Geriatric Screening and Preventive Care

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Preventive health care decisions and recommendations become more complex as the population ages. The leading causes of death (i.e., heart disease, malignant neoplasms, cerebrovascular disease, and chronic lower respiratory disease) among older adults mirror the actual causes of death (i.e., tobacco use, poor diet, and physical inactivity) among persons of all ages. Many aspects of mortality in older adults are modifiable through behavior change. Patients 65 years and older should be counseled on smoking cessation, diets rich in healthy fats, aerobic exercise, and strength training. Other types of preventive care include aspirin therapy; lipid management; and administration of tetanus and diphtheria, pneumococcal, and influenza vaccines. Although cancer is the second leading cause of death in patients 65 years and older, a survival benefit from cancer screening is not seen unless the patient's life expectancy exceeds five years. Therefore, it is best to review life expectancy, functionality, and comorbidities with older patients when making cancer screening recommendations. Other recommended screenings include abdominal aortic aneurysm for men 65 to 75 years of age, breast cancer for women 40 years and older with a life expectancy greater than five years, and colorectal cancer for men and women 50 years and older with a life expectancy greater than five years. *(Am Fam Physician.* **2008;78(2):206-215. Copyright © 2008 American Academy of Family Physicians.)**

ILLUSTRATION BY JOHN W. KARAPELOU

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Approximately 8 percent of the world's population was 60 years and older in 1950. By 2000, this number had increased to 10 percent; it is expected to reach 21 percent by 2050.[1] Delivering comprehensive clinical preventive services to this population is important; however, persons older than 65 are rarely included in preventive care research. This article reviews the leading and actual causes of death and discusses how behaviors, functional status, comorbidities, and life expectancy can predict who will benefit most from geriatric screening and preventive care.

Leading vs. Actual Causes of Death

The leading causes of death among persons 65 years and older in the United States in 2002 are listed in *Table 1*.[2] The actual causes of death among persons of all ages are determined by analyzing modifiable risk factors with U.S. mortality data *(Table 2*[3]*)*. The actual causes of death (i.e., tobacco use, poor diet, and physical inactivity) mirror the leading causes of death (i.e., heart disease, malignant neoplasm, cerebrovascular disease, and chronic lower respiratory disease) in older adults. Therefore, many aspects of mortality among older adults may be preventable through a change in lifestyle behaviors.

Behavioral Counseling and Other Preventive Therapies

TOBACCO CESSATION COUNSELING

Smoking cessation at 65 years of age leads to an increase in life expectancy of 1.4 to 2.0 years for men and 2.7 to 3.7 years for women.[4] Additionally, smoking cessation at any age benefits those exposed to secondhand smoke, which causes 80 to 90 percent of the negative cardiovascular health effects related to personal smoking.[5] The U.S. Preventive Services Task Force (USPSTF) and the U.S. Surgeon General recommend three-minute counseling sessions with patients, with or without the use of pharmacologic aids[6,7] (i.e., varenicline [Chantix],[8] bupropion [Wellbutrin], or nicotine products). Telephone support can be a successful adjunct to counseling.

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*	*Comments*
Screen for tobacco use in all adults.	A	7	Tobacco use kills about 440,000 persons each year in the United States; even small increases in quitting have a strong positive effect on health and mortality; current medications increase quit rates
Discuss aspirin therapy with all patients at increased risk of coronary heart disease.	A	17	Decreases mortality
Screen for abdominal aortic aneurysm by ultrasonography in all men 65 to 75 years of age who have ever smoked.	A	22, 28	Decreases mortality; guideline is specific to age and sex
Continue mammography screening in women older than 65 years.	A	29	Decreases mortality; discuss the possibility of discontinuing mammography with women who have serious morbidities
Screen for colorectal cancer beginning at 50 years of age.	A	30	Decreases mortality; fecal occult blood test and sigmoidoscopy are acceptable alternatives for those who cannot afford or do not wish to undergo colonoscopy
Perform cholesterol screening, including measurement of low- and high-density lipoproteins, in men 35 years and older and women 45 years and older who are at increased risk of CHD.	A	18	Decreases mortality; NCEP-ATP III update is available at http://www.circ.ahajournals.org
Screen for diabetes in persons with hypertension or hyperlipidemia.	A	22, 39	The ADA recommends routine screening every three years in asymptomatic persons starting at 45 years of age, and in overweight persons younger than 45 years who have at least one risk factor (e.g., sedentary lifestyle, cardiovascular disease, black or Hispanic race)

