Wellness and Integrative Medicine

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LEARNING OBJECTIVES

1. Evaluate recommendations for health screenings for adult patients on the basis of age and/or sex.
2. Justify the application of preventive health screenings for adult patients on the basis of age and/or sex.
3. Identify appropriate health screenings and preventive measures on the basis of age and/or sex.
4. Determine the role and place in therapy of integrative medicine practices in health care management.
5. Distinguish between resources available for health and wellness, and disease screening and prevention.

ABBREVIATIONS IN THIS CHAPTER

ACOG	American College of Obstetricians and Gynecologists
ACS	American Cancer Society
CRC	Colorectal cancer
EPDS	Edinburgh Postnatal Depression Scale
ESS	Epworth Sleepiness Scale
FIT	Fecal occult blood test, immunochemical-based
FOBT	Fecal occult blood test
HCV	Hepatitis C virus
HPV	Human papillomavirus
IBIS	International Breast Cancer Intervention Studies (IBIS) Breast Cancer Risk Evaluation Tool
LDCT	Low-density computed tomography
MSM	Men who have sex with men
MVAP	Multivariable Apnea Prediction (index)
NCCN	National Comprehensive Cancer Network
OSA	Obstructive sleep apnea
PDSS	Postpartum depression screening scale
PHQ	Patient Health Questionnaire
PSA	Prostate-specific antigen
QALY	Quality-adjusted life-year
STD	Sexually transmitted disease
STOP	Snoring, Tired, Observed, Pressure [questionnaire]

INTRODUCTION

For many, wellness and disease prevention are closely related. Unfortunately, the burden of chronic preventable diseases in the United States alone is heavy. The National Center for Chronic Disease Prevention and Health Promotion through the CDC shows that 50% of American adults have at least one chronic disease, and these diseases are responsible for 7 of 10 deaths annually. Patients with chronic diseases account for more office visits across the health care system, and those with at least five chronic conditions account for almost two-fifths of the total health care spending. Almost 30% of the total health care spending in 2010 was attributed to only five preventable chronic diseases in the United States, including cardiovascular disease, cancers, chronic obstructive pulmonary disease or asthma, and diabetes. However, only 3% of health care–related spending was for prevention. The American Public Health Association estimates that investments in preventive services would save $200 billion for treatment costs and reduce the economic burden of chronic disease by $1 trillion annually. Specifically, preventive screenings and risk reduction programs could prevent almost $26 billion in lost productivity costs as the result of colorectal cancer (CRC) alone, and costs related to absenteeism would be reduced by $2.37 per employee for every $1 spent on workplace wellness.

Before the Patient Protection and Affordable Care Act (ACA), financial barriers reduced the number of people who sought preventive screenings and other services. The ACA placed a larger focus on preventive services and population health management, mandating that many insurers cover evidence-based preventive services at little or no cost sharing. The required covered services are established by recommendations from the U.S. Preventive Services Task Force (USPSTF), the Advisory Committee on Immunization Practices, and the Institute of Medicine's committee on women's preventive services for adults. Medicare also increased coverage for certain preventive

STOP-Bang	Snoring, Tired, Observed, Pressure, BMI, age, neck size, sex [questionnaire]
T2DM	Type 2 diabetes
USPSTF	U.S. Preventive Services Task Force

Table of other common abbreviations.

services for beneficiaries. Table 1 identifies select screenings as well as the strength of recommendation, according to the USPSTF. Services rated A or B are ACA mandated to be covered free of charge to patients.

In addition to preventive screenings, complementary medicine approaches to prevention and wellness are becoming more common. The National Center for Complementary and Integrative Health defines integrative medicine as the practice of using a combination of complementary and conventional medicine to treat a patient in a holistic manner. Conversely, alternative medicine refers to practices used in place of conventional medicine and is uncommon in the United States. Integrative and complementary health approaches aim to treat the body as a complex system to achieve patient-centered outcomes such as well-being, energy, happiness, clarity, and purpose (Hackley 2017).

Using health screenings properly and understanding when complementary and integrative health measures are appropriate is important to reach and maintain optimal health. This chapter focuses on select preventive health screenings that may improve a patient's well-being and reviews the most common integrative, complementary, and alternative medicine therapies and techniques that are used by patients to improve wellness.

BASELINE KNOWLEDGE STATEMENTS

Readers of this chapter are presumed to be familiar with the following:

- Wellness visits
- Benefit of preventive services overall
- Treatment of common chronic diseases and disease complications when preventive screenings are recommended
- Immunization assessments and indications
- Complementary and alternative medicine

Table of common laboratory reference values.

ADDITIONAL READINGS

The following free resources have additional background information on this topic:

- American Society of Clinical Oncology. Guidelines, tools, and resources.
- American Society of Colposcopy and Cervical Pathology. Clinical Practice Guidelines.
- National Comprehensive Cancer Network (NCCN). NCCN Guidelines for Detection, Prevention, and Risk Reduction (free registration required).
- CDC. Prevention Checklist.
- American Diabetes Association. Standards of Medicare Care in Diabetes – 2018. Diabetes Care 2018;41:S1-159.
- Baldwin AL, Vitale A, Brownell E, et al. The Touchstone Process: an ongoing critical evaluation of reiki in the scientific literature. Holist Nurs Pract 2010;24:260-76.
- Gabay M, Smith JA, Chavez ML, et al. White paper on natural products. Pharmacotherapy 2017;37:e1-e5.
- National Center for Complementary and Integrative Medicine. Integrative Medicine Research Lecture Series.

RECOMMENDED HEALTH SCREENINGS AND MEASURES

Cancers

Several early detection screenings are recommended by the American Cancer Society (ACS), supported by evidence, and endorsed by the USPSTF. These cancers include cervical, breast, colorectal, lung, and prostate. Table 2 compares recommendations for cancer screenings from several groups.

Breast

Recommendations for breast cancer screening are based on age and risk of developing cancer (see Table 2). The USPSTF recommends that women with a first-degree relative who has a history or who are otherwise considered high risk (e.g., known mutation of *BRCA1* or *BRCA2*) be screened in their 40s. Results of a 2016 meta-analysis funded by the Agency for Healthcare Research and Quality showed that screening significantly reduced breast cancer mortality for women age 50–59 as well as those age 60–69 (Nelson 2016). Screening women at 40–49 years of age resulted in a nonsignificant reduction in breast cancer mortality and is a lower-rated USPSTF recommendation. Women in this younger age group are more likely to have a false-positive screening (121.2 per 1000 women; 95% CI [105.6–138.7]), as well as require additional imaging (124.9 per 1000 women; 95% CI [109.3–142.3]) (Nelson 2016).

In addition to mammography, the American College of Obstetricians and Gynecologists (ACOG) advocates the use of risk assessment tools to stratify patients as average or high risk to help determine which additional interventions (e.g., genetic testing and risk reduction strategies) may be warranted. Use of validated tools such as the Gail model or the Tyrer-Cuzick model is recommended for women who have been identified as potentially at risk after an initial

Table 1. USPSTF Screenings and Recommendation Grades[a]

Screening	Population	Grade	Year
Blood pressure	All adults at least 18 yr of age	A	2015
Obesity	All adults at least 18 yr of age and children and adolescents age 6–18 yr	B	2012
Depression	All adults, including pregnant and postpartum women	B	2016
Type 2 diabetes	Overweight or obese adults 40–70 yr of age	B	2015
Chlamydia and gonorrhea	Sexually active women up to age 24 yr, or older with risk factors Sexually active men	B I	2014
Hepatitis C[b]	All high risk adults; one-time screening for adults born 1945–1965	B	2013
HIV[b]	All adolescents and adults 15–65 yr of age and all pregnant women; other ages if at increased risk	A	2013
Obstructive sleep apnea	Asymptomatic adults	I	2017
Abdominal aortic aneurysm[b]	Men 65–75 yr with any smoking history Men 65–75 yr without smoking history Women 65–75 yr with any smoking history Women without smoking history, any age	B C I D	2014

[a]Grade Legend: A = high certainty net benefit is substantial and service recommended; B = moderate certainty net benefit is moderate to substantial and service recommended; I = insufficient evidence available to assess net benefit or harm.

[b]Update in progress.

Information from: U.S. Preventive Services Task Force. Published Recommendations.

