Health maintenance for adults

The right clinical information, right where it's needed
# Table of Contents

<table>
<thead>
<tr>
<th>Overview</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Risk factors for cardiovascular disease</td>
<td>3</td>
</tr>
<tr>
<td>Screening for cardiovascular risk factors</td>
<td>3</td>
</tr>
<tr>
<td>Strategies for cardiovascular risk reduction</td>
<td>4</td>
</tr>
<tr>
<td>Recommendations for cardiovascular risk reduction</td>
<td>6</td>
</tr>
<tr>
<td>Effectiveness of cancer screening and prevention</td>
<td>6</td>
</tr>
<tr>
<td>Recommendations for cancer screening and counseling</td>
<td>6</td>
</tr>
<tr>
<td>Breast cancer screening</td>
<td>7</td>
</tr>
<tr>
<td>Cervical cancer screening</td>
<td>7</td>
</tr>
<tr>
<td>Colorectal cancer screening</td>
<td>8</td>
</tr>
<tr>
<td>Prostate cancer screening</td>
<td>8</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>9</td>
</tr>
<tr>
<td>Immunization</td>
<td>9</td>
</tr>
<tr>
<td>Online resources</td>
<td>10</td>
</tr>
<tr>
<td>Evidence scores</td>
<td>11</td>
</tr>
<tr>
<td>References</td>
<td>12</td>
</tr>
<tr>
<td>Images</td>
<td>20</td>
</tr>
<tr>
<td>Disclaimer</td>
<td>21</td>
</tr>
</tbody>
</table>
Health maintenance for adults

Overview

Introduction

Routine health maintenance, or preventive health care, is an important component of primary care medicine. Several studies show small but significant health benefits to routine health checks.[1]

Cardiovascular disease (CVD), including coronary heart disease (CHD) and stroke, is the most important cause of morbidity and mortality in the US.[2] About 800,000 people die of cardiovascular disease in the US each year. Evidence supports a range of strategies to prevent cardiovascular events. Cancer is the second-leading cause of mortality in the US with over 560,000 deaths per year. The lifetime risk of developing cancer is over 50%, with most cases occurring in those over 55 years of age.

Prevention and early detection involves periodic screening of risk factors for both CVD and cancer, and targeted lifestyle interventions for CVD prevention. Specific cancer screening recommendations for average-risk adults are available for breast,[3] cervical,[4] and colorectal cancer.[5] [American College of Physicians (ACP): screening for cancer - advice for high-value care from the American College of Physicians] Appropriate treatment can then be started as early as necessary. Patients with established CVD or high risk of CVD can reduce cardiovascular events and/or mortality with multifactorial lifestyle interventions.[6]

Recommendations on preventive health care are available from the US Preventive Services Task Force (USPSTF). [USPSTF: guide to clinical preventive services, 2014]

Advice regarding appropriate immunizations for adults is available from the Centers for Disease Control and Prevention (CDC).[7] [CDC: adult immunization schedule] [CDC: vaccine recommendations of the Advisory Committee for Immunization Practices (ACIP)]

Risk factors for cardiovascular disease

Cardiovascular events become more common with age. Men have higher rates than women at a given age but, due to the longer life expectancy of women, CVD has a greater impact on women.[8] Nearly half of men (49%) and one third of women (32%) develop CHD during their lifetime.[2] Black people have a higher risk of CVD than white people.[9] CHD is more common in people who smoke cigarettes and who have an elevated BP.

