

# Breast Cancer – Noninvasive

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. This algorithm should not be used to treat pregnant women.

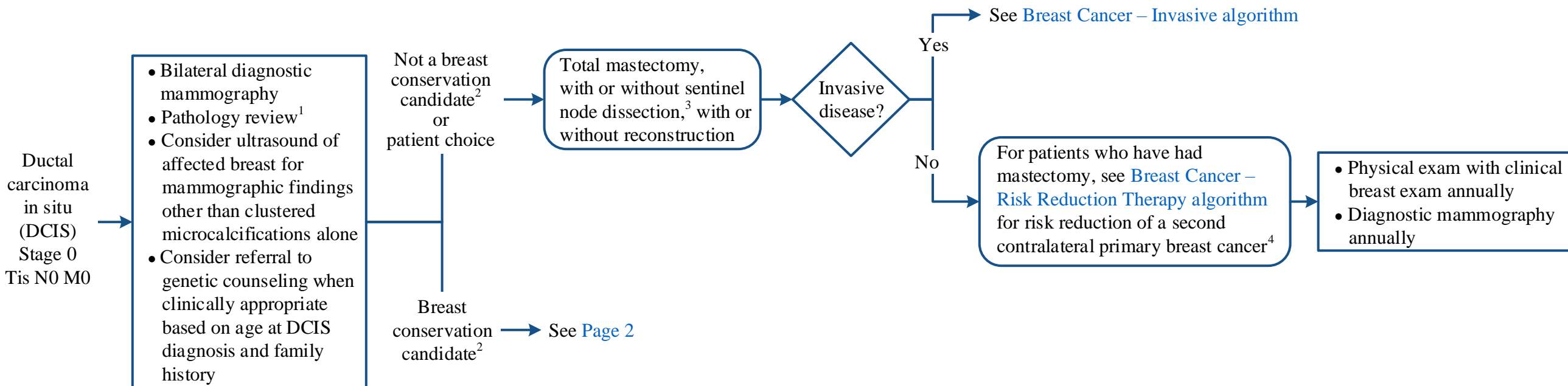
**Note:** Consider Clinical Trials as treatment options for eligible patients.

## DIAGNOSIS EVALUATION

## LOCAL TREATMENT

## SYSTEMIC TREATMENT

## SURVEILLANCE/FOLLOW-UP



<sup>1</sup> Pathology review to include:

- Tumor size
- Rule out invasive component
- Lymph node status if lymph node surgery performed
- Estrogen receptor (ER)/progesterone receptor (PR) status, preferably on the surgical specimen (unless patient is undergoing bilateral mastectomy)
- Margin status
- Nuclear grade
- Histologic type/necrosis

<sup>2</sup> Candidates for breast conservation therapy:

- Unicentric disease
- Tumor to breast size ratio allows for acceptable cosmetic result
- Attempt margins  $\geq 2$  mm
- No evidence of diffuse microcalcifications on mammography
- No contraindication to radiation therapy

<sup>3</sup> DCIS lymph node evaluation not recommended unless patient having total mastectomy which would preclude mapping at a later date if invasive disease noted on final pathology

<sup>4</sup> For ER or PR positive DCIS, endocrine therapy with tamoxifen for 5 years or aromatase inhibitor (AI) therapy is also an option for postmenopausal patients for risk reduction. See [Breast Cancer – Risk Reduction Therapy algorithm](#) for risk reduction of a second contralateral primary breast cancer. For patients who underwent bilateral mastectomy, there is zero indication for risk reduction therapy.

# Breast Cancer – Noninvasive

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. This algorithm should not be used to treat pregnant women.

