



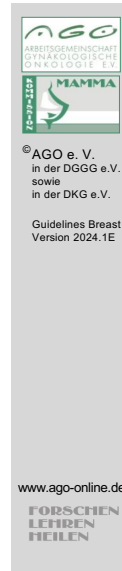
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Guidelines Breast  
Version 2024.1E

FORSCHEN  
LEHREN  
HEILEN

# Diagnosis and Treatment of Patients with early and advanced Breast Cancer

## Breast Cancer Follow-Up



## Breast Cancer Follow-Up

### Versions 2002–2023:

Bauerfeind / Bischoff / Blohmer / Böhme / Costa / Diel / Friedrich /  
Gerber / Gluz / Hanf / Heinrich / Huober / Janni / Kaufmann / Kolberg-  
Liedtke / Kümmel / Lüftner / Lux / Maass / Möbus / Müller-Schimpfle/  
Mundhenke / Oberhoff / Rody / Scharl / Solbach / Solomayer /  
Stickeler / Thomssen / Wöckel

### Version 2024:

Mundhenke / Schmidt

Aktualisierung der Therapieempfehlungen nach Durchsicht der ASCO, NCCN und ACS Guidelines\*, sowie der S3 Leitlinie Durchgeführte „Medline“ und „PubMed“-Suche nach „Surveillance Breast Cancer“ und „Follow up primary breast cancer“ (2019/01-2023/01)

\*Runowicz CD et al. , American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline, JCO 34 :611-635,  
NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Breast Cancer, Version 4.2022 — June 21, 2022; NCCN.org



## Breast Cancer Follow-Up Objectives

	Oxford		
	LoE	GR	AGO
<b>Early detection of curable events</b>			
▪ In-breast recurrence	1a	B	++
▪ Loco-regional recurrence*	1a	B	++
<b>Early detection of contralateral cancers</b>	1a	B	++
<b>Early detection of metastasis</b>			
▪ Early detection of symptomatic metastases	3b	C	+
▪ Early detection of asymptomatic metastases	1a	A	-

\* loco-regional recurrence is associated with a higher risk of mortality in node-positive, PR-negative, younger patients and in patients with a short time between primary diagnosis and recurrence

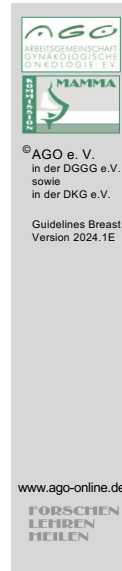
1. De Bock GH, Bonnema J, van Der Hage J et al., Effectiveness of Routine Visits and Routine Tests in Detecting Isolated Locoregional Recurrences After Treatment for Early-Stage Invasive Breast Cancer: A Meta-Analysis and Systematic Review. J Clin Oncol 2004; 22 (19): 4010-4018.
2. Margenthaler JA, Allan E, Cheng L, et al. Surveillance of Patients With Breast Cancer After Curative-Intent Primary Treatment: Current Practice Patterns. Journal of Oncology Practice 2012; 8(2): 79 – 83.
3. Parmeshwar R, Margenthaler JA, Allam E, et al. Patient Surveillance After Initial Breast cancer Therapy Variation by Physician Specialty. Am J Surg 2013; 206(2): 218-222.
4. Jochelson M, Hayes DF, Ganz PA. Surveillance and Monitoring in Breast Cancer Survivors: Maximizing Benefit and Minimizing Harm. ASCO Educational Book 2013 e13 – e18.
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of Regular Postoperative Surveillance for Patients with Early Breast Cancer

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10. NCCN Clinical Practice Guidelines in Oncology, Breast Cancer Version 3.17-10.17;  
[https://www.nccn.org/professionals/physician\\_gls/pdf/breast.pdf](https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf)
11. NCCN Clinical Practice Guidelines in Oncology, Breast Cancer Version 6.2020  
[https://www.nccn.org/professionals/physician\\_gls/pdf/breast\\_blocks.pdf](https://www.nccn.org/professionals/physician_gls/pdf/breast_blocks.pdf)
12. Lin J, Hu H, Shriver CD et al., Survival among Breast Cancer Patients: Comparison of the U.S. Military Health System with the Surveillance, Epidemiology and End Results Program. Clin Breast Cancer. 2021 Dec 1:S1526-8209(21)00348-7.
13. Viuff JH, Greiber IK, Karlsen MA et al., Survival in Women Diagnosed With Breast Cancer During Pregnancy. Clin Breast Cancer. 2021 Dec 1:S1526-8209(21)00346-3. doi: 10.1016/j.clbc.2021.11.009.

Statement: risk factors of mortality after loco-regional recurrence

1. Dent R, Valentini H, Hanna W, et al.. Factors associated with breast cancer mortality after local recurrence. Curr Oncol 2014; 21 (3): e418-25.



## Breast Cancer Follow-Up Objectives

	Oxford		
	LoE	GR	AGO
▪ <b>Improve quality of life</b>	2b	B	+
▪ <b>Improve physical performance</b>	2a	B	+
▪ <b>Reduction and / or early detection of therapy-related side effects</b> (such as osteoporosis, cardiac failure, fatigue, neurotoxicity, lymphedema, web axillary pain syndrome (abacterial lymphangitis), sexual disorders, cognitive impairment, sterility, and secondary tumors) <b>and start of necessary therapies</b>	2b	B	+
▪ <b>Participation in interventional programs during follow-up for breast cancer survivors in order to maximize therapy adherence, assess life-style interventions, and improve quality of life</b>	3b	B	+

### Statement: Outcome measurements

1. Ong WL, Schouwenburg MG, van Bommel ACM et al. A Standard Set of Value-Based Patient-Centered Outcomes for Breast Cancer: The International Consortium for Health Outcomes Measurement (ICHOM) Initiative. *JAMA Oncol.* 2017 May 1;3(5):677-685.
2. Browall M, Forsberg C, Wengström Y. Assessing patient outcomes and cost-effectiveness of nurse-led follow-up for women with breast cancer - have relevant and sensitive evaluation measures been used? *J Clin Nurs.* 2017 Jul;26(13-14):1770-1786.
3. Cheng KKF, Lim YTE, Koh ZM et al. Home-based multidimensional survivorship programmes for breast cancer survivors. *Cochrane Database Syst Rev.* 2017 Aug 24;8:CD011152.
4. Rassaf T, Totzeck M, Backs J et al. for Committee for Clinical Cardiovascular Medicine of the German Cardiac Society. Onco-Cardiology: Consensus Paper of the German Cardiac Society, the German Society for Pediatric Cardiology and Congenital Heart Defects and the German Society for Hematology and Medical Oncology. *Clin Res Cardiol.* 2020 Oct;109(10):1197-1222.
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system inhibitors for preventing left ventricular dysfunction due to anthracyclines or trastuzumab in patients with breast cancer. *Eur Heart J*. 2021 Dec 24;ehab843. doi: 10.1093/eurheartj/ehab843.