Other established risk factors include elevated LDL-cholesterol, low HDL-cholesterol, hyperglycemia (due to diabetes), left ventricular hypertrophy, obesity, social deprivation, decreased physical activity, and a family history of early MI.[10] [11] [12]

Risk factors for stroke include elevated BP, cigarette smoking, hyperglycemia (due to diabetes), left ventricular hypertrophy, and atrial fibrillation.[13] [14]

Screening for cardiovascular risk factors

Providers need to develop strategies to identify and treat adults with sufficient cardiovascular risk to benefit early from available treatments. However, the evidence is limited regarding at what age to start and stop screening and counseling, and at what frequency of intervals. The recommendations are based mainly on modeling and limited data. Women are a particular area of growing concern, particularly after the age of 65 years when the prevalence of CVD risk factors approaches that of men.[15] [16]

- All adults should have their smoking status assessed, with more frequent assessment for current and former smokers (including readiness to stop).
- BP should be assessed in all adults, with more frequent measurement for those with elevated readings or strong family history of hypertension.
- All middle-aged and older adults (>35 years for men; >45 years for women) should have total and HDL-cholesterol measured. Because the reliability of measuring lipids is modest, 2 or more measurements should be obtained if the patient is near a treatment threshold.[17]
Screening and subsequent intervention for an abdominal aortic aneurysm (AAA) reduces the incidence of aortic rupture. Men ages 65 to 75 years with a smoking history should undergo one-time screening for AAA by ultrasound scan.[18] [19] [B]Evidence

Epidemiologists have developed relatively simple scoring systems to estimate global cardiovascular risk for adults with no previous history of CHD events, peripheral vascular disease, or stroke. [NHLBI: ATPIII guidelines at a glance - Framingham point scores] They enable estimation of 10-year global risk based on key risk factors, including age, gender, smoking status, BP, and total and HDL-cholesterol.[20] [21] [NHLBI: ATPIII guidelines at a glance - Framingham point scores] In some systems, diabetes or left ventricular hypertrophy on ECG are also assessed. Similarly, recommendations have been outlined to estimate the risk of stroke.[14] [22] [23]

Guidelines recommend calculating global CHD risk every 5 years for all adults over age 40 years or those with 2 or more risk factors, in order to consider risk modification.[11] [24] Risk should be reassessed periodically, based on changes in age, BP, and lipid levels. Lipid levels do not change rapidly in most cases, so experts have recommended a 5-year interval for screening those whose previous value was considered low risk. More frequent monitoring can be considered when previous values placed the patient closer to a treatment threshold.

Other tests that have been suggested include CRP, anthropomorphic measurements such as waist-to-hip ratio or BMI, assessing atherosclerosis with electron beam CT for coronary calcium, carotid ultrasound, ankle-brachial index, and measuring asymptomatic ischemia with exercise or resting ECG, or myocardial perfusion imaging.[25] [26] [27] It is, however, unclear whether identifying these risk factors helps refine existing prevention strategies sufficiently to justify the additional resources and cost.

Strategies for cardiovascular risk reduction

As previously mentioned, lifestyle modifications can have a significant impact on those patients with or at risk for CVD.[6] Some of those interventions are as follows.

- Dietary modification: dietary advice may include the use of low-salt, high-fiber, and low saturated-fat diets such as the Dietary Approaches to Stop Hypertension (DASH) diet (3 servings of fruit and vegetables daily, whole grains, low sodium, and low-fat proteins).[28] Reducing salt intake should be recommended,[29] [30] [A]Evidence and increasing fruit and vegetable intake should be encouraged.[31] [A]Evidence Low-carbohydrate diets have been shown to be effective for weight loss and cardiovascular risk factor reduction.[32]

- Weight: patients should be counseled on weight loss as appropriate with a target BMI <30 kg/m².

- Exercise: counseling on regular exercise and improving physical fitness through aerobic exercise is extremely important. It is recommended that patients engage in 30 minutes or more of moderate-intensity physical activity on most, and preferably all, days of the week. Likewise, patients should engage in multiple short bouts of physical activity daily (e.g., such as taking the stairs instead of the elevator, taking walk breaks at work). Before starting an exercise program, some patients (e.g., older or with cardiovascular impairment) should discuss a plan with their healthcare provider.

