

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.*

TABLE OF CONTENTS

Germ Cell Seminoma Stage I Surveillance.....	Page 2
Germ Cell Seminoma Stage I – Post Adjuvant Radiation Therapy or Single-agent Carboplatin....	Page 3
Germ Cell Non-Seminoma Stage I Surveillance.....	Page 4
Germ Cell Non-Seminoma Stage I – Post-RPLND and/or Adjuvant Chemotherapy.....	Page 5
Germ Cell – All types, Stages II-IIIC.....	Page 6
Suggested Readings.....	Pages 7 – 8
Development Credits.....	Page 9

RPLND = retroperitoneal lymph node dissection

Survivorship – Testicular Cancer: Germ Cell Seminoma Stage I Surveillance

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.

ELIGIBILITY

CONCURRENT COMPONENTS OF VISITS

SURVEILLANCE

MONITORING FOR LATE EFFECTS

RISK REDUCTION/EARLY DETECTION

PSYCHOSOCIAL FUNCTIONING

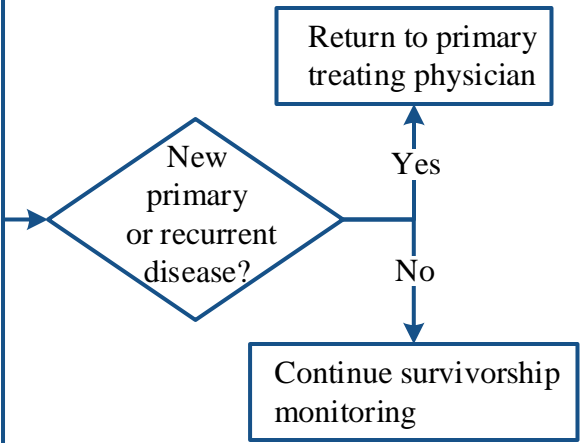
- Physical exam with each visit to include thorough exam of supraclavicular lymph nodes and contralateral testicle
- Years 2-5:
 - AFP, beta HCG and LDH every 6 months
 - Chest x-ray every 6 months
 - CT of abdomen and pelvis every 12-24 months
 - Testosterone, glucose, creatinine, and lipid profile annually
 - Testicular ultrasound¹ annually if high-risk
- Years 6-10:
 - Comprehensive metabolic panel (CMP), CBC with platelets, serum testosterone, and lipid profile annually
 - AFP, beta HCG and LDH as clinically indicated
 - Chest x-ray annually (optional)
 - CT of abdomen and pelvis as clinically indicated
 - Testicular ultrasound¹ annually if high-risk
- After year 10:
 - Testosterone, glucose, creatinine, and lipid profile annually
 - Imaging studies as clinically indicated

- Infertility
- Hypogonadism

- Patient education, counseling, and screening:
- Lifestyle risk assessment²
 - Cancer screening³
 - HPV vaccination as clinically indicated (see [HPV Vaccination Algorithm](#))
 - Screening for Hepatitis B and C as clinically indicated (see [Hepatitis Screening and Management – HBV and HCV Algorithm](#))
 - Consider cardiovascular risk reduction⁴

- Assess for:
- Distress management (see [Distress Screening and Psychosocial Management Algorithm](#))
 - Financial stressors
 - Social support
 - Body image

DISPOSITION



Refer or consult as indicated

Germ cell tumors, seminoma stage I, 2 or more years from treatment completion and NED

NED = no evidence of disease

¹ Annual ultrasound of contralateral testicle if one of the following present: diagnosis of seminoma and less than 30 years old when diagnosed or testicular maldescent or infertility

² See [Physical Activity](#), [Nutrition](#), and [Tobacco Cessation](#) algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice

³ Includes [colorectal](#), [liver](#), [lung](#), [pancreatic](#), [prostate](#), and [skin cancer screening](#)

⁴ Consider use of Vanderbilt's [ABCDE's approach to cardiovascular health](#)

Survivorship – Testicular Cancer: Germ Cell Seminoma Stage I Post Adjuvant Radiation Therapy or Single-Agent Carboplatin

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.

