

CA

A Cancer Journal for Clinicians

American Cancer Society Guidelines for the Early Detection of Cancer

Robert A. Smith, Vilma Cokkinides, Andrew C. von Eschenbach, Bernard Levin, Carmel Cohen, Carolyn D. Runowicz, Stephen Sener, Debbie Saslow and Harmon J. Eyre

CA Cancer J Clin 2002;52;8-22

DOI: 10.3322/canjclin.52.1.8

This information is current as of July 4, 2009

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://caonline.amcancersoc.org/cgi/content/full/52/1/8>

To subscribe to the print issue of *CA: A Cancer Journal for Clinicians*, go to (US individuals only): <http://caonline.amcancersoc.org/subscriptions/>

CA: A Cancer Journal for Clinicians is published six times per year for the American Cancer Society by Wiley-Blackwell. A bimonthly publication, it has been published continuously since November 1950. *CA* is owned, published, and trademarked by the American Cancer Society, 250 Williams Street NW, Atlanta GA 30303. (©American Cancer Society, Inc.) All rights reserved. Print ISSN: 0007-9235. Online ISSN: 1542-4863.



American Cancer Society Guidelines for the Early Detection of Cancer

Robert A. Smith, PhD; Vilma Cokkinides, PhD; Andrew C. von Eschenbach, MD; Bernard Levin, MD; Carmel Cohen, MD; Carolyn D. Runowicz, MD; Stephen Sener, MD; Debbie Saslow, PhD; Harmon J. Eyre, MD

Dr. Smith is Director of Cancer Screening, Cancer Control Department, American Cancer Society, Atlanta, GA.

Dr. Cokkinides is Program Director for Risk Factor Surveillance, Department of Epidemiology and Research Surveillance, American Cancer Society, Atlanta, GA.

Dr. von Eschenbach is Director, National Cancer Institute, Bethesda, MD (effective January 22, 2002), and formerly Director, Program Center for Genitourinary Cancers, The University of Texas MD Anderson Cancer Center, Houston, TX.

Dr. Levin is Vice President of Cancer Prevention, The University of Texas MD Anderson Cancer Center, Houston, TX.

Dr. Cohen is Professor and Director, Division of Gynecologic Oncology, Mount Sinai Medical Center, New York, NY.

Dr. Runowicz is Professor, Department of Obstetrics and Gynecology, Albert Einstein College of Medicine, Bronx, NY.

Dr. Sener is Vice Chairman, Department of Surgery, Evanston Northwestern Healthcare, Evanston, IL.

Dr. Saslow is Director of Breast and Cervical Cancers, Department of Cancer Control, American Cancer Society, Atlanta, GA.

Dr. Eyre is Executive Vice President for Research and Medical Affairs, American Cancer Society, Atlanta, GA, and Editor in Chief of *CA*.

This article is also available online at www.cancer.org.

ABSTRACT Each year the American Cancer Society publishes a summary of existing recommendations for early cancer detection, including updates, and/or emerging issues that are relevant to screening for cancer. In last year's article, the guidelines regarding screening for the early detection of prostate, colorectal, and endometrial cancers were updated, as was the narrative pertaining to testing for early lung cancer detection. Although none of the ACS's guidelines were updated in 2001, work is proceeding on an update of screening recommendations for breast and cervical cancer and an update of these guidelines will be announced in the January/February 2003 issue of *CA*. As in previous issues, we review recommendations for the "cancer-related check-up," in which clinical encounters provide case-finding and health counseling opportunities. Finally, we provide an update of the most recent data pertaining to participation rates in cancer screening by age, gender, and ethnicity from the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System (BRFSS) and National Health Interview Survey (NHIS). (*CA Cancer J Clin* 2002;52:8-22.)

INTRODUCTION

In 2000, the American Cancer Society (ACS) announced that it was inaugurating a yearly report on its cancer detection guidelines.¹ The annual report would be a regular summary source on current ACS guidelines for the early detection of cancer, including background and rationale for guidelines that had been updated in the prior year, announcements of upcoming guideline reviews, and a summary of the most recent data on adult cancer screening rates.

In 2001, the ACS published revisions in the early detection guidelines for colorectal cancer, endometrial cancer, and prostate cancer, and an updated narrative related to testing for early lung cancer detection.² Guidelines for the early detection of cervical cancer and breast cancer are currently under review and will be updated in the January/February issue of this journal in 2003.

The current recommendations and accompanying rationale for the early detection of cervical cancer were last updated in 1991,³ and the most recent update of the breast cancer screening guidelines took place in 1997.⁴ These guidelines were also summarized in the first summary report of ACS's early detection guidelines.¹ That report also included a description of the ACS process for the development or update of a cancer screening guideline.

This report includes the current guidelines (Table 1), key issues being addressed in the update of the guidelines for breast and cervical cancer screening, and a summary of current screening rates among US adults.

SCREENING FOR BREAST CANCER

The ACS currently recommends that women begin monthly breast self-examination (BSE) at age 20; between age 20 and 39, women should have a clinical breast examination (CBE) by a health care professional every three years; and beginning at age 40, women should have an annual mammogram and CBE* (Table 1).⁴

Beginning at age 40, CBE should take place *prior* to mammography and ideally there should be a short interval between the timing of the two examinations so that if a mass is detected on CBE it can be brought to the attention of the radiologist for diagnostic evaluation. If CBE follows mammography and a mass is detected that was not seen on the mammogram, then the patient will need to return for additional directed imaging. Further, the natural desire to prefer the normal results of the mammogram over the abnormal results of the CBE should be avoided. A normal mammogram in the presence of a palpable mass does not rule out breast cancer.⁶ There is no upper age limit to ACS breast cancer screening guidelines as long as a woman is in good health. Women with a family history of breast cancer should talk with their health care providers about initiating screening earlier.^{4,7}

ACS guidelines for breast cancer screening were last revised in 1997,⁴ and in the coming year the current recommendations for early

breast cancer detection will be updated. In the interval since that last update, evidence supporting the importance of early breast cancer detection has grown stronger.