ADA = American Diabetes Association; CHD = coronary heart disease; NCEP-ATP III = National Cholesterol Education Program, Adult Treatment Panel III.

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, see http://www.aafp.org/afpsort.xml.

NUTRITION COUNSELING

Elimination of industrially produced *trans*-fatty acids would avert 6 to 19 percent of all coronary heart disease (CHD) events in the United States each year.[9] A diet rich in healthy fats (e.g., the Mediterranean diet; *online Table A*) is associated with decreased overall mortality.[10] Healthy Ageing: a Longitudinal study in Europe (HALE) followed Europeans 70 to 90 years of age for 10 years and found that use of the Mediterranean diet, moderate to high levels of physical activity, moderate alcohol consumption, and nonsmoking were associated with a 50 percent reduction in all-cause mortality.[10] No more than two alcoholic drinks per day for men and one per day for women are recommended.[11] The American Academy of Family Physicians (AAFP) and the USPSTF recommend nutrition counseling for patients with diet-related illness such as diabetes or hypertension and those with other risk factors for CHD.[12,13]

EXERCISE COUNSELING

Physical activity is beneficial to all adults. It reduces the rate of all-cause mortality and helps to prevent osteoporosis and obesity.[14] A regular exercise program is an integral part of any weight-reduction or weight-maintenance program. Although the USPSTF recognizes the importance of exercise and the potential benefits of counseling, it is unable to recommend physician counseling because of insufficient evidence of effectiveness.[15] The U.S. Surgeon General recommends that all adults perform aerobic exercise three times per week for a minimum of one half hour, as well as strength training at least twice per week.[16]

OTHER PREVENTIVE THERAPIES

In addition to lifestyle changes, older patients can benefit from preventive therapies. Aspirin therapy results in decreased mortality for those at highest risk for CHD. The decrease is greatest among patients 70 to 84 years of age.[17] The USPSTF recommends discussing preventive aspirin therapy with patients at increased risk for CHD (i.e., men older than 40 years, postmenopausal women, and premenopausal women who smoke or have hypertension or dyslipidemia).[17] Greater risk of intracranial and gastrointestinal bleeding in older adults must be considered when prescribing aspirin therapy.[17]

In addition, the National Cholesterol Education Program, Adult Treatment Panel III recommends aggressive statin therapy for patients with high cholesterol levels who have established cardiovascular disease, or for those at high risk of CHD, including persons 70 years and older.[18] The Centers for Disease Control and Prevention (CDC) recommends an initial tetanus toxoid and diphtheria toxoid (Td) vaccination series for those who have not previously received it. The CDC also recommends a Td booster vaccine every 10 years, an annual influenza vaccine for those 55 years and older, and a one-time pneumococcal vaccine at 65 years of age.

Table 1. Leading Causes of Death in Adults 65 Years and Older in the United States, 2002

Heart disease
Malignant neoplasms
Cerebrovascular diseases
Chronic lower respiratory disease
Influenza and pneumonia
Alzheimer's disease
Diabetes mellitus
Nephritis, nephrotic syndrome, and nephrosis
Unintentional injuries
Septicemia

NOTE: *Listed in descending order of frequency.*

Information from reference 2.

