

American Society of Clinical Oncology 2006 Update of the Breast Cancer Follow-Up and Management Guidelines in the Adjuvant Setting

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ABSTRACT

Purpose

To update the 1999 American Society of Clinical Oncology (ASCO) guideline on breast cancer follow-up and management in the adjuvant setting.

Methods

An ASCO Expert Panel reviewed pertinent information from the literature through March 2006. More weight was given to studies that tested a hypothesis directly relating testing to one of the primary outcomes in a randomized design.

Results

The evidence supports regular history, physical examination, and mammography as the cornerstone of appropriate breast cancer follow-up. All patients should have a careful history and physical examination performed by a physician experienced in the surveillance of cancer patients and in breast examination. Examinations should be performed every 3 to 6 months for the first 3 years, every 6 to 12 months for years 4 and 5, and annually thereafter. For those who have undergone breast-conserving surgery, a post-treatment mammogram should be obtained 1 year after the initial mammogram and at least 6 months after completion of radiation therapy. Thereafter, unless otherwise indicated, a yearly mammographic evaluation should be performed. Patients at high risk for familial breast cancer syndromes should be referred for genetic counseling. The use of CBCs, chemistry panels, bone scans, chest radiographs, liver ultrasounds, computed tomography scans, [¹⁸F]fluorodeoxyglucose-positron emission tomography scanning, magnetic resonance imaging, or tumor markers (carcinoembryonic antigen, CA 15-3, and CA 27.29) is not recommended for routine breast cancer follow-up in an otherwise asymptomatic patient with no specific findings on clinical examination.

Conclusion

Careful history taking, physical examination, and regular mammography are recommended for appropriate detection of breast cancer recurrence.

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INTRODUCTION

The American Society of Clinical Oncology (ASCO) published its first evidence-based clinical practice guidelines on postoperative surveillance for the detection of recurrent breast cancer in 1997. Since the last update in 1998, there has been an increase in the availability of diagnostic testing for breast cancer patients. A review of the available data is necessary to formulate an up-to-date, evidence-based strategy for breast cancer follow-up and management in asymptomatic patients after primary, curative therapy. A summary of the 2006 recommendations is provided in Table 1.

In 1996, ASCO published a list of clinical outcomes that justify the use of a technology or drugs in

the guideline development process.¹ The clinical outcomes include the following: improvements in overall or disease-free survival; improvement in quality of life, as shown by a valid measure of global health outcomes; reduced toxicity; and improved cost effectiveness. The ASCO Panel was guided by these criteria and recommended tests if they demonstrated a positive impact on these important clinical outcomes. Although published guidelines alone may not alter individual practice patterns, it is hoped that these guidelines will serve as a foundation for internal guideline development within institutions and practices.

Historically, breast cancer follow-up has used a conservative approach based on clinical examination and mammography, but variations in practice

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Table 1. Summary of 2006 Guideline Recommendations for Breast Cancer Surveillance

