

CURRENT

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Preface

Current Medical Diagnosis & Treatment 2022 (CMDT 2022) is the 61st edition of this single-source reference for practitioners of adult medicine in both hospital and ambulatory settings. The book emphasizes the practical features of clinical diagnosis and patient management in all fields of internal medicine and in specialties of interest to primary care practitioners and to subspecialists who provide general care.

Our students have inspired us to look at issues of race and justice, which surely impact people's health. We have therefore reviewed the contents of our work with the goal of ensuring that it reflects the dignity and equality that every patient deserves.

INTENDED AUDIENCE FOR CMDT

House officers, medical students, and all other health professions students will find the descriptions of diagnostic and therapeutic modalities, with citations to the current literature, of everyday usefulness in patient care.

Internists, family physicians, hospitalists, nurse practitioners, physician assistants, and all primary care providers of adult medicine will appreciate *CMDT* as a ready reference and refresher text. Physicians in other specialties, pharmacists, and dentists will find the book a useful basic medical reference text. Nurses, nurse practitioners, and physician assistants will welcome the format and scope of the book as a means of quickly referencing medical diagnosis and treatment modalities.

Patients and their family members who seek information about the nature of specific diseases and their diagnosis and treatment may also find this book to be a valuable resource.

NEW IN THIS EDITION OF CMDT

- INNOVATIVE TABLE highlighting the “**Year in Review: Key Clinical Updates in CMDT 2022**,” individually listed with page numbers and reference citations, for easy access to significant changes in this edition
- American College of Cardiology/American Heart Association guidelines for managing valvular heart disease and algorithms detailing interventions for primary and secondary mitral regurgitation, aortic valve stenosis, and aortic regurgitation
- American College of Cardiology/American Heart Association guidelines for diagnosing and treating hypertrophic cardiomyopathy
- European Society of Cardiology guidelines for adult congenital disease
- Vericiguat receives FDA approval for treating heart failure
- New section on managing supine hypertension in patients with orthostatic hypertension
- Tables outlining causes of secondary hypertension and the impact of lifestyle modifications on hypertension
- Role of renal sympathetic nerve ablation as an alternative or adjunctive modality in the treatment of hypertension
- Table outlining updated classification of pulmonary hypertension
- Luspatercept has been FDA approved for transfusion-dependent beta-thalassemia
- Sacituzumab govitecan (TRODELVY) is the first antibody-drug conjugate approved for triple-negative breast cancer
- Atezolizumab and bevacizumab have emerged as first-line treatments for hepatocellular carcinoma
- The US Multi-Society Task Force Guideline provides recommendations for repeat colonoscopy
- Extensive revision of Electrolyte & Acid-Base Disorders chapter
- Integration of material regarding SARS-CoV-2 throughout the text, eg, in a new section discussing its effects on the kidney
- Phexxi (a vaginal pH regulator gel containing lactic acid-citric acid-potassium bitartrate) is now FDA approved as a contraceptive gel
- Cabotegravir, an HIV integrase inhibitor medication, has been approved for use in the United States, Canada, and in the European Union. Given intramuscularly with rilpivirine (each in its own site), they are the first once-monthly maintenance regimen for patients with virally suppressed HIV infection
- Fostemsavir and ibalizumab are FDA approved for adults with multidrug-resistant HIV who are not responding to their existing regimen
- Online images in Dermatologic Disorders, Eye & Eye Lid Disorders, Blood Disorders, and Blood Vessel & Lymphatic Disorders chapters

OUTSTANDING FEATURES OF *CMDT*

- Medical advances up to time of annual publication
- Detailed presentation of internal medicine disciplines, plus primary care topics in gynecology, obstetrics, dermatology, ophthalmology, otolaryngology, psychiatry, neurology, toxicology, urology, geriatrics, orthopedics, women's health, sexual and gender minority health, preventive medicine, and palliative care
- Concise format, facilitating efficient use in any practice setting
- More than 1000 diseases and disorders
- Updates on SARS-CoV-2 virus and COVID-19, HIV/AIDS, Ebola virus, Zika virus, and other newly emerging infections
- Specific disease prevention information
- Easy access to medication dosages, with trade names indexed and current costs updated in each edition
- Recent references, with unique identifiers (PubMed, PMID numbers) for rapid downloading of article abstracts and, in some instances, full-text reference articles

E-CHAPTERS, *CMDT ONLINE*, & AVAILABLE APPS

Seven *e-chapters* listed in the Table of Contents can be accessed at www.AccessMedicine.com/CMDT. These online-only chapters (available without need for subscription) include

- Anti-Infective Chemotherapeutic & Antibiotic Agents
- Diagnostic Testing & Medical Decision Making
- Information Technology in Patient Care
- Integrative Medicine
- Podiatric Disorders
- Women's Health Issues
- Appendix: Therapeutic Drug Monitoring, Laboratory Reference Intervals, & Pharmacogenetic Testing

Institutional or individual subscriptions to AccessMedicine also have full electronic access to *CMDT 2022*.

Subscribers to *CMDT Online* receive full electronic access to *CMDT 2022* as well as

- An expanded, dedicated media gallery
- ***Quick Medical Diagnosis & Treatment (QMDT)***—a concise, bulleted version of *CMDT 2022*
- ***Guide to Diagnostic Tests***—for quick reference to the selection and interpretation of commonly used diagnostic tests
- ***CURRENT Practice Guidelines in Primary Care***—delivering concise summaries of the most relevant guidelines in primary care
- ***Diagnosaurus***—consisting of 1000+ differential diagnoses

CMDT 2022, *QMDT*, *Guide to Diagnostic Tests*, and *Diagnosaurus* are also available as individual apps for your smartphone or tablet and can be found in the Apple App Store and Google Play.

SPECIAL RECOGNITION: DAVID B. HELLMANN, MD, MACP

With this edition of *CMDT*, we thank and say goodbye to Dr. David B. Hellmann, a 30-year contributor to the “Rheumatologic, Immunologic, & Allergic Disorders” chapter. For a dozen of those years, Dr. Hellmann coauthored this chapter with Dr. John B. Imboden, Jr., and together they served as coeditors of another McGraw-Hill textbook, *Current Rheumatology Diagnosis & Treatment*.