- Smoking cessation: smokers have an increased risk of MI and stroke. The incidence of nonfatal MI is 5 times greater in cigarette smokers 30 to 49 years of age, 3 times greater in cigarette smokers 50 to 59 years of age, and twice as great in cigarette smokers 60 to 79 years of age compared with nonsmokers.[33] Studies in patients with heart disease suggest that this risk decreases after smoking cessation.[34] [35] Identifying patients who smoke, assessing their readiness to stop smoking, and providing behavioral and pharmacologic support for those interested in smoking cessation are important strategies for reducing cardiovascular risk.[36]

Aspirin and other antiplatelet agents

- Low-dose aspirin (81-325 mg/day) is effective in reducing the risk of nonfatal MI in middle-aged and older men.[37] [38] [39] [40] A meta-analysis reported that aspirin reduced the incidence of serious cardiovascular events by 12%.[41] For women, the evidence is weaker; it suggests that aspirin may reduce stroke in middle-aged and older women, but it does not seem to reduce the risk for MI.[38] [39] Meta-analyses suggest that aspirin produce a modest-sized reduction in MI and stroke in patients with diabetes, but current evidence is not conclusive.[42] Aspirin is ineffective for primary prevention of cardiovascular mortality and would not benefit those at low risk for CHD.[43] [44] [45]
• For both men and women, aspirin increases the risk of GI bleeding and possibly hemorrhagic stroke.[41] Risk of major GI and extracranial bleeding with aspirin is proportional to cardiovascular risk.[41]
• The decision about whether to prescribe aspirin must be based on the patient’s risk of cardiovascular events.[37] If the risk of CVD is high, the benefits of aspirin outweigh the adverse effects; conversely, low-risk patients should not take aspirin, as the adverse effects exceed the benefits. The benefits of aspirin exceed the adverse effects when the 10-year cardiovascular risk is >10%. [46] [47] For those with 5% or lower risk, aspirin is not warranted. For those with 10-year risk of 5% to 10%, the decision is not clear-cut and should be based on patient preferences.[38]
• Other antiplatelet agents commonly used for prevention of occlusive vascular events include clopidogrel and dipyridamole. Although not currently recommended for primary prevention, there is evidence that these agents can be used for secondary prevention, particularly in patients who are intolerant of aspirin. Clopidogrel is recommended for patients who have had ischemic stroke or multivascular disease. It is also recommended for patients after MI if aspirin is not tolerated. Dipyridamole in combination is currently recommended for people who have had a transient ischemic attack or with ischemic stroke if clopidogrel is contraindicated or not tolerated.[48] [49]

BP control

• Evidence from several randomized trials supports the effectiveness of reducing BP with medications as a means of reducing cardiovascular risk.[50] [51] However, the Eighth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8) recommends a target BP of <150/90 mmHg for patients aged 60 and over, and a target of <140/90 mmHg in patients under 60 years of age, or with diabetes mellitus or chronic kidney disease, as this is associated with reduced CVD burden.[52]
• Earlier treatment of hypertension may effectively limit end-organ damage, such as left ventricular hypertrophy or renal insufficiency, which affects later cardiac risk. However, cardiovascular events are uncommon in young adults, and studies have not evaluated the reduction in cardiovascular risk by treating young patients with mild to moderate hypertension.
• Dietary salt restriction (ideally <3 g/day) has been shown to reduce systolic blood pressure and should be encouraged for all patients.[53] Diuretics, ACE inhibitors, and calcium-channel blockers are effective first-line agents.[54] There is little evidence to show that any one particular antihypertensive is superior than any other for the primary prevention of CHD.[55]
• BP should be targeted at <140/90 mmHg in the absence of known CHD, diabetes, renal disease, or heart failure. If other risk factors are present, the target is lowered to <130/80 mmHg.

