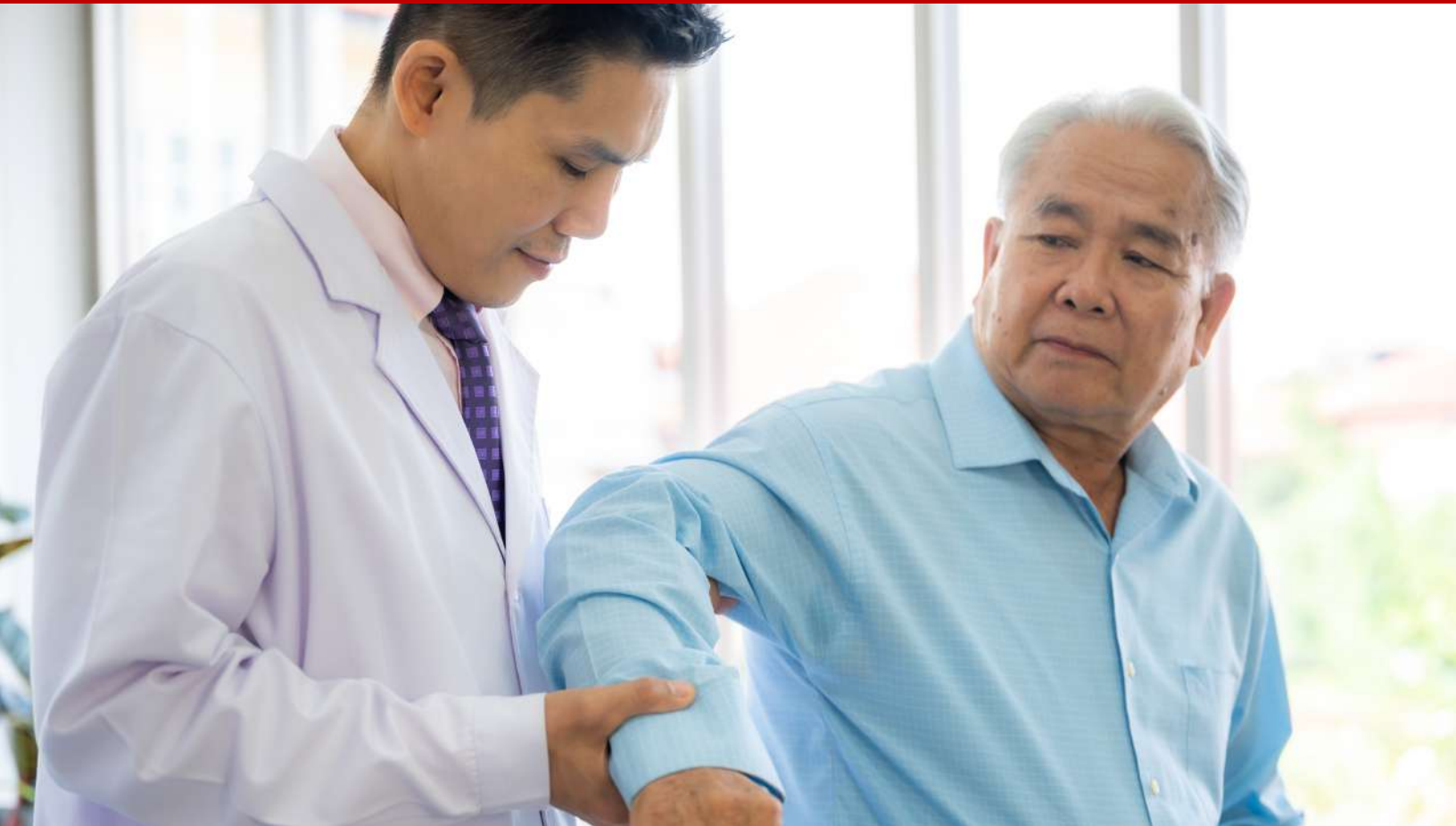




# Osteoporosis



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## Introduction

Research presented by the Centers for Disease Control and Prevention (CDC) indicates that osteoporosis is one of the most prevalent bone diseases affecting Americans. Research presented by the CDC also indicates that the cases of osteoporosis may be on the rise. The question is, what should health care professionals know about osteoporosis to optimize patient care and patient outcomes? This course will answer that very question, while highlighting osteoporosis screening, prevention, and treatment recommendations.