Dr. Hellmann, a graduate of Yale College, received his medical degree from Johns Hopkins School of Medicine, his internal medicine training on the Osler Service at Hopkins, and completed his fellowship in rheumatology at the University of California San Francisco. A practicing rheumatologist, Dr. Hellmann has been recognized as one of America’s top doctors and has received multiple local and national teaching and service awards. He has published over 200 papers in peer-reviewed journals and books. Now the Aliko Perroti Professor of Medicine at Johns Hopkins School of Medicine, Dr. Hellmann first served as the Program Director for the Osler Medical Training Program at the Johns Hopkins Hospital. From 2000 to 2021, he served as Chairman of the Department of Medicine at Johns Hopkins Bayview Medical Center and became Vice Dean for that campus in 2005.

In 2004, David launched the Center for Innovative Medicine at the Johns Hopkins Bayview campus to bring together and to support people dedicated to promoting the ideal of Medicine as a public trust. This Center has (1) redesigned the Bayview internal medicine training to emphasize knowing the patient as a person; (2) created an Academy of Clinical Excellence; (3) increased the diversity of house staff and faculty leadership; (4) partnered with community centers, religious organizations, and schools to promote public health and wellness; and (5) established a novel Precision Medicine Center of Care at Bayview.

David has also served as Governor for the Maryland Chapter of the American College of Physicians, as a Director of the American Board of Internal Medicine, as a member of the American Internal Medicine Board Foundation, and as editor of *Medicine (Baltimore)*.

He and his wife, Linda, live in Baltimore and enjoy ballroom dancing. They have two children and four granddaughters.

We wish David the very best for continuing his work in the Vasculitis Center he founded at Hopkins Bayview to care for patients with this complex disorder and for continuing his leadership of the Academy of Clinical Excellence in the Center for Innovative Medicine. As his editors, we have been exceedingly grateful for David’s comprehensive and timely annual updates. It has been a sincere pleasure to work with him on *CMDT* for the past 30 years, and we have thoroughly enjoyed our frequent conversations with him. Thank you, David. We will miss working with you!



ACKNOWLEDGMENTS

We wish to thank our authors for participating once again in the annual updating of this important book. We are especially grateful to Asha N. Chesnutt, MD, Mark S. Chesnutt, MD, Patricia A. Cornett, MD, John B. Imboden, Jr., MD, C. Bree Johnson, MD, MPH, Tracy Minichiello, MD, Kevin A. Ostrowski, MD, Thomas J. Prendergast, MD, and Brian S. Schwartz, MD, who are leaving *CMDT* this year. We have all benefited from their clinical wisdom and commitment.

We also wish to extend our heartfelt gratitude to Eva Clark, MD, PhD, and to Wayne Shandera, MD, for authoring the new section on the Severe Acute Respiratory Syndrome—Coronavirus 2019 (SARS-CoV-2) in the Viral chapter of this year’s print edition of *CMDT* and for providing ongoing, current, and expert updates on this topic in *CMDT Online*.

Many students and physicians have contributed useful suggestions to this and previous editions, and we are grateful. We continue to welcome comments and recommendations for future editions in writing or via electronic mail. The editors’ e-mail addresses are below and author e-mail addresses are included in the Authors section.

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With enormous gratitude and respect, we dedicate this 61st anniversary edition of *Current Medical Diagnosis & Treatment* to all health care professionals and staff who have cared for patients with COVID-19. We honor their competence, their humanity, and their bravery.

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Disease Prevention & Health Promotion

Michael Pignone, MD, MPH¹
René Salazar, MD

1

GENERAL APPROACH TO THE PATIENT

The medical interview serves several functions. It is used to collect information to assist in diagnosis (the “history” of the present illness), to understand patient values, to assess and communicate prognosis, to establish a therapeutic relationship, and to reach agreement with the patient about further diagnostic procedures and therapeutic options. It also serves as an opportunity to influence patient behavior, such as in motivational discussions about smoking cessation or medication adherence. Interviewing techniques that avoid domination by the clinician increase patient involvement in care and patient satisfaction. Effective clinician-patient communication and increased patient involvement can improve health outcomes.

▶ Patient Adherence

For many illnesses, successful prevention and treatment depends on difficult fundamental behavioral changes, including altering diet, taking up exercise, giving up smoking, cutting down drinking, wearing masks to prevent infection, and adhering to medication regimens that are often complex. Adherence is a problem in every practice; up to 50% of patients fail to achieve full adherence, and one-third never take their medicines. Many patients with medical problems, even those with access to care, do not seek appropriate care or may drop out of care prematurely. Adherence rates for short-term, self-administered therapies are higher than for long-term therapies and are inversely correlated with the number of interventions, their complexity and cost, and the patient’s perception of overmedication.

As an example, in HIV-infected patients, adherence to antiretroviral therapy is a crucial determinant of treatment success. Studies have unequivocally demonstrated a close relationship between patient adherence and plasma HIV RNA levels, CD4 cell counts, and mortality. Adherence levels of more than 95% are needed to maintain virologic suppression. However, studies show that 40% of patients

are less than 90% adherent and that adherence tends to decrease over time.

Patient reasons for suboptimal adherence include simple forgetfulness, being away from home, being busy, and changing daily routine. Other reasons include psychiatric disorders (depression or substance misuse), uncertainty about the effectiveness of treatment, lack of knowledge about the consequences of poor adherence, regimen complexity, and treatment side effects. The rising costs of medications, including generic drugs, and the increase in patient cost-sharing burden, have made adherence even more difficult, particularly for those with lower incomes.

Patients seem better able to take prescribed medications than to adhere to recommendations to change their diet, exercise habits, or alcohol intake or to perform various self-care activities (such as monitoring blood glucose levels at home). For short-term regimens, adherence to medications can be improved by giving clear instructions. Writing out advice to patients, including changes in medication, may be helpful. Because low functional health literacy is common (almost half of English-speaking US patients are unable to read and understand standard health education materials), other forms of communication—such as illustrated simple text, videotapes, or oral instructions—may be more effective. For non-English-speaking patients, clinicians and health care delivery systems can work to provide culturally and linguistically appropriate health services.

