Preventive Medicine

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Preventive Medicine Overview

- Counseling
- Screening
- Immunizations
- Chemoprophylaxis

USPSTF Grade Definitions

- A: USPSTF recommends. High certainty that net benefit is substantial.
- B: USPSTF recommends. High certainty of moderate benefit or moderate certainty of substantial benefit.
- C: USPSTF recommends against routine use. May be considerations that support it in an individual patient. At least moderate certainty that benefit is small.
- D: USPSTF recommends against any use. Moderate-high certainty that no benefit or harms outweigh benefits.
- I: Insufficient evidence for a recommendation.

Counseling

Counseling: Question

You are seeing a a 54-year-old woman new to your clinic. She is diabetic, with a hemoglobin A1c of 9.4%, hypertensive, with a blood pressure of 160/95, and an active smoker, with a 50-pack-year history. Which change will have the biggest mortality benefit?

A. Reducing her blood pressure below 130/80
B. Smoking cessation
C. Improving glycemic control, goal A1c <7.0%
D. Taking an 81 mg aspirin each day

Smoking Cessation Counseling

- USPSTF A (2021)
- Brief behavioral counseling (less than 3 minutes) and pharmacotherapy in primary care settings increase abstinence rates for 1 year.
- Smoking cessation reduces all-cause mortality by up to 50%.
- Pharmacotherapy in preganant women: Grd I
- E-cigarettes: Grade I

Counseling: Question

A 35-year-old woman transfers to you for primary care. She is married, working full time as an engineer, and has two children under the age of 5 at home. The nurse does the AUDIT-C during check-in. She scored 5 points, because she has 2-3 glasses of wine on most nights.

What is the definition of at-risk drinking?

A. Failure to fulfill occupational, school or social obligations
B. Continuing to drink despite negative health effects
C. More than 14 drinks a week, or 4 on any one occasion, for men and more than 7 drinks a week or 3 on any one occasion for women
D. Drinking more than your doctor

Alcohol Screening & Counseling

- USPSTF B (2018)
- Multiple studies have shown the effectiveness of brief, office-based interventions for at-risk drinking.
- At-risk drinking is defined by quantity of alcohol use, alcohol abuse indicates social or occupational problems associated with its use, and dependence indicates addiction and maladaptive social behavior.
- Brief interventions are not effective for alcohol abuse and dependence. Aggressive support is necessary.

Drug Screening & Counseling

- USPSTF B (2020)
- Multiple screening tools available, e.g. NIDA NMASSIST (https://archives.drugabuse.gov/nmassist/)
- Moderate net benefit when adequate treatment resources available

Obesity Screening & Counseling

- USPSTF B (2018)
- Intensive multicomponent counseling recommended for adult patients with BMI > 30
- Intensive counseling and behavioral interventions recommended to promote and sustain weight loss for obese adults

Diet/Exercise Counseling

- USPSTF C (2023) for adults without CV risk factors
- Use motivational interviewing and focus on those who are ready to change
- Tailor recommendations to individual circumstances and SDH
- Overall USPSTF assessment is moderate certainty of a small net benefit

Skin Cancer Prevention

- USPSTF B (2018) recommendation in fair skinned youth and young adults (6m-24y)
- USPSTF C recommendation in adults over 24: evidence of efficacy mixed but consider in patients at high risk
- RCT: 5 years of broad-spectrum sunscreen yields 73% reduction in melanoma over 15 years of follow-up.

Skin Cancer Screening

- USPSTF I (2023) in all patients
- Data limited (mostly from Germany) and inconclusive
- Risk of overdiagnosis is significant

STI Prevention

- USPSTF B (2020) recommendation: behavioral counseling in all sexually active adolescents and for adults who are at increased risk for sexually transmitted infections (STIs)
- “Adequate” evidence that behavioral counseling interventions reduce STIs, increase condom use and other protective sexual practices.

Fall Prevention

- USPSTF B (2018) recommendation: exercise interventions (group classes best studied) to prevent falls in community-dwelling adults 65 and over who are at high risk.
- Multifactorial interventions: grade C
- Vitamin D supplementation to prevent falls: Grade D

Screening

Screening: Question

You are seeing a new patient, a 22-year-old college student. She has been sexually active since age 17, has had 4 lifetime sexual partners. She has had all childhood immunizations including HPV. She should be screened for:

A. Chlamydia and gonorrhea
B. Chlamydia, gonorrhea, and HSV
C. Chlamydia, gonorrhea, and syphilis
D. Chlamydia, gonorrhea, HSV, and syphilis
E. Chlamydia, gonorrhea, syphilis, and Hep C

