CME CREDIT ***EDUCATIONAL OBJECTIVE:*** Readers will be aware of US Preventive Services Task Force guidelines in order to better advise patients regarding screening options

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Six screening tests for adults: What's recommended? What's controversial?

ABSTRACT

This paper discusses guidelines from the US Preventive Services Task Force (USPSTF) and other recommending bodies for screening for abdominal aortic aneurysm and cancers of the colon, cervix, lung, breast, and prostate.

KEY POINTS

The USPSTF has stringent standards of evidence and therefore its recommendations tend to be more conservative than those of other organizations that issue guidelines. Recommendations are available at www.uspreventiveservicestaskforce.org.

Because screening can result in harm as well as benefit, screening should be done after shared decision-making with the patient, especially if the screening is controversial, as is the case with mammography for breast cancer and prostate-specific antigen testing for prostate cancer.

Screening for lung cancer using low-dose computed tomography is recommended yearly beginning at age 55 for people who have at least a 30-pack-year smoking history.

In women over age 30, cervical cancer screening with Papanicolaou (Pap) and human papillomavirus (HPV) testing is now recommended every 5 years rather than every 3 years. Testing for HPV infection may soon become the first-line screening test, with Pap testing reserved for patients who have a positive HPV result.

Although the USPSTF no longer recommends mammography for women ages 40 to 49, other organizations continue to do so.

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A 68-YEAR-OLD MAN with a history of hyperlipidemia is evaluated during a routine examination. He has a 25-pack-year cigarette smoking history but quit 12 years ago. He has no history of hypertension, diabetes mellitus, or stroke. A review of systems is unremarkable, and he has no family history of heart disease or cancer. He has noted no change in his bowel movements, and his most recent screening colonoscopy, done at age 60, was normal. His only current medication is lovastatin.

Physical examination reveals no abnormalities. His blood pressure is 130/82 mm Hg, and his body mass index is 24 kg/m^2. His total cholesterol level is 213 mg/dL, and his high-density lipoprotein level is 48 mg/dL.

Which screening tests, if any, would be appropriate for this patient?

The advent in recent years of several new screening tests, along with changing and conflicting screening recommendations, has made it a challenge to manage this aspect of patient care. This article reviews six common screening tests and presents the current recommendations for their use (TABLE 1).

SCREENING CAN HARM

Screening is used to detect a disease in people who have no signs or symptoms of that disease; if signs or symptoms are present, diagnostic testing is indicated instead. Ideally, screening allows for early treatment to reduce the risk of illness and death associated with a disease.

Problems with screening relate to lead-time bias (detection of disease earlier in its course without actually affecting survival time), length-time bias (detection of indolent and benign cancers rather than aggressive ones),

and overdiagnosis (detection of abnormalities that would not cause a problem in the patient's lifetime, causing unnecessary concern, cost, or treatment).

The leading advisory groups on screening are the US Preventive Services Task Force (USPSTF),[1] which is stringently evidence-based in its recommendations, and subspecialty societies, which often rely on expert opinion.[2,3]

ULTRASONOGRAPHY FOR ABDOMINAL AORTIC ANEURYSM

In 2005, the USPSTF gave a grade-B recommendation (recommended; benefit outweighs harm) for one-time ultrasonographic screening for abdominal aortic aneurysm in men ages 65 to 75 who have ever smoked at least 100 cigarettes over a lifetime. For men in the same age range who have never smoked, they gave a grade-C recommendation (no recommendation; small net benefit). The USPSTF updated its recommendation in 2014. For women ages 65 to 75 who smoke, the USPSTF thinks the evidence is insufficient to recommend for or against screening (grade-I recommendation).

Our patient described above—male, age 68, and with a 25 pack-year smoking history—is a candidate for screening for abdominal aortic aneurysm.

CT SCREENING FOR LUNG CANCER

In December 2013, the USPSTF gave a B-grade recommendation for annual screening for lung cancer with low-dose computed tomography (CT) for adults ages 55 to 80 who have a 30-pack-year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that limits life expectancy or the ability to undergo curative lung surgery.

These recommendations were based on the outcomes of the National Lung Screening Trial.[4] However, whereas this trial was in people ages 55 to 74, the USPSTF boosted the upper age limit to 80 based on computer modeling, a decision that was somewhat controversial.

Patz et al[5] analyzed data from the National Lung Screening Trial and found that about 18% of lung cancers detected by low-dose CT appeared to be indolent and were unlikely to become clinically apparent during the patient's lifetime. The authors concluded that overdiagnosis should be considered when guidelines for mass screening programs are developed.

Our 68-year-old patient would not qualify for CT screening for lung cancer, since his smoking history is less than 30 pack-years.

