R., Zaorsky, N. G., Trifiletti, D. M., Paulino, A. C., & Palmer, J. D. (2022). Risk of secondary malignant neoplasms in children following proton therapy vs. photon therapy for primary CNS tumors: A systematic review and meta-analysis. Frontiers in oncology, 12, 893855. https://doi.org/10.3389/fonc.2022.893855

Wilson, J. S., Main, C., Thorp, N., Taylor, R. E., Majothi, S., Kearns, P. R., English, M., Dandapani, M., Phillips, R., Wheatley, K., & Pizer, B. (2024). The effectiveness and safety of proton beam radiation therapy in children and young adults with Central Nervous System (CNS) tumours: a systematic review. Journal of neuro-oncology, 167(1), 1–34. https://doi.org/10.1007/s11060-023-04510-4

Zheng, T., Wang, D., Miao, Y., Dong, M., Liu, Q., Zhang, Q., Bai, H., Luo, H., & Li, M. (2025). Clinical efficacy and safety of proton radiotherapy for ocular conjunctival malignancies: a systematic review and meta-analysis. Frontiers in public health, 13, 1486988. https://doi.org/10.3389/fpubh.2025.1486988

Neutron Beam

American Cancer Society. (March 2022). Radiation therapy for salivary gland cancer. www.cancer.org. Accessed 08/28/25.

Breteau, N., Wachter, T., Kerdraon, R., Guzzo, M., Armaroli, L., Chevalier, D., Darras, J. A., Coche-Dequeant, B., & Chauvel, P. (2000). Utilisation des neutrons rapides dans le traitement des tumeurs des glandes salivaires: rationnel, revue de la littérature et expérience d'Orléans [Use of fast neutrons in the treatment of tumors of the salivary glands: rationale, review of the literature and experience in Orleans]. Cancer radiotherapie : journal de la Societe francaise de radiotherapie oncologique, 4(3), 181–190. https://doi.org/10.1016/s1278-3218(00)89092-7

Buchholz, T. A., Laramore, G. E., Griffin, B. R., Koh, W. J., & Griffin, T. W. (1992). The role of fast neutron radiation therapy in the management of advanced salivary gland malignant neoplasms. Cancer, 69(11), 2779–2788. https://doi.org/10.1002/1097-0142(19920601)69:11<2779::aid-cncr2820691125>3.0.co;2-n

Colombo, E., Van Lierde, C., Zlate, A., Jensen, A., Gatta, G., Didonè, F., Licitra, L. F., Grégoire, V., Vander Poorten, V., & Locati, L. D. (2022). Salivary gland cancers in elderly patients:

challenges and therapeutic strategies. Frontiers in oncology, 12, 1032471. https://doi.org/10.3389/fonc.2022.1032471

Douglas, J. G., Laramore, G. E., Austin-Seymour, M., Koh, W. J., Lindsley, K. L., Cho, P., & Griffin, T. W. (1996). Neutron radiotherapy for adenoid cystic carcinoma of minor salivary glands. International journal of radiation oncology, biology, physics, 36(1), 87–93. https://doi.org/10.1016/s0360-3016(96)00213-1

Griffin, T. W., Pajak, T. F., Laramore, G. E., Duncan, W., Richter, M. P., Hendrickson, F. R., & Maor, M. H. (1988). Neutron vs photon irradiation of inoperable salivary gland tumors: results of an RTOG-MRC Cooperative Randomized Study. International journal of radiation oncology, biology, physics, 15(5), 1085–1090. https://doi.org/10.1016/0360-3016(88)90188-5

Jones B. (2020). Clinical Radiobiology of Fast Neutron Therapy: What Was Learnt?. Frontiers in oncology, 10, 1537. https://doi.org/10.3389/fonc.2020.01537

Krüll, A., Schwarz, R., Engenhart, R., Huber, P., Lessel, A., Koppe, H., Favre, A., Breteau, N., & Auberger, T. (1996). European results in neutron therapy of malignant salivary gland tumors. Bulletin du cancer. Radiotherapie : journal de la Societe francaise du cancer : organe de la societe francaise de radiotherapie oncologique, 83 Suppl, 125–9s. https://doi.org/10.1016/0924-4212(96)84897-3

Laramore, G. E., Krall, J. M., Griffin, T. W., Duncan, W., Richter, M. P., Saroja, K. R., Maor, M. H., & Davis, L. W. (1993). Neutron versus photon irradiation for unresectable salivary gland tumors: final report of an RTOG-MRC randomized clinical trial. Radiation Therapy Oncology Group. Medical Research Council. International journal of radiation oncology, biology, physics, 27(2), 235–240. https://doi.org/10.1016/0360-3016(93)90233-l

National Cancer Institute. (May 2025). Salivary gland cancer treatment (PDQ©)- Health professional version. www.cancer.gov. Accessed 08/28/25.

National Comprehensive Cancer Network (August 2025). NCCN Clinical Practice Guidelines in oncology: Head and neck cancers. www.nccn.org. Accessed 08/28/25.

Nondiscrimination & Language Access Policy

Discrimination is Against the Law. Aspirus Health Plan, Inc. complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex, (including sex characteristics, including intersex traits; pregnancy or related conditions; sexual orientation, gender identity and sex stereotypes), consistent with the scope of sex discrimination described at 45 CFR § 92.101(a)(2). Aspirus Health Plan, Inc. does not exclude people or treat them less favorably because of race, color, national origin, age, disability, or sex.