## Section 1: Osteoporosis

A 68-year-old female patient presents to a health care facility with a fractured wrist. Upon questioning, the patient reports that she believes she "hurt her wrist" when she used her right hand to brace herself when she "slipped in the bathroom." Further questioning by a health care professional reveals that the patient has a history of alcohol and tobacco use. As the conversation with the patient continues, the health care professional examining the patient begins to consider the possibility of osteoporosis. The question that remains is, what should health care professionals know about osteoporosis to optimize patient care and patient outcomes? The straightforward answer to the previous question is that health care professionals should be familiar with osteoporosis concepts central to patient care. With that in mind, this section of the course will review osteoporosis concepts, while providing insight into osteoporosis screening recommendations. The information found within this section of the course was derived from materials provided by the National Institute of Arthritis and Musculoskeletal and Skin Diseases unless, otherwise, specified (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2019).

### What is osteoporosis?

Osteoporosis may refer to a condition in which the bones become thinner, weaker, and more likely to fracture or break.

Health care professionals should note the following: individuals suffering from osteoporosis typically have less bone mass and strength; osteoporosis typically develops without any symptoms or pain, and it is usually not discovered until the weakened bones cause painful fractures (e.g., hip, wrist, and spine fractures); osteoporosis is the major

cause of fractures in postmenopausal women and in older adult men (note: the term older adult may refer to an individual 65 years or older).

## What causes osteoporosis?

Osteoporosis occurs when too much bone mass is lost and changes occur in the structure of bone tissue, which impacts the strength and thickness of the bones.

## What are the risk factors for osteoporosis?

- **Age** - the first risk factor that may come to mind when considering osteoporosis is age. Older adults are at higher risk for developing osteoporosis because as individuals age, bone loss happens faster, and new bone growth is slower. Thus, over time, bones weaken and the risk for osteoporosis increases (note: most individuals suffering from osteoporosis are over the age of 50).
- **Gender** - another risk factor that may initially come to mind when considering osteoporosis is gender. Unfortunately, women are at greater risk for developing osteoporosis when compared to men. Health care professionals should note the following: women are four times more likely to develop osteoporosis than men; women over the age of 50 or postmenopausal women have the greatest risk of developing osteoporosis; women undergo rapid bone loss in the first 10 years after entering menopause, because menopause slows the production of estrogen, a hormone that protects against excessive bone loss.
- **Body size** - slender, thin-boned women and men are at greater risk for developing osteoporosis because they have less bone to lose compared to larger boned women and men.
- **Hormone changes** - low levels of certain hormones can increase the chances of developing osteoporosis (e.g., low estrogen levels in women after menopause; low levels of estrogen from the abnormal absence of menstrual periods in premenopausal women due to hormone disorders or extreme levels of physical activity; low levels of testosterone in men).
- **Family history** - evidence suggests that the risk for osteoporosis and fractures may increase for an individual if his or her parents have a history of osteoporosis or hip fracture.

