

# Cancer Screening Guidelines

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**Numerous medical organizations have developed cancer screening guidelines. Faced with the broad, and sometimes conflicting, range of recommendations for cancer screening, family physicians must determine the most reasonable and up-to-date method of screening. Major medical organizations have generally achieved consensus on screening guidelines for breast, cervical and colorectal cancer. For breast cancer screening in women ages 50 to 70, clinical breast examination and mammography are generally recommended every one or two years, depending on the medical organization. For cervical cancer screening, most organizations recommend a Papanicolaou test and pelvic examination at least every three years in patients between 20 and 65 years of age. Annual fecal occult blood testing along with flexible sigmoidoscopy at five-year to 10-year intervals is the standard recommendation for colorectal cancer screening in patients older than 50 years. Screening for prostate cancer remains a matter of debate. Some organizations recommend digital rectal examination and a serum prostate-specific antigen test for men older than 50 years, while others do not. In the absence of compelling evidence to indicate a high risk of endometrial cancer, lung cancer, oral cancer and ovarian cancer, almost no medical organizations have developed cancer screening guidelines for these types of cancer. (Am Fam Physician 2001;63:1101-12.)**

Several studies<sup>1</sup> show that primary care physicians do not always comply with cancer screening guidelines. One reason is that recommendations for cancer detection and screening are often fragmented in the sense that they are developed by various medical organizations, which may make decision-making more difficult as far as which recommendations to follow.

*Table 1* summarizes cancer screening recommendations from different medical organizations for low-risk patients. *Table 2* describes what cancer screening procedures are currently covered by Medicare.

Recommendations developed by the Canadian Task Force on Preventive Health Care (CTFPHC) and by the U.S. Preventive Services Task Force (USPSTF) are based on an explicit methodology for evaluating and weighing the strength of the evidence. With the other medical organizations mentioned in this article, cancer screening guidelines have

generally been formulated from a combination of a literature review and expert opinion.

## Breast Cancer

An estimated 182,800 new cases of breast cancer were diagnosed in American women in 2000. Breast cancer ranks second as a cause of cancer-related deaths in women, with 41,200 deaths (40,800 in women and 400 in men) were predicted to occur in 2000.<sup>2</sup>

Numerous clinical trials have evaluated the benefits of the three most commonly recommended screening tests: mammography, breast self-examination and clinical breast examination.

## SCREENING RECOMMENDATIONS FOR LOW-RISK PATIENTS

CTFPHC recommends screening by mammography every year in women ages 50 to 69. Evidence suggests that such screening is associated with a significant decrease in mortality in this age group.<sup>3</sup> USPSTF recommends mammography every one to two years, with or without clinical breast examination, in women ages 50 to 69.<sup>4</sup>

**See editorial on page 1040.**

The American College of Radiology supports annual mammography and clinical breast examinations starting at age 40.<sup>5</sup> The American College of Obstetricians and Gynecologists (ACOG) recommends annual clinical breast examinations accompanied by mam-

mammography every one to two years in women from 40 to 50 years of age and annually after age 50.<sup>6</sup> The American Medical Association (AMA) recommends mammograms and clinical breast examinations annually in women 50 years and older and mammography and clinical breast examinations every one to two years in women between 40 and 49 years of age.<sup>7</sup>