ELIGIBILITY

CONCURRENT COMPONENTS OF VISIT

SURVEILLANCE

MONITORING FOR LATE EFFECTS

RISK REDUCTION/EARLY DETECTION

PSYCHOSOCIAL FUNCTIONING

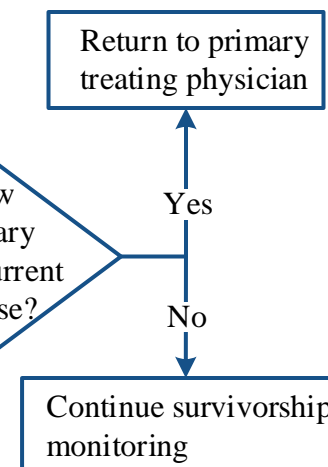
- Physical exam with each visit to include thorough exam of supraclavicular lymph nodes and contralateral testicle
- Years 2 and 3:
 - AFP, beta HCG, and LDH every 6 months
 - CBC and platelets, testosterone, glucose creatinine, and lipid profile annually
 - Chest x-ray and CT annually (CT of pelvis if post-radiation therapy; CT of abdomen if post-carboplatin)
 - Testicular ultrasound¹ annually if high-risk
- Years 4 and 5:
 - CBC and platelets, AFP, beta HCG, LDH, testosterone, glucose, creatinine, and lipid profile annually
 - Chest x-ray annually
 - CT of abdomen every 12-24 months (CT of pelvis if post-radiation therapy; CT of abdomen if post-carboplatin)
 - Testicular ultrasound¹ annually if high-risk
- Years 6-10:
 - CMP, CBC and platelets, serum testosterone and lipid profile annually
 - AFP, beta HCG, and LDH as clinically indicated
 - Testicular ultrasound¹ annually if high-risk
 - Other imaging as clinically indicated
- After year 10:
 - CBC and platelets, testosterone, glucose, creatinine, and lipid profile annually
 - Imaging as clinically indicated

- Infertility
- Cardiovascular disease²
- Neurotoxicity
- Hypogonadism
- Metabolic syndrome
- Renal insufficiency

- Patient education, counseling, and screening:
- Lifestyle risk assessment³
 - Cancer screening⁴
 - HPV vaccination as clinically indicated (see [HPV Vaccination Algorithm](#))
 - Screening for Hepatitis B and C as clinically indicated (see [Hepatitis Screening and Management – HBV and HCV Algorithm](#))

- Assess for:
- Distress management (see [Distress Screening and Psychosocial Management Algorithm](#))
 - Financial stressors
 - Body image
 - Social support

DISPOSITION



Refer or consult as indicated

Germ cell tumors, seminoma stage I, 2 or more years post-adjuvant radiotherapy or single-agent carboplatin and NED

CMP = comprehensive metabolic panel
 NED = no evidence of disease

¹ Annual ultrasound of contralateral testicle if one of the following is present: diagnosis of seminoma and less than 30 years old when diagnosed or testicular maldescent, or infertility

² Consider use of Vanderbilt's [ABCDE's approach to cardiovascular health](#)

³ See [Physical Activity](#), [Nutrition](#), and [Tobacco Cessation](#) algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice

⁴ Includes [colorectal](#), [liver](#), [lung](#), [pancreatic](#), [prostate](#), and [skin cancer screening](#)

