



## DAFTAR PUSTAKA

- [1] F. Bray, M. Laversanne, H. Sung, J. Ferlay, R. L. Siegel, I. Soerjomataram, dan A. Jemal, “Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries,” *CA. Cancer J. Clin.*, vol. 74, no. 3, hlm. 229–263, 2024, doi: 10.3322/caac.21834.
- [2] “Cancer Facts & Figures 2023 | American Cancer Society.” Diakses: 11 September 2023. [Daring]. Tersedia pada: <https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/2023-cancer-facts-figures.html>
- [3] “Cancer Survival in England, cancers diagnosed 2016 to 2020, followed up to 2021,” NHS Digital. Diakses: 11 September 2023. [Daring]. Tersedia pada: <https://digital.nhs.uk/data-and-information/publications/statistical/cancer-survival-in-england/cancers-diagnosed-2016-to-2020-followed-up-to-2021>
- [4] A. Barsouk, S. A. Padala, A. Vakiti, A. Mohammed, K. Saginala, K. C. Thandra, P. Rawla, dan A. Barsouk, “Epidemiology, Staging and Management of Prostate Cancer,” *Med. Sci.*, vol. 8, no. 3, Art. no. 3, Sep 2020, doi: 10.3390/medsci8030028.
- [5] F. Safriadi, R. Umbas, L. Hakim, S. M. Warli, A. R. Hamid, S. Hudaya, J. Ismy, I. Soerohardjo, S. Widjanarko, dan W. Yudiana, “PANDUAN PENANGANAN KANKER PROSTAT,” 2022.
- [6] R. F. Wolff, S. Ryder, A. Bossi, A. Briganti, J. Crook, A. Henry, J. Karnes, L. Potters, T. de Reijke, N. Stone, M. Burckhardt, S. Duffy, G. Worthy, dan J. Kleijnen, “A systematic review of randomised controlled trials of radiotherapy for localised prostate cancer,” *Eur. J. Cancer Oxf. Engl.* 1990, vol. 51, no. 16, hlm. 2345–2367, Nov 2015, doi: 10.1016/j.ejca.2015.07.019.
- [7] M. Beyzadeoglu, G. Ozyigit, dan C. Ebruli, *Basic Radiation Oncology*. Cham: Springer International Publishing, 2022. doi: 10.1007/978-3-030-87308-0.
- [8] L. L. S. Jalut, N. N. Rupiasih, dan Y. Sardjono, “Analysis Dosage of Boron in BNCT with Simulation Method Using PHITS (Particle and Heavy Ion Transport Code System) Program,” *Bul. Fis.*, vol. 21, no. 1, Art. no. 1, Feb 2020.