Table 2. Other Cancer Screening Recommendations for Average-Risk Patients[a]

Cancer	ACS[b]	NCCN[c]	Other
Breast	Annual mammography at age 45–54; offer beginning at age 40 Biennial beginning at age 55, until life expectancy < 10 yr	Annual mammography at age 40, until life expectancy < 10 yr	ACOG[d]: Annual to biennial mammography at least by age 50; offer screening at age 40; continue until age 75 USPSTF (2016)[e]: Biennial screening for women age 50–74 (grade B)
Cervical	Cytology every 3 yr for women age 21–29; co-testing every 5 yr for women age 30–65	Endorses ACS	ACOG[f]: Cytology every 3 yr for women age 21–29; co-testing every 5 yr for women age 30–65 preferred to cytology every 3 yr; hrHPV DNA testing only is alternative USPSTF (2012)[e]: Women age 21–65 with cytology only every 3 yr, or 30–65 with cytology and HPV DNA testing every 5 yr (grade A) USPSTF (2017 Draft)[e]: *-Women age 21–29 with cytology every 3 yr (grade A)* *-Women age 30–65 with cytology every 3 yr or hrHPV DNA testing every 5 yr (grade A)*

Table 2. Other Cancer Screening Recommendations for Average-Risk Patients[a] (Continued)

Cancer	ACS[b]	NCCN[c]	Other
Colorectal	Age 50–75 yr: Colonoscopy every 10 yr OR stool-based screen every 1–3 yr OR flex sigmoidoscopy every 5 yr OR CTC every 5 yr	Age 50–75 yr: Colonoscopy every 10 yr OR stool-based screen every 1–3 yr OR flex sigmoidoscopy + stool-based (year 3) every 5–10 yr OR CTC every 5 yr	USPSTF (2016)[e]: -All adults age 50–75 (grade A) -Adults age 76–85 (grade C)
Lung	Discuss screening with patients age 55–74 who have at least a 30 pack-year smoking history, currently smoke or have quit within the past 15 yr, and who are in relatively good health	People age 55–74 with a ≥ 30 pack-year history who have quit within the past 15 yr or people age ≥ 50 with a ≥ 20 pack-year history with at least one risk factor for lung cancer other than secondhand smoke	USPSTF (2013)[e]: Annual screening with LDCT for adults age 55–80, at least a 30 pack-year history, and currently smoke (or quit within 15 yr) (grade B)
Prostate	Discuss benefits and harms of PSA screening beginning at age 50 if life expectancy > 10 yr	Offer baseline PSA screening and consider digital rectal examination; repeat every 1–4 yr depending on result	USPSTF (2012)[e]: Do not recommend screening using PSA (grade D) USPSTF (2017 Draft)[e]: *-Men age 55–69 with PSA (grade C)* *-Men age ≥ 70 with PSA (grade D)*

[a]Grade Legend: A = high certainty net benefit is substantial and service recommended; B = moderate certainty net benefit is moderate to substantial and service recommended; C = moderate certainty net benefit is small and service recommended for select patients; D = moderate to high certainty there is no net benefit, or there is net harm and service is not recommended; I = insufficient evidence available to assess net benefit or harm.

[a]American Cancer Society (ACS). Cancer A-Z.

[b]National Comprehensive Cancer Network (NCCN). NCCN Guidelines for Detection, Prevention, and Risk Reduction.

[c]American College of Obstetricians and Gynecologists (ACOG). Breast cancer risk assessment and screening in average-risk women. Practice Bulletin No. 179. Obstet Gynecol 2017;130:e1-16. Accessed July 12, 2017.

[d]U.S. Preventive Services Task Force (USPSTF). Published Recommendations.

[e]American College of Obstetricians and Gynecologists (ACOG). Cervical cancer screening and prevention. Practice Bulletin No. 168. Obstet Gynecol 2016;128:e111-30.

ACOG = American College of Obstetricians and Gynecologists; ACS = American Cancer Society; CTC = computed tomographic colonography; hrHPV = high-risk human papillomavirus; LDCT = low-dose computed tomography; NCCN = National Comprehensive Cancer Network; PSA = prostate-specific antigen.

assessment of family history. These models or tools are not intended for women who would not otherwise qualify for screening on the basis of age.

The Gail model has been widely used and includes risk factors such as age, age at menarche, age at first live birth, first-degree relative with breast cancer, and history of breast biopsies as well as history of atypical ductal hyperplasia (Amir 2010). However, the Gail model does not provide genetic risk prediction. The International Breast Cancer Intervention Studies (IBIS) Breast Cancer Risk Evaluation Tool model incorporates the same risk factors as the Gail model but also includes BMI, age at menopause, use of hormone replacement therapy, age at onset of relative breast cancer, and several others. The model also accounts for the presence of other genes, including the mutations for *BRCA1* and *BRCA2*, and therefore provides genetic risk prediction. Other risk assessment models that have been used are the Jonker model, the Claus model, and the BOADICEA (Breast and Ovarian Analysis of Disease Incidence and Carrier Estimation Algorithm). These tools are similar by including family history and age and do not include other hormonal or reproductive factors such as age at menarche or menopause. Area-under-the-curve estimates to determine and compare the accuracy of risk prediction found that IBIS was more accurate (0.762) than the Gail model (0.735) and the Claus model (0.716) (Amir 2010).

Women with a family history of *BRCA*-related cancers, including breast or ovarian, should be further assessed using a validated tool to determine the need for more in-depth genetic counseling, beginning at the age of consent or 18 years, according to the USPSTF 2014 recommendation statement (Moyer 2014). The USPSTF does not recommend using the Gail model to determine whether to seek *BRCA* testing,

but instead recommends using more specific tools like the Ontario Family History Assessment Tool, Manchester Scoring System, Referral Screening Tool, Pedigree Assessment Tool, and Family History Screen 7 (FHS-7). The quickest tools to complete are the FHS-7 and the Referral Screening Tool, but one tool is not recommended over another. The USPSTF does not provide threshold scores for further testing, but recommendations for referral for testing are available from the individual tools. Specifically, any positive response in the FHS-7 and at least two positive responses in the Referral Screening Tool indicate a need for further testing.

Neither the ACS nor the USPSTF recommends breast self-examinations, citing a lack of evidence that the benefits most likely do not outweigh the risks of false-positive findings in average-risk women. However, the ACS, USPSTF, and ACOG recommend patient breast self-awareness and discussing any changes with their providers, given that 50%–64% of breast cancer cases were self-detected (Coates 2001).

Cervical

For cervical cancer screening recommendations, see Table 2. The ACOG suggests that use of high-risk human papillomavirus (hrHPV) alone may be considered in women at least 25 years of age as an alternative to cytology-based methods; however, infections in women younger than 30 spontaneously resolve at a high frequency (USPSTF 2017). The USPSTF's updated draft recommendation eliminates co-testing for women 30–65 years of age and states that hrHPV DNA testing only in this age group every 5 years is preferred. This is largely based on modeling estimates that co-testing would result in more additional tests (about 7000 in a lifetime) than hrHPV DNA testing alone while preventing the same number of cancer cases (1) per 1000 women screened (USPSTF 2017). Co-testing with cytology and human papillomavirus (HPV) increases the sensitivity of the screening and detects more high-grade cervical changes than cytology alone but results in substantially more colposcopies (640) than cytology alone (39) per case prevented. A Cochrane review found that HPV DNA testing would correctly identify four more women with high-grade lesions compared with cytology testing but would also identify four more women for unnecessary testing (Koliopoulos 2017). The ACOG reviewed the evidence provided by the USPSTF and was to submit comments during the public comment period on the draft USPSTF recommendations.

Women who have completed the HPV vaccination series should still be screened according to their age and risk. Women older than 65 with no history of cervical changes or precancerous cells should no longer be screened. Women who have a positive history of high-grade cervical changes should continue to be screened for 20 years after lesion resolution, regardless of age. In addition to age, a patient's sexual activity, particularly with new partners, should be considered when assessing risk factors for developing cervical cancer and need for screening.

Colorectal

Similar to other cancers, age is an important risk factor for developing CRC. The median age for diagnosis of colon cancer is 68 years and 72 years for men and women, respectively. Another important risk factor is family history: occurrence of CRC or colorectal polyps in first-degree family relatives before age 60 or occurrence in two or more first-degree relatives regardless of age significantly increases the likelihood of developing CRC (ACS 2017a). Other identified risk factors for CRC include a history of colorectal polyps, inflammatory bowel disease, obesity, smoking, heavy consumption of red meat, and inactive lifestyle.

The Colorectal Cancer Risk Assessment Tool available from the National Cancer Institute (NCI) (https://www.cancer.gov/colorectalcancerrisk/Default.aspx) provides a person's absolute risk estimate for developing CRC within a specific time. The model is based on data from two U.S. case-control studies; 13 NCI SEER (Surveillance, Epidemiology, and End Results) registries; and published mortality rates. The USPSTF recommends that all adults be routinely screened for CRC from age 50 to 75 years (Lin 2016). Frequency of screening depends on the method used and is discussed in the text that follows. For adults who are considered at high risk (i.e., known family history of CRC), screening should begin earlier (ACS 2017a).