Table 2. Actual Causes of Death Among Persons of all Ages in the United States, 2000

Actual cause	*Percentage*
Tobacco use	18.1
Poor diet and physical inactivity	15.2
Alcohol consumption	3.5
Microbial agents (e.g., influenza, pneumonia)	3.1
Toxic agents (e.g., particulate air pollution, environmental tobacco smoke, radon)	2.3
Motor vehicle crashes	1.8
Firearms	1.2
Sexual behavior	0.8
Illicit drug use	0.7

Adapted with permission from Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000 [published correction appears in JAMA. *2005;293(3):293-294].* JAMA. *2004;291(10):1240.*

Screening

The decision to screen older patients for diseases depends on comorbidities, functional status, and life expectancy. Physicians should discuss the potential benefits and harms of screening with individual patients. Although cancer is the second leading cause of death, cancers of the breast, colon, prostate, and cervix can be detected during treatable stages of illness with screening. However, patients do not demonstrate a survival benefit from cancer screening unless life expectancy exceeds five years.[19] Guidelines from the American Geriatrics Society,[20] the American Cancer Society,[21] the AAFP,[12] and the USPSTF[22] reflect this uncertainty and lack of direct evidence for patients 70 years and older.

COMORBIDITY, FUNCTIONAL STATUS, AND LIFE EXPECTANCY

Functional status and the number and severity of comorbid conditions are predictors of life expectancy. Functional status can be rated using self-reported activities of daily living[23] and instrumental activities of daily living[24] *(online Table B)*. The presence of significant comorbidities (e.g., diabetes

with complications, cancer, heart failure, end-stage renal disease, oxygen-dependent lung disease) can predict a decrease in life expectancy. A framework for individualized decision making in cancer screening for older adults is shown in *Figures 1 and 2*.[19] These graphs are based on the 75th, 50th, and 25th percentiles of life expectancy for men and women as influenced by comorbidities and functional status.

Older persons with good functional status and no comorbidities are presumed to be in the upper quartile (75th percentile) of life expectancy, whereas those with significant comorbidity and functional impairment are presumed to be in the lower quartile (25th percentile) of life expectancy. For example, an 80-year-old woman with good functional status and without comorbidities is probably in the upper quartile of life expectancy (13 years), which would make her a candidate for breast cancer screening. An 80-year-old woman with comorbidities and functional limitations is probably in the lower quartile of life expectancy (4.6 years), which would not make her a candidate for breast cancer screening. The majority of healthy older adults want their physicians to talk with them about their life expectancy in the context of cancer screening tests.[25]

A validated four-year mortality index for older adults *(online Table C)* has been developed to stratify community-dwelling adults older than 50 years into mortality groups.[26] This simplified 12-item questionnaire incorporates age, sex, self-reported behaviors, comorbid conditions, and functional measures to prognosticate risk for four-year mortality. Using instruments such as the individual decision-making framework of the quartile life expectancy tables[19] or the four-year mortality prognostic index[26] should facilitate a physician's discussion of the harms and benefits of screening with individual patients.

Another useful approach to health maintenance screening based on functional status and life expectancy is shown in *Table 3*.[27] This health maintenance clinical glidepath is a geriatric consensus-based model involving four levels of care: robust, frail, moderately demented, and end of life. The clinical glidepaths are designed to bridge evidence-based medicine and clinical practice to provide appropriate preventive care for older patients. *Table 4*[17,18,28-40] lists specific screening recommendations of the USPSTF[22] and the AAFP.[12]

SPECIFIC RECOMMENDATIONS

Abdominal Aortic Aneurysm. Repair of significant abdominal aortic aneurysm decreases mortality in men 65 to 75 years of age; however, for men older than 75 years, mortality