- **Diet** - beginning in childhood and into older adulthood, a diet low in calcium and vitamin D can increase individuals' risk for osteoporosis and fractures. Additionally, excessive dieting or poor protein intake may increase individuals' risk for bone loss and osteoporosis.
- **Chronic, heavy alcohol consumption** - evidence suggests that chronic, heavy alcohol consumption compromises bone health and increases the risk of osteoporosis (note: heavy alcohol use decreases bone density and weakens bones' mechanical properties; for men, heavy drinking is typically defined as consuming 15 drinks or more per week; for women, heavy drinking is typically defined as consuming eight drinks or more per week).
- **Tobacco use** - research indicates that tobacco use/smoking may increase the risk for developing osteoporosis.
- **Sedentary lifestyle** - research indicates that a sedentary lifestyle may increase the risk for developing osteoporosis (note: a sedentary lifestyle may refer to an inactive lifestyle characterized by prolonged periods of sitting and/or lying down and a lack of physical activity; physical activity may refer to any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level).
- **Medical conditions** - the following medical conditions may increase the risk of developing osteoporosis: endocrine and hormonal diseases, gastrointestinal diseases, rheumatoid arthritis, certain types of cancer, human immunodeficiency virus (HIV), acquired immunodeficiency syndrome (AIDS), and anorexia nervosa.
- **Osteopenia (low bone mass)** - to build on the previous risk factor, osteopenia, also referred to as low bone mass, may lead to osteoporosis (note: osteopenia may refer to a condition characterized by low bone mass that is not severe enough to be called osteoporosis; osteopenia typically occurs because of low peak bone mass and/or bone loss after the age of 30; osteopenia is often considered to be "pre-osteoporosis").
- **Medications** - long-term use of the following medications may increase the risk of developing osteoporosis: glucocorticoids and adrenocorticotrophic hormone, which may be used to treat asthma and rheumatoid arthritis; antiepileptic medicines, which may be used to treat seizures and other neurological disorders; selective serotonin reuptake inhibitors, which may be used to treat different types

of depression and/or anxiety; thiazolidinediones, which may be used to treat type II diabetes; proton pump inhibitors; and cancer medications.

## **What are the signs/symptoms of osteoporosis?**

As previously mentioned, osteoporosis typically develops without any signs/symptoms. With that said, some individuals suffering from osteoporosis may exhibit the signs/symptoms found below.

- Loss of height (e.g., getting shorter by an inch or more)
- Change in posture (e.g., stooping or bending forward)
- Shortness of breath (e.g., smaller lung capacity due to compressed disks).
- Pain in the lower back
- Bone fractures due to normal stresses (e.g., bending, lifting) and/or minor falls (e.g., a fall from standing height that would not normally cause a break in a healthy bone)

## **Should individuals be screened for osteoporosis?**

Yes, certain individuals should be screened for osteoporosis. Health care professionals should note that a bone mineral density (BMD) test may be used to screen individuals for osteoporosis. Specific information regarding the BMD test may be found below.

- The bone mineral density (BMD) test may refer to a procedure that measures an individual's bone mineral density and compares it to that of an established norm or standard in order to establish a specific score, which may be used to identify the presence of osteoporosis and/or to determine the individual's risk for fractures (note: a BMD test may also be used to measure an individual's response to osteoporosis treatment).
- Typically, an individual's BMD test result is compared to the bone mineral density of a healthy young adult, and an individual is given a T-score.
- A score of 0 means an individual's BMD is equal to the norm for a healthy young adult; differences between an individual's BMD and that of a healthy young adult norm are measured in units called standard deviations (SDs); the more standard

deviations below 0, indicated as negative numbers, the lower an individual's BMD and the higher the individual's risk of fracture.

- A T-score between +1 and -1 is considered normal or healthy; a T-score between -1 and -2.5 indicates that an individual has low bone mass, although not low enough to be diagnosed with osteoporosis; a T-score of -2.5 or lower indicates that an individual has osteoporosis (note: the greater the negative number, the more severe the osteoporosis).
- The most commonly used BMD test is called a central dual-energy x-ray absorptiometry, or central DXA test.
- The central DXA test is quick, painless, and noninvasive; DXA uses low levels of x-rays; the test measures the BMD of the skeleton and at various sites that are prone to fracture, such as the hip and spine; some individuals may undergo a peripheral DXA, which measures bone density in the wrist and heel.

### **Are there specific osteoporosis screening recommendations?**

Yes. Specific osteoporosis screening recommendations may be found below.