Mode of Surveillance	Summary of Recommendations
Recommended breast cancer surveillance	
History/physical examination	Every 3 to 6 months for the first 3 years after primary therapy; every 6 to 12 months for years 4 and 5; then annually
Patient education regarding symptoms of recurrence	Physicians should counsel patients about the symptoms of recurrence including new lumps, bone pain, chest pain, abdominal pain, dyspnea or persistent headaches; helpful websites for patient education include www.plwc.org and www.cancer.org
Referral for genetic counseling	Criteria include: Ashkenazi Jewish heritage; history of ovarian cancer at any age in the patient or any first- or second-degree relatives; any first-degree relative with a history of breast cancer diagnosed before the age of 50 years; two or more first- or second-degree relatives diagnosed with breast cancer at any age; patient or relative with diagnosis of bilateral breast cancer; and history of breast cancer in a male relative
Breast self-examination	All women should be counseled to perform monthly breast self-examination
Mammography	First post-treatment mammogram 1 year after the initial mammogram that leads to diagnosis but no earlier than 6 months after definitive radiation therapy; subsequent mammograms should be obtained as indicated for surveillance of abnormalities
Coordination of care	Continuity of care for breast cancer patients is encouraged and should be performed by a physician experienced in the surveillance of cancer patients and in breast examination, including the examination of irradiated breasts; if follow-up is transferred to a PCP, the PCP and the patient should be informed of the long-term options regarding adjuvant hormonal therapy for the particular patient; this may necessitate rereferral for oncology assessment at an interval consistent with guidelines for adjuvant hormonal therapy
Pelvic examination	Regular gynecologic follow-up is recommended for all women; patients who receive tamoxifen should be advised to report any vaginal bleeding to their physicians
Breast cancer surveillance testing: not recommended	
Routine blood tests	CBCs and liver function tests are not recommended
Imaging studies	Chest x-ray, bone scans, liver ultrasound, computed tomography scans, FDG-PET scans, and breast MRI are not recommended
Tumor markers	CA 15-3, CA 27.29, and carcinoembryonic antigen are not recommended
FDG-PET	FDG-PET scanning is not recommended for routine breast cancer surveillance
Breast MRI	Breast MRI is not recommended for routine breast cancer surveillance
Abbreviations; PCP, primary care physician; FDG-PET, [¹⁸ F]fluorodeoxyglucose–positron emission tomography; MRI, magnetic resonance imaging.	

patterns exist and have significant cost implications. Mille et al² at Centre Regional Leon Berard studied the impact of clinical practice guidelines on follow-up of patients with localized breast cancer. Follow-up that was not guideline compliant cost 2.2 to 3.6 times more than guideline-compliant follow-up as a result of nonmammographic examinations performed in the absence of any warning signs or symptoms of recurrence. After the introduction of surveillance guidelines in 1994, there was a one-third decrease in expenditures per patient, with no change in health outcomes expected. Although guideline compliance saves limited health care resources, patients also understand the limitations of diagnostic tests and accept limited testing from their physicians when recommended.^{3,4}

UPDATE METHODOLOGY

For the 2006 update, the Expert Panel completed the review and analysis of data published since 1998. Computerized literature searches of MEDLINE and the Cochrane Collaboration Library were performed. The searches of the English-language literature from 1999 to March 2006 combined the terms “breast neoplasms” with the MeSH term “follow-up studies” and the text words “surveillance” and “follow-up.” The set of articles yielded from this initial search was supplemented by articles identified from searches on each of the tests or procedures addressed in the original guideline (eg, history and physical examination, carcinoembryonic antigen) in combination with “surveillance,” “follow-up studies,” and “follow-up.” The searches were limited to human-only studies

and to specific study design or publication type, such as randomized clinical trial, meta-analysis, practice guideline, systematic overview, or systematic review. The literature review centered on randomized clinical trials and meta-analyses of data from randomized clinical trials.

SUMMARY OF KEY LITERATURE REVIEW RESULTS

The Expert Panel did not complete an independent meta-analysis of the data from available randomized clinical trials given the availability of a high-quality and recent meta-analysis and a high-quality systematic literature review identified through the literature search.^{4,5} ASCO guideline recommendations for breast cancer surveillance are consistent with other thorough evidence-based reviews that have examined the available clinical and scientific data. Rojas et al,⁵ in a Cochrane Collaboration review of four randomized, controlled clinical trials involving 3,055 women with breast cancer,^{3,6-8} found no difference in overall survival or disease-free survival between patients observed with intensive radiologic and laboratory testing and those observed with clinical visits and mammography. In addition, the 2005 clinical practice guideline update for breast cancer surveillance after primary therapy published by Health Canada’s Canadian Breast Cancer Initiative⁹ recommends regular clinical visits and mammography as surveillance for breast cancer recurrence; routine laboratory and other radiologic testing are not recommended. Likewise, the ASCO breast cancer follow-up and management guideline recommends regular clinical

evaluation in conjunction with mammography as the foundation on which breast cancer follow-up should be based.

It is important to emphasize that guidelines and technology assessments cannot always account for individual variation among patients. They are not intended to supplant physician judgment with respect to particular patients or special clinical situations and cannot be considered inclusive of all proper methods of care or exclusive of other treatments reasonably directed at obtaining the same result.