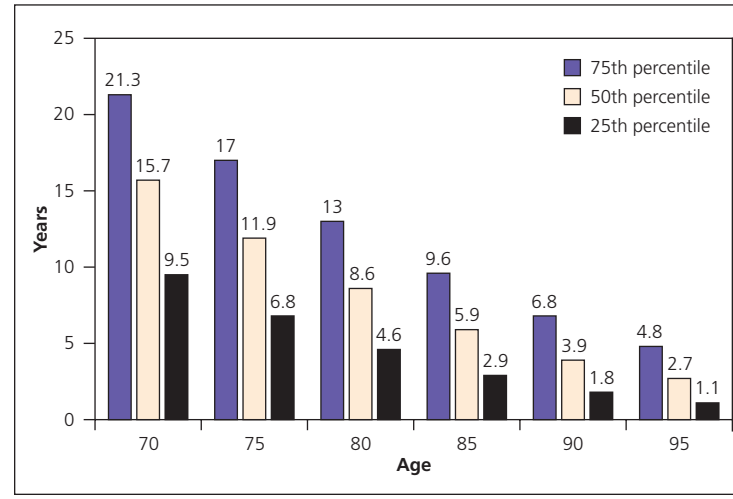

Figure 1. Life expectancy for older women in the United States.

Adapted with permission from Walter LC, Covinsky KE. Cancer screening in elderly patients: a framework for individualized decision making. JAMA. *2001;285(21):2751.*

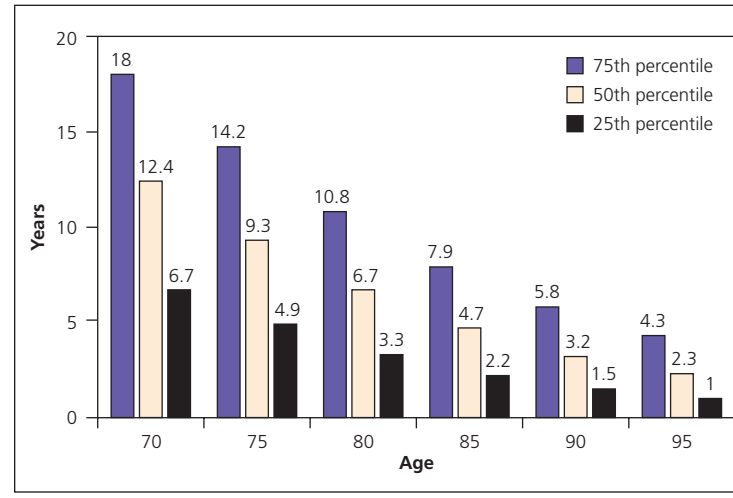

Figure 2. Life expectancy for older men in the United States.

Adapted with permission from Walter LC, Covinsky KE. Cancer screening in elderly patients: a framework for individualized decision making. JAMA. *2001;285(21):2751.*

Table 3. Health Maintenance Screening Based on Functional Status and Life Expectancy

Recommendation	*Robust (life expectancy ≥ five years; functionally independent)*	*Frail (life expectancy < five years; significant functional impairment)*	*Moderately demented (life expectancy of two to 10 years)*	*End of life (life expectancy < two years)*
Cholesterol screening	Consider screening for patients 65 to 75 years of age if they have additional risk factors	Consider screening for patients 65 to 75 years of age if they have additional risk factors	Do not screen	Do not screen
Colonoscopy	Consider performing every five to 10 years	Do not perform	Do not perform	Do not perform
Fasting blood glucose test	Perform if patient has symptoms, or every three years if patient has risk factors	Perform if patient has symptoms, or every three years if patient has risk factors	Perform if patient has symptoms, or every three years if patient has risk factors	Consider performing if patient has symptoms
Fecal occult blood test	Perform yearly	Consider performing yearly	Consider performing yearly	Do not perform
Herpes zoster vaccine	Administer once for patients 60 years and older	Administer once for patients 60 years and older	Administer once for patients 60 years and older	Administer once for patients 60 years and older
Influenza vaccine	Administer yearly	Administer yearly	Administer yearly	Administer yearly
Lifestyle education	Provide at every visit	Provide at every visit	Discuss periodically with caregiver	Do not provide
Mammography	Perform every one to two years up to 80 years of age	Consider performing every one to two years up to 75 years of age	Consider performing every one to two years up to 70 years of age	Do not perform
Papanicolaou (Pap) smear	Consider performing one to three Pap smears if patient has never had a Pap smear	Do not perform	Do not perform	Do not perform
Pneumococcal vaccine	Administer once	Administer once	Administer once	Consider administering once
Prostate-specific antigen test	Discuss pros and cons with patient	Discuss pros and cons with patient	Discuss pros and cons with caregiver	Do not perform
Tetanus toxoid and diphtheria toxoid vaccine	Administer primary series if not done previously; administer booster every 10 years	Administer primary series if not done previously	Administer primary series if not done previously	Do not administer