7. Franzoi MA, Degousée L, Martin et al. (2023) Implementing a PROACTIVE Care Pathway to Empower and Support Survivors of Breast Cancer. *JCO Oncol Pract* 19(6):353–361. doi:10.1200/OP.23.00016

Statement: Obesity, physical activity and quality of life

1. Bicego D, Brown K. Effects of Exercise on Quality of Life in Women Living with Breast Cancer: A Systematic Review. *The Breast Journal* 2009; 15(1): 45-51.
2. Carson JW, Carson KM, Porter LS et al. Yoga of Awareness program for menopausal symptoms in breast cancer survivors: results from a randomized trial. *Support Care Cancer* 2009; 17: 1301-1309.
3. Vaskuil DW, van Nes JG, Jungeburgt JM et al. Maintenance of physical activity and body weight in relation to subsequent quality of life in postmenopausal breast cancer patients. *Annals of Oncology* 2010; 21: 2094–2101.
4. Cramp F, Byron-Daniel J. Exercise for the management of cancer-related fatigue in adults. *Cochrane Database Syst Rev*. 2012 Nov 14;11:CD006145.
5. Bower JE, Garet D, Sternlieb B et al. Yoga for persistent fatigue in breast cancer survivors: A randomized controlled trial. *Cancer* 2012; 118(15): 3766-75.
6. Cramer H, Lange S, Klose P et al. Can yoga improve fatigue in breast cancer patients? A systematic review. *Acta Oncol* 2012; 51(4): 559 – 60.
7. Yang H, Brand JS, Fang F et al. Time-dependent risk of depression, anxiety, and stress-related disorders in patients with invasive and in situ breast cancer. *Int J Cancer*. 2017 Feb 15;140(4):841-852.
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9. Baumann FT, Bieck O, Oberste M et al.. Sustainable impact of an individualized exercise program on physical activity level and fatigue syndrome on breast cancer patients in two German rehabilitation centers. *Support Care Cancer*. 2017 Apr;25(4):1047-1054.
10. NCCN-Guidelines Version 2.2018. Cancer-related Fatigue.
11. Fabi A, Bhargava R, Fatigoni S, et al. Cancer-related fatigue: ESMO Clinical Practice Guidelines for diagnosis and treatment. *Annals of Oncology* 2020;31:713-23.
12. Curigliano G, Lenihan D, Fradley M, et al. Management of cardiac disease in cancer patients throughout oncological

treatment: ESMO consensus recommendations. *Annals of Oncology* 2020;31:171-90.

13. Lisevick A, Cartmel B, Harrigan M, Li F, et al. Effect of the Lifestyle, Exercise, and Nutrition (LEAN) Study on Long-Term Weight Loss Maintenance in Women with Breast Cancer. *Nutrients*. 2021 Sep 18;13(9):3265.

Statement: Obesity and breast cancer prognosis

1. Ewertz M, Jensen MB, Gunnarsdóttir KÁ et al.. Effect of obesity on prognosis after early-stage breast cancer. *J Clin Oncol* 2011; 29(1): 25-31.
2. Cespedes Feliciano EM, Kroenke CH, Bradshaw PT et al.. Postdiagnosis Weight Change and Survival Following a Diagnosis of Early-Stage Breast Cancer. *Cancer Epidemiol Biomarkers Prev*. 2017 Jan;26(1):44-50.

Statement: Lymphedema

1. Soran A, Ozmen T, McGuire KP et al.. The importance of detection of subclinical lymphedema for the prevention of breast cancer-related clinical lymphedema after axillary lymph node dissection; a prospective observational study. *Lymphat Res Biol* 2014;12(4): 289-9.
2. Basta MN, Wu LC, Kanchwala SK et al.. Reliable prediction of postmastectomy lymphedema: the Risk Assessment Tool Evaluating Lymphedema. *Am J Surg*. 2017 Jun;213(6):1125-1133.
3. Ferguson CM, Swaroop MN, Horick N, et al. Impact of Ipsilateral Blood Draws, Injections, Blood Pressure Measurements, and Air Travel on the Risk of Lymphedema for Patients Treated for Breast Cancer. *Journal of Clinical Oncology* 2016;34:691-8.
4. McNeely ML, Dolgoy ND, Rafn BS et al. Nighttime compression supports improved self-management of breast cancer-related lymphedema: A multicenter randomized controlled trial. *Cancer*. 2021 Oct 6. doi: 10.1002/cncr.33943.
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6. Jeffers EJ, Wagner JL, Korentager SS et al. (2023) Breast Cancer-Related Lymphedema (BCRL) and Bioimpedance Spectroscopy: Long-Term Follow-Up, Surveillance Recommendations, and Multidisciplinary Risk Factors. *Ann Surg Oncol* 30(10):6258–6265. doi:10.1245/s10434-023-13956-9

Statement: Neurotoxicity:

1. Jordan B, Margulies A, Cardoso F et al. Systemic anticancer therapy-induced peripheral and central neurotoxicity:

ESMO-EONS-EANO Clinical Practice guidelines for diagnosis, prevention, treatment and follow-up. Ann Oncology 2020 Oct; 31(10):1306-1319. doi 10.1016/j.annonc.2020.07.003

Statement: web axillary pain syndrome (Morbus Mondor):

1. Agostini F, Attanasi C, Bernetti A et al., Web Axillary Pain Syndrome-Literature Evidence and Novel Rehabilitative Suggestions: A Narrative Review. Int J Environ Res Public Health. 2021 Oct 2;18(19):10383.