**TABLE 1**  
**Summary of Cancer Screening Recommendations for Low-Risk Patients**

<i>Medical organization</i>	<i>Screening recommendations</i>
<b>Breast cancer</b>	
<b>MAMMOGRAPHY</b>	
AAFP	Every 1 to 2 years, ages 50 to 69; counsel women ages 40 to 49 about potential risks and benefits of mammography and clinical breast examination.
ACOG	Every 1 to 2 years starting at age 40, yearly after age 50
ACS	Annually after age 40
AMA	Every 1 to 2 years in women ages 40 to 49; annually beginning at age 50
CTFPHC	Every 1 to 2 years, ages 50 to 59
NIH	Data currently available do not warrant a universal recommendation for mammography for women in their 40s; each woman should decide for herself whether to undergo mammography.
USPSTF	Every 1 to 2 years, ages 50 to 69
<b>CLINICAL BREAST EXAMINATION</b>	
AAFP	Every 1 to 2 years, ages 50 to 69; counsel women ages 40 to 49 about potential risks and benefits of mammography and clinical breast examination.
ACOG	Yearly (or as appropriate) general health evaluation that includes examination to detect signs of premalignant or malignant conditions
ACS	Every 3 years, ages 20 to 39; yearly after age 40; monthly breast self-examination beginning at age 20
AMA	Continuation of clinical breast examinations in asymptomatic women older than age 40
CTFPHC	Yearly, ages 50 to 69
USPSTF	Insufficient evidence to recommend for or against using clinical breast examination alone; optional every 1 to 2 years, ages 50 to 69
<b>Cervical cancer</b>	
AAFP	Pap test at least every 3 years to women who have ever had sexual intercourse and who have a cervix
ACOG	Annual Pap test and pelvic examination beginning at age 18 or when sexually active; after 3 or more tests with normal results, Pap test may be performed less frequently on physician's advice.
ACS	Pap test annually starting at age 18 or when sexually active; after 2 to 3 normal (negative) tests, continue at discretion of physician.
AGS	Pap test every 3 years until age 70; in women of any age who have never had a Pap test, screening with at least 2 negative smears 1 year apart
AMA	Annual Pap test and pelvic examination starting at age 18 (or when sexually active); after 3 or more normal annual Pap tests, the Pap test may be performed less frequently at the physician's discretion.
CTFPHC	Pap test annually beginning at age 18 or following initiation of sexual activity; after 2 normal Pap results, perform Pap tests every 3 years to age 69.
USPSTF	Pap test at least every 3 years in women who have ever had sexual intercourse and who have a cervix; discontinue regular testing after age 65 if Pap test results have been consistently normal.

*Table continues on next page*

TABLE 1 (continued)

Medical organization	Screening recommendations
<b>Colorectal cancer</b>	
AAFP	No published standards or guidelines for low-risk patients
ACOG	After age 50, annual FOBT (DRE should accompany pelvic examination); sigmoidoscopy every 3 to 5 years
ACS	After age 50, yearly FOBT plus flexible sigmoidoscopy and DRE every 5 years or colonoscopy and DRE every 10 years or double-contrast barium enema and DRE every 5 to 10 years
AMA	Annual FOBT beginning at age 50, and flexible sigmoidoscopy every 3 to 5 years beginning at age 50
AGA	FOBT beginning at age 59 (frequency not specified); sigmoidoscopy every 5 years, double-contrast barium enema every 5 to 10 years or colonoscopy every 10 years.
CTFPHC	Insufficient evidence to recommend using FOBT screening in the periodic health examination of individuals older than age 40; insufficient evidence to recommend sigmoidoscopy in the periodic health examination; insufficient evidence to recommend screening with colonoscopy in the general population
USPSTF	After age 50, yearly FOBT and/or sigmoidoscopy (unspecified frequency for sigmoidoscopy)
<b>Prostate cancer</b>	
AAFP	No published standards or guidelines for low-risk patients
ACP-ASIM	Physicians should describe potential benefits and known harms of screening, diagnosis and treatment; listen to the patient's concerns, then individualize the decision to screen.
ACS and AUA	Offer annual DRE and PSA screening, beginning at age 50, to men who have at least a 10-year life expectancy and to younger men at high risk.
AMA	Provide information regarding the risks and potential benefits of prostate screening.
CTFPHC and USPSTF	DRE and PSA tests are not recommended for the general population.
<b>Skin cancer</b>	
ACS	Cancer-related checkup, including skin examination every 3 years between ages 20 and 40, and every year for anyone age 40 and older
AMA	Patients should talk to their physicians about the frequency of screening for skin cancer (those at modestly increased risk should see a primary care physician annually); skin self-examination should be performed monthly.
CTFPHC	Insufficient evidence to recommend for or against total-body skin examination or self-examination; counsel on avoiding sun exposure and wearing protective clothing.
USPSTF	Insufficient evidence to recommend for or against routine screening for skin cancer by primary care clinicians or counseling patients to perform periodic skin examination.
<b>Testicular cancer</b>	
ACS	Examine testicles as part of a cancer-related checkup.
CTFPHC	Insufficient evidence to recommend routine examination of testes by physician or by patient self-examination
USPSTF	Insufficient evidence to recommend for or against routine screening of asymptomatic men in the general population by physician examination or patient self-examination

DRE = digital rectal examination; FOBT = fecal occult blood testing; Pap = Papanicolaou; PSA = prostate-specific antigen.