Tabar and colleagues, noting that it was important to determine how well breast cancer screening performs outside of research settings, evaluated long-term breast cancer mortality trends in the two counties in which the Swedish Two County Trial of breast cancer screening had taken place.^{8,9} They found that the mortality from incident breast carcinoma diagnosed in women aged 40 to 69 years who actually were screened during the service screening period (1988 to 1996) declined significantly by 63 percent compared with breast carcinoma mortality during the time period when no screening was available (1968 to 1977).⁹

The magnitude of the benefit is greater than estimates from the randomized clinical trials (RCTs) because the comparison from the current study is based on women who actually attended screening, whereas estimates from RCTs are derived from comparisons between a group invited to screening and a group not invited to screening. Thus, in the end, the invited group will include breast cancer deaths among women who were not screened, and the uninvited group will include women whose breast cancer was detected by screening outside of the study.

While comparisons between the invited and noninvited group protect against known biases (lead-time bias, length bias, and selection bias), noncompliance with the randomization assignment reduces the magnitude of the potential true benefit of screening. Put another way, when advising women to be screened for breast cancer, the more appropriate estimate of

*The ACS withdrew its recommendation for a baseline mammogram between the ages of 35 and 40 in 1992. (Dodd GD. American Cancer Society guidelines on screening for breast cancer: An overview. *Cancer* 1992;69:1885-1887.)

TABLE 1

American Cancer Society Recommendations for the Early Detection of Cancer in Average-Risk, Asymptomatic People			
Cancer Site	Population	Test or Procedure	Frequency
Breast	Women, age 20+	Breast self-examination	Monthly, starting at age 20.
		Clinical breast examination	Every 3 years, ages 20-39. Annual, starting at age 40.*
		Mammography	Annual, starting at age 40.
Colorectal	Men and women, age 50+	Fecal occult blood test (FOBT) and flexible sigmoidoscopy†	Annual FOBT and flexible sigmoidoscopy every 5 years, starting at age 50.
		-or-	
		Flexible sigmoidoscopy	Every 5 years, starting at age 50.
		-or-	
		FOBT	Annual, starting at age 50.
		-or-	
Colonoscopy	Colonoscopy every 10 years, starting at age 50.		
-or-			
Double contrast barium enema (DCBE)	DCBE every 5 years, starting at age 50.		
Prostate	Men, age 50+	Digital rectal examination (DRE) and prostate specific antigen test (PSA)	The PSA test and the DRE should be offered annually, starting at age 50, for men who have a life expectancy of at least 10 years.‡
Cervix	Women, age 18+	Pap test and pelvic examination	All women who are, or have been, sexually active, or have reached age 18 should have an annual Pap test and pelvic examination. After a woman has had 3 or more consecutive satisfactory normal annual examinations, the Pap test may be performed less frequently at the discretion of the physician.
Cancer-related check-up	Men and women, age 20+	Examinations every 3 years from ages 20 to 39 years and annually after age 40. The cancer-related check-up should include examination for cancers of the thyroid, testicles, ovaries, lymph nodes, oral cavity, and skin, as well as health counseling about tobacco, sun exposure, diet and nutrition, risk factors, sexual practices, and environmental and occupational exposures.	

* Beginning at age 40, annual clinical breast examination should be performed prior to mammography.

† Flexible sigmoidoscopy together with FOBT is preferred compared with FOBT or flexible sigmoidoscopy alone.

‡ Information should be provided to men about the benefits and limitations of testing.

the magnitude of the benefit is the observed mortality reduction among women who actually participated in screening. Of course, policy makers would be interested in the overall mortality reduction in a population, which would include deaths among women who did not take advantage of screening, as well as women who were screened, but either did not have their cancer detected by mammography or had a screen-detected breast cancer and still died. Overall, the mortality decline in the two counties was 48 percent (adjusted for selection bias) when breast carcinoma mortality among all women who were invited to undergo screening (nonattendees included) was compared with breast cancer mortality during the time period when no screening was available.

During this past year, there have been several challenges to the value of screening exams that make up the existing guidelines for early detection. In their evaluation of breast self-examination (BSE), the Canadian Task Force on Preventive Medicine concluded that there was fair evidence of no benefit and good evidence of harm, and that routine teaching of BSE should be excluded from periodic health examinations in women aged 40 to 69.¹⁰

The Task Force based their conclusion on a review of results from two randomized trials and other studies that had shown no breast cancer mortality reductions associated with BSE, as well as estimates of additional costs measured resulting from additional physician visits and evaluation of benign lesions. In an accompanying editorial, Nekhlyudov and Fletcher questioned the wisdom of the new recommendations citing numerous limitations in the existing evidence related to benefit as well as harm. They further noted that an absence of clear evidence of benefit is not the same as clear evidence of no benefit.¹¹

Regular BSE has been recommended to women since the 1950s, based on the value of detecting palpable masses at the earliest opportunity.¹² However, it is reasonable to ask

what should be expected from BSE now that the manifest public health goal is detection of breast cancer in asymptomatic women. Since prognosis is strongly associated with tumor size, it is clearly important to insure the earliest awareness of the development of a palpable mass in a woman who is under age 40, and among women age 40 and over who have had a recent normal mammogram, or women who are not in a program of regular screening.

While the Canadian Task Force concluded that women should be instructed to promptly report any breast changes or concerns, whether or not that awareness can be achieved without any instruction in self-exam is unclear. It is also unclear whether lack of instruction or the periodic practice of BSE might even result in a higher rate of physician encounters for breast symptoms for which the significance to the woman is uncertain. In other words, women may benefit from some guidance in learning what normal breast composition is for them. The recommendations from the Canadian Task Force and the accumulation of evidence will be carefully reviewed in the upcoming update of ACS guidelines.

In 2000, Gotzsche and Olsen concluded that screening for breast cancer with mammography was unjustified.¹³ Their conclusion was based on a meta-analysis of the world's breast cancer RCTs that resulted in rejecting the evidence from six of eight trials based on their judgment that the randomization was inadequate, leaving two trials for which the results showed no benefit.

In an accompanying editorial, Harry de Koning criticized the analysis as having failed to demonstrate how the alleged biases influenced the end results, and citing numerous other methodologic shortcomings and factual errors rendering the conclusion that mammography screening was unjustified entirely without merit.¹⁴ The majority of the letters to the editor about the article were also highly critical of the analysis and conclusions,¹⁵⁻²⁰ as were critiques in

other publications.²¹

The original Gotzsche and Olsen analysis has been updated under the auspices of the Cochrane Collaboration, but in an unusual turn of events, two different versions of the analysis have been published. The version published in the Cochrane library²² includes findings showing a benefit from mammography if the majority of the results from the breast cancer screening trials are included in the meta-analyses.