Statement: sexual disorders and cognitive impairment:

1. Runowcz CD, Leach CR, Henry L et al.. American Cancer Society/American Society of Clinical Oncology breast cancer survivorship care guideline. CA Cancer J Clin 2016; 66: 43-73.
2. Janelsins MC, Heckler CE, Peppone LJ et al.. Cognitive Complaints in Survivors of Breast Cancer After Chemotherapy Compared With Age-Matched Controls: An Analysis From a Nationwide, Multicenter, Prospective Longitudinal Study. J Clin Oncol. 2017 Feb 10;35(5):506-514.
3. Bernstein LJ, McCreath GA, Komeylian Z et al..Cognitive impairment in breast cancer survivors treated with chemotherapy depends on control group type and cognitive domains assessed: A multilevel meta-analysis. Neurosci Biobehav Rev. 2017 Dec;83:417-428.

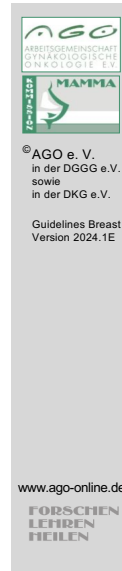
Statement kognitive Einschränkungen

1. Small BJ, Lange M, Zhai W et al. for Thinking Living with Cancer C. O. G.-Age Studies. Impact of taxane-based chemotherapy among older women with breast cancer on cognition and quality of life: a longitudinal pooled analysis. Breast Cancer Res Treat. 2021 Nov 24. doi: 10.1007/s10549-021-06455-6.

Statement: Secondary tumors:

1. Hoekstra N, Fleury E, Merino Lara TR, et al. Long-term risks of secondary cancer for various whole and partial breast irradiation techniques. Radiother Oncol. 2018 Sep;128(3):428-433





## Monitoring after Cardiotoxic Therapy (e.g. Anthracyclins, anti-HER2)

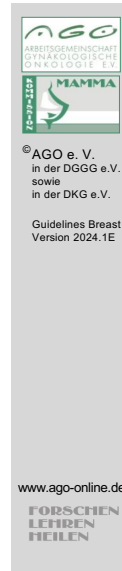
### After anthracyclines / Trastuzumab:

- ECG and echocardiography:
  - 6, 12, 24 months and yearly up to 5 years after therapy
  - after 5th year, every 5 years and if patient is symptomatic
- If cardiovascular risk factors:
  - blood pressure at least yearly
  - lipids and HbA1c in serum yearly
- Modify risk factors if possible:
  - nicotine, body weight, bmi
- Education about individual risk profile and lifestyle

### Risk factors:

radiotherapy of left breast, nicotine, hypertonus, diabetes mell., dyslipidaemia, adiposity, age > 60, cardiac diseases: reduced ejection fraction, post-myocardial infarction status, ≥ moderate heart defects

1. Curigliano G, Lenihan D, Fradley M, et al. Management of cardiac disease in cancer patients throughout oncological treatment: ESMO consensus recommendations. *Annals of Oncology* 2020;31:171-90.
2. Michel L, Rassaf T, Totzeck M. Biomarkers for the detection of apparent and subclinical cancer therapy-related cardiotoxicity. *J Thorac Dis* 2018;10:S4282-S95.
3. Rassaf T, Totzeck M, Backs J, et al. Onco-Cardiology: Consensus Paper of the German Cardiac Society, the German Society for Pediatric Cardiology and Congenital Heart Defects and the German Society for Hematology and Medical Oncology. *Clin Res Cardiol* 2020;109:1197-222.
4. Dent S, Fergusson D, Aseyev O et al. ,A Randomized Trial Comparing 3- versus 4-Monthly Cardiac Monitoring in Patients Receiving Trastuzumab-Based Chemotherapy for Early Breast Cancer. *Curr Oncol.* 2021 Dec 3;28(6):5073-5083.



## Breast Cancer Follow-Up Objectives

	Oxford		
	LoE	GR	AGO
<b>Evaluation of current adjuvant therapy</b>	<b>2b</b>	<b>B</b>	<b>++</b>
incl. monitoring of adherence to endocrine therapies			
Control of menopausal status, e.g. in case of CT-induced amenorrhea (FSH/2 or bleeding history) and addition of GnRH analogs (up to 2 years after CT) if premenopausal status in women < 45 years old, or switch to aromatase inhibitors (if postmenopausal)			
<b>Pro-active improvement of therapy adherence</b>	<b>5</b>	<b>D</b>	<b>++</b>
Patient information about efficacy data for 5-10 years endocrine therapy			
Early therapy of side effects (sports, NSAIDs, vitamin D / calcium)			

### Evaluation of current adjuvant therapy

1. Hershman DL, Kushi LH, Shao T et al. Early Discontinuation and Nonadherence to Adjuvant Hormonal Therapy in a Cohort of 8,769 Early-Stage Breast Cancer Patients. *J Clin Oncol* 2010; 28: 4120-4128.
2. Lueck H-J, Hadji P, Harbeck N et al. 24 Months Follow-Up Results from PACT (Patient's Anastrozole Compliance to Therapy Programme), a Non-Interventional Study Evaluating the Influence of a Standardized Information Service on Compliance in Postmenopausal Women with Early Breast Cancer. *SABCS 2011* [P5-17-05].
3. Neven P, Markopoulos C, Tanner M et al. The impact of educational materials on compliance and persistence rates with adjuvant aromatase inhibitor treatment: first-year results from the compliance of aromatase inhibitors assessment in daily practice through educational approach (CARIATIDE) study. *Breast*. 2014 Aug;23(4):393-9.
4. Hershman DL, Kushi LH, Hillyer GC et al. Psychosocial factors related to non persistence with adjuvant endocrine therapy among women with breast cancer: the Breast Cancer Quality of Care Study (BQUAL). *Breast Cancer Res Treat*. 2016 May;157(1):133-43.
5. Goss PE, Ingle JN, Pritchard KI et al. Extending Aromatase-Inhibitor Adjuvant Therapy to 10 Years. *N Engl J Med*. 2016 Jul 21;375(3):209-19.
6. Nabieva N, Kellner S, Fehm T et al. Patient and tumor characteristics and their influence on early therapy persistence with letrozole in postmenopausal patients with early breast cancer. *Ann Oncol*. 2017 Oct 10. doi: 10.1093/annonc/mdx630.