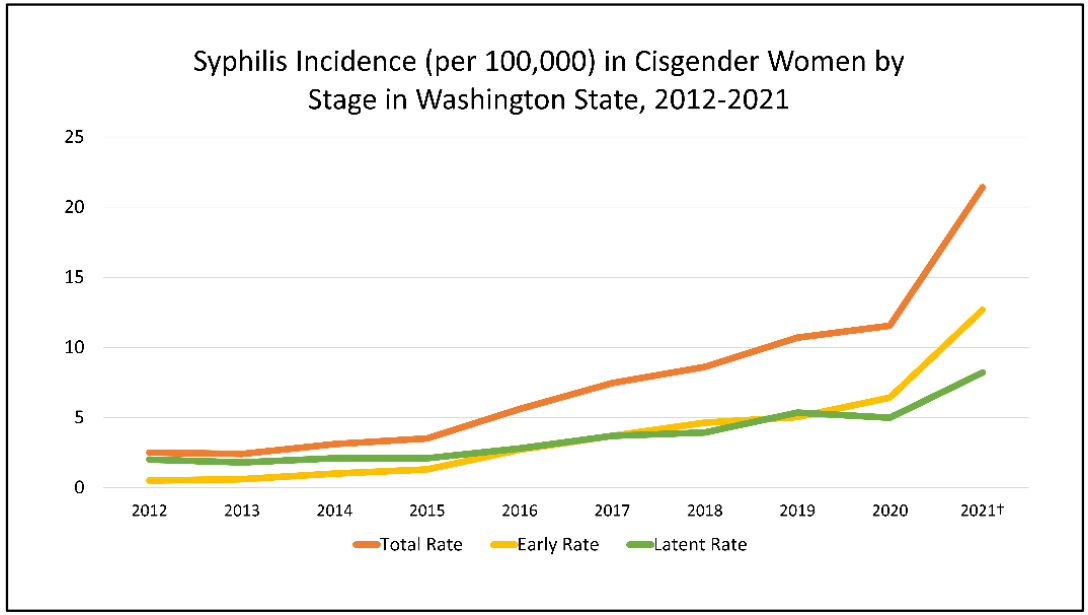
Screening: chlamydia/gonorrhea

- Clinicians should screen all sexually active women age 24 and younger for chlamydia and gonorrhea (USPSTF B. 2021).
- Prevalence of GC and chlamydia peaks in late teens and early twenties among both men and women
- Rescreen and continue screening over age 24 based on risk
- There is no evidence that screening men reduces long-term consequences in women: USPSTF I

Screening: Syphilis

- Clinicians should screen those at increased risk of syphilis and pregnant women (USPSTF A, 2023).
- Risk factors are broader in the 2023 recommendation (young adults, military service, concurrent STI, MSM, commercial sex workers, illicit drug use, incarceration)
- **In Washington State…**

Screening: Syphilis



- Washington DOH observed dramatic rise in syphilis among cis-women and concurrent rise in congenital syphilis (51 cases in 2021)
- Current recs: one time screening for cis-women and cis-men who have sex with women; annual screening for low risk MSM/TSM outside of monogamous relationships; quarterly screening for high risk/high risk partners

Screening: Herpes simplex

- Clinicians should NOT routinely screen asymptomatic patients for HSV (USPSTF D, 2023).
- Many commercial HSV tests are only 80-85% specific when compared to Western blot
- No treatment for asymptomatic disease
- Could screen long-term partners of symptomatic patients if considering suppressive therapy for + partner

Screening: Hepatitis C

- Birth cohort from 1945-1965 five fold more likely to be infected with hepatitis C
- CDC recommended birth cohort screening in May 2013
- USPSTF initially followed CDC recs, then in 2019 changed to universal screening from 18-79 y/o
- Limited data on repeat screening

Screening: Hepatitis B

- USPSTF B (2021) recommendation: screen if non-immune and prevalence > 2%
- Region of origin: Africa, Asia, Pacific Islands, parts of South America
- Other risk factors: HIV-positive persons, injection drug users, household contacts or sexual partners of persons with HBV infection, and men who have sex with men

Screening: Hepatitis B

- CDC (2023)
  - Screen adults 19 and older with no prior screening
  - Immunize up to age 59

Screening: LTBI

- USPSTF B (2023)
- Screen adults at increased risk:
  - Unhoused/incarcerated
  - Migrant from endemic region
  - Immunosuppresed/transplant

Screening: question

A 34-year-old man returns to clinic for suture removal. His blood pressure today is 135/86. Last week when the sutures were placed it was 138/88. He reports he is healthy and takes no medications. “C’mon, doc, it’s just high because I hate the doctor’s office”. Which of the following is true?