Adapted with permission from Flaherty JH, Morley JE, Murphy DJ, Wasserman MR. The development of outpatient clinical glidepaths. J Am Geriatr Soc. *2002;50(11):1892-1893.*

exceeds benefits.[28] The USPSTF recommends a one-time screening with ultrasound in men 65 to 75 years of age who have ever smoked.

Breast Cancer. Two thirds of deaths from breast cancer occur in women 65 years and older. Mammography is cost-effective in women up to 79 years of age. The USPSTF recommends mammography every one to two years starting at 40 years of age for women with a life expectancy of five years or more.[29]

Cervical Cancer. Cervical cancer is rare in women 65 years and older who have been previously screened. The USPSTF recommends against routine Papanicolaou smears for

Table 4. Evidence-based Medicine Screening Recommendations from the AAFP, NCEP-ATP III, and USPSTF

Screening area or intervention	*Recommendation*	*Comments*
Abdominal aortic aneurysm	Recommends one-time screening by ultrasound for men 65 to 75 years of age (AAFP limits to men who have ever smoked)	Significant decrease in mortality for men 65 to 75 years of age, but increased mortality for those older than 75 years[28]
Alcohol misuse	Recommends screening and counseling (15-minute intervention with at least one follow-up) in primary care settings	Those older than 65 years were included in nine of the 12 studies reviewed for the recommendation; the intervention led to positive health outcomes up to four years later[32]
Anemia (iron deficiency)	No recommendation for nonpregnant adults	Guideline from National Anemia Action Council advises to screen with complete blood count every year for persons with underlying chronic conditions, and every five years for those 50 years and older[33]
Aspirin prophylaxis for primary CHD prevention	Recommends discussion with patients at increased risk of CHD (i.e., men older than 40 years, postmenopausal women, and younger women with increased risk)	Four out of five studies included patients up to 79 years of age; decrease in relative risk appears greatest in older participants (70 to 84 years of age); increased risk of intracranial and gastrointestinal bleeding must be considered—these bleeds appear to be less likely with decreasing aspirin dosage; relative risk for all-cause mortality is 0.93[17]
Back pain (low)—interventions to prevent onset	No interventions effective (specifically modification of risk factors, back schools, back belts, and physical exercise)	—
Bacteriuria (asymptomatic)	Recommends against screening men and nonpregnant women	Infectious Diseases Society of America recommends against screening older adults who are institutionalized or living in the community, and persons with diabetes, catheters in place, or spinal cord injuries[34]
Bladder cancer	Recommends against screening	Greatest risk factor is smoking[35]
Breast cancer	Recommends screening mammography every one to two years starting at 40 years of age with or without clinical breast examination Screening for breast cancer susceptibility genes only in those at higher risk No recommendation for or against teaching of self-breast examination, or for clinical breast examination alone AAFP recommends that women be counseled on benefits and risks of mammography before screening	Nearly two thirds of deaths from breast cancer occur in patients older than 65 years; USPSTF concludes that recommendation is generalizable to women 70 years and older A meta-analysis of cost-effectiveness included multiple studies of women up to 79 years of age and showed that the cost per year of life saved was comparable to that of treating hypertension; however, the harms outweigh the benefits in women with the shortest life expectancy[29]
Calcium supplements	Recommends that all females 11 years and older be counseled on maintaining good calcium intake to prevent osteoporosis	A three-year RCT of ambulatory persons older than 65 years showed that 700 IU of vitamin D plus 500 mg of calcium citrate malate daily reduced the odds of falling in ambulatory women by 46 percent; no effect was found on men[36]
Carotid artery stenosis	USPSTF recommends against screening asymptomatic persons	Ultrasound screening leads to carotid endarterectomies, which give rise to strokes; alternatively, screening with carotid angiography leads to strokes[37]
Cervical cancer	Recommends against routine screening in persons older than 65 years who have a recent history of normal Papanicolaou (Pap) smears and are not high risk; recommends against routine Pap smears in those whose uterus has been removed for noncancerous disease	—
CHD	Recommends against screening persons at low risk; no recommendation for or against screening high-risk patients with electrocardiography, exercise treadmill, or computed tomography	—