7. Laroche F, Perrot S, Medkour T et al. Quality of life and impact of pain in women treated with aromatase inhibitors for breast cancer. A multicenter cohort study. PLoS One. 2017 Nov 8;12(11):e0187165.
8. Kim, H. A., Lee, J. W., Nam, S. J., et al. Adding Ovarian Suppression to Tamoxifen for Premenopausal Breast Cancer: A Randomized Phase III Trial J Clin Oncol 2020 Feb 10;38(5):434-443

Adhärenz erhöhen durch Verhaltenstherapie/-training

1. Ream ME, Walsh EA, Jacobs JM, et al. Brief relaxation training is associated with long-term endocrine therapy adherence among women with breast cancer: post hoc analysis of a randomized controlled trial. Breast Cancer Res Treat. 2021 Nov;190(1):79-88. doi: 10.1007/s10549-021-06361-x.



## Breast Cancer Follow-Up Objectives

	Oxford		
	LoE	GR	AGO
<ul style="list-style-type: none"> <li>▪ <b>Psycho-social aspects of support and counseling</b> <ul style="list-style-type: none"> <li>▪ Pregnancy, contraception, sexuality, quality of life, menopausal symptoms, fear of recurrence</li> <li>▪ Inclusion of related persons (partner, family, friends, caregivers)</li> </ul> </li> </ul>	4	C	+
<ul style="list-style-type: none"> <li>▪ <b>Second opinion regarding primary therapy</b></li> </ul>	2c	B	++
<ul style="list-style-type: none"> <li>▪ <b>General counseling (e.g. changes in family history of breast, ovarian, prostate, pancreas carcinoma with new indication for genetic counseling, HRT, prophylactic surgery, breast reconstruction)</b></li> </ul>	2c	C	+

### Statement: Psycho-social aspects

1. Drolet M, Maunsell E, Brisson J et al. Not Working 3 Years After Breast Cancer: Predictors in a Population-Based Study. J Clin Oncol 2005; 23(33): 8305-8312.
2. Scheier MF, Helgeson VS, Schulz R et al.. Interventions to Enhance Physical and Psychological Functioning Among Younger Women Who Are Ending Nonhormonal Adjuvant Treatment for Early-Stage Breast Cancer. J Clin Oncol 2005; 23(19): 4298-4311.
3. Fors EA, Bertheussen GF, Thune I et al.: Psychosocial interventions as part of breast cancer rehabilitation programs? Results from a systematic review. Psycho-Oncology 2011; 20: 909-918.
4. Silva C, Caramelo O, Almeida-Santos T et al.. Factors associated with ovarian function recovery after chemotherapy for breast cancer: a systematic review and meta-analysis. Hum Reprod. 2016 Dec;31(12):2737-2749.
5. Luke B, Brown MB, Missmer SA et al.. Assisted reproductive technology use and outcomes among women with a history of cancer. Hum Reprod. 2016 Jan;31(1):183-9.
6. Gudenkauf LM, Ehlers SL. Psychosocial interventions in breast cancer survivorship care. Breast. 2017 Nov 20;38:1-6.
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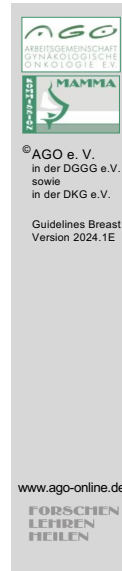
8. Y Kim, DA Kashy, RL Spillers, et al.: Needs assessment of family caregivers of cancer survivors: Three cohorts comparison *Psychooncology* 19:573–582,2010 Crossref, Medline, Google Scholar
9. Y Kim, RL Spillers, DL Hall: Quality of life of family caregivers 5 years after a relative's cancer diagnosis: Follow-up of the national quality of life survey for caregivers *Psychooncology* 21:273–281,2012 Crossref, Medline, Google Scholar
10. BA Given, CW Given, PR Sherwood: Family and caregiver needs over the course of the cancer trajectory *J Support Oncol* 10:57–64,2012 Crossref, Medline, Google Scholar
11. Tran TXM, Jung S, Lee EG et al., Fear of Cancer Recurrence and Its Negative Impact on Health-Related Quality of Life in Long-term Breast Cancer Survivors. *Cancer Res Treat.* 2021 Dec 9. doi: 10.4143/crt.2021.835.
12. Knerr S, Guo B, Wernli KJ et al. (2023) Longitudinal adherence to breast cancer surveillance following cancer genetic testing in an integrated health care system. *Breast Cancer Res Treat* 201(3):461–470. doi:10.1007/s10549-023-07007-w
13. Cathcart-Rake EJ, Ruddy KJ (2023) Evidence-Based Guidance for Breast Cancer Survivorship. *Hematol Oncol Clin North Am* 37(1):225–243. doi:10.1016/j.hoc.2022.08.019

Statement: prophylactic surgery

1. Rhiem K, Engel C, Graeser M et al.. The risk of contralateral breast cancer in patients from BRCA ½ negative high risk families as compared to patients from BRCA1 or BRCA2 positive families: a retrospective cohort study. *Breast Cancer Res.* 2012; 14(6): R156.

Statement zur Analgesie

1. Lu YC, Chen PT, Lin MC et al., Nonsteroidal Anti-Inflammatory Drugs Reduce Second Cancer Risk in Patients With Breast Cancer: A Nationwide Population-Based Propensity Score-Matched Cohort Study in Taiwan. *Front Oncol.* 2021 Nov 24;11:756143. doi: 10.3389/fonc.2021.756143.