ABBREVIATIONS FOR MEDICAL ORGANIZATIONS: AAFP = American Academy of Family Physicians; ACOG = American College of Obstetricians and Gynecologists; ACP-ASIM = American College of Physicians-American Society of Internal Medicine; ACS = American Cancer Society; AGA = American Gastroenterological Association; AGS = American Geriatrics Society; AMA = American Medical Association; AUA = American Urological Association; CTFPHC = Canadian Task Force on Preventive Health Care; NIH = National Institutes of Health; USPSTF = U.S. Preventive Services Task Force.

*At a minimum, women between the ages of 40 and 69 should have a mammogram every one to two years.*

The American Cancer Society (ACS) recommends mammography annually after age 40; clinical breast examination is recommended every three years in women between 20 and 39 years of age and annually after age 40.<sup>2</sup> The American Academy of Family Physicians (AAFP) recommends mammography and clinical breast examination every one to two years in women ages 50 to 69.<sup>8</sup>

**SCREENING RECOMMENDATIONS FOR HIGH-RISK PATIENTS**

USPSTF does not specifically recommend mammography or clinical breast examination in women younger than 50 years who are at increased risk of breast cancer, but leaves it up to the discretion of the patient and physician. However, such screening may be recommended for a patient at high risk of breast cancer based on the patient's and physician's preferences and the higher frequency of a

positive predictive value of screening in the high-risk group.<sup>4</sup>

**Cervical Cancer**

An estimated 12,800 cases of invasive cervical cancer were diagnosed in 2000 and an estimated 4,600 women died of the disease.<sup>2</sup> Mortality and incidence rates have declined sharply over the past several decades.<sup>2</sup>

**SCREENING RECOMMENDATIONS FOR ALL PATIENTS**

There is consensus among medical organizations for regular cervical cancer screening with Papanicolaou (Pap) tests in women who have ever been sexually active. The recommendations differ in the frequency of Pap tests and the age at which regular Pap tests should begin and stop.

ACOG, ACS, AMA and CTFPHC recommend annual screening with a Pap test and pelvic examination in all women who are or who have been sexually active or who are 18 years and older.<sup>2,3,6,7</sup> The frequency of Pap tests may be decreased at the discretion of the physician after two or three consecutive normal tests. CTFPHC recommends Pap tests

**TABLE 2  
Medicare Coverage for Cancer Screening Procedures**

<i>Type of cancer</i>	<i>Description of Medicare coverage</i>
Breast	Annual screening mammography for women older than age 40
Cervix	Pap testing and pelvic examination at three-year intervals. Yearly screening is allowed for women who are at a high risk of cervical or vaginal cancer or who have had an abnormal Pap smear in the preceding three years.
Colorectal	For individuals older than 50 years, screening fecal occult blood testing is reimbursed by Medicare one time per year and flexible sigmoidoscopy is reimbursed once every four years or once every two years if the patient is at high risk. Colonoscopy is reimbursed every two years if the patient is at high risk for colon cancer (no age limit). Barium enema is reimbursed as a substitute for sigmoidoscopy or colonoscopy if the primary care physician deems it advisable.
Prostate	Annual digital rectal examination and prostate-specific antigen test in men older than 50 years

*Pap = Papanicolaou.*

every three years until the age of 69. The frequency may be increased if any risk factors are present, including age 18 or younger at the time of first sexual intercourse, having numerous sexual partners, smoking or having a low socioeconomic status.<sup>3</sup>

USPSTF and AAFP recommend Pap tests at least every three years for all women who have ever had sexual intercourse and who have a cervix.<sup>4,8</sup> A Pap test every one or two years as compared with every three years has been found to improve the screening effectiveness by less than 5 percent.<sup>9</sup> USPSTF recommends discontinuing regular Pap testing after age 65 in women who have had consistently normal results on previous tests.<sup>4</sup>

