

## DAFTAR PUSTAKA

- [1] Kementerian Kesehatan Republik Indonesia, “Jenis Kanker Ini Rentan Menyerang Manusia,” Biro Komunikasi dan Pelayanan Masyarakat Kemenkes RI, Jakarta, 2020.
- [2] International Agency for Research on Cancer, “Indonesia Fact Sheet,” The Global Cancer Observatory, Lyon, 2021.
- [3] World Health Organization, “Cervical Cancer,” World Health Organization, 2020. [Online]. Available: [https://www.who.int/health-topics/cervical-cancer#tab=tab\\_1](https://www.who.int/health-topics/cervical-cancer#tab=tab_1). [Diakses 17 Oktober 2020].
- [4] Mayo Clinic Staff, “Cervical Cancer,” Mayo Clinic, 17 Juni 2021. [Online]. Available: <https://www.mayoclinic.org/diseases-conditions/cervical-cancer/symptoms-causes/syc-20352501>. [Diakses 23 Februari 2022].
- [5] HonestDocs Editorial Team, “Gejala Awal Kanker Serviks Stadium 1, 2, dan 3,” HonestDocs, 12 Oktober 2020. [Online]. Available: <https://www.honestdocs.id/gejala-awal-kanker-serviks-stadium-0-1-2-dan-3>. [Diakses 23 Februari 2022].
- [6] Andrijono, G. Purwoto, S. M. Sekarutami, D. R. Handjari, Primariadewi, S. A. Nuhonni, F. Witjaksono, N. R. M. Manikam dan L. I. Octavia, Penulis, *Panduan Penatalaksanaan Kanker Serviks*. [Performance]. Komite Penanggulangan Kanker Nasional.
- [7] European Society for Medical Oncology, “Finding cancer 'cold spot' can help minimize radiotherapy side-effects,” ScienceDaily, 15 Juli 2010. [Online]. Available: <https://www.sciencedaily.com/releases/2010/04/100430091600.htm>. [Diakses 26 Desember 2020].
- [8] M. Beyzadeoglu, G. Ozyigit dan C. Ebruli, *Basic Radiation Oncology*, Heidelberg: Springer, 2010.
- [9] E. B. Podgoršak, *Radiation Physics for Medical Physicist*, Heidelberg: Springer, 2010.
- [10] R. Mohan dan D. Grosshans, “Proton Therapy - Present and Future,” *Advanced Drug Delivery Reviews*, vol. 109, pp. 26-44, 2017.



- [11] E. Sulistya, "Penentuan Dosis Optimum Pada Radioterapi Proton dengan Menggunakan Program SRIM," Universitas Gadjah Mada, Yogyakarta, 2016.
- [12] G. M. Department, Penulis, *10 Reasons Why You Should Consider Proton Therapy for Your Radiation Oncology Department*. [Performance]. IBA, 2018.
- [13] IBA International, "IBA to install Indonesia's first proton therapy center," IBA International, 21 Februari 2020. [Online]. Available: <https://iba-worldwide.com/content/iba-install-indonesia-s-first-proton-therapy-center>. [Diakses 14 Juni 2020].
- [14] H. Paganetti, *Proton Beam Therapy*, Bristol: IOP Publishing, 2017.
- [15] E. Amato, D. Lizio dan S. Baldari, "Application of the Monte Carlo Method in Medical Physics," *Medical Physics*, pp. 105-113, 2013.
- [16] PHITS Development Team, "Features of PHITS3.24," 2021.
- [17] B. Gottschalk, "Physics of Proton Interactions in Matter," dalam *Proton Therapy Physics*, Boca Raton, CRC Press, 2012, pp. 19-59.
- [18] Japan Atomic Energy Agency, "PHITS," Japan Atomic Energy Agency, 25 Mei 2020. [Online]. Available: <https://phits.jaea.go.jp/>. [Diakses 15 Juni 2020].