- [9] W. P. Levin, H. Kooy, J. S. Loeffler, dan T. F. DeLaney, “Proton beam therapy,” *Br. J. Cancer*, vol. 93, no. 8, hlm. 849–854, Okt 2005, doi: 10.1038/sj.bjc.6602754.
- [10] Y. Iwamoto, T. Sato, S. Hashimoto, T. Ogawa, T. Furuta, S. Abe, T. Kai, N. Matsuda, R. Hosoyamada, dan K. Niita, “Benchmark study of the recent version of the PHITS code,” *J. Nucl. Sci. Technol.*, vol. 54, no. 5, hlm. 617–635, Mei 2017, doi: 10.1080/00223131.2017.1297742.
- [11] BAPETEN, *Keselamatan Radiasi Dalam Penggunaan Radioterapi*. Diakses: 12 Juli 2024. [Daring]. Tersedia pada: <https://jdih.bapeten.go.id/id/dokumen/peraturan/peraturan-kepala-badan-pengawas-tenaga-nuklir-nomor-3-tahun-2013-tentang-keselamatan-radiasi-dalam-penggunaan-radioterapi>
- [12] G. Li, Y. Li, J. Wang, X. Gao, Q. Zhong, L. He, C. Li, M. Liu, Y. Liu, M. Ma, H. Wang, X. Wang, dan H. Zhu, “Guidelines for radiotherapy of prostate cancer (2020 edition),” *Precis. Radiat. Oncol.*, vol. 5, no. 3, hlm. 160–182, Sep 2021, doi: 10.1002/pro6.1129.
- [13] C. Vargas, A. Fryer, C. Mahajan, D. Indelicato, D. Horne, A. Chellini, C. McKenzie, P. Lawlor, R. Henderson, Z. Li, L. Lin, K. Olivier, dan S. Keole, “Dose–Volume Comparison of Proton Therapy and Intensity-Modulated Radiotherapy for Prostate Cancer,” *Int. J. Radiat. Oncol.*, vol. 70, no. 3, hlm. 744–751, Mar 2008, doi: 10.1016/j.ijrobp.2007.07.2335.
- [14] Y.-Y. Wu dan K.-H. Fan, “Proton therapy for prostate cancer: current state and future perspectives,” *Br. J. Radiol.*, vol. 95, no. 1131, hlm. 20210670, Mar 2022, doi: 10.1259/bjr.20210670.
- [15] S. Jolly, H. Owen, M. Schippers, dan C. Welsch, “Technical challenges for FLASH proton therapy,” *Phys. Med.*, vol. 78, hlm. 71–82, Okt 2020, doi: 10.1016/j.ejmp.2020.08.005.
- [16] W. Cao, G. J. Lim, Y. Li, X. R. Zhu, dan X. Zhang, “Improved Beam Angle Arrangement in Intensity Modulated Proton Therapy Treatment Planning for Localized Prostate Cancer,” *Cancers Basel*, vol. 7, no. 2, hlm. 574–584, Mar 2015, doi: 10.3390/cancers7020574.



- [17] Y. Liu, S. A. Patel, A. B. Jani, T. W. Gillespie, P. R. Patel, K. D. Godette, B. W. Hershatter, J. W. Shelton, dan M. W. McDonald, “Overall Survival After Treatment of Localized Prostate Cancer With Proton Beam Therapy, External-Beam Photon Therapy, or Brachytherapy,” *Clin. Genitourin. Cancer*, vol. 19, no. 3, hlm. 255-266.e7, Jun 2021, doi: 10.1016/j.clgc.2020.08.009.
- [18] “How does the prostate work?,” dalam *InformedHealth.org [Internet]*, Institute for Quality and Efficiency in Health Care (IQWiG), 2016. Diakses: 2 Oktober 2023. [Daring]. Tersedia pada: <https://www.ncbi.nlm.nih.gov/books/NBK279291/>
- [19] American Joint Committee on Cancer, “Prostate Cancer Stages | Staging of Prostate Cancer.” Diakses: 22 September 2023. [Daring]. Tersedia pada: <https://www.cancer.org/cancer/types/prostate-cancer/detection-diagnosis-staging/staging.html>
- [20] P. Hoskin, Ed., *External Beam Therapy*, Third Edition, Third Edition. dalam Radiotherapy in Practice. Oxford, New York: Oxford University Press, 2019.
- [21] W. D. Newhauser dan R. Zhang, “The physics of proton therapy,” *Phys. Med. Biol.*, vol. 60, no. 8, hlm. R155, Mar 2015, doi: 10.1088/0031-9155/60/8/R155.
- [22] S. L. Gulliford dan K. M. Prise, “Relative Biological Effect/Linear Energy Transfer in Proton Beam Therapy: A Primer,” *Clin. Oncol.*, vol. 31, no. 12, hlm. 809–812, Des 2019, doi: 10.1016/j.clon.2019.06.009.
- [23] R. Mohan, “A Review of Proton Therapy - Current Status and Future Directions,” *Precis. Radiat. Oncol.*, vol. 6, no. 2, hlm. 164–176, Jun 2022, doi: 10.1002/pro6.1149.
- [24] W. Demtröder, *Nuclear and Particle Physics*. dalam Undergraduate Lecture Notes in Physics. Cham: Springer International Publishing, 2022. doi: 10.1007/978-3-030-58313-2.
- [25] D. R. Grimes, D. R. Warren, dan M. Partridge, “An approximate analytical solution of the Bethe equation for charged particles in the radiotherapeutic energy range,” *Sci. Rep.*, vol. 7, no. 1, Art. no. 1, Agu 2017, doi: 10.1038/s41598-017-10554-0.