The American Geriatrics Society (AGS) recommends Pap tests every three years until age 70 and suggests that cervical cancer screening, with two negative tests one year apart, be performed in a woman of any age who has never had a Pap test.<sup>10</sup> It has been found that Pap testing may not be useful in elderly women who have consistently normal results. Modeling data suggest that continued testing of previously screened women reduces the risk of cervical cancer mortality by only 0.18 percent at age 65 and by 0.06 percent at age 74.<sup>9</sup>

For women who have had a hysterectomy, AGS recommends screening only if the cervical cuff is still present.<sup>10</sup> Similarly, USPSTF recommendations state that Pap testing is not required in women who have undergone a hysterectomy in which the cervix was removed, unless the surgery was performed because of cervical cancer or its precursors.<sup>4</sup>

### Colorectal Cancer

Colorectal cancer is the third most common cancer. Approximately 130,200 new cases (93,800 of the colon and 36,400 of the rectum) were diagnosed in 2000, and this disease accounted for an estimated 56,300 deaths (47,700 from colon cancer and 8,600 from rectal cancer) in 2000. Mortality rates for colorectal cancer have declined in men and women during the past 20 years.<sup>2</sup>

*According to the U.S. Preventive Services Task Force, Papanicolaou tests are not necessary in women who have had a complete hysterectomy, unless the surgery was performed because of cervical cancer or its precursors.*

High-risk patients include patients younger than 60 years with a history of hereditary non-polyposis colorectal cancer, familial polyposis, ulcerative colitis, high-risk adenomatous polyps or previous colorectal cancer.

#### SCREENING RECOMMENDATIONS FOR LOW-RISK PATIENTS

USPSTF recommends fecal occult blood testing (FOBT) yearly beginning at age 50. Sigmoidoscopic screening is also suggested as an alternative to FOBT but with no recommended frequency. USPSTF concludes that there is insufficient evidence to support screening with the digital rectal examination (DRE), barium enema or colonoscopy.<sup>4</sup>

ACOG recommends FOBT annually and sigmoidoscopy every three to five years after the age of 50. DRE should be performed at the time of pelvic examination.<sup>6</sup>

AMA supports annual FOBT beginning at age 50, and flexible sigmoidoscopy every three to five years beginning at age 50. Colonoscopy and/or double-contrast barium enema are appropriate alternatives to sigmoidoscopy.<sup>11</sup>

ACS recommends one of three options for average-risk persons after age 50: yearly FOBT plus flexible sigmoidoscopy every five years, colonoscopy every 10 years or double-contrast barium enema every five to 10 years.<sup>8,12</sup> For all the above screening options, DRE should be performed simultaneously.<sup>2</sup>

The American Gastroenterological Association (AGA) recommends FOBT beginning at age 50 (no frequency specified) for screening for colorectal cancer and adenomatous polyps in all men and women without risk factors. In addition, screening sigmoidoscopy should be

*The Canadian Task Force for Preventive Health Care and the U.S. Preventive Services Task Force do not recommend screening for prostate cancer because of insufficient evidence in support of such screening.*

performed every five years, a double-contrast barium enema every five to 10 years or colonoscopy every 10 years.<sup>13</sup>

AAFP guidelines are similar to the AGA guidelines. CTFPHC states that there is insufficient evidence to recommend use of FOBT screening, sigmoidoscopy or colonoscopy in the general population older than age 40.<sup>3</sup>

#### **SCREENING RECOMMENDATIONS FOR HIGH-RISK PATIENTS**

USPSTF recommends regular endoscopic screening in patients with a family history of hereditary syndromes associated with a high risk of colon cancer (i.e., familial polyposis and hereditary nonpolyposis colorectal cancer) and in patients with ulcerative colitis, high-risk adenomatous polyps or colon cancer. Referral to a subspecialist is appropriate in such cases.<sup>4</sup>

ACS recommends the same screening options for low-risk and high-risk patients (i.e., a history of cancer or polyps before age 60 in a first-degree relative or in two first-degree relatives of any age, or a personal history of colorectal cancer, adenomatous polyps or chronic inflammatory bowel disease) but recommends that screening begin at an earlier age and/or be performed more often in patients at high risk of colorectal cancer.<sup>8</sup>

AAFP guidelines recommend that adults 40 years and older with a family history of early colorectal cancer undergo FOBT annually and sigmoidoscopy, barium enema or colonoscopy (the frequency of these procedures is not specified).<sup>8</sup>