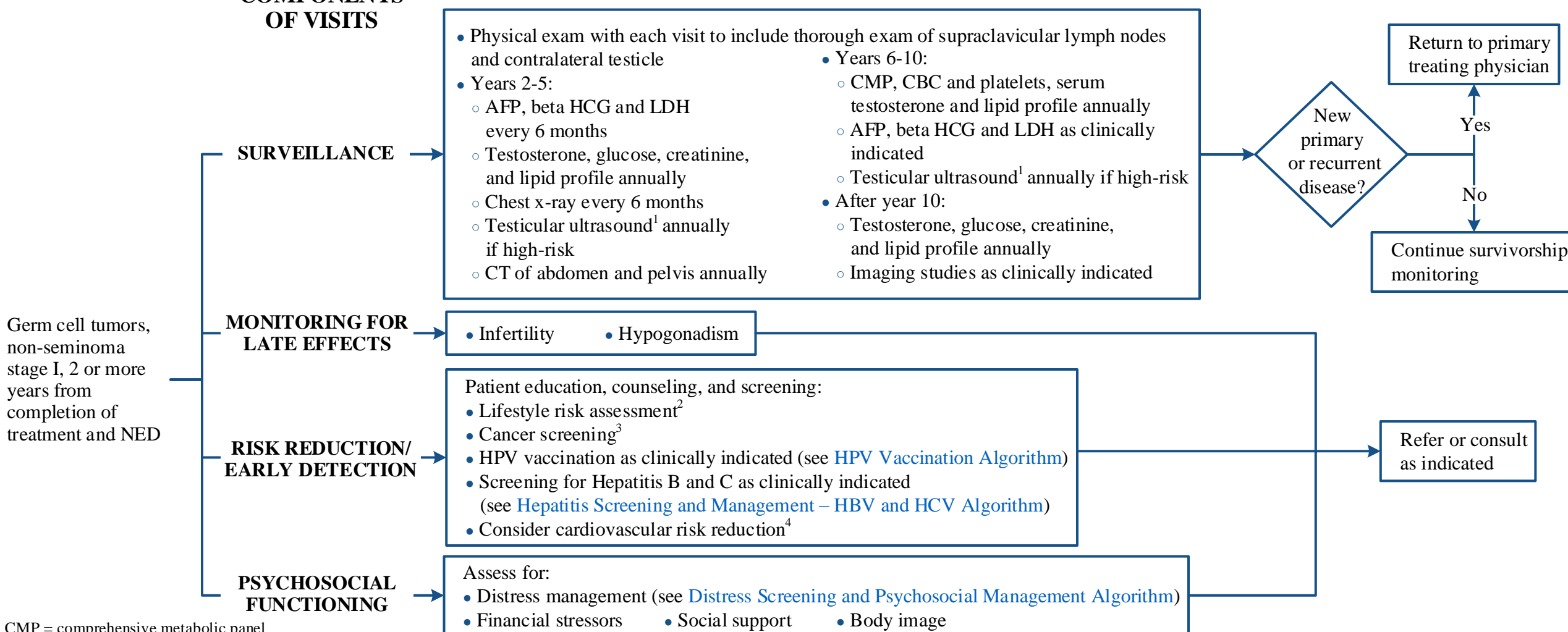
Survivorship – Testicular Cancer: Germ Cell Non-Seminoma Stage I Surveillance

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.

ELIGIBILITY

CONCURRENT COMPONENTS OF VISITS

DISPOSITION



CMP = comprehensive metabolic panel
 NED = no evidence of disease

¹ Annual ultrasound of contralateral testicle if one of the following present: diagnosis of seminoma and less than 30 years old when diagnosed or testicular maldescent or infertility