A. He has prehypertension and should be monitored.
B. He has white coat hypertension and no further intervention is needed.
C. He has stage 1 hypertension and you should discuss treatment options.
D. His blood pressures should be confirmed with home readings.

Screening: high blood pressure

- USPSTF A (2021)
- All adults age 18 and older should be screened for high blood pressure.
- Those with abnormal readings should have BP confirmed outside of the clinical setting before starting treatment.
- Stage 1 hypertension is 130-139/80-89

Screening: diabetes

- USPSTF B (2021)
- Adults aged **35** to 70 who are overweight or obese should be screened for prediabetes/ diabetes.
- A_1C, fasting glucose or OGTT are all acceptable.

Screening: AAA (2019)

- USPSTF B: male former smokers, 65-75 y/o
- USPSTF C: male never smokers, 65-75 y/o
- USPSTF I: female former smokers, 65-75 y/o
- USPSTF D: female never smokers, 65-75 y/o

Screening: Osteoporosis

- USPSTF B (2018) for women, I for men
- Women aged 65 and older and younger women with 10 year fracture risk > 9.3% on FRAX or similar tool
- NOF also recommends screening men over 70; ACP recommends individualized approach.

Screening: Depression

- USPSTF B (2016)
- Screen adolescents and adults over age 12
- Re-screen pregnant and postpartum women
- No specific test or screening interval recommended
- 2023 draft: no major revisions

Screening: question

Which patient should definitely be screened for domestic violence, abuse, or neglect?

A. A 88-year-old man living with his son.
B. A 38-year-old woman living with her husband and daughter.
C. A 26-year-old man with severe developmental delay living with his mother.
D. All of the above.

Screening: Intimate Partner Violence

- USPSTF B (2018)
- Recommends screening women of reproductive age regardless of sx/signs
- Many available screening tools: HITS, HARK, WAST, OAS/OVAT
- Elderly/vulnerable adult screening is grade I
- Update in progress, stay tuned

Cancer Screening

Cervical Cancer Screening

A 67-year-old woman presents to establish primary care. She had one prior Pap smear 20 years ago and believes the result was normal. She is married and sexually active, but reluctant to undergo a pelvic exam.

You advise her that the recommended cervical cancer screening strategy for a woman in her situation is:

A. Co-test now; stop if results are normal.
B. HPV testing only; stop if results low-risk.
C. HPV testing now and again in 5 years; stop if results are low-risk.
D. Pap smear not necessary after age 65.

Cervical Cancer Screening

- USPSTF A (2018, ACOG 2021): Screen with cytology (*not* HPV) every 3 years from age 21-29
- From 30-65 options are HrHPV testing *with or without* cytology every 5 years or cytology alone every 3 years
- No need to screen if:
  - Under age 21
  - Over age 65 **if adequate prior screening** (3 cytology or 2 HPV within 10 years, most recent within 5 years)
  - Hysterectomy for benign disease

Cervical Cancer Screening

TABLE 1

Model-Estimated Benefits and Costs of Cervical Cancer Screening

Organization	Screening recommendation	Cancer cases per 1,000 patients	Cancer deaths per 1,000 patients	Average lifetime pelvic examinations per patient	Average lifetime colposcopies per patient
American Cancer Society	25 to 65 years of age: primary human papilloma-virus testing every 5 years	0.9	0.3	11	1.8
American College of Obstetricians and Gynecologists	21 to 30 years of age: cytology every 3 years 30 to 65 years of age: cotesting every 5 years	1.1	0.3	20	1.6
No screening	—	18.9	8.3	—	—

- ACS 2021: HPV every 5 years, ages 25-65
- WHO 2021: HPV every 5-10 years, ages 30-?
- USPSTF under review

Breast Cancer Screening

A 45-year-old woman expresses concern about her risk of breast cancer. Her mother died of the disease at 65; 3 sisters are healthy. She performs monthly breast self-exam, and her breast exam in clinic is normal. She requests mammography.

Which of the following statements about breast cancer screening is true?

A. Women younger than age 50 benefit from mammography.
B. Breast self-exam reduced breast cancer mortality in clinical trials.
C. Mammography is more accurate in younger women.
D. Breast MRI is the preferred screening test for women younger than age 50.