## Breast Cancer Follow-Up Recommended Interventions

### Interventions regarding lifestyle risks and comorbidity in order to reduce an unfavorable impact on disease outcome

	Oxford		
	LoE	GR	AGO
<b>Treatment of type II-diabetes</b> (> 25% undetected DM in postmenopausal BC patients, endocrine therapy improves risk for DM)	2a	B	++
<b>Weight/lifestyle intervention</b> (if BMI < 18.5 and > 30)	2a	B	+
<b>Nightly fastening &gt; 13 h</b>	2b	B	+
<b>Reduction of dietary intake (at least 15 % calories from fat) in HR-negative BC is associated with improved overall survival</b>	2b	B	+
<b>Stop smoking</b> (smoking causes 2-fold increase in BC-specific and 4-fold increase in not directly BC-associated mortality)	2b	B	++
<b>Alcohol consumption reduction (below 6g/d)</b>	2b	B	+
<b>Moderate sport</b> (in patients with reduced physical activity prior to diagnosis) (at least 150 minutes/w, 2x/w)	1b	A	++
<b>Distress reduction</b>	3b	B	+

1. Onitilo AA, Donald M, Stankowski RV et al. Breast and prostate cancer survivors in a diabetic cohort: results from the Living with DiabetesStudy. Clin Med Res. 2013 Dec;11(4):210-8.
2. Anderson C, Sandler DP, Weinberg CR et al. Age- and treatment-related associations with health behavior change among breast cancer survivors. Breast. 2017 Jun;33:1-7.
3. Syrowatka A, Motulsky A, Kurteva S et al. Predictors of distress in female breast cancer survivors: a systematic review. Breast Cancer Res Treat. 2017 Sep;165(2):229-245. Review.
4. Gudenkauf LM, Ehlers SL. Psychosocial interventions in breast cancer survivorship care. Breast. 2017 Nov 20;38:1-6. Review.
5. Mehra K, Berkowitz A, Sanft T.D et al. Physical Activity, and Body Weight in Cancer Survivorship. Med Clin North Am. 2017 Nov;101(6):1151-1165. Review
6. Haykowsky MJ, Scott JM, Hudson K et al. Lifestyle Interventions to Improve Cardiorespiratory Fitness and Reduce Breast Cancer Recurrence. Am Soc Clin Oncol Educ Book. 2017;37:57-64.
7. Chlebowski RT, Aragaki AK, Anderson GL et al. Low-Fat Dietary Pattern and Breast Cancer Mortality in the Women's Health Initiative Randomized Controlled Trial. J Clin Oncol. 2017 Sep 1;35(25):2919-2926.
8. Marinac CR, Nelson SH, Breen CI et al. Prolonged Nightly Fasting and Breast Cancer Prognosis. JAMA Oncol. 2016 Aug 1;2(8):1049-55.

9. Sonnenblick A, Agbor-Tarh D, Bradbury I, et al. Impact of Diabetes, Insulin, and Metformin Use on the Outcome of Patients With Human Epidermal Growth Factor Receptor 2–Positive Primary Breast Cancer: Analysis From the ALTO Phase III Randomized Trial. *Journal of Clinical Oncology* 2017;35:1421-9.
10. D'cunha K, Park Y, Protani MM, Reeves MM (2023) Circadian rhythm disrupting behaviours and cancer outcomes in breast cancer survivors: a systematic review. *Breast Cancer Res Treat* 198(3):413–421. doi:10.1007/s10549-022-06792-0

#### AHT erhöht Diabetes mellitus

1. Ye F, Wen J, Yang A et al., The Influence of Hormone Therapy on secondary diabetes mellitus in Breast Cancer: A Meta-analysis. *Clin Breast Cancer*. 2021 Jul 21:S1526-8209(21)00174-9. doi: 10.1016/j.clbc.2021.06.014.

#### Statement: for all statements see most recent literature see at Survivorship care guidelines of ASC and ASCO

1. Runowcz CD, Leach CR, Henry L et al. American Cancer Society/American Society of Clinical Oncology breast cancer survivorship care guideline. *CA Cancer J Clin* 2016; 66: 43-73.
2. Rock CL, Doyle C, Demark-Wahnefried W, et al. Nutrition and physical activity guidelines for cancer survivors. *CA: a cancer journal for clinicians* 2012;62:243-74.

#### Weight intervention.

1. Chajès V, Romieu I. Nutrition and breast cancer. *Maturitas*, 2014; 77 (1): 7–11.
2. Shaikh H, Bradhurst P, Ma LX et al.: Body weight management in overweight and obese breast cancer survivors. *The Cochrane database of systematic reviews* 2020;12:Cd012110.
3. Goodwin PJ, Segal RJ, Vallis M, et al. The LISA randomized trial of a weight loss intervention in postmenopausal breast cancer. *npj Breast Cancer* 2020;6:6.
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1. Lee E, Kawaguchi ES, Zhang J et al. Bariatric surgery in patients with breast and endometrial cancer in California: population-based prevalence and survival. Surg Obes Relat Dis. 2022 Jan;18(1):42-52. doi: 10.1016/j.soard.2021.09.017.





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## Nightly Fasting

### **Prolonged nightly fasting improves prognosis in breast cancer patients**

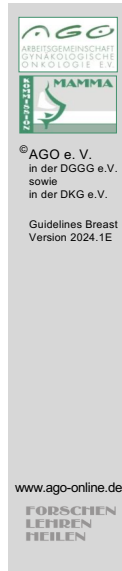
retrospective cohort study:

2413 BC-pat. (no diabetes), nightly fasting more or less than 13 hrs

**Fasting < 13 hrs: HR 1.36, 36% increase of risk for recurrence**  
**HR 1.21, n.s. increase of risk for mortality**

**every 2-hrs-prolonged fasting was correlated with a 20% increase of sleeping duration**

Marinac CR, Nelson SH, Breen CI et al. JAMA Oncol 2016; 2:1049-1055



## Routine Follow-Up Examinations in Asymptomatic Patients

Tests:	Oxford		
	LoE	GR	AGO
History (specific symptoms)	1a	A	++
Physical examination	1a	B	++
Breast self-examination	5	D	+
Mammography	1a	A	++
Sonography of the breast	2a	B	++
Routine MRI of the breast*	3a	B	+/-
Breast MRI if conventional imaging is inconclusive	3b	B	+
Pelvic examination	5	D	++
DXA-scan at baseline and repeat scan according to individual risk in women with premature menopause or women taking an AI	5	D	+

\* Consider in case of increased risk (age < 50 y, HR-neg., diagnostic assessability C/D in mammography + ultrasound)

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3. Jochelson M, Hayes DF, Ganz PA. Surveillance and Monitoring in Breast Cancer Survivors: Maximizing Benefit and Minimizing Harm. *ASCO Educational Book* 2013 e13 – e18.
4. Khatcheressian JL, Hurley P, Bantug E, et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . *J Clin Oncol.* 2013 March 1; 31(7):961-965.
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6. Expert Panel on Breast Imaging: Moy L, Bailey L, D'Orsi C et al. ACR Appropriateness Criteria<sup>®</sup> Stage I Breast Cancer: Initial Workup and Surveillance for Local Recurrence and Distant Metastases in Asymptomatic Women. *J Am Coll Radiol.* 2017 May;14(5S):S282-S292.
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Statement: Physical examination