TABLE 1

Screening recommended by the United States Preventive Services Task Force

Abdominal aortic aneurysm: once for male smokers and former smokers ages 65 to 75

Lung cancer: annually for current or recent heavy smokers ages 55 to 80

Colorectal cancer: for adults ages 50 to 75 using periodic fecal occult blood testing, sigmoidoscopy, or colonoscopy

Cervical cancer: periodically for women ages 21 to 65 using cytology, human papillomavirus testing, or both

Prostate cancer: prostate-specific antigen testing is not recommended

Breast cancer: every 2 years with mammography in women ages 50 to 74

COLORECTAL CANCER SCREENING AND PREVENTION

Unlike other cancer screening tests, colorectal cancer screening can also be a preventive measure; removing polyps found during screening with colonoscopy or sigmoidoscopy is an effective strategy in preventing colon cancer.

The USPSTF last updated its colorectal screening recommendations in 2008, giving a grade-A recommendation (strongly recommended; benefit far outweighs harm) to screening using fecal occult blood testing, sigmoidoscopy, or colonoscopy for adults ages 50 to 75. The risks and benefits of these screening methods vary. For adults ages 76 to 85, the task force recommends against routine screening but gives a grade-C recommendation for screening in that age group in some circumstances. They give a grade-D recommendation for screening after age 85.

The USPSTF concluded that the evidence is insufficient to assess the benefits and harms of CT colonography and fecal DNA testing for colorectal cancer screening.

Screening is used to detect disease in people with no signs or symptoms

The American Cancer Society issued similar guidelines in 2013, recommending that starting at age 50, men and women at low risk of colorectal cancer should be screened using one of the following schedules (the first four methods help detect both polyps and cancers, and the others detect only cancer)[6]:

- Colonoscopy every 10 years
- Flexible sigmoidoscopy every 5 years
- A double-contrast barium enema every 5 years
- CT colonography ("virtual colonoscopy") every 5 years
- A guaiac-based fecal occult blood test annually
- A fecal immunochemical test annually.

Those at moderate or high risk of colorectal cancer are advised to talk with a doctor about a different testing schedule. (eg, colonoscopy every 5 years in patients with a significant family history of colon cancer).

Our patient last underwent colonoscopy 8 years ago and so does not need to be screened again for another 2 years.

CERVICAL CANCER SCREENING: MOVING TOWARD HPV TESTING FIRST?

USPSTF's recommendations are considered the gold standard but are sometimes controversial

Cervical cancer screening recommendations are fairly uniform across the major guideline-setting organizations.[7] In general, they are:

- Ages 21–29: Check cytology every 3 years
- Ages 30–65: Cytology plus human papillomavirus (HPV) testing every 5 years (or cytology alone every 3 years)
- After age 65: Stop screening if prior screenings have been adequate and negative over the past 20 years.

Women who have been vaccinated against HPV have the same screening recommendations as above. Women who have had a hysterectomy for benign reasons do not need further screening.

The future of cervical cancer screening may be "reflex testing." Rather than checking cervical samples for cytologic study (Papanicolaou smear) and HPV status together, we may one day screen samples first for HPV and, if that is positive, follow up with cytologic study. Easy-to-use home tests for HPV will likely be developed and should increase screening rates.

PROSTATE CANCER SCREENING: A SHARED DECISION

Prostate cancer screening remains controversial. Different guideline-setting bodies have different recommendations, creating confusion for patients. Physicians must follow what fits their own practice and beliefs.

The USPSTF in 2012 gave a grade-D recommendation to prostate-specific antigen (PSA) testing to screen for prostate cancer, stating that it did more harm than good. However, some men continue to be screened for PSA.

The American Cancer Society in 2013 recommended against routine testing for prostate cancer without a full discussion between physician and patient of the pros and cons of testing.[8] If screening is decided upon, it should be done with annual PSA measurement or digital rectal examination, or both, starting at age 50. Men at high risk (ie, African American men, and men with a first-degree relative diagnosed with prostate cancer before age 65) should begin screening at age 45.

The American College of Physicians in 2013 issued a statement that clinicians should inform men between the ages of 50 and 69 about the limited potential benefits and substantial harms of prostate cancer screening.[9] They recommended against PSA screening in men of average risk who are younger than age 50 or older than age 69, or those whose life expectancy is less than 10 to 15 years.

The American Urological Association in 2013 advised that[10]:

- PSA screening is not recommended in men younger than 40.
- Routine screening is not recommended in men between ages 40 and 54 at average risk.
- In men ages 55 to 69, decisions about PSA screening should be shared and based on each patient's values and preferences. The decision to undergo PSA screening involves weighing the benefits of preventing death from prostate cancer in 1 man for every 1,000 men screened over a decade against the known potential harms associated with screening and treatment.
- To reduce the harm of screening, a routine interval of 2 years may be chosen over annual screening; such a schedule may preserve most benefits and reduce overdiagnosis and false-positive results.

- Routine PSA screening is not recommended in men ages 70 and older or with less than a 10- to 15-year life expectancy.

Shared decision-making. Many of the guidelines for prostate cancer screening are based on the concept of shared decision-making. However, studies indicate that many patients do not receive a full discussion of the issue,[11] and in any event, patient education may make little difference in PSA testing rates.[12,13]

On the horizon for prostate cancer screening is the hope of finding a more predictable test. There is also discussion of using the PSA test earlier: some evidence shows that a very low result at age 45 predicts a less than 1% chance of developing metastatic prostate cancer by age 75, so it is possible that screening could stop in that population.