Aspirus Health Plan, Inc.:
Provides people with disabilities reasonable modifications and free appropriate auxiliary aids and services to communicate effectively with us, such as:

- Qualified sign language interpreters.
- Written information in other formats (large print, audio, accessible electronic formats, other formats).

Provides free language assistance services to people whose primary language is not English, which may include:

- Qualified interpreters.
- Information written in other languages.

If *you* need reasonable modifications, appropriate auxiliary aids and services, or language assistance services, contact the Nondiscrimination Grievance Coordinator at the address, phone number, fax number, or email address below.

If *you* believe that Aspirus Health Plan, Inc. has failed to provide these services or discriminated in another way on the basis of race, color, national origin, age, disability, or sex, *you* can file a *grievance* with:

Nondiscrimination Grievance Coordinator
Aspirus Health Plan, Inc.
PO Box 1890
Southampton, PA 18966-9998
Phone: 1-866-631-5404 (TTY: 711)
Fax: 763-847-4010
Email: customerservice@aspirushealthplan.com

You can file a *grievance* in person or by mail, fax, or email. If *you* need help filing a *grievance*, the Nondiscrimination Grievance Coordinator is available to help *you*.

You can also file a civil rights complaint with the U.S. Department of Health and Human Services, Office for Civil Rights, electronically through the Office for Civil Rights Complaint Portal, available at https://ocrportal.hhs.gov/ocr/portal/lobby.jsf, or by mail or phone at:

U.S. Department of Health and Human Services
200 Independence Avenue, SW
Room 509F, HHH Building
Washington, D.C. 20201
1.800.368.1019, 800.537.7697 (TDD)

Complaint forms are available at http://www.hhs.gov/ocr/office/file/index.html. This notice is available at Aspirus Health Plan, Inc.'s website: https://aspirushealthplan.com/webdocs/70021-AHP-NonDiscrim_Lang-Assist-Notice.pdf.

Language Assistance Services

Albanian: KUJDES: Nëse flitni shqip, për ju ka në dispozicion shërbime të asistencës gjuhësore, pa pagesë.Telefononi në 1-800-332-6501 (TTY: 711).

Arabic تنبيه: إذا كنت تتحدث اللغة العربية، فإن خدمات المساعدة اللغوية متاحة لك مجاناً. اتصل بن اعلى رقم الهاتف1-800-332-6501(رقم هاتف الصم والبك : 711)

French: ATTENTION: Si vous parlez français, des services d'aide linguistique vous sont proposés gratuitement. Appelez le 1-800-332-6501 (ATS: 711).

German: ACHTUNG: Wenn Sie Deutsch sprechen, stehen Ihnen kostenlos sprachliche Hilfsdienstleistungen zurVerfügung. Rufnummer: 1-800-332-6501 (TTY: 711).

Hindi: _यान द_: य_द आप ि हंदी बोलते ह_ तो आपके ि लए मु_त म_ भाषा सहायता सेवाएं उपल_ध ह_।1-800-332-6501 (TTY: 711) पर कॉल कर_।

Hmong: LUS CEEV: Yog tias koj hais lus Hmoob, cov kev pab txog lus, muaj kev pab dawb rau koj. Hu rau 1-800-332-6501 (TTY: 711).

Korean: 주의: 한국어를 사용하시는 경우, 언어 지원 서비스를 무료로 이용하실 수 있습니다.1-800-332-6501 (TTY: 711)번으로 전화해 주십시오.

Polish: UWAGA: Jeżeli mówisz po polsku, możesz skorzystać z bezpłatnej pomocy językowej. Zadzwoń pod numer1-800-332-6501 (TTY: 711).

Russian: ВНИМАНИЕ: Если вы говорите на русском языке, то вам доступны бесплатные услуги перевода.Звоните 1-800-332-6501 (телетайп: 711).

Spanish: ATENCIÓN: si habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al1-800-332-6501 (TTY: 711).

Tagalog: PAUNAWA: Kung nagsasalita ka ng Tagalog, maaari kang gumamit ng mga serbisyo ng tulong sa wika nangwalang bayad. Tumawag sa 1-800-332-6501 (TTY: 711).

Traditional Chinese: 注意：如果您使用繁體中文， 您可以免費獲得語言援助服務。請 致電 1-800-332-6501 (TTY: 711)

Vietnamese: CHÚ Ý: Nếu bạn nói Tiếng Việt, có các dịch vụ hỗ trợ ngôn ngữ miễn phí dành cho bạn. Gọi số 1-800-332-6501 (TTY: 711).

Pennsylvania Dutch: Wann du Deitsch (Pennsylvania German / Dutch) schwetzscht, kannscht du mitaus Koschte ebbergricke, ass dihr helft mit die englisch Schprooch. Ruf selli Nummer uff: Call 1-800-332-6501 (TTY: 711).

Lao: ໂປດຊາບ: ຖ້າວ່າ ທ່ານເວົ້າພາສາ ລາວ, ການບໍລິການຊ່ວຍເຫຼືອດ້ານພາສາ,ໂດຍບໍ່ເສັງຄ່າ, ແມ່ນມີພ້ອມໃຫ້ທ່ານ. ໂທຣ 1-800-332-6501 (TTY: 711).

70021 07-24 ©2024 Aspirus Health Plan, Inc. All rights reserved.