- [26] T. Bortfeld, “An analytical approximation of the Bragg curve for therapeutic proton beams,” *Med. Phys.*, vol. 24, no. 12, hlm. 2024–2033, Des 1997, doi: 10.11118/1.598116.
- [27] P. R. Symonds, J. A. Mills, dan A. Duxbury, *Walter and Miller’s Textbook of Radiotherapy: Radiation Physics, Therapy and Oncology - E-Book: Walter and Miller’s Textbook of Radiotherapy: Radiation Physics, Therapy and Oncology - E-Book*. Elsevier Health Sciences, 2019.
- [28] R. Leroy, N. Benahmed, F. Hulstaert, F. Mambourg, N. Fairon, E. Van Eycken, dan D. Ruysscher, *Hadron therapy in children – an update of the scientific evidence for 15 paediatric cancers*. 2015.
- [29] L. B. Marks, E. D. Yorke, A. Jackson, R. K. Ten Haken, L. S. Constine, A. Eisbruch, S. M. Bentzen, J. Nam, dan J. O. Deasy, “Use of normal tissue complication probability models in the clinic,” *Int. J. Radiat. Oncol. Biol. Phys.*, vol. 76, no. 3 Suppl, hlm. S10-19, Mar 2010, doi: 10.1016/j.ijrobp.2009.07.1754.
- [30] B. Emami, J. Lyman, A. Brown, L. Coia, M. Goitein, J. E. Munzenrider, B. Shank, L. J. Solin, dan M. Wesson, “Tolerance of normal tissue to therapeutic irradiation,” *Int. J. Radiat. Oncol. Biol. Phys.*, vol. 21, no. 1, hlm. 109–122, Mei 1991, doi: 10.1016/0360-3016(91)90171-y.
- [31] T. Rancati, F. Palorini, C. Cozzarini, C. Fiorino, dan R. Valdagni, “Understanding Urinary Toxicity after Radiotherapy for Prostate Cancer: First Steps Forward,” *Tumori J.*, vol. 103, no. 5, hlm. 395–404, Sep 2017, doi: 10.5301/tj.5000681.
- [32] N. A. Serrano, N. S. Kalman, dan M. S. Anscher, “Reducing rectal injury in men receiving prostate cancer radiation therapy: current perspectives,” *Cancer Manag. Res.*, vol. Volume 9, hlm. 339–350, Jul 2017, doi: 10.2147/CMAR.S118781.
- [33] W. Newhauser, “International Commission on Radiation Units and Measurements Report 78: Prescribing, Recording and Reporting Proton-beam Therapy,” *Radiat. Prot. Dosimetry*, vol. 133, no. 1, hlm. 60–62, Jan 2009, doi: 10.1093/rpd/ncp005.





