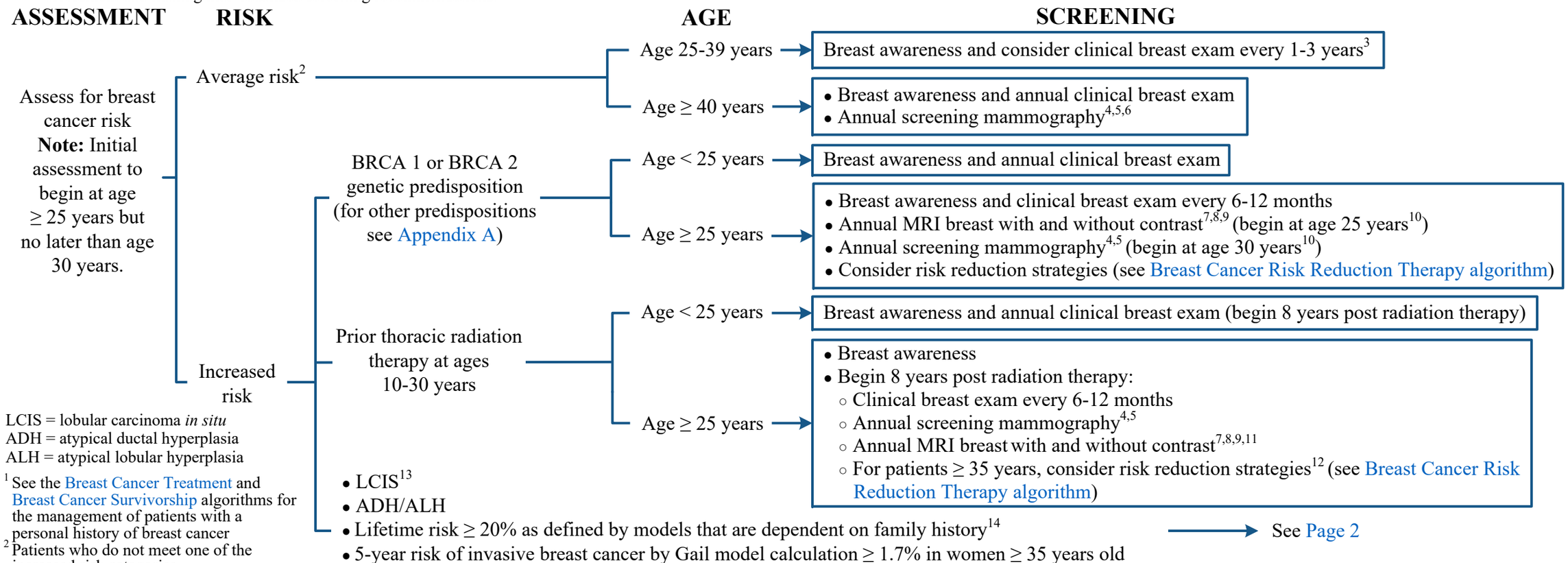
Breast Cancer Screening

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

Note: This algorithm is not intended for patients with a personal history of breast cancer[1]. Breast cancer screening may continue as long as a patient has a 10-year life expectancy and no co-morbidities that would limit the diagnostic evaluation or treatment of any identified problem. Patients should be counseled about the benefits, risks and limitations of screening mammography. For transgender patients, recommend performing a breast cancer risk assessment and making individualized screening recommendations.



See Page 2

LCIS = lobular carcinoma *in situ*
ADH = atypical ductal hyperplasia
ALH = atypical lobular hyperplasia