The recommended frequency of screening depends on the method used; Table 3 provides a brief overview of tests and frequencies. Several methods are available for screening,

Table 3. Overview of Colorectal Screening Tests

Test or Procedure	Detection	Frequency
Colonoscopy	Polyps and cancer	Every 10 years
Computed tomographic colonography (CTC)	Polyps and cancer	Every 5 years
Flexible sigmoidoscopy	Polyps and cancer	Every 5 years
Immunochemical-based fecal occult blood test (FIT)	Cancer	Every year
Guaiac-based fecal occult blood test (gFOBT)	Cancer	Every year
Stool-based DNA	Cancer	Every 3 years

including stool-based tests, endoscopy, and imaging. The American Cancer Society website provides a comparison of pros and cons of each test. Stool-based tests may check for blood and/or DNA in fecal samples; several are FDA approved for use and are relatively inexpensive. These include the guaiac-based fecal occult blood test (gFOBT), immunochemical-based fecal occult blood test (FIT), and stool DNA (sDNA). Stool-based tests do not require bowel preparation, may be done at home, and are less invasive. These tests are performed more often, typically every 1–3 years, and abnormal findings need to be confirmed with a colonoscopy. Sensitivity for stool-based tests varies, and those with high sensitivity often have low specificity. For instance, Cologuard, a newer sDNA test, is 92% sensitive (95% CI 84%–97%) for CRC but has only 84% specificity (95% CI, 84%–85%) (Lin 2016). Stool-based tests, specifically gFOBT, are associated with reduced CRC-related mortality compared with no screening.

Endoscopy

Endoscopy screenings are more invasive and expensive than other screening methods but can be performed every 5–10 years. Colonoscopies are beneficial for screening as well as diagnostic purposes but are associated with more bleeding (8.21 per 10,000; 95% CI, 4.98–13.51) and perforations (3.62 per 10,000; 95% CI, 2.42–5.42) and require patients to be referred to a specialist for completion (Lin 2016). Reduced CRC mortality has been shown with sigmoidoscopy testing (incidence rate ratio 0.73; 95% CI, 0.66–0.82), mainly in patients 55–64 years of age, and may be more beneficial when combined with other screening strategies such as FIT (Lin 2016). Flexible sigmoidoscopy plus FIT resulted in reduced mortality compared with flexible sigmoidoscopy alone (HR 0.62; 95% CI, 0.42–0.90) in one study of about 100,000 patients in Norway (Holme 2014). Another analysis of data included in the USPSTF report suggests that flexible sigmoidoscopy reduces all-cause mortality (RR 0.975; 95% CI, 0.959–0.992) (Swartz 2017). Compared with colonoscopies, flexible sigmoidoscopy testing is less invasive and does not have to be conducted by specialists. However, a sigmoidoscopy should be repeated every 5 years with normal results. Several ongoing clinical trials are comparing colonoscopy screening with other methods, including FIT, for mortality and CRC reduction rates (Lin 2016). High-volume bowel preparations are associated with better bowel cleanliness than are low-volume regimens; however, high-volume preparations are less well tolerated by patients (Martel 2015). No clear guidance has been recommended for one preparation over another.

Imaging

Imaging is less invasive and does not require sedation, unlike colonoscopies. A recent systematic review found that the sensitivity and specificity of computed tomographic colonography (CTC) were increased with bowel preparation (67%–94%; 86%–98%) compared with no bowel preparation (67%–90%; 85%–90%) (Lin 2016). Advantages of CTC include quickness of procedure, lack of sedation needed, and fewer expected complications than with colonoscopies. Disadvantages include the increased frequency of screening (every 5 years), potential harm from repeated radiation exposure, and lack of insurance coverage compared with colonoscopy examinations. The American Academy of Family Physicians disagrees with the USPSTF's suggestion to consider CTC as a method to screen for CRC, preferring only fecal testing, flexible sigmoidoscopy, or colonoscopies (Lin 2017).

Medicare coverage for these screenings depends on patient age and test selected. Patients 50 years or older may have an FOBT or a FIT completed annually with full coverage, and those 50–85 years of age may have an sDNA covered every 3 years as long as patients are asymptomatic and do not have an increased risk of CRC. Medicare will cover a sigmoidoscopy every 4 years, or a colonoscopy every 10 years, as long as it is for screening purposes only; if a biopsy is taken or a growth is removed, the test is then considered diagnostic, and co-insurance or co-pays apply. Patients cannot have a flex sigmoidoscopy within 10 years of a colonoscopy. Private or commercial insurance may vary, but coverage of CRC screening should be provided at no additional charge for patients 50–75 years of age because this is recommended by the USPSTF with the highest level of evidence.

Lung Cancer

Lung cancer accounts for almost 25% of cancer diagnoses, and over 150,000 deaths in 2017 are estimated to be caused by lung or bronchial cancer (ACS 2017b). Risk factors include tobacco smoke; personal or family history of lung cancer; exposure to radon, asbestos, or other carcinogens; and air pollution. In addition, supplementation with beta-carotene 20–30 mg daily for 2 years or more in current smokers increased the risk of developing lung cancer (OR 1.24, 95% CI [1.1–1.39]) (Tanvetyanon 2008).

The National Lung Screening Trial was a multicenter trial that enrolled over 50,000 participants 55–74 years of age to compare low-dose computed tomography (LDCT) with chest radiography in reducing lung cancer mortality (Aberle 2011). Participants had to have at least a 30 pack-year smoking history and either be current smokers or have quit within the past 15 years. Overall, most participants (43%) were 55–59 years, male (59%), white (91%), and former smokers (52%). A series of three annual screenings were conducted with random assignment for either LDCT or chest radiograph, and participants were followed for a median of 6.5 years. Overall, almost 39% of participants in the LDCT group had a positive result compared with only 16% in the chest radiography group. The rate of lung cancer mortality in the LDCT group was significantly lower than in the chest radiography group (346 deaths/26,455 participants vs. 425 deaths/26,232 participants; 20% reduction, p=0.004). All-cause mortality was also significantly less in the LDCT group than in the chest radiography group (6.7%

reduction, p=0.02) but was mainly the result of cancer mortality. The difference in overall mortality was not statistically different (3.2% reduction, p=0.28) when lung cancer deaths were removed. One other study with about 2500 participants favored annual screening with LDCT in men 60–74 years of age for reduction in lung cancer mortality but did not reach statistical significance. Two other studies that included younger patients with less tobacco exposure did not show statistical significance or favor screening with LDCT for lung cancer or all-cause mortality.

Given the available evidence, the USPSTF recommends annual screening using LDCT for patients 55–80 years of age who have at least a 30-pack year smoking history and who currently smoke or have quit within the past 15 years. Medicare will only cover patients up to age 77 with waived deductible and coinsurance. A systematic review of nine studies evaluating the cost-effectiveness of LDCT found that screenings are cost-effective (less than $50,000 per quality-adjusted life-year [QALY]) for most patients who have at least a significant smoking history and that successful smoking cessation increases the cost-effectiveness (Puggina 2016).

Prostate

The ACS estimates that over 160,000 new cases of prostate cancer will be diagnosed in 2017 (ACS 2017a; ACS 2017b). Age is the primary risk factor, given that most cases develop after age 65; others include race/ethnicity (i.e. African American or African descent), and geographic location (e.g. North America, northwestern Europe, Australia, and the Caribbean Islands). Screening using prostate-specific antigen (PSA) may be considered for men beginning at age 50 or sooner if risk factors are present, including one or more first-degree relative with a history of prostate cancer before age 65, or African American race. A genetic mutation in the *BRCA1* and *BRCA2* genes can also increase the risk of prostate cancer. Those having several family members with prostate cancer should be educated about prostate cancer screenings at age 40. The National Comprehensive Cancer Network (NCCN) recommends offering a baseline PSA for men at least 45 years old and repeating it every 1–4 years, depending on the results (NCCN 2017). In contrast, the USPSTF rates prostate screening for men 55–69 years of age as evidence level C and recommends against routine screening in men 70 and older in a draft guidance.

An elevated PSA is not specific to prostate cancer because about only 25% of patients with concentrations of 4–10 ng/mL will have a positive biopsy, and about 30% will have or develop prostate cancer (NCCN 2017). Screening using PSA may result in reduced metastases and prostate cancer mortality by up to 21% (RR 0.79; 95% CI, 0.68–0.91), but significant concerns exist about increased harm of false-positive screenings, overdiagnosis (20%–50% of cases), and overtreatment of suspected cancer (Fenton 2017; NCCN 2017). The NCCN, USPSTF, and ACS strongly encourage shared decision-making when deciding whether to screen using PSA and at what age to begin.

Cardiovascular Disease

The 2013 guidelines from the American College of Cardiology and the American Heart Association for assessing cardiovascular risk recommend that all adults should be assessed for their risk of developing atherosclerotic cardiovascular disease (ASCVD) events in the next 10 years at 40–79 years of age using the Pooled Cohort Equations (Goff 2014). In addition, adults 20–79 years of age should have their risk factors for developing ASCVD assessed every 4–6 years. These risks include age, TC and HDL, smoking status, systolic blood pressure, use of antihypertensive medication, and presence of diabetes; these are assessed in the Pooled Cohort Equations. Consideration of a lifetime risk assessment is suggested for adults 20–59 years of age using the traditional risk factors previously mentioned.