- [34] M. Dean, R. Jimenez, E. Mellon, E. Fields, R. Yechiel, dan R. Mak, “CB-CHOP: A simple acronym for evaluating a radiation treatment plan,” *Appl. Radiat. Oncol.*, hlm. 28–30, Des 2017, doi: 10.37549/ARO1136.
- [35] D. Jones, “ICRU Report 50—Prescribing, Recording and Reporting Photon Beam Therapy,” *Med. Phys.*, vol. 21, no. 6, hlm. 833–834, 1994, doi: 10.1118/1.597396.
- [36] W. Parker dan H. Patrocinio, “Clinical treatment planning in external photon beam radiotherapy,” Jul 2005, Diakses: 16 Februari 2024. [Daring]. Tersedia pada: <https://www.osti.gov/etdeweb/biblio/20628274>
- [37] D. P. Kroese, T. Brereton, T. Taimre, dan Z. I. Botev, “Why the Monte Carlo method is so important today,” *WIREs Comput. Stat.*, vol. 6, no. 6, hlm. 386–392, 2014, doi: 10.1002/wics.1314.
- [38] T. Sato, K. Niita, N. Matsuda, S. Hashimoto, Y. Iwamoto, T. Furuta, S. Noda, T. Ogawa, H. Iwase, H. Nakashima, T. Fukahori, K. Okumura, T. Kai, S. Chiba, dan L. Sihver, “Overview of particle and heavy ion transport code system PHITS,” *Ann. Nucl. Energy*, vol. 82, hlm. 110–115, Agu 2015, doi: 10.1016/j.anucene.2014.08.023.
- [39] T. Sato, Y. Iwamoto, S. Hashimoto, T. Ogawa, T. Furuta, S.-I. Abe, T. Kai, Y. Matsuya, N. Matsuda, Y. Hirata, T. Sekikawa, L. Yao, P.-E. Tsai, H. N. Ratliff, H. Iwase, Y. Sakaki, K. Sugihara, N. Shigyo, L. Sihver, dan K. Niita, “Recent improvements of the particle and heavy ion transport code system – PHITS version 3.33,” *J. Nucl. Sci. Technol.*, vol. 61, no. 1, hlm. 127–135, Jan 2024, doi: 10.1080/00223131.2023.2275736.
- [40] V. Maradia, D. Meer, R. Dölling, D. C. Weber, A. J. Lomax, dan S. Psoroulas, “Demonstration of momentum cooling to enhance the potential of cancer treatment with proton therapy,” *Nat. Phys.*, vol. 19, no. 10, hlm. 1437–1444, Okt 2023, doi: 10.1038/s41567-023-02115-2.
- [41] M. Shahmohammadi Beni, K. N. Yu, M. R. Islam, dan H. Watabe, “Development of PHITS graphical user interface for simulation of positron emitting radioisotopes production in common biological materials during





proton therapy,” *J. Radiat. Res. (Tokyo)*, vol. 63, no. 3, hlm. 385–392, Mar 2022, doi: 10.1093/jrr/rrac010.

- [42] C. H. Kim, Y. S. Yeom, N. Petoussi-Henss, M. Zankl, W. E. Bolch, C. Lee, C. Choi, T. T. Nguyen, K. Eckerman, H. S. Kim, M. C. Han, R. Qiu, B. S. Chung, H. Han, dan B. Shin, “ICRP Publication 145: Adult Mesh-Type Reference Computational Phantoms,” *Ann. ICRP*, vol. 49, no. 3, hlm. 13–201, Okt 2020, doi: 10.1177/0146645319893605.
- [43] S. Seltzer, “Stopping-Powers and Range Tables for Electrons, Protons, and Helium Ions, NIST Standard Reference Database 124.” [object Object], 1993. doi: 10.18434/T4NC7P.
- [44] International Commission on Radiation Units and Measurements, Ed., *Tissue substitutes in radiation dosimetry and measurement*. dalam ICRU report, no. 44. Bethesda, Md., U.S.A: International Commission on Radiation Units and Measurements, 1989.
- [45] I. A. E. Agency, “Relative Biological Effectiveness in Ion Beam Therapy,” International Atomic Energy Agency, Text, 2008. Diakses: 27 Juli 2024. [Daring]. Tersedia pada: <https://www.iaea.org/publications/7682/relative-biological-effectiveness-in-ion-beam-therapy>
- [46] M. Ilham, “Analisis Dosis dan Waktu Iradiasi Terapi Proton Pada Kanker Serviks Menggunakan PHITS,” Universitas Gadjah Mada, 2022. Diakses: 5 Maret 2024. [Daring]. Tersedia pada: [https://etd.repository.ugm.ac.id/home/detail\\_pencarian/209791](https://etd.repository.ugm.ac.id/home/detail_pencarian/209791)
- [47] T. Ventura, M. do C. Lopes, B. C. Ferreira, dan L. Khouri, “SPIDERplan: A tool to support decision-making in radiation therapy treatment plan assessment,” *Rep. Pract. Oncol. Radiother.*, vol. 21, no. 6, hlm. 508–516, 2016, doi: 10.1016/j.rpor.2016.07.002.