Lipid lowering with statins

• Several randomized studies support the effectiveness of statins for reducing cardiovascular events in adults with a wide range of baseline lipid levels. These studies compared a fixed dosage of statin with a placebo, with both groups receiving low-intensity dietary counseling. Meta-analysis found that statins reduced the relative risk of CHD by 23% and stroke by 17%.[56] [57] [58] [4A] Evidence The threshold for prescribing statins should be reduced in light of this data, and of the low cost and safety of treatment over a long duration.[59] Data suggest that CVD risk can be reduced with statins after 5 years of therapy.[60]
• It is unclear whether patients with dyslipidemia should start statin therapy in young adulthood, before short-term cardiovascular risk increases to significant levels. Statin use in older people has benefits, but only in certain populations. Statins have displayed a decrease in all-cause mortality in terms of secondary prevention in the elderly, and these benefits are seen after 1 year of treatment. In primary prevention, however, the benefit is less clear. Although there may be a decrease in CHD events and all-cause mortality, the numbers needed to treat are much higher.[61] Statins have shown significant mortality benefit for diabetic patients in both primary and secondary prevention.[62]
• The effectiveness of other lipid-lowering drugs for primary prevention of CVD is less well established, although some earlier studies have shown reduction in CHD events with bile acid-binding resins or fibrates.[63]
• There have been considerable revisions to the use of lipid-lowering agents since revised guidelines were published by the ACC/AHA in 2013.[64] Lifestyle modifications continue to be an emphasis in these new recommendations and remain the first line of therapy for hyperlipidemia. The calculation of risk assessment is recommended using an updated atherosclerotic cardiovascular disease (ASCVD) calculator, which estimates 10-year and lifetime ASCVD risk. The updated risk calculator has been
Health maintenance for adults

Overview

The risk estimator should not be used if the patient is already taking a statin.

In terms of pharmacologic treatment of cholesterol, the focus should be on high-intensity statin therapy. These latest guidelines did not support using LDL as a target for treatment, therefore reducing the practice of titrating medications or adding other medications. This would also reduce the frequency of follow-up laboratory testing.

Hormone replacement

- There is little evidence to suggest that hormone replacement therapy (HRT) has any cardiovascular protective benefit. In postmenopausal women, HRT should not be prescribed for either primary or secondary prevention because there is a slightly increased risk of stroke and venous thromboembolic events in this patient population.[65]

Recommendations for cardiovascular risk reduction

The following recommendations should be considered:[24]

- High risk (10-year risk: >20%): treatment with both aspirin and statins should be encouraged
- Intermediate risk (10-year risk: 10% to 20%): treatment with statins and/or aspirin should be offered
- Moderately low risk (10-year risk: 6% to 9%): patients should decide regarding aspirin or statin or no therapy
- Low risk (10-year risk: 5% or less): no pharmacologic treatment should be initiated.

Effectiveness of cancer screening and prevention

Cancer screening is the systematic application of a test or tests to detect early-stage cancer or precancerous states so that they can be treated as a means of reducing cancer incidence and mortality. Screening remains the most widely implemented strategy for reducing cancer incidence and mortality in the US, and strategies have been developed for various cancer types. However, various cancers differ in their etiology, risk factors, rate of progression, and amenability to prevention and/or early detection.

A given screening test may detect early-stage cancer or important precancerous lesions more effectively than standard care. The value of a screening test can be assessed only by comparing the effect of treatment between those who screen positive and those in whom cancer is detected clinically. This is because screening may confer no benefit if earlier detection does not result in more effective therapy. This necessitates further studies that measure disease incidence, mortality, and quality of life.

Screening, however, may be associated with potential harms, including the adverse effects of the screening tests themselves or of subsequent diagnostic evaluations, adverse effects of treatment, psychological effects of labeling a diagnosis, cancer-related anxiety, and identification of a cancer that may have remained asymptomatic. Unfortunately, many screening tests have been accepted in widespread practice without sufficient evaluation, precluding determination of their net effect on health.