Blood Pressure

All adults 18 years and older, unless they already have a diagnosis of hypertension, should be screened for high blood pressure, according to the USPSTF (Siu 2015). If screening results are normal, routine screening every 3–5 years is recommended. If screening results are abnormal, providers are encouraged to obtain blood pressure measurements outside the clinic setting before patients are given a diagnosis of hypertension. Early detection can profoundly affect the prevention of cardiovascular events. One community-based randomized controlled trial was conducted in 39 Canadian communities with an average of more than 3000 people at least 65 years of age (Kaczorowski 2011). Participants in the intervention group received blood pressure screenings, education related to high blood pressure, and pharmacist consultations related to drugs; the control group received no intervention. The intervention group had a reduction in the primary composite outcome of hospitalization for heart failure, myocardial infarction, or stroke (rate ratio 0.91, 95% CI [0.86–0.97]) compared with the control group.

The role of automated office blood pressure (AOBP) has been compared with the role of manual office blood pressure as well as ambulatory blood pressure monitoring. Blood pressure readings in the office are often higher than ambulatory or home blood pressure readings. Concerns regarding manual office blood pressure include white-coat hypertension, staff error in measurement, and patient factors such as a full bladder and recent caffeine or cigarette intake. Ambulatory blood pressure monitoring more accurately assesses the patient's actual blood pressure but is more expensive, requires the patient to wear a special device for at least 24 hours, and may not be available in all practices. With AOBP, a series of blood pressure readings are obtained, but while the patient is still in the office. However, the patient is left in the room with the blood pressure monitor on alone, which reduces some interference

of white-coat syndrome. The average or individual blood pressure readings may then be used to more accurately assess the patient's blood pressure (Myers 2014). This method has effects similar to ambulatory blood pressure monitoring and is more accurate than manual office blood pressure. The 2017 American College of Cardiology/American Heart Association hypertension guidelines promote self-monitoring of blood pressure at home with validated instruments to be used for considerations in hypertension diagnosis and management (Whelton 2017). Patients are asked to collect two blood pressure readings every morning before taking medications and every evening for 2 weeks before an office visit.

Cholesterol

Recommendations for routine cholesterol screening have changed over the past several years because of updated guidelines for managing dyslipidemia. The National Lipid Association recommends that all adults receive cholesterol screening at least every 5 years beginning at age 20 (Jacobson 2015). Similarly, the USPSTF recommends that men 35 and older and women 45 and older receive cholesterol screening about every 5 years. This recommendation also suggests that men and women considered at high risk of developing cardiovascular disease or experiencing a cardiovascular event should be screened starting at age 20, which includes those who smoked, had diabetes or a personal history of coronary heart disease, had hypertension, or had obesity. Currently, the USPSTF has no recommendation specifically for cholesterol.

Diabetes

The American Diabetes Association (ADA) recommends that any asymptomatic overweight adult or any overweight child or child with obesity younger than 18 years with an additional risk factor be screened for type 2 diabetes (T2DM). These risk factors can be found within the Standards of Medical Care in Diabetes recommendations. A validated self-administered risk assessment tool was developed for U.S. adults on the basis of the 1999–2006 National Health and Nutrition Examination Survey (NHANES) data and has been adopted by the ADA (Bang 2009). The tool identifies those at high risk of developing T2DM (scores of 5 or higher) who should receive further diagnostic testing or screening for the disease. Adults with abnormal screening results should be tested at least annually. Otherwise, all adults at least 45 years of age, and those with normal results, should undergo routine screening at least every 3 years. The American Association of Clinical Endocrinologists (AACE) has similar recommendations regarding who should be screened and how often to screen for T2DM, including age and major risk factors to look for. However, the AACE recommendations suggest annual screening if two or more risk factors are present.

A study completed in 2010 using a mathematical model estimated the cost-effectiveness of routine screening on the basis of age and frequency. A simulated population was created on the basis of NHANES in 1999–2004 and was evaluated using nine screening strategies (Kahn 2010). Estimated costs included screening, diagnosis, treatment, and monitoring, not only for T2DM but also for coronary artery disease, stroke, hypertension, hyperlipidemia, and heart failure. This simulated analysis showed that initiating screening at 30–45 years of age and repeating it every 3–5 years was most cost-effective, resulting in a cost per QALY of no more than $10,500. Of note, fasting plasma glucose was the only screening method included in this study. In addition, when screening for T2DM was included during simulated office visits for hypertension or hyperlipidemia, the cost per QALY was further reduced.

The USPSTF conducted a systematic review of the available literature to determine what effect, if any, screening for T2DM had on mortality (Selph 2015). The review included only two randomized controlled trials that investigated screen-detected T2DM and mortality and concluded that screening did not affect 10-year mortality rates, including all-cause, diabetes-related, and cardiovascular-related rates. Because of this review, the USPSTF recommends screening for T2DM as part of cardiovascular risk assessment for patients 40–70 years of age who are overweight or have obesity, or sooner if additional risk factors are present such as family history, high-risk ethnicities, or history of gestational diabetes or polycystic ovarian syndrome.

Infectious Disease

Vaccine-preventable diseases

Immunizations are preventive health measures that reduce the incidence and prevalence of infectious diseases. The Advisory Committee on Immunization Practices develops immunization schedules annually for adults on the basis of age as well as health conditions that are available through the CDC. Screening adults routinely for immunization needs may decrease the prevalence of disease as well as overall health care costs. The Immunization Action Coalition provides online tools for practitioners related to vaccinations.

Sexually Transmitted Diseases

Despite efforts to increase awareness, rates of new cases of chlamydia, syphilis, and gonorrhea continue to rise, with more than 2 million cases in 2016, and health care costs associated with sexually transmitted diseases (STDs) are estimated at $16 billion annually (CDC 2017). However, prevention through immunizations, protected sexual intercourse with barrier contraceptives, or abstinence can reduce the incidence of STDs. Vaccination against HPV provides 98%, 100%, and 75% efficacy in prevention of cervical HPV strains linked to cervical, vulvar/vaginal, and anal cancers, respectively, and 89% efficacy in the prevention of genital warts in males and 99% in females, according to merckvaccines.com. Vaccination for either sex is recommended at age 11–12 but

is approved for administration beginning as early as age 9. Vaccination against HPV is approved for use in women up to age 26, for men up to age 21, and for men who have sex with men (MSM), men with certain immunocompromising conditions, and transgender women up to age 26.

Chlamydia and Gonorrhea

Chlamydia and gonorrhea are the most commonly reported STDs in the United States, at a rate of 497 and 145 per 100,000 people, respectively, in 2016, with most infections in young women 15–24 years of age (CDC 2017). Risk factors include new sexual partners, lack of barrier contraceptive use, multiple sexual partners, and STD history. Screenings should be performed using nucleic acid amplification tests (NAATs), which accurately detect *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in urine, vaginal, urethral, and endocervical specimens. Potential disadvantages of screening include false-positive or false-negative results, but NAATs are highly specific (95%) and sensitive (95%), so these results are minimized. The USPSTF recommendations for screening chlamydia and gonorrhea include all sexually active women up to age 24 and those with risk factors 25 and older, including pregnant women. Given current evidence, the USPSTF has no recommendation regarding the routine screening of sexually active men, and screenings should be done if new risks of infection arise or persist after previous negative tests. The USPSTF review found that first-catch urine specimens (males) and self-collected vaginal specimens are acceptable and equivalent to urethral or clinician-collected specimens, respectively.

Syphilis

The USPSTF recommends that all nonpregnant adolescents and adults be screened for syphilis if at risk of infection. Although syphilis infections are not as common as gonorrhea or chlamydia, syphilis infection rates have risen since 2000 from 11.2 to 27.4 per 100,000 people (CDC 2017). Complications related to syphilis include inflammatory lesions, dementia, and blindness, as well as an increased risk of acquiring HIV. Individuals at increased risk of acquiring syphilis include MSM and people with HIV.

General Screening for STDs

The CDC published guidelines on the screening and treatment of STDs in 2015. Completing a behavioral risk assessment by obtaining a thorough sexual history during the clinical encounter is important. The CDC provides a guidance booklet to aid practitioners in discussing sexual health with patients and suggests incorporating the 5 P's of sexual health: partners (sex, number, and monogamy), practices (type of sexual contact and use of barrier contraceptives), protection from STDs, history of STDs, and prevention of pregnancy. Screening for STDs, including chlamydia, gonorrhea, and syphilis, is recommended for both men and women. Sexually active women younger than 25 and women at least 25 years of age with risk factors should be screened for chlamydia and gonorrhea, according to the CDC; consider screening young men if they are located in high-prevalence areas (CDC 2015). Patients with HIV should be screened for chlamydia, gonorrhea, and syphilis at the first visit, if sexually active, and then annually. Men who have sex with men should be screened annually, up to every 3–6 months, at sites of contact, if sexually active.