1. Margenthaler JA, Allan E, Cheng L, et al. Surveillance of Patients With Breast Cancer After Curative-Intent Primary Treatment: Current Practice Patterns. *Journal of Oncology Practice* 2012; 8(2): 79 – 83.
2. Khatcheressian JL, Hurley P, Bantug E, et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . *J Clin Oncol*. 2013 March 1; 31(7):961-965.
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Statement: Mammography

1. De Bock GH, Bonnema J, van Der Hage J et al. Effectiveness of Routine Visits and Routine Tests in Detecting Isolated Locoregional Recurrences After Treatment for Early-Stage Invasive Breast Cancer: A Meta-Analysis and Systematic Review. *J Clin Oncol* 2004; 22(19): 4010-4018 .
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1. Graf O, Helbich TH, Fuchsjaeger MH et al. Follow-up of palpable circumscribed noncalcified solid breast masses at mammography and US: can biopsy be averted? *Radiology* 2004; 233(3): 850-6.
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personal history of breast cancer. *Acta Radiol.* 2017 Jan 1;284185117725779.

Statement: MRI of the breast

1. DeMartini W, Lehman C. A review of current evidence-based clinical applications for breast magnetic resonance imaging. *Top Magn Reson Imaging* 2008;19(3):143-50. Review.
2. Warner E. The role of magnetic resonance imaging in screening women at high risk of breast cancer. *Top Magn Reson Imaging.* 2008; 19(3):163-9. Review.
3. Lehman CD, Lee JM, DeMartini WB et al. Screening MRI in Women With a Personal History of Breast Cancer. *J Natl Cancer Inst.* 2016 Jan 7;108(3).
4. Shah C, Ahlawat S, Khan A et al. The Role of MRI in the Follow-up of Women Undergoing Breast-conserving Therapy. *Am J Clin Oncol.* 2016 Jun;39(3):314-9.
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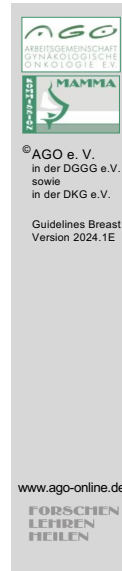
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Statement: DEXA scan Expert Opinion

1. Mahon SM, Williams MT, Spies MA: Screening for second cancers and osteoporosis in long-term survivors. *Cancer Pract* 2000; 8(6): 282-90.
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## Routine Follow-Up Examinations in Asymptomatic Patients

	Oxford		
	LoE	GR	AGO
<b>Routine biochemistry (incl. tumor markers)</b>	1a	A	-
<b>Blood tests for monitoring of acute and late toxicities</b>	5	D	+
<b>Ultrasound of the liver/ Bone scan/ Chest X-ray</b>	1a	A	-
<b>CT of chest, abdomen, and pelvis</b>	2a	D	-
<b>Detection of isolated / circulating tumor cells</b>	2a	D	-
<b>ctDNA</b>	2a	D	-
<b>PET/ Whole body MRI</b>	2b	B	-

1. Bychkovsky BL, Lin NU. Imaging in the evaluation and follow-up of early and advanced breast cancer: When, why, and how often? *Breast*. 2017 Feb;31:318-324 Review.
2. Lam DL, Houssami N, Lee JM. Imaging Surveillance After Primary Breast Cancer Treatment. *AJR Am J Roentgenol*. 2017 Mar;208(3):676-686. Review.
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4. Lafranconi A, Pyykkänen L, Deandrea S et al. Intensive follow-up for women with breast cancer: review of clinical, economic and patient's preference domains through evidence to decision framework. *Health Qual Life Outcomes*. 2017 Oct 19;15(1):206.
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6. Sheng JY, Snyder CF, Smith KC et al. (2023) Evaluating potential overuse of surveillance care in cancer survivors. *Cancer Med* 12(5):6139–6147. doi:10.1002/cam4.5346

Statement: Magnetic resonance imaging (MRI) of the breast

1. DeMartini W, Lehman C. A review of current evidence-based clinical applications for breast magnetic resonance imaging. Top Magn Reson Imaging 2008; 19(3):143-50. Review.
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Statement: Routine biochemistry (incl. tumor markers)

1. McShane LM, Altman DG, Sauerbrei W et al. Statistics Subcommittee of the NCI-EORTC Working Group on Cancer Diagnostics. Reporting recommendations for tumor marker prognostic studies. J Clin Oncol 2005; 23(36): 9067-72.
2. Harris LN, Ismaila N, McShane LM et al. Use of Biomarkers to Guide Decisions on Adjuvant Systemic Therapy for Women With Early-stage Invasive Breast Cancer: American Society of Clinical Practice Guideline. J Clin Oncol 2016; 34(10): 1134-50.
3. Cardoso F, Kyriakides S, Ohno S, et al. Early breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up<sup>&#x2020;</sup>. Annals of Oncology 2019;30:1194-220.

Statement: Ultrasound of the liver

Statement: Bone scan

Statement: Chest X-ray

Statement: CT of chest, abdomen and pelvis

1. Emens LA, Davidson NE. The follow-up of breast cancer. Semin Oncol. 2003; 30(3): 338-48. Review.
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3. Dull B, Linkugel A, Margenthaler JA, Cyr AE. Overuse of Chest CT in Patients With Stage I and II Breast Cancer: An Opportunity to Increase Guidelines Compliance at an NCCN Member Institution. J Natl Compr Canc Netw. 2017 Jun;15(6):783-789.