BREAST CANCER SCREENING: DIVERGENT RECOMMENDATIONS

The USPSTF created considerable controversy a few years ago when it recommended screening mammography from ages 50 to 74, and then only every 2 years—a departure from the traditional practice of starting screening at age 40. Few doctors heed the USPSTF guideline: most of the other guideline-setting organizations (eg, the American Cancer Society, the American Congress of Obstetricians and Gynecologists) recommend annual mammography for women starting at age 40.

Overdiagnosis is an especially pertinent issue with screening mammography for breast cancer because some cancers are indolent and will not cause a problem during a lifetime. Falk et al[14] analyzed a Norwegian breast cancer screening program and found that overdiagnosis occurred in 10% to 20% of cases. Welch and Passow[15] quantified the benefits and harms of screening mammography in 50-year-old women in the United States and found that of 1,000 women screened annually for a decade, 0.3 to 3.2 will avoid a breast cancer death, 490 to 670 will have at least one false alarm, and 3 to 14 will be overdiagnosed and treated needlessly.

Mammography screening for breast cancer will likely stay controversial for some time as we await additional data.

OTHER CANCERS: SCREENING NOT RECOMMENDED

The USPSTF currently does not recommend screening for ovarian cancer (guideline issued in 2012), pancreatic cancer (2004), or testicular cancer (2011), giving each a grade-D recommendation, indicating that screening does more harm than good. It also stated that there is insufficient evidence to recommend screening for oral cancer (2013), skin cancer (2009), and bladder cancer (2011).

REFERENCES

1. **US Preventive Services Task Force**. www.uspreventiveservicestaskforce.org. Accessed August 11, 2014.
2. **Tricoci P, Allen JM, Kramer JM, Califf RM, Smith SC Jr**. Scientific evidence underlying the ACC/AHA clinical practice guidelines. JAMA 2009; 301:831–841. Erratum in: JAMA 2009; 301:1544.
3. **Lee DH, Vielemeyer O**. Analysis of overall level of evidence behind Infectious Diseases Society of America practice guidelines. Arch Intern Med 2011; 171:18–22.
4. **National Lung Screening Trial Research Team, Aberle DR, Adams AM, Berg CD, et al**. Reduced lung-cancer mortality with low-dose computed tomographic screening. N Engl J Med 2011; 365:395–409.
5. **Patz EF Jr, Pinsky P, Gatsonis C, et al; NLST Overdiagnosis Manuscript Writing Team**. Overdiagnosis in low-dose computed tomography screening for lung cancer. JAMA Intern Med 2014; 174:269–274.
6. **American Cancer Society**. Colorectal cancer screening and surveillance guidelines. www.cancer.org/healthy/informationforhealthcareprofessionals/colonmdclinicansinformationsource/colorectalcancerscreeningandsurveillanceguidelines/index. Accessed August 11, 2014.
7. **Jin XW, Lipold L, McKenzie M, Sikon A**. Cervical cancer screening: what's new and what's coming? Cleve Clin J Med 2013; 80:153–160.
8. **American Cancer Society**. Prostate cancer screening guidelines. www.cancer.org/healthy/informationforhealthcareprofessionals/prostatemdcliniciansinformationsource/prostatecancerscreeningguidelines/index. Accessed August 11, 2014.
9. **Qaseem A, Barry MJ, Denberg TD, Owens DK, Shekelle P; Clinical Guidelines Committee of the American College of Physicians**. Screening for prostate cancer: a guidance statement from the Clinical Guidelines Committee of the American College of Physicians. Ann Intern Med 2013; 158:761–769.
10. **Carter HB, Albertsen PC, Barry MJ, et al**. Early detection of prostate cancer: AUA guideline. www.auanet.org/common/pdf/education/clinical-guidance/Prostate-Cancer-Detection.pdf. Accessed September 5, 2014.
11. **Han PK, Kobrin S, Breen N, et al**. National evidence on the use of shared decision making in prostate-specific antigen screening. Ann Fam Med 2013; 11:306–314.
12. **Taylor KL, Williams RM, Davis K, et al**. Decision making in prostate cancer screening using decision aids vs usual care: a randomized clinical trial. JAMA Intern Med 2013; 173:1704–1712.
13. **Landrey AR, Matlock DD, Andrews L, Bronsert M, Denberg T**. Shared decision making in prostate-specific antigen testing: the effect of a mailed patient flyer prior to an annual exam. J Prim Care Community Health 2013; 4:67–74.
14. **Falk RS, Hofvind S, Skaane P, Haldorsen T**. Overdiagnosis among women attending a population-based mammography screening program. Int J Cancer 2013; 133:705–712.
15. **Welch HG, Passow HJ**. Quantifying the benefits and harms of screening mammography. JAMA Intern Med 2014; 174:448–454.

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