Hepatitis C Virus

According to the CDC, 3 million Americans are estimated to be chronically infected with hepatitis C virus (HCV), with 30,000 cases of acute HCV estimated in 2014 alone. Risk factors associated with HCV include current or former injection drug users, chronic hemodialysis patients, those infected with HIV, recipients of clotting factors before 1987, and recipients of solid organ transplants or blood transfusions before July 1992. Patients with any of these risk factors should periodically be screened for HCV by HCV antibody testing. In addition, the CDC and USPSTF recommend that adults born in 1945–1965 be screened once for HCV infection (Moyer 2013b; CDC 2012).

Screening to identify the HCV antibody using an FDA-approved test is preferred and may include the OraQuick Rapid Antibody test or laboratory-based methods. These antibody tests do not differentiate between active or resolved infections and should therefore be followed by testing for HCV RNA, if reactive. Nucleic acid testing (NAT) is preferred to detect HCV RNA. Although the OraQuick test can use a fingerstick blood sample, NAT should be done with venipuncture. Patients should be referred for further evaluation and treatment if testing results with both a reactive antibody test and HCV RNA. Early detection increases the opportunity for eradicating HCV with effective treatment, and curing the infection before the development of cirrhosis can prevent fibrosis, hepatocellular carcinoma, and death related to HCV (NAS 2016).

Human Immunodeficiency Virus

Around 40,000 Americans were given a diagnosis of HIV in 2015, and the overall rate declined by 9% in the preceding 4 years, according to the CDC. The USPSTF recommends screening for HIV at 15–65 years for average-risk people, as well as for all pregnant women, but does not specify an ideal interval. People at high risk, including MSM, active injection drug users, people participating in unprotected sexual intercourse, those who have acquired or ask for testing for other STDs, or have HIV-infected sexual partners, may consider screening annually, to every 3–5 years. People outside these specified age ranges with risk factors for contracting HIV should also be screened; however, benefit is greatest in screening the specified groups, particularly adolescents, adults, and pregnant women. One-time screening may be sufficient in the absence of other risk factors for those 15–65 years of age.

In a mathematical model, quarterly screening of MSM prevented an additional 3.2 cases of HIV and saved costs with a fourth-generation immunoassay compared with annual or every-6-month testing, and rapid point-of-care testing every 3 months prevented an additional 2.66 HIV cases (Hutchison 2016). Quarterly testing of MSM by point of care was cost-effective, resulting in an incremental cost per QALY gained of $48,000 compared to biannual screening, while testing every 6 months with point of care saved costs compared to only annual screening. Screening injection drug users every 6 months prevented 0.39 and 0.35 HIV cases with fourth-generation immunoassay and rapid point-of-care tests, and the incremental cost per QALY gained was $133,200 and $232,500, respectively. Screening every 3 months, compared with every 6 months, prevented 0.21 and 0.15 cases of HIV with fourth-generation immunoassay and rapid point-of-care tests at an incremental cost that was 3–4 times higher than costs to screen every 6 months. These figures are based on an estimated high annual incidence rate of 1.27%. The CDC continues to recommend annual screening of MSM, injection drug users, and those practicing unprotected sexual intercourse according to the available evidence, which consists mainly of mathematical models or low-quality studies (DiNenno 2017). More frequent screening (i.e., every 3 or 6 months) is recommended for MSM with several partners, or every 3 months for those prescribed preexposure prophylaxis (PrEP). The CDC also recommends that patients at risk of acquiring HIV because of high-risk sexual behavior and/or intravenous drug use be screened for eligibility for HIV PrEP, which is highly effective and tolerable (CDC 2014).

Mental Health Conditions

Depression

Without treatment, depression may decrease a patient's quality of life and lead to poorer health overall. Major depressive disorder is a leading cause of disability in those 15–45 years of age and affects about 7% of the U.S. population. The USPSTF, with a grade B recommendation, endorses screening for depression in all adults, including those who are pregnant or in the postpartum period (Siu 2016). Several tools are available for screening in primary care, including the Patient Health Questionnaire (PHQ; available in two or nine questions), the Hospital Anxiety and Depression Scales, the Geriatric Depression Scale, and the Edinburgh Postnatal Depression Scale (EPDS). Evidence is insufficient to support one tool over the other, and those identified have acceptable accuracy to detect patients at risk of depression. Tools with fewer questions, including PHQ-2, PHQ-9, and EPDS, are quicker to administer and may be easier to incorporate into daily practice. All patients, including those in the perinatal period, who screen positively should be referred for a follow-up for further evaluation and potential treatment.

Screening is especially important during the postpartum period because depression can adversely affect the maternal-infant relationship. Currently, little evidence is available to suggest an ideal screening frequency or preferred tool. The EPDS includes questions related to anxiety that may be common in depression and omits questions related to changes in sleeping patterns because these may be common in the perinatal period but can be unrelated to depression. Other tools used in pregnant and postpartum women, such as the PHQ-9 and Postpartum Depression Screening Scale (PDSS), assess sleeping patterns, which lowers the specificity for depression during this period. Screening for depression should occur at least once during the perinatal period, according to the ACOG, and potentially at each well-child visit during the postpartum period up to age 6 months, as suggested by the American Association of Pediatrics (ACOG 2015; Earls 2010). An ACOG toolkit includes the EPDS screening tool to use during the perinatal period, as well as recommendations for managing depression.

Sleep Disorders

An estimated 70 million Americans have sleep disorders, which account for about $16 billion in health care costs (NHLBI 2018). Insomnia has been associated with developing depression, hypertension, and other metabolic abnormalities. A recent meta-analysis found an association with increased risk of cardiovascular events in those with difficulty initiating sleep (RR 1.27; 95% CI, 1.15–1.4), difficulty maintaining sleep (RR 1.11; 95% CI, 1.0–1.19), and having non-restorative sleep symptoms (RR 1.18; 95% CI, 1.05–1.32) (He 2017). Those with only early-morning awakening symptoms were not at increased risk. Asking patients about sleep patterns during well visits should be considered.

Obstructive sleep apnea (OSA) is characterized by repeated periods of partial or complete upper airway obstruction during sleep. Risk factors include male sex, older age, obesity, snoring, and upper airway or craniofacial abnormalities (Jonas 2017). Obstructive sleep apnea has been associated with increased cardiovascular mortality (OR 2.09; 95% CI [1.20–3.65]), so early detection and treatment may be beneficial (Loke 2012).

Several screening questionnaires are available to predict the likelihood of severe OSA. These include the Berlin Questionnaire and the Multivariable Apnea Prediction (MVAP) index; the Snoring, Tired, Observed, Pressure [questionnaire] (STOP); the Snoring, Tired, Observed, Pressure, BMI, age, neck size, sex [questionnaire] (STOP-Bang); and the Epworth Sleepiness Scale (ESS). The Berlin Questionnaire consists of 10 questions evaluating three categories: snoring, tiredness, and blood pressure; age, sex, height and weight are also collected. The third category, blood pressure, may be considered positive if the person has a history of high blood pressure or if the calculate BMI is greater than 30 kg/m^2. Risk of OSA is classified as high if

at least two categories of questions using Berlin are positive. The MVAP assesses information similar to the Berlin Questionnaire but only focuses on symptoms of snoring, choking, and witnessed apneic episodes. The STOP is a relatively short questionnaire with only four questions, and positive responses to two of the questions are considered suggestive of OSA. The STOP-Bang includes the four previous questions and captures BMI, age, neck size, and sex. The ESS focuses on sleepiness during daily activities and does not capture other OSA-related symptoms.

Evidence supporting the use of these screening questionnaires in practice varies and is conflicting. A 2011 comparative effectiveness review found more evidence, although low quality, with the Berlin Questionnaire than with STOP, ESS, or STOP-Bang to predict OSA (Balk 2011). Only the MVAP and the Berlin Questionnaire were assessed in the USPSTF's recent recommendation, which found insufficient evidence for either in asymptomatic patients. Several recently published small cohorts suggest that STOP-Bang is more accurate, particularly in areas with limited resources (Prasad 2017). The American Academy of Sleep Medicine (Kapur 2017) recommends against using screening or prediction questionnaires to diagnose OSA and recommends that diagnostic testing be done with polysomnography, citing a lack of evidence for prediction tools compared with collecting a patient history and conducting a physical examination. The USPSTF also concludes that evidence is insufficient to recommend routine screening for OSA in asymptomatic patients. Although the evidence is lacking to support screening for OSA to reduce mortality, early treatment of OSA improves quality of life.