Statement: Detection of isolated/circulating tumor cells/ctDNA

1. Janni W, Vogl FD, Wiedswang G et al. Persistence of disseminated tumor cells (DTC) in bone marrow (BM) during Follow-up predicts increased risk for relapse – Up-date of the pooled European data. Clin Cancer Res 2011; 17(9): 2967-76.
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Statement: PET / WB-MRI

1. Ide M. Cancer screening with FDG-PET. Q J Nucl Med Mol Imaging 2006; 50(1): 23-7.
2. Schöder H, Gönen M. Screening for cancer with PET and PET/CT: potential and limitations. J Nucl Med 2007; 48 Suppl 1:4S-18S. Review.
3. Lei L, Wang X, Chen Z. PET/CT Imaging for Monitoring Recurrence and Evaluating Response to Treatment in Breast Cancer. Adv Clin Exp Med. 2016 Mar-Apr;25(2):377-82.
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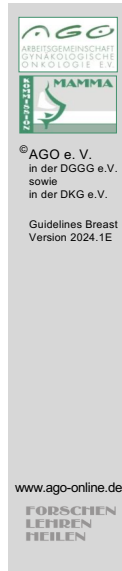
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## Background for Toxicity Management

Tamoxifen:	Cholesterol, Triglycerides, Bilirubin, ALAT, ASAT, gamma-GT, Glucose
Aromatase inhibitors:	Cholesterol, Triglycerides, Bilirubin, ALAT, ASAT, gamma-GT
Anthracyclines:	pro-BNP, possibly Troponin
Trastuzumab:	pro-BNP, possibly Troponin
Checkpoint inhibitors:	Bilirubin, ALAT, ASAT, gamma-GT, Creatinine, TSH, fT3/T4, Myoglobin



## Early Detection of Potentially Curable Events

	Oxford		
	LoE	GR	AGO
<b>Locoregional recurrence (chest wall, in-breast):</b>			
Incidence 7–20% (depending on time of F/U)			
<b>Breast self-examination</b>	5	D	+
<b>Physical examination, mammography &amp; US</b>	1a	A	++
<b>Magnetic resonance imaging (MRI)*</b>	3a	B	+/-

\* Consider in case of increased risk (age < 50 y, HR-neg., diagnostic assessability C/D in mammography + ultrasound)

### Statement incidence

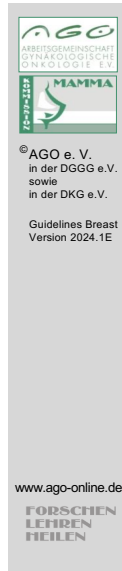
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3. Cheun J-H, Kim H-K, Moon H-G, Han W, Lee H-B (2023) Locoregional Recurrence Patterns in Patients With Different Molecular Subtypes of Breast Cancer. JAMA Surg 158(8):841–852. doi:10.1001/jamasurg.2023.2150

### Statement breast self examination

1. Thomas DB, Gao DL, Ray RM et al. Randomized trial of breast self-examination in Shanghai: final results. J Natl Cancer Inst 2002; 94(19): 1445-57.
2. Khatcheressian JL, Wolff AC, Smith TJ. American Society of Clinical Oncology 2006 update of the breast cancer follow-up and management guidelines in the adjuvant setting. J Clin Oncol. 2006 Nov 1;24(31):5091-7.
3. Montgomery DA, Krupa K, Cooke TG. Follow-up in breast cancer: does routine clinical examination improve outcome? A systematic review of the literature. Br J Cancer 2007; 97(12): 1632-41.

Statement physical examination, mammography & US & MRI

1. Beinart G, Gonzalez-Angulo AM, Broglio K. Clinical course of 771 patients with bilateral breast cancer: characteristics associated with overall and recurrence-free survival. *Clin Breast Cancer* 2007; 7(11): 867-74.
2. Montgomery DA, Krupa K, Cooke TG. Follow-up in breast cancer: does routine clinical examination improve outcome? A systematic review of the literature. *Br J Cancer*. 2007; 97(12): 1632-41.
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## Early Detection of Potentially Curable Events

	Oxford		
	LoE	GR	AGO
<b>Contralateral breast cancer:</b>			
Relative risk: 2.5 - 5			
Incidence: 0.5 - 1.0 %/year			
Breast self-examination	5	D	+
Physical examination, mammography & US	1a	A	++
Routine breast MRI*	3b	B	+/-
▪ Male breast cancer: analogous to BC in women**	5	D	+

\* Consider in case of increased risk: age < 50 y, HR-neg., diagnostic assessability C/D in mammography + ultrasound.  
 \*\* See chapter "Breast Cancer Specific Situations"

### Statement risk and incidence

1. Hooning MJ, Aleman BM, Hauptmann M et al. Roles of radiotherapy and chemotherapy in the development of contralateral breast cancer J Clin Oncol 2008; 26(34): 5561-8.
2. Yerushalmi R, Kennecke H, Woods R et al. Does multicentric/multifocal breast cancer differ from unifocal breast cancer? An analysis of survival and contralateral breast cancer incidence. Breast Cancer Res Treat 2009; 117(2): 365-70.
3. Bertelsen L, Mellekjær L, Christensen J et al. Age-Specific Incidence of Breast Cancer in Breast Cancer Survivors and Their First-Degree Relatives. Epidemiology 2009; 20(2): 175 – 80.
4. Chao C, Bhatia S, Xu L, et al. Incidence, Risk Factors, and Mortality Associated With Second Malignant Neoplasms Among Survivors of Adolescent and Young Adult Cancer. JAMA Network Open 2019;2:e195536-e.
5. Ramin C, Veiga LHS, Vo JB et al. (2023) Risk of second primary cancer among women in the Kaiser Permanente Breast Cancer Survivors Cohort. Breast Cancer Res 25(1):50. doi:10.1186/s13058-023-01647-y

### Statement breast self examination

1. Thomas DB, Gao DL, Ray RM et al. Randomized trial of breast self-examination in Shanghai: final results. J Natl Cancer Inst 2002; 94(19): 1445-57.
2. Montgomery DA, Krupa K, Cooke TG et al. Follow-up in breast cancer: does routine clinical examination improve

outcome? A systematic review of the literature. Br J Cancer 2007; 97(12): 1632-41.

3. Khatcheressian JL, Hurley P, Bantug E et al.: Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update. J Clin Oncol. 2013 March 1; 31(7):961-965.

#### Statement physical examination, mammography & US&MRI

1. Beinart G, Gonzalez-Angulo AM, Broglio K et al. Clinical course of 771 patients with bilateral breast cancer: characteristics associated with overall and recurrence-free survival. Clin Breast Cancer 2007; 7(11): 867-74.
2. Montgomery DA, Krupa K, Cooke TG et al. Follow-up in breast cancer: does routine clinical examination improve outcome? A systematic review of the literature. Br J Cancer. 2007; 97(12): 1632-41.
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4. Kim JY1, Cho N, Koo HR et al. Unilateral breast cancer: screening of contralateral breast by using preoperative MR imaging reduces incidence of metachronous cancer. Radiology. 2013 Apr;267(1):57-66.
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7. van Bodegraven EA, van Raaij JC, Van Goethem M et al. Guidelines and recommendations for MRI in breast cancer follow-up: A review. Eur J Obstet Gynecol Reprod Biol. 2017 Nov;218:5-11.