Recommendations for cancer screening and counseling

Cancer screening and counseling involves decision making on the part of the patient. Informed decision making is a person’s overall process of gathering relevant health information from his or her clinician and from other clinical and nonclinical sources, with or without independent clarification of values.[66] Shared decision making is decision making by the patient and clinician, in which the patient: understands the risk or seriousness of the disease or condition to be prevented; understands the preventive service, including the risks, benefits, alternatives, and uncertainties; has weighed his or her values regarding the potential benefits and harms associated with the service; and has engaged in decision making at a level at which he or she desires and feels comfortable.[67]
Specific cancer screening recommendations for average-risk adults are available for breast,[3] cervical,[4] and colorectal cancer.[5] These include guidance on the age at which to start and stop screening and the screening intervals.

The US Preventive Services Task Force (USPSTF) recommends against routine screening for testicular cancer,[68] ovarian cancer,[69] bladder cancer,[70] and pancreatic cancer.[71] Evidence is insufficient to recommend for or against screening for skin cancer[72] and oral cancer.[73] Screening for lung cancer is recommended in high-risk patients.[74] Counseling for smoking cessation is strongly advocated to reduce the incidence of related cancers (e.g., lung cancer).[75] More than 150,000 new cases of cancer each year are attributable to tobacco use and could be prevented by effective therapies to decrease its use.

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Screening modality</th>
<th>Age (years) at which to start screening</th>
<th>Frequency</th>
<th>Age (years) at which to stop routine screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>Mammography</td>
<td>40</td>
<td>Every 1-2 years</td>
<td>Not defined</td>
</tr>
<tr>
<td>Cervical</td>
<td>Pap smear</td>
<td>21</td>
<td>Every 3 years</td>
<td>65</td>
</tr>
<tr>
<td>Colorectal</td>
<td>Fecal occult blood testing</td>
<td>50</td>
<td>Annually</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Sigmoidoscopy</td>
<td>50</td>
<td>Every 5 years</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Colonoscopy</td>
<td>50</td>
<td>Every 10 years</td>
<td>75</td>
</tr>
</tbody>
</table>

Recommended cancer screening for average-risk adults

Created by Michael Pignone, MD, PhD

Breast cancer screening

Controversy exists regarding the age to initiate breast cancer screening among women at average risk for the disease. The American Cancer Society recommends that women of average risk undergo screening mammography every year, beginning at age 40 years.[75] The USPSTF and the American Academy of Family Physicians (AAFP) recommend that women of average risk undergo biennial screening mammography at the age of 50 to 74 years.[3] [19] Both the USPSTF and the AAFP further recommend that the decision to start regular, biennial screening mammography before the age of 50 years should be an individual one and take patient context into account, including the patient's values regarding specific benefits and harms.[3] [19] [76] Mammography reduces breast cancer mortality among women ages 40 to 74 years.[3] [77] [78] Clinicians should not screen average-risk women younger than 40 or older than 75 years. The role of self breast exam and clinical breast exam to detect lumps/malignancy is less clear.[3]

American Cancer Society guidelines recommend breast MRI for women with a >20% lifetime breast cancer risk.[75] This includes women with a known BRCA1 or BRCA2 gene mutation, those with a first-degree relative (mother, father, brother, sister, or child) with a BRCA1 or BRCA2 gene mutation, those with a risk of 20% or greater based on risk assessment models (e.g., Gail or Claus model), those with a history of chest irradiation between the ages of 10 and 30 years, or women with a personal or family history of one of the following hereditary conditions: breast-ovarian cancer syndrome, Li-Fraumeni syndrome, Cowden syndrome, or ataxia-telangiectasia. A risk assessment tool may be helpful in informing patients about screening decisions. [National Cancer Institute (NCI)/National Surgical Adjuvant Breast and Bowel Project (NSABP): breast cancer risk assessment tool] MRI or tomosynthesis are not recommended for average-risk women.
Cervical cancer screening