To help improve adherence to long-term regimens, clinicians can work with patients to reach agreement on the goals for therapy, provide information about the regimen, ensure understanding by using the “teach-back” method, counsel about the importance of adherence and how to organize medication-taking, reinforce self-monitoring, provide more convenient care, prescribe a simple dosage regimen for all medications (preferably one or two doses daily), suggest ways to help in remembering to take doses (time of day, mealtime, alarms) and to keep appointments, and provide ways to simplify dosing (medication boxes). Single-unit doses supplied in foil wrappers can increase adherence but should be avoided for patients who have difficulty opening them. Medication boxes with compartments (eg, Medisets) that are filled weekly are useful. Microelectronic devices can provide feedback to show

¹Dr. Pignone is a former member of the US Preventive Services Task Force (USPSTF). The views expressed in this chapter are his and Dr. Salazar’s and not necessarily those of the USPSTF.

patients whether they have taken doses as scheduled or to notify patients within a day if doses are skipped. Reminders, including cell phone text messages, are another effective means of encouraging adherence. The clinician can also enlist social support from family and friends, recruit an adherence monitor, provide a more convenient care environment, and provide rewards and recognition for the patient's efforts to follow the regimen. Collaborative programs in which pharmacists help ensure adherence are also effective. Motivational interviewing techniques can be helpful when patients are ambivalent about their therapy.

Adherence is also improved when a trusting doctor-patient relationship has been established and when patients actively participate in their care. Clinicians can improve patient adherence by inquiring specifically about the behaviors in question. When asked, many patients admit to incomplete adherence with medication regimens, with advice about giving up cigarettes, or with engaging only in "safer sex" practices. Although difficult, sufficient time must be made available for communication of health messages.

Medication adherence can be assessed generally with a single question: "In the past month, how often did you take your medications as the doctor prescribed?" Other ways of assessing medication adherence include pill counts and refill records; monitoring serum, urine, or saliva levels of drugs or metabolites; watching for appointment nonattendance and treatment nonresponse; and assessing predictable drug effects, such as weight changes with diuretics or bradycardia from beta-blockers. In some conditions, even partial adherence, as with drug treatment of hypertension and diabetes mellitus, improves outcomes compared with nonadherence; in other cases, such as HIV antiretroviral therapy or tuberculosis treatment, partial adherence may be worse than complete nonadherence.

▶ Guiding Principles of Care

Ethical decisions are often called for in medical practice, at both the "micro" level of the individual patient-clinician relationship and at the "macro" level of the allocation of resources. Ethical principles that guide the successful approach to diagnosis and treatment are honesty, beneficence, justice, avoidance of conflict of interest, and the pledge to do no harm. Increasingly, Western medicine involves patients in important decisions about medical care, eg, which colorectal screening test to obtain or which modality of therapy for breast cancer or how far to proceed with treatment of patients who have terminal illnesses (see Chapter 5).

The clinician's role does not end with diagnosis and treatment. The importance of the empathic clinician in helping patients and their families bear the burden of serious illness and death cannot be overemphasized. "To cure sometimes, to relieve often, and to comfort always" is a French saying as apt today as it was five centuries ago—as is Francis Peabody's admonition: "The secret of the care of the patient is in caring for the patient." Training to improve mindfulness and enhance patient-centered communication increases patient satisfaction and may also improve clinician satisfaction.

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HEALTH MAINTENANCE & DISEASE PREVENTION

Preventive medicine can be categorized as primary, secondary, or tertiary. Primary prevention aims to remove or reduce disease risk factors (eg, immunization, giving up or not starting smoking). Secondary prevention techniques promote early detection of disease or precursor states (eg, routine cervical Papanicolaou screening to detect carcinoma or dysplasia of the cervix). Tertiary prevention measures are aimed at limiting the impact of established disease (eg, partial mastectomy and radiation therapy to remove and control localized breast cancer).

Tables 1-1 and 1-2 give leading causes of death in the United States and estimates of deaths from preventable causes. Recent data suggest increased mortality rates, driven by increases in suicide and substance misuse and its sequelae. Unintentional injuries, including deaths from opioid-related overdoses, have become the third leading cause of death in the United States. Non-Hispanic Whites with a high school education or less have suffered disproportionately.

Many effective preventive services are underutilized, and few adults receive all of the most strongly recommended services. Several methods, including the use of

Table 1-1. Leading causes of death in the United States, 2018.

Category	Estimate
All causes	2,839,205
1. Diseases of the heart	655,381
2. Malignant neoplasms	599,274
3. Unintentional injuries	167,127
4. Chronic lower respiratory diseases	159,486
5. Cerebrovascular diseases	147,810
6. Alzheimer disease	122,019
7. Diabetes mellitus	84,946
8. Influenza and pneumonia	59,120
9. Nephritis, nephrotic syndrome, and nephrosis	51,386
10. Intentional self-harm (suicide)	48,344

Data from National Center for Health Statistics 2020.

Table 1–2. Leading preventable causes of death in the United States, 2017.

Category	Estimate
Dietary risks	503,390
High systolic blood pressure	454,346
Tobacco	437,706
High fasting plasma glucose	420,192
High BMI	408,831
High LDL cholesterol	221,557
Impaired kidney function	173,378
Air pollution	107,506
Alcohol use	104,536
Drug use	104,440
Low physical activity	70,844
Occupational risks	63,580

BMI, body mass index; LDL, low-density lipoprotein.
Data from the US Burden of Disease Collaborators, 2019.

provider or patient reminder systems (including interactive patient health records), reorganization of care environments, and possibly provision of financial incentives to clinicians (though this remains controversial), can increase utilization of preventive services, but such methods have not been widely adopted.

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PREVENTION OF INFECTIOUS DISEASES

Much of the decline in the incidence and fatality rates of infectious diseases is attributable to public health measures—especially immunization, improved sanitation, and better nutrition.

Immunization remains the best means of preventing many infectious diseases. Recommended immunization schedules for children and adolescents can be found online at <http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html>, and the schedule for adults is at <http://www.cdc.gov/vaccines/schedules/hcp/adult.html> (see also Chapter 30). Substantial morbidity and mortality from vaccine-preventable diseases, such as hepatitis A, hepatitis B, influenza, and pneumococcal infections, continue to occur among adults. Increases in the number of

vaccine-preventable diseases in the United States (eg, regional epidemics) highlight the need to understand the association of vaccine refusal and disease epidemiology.

Evidence suggests annual **influenza vaccination** is safe and effective with potential benefit in all age groups, and the Advisory Committee on Immunization Practices (ACIP) recommends routine influenza vaccination for all persons aged 6 months and older, including all adults. An alternative high-dose inactivated vaccine is available for adults 65 years and older.

Routine use of **23-valent pneumococcal polysaccharide vaccine (PPSV23)** is recommended for adults aged 65 and older. If PPSV23 was administered prior to age 65 years, administer one dose PPSV23 at least 5 years after previous dose. A shared clinical decision-making approach is recommended for use of 13-valent pneumococcal conjugate vaccine (PCV13) in average-risk individuals aged 65 and older.