Breast Cancer Screening

- USPSTF B (2023 Draft)
- Mammography every 2 years for women aged *40* to 74.
- Recommendation for *biennial* mammography has not changed
- Grade I: Additional modalities (US,MRI) for women with dense breasts, mammography 75 and older

Breast Cancer Screening (2016)

- USPSTF B: Mammography every 2 years for women aged 50 to 74.
- USPSTF C: 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.

Screening for BRCA

Your patient is a healthy 34-year-old woman with a family history of breast cancer asking about genetic testing. Her mother had breast cancer at 55 y/o, and her grandmother had ovarian cancer at 62. What do you recommend?

A. Genetic testing for BRCA 1 & 2
B. Refer for genetic counseling
C. Assess risk using a standardized tool and do genetic testing/counseling if high risk
D. Perform mammogram and breast MRI

Screening for BRCA

- USPSTF B (2019) recommendation in high risk women
  (≥ 10% probability of carrying mutation)
- If family hx or ethnicity/ancestry associated with increased BRCA risk, use a standardized risk assessment tool
- http://www.breastcancergenescreen.org/
- USPSTF recommends against (Grade D) routine genetic testing or counseling

Colorectal Cancer Screening

A 46-year-old man comes to your office for a routine physical examination. He has no family history of colon cancer and has not had prior screening.

His exam is normal.

Which of the following is the best option for screening?

A. Fecal immunochemical testing (FIT) every year.
B. Fecal DNA testing (Cologuard or similar) every three years.
C. Colonoscopy every ten years.
D. Patient's choice of the above.
E. No screening is indicated.

Colorectal Cancer Screening USPSTF Recommends:

- USPSTF A (2021) Do **something** to screen for colorectal cancer in adults age 50-75
- USPSTF B: **45-49 y/o**
- USPSTF C: 76-85 y/o
- FOBT, FIT, FIT-DNA, sigmoidoscopy, CT colography, colonoscopy all acceptable
- Review of pros/cons on USPSTF web site

Colorectal Cancer Screening

- Favor colonoscopy for higher risk patients
  - Family history
  - History of adenoma
- CT Colography every 5 yr is an alternative but requires prep, radiation exposure; also risk of incidentalomas
- Fecal DNA testing every 1-3 years is more sensitive than FIT but also generates more colonoscopies

Lung Cancer Screening

A 72-year-old new patient comes to your office for a routine physical examination. He has a forty pack-year smoking history but is delighted to report that he quit smoking last year. He is otherwise healthy and wondering if he still needs his annual chest x-ray for lung cancer screening.

Which of the following is the most appropriate next step?

A. Recommend CT but advise pt that 5% of patients may have a false positive study.
B. Recommend CT but advise pt that 20% of patients may have a false positive study.
C. Recommend CXR because CT has high false positive rate.
D. Recommend against screening.

Lung Cancer Screening

- USPSTF B (2021)
- Annual screening of adults **50**-80 years who have a **20** pack-year smoking history and have smoked within the past 15 years
- Stop screening when comorbidities exceed benefit or pt unwilling/unable to have surgery

Prostate Cancer Screening

- USPSTF D->C (2018) age 55-69
- USPSTF changed 2012 “D” recommendation to “C” for this age group citing new data:
- Improved data on reductions in mortality (1-2/1000 screened) and metastasis (3/1000)
- Too controversial for exam: right answer would be informed decision making

Immunization

Question

A 38 y/o nonbinary patient with diabetes comes in for routine follow up. They have never been immunized against pneumococcal disease.

Which do you recommend for this patient?

A. 13-valent pneumococcal conjugate vaccine
B. 15-valent pneumococcal conjugate vaccine
C. 20-valent pneumococcal conjugate vaccine
D. 23-valent pneumococcal polysaccharide vaccine
E. No pneumococcal immunization is indicated

New pneumococcal vaccines

- PCV-15: Similar to PCV-13; give once with a PPSV-23 chaser one year later
- PCV-20: One and done
- PPSV-23 requires boosters if given < 65 y/o, PCV vaccines do not

Special indications

- Pneumococcal: asplenia (including sickle cell), CSF leak, cochlear implant, immunosuppression (including ESRD), chronic heart/lung/liver disease, diabetes, alcoholism, smoking
- Add meningococcal, HiB in asplenic patients
- Hep A/B in IVDU, chronic liver disease, high-risk sexual activity; just B in diabetes, ESRD, HIV

Tetanus Prevention: Question

A 43-year-old man falls while rummaging for auto parts in a junk yard and seeks care for a left arm laceration. The wound requires repeated irrigation to remove dirt.

Vaccination history: Full 5-dose DPT series in childhood followed by Td boosters every 10 years (most recent booster 7 years ago).