The version published on the *Lancet* Web site and extolled in the journal does not include that finding, but rather only results from the meta-analysis showing no benefit, which includes only two trials.^{23,24} In an accompanying editorial, Horton chooses to side with the Danish authors rather than the Cochrane editors, and concludes that the question of the value of screening with mammography will only be answered when each of the investigators of the world's trials provides individual patient data from their studies to an independent overview group for re-analysis.

It is ironic that this recommendation neglects the fact that just such an independent analysis of individual-level data from the five Swedish trials was conducted under the auspices of the Swedish Board of Health and published in the *Lancet* in 1993.²⁵ That analysis showed a statistically significant 24% breast cancer mortality reduction among those invited to mammography screening compared with those not invited. Further, the analysis of long-term mortality trends in the two Swedish counties mentioned earlier is based on an analysis of individual screening compliance data in the context of prevailing health policy, which avoids the problems of mixing screened and unscreened cohorts when evaluating mortality trends, and provides the opportunity to measure the impact of screening among women actually screened as well as at the population level.

In that analysis, the impact of high-quality mammography in a setting with high rates of compliance revealed the strongest breast cancer

mortality reductions observed to date.⁹ While there are many remaining, as well as emerging questions related to early breast cancer detection, the inherent value of detecting and treating smaller cancers in asymptomatic women is an established fact.

The review of breast cancer screening guidelines, from which updated guidelines will be announced in early 2003, will address additional issues, including the implications of the introduction of computer-aided diagnostic technology,²⁶ digital mammography,²⁷ and experimental use of MRI for screening in high-risk women.²⁸

Additional issues will include whether there is sufficient evidence to issue modified surveillance recommendations to high-risk subgroups, and how to provide clearer guidance to providers regarding continued screening among older cohorts of women.

SCREENING FOR CERVICAL CANCER

The ACS recommends that women should begin annual screening for cervical cancer with the Pap test at the age of 18, or after the onset of sexual activity, whichever comes first. After three consecutive negative Pap tests, screening can be performed less frequently at the discretion of the physician (Table 1).^{3,29}

The ACS does not set an upper age limit for cervical cancer screening, as is the case with other screening recommendations. As long as a person is healthy, she should participate in regular screening (Table 1).

The last time the ACS's guidelines for cervical cancer screening were revised was in 1991.³ In the decade that has passed, our understanding of the underlying etiology of cervical intraepithelial neoplasia and the role of human papilloma virus has grown. The reporting systems for cervical cytology have gone through several changes and the technology of cervical cytology has evolved far

beyond the basic Pap smear.³⁰⁻³²

While this evolution in both new knowledge and the technology of cervical cytology has grown, many of the fundamental questions that pertain to any screening program are still with us, or in some cases, the new knowledge warrants consideration of whether the older recommendations still apply.

An ongoing review of the ACS guidelines for cervical cancer screening has focused on several issues that have been receiving renewed attention as they pertain to screening for cervical cancer, including: (1) when should screening start? (2) at what interval should screening be performed? (3) is there new potential for risk-based screening? (4) should women who have had a hysterectomy continue to get screened? (5) should older women continue to be screened, and if so, at what intervals? (6) should new screening tests be offered or recommended instead of/or in conjunction with the conventional Pap smear?

Updated guidelines for cervical cancer screening will be announced early in 2003.

SCREENING AND SURVEILLANCE FOR THE EARLY DETECTION OF ADENOMATOUS POLYPS AND COLORECTAL CANCER

ACS guidelines for screening and surveillance for the early detection of adenomatous polyps and colorectal cancer were updated in 2001 (Table 1).² Adults at average risk should begin colorectal cancer screening at age 50, utilizing one of the following five options for screening (Table 1): (1) annual fecal occult blood test (FOBT); (2) flexible sigmoidoscopy every five years; (3) annual FOBT plus flexible sigmoidoscopy every five years; (4) double contrast barium enema (DCBE) every five years; or (5) colonoscopy every 10 years.

Because combining flexible sigmoidoscopy with FOBT can increase the benefits of either

test alone, especially in the instance of adding flexible sigmoidoscopy every five years to annual FOBT, the ACS regards annual FOBT accompanied by flexible sigmoidoscopy every five years as a better choice than either FOBT or flexible sigmoidoscopy alone.³³⁻³⁶

Recommendations for individuals at increased risk (people previously diagnosed as having adenomatous polyps, a personal history of curative-intent resection of colorectal cancer, or a family history of either colorectal cancer or colorectal adenomas diagnosed in a first-degree relative before age 60), and at high-risk (individuals with inflammatory bowel disease of significant duration, and those individuals with one of two hereditary syndromes that place them at very high risk for colorectal cancer) are shown in Table 2.

FOBT as it is commonly done, with the single stool sample collected on the fingertip during a digital rectal examination, is not an adequate substitute for the recommended at-home procedure of collecting two samples from three consecutive specimens. This is because colonic neoplasms typically bleed intermittently and/or because blood usually is not present throughout the entire stool. Further, several studies have shown that the yield of the three-sample protocol is higher than that of the first sample alone.^{36,37} A positive FOBT should be followed by a colonoscopy because of the possibility that an important lesion can be visualized and biopsied during the examination. If a clinically relevant source of bleeding is not identified, then a source outside the large bowel should be investigated.