[1] See the Breast Cancer Treatment and Breast Cancer Survivorship algorithms for the management of patients with a personal history of breast cancer
[2] Patients who do not meet one of the increased risk categories
[3] A randomized control trial comparing clinical breast exam to no screening showed beneficial downstaging among women age 40-64 years and mortality benefit for women age 50-64 years
[4] Consider tomosynthesis as it improves cancer detection and decreases recall rates
[5] Augmented breasts need additional views for complete assessment
[6] Consider additional supplemental screening for dense breast (heterogeneously dense or extremely dense) with bilateral ultrasound breast or MRI breast with and without contrast. Patients should be educated that insurance may not cover the MRI.
[7] Patients should be educated that insurance may not cover the MRI
[8] If there's contraindication to breast MRI (*e.g.,* metal implants or severe claustrophobia), may consider screening contrast-enhanced mammography or molecular breast imaging as an alternative
[9] Alternating mammography and MRI breast every 6 months is suggested if feasible. While there is no data to suggest that this is the optimal approach, it is done with the expectation that interval cancers may be identified earlier. MRI breast performed at the time of the annual screening mammography is also acceptable.
[10] Screening decisions to be individualized for patients with family history of a breast cancer diagnosed at age < 30 years
[11] Risk of breast cancer begins to increase 8-10 years after thoracic radiation therapy. The optimal age to begin MRI screening in this high risk population is not currently known.
[12] Limited data regarding risk reduction therapy in women with prior thoracic radiation therapy
[13] Refers to classic lobular carcinoma *in situ* (CLCIS). For pleomorphic lobular carcinoma *in situ* (PLCIS), refer to the Breast Cancer - Ductal Carcinoma in Situ (DCIS) algorithm for surveillance.
[14] The Tyrer-Cuzick is a risk model that is largely dependent on family history

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Breast Cancer Screening

Note: This algorithm is not intended for patients with a personal history of breast cancer[1]. Breast cancer screening may continue as long as a patient has a 10-year life expectancy and no co-morbidities that would limit the diagnostic evaluation or treatment of any identified problem. Patients should be counseled about the benefits, risks and limitations of screening mammography. For transgender patients, recommend performing a breast cancer risk assessment and making individualized screening recommendations.

RISK	SCREENING
Increased risk: • LCIS[2] • ADH/ALH	• Breast awareness and clinical breast exam every 6-12 months • Consider annual MRI breast with and without contrast[3,4,5] (begin at diagnosis of LCIS or ADH/ALH but not prior to age 25 years) • Annual screening mammography[6,7] (begin at diagnosis of LCIS or ADH/ALH but not prior to age 30 years) • Begin risk reduction strategies (see Breast Cancer Risk Reduction Therapy algorithm) (begin at diagnosis of LCIS or ADH/ALH but not prior to age 35 years)
Increased risk: Lifetime risk ≥ 20% as defined by models that are dependent on family history[8]	**A** • Breast awareness and clinical breast exam every 6-12 months • Refer to genetic counselor, if not already done • Annual MRI breast with and without contrast[3,4,5] (begin 10 years before youngest case in the family but not prior to age 25 years) • Annual screening mammography[6,7] (begin 10 years before youngest case in the family but not prior to age 30 years) • Consider risk reduction strategies (see Breast Cancer Risk Reduction Therapy algorithm)
Increased risk: 5-year risk of invasive breast cancer by Gail model calculation ≥ 1.7% in women ≥ 35 years[9] old	• Breast awareness • To begin at age identified at increased risk: ◦ Consider risk reduction strategies (see Breast Cancer Risk Reduction Therapy algorithm) ◦ Clinical breast exam every 6-12 months ◦ Annual screening mammography[6,7]

[1] See the Breast Cancer Treatment and Breast Cancer Survivorship algorithms for the management of women with a personal history of breast cancer
[2] Refers to classic lobular carcinoma *in situ* (CLCIS). For pleomorphic lobular carcinoma *in situ* (PLCIS), refer to the Breast Cancer - Ductal Carcinoma in Situ (DCIS) algorithm for surveillance.
[3] If there's contraindication to breast MRI (*e.g.,* metal implants or severe claustrophobia), may consider screening contrast-enhanced mammography or molecular breast imaging as an alternative
[4] Alternating mammography and MRI breast every 6 months is suggested if feasible. While there is no data to suggest that this is the optimal approach, it is done with the expectation that interval cancers may be identified earlier. MRI breast performed at the time of the annual screening mammography is also acceptable.
[5] Patient should be educated that insurance may not cover the MRI
[6] Consider tomosynthesis as it improved cancer detection and decreases recall rates
[7] Augmented breasts need additional views for complete assessment
[8] The Tyrer-Cuzick is a risk model that is largely dependent on family history
[9] For women age ≥ 35 years with a 5-year risk of invasive breast cancer by Gail model calculation ≥ 1.7% **and** a lifetime risk ≥ 20% with models that are dependent on family history, follow the recommendations listed above in Box A