Accordingly, ASCO considers adherence to this guideline assessment to be voluntary, with the ultimate determination regarding its application to be made by the physician in light of each patient's individual circumstances. In addition, this guideline describes the use of procedures and therapies in clinical practice; it cannot be assumed to apply to the use of these interventions performed in the context of clinical trials, given that clinical studies are designed to evaluate or validate innovative approaches in a disease for which improved staging and treatment is needed. Because guideline development involves a review and synthesis of the latest literature, a practice guideline also serves to identify important questions and settings for further research.

RECOMMENDED BREAST CANCER SURVEILLANCE

History, Physical Examination, and Patient Education Regarding Symptoms of Recurrence

2006 recommendation. All women should have a careful history and physical examination every 3 to 6 months for the first 3 years after primary therapy, then every 6 to 12 months for the next 2 years, and then annually. Physicians should counsel patients about the symptoms of recurrence including new lumps, bone pain, chest pain, dyspnea, abdominal pain, or persistent headaches. Helpful Web sites for patient education include www.plwc.org and www.cancer.org.

Women at high risk for familial breast cancer syndromes should be referred for genetic counseling in accordance with clinical guidelines recommended by the US Preventive Services Task Force.¹⁰ Criteria to recommend referral include the following: Ashkenazi Jewish heritage; history of ovarian cancer at any age in the patient or any first- or second-degree relatives; any first-degree relative with a history of breast cancer diagnosed before the age of 50 years; two or more first- or second-degree relatives diagnosed with breast cancer at any age; patient or relative with diagnosis of bilateral breast cancer; and history of breast cancer in a male relative.

Literature update and discussion. The Panel acknowledges that there have been no recent prospective studies evaluating alternative clinical follow-up schedules for surveillance. The current recommendations are the same as the original 1997 guidelines that, in part, based its recommendations on two well-designed prospective studies^{6,8} evaluating surveillance with regular clinical visits and mammography (standard follow-up) versus the same surveillance program plus scheduled laboratory and other imaging studies (intensive surveillance). Since that time, a validated risk assessment tool¹¹ (<http://www.adjuvantonline.com>) has been developed to estimate the 10-year risk of breast cancer recurrence and death based on readily available pathologic data. No studies have evaluated the benefit of more frequent clinical visits in patients with known high-risk versus low-risk disease. In addition, more than half of breast cancer recurrences are symptomatic and found between scheduled follow-up visits. A recent meta-analysis¹² of 12 studies involving 5,045 patients found that 40%

(95% CI, 35% to 45%) of patients with locoregional recurrences were diagnosed during routine clinic visits or routine testing, whereas the remainder (approximately 60%) developed symptomatic recurrences before their scheduled clinical visits. Conclusions could not be drawn regarding survival and cost due to the overall quality of the studies analyzed and the relatively low incidence of locoregional recurrence. Nonetheless, the study emphasizes the importance of patient education regarding the symptoms of recurrence in the interest of a timely diagnosis. There are no changes to the previous recommendation.

The previous guideline did not address the need for genetic counseling referral in patients at increased risk for familial breast cancer syndromes. The US Preventive Services Task Force recently released clinical guidelines¹⁰ recommending referral in certain at-risk women but specifically applied the guidelines only to women who have not received a diagnosis of breast or ovarian cancer. The Panel felt that the available data were sufficient to render an expert opinion on the matter of referral for genetic counseling in women diagnosed with breast cancer with certain personal or familial clinical characteristics. Criteria to recommend referral include the following: Ashkenazi Jewish heritage; history of ovarian cancer at any age in the patient or any first- or second-degree relatives; any first-degree relative with a history of breast cancer diagnosed before the age of 50 years; two or more first- or second-degree relatives diagnosed with breast cancer at any age; patient or relative with diagnosis of bilateral breast cancer; and history of breast cancer in a male relative.

Breast Self-Examination

2006 recommendation. All women should be counseled to perform monthly breast self-examination (BSE).