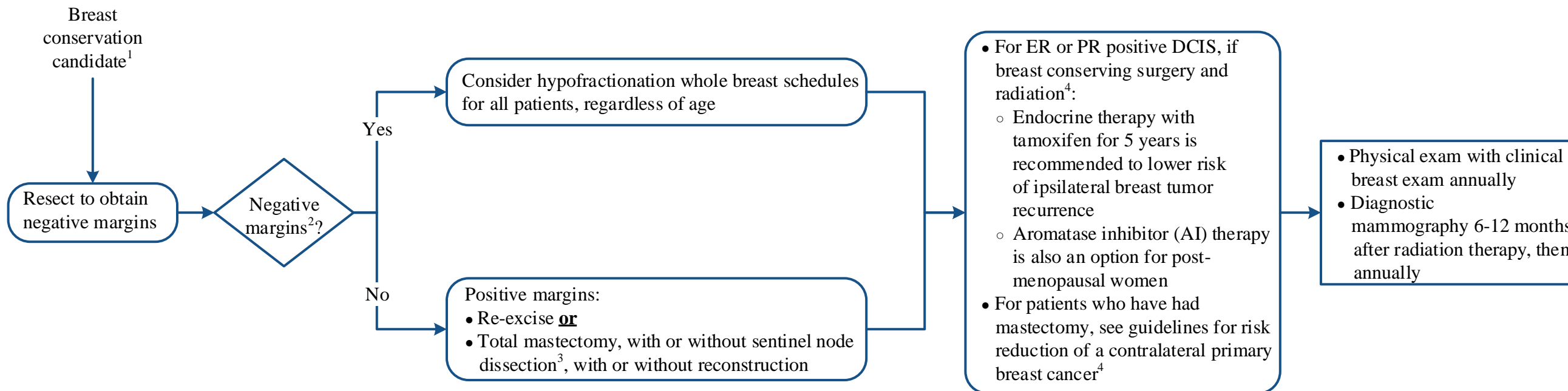
**Note:** Consider Clinical Trials as treatment options for eligible patients.

## DIAGNOSIS EVALUATION

## LOCAL TREATMENT

## SYSTEMIC TREATMENT

## SURVEILLANCE/ FOLLOW-UP



<sup>1</sup> Candidates for breast conservation therapy:

- Unicentric disease
- Tumor to breast size ratio allows for acceptable cosmetic result
- No evidence of diffuse microcalcifications on mammography
- No contraindication to radiotherapy

<sup>2</sup> Negative net margins:

- If < 2 mm negative margins and planned radiation therapy, multidisciplinary planning to consider need to re-excite and consider radiation therapy boost 14-16 Gy as an alternative to re-excision
- If < 2 mm negative margins and no planned radiation therapy, re-excite

<sup>3</sup> DCIS lymph node evaluation not recommended unless patient having total mastectomy which would preclude mapping at a later date if invasive disease noted on final pathology.

<sup>4</sup> For ER or PR positive DCIS, if patient undergoes breast conserving surgery and radiation, endocrine therapy is recommended to lower risk of ipsilateral breast tumor recurrence. The magnitude of local recurrence risk reduction depends on absolute risk of local recurrence based on factors such as grade and size (molecular profiling impact still is uncertain). Tamoxifen 20 mg daily for 5 years is approved to lower ipsilateral breast tumor recurrence after breast conserving surgery and radiation. AI therapy (anastrozole 1 mg daily for 5 years) has been shown to be equally effective, yet not FDA-approved for this indication. Endocrine therapy can also be considered for ER or PR positive DCIS treated with breast conserving surgery without radiation, but less supportive data exists. For patients undergoing mastectomy, refer to breast cancer prevention guidelines for prevention of a contralateral breast cancer.

# Breast Cancer – Noninvasive

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. This algorithm should not be used to treat pregnant women.