The USPSTF strongly recommends screening for cervical cancer in women who have been sexually active.[4] [US Preventive Services Task Force: screening for cervical cancer]

The USPSTF recommends screening for cervical cancer in women ages 21 to 65 years with cytology (Papanicolaou smear) every 3 years or, for women ages 30 to 65 years who want to lengthen the screening interval, screening with a combination of cytology and HPV testing every 5 years. Screening is not recommended for average-risk patients younger than 21 years. In addition, the USPSTF recommends against routinely screening women older than age 65 for cervical cancer if they have had adequate recent screening with normal Pap smears and are not otherwise at high risk for cervical cancer. The potential harms of screening are likely to exceed benefits among older women who have had normal results previously and who are not otherwise at high risk for cervical cancer. The USPSTF recommends against screening for cervical cancer with HPV testing, alone or in combination with cytology, in women younger than 30 years.[4]

Lastly, the USPSTF also recommends against routine Pap smear screening in women who have had a total hysterectomy for benign disease.[4] [69] Many similar recommendations are noted in guidelines from the American Cancer Society.[79]

Colorectal cancer screening

For the average-risk population, the most widely investigated screening modality has been the guaiac-based fecal occult blood test (gFOBT), based on the knowledge that cancer and polyps may bleed. A positive result is followed by imaging of the whole colon, usually with colonoscopy. gFOBT screening has been shown to reduce mortality from colorectal cancer. [5] [80] The USPSTF guidelines provide a range of screening options rather than a ranking of tests: stool-based tests (annual fecal immunochemical test [FIT] and FIT-DNA every 3 years); and direct visualization tests (flexible sigmoidoscopy every 10 years, alone or combined with annual FIT; colonoscopy every 10 years; and computed tomographic [CT] colonography every 5 years).[5] [75] [81] [82] [83] However, the US Multi-Society Task Force for Colorectal Cancer recommends screening tests ranked in 3 tiers: colonoscopy every 10 years and annual FIT (first-tier tests); CT colonography every 5 years, FIT-DNA test every 3 years, and flexible sigmoidoscopy every 5 to 10 years (second-tier tests); capsule colonoscopy every 5 years (third-tier test).[84]

The USPSTF recommends screening for colorectal cancer beginning at age 50 years and continuing until age 75 years.[5] They recommend that the decision to screen for colorectal cancer in adults ages 76 to 85 years should be an individual one taking into account the patient’s overall health and prior screening history. Adults ages 76 to 85 years who have never been screened for colorectal cancer are more likely to benefit from screening. The net benefit of screening for colorectal cancer in adults in this patient group who have previously been screened is small. The USPSTF recommends against screening in adults older than age 86 years.

Guidelines stress the importance of shared decision making, focusing on maximizing the number of individuals who get screened by incorporating in the discussion information on test quality and availability.[5] [84]

For patients with higher risk, screening should be based on individual risk. For example, screening colonoscopy is recommended in patients with 2 or more first-degree relatives with colorectal cancer, with a single first-degree relative with colon cancer, or with adenomatous polyps diagnosed before 60 years of age. Colonoscopy should begin at 40 years of age or at an age 10 years before the earliest diagnosis in the family, whichever comes first, and be repeated every 5 years. A risk assessment tool may be helpful in informing patients about screening decisions. [National Cancer Institute: colorectal cancer risk assessment tool] There is now limited evidence supporting screening at age 45 years for African-Americans, which is now a recommendation supported by the US Multi-Society Task Force for Colorectal Cancer. This is due in large part to a rising incidence in people under age 50 years.[84]

Other higher-risk populations include those with ulcerative colitis or Crohn disease. Frequency of screening colonoscopy for these patient populations can range from every 1 to 5 years depending on the extent of disease on the baseline colonoscopy.[85]
Prostate cancer screening