Substance Use Disorders

Excessive alcohol use causes over 80,000 deaths in the United States each year and may lead to chronic diseases such as hypertension, heart disease, certain cancers, and depression (Stahre 2014; Moyer 2013a). Consuming more than 14 drinks per week for men and more than seven drinks per week for women is considered excessive and risky and may lead to alcohol abuse. Several screening tools can detect alcohol misuse in the primary care setting, including Cut-Down, Annoyed, Guilty, Eye-Opener (CAGE); Rapid Alcohol Problems Screen 4 (RAPS4); and Alcohol Use Disorders Identification Test (AUDIT). The WHO developed the AUDIT tool, which is available as 10 questions or a condensed three-question version (AUDIT-C). Both AUDIT tools have sufficient evidence to support use to identify all types of alcohol misuse in adults as well as pregnant women and are preferred in the USPSTF screening recommendations. All adults at least 18 years of age should be screened periodically for alcohol misuse and offered behavioral counseling interventions, if positive. Evidence is lacking to suggest an optimal screening interval. Given that these tools are quick to administer, they can be incorporated into all patient interactions when reviewing patient history information, including routine visits.

Tobacco use, specifically cigarette smoking, causes almost ½ million premature deaths each year. Smoking is associated with increased risks of cancer, cardiovascular disease, respiratory disease, and erectile dysfunction (HHS 2014). Assessing tobacco use status is important and critical to improving cessation rates. The USPSTF recommends that all adults, even those who are pregnant, be asked about tobacco use and provided advice to quit. Frequent, brief encounters are effective in increasing cessation rates, and simply asking about use and advising to quit can be an effective strategy (Patnode 2015).

Other Screenings

Other screenings include those for thyroid dysfunction, celiac disease, and chronic kidney disease. To date, evidence is insufficient to support routine use of screenings in asymptomatic adults. Screening should be performed in patients with other conditions or with symptoms suggestive of dysfunction. In addition, the USPSTF recommends against screening for chronic obstructive pulmonary disease and carotid artery stenosis in asymptomatic patients because the harms of screening outweigh the benefit of detection.

Obesity

According to the CDC, almost 40% of the U.S. population has obesity. Obesity increases the risk of developing T2DM, heart disease, and certain cancers and is considered a modifiable risk factor for several chronic medical conditions. Many national guidelines recommend routine screening for obesity and subsequent treatment with pharmacologic therapy, lifestyle modifications, and bariatric surgery in morbid obesity or obesity with chronic conditions, such as diabetes.

The USPSTF recommends that all adults beginning at age 18 be screened for obesity by calculating the BMI but provides no suggestion on frequency of screening. Height and weight are required to calculate BMI, both of which are relatively easy to obtain. Pharmacists and other health care professionals can likely assess BMI routinely, possibly with each visit or face-to-face interaction.

Osteoporosis

Women 50–64 years of age with a FRAX (fracture risk assessment) score of at least 9.3%, as well as all women 65 and older, should receive screening by bone density measurement, according to the USPSTF. The National Osteoporosis Foundation recommends that all women at least 65, all men at least 70, younger postmenopausal women, men 50–69 years of age with risk factors, and adults taking glucocorticoid doses equivalent to at least 5 mg of prednisone daily should be screened for osteoporosis by measuring bone

Patient Care Scenario

A 32-year-old woman presents as a new patient to your clinic. Her medical history includes two pregnancies with two live births (gestational diabetes during second pregnancy) and seasonal allergic rhinitis. She currently takes cetirizine 10 mg daily as needed and a prenatal vitamin because she is breastfeeding her 3-month-old child. She denies alcohol or tobacco use and believes she is up to date on her immunizations. She is in a monogamous relationship and remembers having several screenings while she was pregnant, all of which were negative. What screenings or preventive care should be discussed with her today?

ANSWER

A history of gestational diabetes is a risk factor for developing T2DM. Screening for diabetes should occur 6–12 weeks postpartum in these patients. Depression screening is recommended in women in the postpartum period using scales such as the PHQ-9 or the EPDS. Her height and weight should be taken today as part of the office visit, and her BMI should be calculated to screen for obesity. In addition, she should be screened for hypertension, though ambulatory blood pressure monitoring at home is encouraged. Cervical cancer screening is recommended but should be performed depending on her last screening and results. She could be screened every 3 years with cytology or with hrHPV testing every 5 years. Screening for HIV likely occurred during pregnancy as well as did needed immunizations (possibly immediately postpartum), and she does not appear to have risk factors for other sexually transmitted infections to warrant additional screenings.

1. American College of Obstetricians and Gynecologists (ACOG). Screening for perinatal depression. Committee Opinion No. 630. Obstet Gynecol 2015;125:1268-71.
2. American College of Obstetricians and Gynecologists (ACOG). Cervical cancer screening and prevention. Practice Bulletin No. 168. Obstet Gynecol 2016;128:e111-30.
3. Koliopoulos G, Nyaga VN, Santesso N, et al. Cytology versus HPV testing for cervical cancer screening in the general population. Cochrane Database of Systematic Reviews 2017, Issue 8. Art. No: CD008587. DOI:10.1002/14651858.CD008587.pub2.

density. Medicare will cover bone density measurement every 2 years in those considered at risk.

INTEGRATIVE MEDICINE

Integrative medicine practices recommend healthy nutrition sources and eating habits to support a stronger foundation for health and well-being. Nutrition principles in integrative medicine acknowledge the importance of eating a balanced diet; however, some will place more emphasis on consuming plant-based foods while minimizing meat consumption. In short, foods should be eaten in a form that is as natural and unmodified as possible. Integrative medicine does not recommend a single, specific diet for all participants. Rather, the individual and any existing conditions and dysfunctions are considered to determine a nutritional plan that is most appropriate for his or her particular needs. Integrative medicine practices have been used in patients of all age groups to manage a wide range of disease states.

As integrative medicine continues to gain popularity, pharmacists should be aware of the utility and limitations of integrative medicine as part of the health care system and healing process. The study design for integrative and complementary therapies is often flawed due to small study populations, potentially biased design, and subjective outcomes. These flaws make it difficult to interpret the true value of these practices. Careful evaluation of available literature, combined with risk-benefit assessment, should be conducted on an individual basis for each patient prior to making recommendations for any therapy. Patients should be encouraged to seek a practitioner with proper training and credentials for many integrative medicine practices as information related to the fields of integrative medicine are constantly adapting and often have varying nuances for care which may be unfamiliar to those not specialized in the field.

Nutrition and Supplements

Supplements are commonly used in the United States by people of all ages, backgrounds, education levels, and socioeconomic status, even though evidence supporting their use is often lacking or inconclusive. The Council for Responsible Nutrition's 2015 Report noted that 68% of Americans take dietary supplements, defined as vitamins and minerals; specialty supplements such as omega-3 fatty acids, fiber and probiotics; herbals and botanicals, such as green tea and Echinacea; and sports nutrition and weight management supplements like protein powders, energy and rehydration drinks. This report shares that 78% of Americans believe dietary supplements are a smart choice for a healthy lifestyle, and 51% of users claim to take them for overall health and wellness benefits.

In 1994 the FDA approved the Dietary Supplement Health Education Act (DSHEA) that defined dietary supplements, provided specifications for labeling, and outlined regulatory requirements of supplements. Regulations mandating current good manufacturing practices for dietary supplements were finalized by the FDA in 2007. These regulations included requirements for quality assurance, manufacturing facilities,

Box 1. Select Resources for Disease Screening and Prevention

U.S. Preventive Services Task Force consists of mainly primary care practitioners, and costs for preventive screenings and treatment are not considered within the recommendation grade. An application is also available for download, Electronic Preventive Services Selector (ePSS), a tool that can be used to quickly identify screenings for which a patient may be eligible.

Agency for Healthcare Research and Quality provides evidence reports that incorporate comparative effectiveness research as part of the Effective Health Care Program.

The **Community Preventive Services Task Force** conducts systematic reviews to determine economic impact as well as effectiveness of available community-based strategies and programs that are not diagnostic or treatment oriented.

The **Centers for Disease Control and Prevention** provides a preventive services checklist. Providers or patients may complete the quick questionnaire, and the information provided is tailored to the responder. In addition, the CDC provides guidance regarding screening recommendations, particularly for infectious diseases, including STDs and HIV. The Advisory Committee on Immunization Practices immunization schedules are published in the *Morbidity and Mortality Weekly Report* (*MMWR*), together with periodic updates to immunization recommendations. The CDC also provides an immunization assessment tool that can be completed online or on paper to identify which vaccines a patient is eligible to receive.

The **Office of Women's Health** provides fact sheets for patients on a variety of health topics for women, in addition to informational webinars. Federal reports published by the Office of Women's Health may be useful for health care professionals.

The **Office of Disease Prevention and Health Promotion (ODPHP)** is responsible for coordinating and leading such efforts nationally in the United States. Three independent websites are managed by ODPHP to accomplish its mission:

- Main site provides guidance for making health information websites and other digital tools more user-friendly with respect to health literacy, as well as online trainings.
- Healthfinder is intended for consumers to connect the public with available health care services.
- Healthy People provides several resources that can be used in practice, including tools for health program planning, implementation, and evaluation. Other resources include educational webinars and reviews of evidence-based interventions to target various objectives of Healthy People.