The ACIP recommends routine use of a single dose of **tetanus, diphtheria, and five-component acellular pertussis vaccine (Tdap)** for adults aged 19–64 years to replace the next booster dose of **tetanus and diphtheria toxoids vaccine (Td)**.

Hepatitis B vaccine administered as a three-dose series is recommended for all children aged 0–18 years and high-risk individuals (ie, health care workers, injection drug users, people with end-stage renal disease). The ACIP recommends **vaccination for hepatitis B** in diabetic patients aged 19–59 years. The hepatitis B vaccine should also be considered in diabetic persons age 60 and older.

Human papillomavirus (HPV) virus-like particle (VLP) vaccines have demonstrated effectiveness in preventing persistent HPV infections and thus may impact the rate of cervical intraepithelial neoplasia (CIN) II–III. The ACIP recommends routine HPV vaccination for children and adults aged 9–26 years. Shared decision-making is recommended for some individuals between 27 and 45 years of age (vaccine is not licensed for adults older than 45 years).

Persons traveling to countries where infections are endemic should take the precautions described in Chapter 30 and at <https://wwwnc.cdc.gov/travel/destinations/list>. Immunization registries—confidential, population-based, computerized information systems that collect vaccination data about all residents of a geographic area—can be used to increase and sustain high vaccination coverage.

Globally, **coronavirus disease 2019 (COVID-19)** has resulted in over 1.2 million deaths in 2020. COVID-19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The impact on frontline workers, including health care workers, has been substantial, and the pandemic has revealed profound inequities in health and health care. In the United States, the COVID-19 mortality rates are higher in Blacks, Latinx, and Native Americans compared to Whites. Several vaccines for SARS-CoV-2 are now available and mass vaccination programs began in early 2021.

The US Preventive Services Task Force (USPSTF) recommends behavioral counseling for adolescents and adults who are sexually active and at increased risk for **sexually**

transmitted infections. Sexually active women aged 24 years or younger and older women who are at increased risk for infection should be screened for chlamydia and gonorrhea. Screening HIV-positive men or men who have sex with men for syphilis every 3 months is associated with improved syphilis detection.

HIV infection remains a major infectious disease problem in the world. The CDC recommends universal HIV screening of all patients aged 13–64, and the USPSTF recommends that clinicians screen adolescents and adults aged 15–65 years. Clinicians should integrate biomedical and behavioral approaches for HIV prevention. In addition to reducing sexual transmission of HIV, initiation of antiretroviral therapy reduces the risk for AIDS-defining events and death among patients with less immunologically advanced disease.

Daily **preexposure prophylaxis (PrEP)** with the fixed-dose combination of tenofovir disoproxil 300 mg and emtricitabine 200 mg (Truvada) should be considered for people who are HIV-negative but at substantial risk for HIV infection. Studies of men who have sex with men suggest that PrEP is very effective in reducing the risk of contracting HIV. Patients taking PrEP should be encouraged to use other prevention strategies, such as consistent condom use and choosing less risky sexual behaviors (eg, oral sex), to maximally reduce their risk. **Postexposure prophylaxis (PEP)** with combinations of antiretroviral drugs is widely used after occupational and nonoccupational contact, and may reduce the risk of transmission by approximately 80%. PEP should be initiated within 72 hours of exposure.

In immunocompromised patients, live vaccines are contraindicated, but many killed or component vaccines are safe and recommended. *Asymptomatic* HIV-infected patients have not shown adverse consequences when given live MMR and influenza vaccinations as well as tetanus, hepatitis B, *Haemophilus influenzae* type b, and pneumococcal vaccinations—all should be given. However, if poliomyelitis immunization is required, the inactivated poliomyelitis vaccine is indicated. In *symptomatic* HIV-infected patients, live-virus vaccines, such as MMR, should generally be avoided, but annual influenza vaccination is safe.

Herpes zoster, caused by reactivation from previous varicella zoster virus infection, affects many older adults and people with immune system dysfunction. It can cause postherpetic neuralgia, a potentially debilitating chronic pain syndrome. The ACIP recommends the herpes zoster subunit vaccine (HZ/su; Shingrix) be used for the prevention of herpes zoster and related complications in immunocompetent adults age 50 and older and in individuals who previously received Zostavax.

Chou R et al. Epidemiology of and risk factors for coronavirus infection in health care workers: a living rapid review. *Ann Intern Med.* 2020;173:120. [PMID: 32369541]

PREVENTION OF CARDIOVASCULAR DISEASE

Cardiovascular diseases (CVDs), including coronary heart disease (CHD) and stroke, represent two of the most important causes of morbidity and mortality in developed countries. Several risk factors increase the risk for coronary disease and stroke. These risk factors can be divided into those that are modifiable (eg, lipid disorders, hypertension, cigarette smoking) and those that are not (eg, age, sex, family history of early coronary disease). Impressive declines in age-specific mortality rates from heart disease and stroke have been achieved in all age groups in North America during the past two decades, in large part through improvement of modifiable risk factors: reductions in cigarette smoking, improvements in lipid levels, and more aggressive detection and treatment of hypertension. This section considers the role of screening for cardiovascular risk and the use of effective therapies to reduce such risk. Key recommendations for cardiovascular prevention are shown in Table 1–3. Guidelines encourage regular assessment of global cardiovascular risk in adults 40–79 years of age without known CVD, using standard cardiovascular risk factors. The role of nontraditional risk factors for improving risk estimation remains unclear.

Cho L et al. Summary of updated recommendations for primary prevention of cardiovascular disease in women: JACC State-of-the-Art Review. *J Am Coll Cardiol.* 2020;75:2602. [PMID: 32439010]

Lin JS et al. Nontraditional risk factors in cardiovascular disease risk assessment: a systematic evidence report for the US Preventive Services Task Force [Internet]. Rockville, MD: Agency for Healthcare Research and Quality (US); 2018 Jul. <https://www.ncbi.nlm.nih.gov/books/NBK525925/> [PMID: 30234933]

Wall HK et al. Vital signs: prevalence of key cardiovascular disease risk factors for Million Hearts 2022—United States, 2011–2016. *MMWR Morb Mortal Wkly Rep.* 2018;67:983. [PMID: 30188885]

▶ Abdominal Aortic Aneurysm

One-time screening for abdominal aortic aneurysm (AAA) by ultrasonography is recommended by the USPSTF (B recommendation) in men aged 65–75 years who have ever smoked. One-time screening for AAA is associated with a relative reduction in odds of AAA-related mortality over 12–15 years (odds ratio [OR] 0.65 [95% confidence interval [CI] 0.57–0.74]) and a similar reduction in AAA-related ruptures (OR 0.62 [95% CI 0.55–0.70]). Women who have never smoked and who have no family history of AAA do not appear to benefit from such screening (D recommendation); the current evidence for women who have ever smoked or who have a family history of AAA is insufficient to assess the balance of risks versus benefits (I recommendation) (Table 1–3).