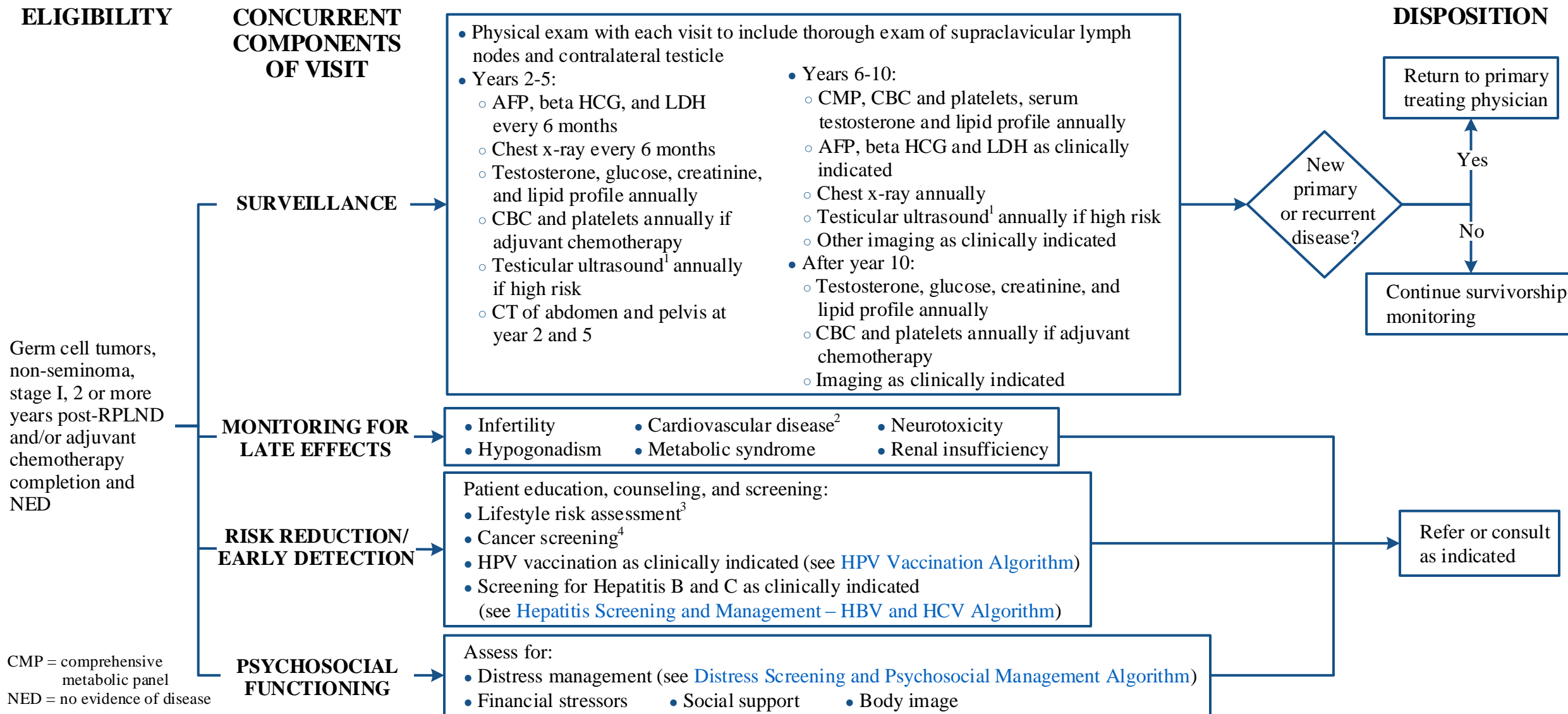
² See [Physical Activity](#), [Nutrition](#), and [Tobacco Cessation](#) algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice

³ Includes [colorectal](#), [liver](#), [lung](#), [pancreatic](#), [prostate](#), and [skin cancer screening](#)

⁴ Consider use of Vanderbilt's [ABCDE's approach to cardiovascular health](#)

Survivorship – Testicular Cancer: Germ Cell Non-Seminoma Stage I Post-RPLND and/or Adjuvant Chemotherapy

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.



¹ Annual ultrasound of contralateral testicle if one of the following is present: diagnosis of seminoma and less than 30 years old when diagnosed or testicular maldescent, or infertility

² Consider use of Vanderbilt's [ABCDE's approach to cardiovascular health](#)