Literature update and discussion. A large study¹³ of more than 260,000 Chinese women evaluating the efficacy of BSE alone failed to show a survival benefit in the group of women assigned to regular BSE. The cumulative breast cancer mortality rates through 10 years of follow-up were similar between the BSE and control groups (risk ratio = 1.04; 95% CI, 0.82 to 1.33; $P = .72$), and more benign breast lesions were diagnosed in the BSE group compared with the control group. Routine screening mammography was not available to the participants in the study. Women who perform regular BSE may be at increased risk of undergoing invasive procedures to diagnose benign breast lesions, but there are no randomized data examining the effect of BSE in conjunction with regular screening mammograms for women who have been treated for breast cancer. In the absence of such data, it is recommended that women be counseled to perform monthly BSE. Women should be made aware that monthly BSE does not replace mammography as a breast cancer screening tool.

Mammography

2006 recommendation. Women treated with breast-conserving therapy should have their first post-treatment mammogram no earlier than 6 months after definitive radiation therapy. Subsequent mammograms should be obtained every 6 to 12 months for surveillance of abnormalities. Mammography should be performed yearly if stability of mammographic findings is achieved after completion of locoregional therapy.

Literature update and discussion. Grunfeld et al¹⁴ documented the lack of high-level evidence supporting current practice of mammography surveillance. Although there is a lack of randomized controlled trial data, observational studies suggest that the method of detection (physical examination or mammography), when reported,

did not seem to influence survival. The Panel acknowledges the barriers to designing a prospective randomized trial to answer such a question. Thus, routine mammography continues to be recommended for breast cancer surveillance.

Coordination of Care

2006 recommendation. The risk of breast cancer recurrence continues through 15 years after primary treatment and beyond. Continuity of care for breast cancer patients is recommended and should be performed by a physician experienced in the surveillance of cancer patients and in breast examination, including the examination of irradiated breasts.

Follow-up by a primary care physician (PCP) seems to lead to the same health outcomes as specialist follow-up with good patient satisfaction. If a patient with early-stage breast cancer (tumor < 5 cm and < four positive nodes) desires follow-up exclusively by a PCP, care may be transferred to the PCP approximately 1 year after diagnosis. If care is transferred to a PCP, both the PCP and the patient should be informed of the appropriate follow-up and management strategy. This approach will necessitate referral for oncology assessment if a patient is receiving adjuvant endocrine therapy.

Literature update and discussion. Follow-up of a patient by multiple specialists after initial therapy is costly, has not been shown to improve outcomes, and may represent duplication of effort. One randomized clinical trial,³ included in the 1998 update, was designed specifically to evaluate whether PCPs, instead of specialist cancer physicians, can safely provide breast cancer surveillance. This well-designed, randomized clinical trial involved 296 women receiving follow-up for breast cancer in specialist oncology and surgical clinics in Great Britain. Patients were randomly assigned to continued specialist follow-up (control group) or to follow-up from their own general practitioner. This study found that primary care follow-up of women with breast cancer in remission is not associated with increase in time to diagnosis of recurrence, increase in anxiety, or deterioration in health-related quality of life, which were the outcomes selected for evaluation. The study also found that 69% of recurrences presented between follow-up visits, and almost half of the patients experiencing recurrence in the specialist group presented first to the general practitioner. Patient satisfaction was found to be greater among those treated by general practitioners.¹⁵ Follow-up by a PCP led to the same health outcomes as follow-up by a specialist physician, better patient satisfaction,¹⁶ and lower health service and patient costs.¹⁷ This study has been replicated in Canada involving 968 early-stage breast cancer patients (tumor < 5 cm and < four positive axillary lymph nodes) observed for a median of 4.5 years from diagnosis.¹⁸ The Canadian study also found that follow-up by a PCP led to the same health outcomes as measured by the rate of recurrence-related serious clinical events and quality of life. This study was conducted before the widespread use of aromatase inhibitors adjuvantly; approximately 50% of the patients in each arm of the study received tamoxifen as adjuvant endocrine therapy. Another randomized trial in Great Britain showed that twice as many patients preferred simpler, less frequent follow-up.⁷ Similarly rigorous evaluations of this same surveillance question (ie, PCP *v* specialist physician follow-up) for breast cancer patients in the United States are not currently available. There is no a priori reason to expect that patients in the United States would want different follow-up schedules, and the demand for medically inappro-

priate testing may be reduced by patient education about the specificity, sensitivity, and usefulness of the available tests.⁴