Centers for Disease Control and Prevention (CDC). Pneumococcal vaccination. <https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html>

Centers for Disease Control and Prevention (CDC). Recommended Adult Immunization Schedule for ages 19 years or older, United States, 2020. <https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html>

Table 1–3. Expert recommendations for cardiovascular risk prevention methods: US Preventive Services Task Force (USPSTF).¹

Prevention Method	Recommendation/[Year Issued]
Screening for abdominal aortic aneurysm (AAA)	<p>Recommends one-time screening for AAA by ultrasonography in men aged 65–75 years who have ever smoked. (B)</p> <p>Selectively offer screening for AAA in men aged 65–75 years who have never smoked. (C)</p> <p>Current evidence is insufficient to assess the balance of benefits and harms of screening for AAA in women aged 65–75 years who have ever smoked or have a family history of AAA. (I)</p> <p>Recommends against routine screening for AAA in women who have never smoked and have no family history of AAA. (D)</p> <p>[2019]</p>
Aspirin use	<p>Recommends initiating low-dose aspirin use for the primary prevention of cardiovascular disease (CVD) and colorectal cancer (CRC) in adults aged 50–59 years who have a 10% or greater 10-year CVD risk, are not at increased risk for bleeding, have a life expectancy of at least 10 years, and are willing to take low-dose aspirin daily for at least 10 years. (B)</p> <p>The decision to initiate low-dose aspirin use for the primary prevention of CVD and CRC in adults aged 60–69 years who have a 10% or greater 10-year CVD risk should be an individual one. Persons who are not at increased risk for bleeding, have a life expectancy of at least 10 years, and are willing to take low-dose aspirin daily for at least 10 years are more likely to benefit. Persons who place a higher value on the potential benefits than the potential harms may choose to initiate low-dose aspirin. (C)</p> <p>The current evidence is insufficient to assess the balance of benefits and harms of initiating aspirin use for the primary prevention of CVD and CRC in adults younger than 50 years or older than age 70. (I)</p> <p>[2016]</p>
Blood pressure screening	<p>The USPSTF recommends screening for high blood pressure in adults aged 18 years or older. The USPSTF recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment. (A)</p> <p>[2015]</p>
Serum lipid screening and use of statins for prevention	<p>The USPSTF recommends that adults without a history of CVD use a low- to moderate-dose statin for the prevention of CVD events and mortality when all of the following criteria are met: (1) they are aged 40–75 years; (2) they have one or more CVD risk factors (ie, dyslipidemia, diabetes mellitus, hypertension, or smoking); and (3) they have a calculated 10-year risk of a cardiovascular event of 10% or greater.</p> <p>Identification of dyslipidemia and calculation of 10-year CVD event risk requires universal lipids screening in adults aged 40–75 years. See the “Clinical Considerations” section of the USPSTF recommendations¹ for more information on lipids screening and the assessment of cardiovascular risk. (B)</p> <p>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of initiating statin use for the primary prevention of CVD events and mortality in adults aged 76 years and older without a history of heart attack or stroke. (I)</p> <p>[2016]</p>
Counseling about healthful diet and physical activity for CVD prevention	<p>Recommends offering or referring adults who are overweight or obese and have additional CVD risk factors to intensive behavioral counseling interventions to promote a healthful diet and physical activity for CVD prevention. (B)</p> <p>[2014]</p> <p>Recommends that primary care professionals individualize the decision to offer or refer adults without obesity who do not have hypertension, dyslipidemia, abnormal blood glucose levels, or diabetes to behavioral counseling to promote a healthful diet and physical activity. (C)</p> <p>[2017]</p>
Screening for diabetes mellitus	<p>Recommends screening for abnormal blood glucose as part of cardiovascular risk assessment in adults aged 40–70 years who are overweight or obese. Clinicians should offer or refer patients with abnormal blood glucose to intensive behavioral counseling interventions to promote a healthful diet and physical activity. (B)</p> <p>[2015]</p>
Screening for smoking and counseling to promote cessation	<p>Recommends that clinicians ask all adults about tobacco use, advise them to stop using tobacco, and provide behavioral interventions and US Food and Drug Administration (FDA)–approved pharmacotherapy for cessation to adults who use tobacco. (A)</p> <p>[2015]</p>

¹US Preventive Services Task Force recommendations available at <http://www.uspreventiveservicestaskforce.org/BrowseRec/Index/browse-recommendations>.

Recommendation A: The USPSTF strongly recommends that clinicians routinely provide the service to eligible patients. (The USPSTF found good evidence that the service improves important health outcomes and concludes that benefits substantially outweigh harms.)

Recommendation B: The USPSTF recommends that clinicians routinely provide the service to eligible patients. (The USPSTF found at least fair evidence that the service improves important health outcomes and concludes that benefits substantially outweigh harms.)

Recommendation C: The USPSTF makes no recommendation for or against routine provision of the service.

Recommendation D: The USPSTF recommends against routinely providing the service to asymptomatic patients. (The USPSTF found at least fair evidence that the service is ineffective or that harms outweigh benefits.)

Recommendation I: The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing the service.

- Guirguis-Blake JM et al. Primary care screening for abdominal aortic aneurysm: updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA*. 2019;322:2219. [PMID: 31821436]
- US Preventive Services Task Force, Owens DK et al. Screening for abdominal aortic aneurysm: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2019;322:2211. [PMID: 31821437]
- Ying AJ et al. Abdominal aortic aneurysm screening: a systematic review and meta-analysis of efficacy and cost. *Ann Vasc Surg*. 2019;54:298. [PMID: 30081169]

associated with improvement of chronic obstructive pulmonary disease symptoms. On average, women smokers who quit smoking by age 35 add about 3 years to their life expectancy, and men add more than 2 years to theirs. Smoking cessation can increase life expectancy even for those who stop after the age of 65.