Recommended management for tetanus prophylaxis is:

A. Td booster
B. Tetanus immune globulin
C. Td booster plus tetanus immune globulin
D. No prophylaxis necessary

Tetanus vaccine and Tetanus Immune Globulin

Vaccine hx	Clean & minor wound		Dirty or major wound	
	Td	TIG	Td	TIG
Unknown or < 3	Yes	No	Yes	**Yes**
3 or more	If > **10 yr**	No	If > **5 yr**	No

Source: cdc.gov

Hepatitis B Exposure: Question

A 36-year-old physician stabs himself in the finger while recapping a needle used to perform phlebotomy. The source patient is HBsAg+. The physician was immunized against hepatitis B 10 years ago during medical school. Best post-exposure management would be:

A. HBIG, 0.06 ml/kg IM, now and in 1 month.
B. HBIG, 0.06 ml/kg IM, and initiate revaccination.
C. Test physician for HBsAb. Give HBIG x1 and vaccine booster if titer < 10 mIU/ml.
D. No treatment necessary.

Hepatitis B Post Exposure Prophylaxis

- Seven day window to give HBIG
- If immunized but unknown response:
  - Test anti-HBs titer
  - If < 10 give one dose HBIG and reimmunize
- If known non-responder after 2 series:
  - Two doses HBIG one month apart

Chemoprophylaxis

Question: Breast Cancer

A healthy 48 y/o premenopausal woman with a family history of breast cancer wants to minimize her risk. She is s/p hysterectomy for fibroids, otherwise healthy. Her estimated 5 year risk of breast cancer is 3.2%. What do you suggest?

A. Continue routine screening
B. Genetic testing for BRCA 1 & 2
C. Offer tamoxifen or raloxifene for prophylaxis

Breast cancer chemoprevention

- USPSTF B (2019)
- Recommends that clinicians offer prophylaxis to women at high risk of cancer but low risk of complications
- Cutoff is vague: 5 year risk of 3% is generally accepted
- http://www.cancer.gov/bcrisktool

Question: Aspirin

A 52 year-old man with hypertension comes in for a preventive visit. BP 118/74, HR 68. Total cholesterol 257, HDL 32, LDL 163.
Meds: Lisinopril 20 mg daily.

He wonders: should he take aspirin daily?

A. Yes, recommend daily aspirin
B. Compute 10-year CV risk and consider aspirin if ≥ 10%
C. No, recommend against aspirin

Aspirin for Primary Prevention (2022)

- Adults aged 40-59 with ≥ 10% 10-yr CVD risk: USPSTF C
- Adults 60 and older: USPSTF D
- If already on aspirin for primary prevention, consider stopping at 75 y/o

PrEP for HIV

- USPSTF A (2019)
- Major risk factors:
  - Serodiscordant partner
  - Inconsistent use of condoms with high-risk partners
  - Syphilis, gonorrhea, chlamydia in last 6 mo

Statins for the Primary Prevention of CV events (2022)

- Adults aged 40-75 with at least 1 risk factor and ≥ 10% 10-yr CVD risk: USPSTF B
- Adults aged 40-75 with at least 1 risk factor and 7.5-10% 10-yr CVD risk: USPSTF C
- Age > 75: USPSTF I.

2022-23 USPSTF Grade D/I

- Obstructive sleep apnea (I)
- Vitamin supplementation
  - D for ß-carotene and Vit E, I for other supplements
- HRT for prevention (D)
- Atrial fibrillation (I)
- COPD (D)
- Visual acuity in elders, open-angle glaucoma (I)
- Eating disorders (I)

Recommendations in draft

- Anxiety: up to age 65 (B), over 65 (I)
- Oral health screening (I)

Thanks!

Statistics

Test Interpretation

- Sensitivity = proportion of population with disease that tests positive
- Specificity = proportion of healthy population that tests negative
- Positive predictive value = proportion with positive tests that have disease
- Negative predictive value = proportion with negative tests that are healthy

- PPV: a/(a+b)
- NPV: d/(c+d)

	Disease Present (+)	Disease Absent (-)
Test +	True Positive (a)	False Positive (b)
Test -	False Negative (c)	True Negative (d)

- Sensitivity: a/(a+c)
- Specificity: d/(b+d)

Number Needed to Treat

- Number of people who must be treated for a period of time to prevent one outcome
- 1 / absolute risk reduction =
  1 / (rate in control group – rate in intervention group)
- Example:
  - control group 44%, intervention group 24%
  - NNT = 1/(0.44 – 0.24) = 1/0.2 = 5