The **Substance Abuse and Mental Health Services Administration (SAMHSA)** provides guidance on identifying and managing substance abuse and mental health conditions, as well as data and statistics related to these areas. Providers can use the Behavioral Health Treatment Locator to identify additional resources for patients; other resources, including implementation tools for evidence-based interventions for behavioral health, are available through the organization's National Registry of Evidence-Based Programs and Practices (NREPP).

STD = sexually transmitted disease.

monitoring of consumer complaints and side effects, as well as documentation and reporting to the FDA. The FDA website on dietary supplements provides information on regulation of products along with educational information for consumers and provides a link for reporting adverse effects associated with dietary supplement use.

In addition, the Federal Trade Commission (FTC), United States Pharmacopeia (USP), and the National Sanitation Foundation have roles in regulation and monitoring of the supplement industry. The FTC is tasked with ensuring advertisements and marketing claims are truthful and not misleading. The USP and the National Sanitation Foundation provide additional quality control monitoring for samples of products that are voluntarily submitted.

Recognizing there are both known and undocumented interactions between natural products and prescription drugs, it is important to emphasize the accuracy of medication profiles. Pharmacists should always remember to ask about the use of supplements when interviewing patients about medications. It is important to evaluate available current literature as the amount of published data on supplement use continues to rise.

RESOURCES FOR DISEASE SCREENING AND PREVENTION

Several organizations provide resources to help providers and patients identify the screenings needed. Patient education material regarding screenings and health topics can be used in practice to supplement provider education, and some organizations have online training for health care professionals as well. Select resources are described in Box 1 and Box 2.

CONCLUSION

Preventing the onset of acute and chronic diseases through appropriate screening and risk reduction measures can improve health care spending in the U.S. There are some applications where integrative medication practices have been deemed beneficial in disease state management; however it is important to evaluate available literature on the practices and evaluate the potential benefits and limitations of each supplement. Pharmacists and other health care providers can help patients evaluate complementary and integrative

Box 2. Resources Regarding Health and Wellness

The **National Center for Complementary and Integrative Health (NCCIH)** is a division of the NIH. The NCCIH website contains basic information, including definitions and descriptions, research summaries and references, and guidance for use about many practices and products for patients and practitioners.

The **Cochrane Database of Systematic Reviews** summarizes reputable data available for health practices, including health screenings, and complementary and integrative medicine. Often, available evidence is insufficient to recommend a complementary or integrative medicine practice.

The **Office of Dietary Supplements (ODS),** established by the NIH, promotes scientific research with dietary supplements and has online fact sheets for consumers and health care professionals in English and Spanish.

Natural Medicines Comprehensive Database specifically houses natural product information and treatment of conditions using these products. Users can search for products by the individual ingredients and find monograph information including documented drug interactions, find natural products used for an indication together with ratings for safety and efficacy, review studies on the product, and access patient-friendly information. Branded products can be searched to determine the ingredients included in the product.

American Society of Health-System Pharmacists' website contains information for users on regulation, risks, and considerations of natural products.

The **Homeopathic Pharmacopoeia of the United States** provides access to monographs, publications, and standards related to the practice of homeopathy.

medicine practices. Disease management guidelines and various governmental agencies serve as helpful resources to guide practitioners in the promotion of wellness strategies and appropriate integrative medicine practices.

Practice Points

- **Decisions to implement preventive screenings should be based on a patient's or population's benefit-risk ratio and/or cost-effectiveness. Patient-specific factors may warrant testing of individuals outside guideline recommendations. Use clinical judgment on the benefits of and need for screenings for each individual patient depending on his or her characteristics.**
- **Recommending screenings outside published guidelines may result in increased out-of-pocket medical costs. However, shared decision-making with patients and health care team members is encouraged.**
- **When discussing use of integrative medicine practices with patients, patient autonomy should be respected and assist with safe integration with health care planning.**

REFERENCES

American Cancer Society (ACS). Cancer A-Z. 2017a.

American Cancer Society (ACS). 2017b. Cancer Facts & Figures 2017. Atlanta: ACS, 2017.

Amir E, Freedman OC, Seruga B, et al. Assessing women at high risk of breast cancer: a review of risk assessment models. J Natl Cancer Inst 2010;102:680-91.

Balk EM, Moorthy D, Obadan NO, et al. Diagnosis and Treatment of Obstructive Sleep Apnea in Adults. Comparative Effectiveness Review No. 32 (Prepared by Tufts Evidence-Based Practice Center under Contract No. 290-2007-10055-1). AHRQ Publication No. 11-EHC052-EF. Rockville, MD: Agency for Healthcare Research and Quality, July 2011

Bang H, Edwards AM, Bomback AS, et al. Development and validation of a patient self-assessment score for diabetes risk. Ann Intern Med 2009;151:775-83.

Centers for Disease Control and Prevention (CDC). Preexposure prophylaxis for the prevention of HIV infection in the United States – 2014 Clinical Practice Guideline. 2014.

Centers for Disease Control and Prevention (CDC). CDC Fact Sheet: Reported STDs in the United States, 2016. September 2017.

Coates RJ, Uhler RJ, Brogan DJ, et al. Patterns and predictors of the breast cancer detection methods in women under 45 years of age (United States). Cancer Causes Control 2001;12:431-2.

Committee on Obstetric Practice. The American College of Obstetricians and Gynecologists Committee Opinion No. 630. Screening for perinatal depression. Obstet Gynecol 2015;125:1268-71.

Council for Responsible Nutrition (CRN). 2015 CRN Consumer Survey on Dietary Supplements.

DiNenno EA, Prejean J, Irwin K, et al. Recommendations for HIV screening of gay, bisexual, and other men who have sex with men – United States 2017. MMWR 2017;66:830-2.

Earls MF; for the Committee on Psychosocial Aspects of Child and Family Health American Academy of Pediatrics. Incorporating recognition and management of perinatal and postpartum depression into pediatric practice. Pediatrics 2010;126:1032-9.

Fenton JJ, Weyrich MS, Durbin S, et al. Prostate-Specific Antigen–Based Screening for Prostate Cancer: A Systematic Evidence Review for the U.S. Preventive Services Task Force. Evidence Synthesis No. 154. AHRQ Publication No. 17-05229-EF-1. Rockville, MD: Agency for Healthcare Research and Quality, 2017

Goff DC, Lloyd-Jones DM, Bennett G, et al. 2013 ACC/AHA guideline on the assessment of cardiovascular risk: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation 2014;129:S49-S73.

Hackley BK, Kreibs JM. Primary Care of Women, 2nd ed. Burlington, MA: Jones & Bartlett, 2017.

Hutchinson AB, Farnham PG, Sansom SL, et al. Cost-effectiveness of frequent HIV testing of high-risk populations in the United States. J Acquir Immune Defic Syndr 2016;71:323-30.

Kaczorowski J, Chambers LW, Dolovich L, et al. Improving cardiovascular health at population level: 39 community cluster randomised trial of Cardiovascular Health Awareness Program (CHAP). BMJ 2011;342:d442.

Kahn R, Alperin P, Borch-Johnson K, et al. Age at initiation and frequency of screening to detect type 2 diabetes: a cost-effectiveness analysis. Lancet 2010;375:1365-74.

Kapur VK, Auckley DH, Chowdhuri S, et al. Clinical practice guideline for diagnostic testing for adult obstructive sleep apnea: an American Academy of Sleep Medicine clinical practice guideline. J Clin Sleep Med 2017;13:479-504.

Lin JS, Piper MA, Perdue LA, et al. Screening for colorectal cancer: updated evidence report and systematic review for the US Preventive Services Task Force. JAMA 2016;315:2576-94.

Lin KW, Frost JL. Should screening techniques for colorectal cancer all have an "A" recommendation? No: when it comes to colorectal cancer screening, test choice matters. Am Fam Physician 2017;95:618-20.

Loke YK, Brown JW, Kwok CS, et al. Association of obstructive sleep apnea with risk of serious cardiovascular events. Circ Cardiovasc Qual Outcomes 2012;5:720-8.

Martel M, Barkun AN, Menard C, et al. Split-dose preparations are superior to day-before bowel cleansing regimens: a meta-analysis. Gastroenterology 2015;149:79-88.

Moyer VA; US Preventive Services Task Force. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: a US Preventive Services Task Force recommendation statement. Ann Intern Med 2013a;159:210-8.

Moyer VA; US Preventive Services Task Force. Screening for hepatitis C virus infection in adults: US Preventive Services Task Force recommendation statement. Ann Intern Med 2013b;159:349-57.

Myers MG, Kaczorowski J, Dawes M, et al. Automated office blood pressure measurement in primary care. Can Fam Physician 2014;60:127-32.

National Academies of Sciences, Engineering, and Medicine (NAS). Eliminating the Public Health Problem of Hepatitis B and C in the United States: Phase One Report. Washington, DC: National Academies Press, 2016.

National Comprehensive Cancer Network (NCCN). NCCN Guidelines for Detection, Prevention, and Risk Reduction. NCCN.