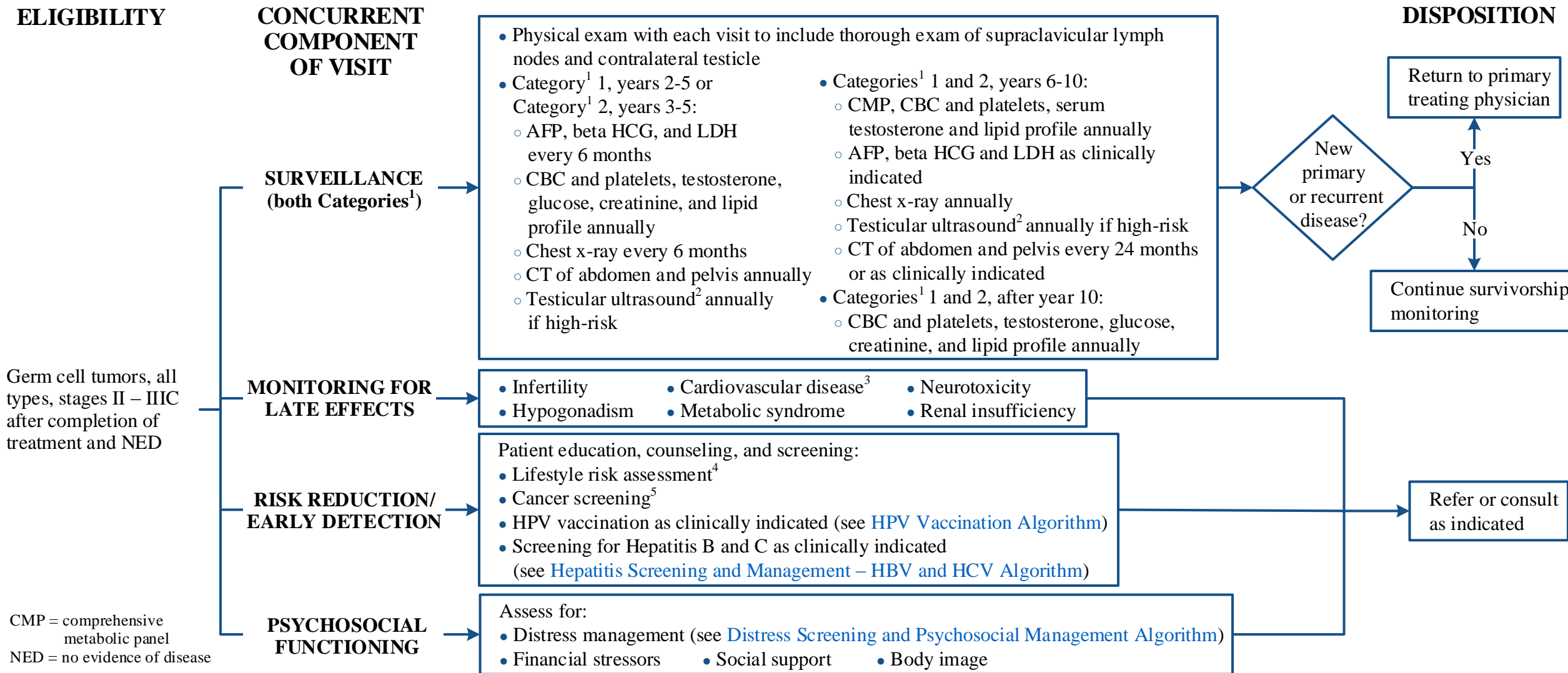
³ See [Physical Activity](#), [Nutrition](#), and [Tobacco Cessation](#) algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice

⁴ Includes [colorectal](#), [liver](#), [lung](#), [pancreatic](#), [prostate](#), and [skin cancer screening](#)

Survivorship – Testicular Cancer: Germ Cell

All types, Stages II-III C

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.



¹ Category 1: germ cell tumors all types, stages II – IIIA; no evidence of disease at 2 years

Category 2: germ cell tumors all types, stages IIIB and IIIC; no evidence of disease at 3 years

² Annual ultrasound of contralateral testicle if one of the following is present: diagnosis of seminoma and less than 30 years old when diagnosed or testicular maldescent, or infertility

³ Consider use of Vanderbilt's [ABCDE's approach to cardiovascular health](#)

⁴ See [Physical Activity](#), [Nutrition](#), and [Tobacco Cessation](#) algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice

⁵ Includes [colorectal](#), [liver](#), [lung](#), [pancreatic](#), [prostate](#), and [skin cancer screening](#)