A recently published overview¹⁹ by the Early Breast Cancer Trialists' Collaborative Group reported 15-year breast cancer recurrence and survival rates. Although hazard ratios for recurrence are highest during the first few years after diagnosis, there seems to be a steady relapse rate through 15 years and beyond. In women with estrogen receptor–positive breast cancer treated with tamoxifen for 5 years, the 15-year probability of death from breast cancer is more than 3 times as great as the 5-year probability. This suggests that the majority of breast cancer recurrences occur more than 5 years after diagnosis when patients are observed for more than 15 years. These findings have implications for long-term breast cancer surveillance and for choice of adjuvant endocrine therapy, which will be required in most patients with hormone receptor–positive cancer. This latter issue is of particular interest in the current era of changing endocrine therapy strategies, and a number of clinical trials continue to address this matter.

A variety of care models have been proposed to coordinate follow-up care between oncologists and PCPs. The Institute of Medicine's recent report, "From Cancer Patient to Cancer Survivor: Lost in Transition,"²⁰ contains recommendations for improving survivorship care including a shared-care model that could be integrated across different specialties. If agreed on by the patient and treating oncologist, a shared-care model would provide treatment summary information and a plan for follow-up care for the patient and PCP; the level of shared follow-up provided by the oncologist and PCP would depend on patient and provider preferences. This is an evolving field of evidence-based practice; the mechanism of care transfer, level of shared care among providers, and likelihood of success of this strategy will depend on the characteristics of the local clinical setting.

Pelvic Examination

2006 recommendation. Regular gynecologic follow-up is recommended for all women. Patients who receive tamoxifen therapy are at increased risk for developing endometrial cancer and should be advised to report any vaginal bleeding to their physicians. Longer follow-up intervals may be appropriate for women who have had a total hysterectomy and oophorectomy.

Literature update. The text of the guideline has been changed to reflect the need for regular gynecologic follow-up, especially with regard to patients who receive tamoxifen therapy.

BREAST CANCER SURVEILLANCE TESTING: NOT RECOMMENDED

Two well-designed randomized controlled trials,^{6,8} published before the 1998 guideline, involving a total of 2,563 women, compared breast cancer follow-up with regular clinical visits with an intensive surveillance regimen involving clinical visits, bone scans, liver ultrasonography, chest x-rays, and laboratory testing. Both groups received yearly mammograms. No significant survival advantage was demonstrated in the intensive surveillance groups of either trial, with data available for up to 10 years of follow-up (hazard ratio = 1.05; 95% CI, 0.87 to 1.26).²¹ Health-related quality-of-life data⁶ also showed no difference between the standard and intensive surveillance groups. The recently updated meta-analysis of these trials by the Cochrane Database⁵ also found no significant survival advantage in the intensive

surveillance group for overall survival (hazard ratio = 0.96; 95% CI, 0.80 to 1.15) or disease-free survival (hazard ratio = 0.84; 95% CI, 0.71 to 1.00). There was also no significant difference in 5-year mortality between the regular and intensive surveillance groups with respect to age, tumor size, or nodal status. In one trial,⁶ a higher percentage of asymptomatic metastases was found in the intensive surveillance group compared with the control group (31% v 21%, respectively), but this did not translate into an improvement in survival.

Joseph et al²² retrospectively identified 129 patients with recurrent breast cancer from an institutional database. Patients were divided into minimalist (history, physical examination, and mammography) or intensive surveillance (serial chemistry panels, tumor markers, chest radiographs, computed tomography [CT] scans, and bone scans) groups according to the method of disease detection. No significant differences in time to detection of recurrence were found ($P = .95$) between the groups, and the method of detection did not significantly affect survival ($P = .18$). It is speculated that a small percentage (1% to 3%) of patients with limited metastatic disease may survive their disease when treated with multimodality therapy with curative and not palliative intent.²³ This hypothesis must first be confirmed by prospective randomized trials before intensive surveillance monitoring is justified. Thus, there are no changes to the 1998 guideline for testing that is not recommended.