Guidelines for average-risk individuals currently provide for greater flexibility in achieving screening goals due to surveillance evidence showing little progress in colorectal screening rates.² At a time when economic and health care system disincentives are common, and as awareness of the importance of screening for colorectal cancer is increasing among adults and health care professionals, the ACS

TABLE 2

American Cancer Society Guidelines on Screening and Surveillance for the Early Detection of Colorectal Adenomas and Cancer—Women and Men at Increased Risk or at High Risk

Risk Category	Age to Begin	Recommendation	Comment
INCREASED RISK			
People with a single, small (< 1 cm) adenoma	3-6 years after the initial polypectomy	Colonoscopy*	If the exam is normal, the patient can thereafter be screened as per average-risk guidelines.
People with a large (1 cm +) adenoma, multiple adenomas, or adenomas with high-grade dysplasia or villous change	Within 3 years after the initial polypectomy	Colonoscopy*	If normal, repeat examination in 3 years; If normal then, the patient can thereafter be screened as per average-risk guidelines.
Personal history of curative-intent resection of colorectal cancer	Within 1 year after cancer resection	Colonoscopy*	If normal, repeat examination in 3 years; If normal then, repeat examination every 5 years.
Either colorectal cancer or adenomatous polyps, in any first-degree relative before age 60, or in two or more first-degree relatives at any age (if not a hereditary syndrome)	Age 40, or 10 years before the youngest case in the immediate family	Colonoscopy*	Every 5-10 years. Colorectal cancer in relatives more distant than first-degree does not increase risk substantially above the average-risk group.
HIGH RISK			
Family history of familial adenomatous polyposis (FAP)	Puberty	Early surveillance with endoscopy, and counseling to consider genetic testing	If the genetic test is positive, colectomy is indicated. These patients are best referred to a center with experience in the management of FAP.
Family history of hereditary non-polyposis colon cancer (HNPCC)	Age 21	Colonoscopy and counseling to consider genetic testing	If the genetic test is positive or if the patient has not had genetic testing, every 1-2 years until age 40, then annually. These patients are best referred to a center with experience in the management of HNPCC.
Inflammatory bowel disease Chronic ulcerative colitis Crohn's disease	Cancer risk begins to be significant 8 years after the onset of pancolitis, or 12-15 years after the onset of left-sided colitis	Colonoscopy with biopsies for dysplasia	Every 1-2 years. These patients are best referred to a center with experience in the surveillance and management of inflammatory bowel disease.

*If colonoscopy is unavailable, not feasible, or not desired by the patient, double contrast barium enema alone or the combination of flexible sigmoidoscopy and double contrast barium enema are acceptable alternatives. Adding flexible sigmoidoscopy to DCBE may provide a more comprehensive diagnostic evaluation than DCBE alone in finding significant lesions. A supplementary DCBE may be needed if a colonoscopic exam fails to reach the cecum, and a supplementary colonoscopy may be needed if a DCBE identifies a possible lesion, or does not adequately visualize the entire colorectum.

determined that utilization of any of the recommended screening tests was preferable to no screening at all.²

Since many clinicians may be able to successfully implement only one or two of the screening modalities, of primary importance at this time is that clinicians recommend at least one of the appropriate screening options for all of their eligible patients.

SCREENING FOR ENDOMETRIAL CANCER

Based on a thorough review of the literature, in 2001 the ACS concluded that there is no indication that screening for endometrial cancer is warranted for women who have no identified risk factors.² Since early diagnosis usually results from the presence of alerting symptoms, specifically bleeding, the ACS recommended that at the onset of menopause, women at average risk should be informed about risks and symptoms of endometrial cancer and strongly encouraged to report any unexpected bleeding or spotting to their physicians (Table 1).

Women at increased risk, due to a history of unopposed estrogen therapy, late menopause, tamoxifen therapy, nulliparity, infertility or failure to ovulate, obesity, diabetes, or hypertension also should be informed about the risks and symptoms of endometrial cancer and strongly encouraged to report any unexpected bleeding or spotting to their physicians.

Asymptomatic women at increased risk should also be informed about the potential benefits, risks, and limitations of testing for early endometrial cancer detection to insure informed decisions about testing.

Women at high risk for endometrial cancer include women known to carry HNPCC-associated genetic mutations, women who have a substantial likelihood of being a mutation carrier (i.e., a mutation is known to be present

in the family), and women without genetic testing results, but who are from families with suspected autosomal dominant predisposition to colon cancer.

Although there are insufficient data to endorse annual screening for endometrial cancer in this group, annual screening beginning at age 35 is recommended due to the high risk of endometrial cancer and the potentially life-threatening nature of this disease.

Women with an HNPCC-associated mutation or with a substantial likelihood of having an HNPCC-associated mutation should be informed about potential benefits, risks, and limitations of testing for early endometrial cancer detection, and should also be informed that the recommendation for screening is based on expert opinion in the absence of definitive scientific evidence.

SCREENING FOR PROSTATE CANCER

The ACS recommends that the prostate specific antigen test (PSA) and digital rectal examination (DRE) should be offered annually beginning at age 50 to men who have a life expectancy of at least 10 years (Table 1).² Men at high risk, including men of African descent (specifically, sub-Saharan African descent) and men with a first-degree relative diagnosed at a younger age should begin testing at age 45.

Men at even higher risk of prostate cancer due to multiple first-degree relatives diagnosed with prostate cancer at an early age could begin testing at age 40. However, if PSA is less than 1.0 ng/ml, no additional testing is needed until age 45. If PSA is greater than 1.0 ng/ml but less than 2.5 ng/ml, annual testing is recommended. If PSA is 2.5 ng/ml or greater, further evaluation with biopsy should be considered.

Information should be provided to all patients about the benefits and limitations of testing. Specifically, prior to testing, men should

have an opportunity to learn about the benefits and limitations of testing for early prostate cancer detection and treatment so that they can make an informed decision with the clinician's assistance.

Men who ask the clinician to make the testing decision on their behalf should be tested. A policy of not discussing testing, or discouraging testing in men who request early prostate cancer detection tests, is inappropriate.

Although data from randomized trials on the efficacy of PSA testing are not yet available, over time inferential evidence has accumulated supporting the association between PSA testing and a reduction in prostate cancer mortality. Recent analysis of the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) data shows that prostate cancer mortality in white men under the age of 85 has declined to levels below those that existed prior to the PSA era, which began about 1986.³⁸

Investigators recently reported results from a natural experiment comparing prostate cancer mortality trends in the Federal State of Tyrol, Austria, where PSA testing had been made freely available, with the rest of the country, which did not have a screening program. After the introduction of the program, a significant shift toward more favorable stage at diagnosis was observed in Tyrol compared with the rest of Austria, followed by a much greater and statistically significant decline in the prostate cancer mortality rate.³⁹ The investigators concluded that the findings were consistent with the hypothesis that a policy of making PSA testing freely available, coupled with high rates of acceptance of screening by men in a geographic area where urology services and radiotherapy were freely available, was associated with a reduction in prostate cancer mortality. However, the authors also note that more definitive evidence that prostate cancer testing reduces prostate cancer mortality rates awaits the results from two prospective

randomized clinical trials, and that much more remains to be learned about the most appropriate approach to population-based prostate cancer screening programs before they can be endorsed as health policy. They further note that the program in Tyrol involved a complex decision algorithm (age-referenced PSA levels, percent-free PSA, and PSA transition zone density) to maximize detection of prostate cancer and avoid an unacceptable rate of negative biopsies. While these data are promising and add to the evidence supporting the hypothesis of benefit from screening, the current recommendation of offering screening, followed by informed decision-making after a discussion of benefits and limitations is the most appropriate approach to testing for prostate cancer.