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.*

SUGGESTED READINGS

- Albers, P., Albrecht, W., Algaba, F., Bokemeyer, C., Cohn-Cedermark, G., Horwich, A., ... & Pizzocaro, G. (2005). Guidelines on testicular cancer. *European Urology*, 48(6), 885-894.
- Amis, E. S., Butler, P. F., Applegate, K. E., Birnbaum, S. B., Brateman, L. F., Hevezi, J. M., ... & Strauss, K. J. (2007). American College of Radiology white paper on radiation dose in medicine. *Journal of the American College of Radiology*, 4(5), 272-284.
- Brenner, D. J., & Hall, E. J. (2007). Computed tomography—an increasing source of radiation exposure. *New England Journal of Medicine*, 357(22), 2277-2284.
- Centers for Disease Control and Prevention. (2018, March 5). *Recommended immunization schedule for adults aged 19 years or older, United States 2018*. Retrieved from <https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html>
- Deti, B., Livi, L., Scoccianti, S., Meattini, I., Gacci, M., Lapini, A., & Biti, G. (2007). Late relapse in testicular germ cell tumors. *Tumori*, 93(5), 428-431.
- Efstathiou, E., & Logothetis, C. J. (2006). Review of late complications of treatment and late relapse in testicular cancer. *Journal of the National Comprehensive Cancer Network*, 4(10), 1059-1070.
- Fosså, S. D., Chen, J., Schonfeld, S. J., McGlynn, K. A., McMaster, M. L., Gail, M. H., & Travis, L. B. (2006). Risk of contralateral testicular cancer: a population-based study of 29515 US Men. *The Journal of Urology*, 175(3), 960-961.
- Fosså, S. D., Gilbert, E., Dores, G. M., Chen, J., McGlynn, K. A., Schonfeld, S., ... & Joensuu, H. (2007). Noncancer causes of death in survivors of testicular cancer. *Journal of the National Cancer Institute*, 99(7), 533-544.
- George, D. W., Foster, R. S., Hromas, R. A., Robertson, K. A., Vance, G. H., Ulbright, T. M., ... & Thurston, V. C. (2003). Update on late relapse of germ cell tumor: a clinical and molecular analysis. *Journal of Clinical Oncology*, 21(1), 113-122.
- Gospodarowicz, M. (2008). Testicular cancer patients: considerations in long-term follow-up. *Hematology/Oncology Clinics of North America*, 22(2), 245-255.
- Kondagunta, G. V., Sheinfeld, J., & Motzer, R. J. (2003, June). Recommendations of follow-up after treatment of germ cell tumors. In *Seminars in Oncology* (Vol. 30, No. 3, pp. 382-389). WB Saunders.
- Krege, S., Beyer, J., Souchon, R., Albers, P., Albrecht, W., Algaba, F., ... & Classen, J. (2008). European consensus conference on diagnosis and treatment of germ cell cancer: a report of the second meeting of the European Germ Cell Cancer Consensus group (EGCCCG): part I. *European Urology*, 53(3), 478-496.
- Krege, S., Beyer, J., Souchon, R., Albers, P., Albrecht, W., Algaba, F., ... & Classen, J. (2008). European consensus conference on diagnosis and treatment of germ cell cancer: a report of the second meeting of the European Germ Cell Cancer Consensus group (EGCCCG): part II. *European Urology*, 53(3), 497-513.
- Martin, J. M., Panzarella, T., Zwahlen, D. R., Chung, P., & Warde, P. (2007). Evidence-based guidelines for following stage 1 seminoma. *Cancer*, 109(11), 2248-2256. *Continued on next page*