National Heart, Lung, and Blood Institute (NHLBI). National Center on Sleep Disorders Research (NCSDR).

National Lung Screening Trial Research Team. Reduced lung-cancer mortality with low-dose computed tomographic screening. N Engl J Med 2011;365:395-409.

Nelson HD, Fu R, Cantor A, et al. Effectiveness of breast cancer screening: systematic review and meta-analysis to update the 2009 US Preventive Services Task Force Recommendation. Ann Intern Med 2016;164:244-55.

Patnode CD, Henderson JT, Thompson JH, et al. Behavioral counseling and pharmacotherapy interventions for tobacco cessation in adults, including pregnant women: a review of reviews for the U.S. Preventive Services Task Force. Ann Intern Med 2015;163:608-21.

Prasad KT, Sehgal IS, Agarwal R, et al. Assessing the likelihood of obstructive sleep apnea: a comparison of nine questionnaires. Sleep Breath 2017 Apr 1. [Epub ahead of print]

Selph S, Dana T, Bougatsos C, et al. Screening for Abnormal Glucose and Type 2 Diabetes Mellitus: A Systematic Review to Update the 2008 U.S. Preventive Services Task Force Recommendation. Evidence Synthesis No. 117. AHRQ Publication No. 13-05190-EF-1. Rockville, MD: Agency for Healthcare Research and Quality, 2015.

Siu AL; for the USPSTF. Screening for depression in adults: US Preventive Services Task Force recommendation statement. JAMA 2016;315:380-7.

Siu AL; for the USPSTF. Screening for high blood pressure in adults: US Preventive Services Task Force recommendation statement. Ann Intern Med 2015;163:778-86.

Smith BD, Morgan RL, Beckett GA, et al. Recommendations for the identification of chronic hepatitis C virus infection among persons born during 1945–1965. MMWR 2012;61(RR4):1-32.

Stahre M, Roeber J, Kanny D, et al. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. Prev Chronic Dis 2014;11:130293.

Tanvetyanon T, Bepler G. Beta-carotene in multivitamins and the possible risk of lung cancer among smokers versus former smokers: a meta-analysis and evaluation of national brands. Cancer 2008;113:150-7.

U.S. Department of Health and Human Services (HHS). The Health Consequences of Smoking – 50 Years of Progress: A Report of the Surgeon General. Atlanta: HHS, 2014.

U.S. Preventive Services Task Force (USPSTF). Published Recommendations.

Whelton PA, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Hypertension 2017 Nov 13. [Epub ahead of print]

Workowski KA, Bolan CA, Centers for Disease Control and Prevention (CDC). Sexually transmitted diseases treatment guidelines, 2015. MMWR Recomm Rep 2015;64(RR3):1-137.

Self-Assessment Questions

Questions 1 and 2 pertain to the following case.

M.Z. is a 42-year-old woman who presents as a new patient at the family medicine clinic. She has not seen a physician in almost 20 years. She takes no OTC or prescription drug therapies and is not aware of any medical diagnoses. Her mother was given a diagnosis of breast cancer at age 55, and M.Z. is worried for herself.

1. According to the recent ACOG guidelines, which one of the following is the best time and frequency for M.Z. to receive a mammogram to screen for breast cancer?

   A. Every year beginning now
   B. Every year beginning at age 50
   C. Every 2 years beginning at age 55
   D. Every 3 years beginning at age 50

2. Which one of the following is also best to recommend for M.Z. according to the USPSTF?

   A. Monthly breast self-examinations
   B. Risk assessment using the Gail model
   C. Risk assessment using FHS-7
   D. Risk assessment using the Claus model

3. The National Lung Screening Trial showed reduced lung cancer mortality using low-dose CT screening (346 deaths/26,455 participants) compared with chest radiography screening (425 deaths/26,232 participants). Which one of the following best approximates the number needed to screen to prevent one lung cancer–related death?

   A. 31
   B. 130
   C. 162
   D. 321

4. A 32-year-old woman who is 9 weeks postpartum presents to the pediatrician for her child's 2-month well-child check. The pediatrician has begun to incorporate maternal postpartum screening as part of this visit. Which one of the following tools is best to use to screen the mother?

   A. EPDS
   B. PHQ-2
   C. PHQ-9
   D. PDSS

5. You are in the planning phase of a health promotion program that will include screening for obstructive sleep apnea in addition to other screenings in a rural community. Which one of the following screening questionnaires is most likely to be beneficial in this particular setting?

   A. ESS
   B. MVAP
   C. STOP
   D. STOP-Bang

Questions 6 and 7 pertain to the following case.

P.G. is a 72-year-old man (BMI 28 kg/m^2) in the clinic today for his annual wellness visit. His medical history is significant only for seasonal allergies, and his current medications include a multivitamin daily and cetirizine 10 mg daily as needed. P.G. quit smoking 8 years ago, but he smoked 2 packs of cigarettes daily for 40 years before quitting. He had a colonoscopy 4 years ago and is up to date on his vaccinations.

6. Which one of the following options for cancer screening, according to the USPSTF, is best to recommend for P.G. at this time?

   A. Colorectal, lung, and prostate
   B. Colorectal and lung
   C. Colorectal and prostate
   D. Lung

7. Which one of the following sets of additional health screenings is best to discuss with P.G.?

   A. Cardiovascular disease and osteoporosis
   B. Thyroid and chronic kidney disease
   C. Abdominal aortic aneurysm and carotid artery stenosis
   D. Chronic obstructive pulmonary disease and diabetes

8. The practice chief at the family medicine clinic wants to screen for HIV more often in high-risk patients but is concerned about costs. Which one of the following is the most cost-effective test group and frequency?

   A. Men who have sex with men (MSM) every 3 months using fourth-generation immunoassay.
   B. MSM every 3 months using rapid point-of-care testing.
   C. Injection drug users every 6 months using fourth-generation immunoassay.
   D. Injection drug users every 6 months using rapid point-of-care testing.

9. An 82-year-old man is in the clinic today for his annual wellness visit. His medical history is significant for hypertension and osteoarthritis, for which he takes lisinopril 40 mg daily and meloxicam 15 mg daily. The patient has never smoked and believes he is up to date on his vaccinations. His last colonoscopy was 15 years ago, and he had a complete physical examination last year. According to the USPSTF, which one of the following preventive screenings is best to recommend for this patient?

   A. Lung cancer
   B. Thyroid disorder

C. Diabetes
D. Depression

10. A 27-year-old woman is concerned that she is not receiving the care she needs. At her recent well-woman examination, she did not have cytology testing as she had the year before, which was negative. She is in a monogamous relationship and is otherwise healthy. According to the current recommendations for cervical cancer screenings, which one of the following is the best response to this patient's concerns?

    A. Cytology should be completed every year because of her risk.
    B. She should receive the human papillomavirus (HPV) vaccination series if not received previously.
    C. Co-testing with cytology and HPV screening every 5 years is warranted because of her age.
    D. Cytology should be completed every 3 years because of her age.

11. The local hospital wishes to host a health promotion event that will include health screenings and other preventive services for the community. Which one of the following resources would be most helpful while planning the event?

    A. USPSTF
    B. Community Preventive Services Task Force
    C. Office of Disease Prevention and Health Promotion
    D. SAMHSA's National Registry of Evidence-Based Programs and Practices

12. A patient wishes to discuss a product for memory impairment that he saw advertised on a television commercial. He is on various prescription drugs that have the potential for drug interactions. Which one of the following resources is best to consult regarding screening for drug-natural product interactions?

    A. Cochrane Database of Systematic Reviews
    B. National Sanitation Foundation
    C. National Center for Complementary and Integrative Health website
    D. Natural Medicines

13. A patient comes to your clinic with an extensive list of nutritional/herbal supplements. She says these products were recommended by her cousin for health and wellness. However, the patient's husband told her none of the products were safe. She wants to learn more about federal regulations on supplement products. Which one of the following websites is best to recommend the patient visit?

    A. FDA Dietary Supplement
    B. Natural Medicines
    C. Cochrane Database of Systematic Reviews
    D. Office of Dietary Supplements

14. You call the manufacturer of a new supplement on the market to inquire about a marketing message that implies the product cures cancer. After speaking to the director of research, you learn that there are no data to support this commercial claim. Which one of the following is the best avenue to address this misinformation?

    A. Report the issue to the FDA.
    B. Report the issue to the FTC.
    C. Write a letter to the newspaper.
    D. Be sure to inform your patients.

15. A patient asks about developing a nutritional/herbal regimen for disease prevention and overall wellness. Recognizing that this is not your specialty, which one of the following is best to recommend for this patient?

    A. Independently review literature and make your best assessment of what to recommend.
    B. Discourage use of supplements since you are not comfortable making any recommendation.
    C. Provide her with list of useful websites and let her decide on her own.
    D. Provide her with list of local integrative medicine providers/clinic to set up an appointment for a consult.