TESTING FOR EARLY LUNG CANCER DETECTION

The ACS does not recommend testing for early lung cancer detection in asymptomatic individuals at risk for lung cancer.² However, because of the limitations of the trials of chest radiography and sputum cytology, as well as the more favorable survival rates associated with the diagnosis of resectable tumors during case finding, the ACS historically has maintained that physicians and patients may decide to have these screening tests done on an individual basis.⁴⁰

The current status of testing for lung cancer is more complicated today due to the emergence of considerably more powerful imaging with the use of low-dose helical CT.⁴¹ In the past few years, however, results from screening studies using spiral CT have been regarded as sufficiently encouraging to lead a growing number of institutions and facilities to promote CT screening to asymptomatic individuals at risk for lung cancer, with availability likely to increase.

Since both media reports and local

advertising may stimulate interest in spiral CT testing among health care providers and individuals at higher risk, the ACS has determined that updated guidance about early lung cancer detection is appropriate. Further, given the high rate of positive results that occur with CT screening for lung cancer and the complexity of the algorithm for working up small nodules, there is reason to be concerned about broad dissemination of lung screening outside of experienced, multispecialty settings and prior to validation of this new technology.

For this reason, it is critically important—during this period of evolving investigations into the efficacy of spiral CT and other modalities—that appropriate and influential professional organizations provide a foundation for best practices based upon the current state-of-the-art imaging, and also promote informed decision-making for patients about possible benefits, risks, and limitations of testing for early lung cancer detection. Individuals interested in early detection also should be encouraged to participate in trials.

The ACS recommends that, to the extent possible, individuals at risk for lung cancer due to current or prior smoking history, history of significant exposure to second-hand smoke, or occupational history, be aware of their continuing lung cancer risk.

Those who seek testing for early lung cancer detection should be informed about what is currently known regarding the benefits, limitations, and risks associated with conventional and emerging early detection technologies, as well as the associated diagnostic procedures and treatment. Individuals who are current smokers also should be informed that the more immediate preventive health priority is the elimination of tobacco use altogether, since smoking cessation offers the surest route at this time to reducing the risk of premature mortality from lung cancer.

In the meantime, because of increasing availability and promotion of testing, it is

critically important that individuals who are interested in testing understand both the limits of our knowledge about the potential benefits of screening with low-dose CT, as well as potential harms associated with diagnostic procedures and treatment.

Given the complexity of diagnostic and follow-up algorithms associated with early lung cancer testing, the ACS discourages testing in a setting that is not linked to multidisciplinary specialty groups for diagnosis and follow-up. Individuals who choose to undergo testing should have access to testing and follow-up that meet state-of-the-art standards, with informed decision-making at every step of an ongoing process.

Ideally, the route to testing should be through an individual's primary care physician, who should be prepared to help patients understand their risks and reach informed decisions about testing, and to provide support if early detection tests are positive. Absence of a referral from a primary care physician due to lack of provider endorsement of testing, or not having a primary care provider, should not be a barrier to testing. However, if an individual seeks testing and does not have a referral from a primary care provider, the radiologist who provides testing is obliged to provide information about benefits, risks, and limitations of testing as described above, and must become the individual's physician of record until proper alternative care arrangements can be made.

At this time, there is an urgent need for rapid resolution of the underlying evidence-based questions about the benefit of spiral CT for early lung cancer detection. As of this writing, plans are currently under discussion to launch several large randomized trials of lung cancer screening in the United States and Europe.⁴² If this technology is effective at identifying early, resectable lung cancers, the public health impact could be substantial. Present and future disease burden, rapid

diffusion of this technology into the community, and rapid evolution of imaging technologies place high demands on the need for evidence-based guidance for policy as soon as possible.

THE CANCER-RELATED CHECK-UP

The ACS historically has viewed periodic encounters with clinicians as having potential for health counseling and a cancer-related check-up.⁴⁰ These encounters may include case-finding examinations of the thyroid, testicles, ovaries, lymph nodes, oral region, and skin. Also, self-examination of the skin and breasts can be encouraged, as can the importance of awareness of symptoms of testicular cancer in young men. Health counseling may include guidance about smoking cessation, diet, physical activity, and the benefits and risks of undergoing various screening tests.

The ACS recommends a cancer-related check-up every three years for asymptomatic individuals aged 20 to 39, and annually for asymptomatic men and women aged 40 and older.

The ACS has recommended a cancer-related check-up during these periodic encounters with clinicians, which historically had been recommended every three years for individuals aged 20 to 39, and annually for men and women aged 40 and older. However, as intervals for routine check-ups have been replaced by recommendations that apply to specific conditions and populations, the periodicity of a

general health check-up when these case-finding examinations might take place has become less clear.

CANCER SCREENING: COLORECTAL, BREAST, AND CERVICAL CANCERS

The estimated proportion of the US adult population that undergoes specific tests for early cancer detection in the United States is presented in Table 3, and derives from the Centers for Disease Control's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) for 1999 and 2000. Data are weighted to provide prevalence estimates representative of the state's adult population.⁴³ From its inception, the focus of the BRFSS has been to establish a surveillance system for the collection of population-based health behaviors, sociodemographics, and related health care factors (i.e., access to health care) known to affect chronic diseases (i.e., including cancer) and the health status of the general population.† The second source of population-based national data presented in Table 4 is from the National Health Interview Survey (NHIS), conducted by the National Center for Health Statistics, CDC. This is the principal source of information on national health indices in the civilian, noninstitutionalized, household population of the United States.

Colorectal Cancer Screening

Colorectal cancer screening utilization among adults 50 and older is low (Table 3).

