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Current recommendations for laboratory-based screening tests for older men

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Health screening tests greatly impact the public's health because they involve testing of asymptomatic populations for specific diseases or health conditions for which specific interventions may alter disease progression before appearance of clinical signs and symptoms. The following criteria characterize an effective screening program:[1]

- The screening test has acceptable performance specifications (positive and negative predictive values) for the disease in question
- The disease is a significant condition with major health and societal implications
- Acceptable, feasible and effective tests for presence of the disease and treatments are available
- Following screening, strategy to decide which patients to treat; those treated must be more likely to do better than those treated later when signs and symptoms appear in the absence of screening
- There must be a net benefit to the individual being screened for the disease while also considering the societal context
- The screening test is available, cost-effective and acceptable for the target population
- Informed consent and patient confidentiality must be ensured.

In this article, recommendations of the U.S. Preventive Services Task Force (USPSTF) for selected laboratory-based screening tests are described. These screening tests include those for colorectal cancer, cardiovascular disease risk, hepatitis C virus (HCV) infection, human immunodeficiency virus (HIV) infection, syphilis infection, Type 2 diabetes mellitus, and prostate cancer. Additionally, specific CDC recommendations, are noted when applicable.

The USPSTF, supported by the Agency for Healthcare Research and Quality, is widely considered to be the leading independent panel of experts in recommendations about disease prevention and in primary and secondary interventions. The USPSTF conducts rigorous and impartial assessments of the scientific evidence for effectiveness of a broad range of clinical preventive services.

The statements made in this article are those of the author, and they do not necessarily represent the official position of the CDC.

Evidence is evaluated using a rating scale: “A” (strong recommendation for screening), “B” (recommendation for screening), “C” (recommendation neither for nor against screening), “D” (recommendation against screening), or “I” (inadequate or insufficient evidence to recommend for or against screening). Table 1 lists the USPSTF screening recommendations for 19 diseases or conditions in adult men. Screening for six of these diseases or conditions received a rating of either A or B, while seven diseases or conditions received a rating of D. The USPSTF's recommendations for the six diseases or condition receiving a rating of either A or B will be discussed in more detail. Also discussed will be the recent USPSTF rating of D for screening of prostate cancer.

Colorectal Cancer

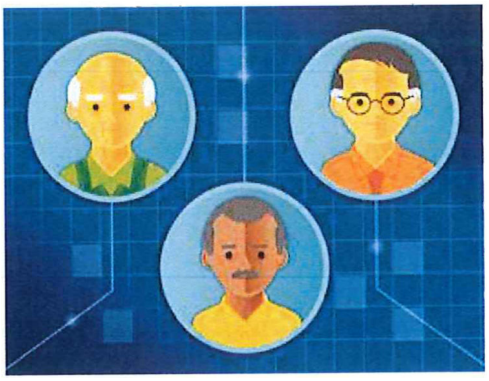
Screening for colorectal cancer using fecal occult blood testing (FOBT), sigmoidoscopy or colonoscopy in adult men and women is strongly recommended beginning at age 50 years and continuing until 75 years of age (A).[2] One of the following three screening methods may be used:

Annual, high-sensitivity FOBT High-sensitivity FOBT every 3 years plus sigmoidoscopy every 5 years Screening colonoscopy every 10 years

The long preclinical phase from development of adenomas to colorectal carcinoma provides opportunities for successful screening, diagnosis, intervention, treatment and extended lives. However, routine screening in asymptomatic adults 75-85 years of age (B) and screening in asymptomatic adults older than 85 years of age with prior history of adequate screening is not recommended since there is at least moderate evidence that net benefit is small (C). There is adequate evidence that the benefits associated with detection and early intervention decline after age 75 years. The lead time between detection and treatment of colorectal cancer and a mortality benefit is substantial, but competing causes of mortality in this renders it less that this benefit will be realized with advancing age.

Risk of Cardiovascular Disease

Screening men aged 35 years or older for lipid disorders up to every five years is strongly recommended (A); screening men aged 20-34 years for lipid disorders up to every five years is recommended if they are also at increased risk for coronary heart disease (CHD) (diabetes, previous personal or family history, tobacco use, hypertension, obesity) (B).[3] Good-quality evidence indicates that total cholesterol, LDL-cholesterol, and HDL-cholesterol are independent predictors of CHD risk, and ratios of total cholesterol to HDL-cholesterol or LDL-cholesterol to HDL-cholesterol classify risk better than total cholesterol alone. Although triglycerides level is a strong univariate predictor of coronary events, its association with CHD events is reduced substantially by adjustment for other risk factors. At least two serum lipid measurements are necessary to ensure that true values are within 10% of the average of measurements.