CBC

2006 recommendation. CBC testing is not recommended for routine breast cancer surveillance.

Automated Chemistry Studies

2006 recommendation. Automated chemistry studies are not recommended for routine breast cancer surveillance.

Chest X-Rays

2006 recommendation. Chest x-rays are not recommended for routine breast cancer surveillance.

Bone Scan

2006 recommendation. Bone scans are not recommended for routine breast cancer surveillance.

Ultrasound of the Liver

2006 recommendation. Liver ultrasound is not recommended for routine breast cancer surveillance.

CT

2006 recommendation. CT is not recommended for routine breast cancer surveillance.

2006 literature update and discussion. One study published since the 1998 update²⁴ retrospectively evaluated 6,628 CT scans of the pelvis in 2,426 patients with breast cancer over a 9-year period. Pelvic metastases were the only site of metastases in 13 patients (0.5%) but led to over 200 additional radiographic examinations and 50 surgical procedures; 84% of the additional procedures (radiographic and surgical) yielded benign or negative results. Another recently published retrospective study²⁵ evaluated 250 patients with early-stage breast cancer over a 2-year period. All patients had chest radiographs (74%) or CT scans (26%) for screening purposes or to evaluate symptoms. Of the 10 patients (4%) who developed metastatic disease, only two (0.8%) had metastatic disease diagnosed by chest radiograph. No patients were found to have metastatic disease by routine chest CT scanning. There have been no other published stud-

ies that demonstrate a clinical benefit to routine CT scanning in the detection of breast cancer recurrence. There are no changes to the previous recommendation.

[¹⁸F]Fluorodeoxyglucose–Positron Emission Tomography Scanning

2006 recommendation. [¹⁸F]fluorodeoxyglucose-positron emission tomography (FDG-PET) scanning is not recommended for routine breast cancer surveillance.

2006 literature update and discussion. This category is new since the 1998 update. We reviewed several recent studies that pertain to surveillance issues in breast cancer patients. Available data on FDG-PET scanning in breast cancer surveillance come from retrospective cohort studies; there are no prospective randomized trial data. Although FDG-PET scanning may demonstrate more sensitivity than conventional imaging in diagnosing recurrent disease, there is no evidence that there is an impact on survival, quality of life, or cost effectiveness.

One cohort study²⁶ of 61 patients compared FDG-PET scanning to conventional imaging for detecting residual or recurrent breast cancer. Sensitivity of FDG-PET versus conventional imaging was slightly improved (93% v 79%, respectively; $P < .05$), but there was no difference in positive predictive value or specificity. The negative predictive value of FDG-PET compared with conventional imaging was also improved (84% v 59%, respectively; $P < .05$), but the impact of these results on survival, quality of life, and cost was not evaluated. Another study²⁷ evaluated the efficacy of whole-body FDG-PET scanning in 60 women with clinical or radiographic suspicion of recurrent breast cancer. Forty women had histologically proven relapsed disease. PET scanning was sensitive and specific for locoregional and distant relapse and seemed to be more sensitive than tumor marker CA 15-3 for detecting recurrence. Patients enrolled onto this nonrandomized study already had evidence of recurrence (clinically or by conventional radiologic testing); thus, no conclusions can be drawn with regard to survival or other benefits from FDG-PET scanning. A meta-analysis²⁸ of 16 studies comprising 808 patients demonstrated a median sensitivity and specificity of 92.7% and 81.6%, respectively, for FDG-PET scanning. The pooled sensitivity was 90% (95% CI, 86.8% to 93.2%), and the pooled false-positive rate was 11% (95% CI, 86.0% to 90.6%). Thus, although FDG-PET scanning seems to be a useful tool to diagnose suspected breast cancer recurrence, there are no data to support its role in routine breast cancer surveillance in asymptomatic patients.