AGA recommends screening starting at age 40 for persons with first-degree relatives with colon cancer (*Table 3*).<sup>13</sup>

## **Endometrial Cancer**

An estimated 36,100 cases of cancer of the uterine corpus, usually of the endometrium, were expected to be diagnosed in 2000.<sup>2</sup> Incidence rates are higher among white women (22.4 per 100,000) than among black women (15.3 per 100,000). Approximately 6,500 deaths as a result of endometrial cancer were predicted in 2000.<sup>2</sup> The incidence of endometrial cancer increases with age, peaking at 100.7 cases per 100,000 women between the ages of 70 and 75.<sup>14</sup>

#### **SCREENING RECOMMENDATIONS FOR LOW-RISK PATIENTS**

ACOG, ACS, CTFPHC and USPSTF have not issued any recommendations for endometrial cancer screening, such as by biopsy or ultrasound, in women at low risk of this disease. ACOG states that screening for endometrial cancer is neither cost-effective nor warranted.<sup>6</sup>

#### **SCREENING RECOMMENDATIONS FOR HIGH-RISK PATIENTS**

ACS recommends endometrial biopsy starting at menopause and then periodically at the discretion of the physician in women at high risk of endometrial cancer.<sup>2</sup> On the basis of expert opinion only, a task force organized by the National Institutes of Health (NIH) and the National Human Genome Research Institute recommends screening for endometrial cancer in women with the hereditary nonpolyposis colorectal cancer.<sup>15</sup> ACOG recommends that screening for endometrial cancer in women who are receiving tamoxifen (Nolvadex) be left to the discretion of the physician.<sup>16</sup>

## **Lung Cancer**

Lung cancer is a leading cause of death in men and women, accounting for an estimated 156,900 deaths in 2000, which translates to 28 percent of all cancer-related deaths.<sup>2</sup> The five-year survival rate is estimated to be less than 13 percent.<sup>4</sup>

TABLE 3

### American Gastroenterological Association Recommendations for Colorectal Cancer Screening in Patients at Increased Risk

#### Patients with a close relative who has had colorectal cancer or an adenomatous polyp

*Recommendation:*

Patients with a sibling, parent or child who has had colorectal cancer or an adenomatous polyp should be offered the same options as average-risk persons but beginning at age 40 instead of age 50. If colorectal cancer was diagnosed in the close relative before age 55 or if an adenomatous polyp was diagnosed in the close relative before age 60, special efforts should be made to ensure that screening takes place.

#### Patients with a family history of familial adenomatous polyposis

*Recommendation:*

Patients with a family history of familial adenomatous polyposis should receive genetic counseling and consider genetic testing to see if they are gene carriers. A negative genetic test result rules out familial adenomatous polyposis only if an affected family member has an identified mutation. Patients who are gene carriers or in whom the findings are indeterminate should be offered flexible sigmoidoscopy every year, beginning at puberty, to see if they are expressing the gene. If polyposis is present, they should begin to consider when colectomy should be performed.

#### Patients with a family history of hereditary nonpolyposis colorectal cancer

*Recommendation:*

Patients with a family history of colorectal cancer in multiple close relatives and across generations, especially if cancer occurred at a young age, should receive genetic counseling and consider genetic testing for hereditary nonpolyposis colorectal cancer. They should be offered an examination of the entire colon every one to two years starting between the ages of 20 and 30 and every year after age 40.

#### Patients with a history of adenomatous polyps

*Recommendation:*

Patients in whom large (more than 1 cm in diameter) or multiple adenomatous polyps are found and removed at colonoscopy should have an examination of the colon three years after the initial examination. The interval for subsequent examinations depends on the type of polyps that were detected. If the first follow-up is normal or only a single, small, tubular adenoma is found, the next examination can be in five years. In special circumstances (such as polyps with invasive cancer, large sessile adenomas or numerous adenomas), a shorter interval may be necessary, according to the judgment of the clinician and the wishes of the patient.

#### Patients with a history of colorectal cancer

*Recommendation:*

Patients with colorectal cancer that has been resected with curative intent (but who did not undergo complete adequate colonoscopic examination preoperatively) should undergo a complete examination of the colon within one year after resection. If this examination reveals normal findings or the complete preoperative examination was normal, subsequent examination should be offered after three years; if the findings of this examination are normal, colonoscopy should then be performed every five years.