- [19] H. A. E., R. M. L. dan M. H. H., "Hybrid Phantom Applications to Nuclear Medicine," *Journal of Biomedical Physics and Engineering*, vol. 2, no. 1, pp. 37-41, 2012.
- [20] T. Sato, Y. Iwamoto, S. Hashimoto, T. Ogawa, T. Furuta, S.-i. Abe, T. Kai, P.-E. Tsai, N. Matsuda, H. Iwase, N. Shigyo, L. Sihver and K. Niita, "Features of Particle and Heavy Ion Transport code System (PHITS) version 3.02," *Journal of Nuclear Science and Technology*, vol. 55, pp. 684-690, 2018.
- [21] F. Landoni, A. Maneco, A. Colombo, F. Placa, R. Milani, P. Perego, G. Favini, L. Ferri and C. Mangioni, "Randomized study of radical surgery versus radiotherapy for stage Ib-IIa cervical cancer," *Lancet*, pp. 535-540, 23 Agustus 1997.
- [22] S. Mabuchi, M. Okazawa, F. Isohashi, K. Matsuo, Y. Ohta, O. Suzuki, Y. Yoshioka, T. Enomoto, S. Kamiura and T. Kimura, "Radical hysterectomy with adjuvant radiotherapy versus definitive radiotherapy alone for FIGO



- stage IIB cervical cancer," *Gynecologic Oncology*, vol. 123, pp. 241-247, 2011.
- [23] F. Landoni, A. Colombo, R. Milani, F. Placa, V. Zanaglono and C. Mangioni, "Randomized study between radical surgery and radiotherapy for the treatment of stage IB-IIA cervical cancer: 20-year update," *Journal of Gynecologic Oncology*, vol. 28, no. 3, 2017.
- [24] Y. Yagur, O. Weitzner, O. Gerner, O. Lavie, U. Beller, I. Bruchim, Z. Vaknin, T. Levy, A. Robinovich, I. B. Shachar, A. Meirovitz, A. B. Arie, E. Derazne, O. Raban, R. Eitan, Y. Kadan, A. Fishman and L. Helpman, "Postoperative radiation rates in stage IIA1 cervical cancer: Is surgical treatment justified? An Israeli Gynecologic Oncology Group Study," *Gynecologic Oncology*, pp. 288-292, 2018.
- [25] W. Y. Song, S. N. Huh, Y. Liang, G. White, R. C. Nichols, W. T. Watkins, A. J. Mundt and L. K. Mell, "Dosimetric comparison study between intensity modulated radiation therapy and three-dimensional conformal proton therapy for pelvic bone marrow sparing in the treatment of cervical cancer," *Journal of Applied Clinical Medical Physics*, vol. 11, no. 4, pp. 83-92, 2010.
- [26] M. A. van de Sande, C. L. Creutzberg, S. van de Water, A. W. Sharfo dan M. S. Hoogeman, "Which cervical and endometrial cancer patients will benefit most from intensity-modulated proton therapy?," *Radiotherapy and Oncology*, vol. 120, pp. 397-403, 2016.
- [27] S. M. Lumbanraja, "Pemanfaatan Partikel Proton Untuk Terapi Kanker," *Ebers Papyrus*, vol. 10, no. 1, pp. 31-38, 2004.
- [28] H. Liu and J. Y. Chang, "Proton therapy in clinical practice," *Chinese Journal of Cancer*, vol. 30, no. 5, pp. 315-326, 2011.
- [29] C. E. Vargas, W. F. Hartsell, M. Dunn, S. R. Keole, L. Doh, E. Eisenbeisz dan G. L. Larson, "Hypofractionated Versus Standard Fractionated Proton-beam Therapy for Low-risk Prostate Cancer: Interim Results of a Randomized Trial PCG GU 002," *American Journal of Clinical Oncology*, vol. 41, no. 2, pp. 115-120, 2018.