(continued)

Table 4 *(continued)*

Screening area or intervention	*Recommendation*	*Comments*
Cholesterol	Strongly recommends screening all men 35 years and older and all women 45 years and older who are at increased risk of CHD; include measurement of low- and high-density lipoproteins	Results of three major studies including older adults showed reduction of cardiovascular events and all-cause mortality similar to that in persons younger than 70 years; these trials were based on statin therapies[18] NCEP-ATP III update notes that aggressive statin therapy for those older than 70 years is supported in persons with established cardiovascular disease and in those at high risk[18]
Colorectal cancer	Strongly recommends screening for women and men 50 years and older	Colorectal cancer incidence is doubled every seven years from 50 years of age; decreased mortality from 50 to 80 years of age has been established in fecal occult blood testing and sigmoidoscopy; screening colonoscopy has been estimated in models to decrease mortality by 61 percent; consideration of life expectancy should be included in decision to screen[30]
Dementia (Alzheimer's disease)	Cannot recommend for or against screening	—
Dental	No recommendations for adults	—
Depression in adults	Recommends screening for adults	The risk of suicide is highest among white men older than 65 years[38]
Diabetes mellitus	Recommends screening in adults with hypertension or hyperlipidemia	The ADA recommends routine screening every three years in asymptomatic persons starting at 45 years of age, and in overweight persons younger than 45 years who have at least one risk factor (e.g., sedentary lifestyle, cardiovascular disease, black or Hispanic race)[39]
Diet	Recommends intensive counseling for adult patients with risk factors for cardiovascular disease and diet-related chronic disease	—
Drug abuse	Cannot recommend for or against routine screening; no current AAFP recommendation	Update in progress by USPSTF
Glaucoma	Cannot recommend for or against screening	—
Hearing impairment (older adults)	Recommends screening by questioning about patients' hearing	Update in progress by USPSTF
Hemochromatosis	Recommends against routine genetic screening	—
Hormone therapy	Recommends against routine use of estrogen and progesterone combinations in postmenopausal women, and against routine use of estrogen in women with a hysterectomy	—
Hypertension	Strongly recommends routine screening in persons 18 years and older	Update in progress by USPSTF
Lung cancer	Recommends against screening asymptomatic persons	—
Obesity in adults	Recommends screening all adults for obesity and offering intensive counseling and behavioral interventions; cannot recommend for or against low- or moderate-intensity counseling in obese adults or any counseling in overweight adults	Counseling at least twice per month for a minimum of three months is considered intensive counseling
Oral cancer	Cannot recommend for or against routine screening	—
Osteoporosis	Recommends routine screening in women 65 years and older and in women 60 to 64 years of age with increased risk factors	—
Ovarian cancer	Recommends against routine screening	—

(continued)