Breast Magnetic Resonance Imaging

2006 recommendation. Breast magnetic resonance imaging (MRI) is not recommended for routine breast cancer surveillance.

2006 literature update and discussion. This category is new since the 1998 update. We reviewed several recent studies of breast MRI screening in patients at high familial risk for breast cancer. A cohort study²⁹ of 529 women at high risk for breast cancer based on family history found that MRI offered higher sensitivity than mammography (91% v 33%, respectively) at detecting breast cancer, whereas specificity was similar (97.2% v 96.8%, respectively). Another cohort study³⁰ in the United Kingdom of 649 women at high familial risk for breast cancer demonstrated similar results in sensitivity (MRI: 77%; 95% CI, 60% to 90%; mammography: 40%; 95% CI, 24% to 58%) and specificity (MRI: 81%; 95% CI, 80% to 83%; mammography: 93%; 95% CI, 92% to 95%) for detecting breast cancer.

Although screening breast MRI seems to be more sensitive than conventional imaging at detecting breast cancer in high-risk women, there is no evidence that breast MRI improves outcomes when used as a breast cancer surveillance tool during routine follow-up in asymptomatic patients. The decision to use breast MRI in high-risk patients should be made on an individual basis depending on the complexity of the clinical scenario.

Breast Cancer Tumor Markers CA 15-3 and CA 27.29

2006 recommendation. The use of the CA 15-3 or CA 27.29 is not recommended for routine surveillance of breast cancer pa-

tients after primary therapy. The ASCO Breast Cancer Tumor Markers Panel will publish guideline recommendations for selected tumor markers.

Breast Cancer Tumor Marker Carcinoembryonic Antigen

2006 recommendation. Carcinoembryonic antigen testing is not recommended for routine surveillance of breast cancer patients after primary therapy. The ASCO Breast Cancer Tumor Markers Panel will publish guideline recommendations for selected tumor markers.