- [30] H. Suit, T. DeLaney, S. Goldberg, H. Paganetti, B. Clasie, L. Gerweck, A. Niemierko, E. Hall, J. Flanz, J. Hallman dan A. Trofimov, "Proton vs Carbon Ion Beams in the Definitive Radiation Treatment of Cancer Patients," *Radiotherapy and Oncology*, vol. 95, pp. 3-22, 2010.



- [31] T. D. Malouff, A. Mahajan, S. Krishnan, C. Beltran, D. S. Seneviratne and D. M. Trifiletti, "Carbon Ion Therapy: A Modern Review of an Emerging Technology," *Frontiers in Oncology*, vol. 10, 2020.
- [32] D. Jones dan A. Wambersie, "Radiation therapy with fast neutrons: A review," *Nuclear Instruments and Methods in Physics Research*, vol. 580, pp. 522-525, 2007.
- [33] Y. Sardjono, H. Faqqiyyah dan N. Bassler, "Pengenalan Program SHIELD-HIT12A Untuk Perhitungan Dosis Pada Uji Invitro dan Invivo BNCT," dalam *Pertemuan dan Presentasi Ilmiah - Penelitian Dasar Ilmu Pengetahuan dan Teknologi Nuklir 2014*, Yogyakarta, 2014.
- [34] J. A. Coderre, J. C. Turcotte, K. J. Riley, P. J. Binns, O. K. Harling dan W. S. Kiger, "Boron Neutron Capture Therapy: Cellular Targeting of High Linear Energy Transfer," *Technology in Cancer Reserach & Treatment*, vol. 2, no. 5, pp. 255-375, 2003.
- [35] D. Nigg, C. Wemple, D. Wessel, F. Wheeler, C. Albright, M. Cohen, M. Frandsen, G. Harkin dan M. Rossmeier, "SERA - An advanced treatment planning system for neutron therapy and BNCT," *Transactions of the American Nuclear Society*, vol. 80, pp. 66-68, 1999.
- [36] N. Wahl, "About matRad," matRad, 17 Juni 2021. [Online]. Available: <https://github.com/e0404/matRad/wiki/about-matRad>. [Diakses 23 Februari 2022].
- [37] T. Sato, Y. Kase, R. Watanabe, K. Niita dan L. Sihver, "Biological Dose Estimation for Charged-Particle Therapy Using an Improved PHITS Code Coupled with a Microdosimetric Kinetic Model," *Radiation Research*, vol. 171, no. 1, pp. 107-117, 2009.
- [38] D. Krstic and D. Nikezic, "Input files with ORNL-mathematical phantoms of the human body for MCNP-4B," *Computer Physics Communications*, vol. 176, pp. 33-37, 2007.
- [39] S. G. Pinasti, B. Achmad and Bagaswoto, "Rekonstruksi Hybrid Computational Human Phantom Untuk Studi Dosimetri Radiasi Internal Pada Terapi Radioiodine," Universitas Gadjah Mada, Yogyakarta, 2014.
- [40] W. Prendiville dan R. Sankaranarayanan, "Calcoscopy and Treatment of Cervical Precancer," International Agency for Research on Cancer, Lyon, 2017.



- [41] P. Symonds, "Gynaecological Cancer," in *Walter and Miller's Textbook of Radiotherapy: Radiation Physics, Therapy and Oology*, Churchill Livingstone, Elsevier, 2012, pp. 567-484.
- [42] The American Cancer Society medical and editorial content team, "Risk Factors for Cervical Cancer," American Cancer Society, 3 Januari 2020. [Online]. Available: <https://www.cancer.org/cancer/cervical-cancer/causes-risks-prevention/risk-factors.html>. [Diakses 17 Oktober 2020].
- [43] T. C. Johnson, "Cervical Cancer," WebMD, 13 Januari 2020. [Online]. Available: <https://www.webmd.com/cancer/cervical-cancer/cervical-cancer#1>. [Diakses 24 Oktober 2020].