Screening for prostate cancer is controversial. There is not a significant effect of PSA screening with or without digital rectal exam on death from prostate cancer or overall mortality.\cite{86} \cite{87} In men younger than 75 years, the USPSTF found inadequate evidence to determine whether treatment for prostate cancer detected by screening improves health outcomes compared with treatment after clinical detection.\cite{88} \cite{89} Clinical trials have also questioned whether screening offers any significant benefit.\cite{90} \cite{91} \cite{92} In 2012, the USPSTF recommended against PSA-based screening for prostate cancer, regardless of age.\cite{88} However, draft recommendations from the USPSTF in 2017 state that clinicians should discuss the potential benefits and harms of prostate cancer screening with men ages 55 to 69 years. The recommendation states that, ultimately, the decision on whether to screen for prostate cancer should be individualized. In addition, the USPSTF also recommends against routine screening for men ages 70 years and older. The 2017 Canadian guidelines recommend that for men who elect to undergo PSA screening, PSA testing should start at age 50 years in most men and at age 45 years in men at increased risk of prostate cancer, such as family history.\cite{93} The decision to screen or not should be based on a discussion of known risks and potential benefits with the patient.\cite{94}

Lung cancer

At present, lung cancer screening is not routinely performed for tobacco users. However, annual low-dose computed tomography (CT) screening has been shown to reduce lung cancer mortality in high-risk patients.\cite{95} \cite{96}

The US Preventive Services Task Force has now issued guidelines for screening using annual CT scans and recommends annual low-dose CT scan screening for those at high risk.\cite{74} High risk is defined as age 55 to 74 years with a 30 pack-year history of smoking and, if no longer smoking, smoking cessation within 15 years, or a 20 pack-year history of smoking with one additional risk factor. Cost effectiveness of screening with CT has not been established.\cite{96} Plain chest x-ray is not recommended for lung cancer screening.

Immunization

Immunization strategies are dependent upon individual age and previous history. In the US advice regarding appropriate immunizations for adults is available from the Centers for Disease Control and Prevention (CDC).\cite{7}

[CDC: adult immunization schedule]

[CDC: vaccine recommendations of the Advisory Committee for Immunization Practices (ACIP)]
## Online resources

1. **American College of Physicians (ACP): screening for cancer - advice for high-value care from the American College of Physicians** *(external link)*

2. **USPSTF: guide to clinical preventive services, 2014** *(external link)*

3. **CDC: adult immunization schedule** *(external link)*

4. **CDC: vaccine recommendations of the Advisory Committee for Immunization Practices (ACIP)** *(external link)*

5. **NHLBI: ATPIII guidelines at a glance - Framingham point scores** *(external link)*

6. **National Cancer Institute (NCI)/National Surgical Adjuvant Breast and Bowel Project (NSABP): breast cancer risk assessment tool** *(external link)*

7. **US Preventive Services Task Force: screening for cervical cancer** *(external link)*

8. **National Cancer Institute: colorectal cancer risk assessment tool** *(external link)*
**Evidence scores**

1. **Reduction in mortality:** there is moderate-quality evidence that screening for AAA and surgical repair of large AAAs (5.5 cm or greater) in men ages 65 to 75 years who have ever smoked decreases AAA-specific mortality.[18]
   - **Evidence level B:** Randomized controlled trials (RCTs) of <200 participants, methodologically flawed RCTs of >200 participants, methodologically flawed systematic reviews (SRs) or good quality observational (cohort) studies.

2. **Reduction in hypertension risk:** there is good-quality evidence that reducing sodium intake in people without hypertension reduced BP compared with usual diet.[29] [30]
   - **Evidence level A:** Systematic reviews (SRs) or randomized controlled trials (RCTs) of >200 participants.

3. **Reduction in cardiovascular risk:** there is good-quality evidence that increasing fruit and vegetable intake reduces risk of CVD in the general population.[31]
   - **Evidence level A:** Systematic reviews (SRs) or randomized controlled trials (RCTs) of >200 participants.