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.*

SUGGESTED READINGS - continued

- National Comprehensive Cancer Network. Testicular Cancer (Version 2.2018). https://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf. Accessed March 7, 2018.
- Oh, J. H., Baum, D. D., Pham, S., Cox, M., Nguyen, S. T., Ensor, J., & Chen, I. (2007). Long-term complications of platinum-based chemotherapy in testicular cancer survivors. *Medical Oncology*, 24(2), 175-181.
- Oldenburg, J., Alfsen, G. C., Waehre, H., & Fosså, S. D. (2006). Late recurrences of germ cell malignancies: a population-based experience over three decades. *British Journal of Cancer*, 94(6), 820-827.
- Oldenburg, J., Martin, J. M., & Fosså, S. D. (2006). Late relapses of germ cell malignancies: incidence, management, and prognosis. *Journal of Clinical Oncology*, 24(35), 5503-5511.
- Oliver, R. T. D., Mason, M. D., Mead, G. M., von der Maase, H., Rustin, G. J. S., Joffe, J. K., ... & Kirk, S. J. (2005). Radiotherapy versus single-dose carboplatin in adjuvant treatment of stage I seminoma: a randomised trial. *The Lancet*, 366(9482), 293-300.
- Rustin, G. J., Mead, G. M., Stenning, S. P., Vasey, P. A., Aass, N., Huddart, R. A., ... & Kirk, S. J. (2007). Randomized trial of two or five computed tomography scans in the surveillance of patients with stage I nonseminomatous germ cell tumors of the testis: Medical Research Council Trial TE08, ISRCTN56475197—the National Cancer Research Institute Testis Cancer Clinical Studies Group. *Journal of Clinical Oncology*, 25(11), 1310-1315.
- Shahidi, M., Norman, A. R., Dearnaley, D. P., Nicholls, J., Horwich, A., & Huddart, R. A. (2002). Late recurrence in 1263 men with testicular germ cell tumors. *Cancer*, 95(3), 520-530.
- Sohaib, S. A., & Husband, J. (2007). Surveillance in testicular cancer: who, when, what and how?. *Cancer Imaging*, 7(1), 145-147.
- Van As, N. J., Gilbert, D. C., Money-Kyrle, J., Bloomfield, D., Beesley, S., Dearnaley, D. P., ... & Huddart, R. A. (2008). Evidence-based pragmatic guidelines for the follow-up of testicular cancer: optimising the detection of relapse. *British Journal of Cancer*, 98(12), 1894-1902.
- van den Belt-Dusebout, A. W., de Wit, R., Gietema, J. A., Horenblas, S., Louwman, M. W., Ribot, J. G., ... & van Leeuwen, F. E. (2007). Treatment-specific risks of second malignancies and cardiovascular disease in 5-year survivors of testicular cancer. *Journal of Clinical Oncology*, 25(28), 4370-4378.
- Vanderbilt Cardio-Oncology Program. (2017). *Know Your ABCDE's*. Retrieved from <http://www.cardioonc.org/2017/08/29/know-your-abcs/>
- Vaughn, D. J., Gignac, G. A., & Meadows, A. T. (2002). Long-term medical care of testicular cancer survivors. *Annals of Internal Medicine*, 136(6), 463-470.
- Vaughn, D. J., Palmer, S. C., Carver, J. R., Jacobs, L. A., & Mohler, E. R. (2008). Cardiovascular risk in long-term survivors of testicular cancer. *Cancer*, 112(9), 1949-1953.
- Wolf, A., Wender, R. C., Etzioni, R. B., Thompson, I. M., D'Amico, A. V., Volk, R. J., ... & DeSantis, C. (2010). American Cancer Society guideline for the early detection of prostate cancer: update 2010. *CA: A Cancer Journal for Clinicians*, 60(2), 70-98.

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care.*

DEVELOPMENT CREDITS

This survivorship algorithm is based on majority expert opinion of the Genitourinary Survivorship work group at The University of Texas MD Anderson Cancer Center. It was developed using a multidisciplinary approach that included input from the following:

Wendy Garcia, BS♦

William Graber, MD (Urology)

Jeri Kim, MD (Genitourinary Medical Oncology)

Deborah A. Kuban, MD (Radiation Oncology)

Paula Lewis-Patterson, DNP, RN, NEA-BC (Cancer Survivorship)

William E. Osai, RN, APN, FNP (Genitourinary Medical Oncology)

Amy Pai, PharmD♦

♦ Clinical Effectiveness Development Team