†The BRFSS is an annual survey conducted by state health departments in collaboration with the CDC in all 50 states, the District of Columbia, and Puerto Rico. The BRFSS provides the most recent annual update of national estimates of screening by conducting a statewide telephone survey of civilian, noninstitutionalized adults (i.e., persons 18 years of age or older living in households with a telephone). The BRFSS survey methodology includes standardized core-questionnaires, complex multi-stage cluster sampling designs, and random-digit dialing methods to select households with telephones. Data are weighted to provide prevalence estimates representative of the state's adult population. (Holtzman D, Powell-Griner E, Bolen J, Rhodes L. State- and sex-specific prevalence of selected characteristics—Behavioral Risk Factor Surveillance System, 1996 and 1997. *Morbidity and Mortality Weekly Report. CDC Surveillance Summaries* 2000;49:1-39.)

TABLE 3

Prevalence (%) of Cancer Screening Among US Adults, Behavioral Risk Factor Surveillance System (BRFSS), 1999 and 2000

	Age	Males		Females		Total	
		Median	(Range)	Median	(Range)	Median	(Range)
Colorectal Cancer							
Either a Flexible Sigmoidoscopy or Colonoscopy*	50+	34.2	(25.7 – 49.0)	30.3	(21.1 – 37.0)	32.3	(22.6 – 46.2)
Fecal occult blood test (FOBT) (home-kit)†	50+	17.1	(9.8 – 35.6)	21.3	(13.1 – 37.2)	19.0	(11.6 – 35.8)
Breast Cancer							
Mammogram‡	40 to 64	—	—	62.5	(49.1 – 74.0)	—	—
	65+	—	—	65.3	(45.4 – 79.3)	—	—
Mammogram and clinical breast exam (CBE)§	40 to 64	—	—	56.9	(45.0 – 67.9)	—	—
	65+	—	—	54.3	(37.3 – 69.0)	—	—
Cervical Cancer							
Pap test#	18 to 44	—	—	89.0	(83.6 – 93.0)	—	—
	45+	—	—	83.9	(75.2 – 90.7)	—	—

*Recent sigmoidoscopy or colonoscopy test within the preceding five years. Source: BRFSS, 1999.
 †Recent fecal occult blood test using a home-kit test performed within the preceding year. Source: BRFSS, 1999.
 ‡Women 40 and older who had a mammogram in the last year. Source: BRFSS, 2000.
 §Women 40 and older who had a mammogram in the last year and a clinical breast exam. Source: BRFSS, 2000.
 #Women who had a Pap test within the preceding three years. Source: BRFSS, 2000.

TABLE 4

Prevalence (%) of Cancer Screening in US Adults: Five Racial and Ethnic Groups, National Health Interview Survey (NHIS), 1998

Type of Cancer Screening Test	Racial and Ethnic Groups				
	White Non-Hispanic	African American Non-Hispanic	Hispanic	American Indian/Alaska Native	Asian/Pacific Islander
Adults who have ever received a sigmoidoscopy	39	32	27	29	34
Had a fecal occult blood test (FOBT) within the past two years	36	30	23	24	31
Mammogram within the past two years	68	66	61	45	61
Pap test within the past three years and women with intact uterine cervix	80	83	74	72	67

Percentages are age adjusted to the 2000 US standard population. Source: National Health Interview Survey, 1998, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2000.

Downloaded from caonline.aacrjournals.org by on July 4, 2009 ©American Cancer Society, Inc.

Men were slightly more likely than women to have received an endoscopic exam (flexible sigmoidoscopy or colonoscopy) within the preceding five years (34.2 percent versus 30.1 percent). On the other hand, women were slightly more likely than men to have conducted an FOBT using the home kit within the previous year (21.3 percent versus 17.1 percent).

Breast Cancer Screening

The proportion of women reporting a mammogram in the last year was 62.5 percent among those 40 to 64 years of age and 65.3 percent among those aged 65 and older (Table 4). The proportion of women reporting both a mammogram and a clinical breast exam in the previous year was 56.9 percent among those 40 to 64 years of age and 54.3 percent among those aged 65 and older.

Cervical Cancer Screening

Women in the 18-to-44 year old age group were more likely to have had a Pap test in the preceding three years compared with women 45 and older (89.0 percent versus 83.9 percent) (Table 3). High rates of participation in cervical cancer screening reflect high acceptance of the Pap test among women and their providers as well as the convenience of testing.

PSA Testing

To date there are no nationally available data on PSA testing and only very limited state-level data on PSA testing and the digital rectal exam. To address this gap in prostate cancer-specific screening data, national and state level surveys are currently being conducted and data will be available in the next few years.

CANCER SCREENING: RACIAL AND ETHNIC PATTERNS

Disparities in risks for cancer exist among racial and ethnic groups in the United States. Recent national data representative of the US adult civilian population from the Health Interview Survey provides the most comprehensive compilation of cancer screening utilization data across five racial and ethnic groups—whites (non-Hispanic), African Americans (non-Hispanic), Hispanics, American Indians or Alaska Natives, and Asian/Pacific Islanders.⁴⁴ These data are summarized for cancer screening utilization during 1998 for colorectal, cervical, and breast cancers (Table 4).

Although racial and ethnic minority groups account for increasingly larger proportions of the US population, information is limited about minority group health behaviors and utilization of preventive health care services, especially at the state and local levels. Nevertheless, the data presented here clearly identify some disparities among racial and ethnic groups.

Comparable rates of mammogram and Pap test utilization were reported for white and African-American women while women of other racial minority groups were less likely to have received a mammogram and a Pap test (Table 4).

In part, the improving rates of screening utilization among African-American women (and in particular, those who are medically underserved and uninsured) may be a reflection of the increased access and coverage for breast and cervical cancer screening through the CDC's National Breast and Cervical Cancer Early Detection Program.⁴⁵ Between July 1991 and September 1995, the program provided 327,017 mammograms and 472,188 Pap tests; 46.7 percent of the mammograms and 46.5 percent of the Pap tests were provided to women of racial and ethnic minorities.⁴⁶

American Indian/Alaska Native women aged 50 and older had the lowest mammography utilization rates within the past two years (45 percent) and Asian/Pacific Islander women age 18 and older had the lowest Pap test-utilization rates within the last three years (67 percent) compared with other racial and ethnic groups.