## SUGGESTED READINGS

- Allegra, C. J., Aberle, D. R., Ganschow, P., Hahn, S. M., Lee, C. N., Millon-Underwood, S., ... Schwartz, A. M. (2010). National Institutes of Health State-of-the-Science Conference statement: Diagnosis and management of ductal carcinoma in situ September 22–24, 2009. *Journal of the National Cancer Institute*, 102(3), 161-169. doi:10.1093/jnci/djp485
- Allred, D. C., Anderson, S. J., Paik, S., Wickerham, D. L., Nagtegaal, I. D., Swain, S. M., ... Land, S. R. (2012). Adjuvant tamoxifen reduces subsequent breast cancer in women with estrogen receptor–positive ductal carcinoma in situ: A study based on NSABP Protocol B-24. *Journal of Clinical Oncology*, 30(12), 1268-1273. doi:10.1200/JCO.2010.34.0141
- Alvarado, R., Lari, S. A., Roses, R. E., Smith, B. D., Yang, W., Mittendorf, E. A., ... Caudle, A. S. (2012). Biology, treatment, and outcome in very young and older women with DCIS. *Annals of Surgical Oncology*, 19(12), 3777-3784. doi:10.1245/s10434-012-2413-4
- Bayraktar, S., Elsayegh, N., Gutierrez Barrera, A. M., Lin, H., Kuerer, H., Tasbas, T., ... Hortobagyi, G. N. (2012). Predictive factors for BRCA1/BRCA2 mutations in women with ductal carcinoma in situ. *Cancer*, 118(6), 1515-1522. doi:10.1002/cncr.26428
- Correa, C., Harris, E. E., Leonardi, M. C., Smith, B. D., Taghian, A. G., Thompson, A. M., ... Harris, J. R. (2017). Accelerated partial breast irradiation: executive summary for the update of an ASTRO evidence-based consensus statement. *Practical Radiation Oncology*, 7(2), 73-79. doi:10.1016/j.prro.2016.09.007
- Correa, C., McGale, P., Taylor, C., Wang, Y., Clarke, M., Davies, C., ... Darby, S. (2010). Overview of the randomized trials of radiotherapy in ductal carcinoma in situ of the breast. *JNCI Monographs*, 2010(41), 162-177. doi:10.1093/jncimonographs/lgq039
- Courdi, A., Ortholan, C., Hannoun-Lévi, J. M., Ferrero, J. M., Largillier, R., Balu-Maestro, C., ... Birtwisle-Peyrottes, I. (2006). Long-term results of hypofractionated radiotherapy and hormonal therapy without surgery for breast cancer in elderly patients. *Radiotherapy and Oncology*, 79(2), 156-161. doi:10.1016/j.radonc.2006.04.005
- Cuzick, J., Sestak, I., Pinder, S. E., Ellis, I. O., Forsyth, S., Bundred, N. J., ... & George, W. D. (2011). Effect of tamoxifen and radiotherapy in women with locally excised ductal carcinoma in situ: long-term results from the UK/ANZ DCIS trial. *The Lancet Oncology*, 12(1), 21-29. doi:10.1016/S1470-2045(10)70266-7
- Eng-Wong, J., Costantino, J. P., & Swain, S. M. (2010). The impact of systemic therapy following ductal carcinoma in situ. *JNCI Monographs*, 2010(41), 200-203. doi:10.1093/jncimonographs/lgq021
- Fisher, B., Dignam, J., Wolmark, N., Mamounas, E., Costantino, J., Poller, W., ... Dimitrov, N. (1998). Lumpectomy and radiation therapy for the treatment of intraductal breast cancer: Findings from National Surgical Adjuvant Breast and Bowel Project B-17. *Journal of Clinical Oncology*, 16(2), 441-452. doi:10.1200/JCO.1998.16.2.441
- Fisher, B., Dignam, J., Wolmark, N., Wickerham, D. L., Fisher, E. R., Mamounas, E., ... Kardinal, C. G. (1999). Tamoxifen in treatment of intraductal breast cancer: National Surgical Adjuvant Breast and Bowel Project B-24 randomised controlled trial. *The Lancet*, 353(9169), 1993-2000. doi:10.1016/S0140-6736(99)05036-9
- Ganz, P. A., Cecchini, R. S., Julian, T. B., Margolese, R. G., Costantino, J. P., Vallow, L. A., ... Gross, H. M. (2016). Patient-reported outcomes with anastrozole versus tamoxifen for postmenopausal patients with ductal carcinoma in situ treated with lumpectomy plus radiotherapy (NSABP B-35): A randomised, double-blind, phase 3 clinical trial. *The Lancet*, 387(10021), 857-865. doi:10.1016/S0140-6736(15)01169-1
- Hughes, K. S., Schnaper, L. A., Bellon, J. R., Cirrincione, C. T., Berry, D. A., McCormick, B., ... Wood, W. C. (2013). Lumpectomy plus tamoxifen with or without irradiation in women age 70 years or older with early breast cancer: Long-term follow-up of CALGB 9343. *Journal of Clinical Oncology*, 31(19), 2382-2387. doi:10.1200/JCO.2012.45.2615

Continued on next page

# Breast Cancer – Noninvasive

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. This algorithm should not be used to treat pregnant women.