HCV Infection

Screening for HCV infection is recommended in adults at high risk including those with any history of intravenous drug use or blood transfusions prior to 1992 (B).[4] Other risk factors include chronic hemodialysis, being born to an HCV-infected mother, imprisonment and intranasal cocaine and other non-injection drug use.[5] The CDC recommends one-time testing without prior ascertainment of HCV risk for adults born between 1945 and 1965, a population with a disproportionately high prevalence of HCV infection and related disease.[6] The USPSTF concluded that benefit of screening all adults in this age group is small (C).[4] Anti-HCV antibody testing with subsequent polymerase chain reaction testing for viremia is accurate for identifying patients with chronic HCV infection.[4]

HIV Infection

Screening adolescents and adults aged 15-65 years for HIV infection as well as older adults with increased risk is recommended using repeated enzyme immunoassay for anti-HIV antibodies when the first test is positive, followed by confirmatory Western blot or immunofluorescence assay (A).[7] There is convincing evidence that identification and treatment of HIV infection is associated with markedly reduced risk for progression to AIDS, AIDS-related events, and death. Overall benefits of screening for HIV infection in adolescents and adults are substantial with convincing evidence that use of antiretroviral therapy is associated with a substantially decreased risk for transmission from HIV-positive persons to uninfected heterosexual partners.[7] The CDC recommends at least annual screening of all who are at high risk for HIV infection including those initiating treatment for tuberculosis and persons seeking treatment for sexually transmitted diseases, as well as one-time screening of all persons 13-64 years of age.[8]

Syphilis Infection

Screening persons at increased risk for syphilis infection is strongly recommended (A).[9] Populations at increased risk for syphilis infection are determined by incident rates and include men who have sex with men or who engage in high-risk sexual behavior, commercial sex workers, persons who exchange sex for drugs, and those in adult correctional facilities. There is adequate evidence that screening tests can accurately detect syphilis infection and that antibiotics can cure syphilis. These include nontreponemal tests

commonly used for initial screening (VDRL or RPR), followed by a confirmatory fluorescent treponemal antibody absorbed or *T. pallidum* particle agglutination test. The benefits of screening persons at increased risk for syphilis infection substantially outweigh potential harms.[9]

Type 2 Diabetes Mellitus

Screening for type 2 diabetes every three years in asymptomatic adults with sustained blood pressure (either treated or untreated) of greater than 135/80 mm Hg is recommended (**B**).[10] The USPSTF found adequate evidence that in adults with hypertension and diabetes, lowering their blood pressure below conventional target values reduces incidence of cardiovascular events and mortality. In addition to criteria for plasma or blood glucose measurement, diabetes can be diagnosed by demonstrating increased blood hemoglobin A_{1c} concentrations.[11] Monitoring of glycemic control may be performed by self-monitoring blood glucose with glucose meters and laboratory analysis of hemoglobin A_{1c}.

Prostate Cancer

Screening for prostate cancer by testing for prostate-specific antigen (PSA) is not recommended (D).[12] Although the precise, long-term effect of PSA screening on prostate cancer-specific mortality remains uncertain, existing studies adequately demonstrate that the reduction in prostate cancer mortality after 10-14 years is very small even for men in the optimal age range of 55-69 years because there is no apparent reduction in all-cause mortality.[12] In contrast, harms associated with diagnosis and treatment of screening-detected cancer are common, occur early, may be persistent, and include a small but real risk for premature death. More men will experience harms of screening and treatment for screening-detected asymptomatic or subclinical disease than will experience direct benefit. The over-diagnosis and over-treatment of prostate cancer as a result of screening exposes many men to the adverse effects of diagnosis and treatment without increased survival. Assessing the balance of benefits and harms requires weighing a moderate to high probability of early and persistent harm from treatment against the very low probability of preventing a death from prostate cancer in the long term. The USPSTF has, therefore, concluded that there is moderate certainty that harms of PSA-based screening for prostate cancer outweigh any potential benefits.[12]

It is perhaps useful to note that outcomes for patients undergoing health screening for chronic diseases can be divided into several categories:[1]

- Those with disease which would have been cured by treatment even if it had not been detected by screening; in these cases, lives may not be improved by screening but earlier detection may impact transmission of diseases
- Those with incurable disease at the time of screening for whom screening itself may not change treatment or outcome but results may impact family, reproductive, and other decisions as well as transmission of some diseases

- Those dying of co-morbidities other than the screened disease; the quality of life may actually be reduced by screening-mediated diagnostic and treatment interventions
- Those who are the main beneficiaries of a screening program with diseases which may be cured through screening and early detection
- Those who do not have the disease or condition being screened, usually the largest group. Harms for this group are usually minimal unless morbidity and mortality resulting from screening is significant.