#### Statement surveillance of male breast cancer

1. Ferzoco RM, Ruddy KJ. Optimal delivery of male breast cancer follow-up care: improving outcomes, Breast Cancer: Targets and Therapy 2015;7 371–379
2. Auvinen A, Curtis RE, Ron E. Risk of subsequent cancer following breast cancer in men. J Natl Cancer Inst. 2002;94(17):1330–1332.

## Early Detection of Potentially Curable Events

	Oxford		
	LoE	GR	AGO
<b>Unrelated site carcinoma:</b>			
MDS (RR 10.9), AML (RR 2.6–5.3), Colon RR 3.0; endometrium RR 1.6; ovary RR 1.5; lymphoma RR 7			
Screening for secondary malignancies according to current guidelines	5	D	++
Pelvic examination and PAP smear	5	D	++
Routine endometrial ultrasound / biopsy	1b	B	-

### Statement: Risk

1. Brown LM, Chen BE, Pfeiffer RM et al. Risk of second non-hematological malignancies among 376,825 breast cancer survivors. *Breast Cancer Res Treat* 2007; 106(3): 439-51.
2. Kirova YM, De Rycke Y, Gambotti L et al. Second malignancies after breast cancer: the impact of different treatment modalities. *Br J Cancer* 2008 Mar 11; 98(5): 870-4.
3. Schaapveld M, Visser O, Louwman MJ et al. Risk of new primary nonbreast cancers after breast cancer treatment: a Dutch population-based study. *J Clin Oncol* 2008; 26(8): 1239-46.
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Statement: Screening for secondary malignancies according to current guidelines

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Statement: Pelvic examination and PAP smear

1. Gerber B, Krause A, Müller H et al. Ultrasonographic detection of asymptomatic endometrial cancer in postmenopausal patients offers no prognostic advantage over symptomatic disease discovered by uterine bleeding. Eur J Cancer 2001; 37(1): 64-71.
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Statement: Endometrial ultrasound / biopsy

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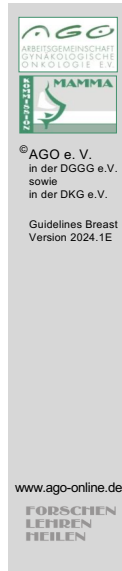
Statement: Marrow neoplasms after adjuvant breast cancer therapy

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Statement: Secondary lung tumors:

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## Follow-Up Care for invasive / non-invasive Breast Cancer

### Recommendations for asymptomatic pts.

(mod. according to ASCO-ACS recommendations 2016, NCCN 2021, ESMO 2019 and S3-guidelines 2017)

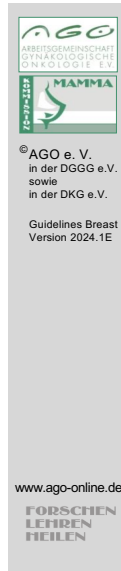
Clinical follow-up	Follow-up*					Screening/ Follow-up
	1	2	3	4	5	
Years after primary therapy						> 5
History, physical examination, counseling	every 3 months DCIS every 6 months			every 6 months		inv.: every 12 months
Self-examination	monthly					
Imaging modalities and biochemistry	indicated only if complaints, clinical findings, or suspicion of recurrence Monitoring of side effects of therapy					
Mammo-graphy and additional sonography	both sides: every 12 months					
	contralateral every 12 months					
Echocardiography	6,12,24 months and yearly up to 5 years after completion of cardiotoxic therapy, after 5th year, every 5 years and if patient is symptomatic.					

\* Continued follow-up visits if still on adjuvant treatment

\*\* In pts after breast-conserving therapy (BCT): First mammography 1 year after initial mammography or at least 6 months after completion of radiotherapy

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2. Merkow RP, Korenstein D, Yeahia R et al. Quality of Cancer Surveillance Clinical Practice Guidelines: Specificity and Consistency of Recommendations. *JAMA Intern Med.* 2017 May 1;177(5):701-709.
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[https://www.nccn.org/professionals/physician\\_gls/pdf/breast.pdf](https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf)
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10. Dent S, Fergusson D, Aseyev O et al. ,A Randomized Trial Comparing 3- versus 4-Monthly Cardiac Monitoring in Patients Receiving Trastuzumab-Based Chemotherapy for Early Breast Cancer. *Curr Oncol*. 2021 Dec 3;28(6):5073-5083.




## Breast Cancer Follow-up Duration and Breast Nurses


	Oxford		
	LoE	GR	AGO
<b>Duration of follow-up</b>			
■ up to 5 years	1c	A	++
up to 10 years	1c	A	+
<b>Surveillance by specialized breast nurses</b>	<b>2b</b>	<b>B</b>	<b>+/-*</b>

\* Studies recommended

1. Sheppard C. Breast cancer follow-up: literature review and discussion. Eur J Oncol Nurs 2007;11(4):340-7.
2. van Hezewijk M, Ranke GM, van Nes JG et al. Patients' needs and preferences in routine follow-up for early breast cancer; an evaluation of the changing role of the nurse practitioner. Eur J Surg Oncol 2011; 37(9): 765-73.
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## Luminal-like, HER2-positive and Triple-negative Breast Cancer Patients

- **Intrinsic typing of breast cancer leads to subgroups with different course of disease. Thus, postoperative surveillance should be adapted to specific time-dependent hazards of recurrence.**
- **ER-positive patients have stable risk over many years requiring long term surveillance.**
- **However, patients with HER2-positive disease and TNBC have more risk in the early phase of follow-up and should therefore receive more intense surveillance in the first years of follow-up.**

Ribelles et al. BCR 2013

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2. Ribelles N, Perez-Villa L, Jerez JM et al. Pattern of recurrence of early breast cancer is different according to intrinsic subtype and proliferation index. Breast Cancer Res 2013;15(5):R98.
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