## SUGGESTED READINGS - continued

- Hughes, L. L., Wang, M., Page, D. L., Gray, R., Solin, L. J., Davidson, N. E., ... Wood, W. C. (2009). Local excision alone without irradiation for ductal carcinoma in situ of the breast: A trial of the Eastern Cooperative Oncology Group. *Journal of Clinical Oncology*, 27(32), 5319-5324. doi:10.1200/JCO.2009.21.8560
- Julien, J. P., Bijker, N., Fentiman, I. S., Peterse, J. L., Delledonne, V., Rouanet, P., ... Van Dongen, J. A. (2000). Radiotherapy in breast-conserving treatment for ductal carcinoma in situ: First results of the EORTC randomised phase III trial 10853. *The Lancet*, 355(9203), 528-533. doi:10.1016/S0140-6736(99)06341-2
- Kerlikowske, K., Molinaro, A. M., Gauthier, M. L., Berman, H. K., Waldman, F., Bennington, J., ... Ljung, B. M. (2010). Biomarker expression and risk of subsequent tumors after initial ductal carcinoma in situ diagnosis. *Journal of the National Cancer Institute*, 102(9), 627-637. doi:10.1093/jnci/djq101
- Kuerer, H. M., Albarracin, C. T., Yang, W. T., Cardiff, R. D., Brewster, A. M., Symmans, W. F., ... Babiera, G. (2009). Ductal carcinoma in situ: state of the science and roadmap to advance the field. *Journal of Clinical Oncology*, 27(2), 279-288. doi:10.1200/JCO.2008.18.3103
- Kuerer, H. M., Smith, B. D., Chavez-MacGregor, M., Albarracin, C., Barcnas, C. H., Santiago, L., ... Krishnamurthy, S. (2017). DCIS Margins and Breast Conservation: MD Anderson Cancer Center Multidisciplinary Practice Guidelines and Outcomes. *Journal of Cancer*, 8(14), 2653. doi:10.7150/jca.20871.
- Lari, S. A., & Kuerer, H. M. (2011). Biological markers in DCIS and risk of breast recurrence: A systematic review. *Journal of Cancer*, 2, 232-261. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3088863/>
- Margolese, R. G., Cecchini, R. S., Julian, T. B., Ganz, P. A., Costantino, J. P., Vallow, L. A., ... Gross, H. M. (2016). Anastrozole versus tamoxifen in postmenopausal women with ductal carcinoma in situ undergoing lumpectomy plus radiotherapy (NSABP B-35): A randomised, double-blind, phase 3 clinical trial. *The Lancet*, 387(10021), 849-856. doi:10.1016/S0140-6736(15)01168-X
- National Comprehensive Cancer Network. (2019). *Breast Cancer* (NCCN Guideline Version 3.2019). Retrieved from [https://www.nccn.org/professionals/physician\\_gls/pdf/breast.pdf](https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf)
- Tadros, A. B., Smith, B. D., Shen, Y., Lin, H., Krishnamurthy, S., Lucci, A., ... Strom, E. A. (2017). Ductal Carcinoma In Situ and Margins < 2 mm: Contemporary Outcomes With Breast Conservation. *Annals of Surgery*. doi:10.1097/SLA.0000000000002439
- Trialists' Group, T. S. (2008). The UK Standardisation of Breast Radiotherapy (START) Trial B of radiotherapy hypofractionation for treatment of early breast cancer: a randomised trial. *The Lancet*, 371(9618), 1098-1107. doi:10.1016/S0140-6736(08)60348-7
- Wapnir, I. L., Dignam, J. J., Fisher, B., Mamounas, E. P., Anderson, S. J., Julian, T. B., ... Wolmark, N. (2011). Long-term outcomes of invasive ipsilateral breast tumor recurrences after lumpectomy in NSABP B-17 and B-24 randomized clinical trials for DCIS. *Journal of the National Cancer Institute*, 103(6), 478-488. doi:10.1093/jnci/djr027
- Wärnberg, F., Garmo, H., Emdin, S., Hedberg, V., Adwall, L., Sandelin, K., ... Jirström, K. (2014). Effect of radiotherapy after breast-conserving surgery for ductal carcinoma in situ: 20 years follow-up in the randomized SweDCIS trial. *Journal of Clinical Oncology*, 32(32), 3613-3618. doi:10.1200/JCO.2014.56.2595
- Yi, M., Meric-Bernstam, F., Kuerer, H. M., Mittendorf, E. A., Bedrosian, I., Lucci, A., ... Hunt, K. K. (2012). Evaluation of a breast cancer nomogram for predicting risk of ipsilateral breast tumor recurrences in patients with ductal carcinoma in situ after local excision. *Journal of Clinical Oncology*, 30(6), 600-607. doi:10.1200/JCO.2011.36.4976



# Breast Cancer – Noninvasive

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. This algorithm should not be used to treat pregnant women.*

## DEVELOPMENT CREDITS

This practice consensus algorithm is based on majority expert opinion of the faculty practicing in the Nellie B. Connally Breast Center at the University of Texas MD Anderson Cancer Center. It was developed using a multidisciplinary approach that included input from the following:

Sausan Abouharb, MD (Breast Medical Oncology)  
Beatriz Adrada, MD (Breast Imaging Department)  
Constance Albarracin, MD (Anatomical Pathology)  
Elsa Arribas, MD (Breast Imaging Department)  
Banu K. Arun, MD (Breast Medical Oncology)  
Carlos Barcenas, MD (Breast Medical Oncology)  
Robert C. Bast, MD (Translational Research)  
Isabelle Bedrosian, MD (Breast Surgical Oncology)  
Daniel J. Booser, MD (Breast Medical Oncology)  
Shon Black, MD (Breast Surgical Oncology)  
Abenaa Brewster, MD (Clinical Cancer Prevention)  
Powel H. Brown, MD (Clinical Cancer Prevention)  
Aman U. Buzdar, MD (Clinical Research Administration)  
Abigail Caudle, MD (Breast Surgical Oncology)  
Mariana Chavez-MacGregor, MD (Health Services Research-Clinical)  
Hui Chen, MD (Anatomical Pathology)  
Alejandro Contreras, MD (Anatomical Pathology)  
Sarah DeSnyder, MD (Breast Surgical Oncology)  
Mark Dryden, MD (Breast Imaging Department)  
Mary Edgerton, MD (Anatomical Pathology)  
Olga N. Fleckenstein<sup>♦</sup>  
Barry Feig, MD (Surgical Oncology)

Sharon Giordano, MD (Health Services Research-Clinical)  
Monica Huang, MD (Breast Imaging Department)  
Karen Hoffman, MD (Radiation Oncology)  
Gabriel N. Hortobagyi, MD (Breast Medical Oncology)  
Kelly K. Hunt, MD (Breast Surgical Oncology)<sup>‡</sup>  
Lei Huo, MD (Anatomical Pathology)  
Rosa Hwang, MD (Breast Surgical Oncology)  
Nuhad K. Ibrahim, MD (Breast Medical Oncology)  
Meghan Karuturi, MD (Breast Medical Oncology)  
Kimberly Koenig, MD (Breast Medical Oncology)  
Savitri Krishnamurthy, MD (Anatomical Pathology)  
Henry M. Kuerer, MD, PhD (Breast Surgical Oncology)  
Deanna Lane, MD (Breast Imaging)  
Huong Le-Petross, MD (Breast Imaging)  
Jessica Leung, MD (Breast Imaging)  
Jennifer Litton, MD (Breast Medical Oncology)<sup>‡</sup>  
Anthony Lucci, MD (Breast Surgical Oncology)  
Funda Meric-Bermstam, MD (Investigational Cancer Therapeutics)  
Lavinia Middleton, MD (Anatomical Pathology)  
Melissa Mitchell, MD (Radiation Oncology)  
Tanya Moseley, MD (Breast Imaging)  
Stacy Moulder, MD (Breast Medical Oncology)

Rashmi Murthy, MD (Breast Medical Oncology)  
Kevin Nead, MD (Epidemiology)  
Amy Pai, PharmD<sup>♦</sup>  
George Perkins, MD (Radiation Oncology)  
Erika Resetskova, MD (Anatomical Pathology)  
Merrick I. Ross, MD (Surgical Oncology)  
Aysegul A. Sahin, MD (Anatomical Pathology)  
Lumarie Santiago, MD (Breast Imaging)  
Simona Shaitelman, MD (Radiation Oncology)  
Benjamin Smith, MD (Radiation Oncology)  
Marion Scoggins, MD (Breast Imaging)  
Nour Sneige, MD (Anatomical Pathology)  
Michael C. Stauder, MD (Radiation Oncology)  
Eric Strom, MD (Radiation Oncology)  
W. Fraser Symmans, MD (Anatomical Pathology)  
Mediget Teshome, MD (Breast Surgical Oncology)  
Debu Tripathy, MD (Breast Medical Oncology)  
Naoto T. Ueno, MD, PhD (Breast Medical Oncology)  
Vicente Valero, MD (Breast Medical Oncology)  
Mary Lou Warren, DNP, APRN, CNS-CC<sup>♦</sup>  
Gary Whitman, MD (Breast Imaging Department)  
Wendy Woodward, MD (Radiation Oncology)  
Yun Wu, MD (Anatomical Pathology)  
Wei Yang, MD (Diagnostic Radiology)

<sup>‡</sup>Core Development Team

<sup>♦</sup>Clinical Effectiveness Development Team