Screening tests have individual and public health implications. The decision to participate in screening can be a matter of individual choice particularly for diseases or conditions with screening recommendation of C or I. This choice may hinge on the probability of various outcomes and may depend on cost of screening and access to it, as well as how individuals feel about them. Screening may save a few lives and reduce morbidity from progressive disease. A few people may experience disease-specific morbidities and eventually die of the disease anyway. More may face subsequent cascades of diagnostic testing or disease monitoring procedures with uncertainties about presence of the disease. Some may be treated unnecessarily or experience the morbidities (and possibly mortality) resulting from the treatment. In short, in some cases, whether or not to be screened may be a matter of personal choice.

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Table 1

Laboratory-Based Screening of Adult Males

Disease / Condition	Screening test(s)	USPSTF grade*
Bladder cancer	Urine dipstick or microscopic urinalysis, urine cytology, tests for urine biomarkers	I
Colorectal cancer; age, 50-75 years	Fecal occult blood (Hemoccult or immunochemical) test, flexible sigmoidoscopy, colonoscopy	A
Colorectal cancer; age, 76-85 years	Fecal occult blood (Hemoccult or immunochemical) test, flexible sigmoidoscopy, colonoscopy	B
Colorectal cancer; age, ≥86 years	Fecal occult blood (Hemoccult or immunochemical) test, flexible sigmoidoscopy, colonoscopy	C
Colorectal cancer	Computed tomographic colonography or fecal DNA test	I
Lung cancer	Low dose computerized tomography, chest x-ray, sputum cytology	I
Pancreatic cancer	Abdominal palpation, ultrasonography, serologic tests	D
Prostate cancer	Testing for prostate-specific antigen (PSA), digital rectal examination, ultrasonography	D
Cardiovascular disease risk	High-sensitivity CRP, leukocyte count, fasting blood glucose, homocysteine, and lipoprotein(a)	I
Cardiovascular disease risk; aged, ≥35 years	Total cholesterol, LDL-cholesterol, triglycerides, HDL-cholesterol	B
Screening for lipid disorders; aged, 20-34 years	Total cholesterol, LDL-cholesterol, triglycerides, HDL-cholesterol	C
Asymptomatic bacteriuria	Urine culture	D
Chlamydia infection	Nucleic acid amplification tests	I
Genital herpes	Enzyme immunoassay (EIA), immunoblot, and western blot assay	D
Gonorrhea; men at increased risk of infection	Nucleic acid amplification and nucleic acid hybridization tests	I
Gonorrhea; men at low-average risk of infection	Nucleic acid amplification and nucleic acid hybridization tests	D
Hepatitis B virus (HBV) infection	Serologic testing for hepatitis B surface antigen	D
Hepatitis C virus (HCV) infection; adults at high risk	Testing for anti-HCV antibodies with confirmatory polymerase chain reaction (PCR)	B
HCV infection; adults born between 1945 and 1965	Testing for anti-HCV antibodies with confirmatory PCR	C
HIV infection; aged 15-65 years and others at increased risk	Repeat EIA followed by confirmatory Western blot or immunofluorescent assay	A
Syphilis; men at increased risk of infection	VDRL or RPR, followed by fluorescent treponemal antibody absorbed or *T. pallidum* particle agglutination test	A
Syphilis; men not at low-average risk of infection	VDRL or RPR, followed by fluorescent treponemal antibody absorbed or T. pallidum particle agglutination test	D
Type 2 diabetes; sustained blood pressure of >135/80 mm Hg	Fasting plasma glucose, hemoglobin A_{1c}	B
Type 2 diabetes; BP of ≤135/80 mm Hg	Fasting plasma glucose, hemoglobin A_{1c}	I
Hemochromatosis	High-risk genotype (C282Y) testing	D
Thyroid disease	Thyroid stimulating hormone (TSH)	I

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Disease / Condition	Screening test(s)	USPSTF grade*
Chronic kidney disease	Urine albumin, urine protein, serum creatinine to estimate glomerular filtration rate	I
Illicit drug use	Toxicological tests of blood or urine	I