Although tobacco use constitutes the most serious common medical problem, it is undertreated. Almost 40% of smokers attempt to quit each year, but only 4% are successful. Persons whose clinicians advise them to quit are 1.6 times as likely to attempt quitting. Over 70% of smokers see a physician each year, but only 20% of them receive any medical quitting advice or assistance.

Factors associated with successful cessation include having a rule against smoking in the home, being older, and having greater education. Several effective clinical interventions are available to promote smoking cessation, including counseling, pharmacotherapy, and combinations of the two.

Helpful counseling strategies are shown in Table 1–4. Additionally, a system should be implemented to identify smokers, and advice to quit should be tailored to the patient's level of readiness to change. All patients trying to quit should be offered pharmacotherapy (Table 1–5) except those with medical contraindications, women who are pregnant or breast-feeding, and adolescents. Weight gain occurs in most patients (80%) following smoking cessation. Average weight gain is 2 kg, but for some (10–15%), major weight gain—over 13 kg—may occur. Planning for the possibility of weight gain, and means of mitigating it, may help with maintenance of cessation.

Several pharmacologic therapies shown to be effective in promoting cessation are summarized in Table 1–5. Nicotine replacement therapy doubles the chance of successful quitting. The nicotine patch, gum, and lozenges are

▶ Cigarette Smoking

Cigarette smoking remains the most important cause of preventable morbidity and early mortality. In 2015, there were an estimated 6.4 million premature deaths in the world attributable to smoking and tobacco use; smoking is the second leading cause of disability-adjusted life-years lost. Cigarettes are responsible for one in every five deaths in the United States, or over 480,000 deaths annually. Annual cost of smoking-related health care is approximately \$130 billion in the United States, with another \$150 billion in productivity losses. Fortunately, US smoking rates have been declining; in 2015, 15.1% of US adults were smokers, and by 2018, 13.7% were smokers. Global direct health care costs from smoking in 2012 were estimated at \$422 billion, with total costs of over \$1.4 trillion.

Over 41,000 deaths per year in the United States are attributable to environmental tobacco smoke.

Smoking cessation reduces the risks of death and of myocardial infarction in people with coronary artery disease; reduces the rate of death and acute myocardial infarction in patients who have undergone percutaneous coronary revascularization; lessens the risk of stroke; and is

Table 1–4. Inquiries to help in support of smoking cessation.

Component	Helpful Clinician Statements and Inquiries
Communicate your caring and concern	<p>"I am concerned about the effects of smoking on your health... and want you to know that I am willing to help you to quit"</p> <ul style="list-style-type: none"> • and so how do you feel about quitting?" • do you have any fears or ambivalent feelings about quitting?"
Encourage the patient to talk about the quitting process	<p>"Tell me..."</p> <ul style="list-style-type: none"> • why do you want to quit smoking?" • when you tried quitting smoking in the past, what sort of difficulties did you encounter?" • were you able to succeed at all, even for a while?" • what concerns or worries do you have about quitting now?"
Provide basic information about smoking (eg, its addictive nature) and successful quitting (eg, nature and time course of withdrawal)	<p>"Did you know that..."</p> <ul style="list-style-type: none"> • the nicotine in cigarette smoke is highly addictive?" • within a day of stopping, you will notice nicotine withdrawal symptoms, such as irritability and craving?" • after you quit, any smoking (even a single puff) makes it likely that you will fully relapse into smoking again?"
Encourage the patient to make a quit attempt	<p>"I want you to reassure you that..."</p> <ul style="list-style-type: none"> • as your clinician, I believe you are going to be able to quit." • there are now available many effective smoking cessation treatments." • more than half the people who have ever smoked have now successfully quit"

Table 1-5. Medications for tobacco dependence and smoking cessation.

Drug	Some Formulations	Usual Adult Dosage ^{1,2}	Cost 30 days
Nicotine Replacement Therapies (NRTs)			
Nicotine transdermal patch ³ – generic (NicoDerm CQ)	7, 14, 21 mg/24-h patches	1 patch/day ⁴	\$57.40
Nicotine polacrilex gum ³ – generic (Nicorette gum)	2, 4 mg/pieces	8–24 pieces/day ^{4,5,6}	\$63.12
Nicotine polacrilex lozenge ^{3,7} – generic (Nicorette lozenge)	2, 4 mg/lozenges	8–20 lozenges/day ^{4,5,8}	\$66.24
Nicotine oral inhaler – Nicotrol	10 mg cartridges ⁹	4–16 cartridges/day ⁴	\$551.11
Nicotine nasal spray – Nicotrol NS	200 sprays/10 mL bottles (0.5 mg/spray)	2 sprays 8–40×/day (max 10 sprays/h) ³	\$578.66 (4-bottle package)
Dopaminergic-Noradrenergic Reuptake Inhibitor			
Bupropion SR – generic	100, 150, 200 mg SR tablets ¹⁰	150 mg orally once daily × 3 days, then 150 mg orally twice daily	\$108.60
Nicotinic Receptor Partial Agonist			
Varenicline tartrate – Chantix	0.5, 1 mg tablets	0.5 mg orally once daily × 3 days, then 0.5 mg twice daily on days 4–7, then 1 mg twice daily	\$585.60

SR, sustained-release.

¹Dosage reductions may be needed for liver or kidney impairment.

²Patients should receive a minimum of 3–6 months of effective therapy. In general, the dosage of NRTs can be tapered at the end of treatment; bupropion SR and varenicline can usually be stopped without a gradual dosage reduction, but some clinicians recommend a taper.

³Available over the counter for persons ≥ 18 years old.

⁴See expanded table for dosage titration instructions, available at: medcalletter.org/TML-article-1576c.

⁵Avoid eating or drinking within 15 minutes of using a gum or lozenge.

⁶A second piece of gum can be used within 1 hour. Continuously chewing one piece after another is not recommended.

⁷Also available in a mini-lozenge.

⁸Maximum of 5 lozenges in 6 hours or 20 lozenges/day. Use of more than 1 lozenge at a time or continuously using one after another is not recommended.

⁹Each cartridge delivers 4 mg of nicotine.

¹⁰Only the generic 150-mg SR tablets are FDA-approved as a smoking cessation aid.