The following subgroups showed the lowest utilization rates for colorectal cancer screening: 27 percent of Hispanics and 29 percent of American Indians/Alaska Natives, age 50 and older, reported ever having had a flexible sigmoidoscopy and 23 percent of Hispanics and 24 percent of American Indians/Alaska Natives, age 50 and older, reported having had a FOBT within the past two years.

These differences in the utilization of cancer screening among racial and ethnic groups have been associated with various factors, including socioeconomic and cultural factors,⁴⁷ lifestyle behaviors (e.g., lack of physical activity, alcohol intake, and cigarette smoking), aspects of the social environment, (e.g., educational and economic opportunities, neighborhood and work conditions), aspects of the health care environment (e.g., access to health care, physician recommendation), and group migration trends.^{48,49}

CONCLUSION

Although significant progress has been made in screening for some cancers, considerable

progress toward achieving uniformly high rates of cancer screening remains to be made.⁵⁰ Participation in screening depends not only on the acceptance of the value of screening by providers and the public, but on overcoming other barriers that include lack of reminder tools, low prioritization, nonpreventive care encounters with health care providers, and other barriers including lack of access to screening and cost factors.⁵¹⁻⁵⁵

Studies have consistently shown that the single most important factor in whether or not an individual has ever had a screening test or has been recently screened is a recommendation from his or her health care provider. But since the average physician/patient encounter is brief and typically for acute care, the situational context of these visits generally is not conducive to cancer screening, discussions about cancer screening, or preventive health counseling.

Tools that have been shown to enhance screening include flowsheets, chart reminders, computerized tracking and reminder systems, and group practices.⁵⁶⁻⁶¹ Also, providers should (1) stress the importance of cancer screening to their patients and office staff, and establish a system for patient reminders; (2) be prepared to answer patients' questions about screening, and acknowledge the limitations of cancer screening as well as the benefits; and (3) share in the decision-making process with patients when selecting a screening strategy. CA

REFERENCES

1. Smith RA, Mettlin CJ, Davis KJ, Eyre H. American Cancer Society guidelines for the early detection of cancer. *CA Cancer J Clin* 2000;50:34-49.
2. Smith RA, von Eschenbach AC, Wender R, et al. American Cancer Society guidelines for the early detection of cancer: Update of early detection guidelines for prostate, colorectal, and endometrial cancers. Also: Update 2001—testing for early lung cancer detection. *CA Cancer J Clin* 2001;51:38-75.
3. Fink D. Guidelines for the cancer-related check-up. American Cancer Society, 1991.
4. Leitch AM, Dodd GD, Costanza M, et al. American Cancer Society guidelines for the early detection of breast cancer: Update 1997. *CA Cancer J Clin* 1997;47:150-153.
5. Dodd GD. American Cancer Society guidelines on screening for breast cancer: An overview. *Cancer* 1992;69:1885-1887.
6. Bassett L, Hendrick R, Bassford T. Quality determinants of mammography. Clinical practice guideline No. 13. Agency for Health Care Policy and Research, Public Health Service, US Department of Health and Human Services, 1994.
7. Burke W, Daly M, Garber J, et al. Recommendations for follow-up care of individuals with an inherited predisposition to cancer. II. BRCA1 and BRCA2. Cancer Genetics Studies Consortium. *JAMA* 1997;277:997-1003.
8. Tabar L, Vitak B, Chen HH, et al. The Swedish Two County Trial twenty years later. Updated mortality results and new insights from long-term follow-up [In Process Citation]. *Radiol Clin North Am* 2000;38:625-651.