- [44] Menteri Kesehatan Republik Indonesia, "Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01.07/MENKES/349/2018 tentang Pedoman Nasional Pelayanan Kedokteran Tata Laksana Kanker Serviks," Kementerian Kesehatan Republik Indonesia, Jakarta, 2018.
- [45] The American Cancer Society medical and editorial content team, "Signs and Symptoms of Cervical Cancer," American Cancer Society, 3 Januari 2020. [Online]. Available: <https://www.cancer.org/cancer/cervical-cancer/detection-diagnosis-staging/signs-symptoms.html>. [Diakses 12 November 2020].
- [46] "Stages, types and grades," Cancer Research UK, 23 Juli 2020. [Online]. Available: <https://www.cancerresearchuk.org/about-cancer/cervical-cancer/stages-types-grades>. [Diakses 1 Desember 2020].
- [47] Faculty of Clinical Oncology of The Royal College of Radiologist, "Radiotherapy Dose-Fractionation," Juni 2006. [Online]. Available: [https://www.rcr.ac.uk/sites/default/files/publication/Dose-Fractionation\\_Final.pdf](https://www.rcr.ac.uk/sites/default/files/publication/Dose-Fractionation_Final.pdf). [Diakses 1 Desember 2020].
- [48] N. Bhatla, J. S. Berek, M. C. Fredes, L. A. Denny, S. Grenman, K. Karunaratne, S. T. Kehoe, I. Konishi, A. B. Olawaiye, J. Prat dan R. Sankaranarayanan, "Revised FIGO Staging for Carcinoma of The Cervix Uteri," *International Journal Gynecology Obstetrics*, vol. 145, no. FIGO Committee Report, pp. 129-135, 2019.
- [49] F. M. Khan, Khan's The Physics of Radiation Therapy, 5th penyunt., Philadelphia: Wolters Kluwer, 2014.



- [50] Z. Alatas, S. Hidayati, M. Akhadi, M. Purba, D. Purwadi, S. Ariyanto, H. Winarno, Rismiyanto, E. Sofyatiningrum, Hendrianto, H. Widyastono, E. M. Parmanto and Syahril, *Buku Pintar Nuklir*, Jakarta: BATAN.
- [51] P. Soedjojo, *Azas-azas Ilmu Fisika Jild 4 Fisika Modern*, Yogyakarta: Gadjah Mada University Press, 2001.
- [52] C. Baker, "Radiation Interactions with Matter," dalam *Walter & Miller's Text Book of Radiotherapy: Radiation Physics, Therapy and Oncology*, Churchill Livingstone, Elsevier, 2012, pp. 15-32.
- [53] N. Tsoulfanidis dan S. Landsberger, *Measurement & Detection of Radiation*, 4th penyunt., New York: CRC Press, 2015.
- [54] W. Parker dan H. Patrocino, "Clinical Treatment Planning in External Photon Beam Radiotherapy," dalam *Radiation Oncology Physics: A Handbook for Teachers and Students*, Vienna, IAEA, 2005, pp. 219-272.
- [55] The University of Toledo, "Time, Dose and Fractionation in Radiotherapy," 25 Februari 2013. [Online]. Available: [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi32amtuJ\\_2AhXV73MBHbKxAPUQFnoECB8QAQ&url=https%3A%2F%2Fwww.utoledo.edu%2Fmed%2Fdepts%2Fradther%2Fpdf%2F2-22-13%2520lecture.pdf&usg=AOvVaw0AziTrjRumuJGIol1NN7ge-](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi32amtuJ_2AhXV73MBHbKxAPUQFnoECB8QAQ&url=https%3A%2F%2Fwww.utoledo.edu%2Fmed%2Fdepts%2Fradther%2Fpdf%2F2-22-13%2520lecture.pdf&usg=AOvVaw0AziTrjRumuJGIol1NN7ge-) [Diakses 27 Februari 2022].