Modified, with permission, from Drugs for smoking cessation. *Med Lett Drugs Ther.* 2019 Jul 15;61(1576):105–10. <http://www.medcalletter.org>. Average wholesale price (AWP, for AB-rated generic when available) for quantity listed. Source: IBM Micromedex Red Book (electronic version) IBM Watson Health, Greenwood Villae, CO, Available at <https://micromedexsolutions.com>, accessed March 27, 2021. AWP may not accurately represent the actual pharmacy cost because wide contractual variations exist among institutions.

available over the counter and nicotine nasal spray and inhalers by prescription. The sustained-release antidepressant drug bupropion (150–300 mg/day orally) is an effective smoking cessation agent and is associated with minimal weight gain, although seizures are a contraindication. It acts by boosting brain levels of dopamine and norepinephrine, mimicking the effect of nicotine. Varenicline, a partial nicotinic acetylcholine-receptor agonist, has been shown to improve cessation rates; however, its adverse effects, particularly its effects on mood, are not completely understood and warrant careful consideration. No single pharmacotherapy is clearly more effective than others, so patient preferences and data on adverse effects should be taken into account in selecting a treatment. Combination therapy is more effective than a single pharmacologic modality. The efficacy of e-cigarettes in smoking cessation has not been well evaluated, and some users may find them addictive. Recent reports of “vaping-related” lung disease

should prompt additional caution in the use of unregulated nicotine delivery devices for smoking cessation (see Chapter 9).

Clinicians should not show disapproval of patients who fail to stop smoking or who are not ready to make a quit attempt. Thoughtful advice that emphasizes the benefits of cessation and recognizes common barriers to success can increase motivation to quit and quit rates. An upcoming medical procedure or intercurrent illness or hospitalization may motivate even the most addicted smoker to quit.

Individualized or group counseling is very cost effective, even more so than treating hypertension. Smoking cessation counseling by telephone (“quitlines”) and text messaging-based interventions have both proved effective. An additional strategy is to recommend that any smoking take place outdoors to limit the effects of passive smoke on housemates and coworkers. This can lead to smoking reduction and quitting.

Public policies, including higher cigarette taxes and more restrictive public smoking laws, have also been shown to encourage cessation, as have financial incentives directed to patients.

Anonymous. Drugs for smoking cessation. *Med Lett Drugs Ther.* 2019;61:105. [PMID: 31381546]

Black N et al. Behaviour change techniques associated with smoking cessation in intervention and comparator groups of randomized controlled trials: a systematic review and meta-regression. *Addiction.* 2020;115:2008. [PMID: 32196796]

Centers for Disease Control and Prevention (CDC). Current cigarette smoking among adults in the United States. 2020 December 10. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm

Hollands GJ et al. Interventions to increase adherence to medications for tobacco dependence. *Cochrane Database Syst Rev.* 2019;8:CD009164. [PMID: 31425618]

Tibuakuu M et al. National trends in cessation counseling, prescription medication use, and associated costs among US adult cigarette smokers. *JAMA Netw Open.* 2019;2:e194585. [PMID: 31125108]

Villanti AC et al. Smoking-cessation interventions for U.S. young adults: updated systematic review. *Am J Prev Med.* 2020;59:123. [PMID: 32418800]

Lipid Disorders

Higher low-density lipoprotein (LDL) cholesterol concentrations and lower high-density lipoprotein (HDL) levels are associated with an increased risk of CHD (see Chapter 28). Measurement of total and high-density lipoprotein cholesterol levels can help assess the degree of CHD risk. The best age to start screening is controversial, as is its frequency. Cholesterol-lowering therapy reduces the relative risk of CHD events, with the degree of reduction proportional to the reduction in LDL cholesterol achieved, at least at LDL levels greater than 100 mg/dL. The absolute benefits of screening for—and treating—abnormal lipid levels depend on the presence and level of other cardiovascular risk factors, including hypertension, diabetes mellitus, smoking, age, and sex. If other risk factors are present, atherosclerotic CVD risk is higher and the potential benefits of therapy are greater. Patients with known CVD are at higher risk and have larger benefits from reduction in LDL cholesterol. The optimal risk threshold for initiating statins for primary prevention remains somewhat controversial, although most guidelines now suggest statin therapy when the 10-year atherosclerotic cardiovascular risk is greater than 10%.

Evidence for the effectiveness of statin-type drugs is better than for the other classes of lipid-lowering agents or dietary changes specifically for improving lipid levels. Multiple large, randomized, placebo-controlled trials have demonstrated important reductions in total mortality, major coronary events, and strokes with lowering levels of LDL cholesterol by statin therapy for patients with known CVD. Statins also reduce cardiovascular events for patients with diabetes mellitus. For patients with no previous history of cardiovascular events or diabetes, meta-analyses have shown important reductions of cardiovascular events.

Newer antilipidemic monoclonal antibody agents (eg, evolocumab and alirocumab) lower LDL cholesterol by 50–60% by binding proprotein convertase subtilisin kexin

type 9 (PCSK9), which decreases the degradation of LDL receptors. PCSK9 inhibitors also decrease Lp(a) levels. These newer agents are very expensive so are often used mainly in high-risk patients when statin therapy does not reduce the LDL cholesterol sufficiently at maximally tolerated doses or when patients are intolerant of statins. So far, few side effects have been reported with PCSK9 inhibitor use.

Guidelines for statin and PCSK9 therapy are discussed in Chapter 28.

Mortensen MB et al. Elevated LDL cholesterol and increased risk of myocardial infarction and atherosclerotic cardiovascular disease in individuals aged 70–100 years: a contemporary primary prevention cohort. *Lancet.* 2020;396:1644. [PMID: 33186534]

Navarese EP et al. Association between baseline LDL-C level and total and cardiovascular mortality after LDL-C lowering: a systematic review and meta-analysis. *JAMA.* 2018;319:1566. [PMID: 29677301]

US Preventive Services Task Force. Statin use for the primary prevention of cardiovascular disease in adults: US Preventive Services Task Force Recommendation Statement. *JAMA.* 2016;316:1997. [PMID: 27838723]

Hypertension

According to the American Heart Association, over 133 million US adults have hypertension, of which approximately 83 million are eligible for pharmacologic treatment. Of these 83 million, hypertension is treated in only about 66% and well controlled in only about 30% (see Chapter 11). In every adult age group, higher values of systolic and diastolic blood pressure carry greater risks of stroke and heart failure. Systolic blood pressure is a better predictor of morbid events than diastolic blood pressure. Home monitoring is better correlated with target organ damage than clinic-based values. Clinicians can apply specific blood pressure criteria, such as those of the Joint National Committee or American Heart Association guidelines, along with consideration of the patient's cardiovascular risk and personal values, to decide at what levels treatment should be considered in individual cases.