9. Tabar L, Vitak B, Tony HH, et al. Beyond randomized controlled trials: Organized mammographic screening substantially reduces breast carcinoma mortality. *Cancer* 2001;91:1724-1731.
10. Baxter N. Preventive health care, 2001 update: Should women be routinely taught breast self-examination to screen for breast cancer? *CMAJ* 2001;164:1837-1846.
11. Nekhlyudov L, Fletcher SW. Is it time to stop teaching breast self-examination? *CMAJ* 2001;164:1851-1852.
12. Lerner BH. *The Breast Cancer Wars*. New York: Oxford University Press, 2001.
13. Gotzsche PC, Olsen O. Is screening for breast cancer with mammography justifiable? *Lancet* 2000;355:129-134.
14. de Koning HJ. Assessment of nationwide screening programs. *Lancet* 2000;355:80-81.
15. Duffy SW, Tabar L. Screening mammography re-evaluated. *Lancet* 2000;355:747-748; discussion 752.
16. Cates C, Senn S. Screening mammography re-evaluated. *Lancet* 2000;355:750; discussion 752.
17. Law M, Hackshaw A, Wald N. Screening mammography re-evaluated. *Lancet* 2000;355:749-750; discussion 752.
18. Moss S, Blanks R, Quinn MJ. Screening mammography re-evaluated. *Lancet* 2000;355:748; discussion 752.
19. Nystrom L. Screening mammography re-evaluated. *Lancet* 2000;355:748-749; discussion 752.
20. Hayes C, Fitzpatrick P, Daly L, Buttner J. Screening mammography re-evaluated. *Lancet* 2000;355:749; discussion 752.
21. Wald N. Populist instead of professional. *J Med Screen* 2000;7:1.
22. Olsen O, Gotzsche PC. Screening for breast cancer with mammography (Cochrane Review). *Cochrane Database Syst Rev* 2001;4:CD001877.
23. Olsen O, Gotzsche PC. Cochrane review on screening for breast cancer with mammography. *Lancet* 2001;358:1340-1342.
24. Horton R. Screening mammography—an overview revisited. *Lancet* 2001;358:1284-1285.
25. Nystrom L, Rutqvist LE, Wall S, et al. Breast cancer screening with mammography: overview of Swedish randomized trials [published erratum appears in *Lancet* 1993;342:1372]. *Lancet* 1993;341:973-978.
26. Freer TW, Ulissey MJ. Screening mammography with computer-aided detection: prospective study of 12,860 patients in a community breast center. *Radiology* 2001;220:781-786.
27. Pisano ED, Kuzmiak C, Koomen M. Perspective on digital mammography. *Semin Roentgenol* 2001;36:195-200.
28. Stoutjesdijk MJ, Boetes C, Jager GJ, et al. Magnetic resonance imaging and mammography in women with a hereditary risk of breast cancer. *J Natl Cancer Inst* 2001;93:1095-1102.
29. Shingleton HM, Patrick RL, Johnston WW, Smith RA. The current status of the Papanicolaou smear. *CA Cancer J Clin* 1995;45:305-320.
30. Solomon D. The Bethesda System for reporting cervical/vaginal cytologic diagnoses: An overview. *Int J Gynecol Pathol* 1991;10:323-325.
31. Franco EL, Rohan TE, Villa LL. Epidemiologic evidence and human papillomavirus infection as a necessary cause of cervical cancer. *J Natl Cancer Inst* 1999;91:506-511.
32. Brown AD, Garber AM. Cost-effectiveness of three methods to enhance the sensitivity of Papanicolaou testing. *JAMA* 1999;281:347-353.
33. Selby JV, Friedman GD, Quesenberry CPJ, Weiss NS. A case-control study of screening sigmoidoscopy and mortality from colorectal cancer. *N Engl J Med* 1992;326:653-657.
34. Newcomb P, Norfleet R, Storer B. Screening sigmoidoscopy and colorectal cancer mortality. *J Natl Cancer Inst* 1992;84:1572-1575.
35. Kavanagh AM, Giovannucci EL, Fuchs CS, Colditz GA. Screening endoscopy and risk of colorectal cancer in United States men. *Cancer Causes Control* 1998;9:455-462.
36. Lieberman DA, Weiss DG. One-time screening for colorectal cancer with combined fecal occult-blood testing and examination of the distal colon. *N Engl J Med* 2001;345:555-560.
37. Yamamoto M, Nakama H. Cost-effectiveness analysis of immunochemical occult blood screening for colorectal cancer among three fecal sampling methods. *Hepatogastroenterology* 2000;47:396-399.
38. Ries L, Eisner M, Kosary C, et al. *SEER Cancer Statistics Review, 1973-1998*. National Cancer Institute, 2001.
39. Bartsch G, Horninger W, Klocker H, et al. Prostate cancer mortality after introduction of prostate-specific antigen mass screening in the Federal State of Tyrol, Austria(1). *Urology* 2001;58:417-424.
40. Eddy D. ACS report on the cancer-related health check-up. *CA Cancer J Clin* 1980;30:193-240.
41. Henschke CI, McCauley DI, Yankelevitz DF, et al. Early Lung Cancer Action Project: overall design and findings from baseline screening. *Lancet* 1999;354:99-105.
42. International Union Against Cancer. *GlobaLink: UICC Electronic Information and Communication Services*. Planning effort underway for international collaboration on studies of lung cancer screening with CT spiral. Available at: www.uicc.org/publ/pr/home/01092401.shtml. Accessed September 24, 2001.
43. Holtzman D, Powell-Griner E, Bolen J, Rhodes L. State- and sex-specific prevalence of selected characteristics—Behavioral Risk Factor Surveillance System, 1996 and 1997. *Morbidity and Mortality Weekly Report*. CDC Surveillance Summaries 2000;49:1-39.
44. National Center for Health Statistics, Data file documentation, National Health Interview Survey, 1998. National Center for Health Statistics, 2000.
45. Marks J, Lee N. Implementing recommendations for the early detection of breast and cervical cancer among low-income women. *Morbidity and Mortality Weekly Report*. CDC Surveillance Summaries 2000;49:35-55.
46. Centers for Disease Control. Update: National Breast and Cervical Cancer Early Detection Program, July 1991-September 1995. *Morbidity and Mortality Weekly Report*. CDC Surveillance Summaries 1996;45:484-487.
47. Hoffman-Goetz L, Mills S. Cultural barriers to cancer screening among African-American women: A critical review of the qualitative literature. *Womens Health* 1997;3:183-201.
48. Lane D, Caplan L, Grimson R. Trends in mammography use and their relation to physician and other factors. *Cancer Det Prev* 1996;20:332-41.
49. Hawley S, Earp J, O'Malley M, Ricketts T. The role of physician recommendation in women's mammography use: Is it a 2-stage process? *Med Care* 2000;38:392-403.
50. Ruffin MT, Gorenflo DW, Woodman B. Predictors of screening for breast, cervical, colorectal, and prostatic cancer among community-based primary care practices. *J Am Board Fam Pract* 2000;13:1-10.
51. Vernon SW. Participation in colorectal cancer screening: A review. *J Natl Cancer Inst* 1997;89:1406-1422.
52. Horton JA, Cruess DF, Romans MC. Compliance with mammography screening guidelines: 1995 Mammography Attitudes and Usage Study Report. *Womens Health Issues* 1996;6:239-245.
53. Smith RA, Haynes S. Barriers to screening for breast cancer. *Cancer* 1992;69:1968-1978.
54. Rimer BK, Trock B, Engstrom PF, Lerman C, King E. Why do some women get regular mammograms? *Am J Prev Med* 1991;7:69-74.
55. Kiefe CI, Funkhouser E, Fouad MN, May DS. Chronic disease as a barrier to breast and cervical cancer screening. *J Gen Intern Med* 1998;13:357-365.
56. Dietrich JJ, O'Conner GT, Keller A, et al. Cancer: Improving early detection and prevention. A community practice randomized trial. *BMJ* 1992;304:91-95.
57. Dietrich JJ, Woodruff CB, Carney PA. Changing office routines to enhance preventive care. The preventive GAPS approach. *Arch Fam Med* 1994;3:176-183.
58. Gann P, Melville SK, Luckmann R. Characteristics of primary care office systems as predictors of mammography utilization. *Ann Intern Med* 1993;118:893-898.
59. Garr DR, Ornstein SM, Jenkins RG, Zemp LD. The effect of routine use of computer-generated preventive reminders in a clinical practice. *Am J Prev Med* 1993;9:55-61.
60. McPhee SJ, Bird JA, Jenkins CN, Fordham D. Promoting cancer screening. A randomized, controlled trial of three interventions. *Arch Intern Med* 1989;149:1866-1872.
61. McPhee SJ, Bird JA, Fordham D, et al. Promoting cancer prevention activities by primary care physicians. Results of a randomized, controlled trial. *JAMA* 1991;266:538-544.