4. **Reduction of cardiovascular events:** there is good-quality evidence that statins reduce cardiovascular events in people at high risk for future CHD events.[56] [57] [58]
   - **Evidence level A:** Systematic reviews (SRs) or randomized controlled trials (RCTs) of >200 participants.
Key articles


• American Academy of Family Physicians. Summary of recommendations for clinical preventive services. Jul 2017 [internet publication]. Full text


References


<table>
<thead>
<tr>
<th>Reference Number</th>
<th>Reference Details</th>
</tr>
</thead>
</table>


### Images

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Screening modality</th>
<th>Age (years) at which to start screening</th>
<th>Frequency</th>
<th>Age (years) at which to stop routine screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>Mammography</td>
<td>40</td>
<td>Every 1-2 years</td>
<td>Not defined</td>
</tr>
<tr>
<td>Cervical</td>
<td>Pap smear</td>
<td>21</td>
<td>Every 3 years</td>
<td>65</td>
</tr>
<tr>
<td>Colorectal</td>
<td>Fecal occult blood testing</td>
<td>50</td>
<td>Annually</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Sigmoidoscopy</td>
<td>50</td>
<td>Every 5 years</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Colonoscopy</td>
<td>50</td>
<td>Every 10 years</td>
<td>75</td>
</tr>
</tbody>
</table>

*Figure 1: Recommended cancer screening for average-risk adults*

Created by Michael Pignone, MD, PhD
Disclaimer

This content is meant for medical professionals. The BMJ Publishing Group Ltd ("BMJ Group") tries to ensure that the information provided is accurate and up-to-date, but we do not warrant that it is. The BMJ Group does not advocate or endorse the use of any drug or therapy contained within nor does it diagnose patients. Medical professionals should use their own professional judgement in using this information and caring for their patients and the information herein should not be considered a substitute for that.

This information is not intended to cover all possible diagnosis methods, treatments, follow up, drugs and any contraindications or side effects. We strongly recommend that users independently verify specified diagnosis, treatments and follow up and ensure it is appropriate for your patient. This information is provided on an “as is” basis and to the fullest extent permitted by law the BMJ Group assumes no responsibility for any aspect of healthcare administered with the aid of this information or any other use of this information.

View our full Website Terms and Conditions.

Contact us
+1 855-458-0579 (toll free from USA)
ussupport@bmj.com

BMJ Americas Office
2 Hudson Place, Suite 300
Hoboken, New Jersey 07030
Contributors:

// Authors:

Jeffrey G. House, DO
Assistant Professor
Department of Medicine, University of Florida College of Medicine, Jacksonville, FL
DISCLOSURES: JGH declares that he has no competing interests.

Linda Edwards, MD
Associate Professor
Department of Medicine, University of Florida College of Medicine, Jacksonville, FL
DISCLOSURES: LE declares that she has no competing interests.

// Acknowledgements:

Dr Jeffrey G. House and Dr Linda Edwards would like to gratefully acknowledge Dr Craig T. Tenner, Dr Kelly Crotty, and Professor Michael Pignone, the previous contributors to this monograph. CTT and KC declare they have no competing interests. MP is a co-author of a number of references cited in this monograph.

// Peer Reviewers:

Mark Pletcher, MD, MPH
Assistant Adjunct Professor
Department of Epidemiology & Biostatistics, University of California San Francisco, San Francisco, CA
DISCLOSURES: MP is a co-author of 2 references cited in this monograph. MP has collaborated with Professor Michael Pignone on other research projects related to cardiovascular disease screening and treatment.

Willie Hamilton, BSc, MB, ChB, MD, FRCP, FRCGP
Consultant Senior Lecturer
Department of Community Based Medicine, University of Bristol, Bristol, UK
DISCLOSURES: WH has received research funding from several bodies for studies.