#### Patients with inflammatory bowel disease

*Recommendation:*

In patients with longstanding, extensive inflammatory bowel disease, surveillance colonoscopy, looking for dysplasia as a marker of colorectal cancer risk, should be considered along with the extent and duration of the disease as a guide to when or whether colectomy should be a consideration.

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**SCREENING RECOMMENDATIONS  
FOR LOW-RISK PATIENTS**

There is no evidence that screening for lung cancer is effective. Cytologic examination of the sputum has not proven useful.<sup>3</sup> Consequently, USPSTF does not recommend screening with chest radiographs or sputum cytology.<sup>4</sup> Instead, USPSTF advises physicians to counsel against tobacco use. In general, medical organizations have not developed any official recommendations for lung cancer screening. While a Japanese study<sup>17</sup> suggests that mass screening with spiral computed tomography may be useful, further research is needed before such a recommendation can be made.

**SCREENING RECOMMENDATION  
FOR HIGH-RISK PATIENTS**

According to CTFPHC and USPSTF, the evidence is strong that periodic screening with chest radiographs in high-risk patients does not reduce mortality from lung cancer. Radiography and sputum cytomorphologic examination lack sufficient accuracy to be used in routine screening of patients with a history of smoking.<sup>3,4</sup>

**Oral Cancer**

Oral cancer accounts for 3 percent of cancers in men and 2 percent of cancers in women.<sup>18</sup> Mucosal erythroplasia, not leukoplakia, is the earliest sign of oral cancer.<sup>19</sup>

**SCREENING RECOMMENDATIONS  
FOR LOW-RISK PATIENTS**

The two most common methods of screening for oral cancer are visual inspection and cytology, neither of which has been shown to reduce mortality from this disease.<sup>19</sup> Therefore, major groups such as USPSTF and CTFPHC state that, although screening can lead to early detection, there is insufficient evidence to recommend for or against routine screening for oral cancer.<sup>3,4</sup> Both groups advocate educational programs directed toward reducing the use of tobacco and alcohol.

ACS has no official guidelines for oral cancer detection; however, it encourages primary care physicians to perform an examination of the whole mouth as part of a routine cancer-related checkup.<sup>8</sup>

**SCREENING RECOMMENDATIONS  
FOR HIGH-RISK PATIENTS**

USPSTF recommends a regular dental examination in patients at high risk of oral cancer.<sup>4</sup> CTFPHC suggests annual examinations by a physician or a dentist to screen for oral cancer in patients older than 60 years with risk factors such as smoking and heavy drinking.<sup>3</sup> These recommendations are supported by large, foreign studies of oral cancer screening, which show that primary care physicians can detect premalignant lesions and early cancer in high-risk patients.<sup>20,21</sup>

**Ovarian Cancer**

Ovarian cancer is the second most common gynecologic cancer, with 23,100 new cases and 14,000 deaths estimated to have occurred in 2000.<sup>2</sup> A woman has a one-in-70 risk of ovarian cancer in her lifetime. The incidence of ovarian cancer increases with age, from 1.4 cases per 100,000 in women younger than age 40 to 45.0 cases per 100,000 in women older than 60 years.<sup>22</sup> Ovarian cancer is the most lethal of all the gynecologic cancers, killing more women each year than cervical and endometrial cancers combined.

**SCREENING RECOMMENDATIONS  
FOR LOW-RISK PATIENTS**

The effectiveness of routine screening of asymptomatic women using pelvic examination, abdominal or vaginal ultrasound or serum carcinoembryonic antigen (CEA-125) has not been established. ACOG, the American College of Physicians-American Society of Internal Medicine (ACP-ASIM), CTFPHC and USPSTF do not recommend routine screening for ovarian cancer.<sup>3,4,23,24</sup> ACS recommends annual pelvic examinations starting at age 18 or when the woman becomes sexually active.<sup>2</sup>

#### SCREENING RECOMMENDATIONS FOR HIGH-RISK PATIENTS

ACS states that women with a high risk of epithelial ovarian cancer, such as those with a very strong family history of the disease, may be screened with transvaginal ultrasound and CEA-125.<sup>8</sup> CTFPHC indicates that evidence is insufficient to recommend for or against ovarian cancer screening in women who have more than one first-degree relative with the disease.<sup>3</sup>

Only 5 to 10 percent of patients with ovarian cancer have a significant family history.<sup>22</sup> However, three familial syndromes have been identified: site-specific ovarian cancer, familial breast-ovarian cancer syndrome and cancer familial syndrome (Lynch type II).