Table 4 *(continued)*

Screening area or intervention	*Recommendation*	*Comments*
Pancreatic cancer	Recommends against routine screening	—
Peripheral arterial disease	Recommends against routine screening	—
Physical activity	Cannot recommend for or against counseling on benefits of physical activity; AAFP recognizes that physical activity is desirable, but cannot recommend for or against	—
Prostate cancer	Cannot recommend for or against screening with prostate-specific antigen or digital rectal examination; any screening should be done after discussion with the patient	It is unlikely that any man with a life expectancy of less than 10 years will receive benefit from screening; the large number of false-positive results and unclear benefit of treatment leaves screening controversial[31]
Skin cancer	Cannot recommend for or against screening for, or counseling on, prevention	Most skin cancers are found in older adults; whites have 20 times the risk of blacks and four times the risk of Hispanics of developing skin cancer; by 50 years of age, men have a much higher incidence of and mortality from melanoma than women; these differences become larger with increasing age; by 65 years of age, mortality rates are 25 per 100,000 for men and five per 100,000 for women[40] Update in progress by USPSTF
Suicide risk	Cannot recommend for or against screening in the general population	Suicide risk increases with age in persons older than 65 years; risk factors include depression, alcoholism, chronic illness, divorced marital status, and male sex[38]
Testicular cancer	Recommends against routine screening in asymptomatic adolescents and adults	—
Thyroid cancer	Routine screening by neck palpation or ultrasonography is not recommended in asymptomatic persons	Update in progress by USPSTF
Thyroid disease	Cannot recommend for or against routine screening in asymptomatic adults	—
Tobacco counseling	Strongly recommends screening all adults for tobacco use; medications and brief intervention counseling (less than three minutes) are recommended	—
Vaccinations	CDC recommends tetanus toxoid and diphtheria toxoid vaccine for everyone every 10 years, influenza vaccine for everyone each year, and pneumococcal vaccine by 65 years of age	The USPSTF no longer evaluates, but defers to the CDC for all recommendations
Visual impairment (older adults)	Recommends screening for all adults 65 years and older	Update in progress by USPSTF
Vitamin supplements	USPSTF and AAFP cannot recommend for or against vitamins A, C, and E; multivitamins with folic acid; or antioxidants for the prevention of cancer or cardiovascular disease; AAFP recommends against beta-carotene for the prevention of cancer or cardiovascular disease	A three-year RCT of ambulatory men and women older than 65 years showed that 700 IU of vitamin D plus 500 mg of calcium citrate malate daily reduced the odds of falling by 46 percent in ambulatory women; no effect was found in men[36]

AAFP = American Academy of Family Physicians; ADA = American Diabetes Association; CDC = Centers for Disease Control and Prevention; CHD = coronary heart disease; NCEP-ATP III = National Cholesterol Education Program, Adult Treatment Panel III; RCT = randomized controlled trial; USPSTF = U.S. Preventive Services Task Force.

Information from references 17, 18, and 28 through 40.

women previously screened and for those who have had hysterectomy for benign reasons.[41]

Colorectal Cancer. The incidence of colorectal cancer doubles every seven years beginning at 50 years of age. Decreased mortality is seen among patients 50 to 80 years of age who have fecal occult blood testing and sigmoidoscopy. The USPSTF recommends screening for men and women 50 years and older with a life expectancy of five years or more. The frequency of screening depends on the modality used: colonoscopy is performed every 10 years, flexible sigmoidoscopy is done every five years, and guaiac-based fecal occult blood screening is done every year.[30]

Osteoporosis. The USPSTF recommends screening women 65 years and older for osteoporosis, or sooner if risk factors such as daily steroid use, decreased exposure to estrogen (i.e., menopause before 45 years of age), or infrequent menses are present.[42]

Prostate Cancer. The USPSTF does not recommend for or against prostate-specific antigen testing or digital rectal examination for prostate cancer because of the unclear benefit of treatment. It is unlikely that men with a life expectancy of less than 10 years will benefit from this screening.[31]

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