REFERENCES

1. American Society of Clinical Oncology: Outcomes of cancer treatment for technology assessment and cancer treatment guidelines. *J Clin Oncol* 14:671-679, 1996
2. Mille D, Roy T, Carrere MO, et al: Economic impact of harmonizing medical practices: Compliance with clinical practice guidelines in the follow-up of breast cancer in a French Comprehensive Cancer Center. *J Clin Oncol* 18:1718-1724, 2000
3. Grunfeld E, Mant D, Yudkin P, et al: Routine follow up of breast cancer in primary care: Randomised trial. *BMJ* 313:665-669, 1996
4. Loprinzi CL, Hayes D, Smith T: Doc, shouldn't we be getting some tests? *J Clin Oncol* 18:2345-2348, 2000
5. Rojas MP, Telaro E, Russo A, et al: Follow-up strategies for women treated for early breast cancer. Oxford, United Kingdom, Cochrane Library, CD001768, 1, 2005
6. The GIVIO Investigators: Impact of follow-up testing on survival and health-related quality of life in breast cancer patients: A multicenter randomized controlled trial. *JAMA* 271:1587-1592, 1994
7. Gulliford T, Opomu M, Wilson E, et al: Popularity of less frequent follow up for breast cancer in randomised study: Initial findings from the hotline study. *BMJ* 314:174-177, 1997
8. Rosselli Del Turco M, Palli D, Cariddi A, et al: Intensive diagnostic follow-up after treatment of primary breast cancer: A randomized trial—National Research Council Project on Breast Cancer Follow-Up. *JAMA* 271:1593-1597, 1994
9. Grunfeld E, Dhesy-Thind S, Levine M: Clinical practice guidelines for the care and treatment of breast cancer: Follow-up after treatment for breast cancer (summary of the 2005 update). *CMAJ* 172:1319-1320, 2005
10. US Preventive Services Task Force: Genetic risk assessment and BRCA mutation testing for breast and ovarian cancer susceptibility: Recommendation statement. *Ann Intern Med* 143:355-361, 2005
11. Olivetto IA, Bajdik CD, Ravdin PM, et al: Population-based validation of the prognostic model ADJUVANT! for early breast cancer. *J Clin Oncol* 23:2716-2725, 2005
12. 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* 22:4010-4018, 2004
13. Thomas DB, Gao DL, Ray RM, et al: Randomized trial of breast self-examination in Shanghai: Final results. *J Natl Cancer Inst* 94:1445-1457, 2002
14. Grunfeld E, Noorani H, McGahan L, et al: Surveillance mammography after treatment of primary breast cancer: A systematic review. *Breast* 11:228-235, 2002
15. Grunfeld E, Fitzpatrick R, Mant D, et al: Comparison of breast cancer patient satisfaction with follow-up in primary care versus specialist care: Results from a randomized controlled trial. *Br J Gen Pract* 49:705-710, 1999
16. Grunfeld E, Yudkin P, Adewuyi-Dalton R, et al: Follow up in breast cancer: Quality of life unaffected by general practice follow up. *BMJ* 311:54, 1995
17. Grunfeld E, Gray A, Mant D, et al: Follow-up of breast cancer in primary care vs specialist care: Results of an economic evaluation. *Br J Cancer* 79:1227-1233, 1999
18. Grunfeld E, Levine MN, Julian JA, et al: Randomized trial of long-term follow-up for early-stage breast cancer: A comparison of family physician versus specialist care. *J Clin Oncol* 24:848-855, 2006
19. Early Breast Cancer Trialists' Collaborative Group: Effects of chemotherapy and hormonal therapy for early breast cancer on recurrence and 15-year survival: An overview of the randomised trials. *Lancet* 365:1687-1717, 2005
20. Institute of Medicine and National Research Council, Committee on Cancer Survivorship: Improving Care and Quality of Life, National Cancer Policy Board. From Cancer Patient to Cancer Survivor: Lost in Transition. Washington, DC, National Academies Press, 2005
21. Palli D, Russo A, Saieva C, et al: Intensive vs clinical follow-up after treatment of primary breast cancer: 10-year update of a randomized trial—National Research Council Project on Breast Cancer Follow-Up. *JAMA* 281:1586, 1999
22. Joseph E, Hyacinthe M, Lyman GH, et al: Evaluation of an intensive strategy for follow-up and surveillance of primary breast cancer. *Ann Surg Oncol* 5:522-528, 1998
23. Hortobagyi GN: Can we cure limited metastatic breast cancer? *J Clin Oncol* 20:620-623, 2002
24. Drotman MB, Machnicki SC, Schwartz LH, et al: Breast cancer: Assessing the use of routine pelvic CT in patient evaluation. *Am J Roentgenol* 176:1433-1436, 2001
25. Hurria A, Leung D, Trainor K, et al: Screening chest imaging studies are not effective in the follow-up of breast cancer patients. *J Oncol Manag* 12:13-15, 2003
26. Vranjesevic D, Filmont JE, Meta J, et al: Whole-body (18)F-FDG PET and conventional imaging for predicting outcome in previously treated breast cancer patients. *J Nucl Med* 43:325-329, 2002
27. Kamel EM, Wyss MT, Fehr MK, et al: [18F]-Fluorodeoxyglucose positron emission tomography in patients with suspected recurrence of breast cancer. *J Cancer Res Clin Oncol* 129:147-153, 2003
28. Isasi CR, Moadel RM, Blafox MD: A meta-analysis of FDG-PET for the evaluation of breast cancer recurrence and metastases. *Breast Cancer Res Treat* 90:105-112, 2005
29. Kuhl CK, Schrading S, Leutner CC, et al: Mammography, breast ultrasound, and magnetic resonance imaging for surveillance of women at high familial risk for breast cancer. *J Clin Oncol* 23:8469-8476, 2005
30. Leach MO, Boggis CR, Dixon AK, et al: Screening with magnetic resonance imaging and mammography of a UK population at high familial risk of breast cancer: A prospective multicentre cohort study (MARIBS). *Lancet* 365:1769-1778, 2005

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Appendix. Panelist Members and Institutions

Panelist	Institution
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