In 1980, a tumor suppression gene (BRCA 1) was discovered on chromosome 17.<sup>24</sup> The BRCA 1 mutation is associated with site-specific ovarian cancer and familial breast-ovarian cancer syndromes. These syndromes are transmitted in an autosomal dominant fashion with variable penetrance. Women with certain mutations in BRCA 1 have an increased risk of ovarian cancer and breast cancer. The cumulative risk of ovarian cancer in women with BRCA 1 has been estimated to be 56 percent by age 70.<sup>25</sup> A task force organized by the NIH and the National Human Genome Research Institute recommends ovarian cancer screening by means of annual or semiannual transvaginal ultrasound and serum CEA-125 levels beginning at ages 25 to 35 in BRCA 1 mutation carriers. The task force did not issue recommendations for or against elective oophorectomy in these patients.<sup>26</sup>

#### Prostate Cancer

Although incidence rates of prostate cancer are declining, estimates are that prostate cancer was diagnosed in 180,400 men in the United States during 2000. Approximately 31,900 men died of the disease, making it the second leading cause of cancer-related deaths in men.<sup>2</sup> The incidence of prostate cancer

*Patients should be counseled about the known risk and uncertain benefits of prostate cancer screening.*

rises rapidly in each decade of life after the age of 50. In whites, the age-adjusted incidence is 108.3 cases per 100,000; in blacks, it is 142.0 per 100,000. Prostate cancer occurs more frequently among men with a family history of prostate cancer.<sup>27</sup>

For many years, DRE has been one of the major screening methods for the detection of prostate cancer, although its true value as a screening tool has never been proven conclusively. The majority of studies on the use of DRE for prostate cancer screening have been observational and have yielded varying measures of sensitivity and survival. None have shown that regular DRE screening reduces mortality from prostate cancer.<sup>28,29</sup>

Currently, use of the serum prostate-specific antigen (PSA) test as a screening tool for prostate cancer is controversial. One problem is that the PSA test is prone to high rates of false-positive results, ranging from 67 to 93 percent, which leads to more invasive diagnostic procedures than are necessary.<sup>3</sup> Data also suggest that PSA screening detects what may be indolent, nonaggressive prostate cancer. The treatment of such a cancer with radiation or radical prostatectomy may result in significant and perhaps unnecessary morbidity.<sup>30</sup> On the other hand, the potential value of PSA testing has been discussed in several articles.<sup>31-33</sup>

The National Cancer Institute (NCI) and the U.S. Public Health Service are conducting a long-term multicenter cancer screening study, called the Prostate, Lung, Colorectal, Ovarian Cancer Screening Trial (PLCO), which includes a study of the impact of PSA screening on survival from prostate cancer. In addition, large prospective randomized studies on prostate cancer screening are underway in Canada and Europe. Hopefully, these studies will settle the controversy surrounding PSA testing.

#### **SCREENING RECOMMENDATIONS FOR LOW-RISK PATIENTS**

Several medical organizations and government agencies have issued guidelines for prostate cancer screening that reflect the current controversy about the value of PSA testing. There is no consensus for using it to screen low-risk patients. Citing insufficient evidence in support of DRE and PSA screening, CTFPHC and USPSTF do not recommend routine DRE or PSA screening for asymptomatic men.<sup>3,4</sup> ACP-ASIM advises counseling patients about the potential benefits and uncertainties associated with prostate cancer screening.<sup>23</sup>

AAFP has not developed specific standards or guidelines for prostate cancer screening.