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APPENDIX A: Breast Management based on Genetic Test Results[1,2]

ATM	Increased risk of breast cancer • Screening: Annual mammography with tomosynthesis starting at age 40 years and consider MRI breast with contrast starting at age 30-35 years[3,4] • RRM: Evidence insufficient, manage based on family history
BARD1	• Screening: Annual mammography with tomosynthesis and consider MRI breast with contrast starting at age 40 years[3,4] • RRM: Evidence insufficient
BRIP1	Unknown or insufficient evidence for breast cancer risk
CDH1	Increased risk of lobular breast cancer • Screening: Annual mammography with tomosynthesis and consider MRI breast with contrast starting at age 30 years[3,4] • RRM: Discuss option of RRM
CHEK2	Increased risk of breast cancer • Screening: Annual mammography with tomosynthesis starting at age 40 years and consider MRI breast with contrast starting at age 30-35 years[3,4] • RRM: Evidence insufficient, manage based on family history
MSH2, MLH1, MSH6, PMS2, EpCAM	Unknown or insufficient evidence for breast cancer risk[4] • Manage based on family history, see Page 2 "Lifetime risk ≥ 20% as defined by models that are dependent on family history"
NF1	Increased risk of breast cancer • Screening: Annual mammography with tomosynthesis starting at age 30 years and consider MRI breast with contrast from ages 30-50 years[3,4] • RRM: Evidence insufficient, manage based on family history

RRM = risk-reducing mastectomy

[1] The following genes and others are found on some of the panels, but there is insufficient evidence to make any recommendations for breast MRI or RRM: FANCC, MRE11A, MUTYH heterozygotes, NBN, RECQL4, RAD50, RINT1, SLX4, SMARCA4, or XRCC2

[2] See Genetic Counseling algorithm

[3] May be modified based on family history (typically beginning screening 10 years earlier than the youngest diagnosis in the family but not later than stated in the table) or specific gene pathogenic/likely pathogenic variant

[4] For women with pathogenic/likely pathogenic variants who are treated for breast cancer and have not had bilateral mastectomy, screening should continue as described. See the Breast Cancer Treatment and Breast Cancer Survivorship algorithms for the management of patients with a personal history of breast cancer.

Continued on next page

APPENDIX A: Breast Management based on Genetic Test Results - continued

PALB2	Increased risk of breast cancer • Screening: Annual mammography with tomosynthesis and MRI breast with contrast at age 30 years[1,2] • RRM: Discuss option of RRM
PTEN	Increased risk of breast cancer • See NCCN Guidelines for Genetic/Familial High-Risk Assessment: Cowden Syndrome Management
RAD51C	• Screening: Annual mammography with tomosynthesis and consider MRI breast with contrast starting at age 40 years[1,2] • RRM: Evidence insufficient
RAD51D	• Screening: Annual mammography with tomosynthesis and consider MRI breast with contrast starting at age 40 years[1,2] • RRM: Evidence insufficient
STK11	Increased risk of breast cancer • Screening: See NCCN Guidelines for Genetic/Familial High-Risk Assessment: Colorectal • RRM: Discuss option of RRM
TP53	Increased risk of breast cancer • See Li-Fraumeni Syndrome Screening - Adult algorithm

[1] May be modified based on family history (typically beginning screening 10 years earlier than the youngest diagnosis in the family but not later than stated in the table) or specific gene pathogenic/likely pathogenic variant
[2] For women with pathogenic/likely pathogenic variants who are treated for breast cancer and have not had bilateral mastectomy, screening should continue as described. See the Breast Cancer Treatment and Breast Cancer Survivorship algorithms for the management of patients with a personal history of breast cancer.

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