Primary prevention of hypertension can be accomplished by strategies aimed at both the general population and special high-risk populations. The latter include persons with high-normal blood pressure or a family history of hypertension, Blacks, and individuals with various behavioral risk factors, such as physical inactivity; excessive consumption of salt, alcohol, or calories; and deficient intake of potassium. Effective interventions for primary prevention of hypertension include reduced sodium and alcohol consumption, weight loss, and regular exercise. Potassium supplementation lowers blood pressure modestly, and a diet high in fresh fruits and vegetables and low in fat, red meats, and sugar-containing beverages also reduces blood pressure. Interventions of unproven efficacy include pill supplementation of potassium, calcium, magnesium, fish oil, or fiber; macronutrient alteration; and stress management.

Improved identification and treatment of hypertension is a major cause of the recent decline in stroke deaths as well as the reduction in incidence of heart failure-related hospitalizations. Because hypertension is usually asymptomatic,

screening is strongly recommended to identify patients for treatment. Elevated office readings should be confirmed with repeated measurements, ideally from ambulatory monitoring or home measurements. Despite strong recommendations in favor of screening and treatment, hypertension control remains suboptimal. An intervention that included both patient and provider education was more effective than provider education alone in achieving control of hypertension, suggesting the benefits of patient participation; another trial found that home monitoring combined with telephone-based nurse support was more effective than home monitoring alone for blood pressure control. Pharmacologic management of hypertension is discussed in Chapter 11.

Bundy JD et al. Comparison of the 2017 ACC/AHA Hypertension Guideline with earlier guidelines on estimated reductions in cardiovascular disease. *Curr Hypertens Rep.* 2019;21:76. [PMID: 31473837]

Fryar CD et al. Hypertension prevalence and control among adults: United States, 2015–2016. *NCHS Data Brief.* 2017; (289):1–8. [PMID: 29155682]

Ritche MD et al. Potential need for expanded pharmacologic treatment and lifestyle modification services under the 2017 ACC/AHA Hypertension Guideline. *J Clin Hypertens (Greenwich).* 2018;20:1377. [PMID: 30194806]

Whelton PK et al. 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.* 2018;71:1269. [PMID: 29133354]

▶ Chemoprevention

Regular use of low-dose aspirin (81–325 mg) can reduce cardiovascular events but increases gastrointestinal bleeding. Aspirin may also reduce the risk of death from several common types of cancer (colorectal, esophageal, gastric, breast, prostate, and possibly lung). The potential benefits of aspirin may exceed the possible adverse effects among middle-aged adults who are at increased cardiovascular risk, which can be defined as a 10-year risk of greater than 10%, and who do not have an increased risk of bleeding. A newer trial in older healthy adults did not find clear benefit from aspirin for reduction of cardiovascular events and saw an increase in all-cause mortality with aspirin. Therefore, aspirin should not be routinely initiated in healthy adults over age 70.

Nonsteroidal anti-inflammatory drugs may reduce the incidence of colorectal adenomas and polyps but may also increase heart disease and gastrointestinal bleeding, and thus are not recommended for colon cancer prevention in average-risk patients.

Antioxidant vitamin (vitamin E, vitamin C, and beta-carotene) supplementation produced no significant reductions in the 5-year incidence of—or mortality from—vascular disease, cancer, or other major outcomes in high-risk individuals with coronary artery disease, other occlusive arterial disease, or diabetes mellitus.

Gaziano JM. Aspirin for primary prevention: clinical considerations in 2019. *JAMA.* 2019;321:253. [PMID: 30667488]

Huang WY et al. Frequency of intracranial hemorrhage with low-dose aspirin in individuals without symptomatic cardiovascular disease: a systematic review and meta-analysis. *JAMA Neurol.* 2019;76:906. [PMID: 31081871]

Marquis-Gravel G et al. Revisiting the role of aspirin for the primary prevention of cardiovascular disease. *Circulation.* 2019;140:1115. [PMID: 31545683]

Patrono C et al. Role of aspirin in primary prevention of cardiovascular disease. *Nat Rev Cardiol.* 2019;16:675. [PMID: 31243390]

Zheng SL et al. Association of aspirin use for primary prevention with cardiovascular events and bleeding events: a systematic review and meta-analysis. *JAMA.* 2019;321:277. [PMID: 30667501]

PREVENTION OF OSTEOPOROSIS

See Chapter 26.

Osteoporosis, characterized by low bone mineral density, is common and associated with an increased risk of fracture. The lifetime risk of an osteoporotic fracture is approximately 50% for women and 30% for men. Osteoporotic fractures can cause significant pain and disability. As such, research has focused on means of preventing osteoporosis and related fractures. Primary prevention strategies include calcium supplementation, vitamin D supplementation, and exercise programs. The effectiveness of calcium and vitamin D for fracture prevention remain controversial, particularly in noninstitutionalized individuals.

Screening for osteoporosis on the basis of low bone mineral density is recommended for women over age 65, based on indirect evidence that screening can identify women with low bone mineral density and that treatment of women with low bone density with bisphosphonates is effective in reducing fractures. However, real-world adherence to pharmacologic therapy for osteoporosis is low: one-third to one-half of patients do not take their medication as directed. Screening for osteoporosis is also recommended in younger women who are at increased risk. The effectiveness of screening in men has not been established. Concern has been raised that bisphosphonates may increase the risk of certain uncommon atypical types of femoral fractures and rare osteonecrosis of the jaw, making consideration of the benefits and risks of therapy important when considering osteoporosis screening.

US Preventive Services Task Force. Screening for osteoporosis to prevent fractures: US Preventive Services Task Force recommendation statement. *JAMA.* 2018;319:2521. [PMID: 29946735]

US Preventive Services Task Force. Vitamin D, calcium, or combined supplementation for the primary prevention of fractures in community-dwelling adults: US Preventive Services Task Force recommendation statement. *JAMA.* 2018;319:1592. [PMID: 29677309]

Yedavally-Yellayi S et al. Update on osteoporosis. *Prim Care.* 2019;46:175. [PMID: 30704657]

PREVENTION OF PHYSICAL INACTIVITY

Lack of sufficient physical activity is the second most important contributor to preventable deaths, trailing only tobacco use. The US Department of Health and Human Services and the CDC recommend that adults (including