ACS and the American Urological Association (AUA) recommend offering annual DRE and PSA screening, beginning at age 50 in men who have at least a 10-year life expectancy and beginning at a younger age in men at high risk.<sup>2,33</sup>

The AMA recommends that patients discuss their medical history and risk factors for prostate cancer with their physicians. On the basis of this information, the patient and physician can determine when screening tests for prostate cancer should be performed.<sup>7</sup>

#### **SCREENING RECOMMENDATIONS FOR HIGH-RISK PATIENTS**

ACS and AUA recommend annual testing of high-risk patients beginning at age 45.<sup>8,34</sup> High-risk patients include African-Americans and patients who have two or more first-degree relatives with prostate cancer. Guidelines published by the other groups mentioned above do not specify routine DRE or PSA in high-risk patients. They recommend that the decision about prostate cancer screening be made on an individual basis after consultation between the physician and the patient.<sup>2,33</sup>

#### **Skin Cancer**

Approximately 1.3 million cases of highly curable basal or squamous cell cancer are diagnosed each year.<sup>2</sup> In addition, approximately 47,700 cases of melanoma were diagnosed in 2000. Since the early 1970s, the incidence rate of melanoma has increased significantly—an average of 4 percent per year. An estimated 9,600 persons died of skin cancer in 2000, with 7,700 dying of melanoma and 1,900 dying of other skin cancers.<sup>2</sup> Several studies have shown that patients who have complete skin examinations are 6.4 times more likely to have a melanoma detected as compared with patients who have partial skin examinations.<sup>35</sup>

#### **SCREENING RECOMMENDATIONS FOR LOW-RISK PATIENTS**

CTFPHC and USPSTF agree that there is insufficient evidence to determine whether a decrease in mortality occurs with routine examination of the skin in low-risk patients by primary care physicians.<sup>3,4</sup> The same is true for self-examination. CTFPHC advises physicians to counsel patients about reducing

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sun exposure by using sun screen and wearing protective clothing.<sup>3</sup>

ACS recommends a cancer-related checkup, including skin examination, every three years in patients between 20 and 40 years of age and yearly in patients older than 40 years.<sup>2</sup>

AMA advises patients to discuss the frequency of screening for skin cancer with their physician and perform skin self-examinations monthly.<sup>7</sup> Annual skin examinations are recommended in patients at moderately increased risk.<sup>7</sup>

The American Academy of Dermatology recommends that individuals adopt a comprehensive sun protection program and perform regular self-examinations of the skin. Any unusual skin changes should be evaluated.<sup>35</sup>

#### SCREENING RECOMMENDATION FOR HIGH-RISK PATIENTS

CTFPHC and USPSTF recommend that patients at high risk of melanoma, such as those with familial melanoma syndrome or a first-degree relative with melanoma, be referred to a dermatologist for monitoring and screening examinations.<sup>3,4</sup> For patients with a family history of melanoma, regular total skin examination should be considered.<sup>3,4</sup>

#### Testicular Cancer

The Surveillance Research Program of the ACS Department of Epidemiology and Surveillance Research estimates that 6,900 cases of testicular cancer were diagnosed in 2000. An estimated 300 men died of this disease.<sup>18</sup> Testicular cancer represents 1.1 percent of cancers among men. The lifetime probability of developing testicular cancer is 0.30 percent and the lifetime probability of dying of this disease is 0.03 percent. It is the most common cancer in males ages 15 to 34, and the incidence has been increasing in this age group.<sup>3</sup>

#### SCREENING RECOMMENDATIONS FOR LOW-RISK PATIENTS

CTFPHC and USPSTF state that there is insufficient evidence to indicate that screen-

ing (either with testicular self-examination or by a primary care physician) would result in a decrease in the mortality rate from this cancer.<sup>3,4</sup> ACS advises a testicular examination as part of a routine cancer-related checkup.<sup>8</sup>

#### SCREENING RECOMMENDATIONS FOR HIGH-RISK PATIENTS

ACS and CTFPHC recommend that individuals at increased risk of testicular cancer, such as those with testicular atrophy, ambiguous genitalia or cryptorchidism, be informed of their increased risk and counseled regarding screening options.<sup>2,3</sup> While ACS suggests monthly examinations in high-risk patients, CTFPHC indicates that the optimal frequency of such examinations has not been determined and should be left to clinical discretion.<sup>2,3</sup>

AAFP formerly recommended a testicular examination for all males in the 13-year-old to 39-year-old age group with a history of cryptorchidism, orchiopexy and/or testicular atrophy. Currently, AAFP provides no recommendations for testicular cancer screening in the general population.<sup>8</sup>

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## Cancer Screening

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