- [56] A. Barrett, J. Dobbs, S. Morris dan T. Roques, *Practical Radiotherapy Planning 4th Edition*, London: Hodder Arnold, 2009.
- [57] M. Jermann, "Particle Therapy Statistics in 2014," *International Journal of Particle Therapy*, vol. 2, no. 1, pp. 50-54, 2015.
- [58] P. T. IBA, Penulis, *IBA Proteus®ONE smart workflow - highlights*. [Performance]. IBA, 2018.
- [59] Sudjatmoko, Triyono dan E. Supriyatni, "Kajian Perkembangan Teknologi Akselerator Untuk Radioterapi Kanker," dalam *Prosiding Seminar Nasional Teknologi Akselerator dan Aplikasinya*, 2000.
- [60] C.-M. C. Ma and T. Lomax, *Proton and Carbon Ion Therapy*, Boca Raton: CRC Press, 2013.
- [61] IAEA and ICRU, "Technical Reports Series No. 461: Relative Biological Effectiveness in Ion Beam Therapy," IAEA, Vienna, 2008.



- [62] A. Luhr, C. v. Neubeck, J. Pawelke, A. Seidlitz, C. Peitzsch, S. M. Bentzen, T. Bortfeld, J. Debus, E. Deutsch, J. A. Lengendijk, J. S. Loeffler, R. Mohan, M. Scholz, B. S. Sorensen, D. C. Weber, M. Baumann dan M. Krause, "'Radiobiology of Proton Therapy': Results of an international expert workshop," *Radiotherapy and Oncology*, vol. 128, pp. 56-67, 2018.
- [63] J. Oh, H.-S. Lee, S. Park, M. Kim, S. Hong, S. Ko dan W.-k. Cho, "Comparison of the FLUKA, MCNPX, and PHITS Codes in Yield Calculation o Secondary Particles Produced by Intermediate Energy Proton Beam," *Progress in Nuclear Science and Technology*, vol. 1, pp. 85-88, 2011.
- [64] T. Sato, Y. Iwamoto, S. Hashimoto, T. Ogawa, T. Furuta, S.-c. Abe, T. Kai, P.-E. Tsai, N. Matsuda, H. Iwase, N. Shigyo, L. Sihver dan K. Niita, "Particle and Heavy Ion Transport Code System," 7 7 2018. [Online]. Available: <https://phits.jaea.go.jp/lec/phits-introduction-en.pdf>. [Diakses 18 Juni 2020].
- [65] PHITS Development Team, PHITS Ver. 3.20 User's Manual, JAEA, 2019.
- [66] M. J. Berger, J. S. Coursey, M. A. Zucker, J. Chang, S. M. Seltzer dan P. M. Bergstrom, "NIST Standard Reference Database 124," Juli 2017. [Online]. Available: <https://www.nist.gov/pml/stopping-power-range-tables-electrons-protons-and-helium-ions>. [Diakses 30 Desember 2020].
- [67] International Commission on Radiological Protection, "Adult Reference Computational Phantoms," Elsevier, 2009.
- [68] K. M. Purwantoro, "Analisis Distribusi Dosis Radiasi Pada Terapi Kanker Srviks dengan Boron Neutron Capture Therapy Menggunakan MCNPX," Universitas Gadjah Mada, Yogyakarta, 2016.
- [69] J. V. d. Walle, Penulis, *IBA accelerators for proton and ion beam therapy*. [Performance]. IBA, 2016.
- [70] H. Paganetti, "The Physics of Proton Biology," in *Proton Therapy Physics*, Boca Raton, CRC Press, 2012, pp. 593-626.
- [71] E. B, "Tolerance of Normal Tissue to Therapeutic Radiation," *Reports of Radiotherapy and Oncology*, vol. 1, no. 1, pp. 35-48, 2013.