- The National Osteoporosis Foundation (NOF) recommends measurement of BMD (DXA of the hip and spine) in:
  - Women, aged 65 years and older, and men, aged 70 years and older, regardless of clinical risk factors.
  - Younger postmenopausal women, women in the menopausal transition, and men aged 50 to 69 years with clinical risk factors for fracture.
  - Adults who have a fracture after age 50 years.
  - Adults with a condition (e.g., rheumatoid arthritis) or taking a medication (e.g., glucocorticoids in a daily dose  $\geq 5$  mg prednisone or equivalent for  $\geq 3$  months) associated with low bone mass or bone loss.
- The International Society for Clinical Densitometry (ISCD) recommends measurement of BMD (DXA of the hip and spine) in:
  - All women age 65 years and older and men aged 70 years and older regardless of risk factors.



- Postmenopausal women and men aged 50 to 70 years when risk factors are present.
  - Adults with a fragility fracture.
  - Adults with a condition or taking a medication associated with low bone mass or bone loss.
  - Anyone being considered for pharmacologic therapy for osteoporosis.
  - Anyone being treated for osteoporosis to monitor response to therapy.
  - Anyone not receiving therapy when evidence of bone loss would lead to treatment.
  - Women in the menopausal transition if there is a specific risk factor associated with increased fracture, such as low body weight, prior low-trauma fracture, or high-risk medication.
  - Postmenopausal women discontinuing estrogen should be considered for bone density testing.
- The Association of Clinical Endocrinologists (AACE) recommends measurement of BMD (DXA) in:
    - All women, aged 65 years and older.
    - Any adult with a history of fracture not caused by severe trauma.
    - Younger postmenopausal women with clinical risk factors for fracture.
  - The United States Preventive Services Task Force (USPSTF) recommends measurements of BMD in:
    - All women, aged 65 years and older.
    - Younger women whose fracture risk is equal to or greater than that of a 65-year-old White woman who has no additional risk factors.
  - The American Academy of Family Physicians (AAFP) recommends measurement of BMD in:
    - Women, aged 65 years and older.

- Women, aged 60 years and older at increased risk for osteoporotic fracture.
- National Institutes of Health (NIH) recommends BMD measurements for:
  - individuals at high risk for osteoporosis.
- The North American Menopause Society (NAMS) recommends measurement of BMD (DXA) in:
  - Women, aged 65 and older.
  - Postmenopausal women with medical causes of bone loss or clinical risk factors for fracture, regardless of age.
  - Postmenopausal women with a fragility fracture.
- The American College of Preventative Medicine (ACPM) recommends measurement of BMD (DXA) in:
  - Women, aged 65 and older.
  - Men, aged 70 and older.
  - Younger postmenopausal women and men aged 50 to 69 years with additional clinical risk factors for fracture.
- The American College of Obstetrics and Gynecology (ACOG) recommends measurement of BMD (DXA) in:
  - Women, aged 65 and older.
  - Women under age 65 with additional clinical risk factors for fracture.

## How is osteoporosis diagnosed?

Osteoporosis is typically diagnosed by a health care professional, and is often based on the results of a physical exam and BMD test.

Health care professionals should note that an osteoporosis-related physical exam may include the following: height and weight measurements; observing individuals for changes in posture; balance and gait observation and monitoring; muscle strength tests (e.g., a test to determine the ability of an individual to stand from sitting without using

his or her arms). Health care professionals should also note that bone density measurement by DXA at the hip and spine is generally considered the most reliable way to diagnose osteoporosis and predict fracture risk.

### **Are there recommendations regarding coronavirus disease 2019 (COVID-19) and osteoporosis?**

Yes. In the current health care climate, health care professionals must consider the impact of COVID-19 on osteoporosis, as well as recommendations regarding COVID-19 and osteoporosis (note: coronavirus disease 2019 [COVID-19] may refer to a respiratory illness that can spread from person to person, which is caused by a virus known as the severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]). That being the case, COVID-19/osteoporosis recommendations may be found below. The information found below was derived from materials provided by the American Society for Bone and Mineral Research (ASBMR) (American Society for Bone and Mineral Research [ASBMR], 2022).

- Osteoporosis does not appear to increase the risk for infection with or complications from COVID-19; therefore, it is not necessary to prioritize patients with osteoporosis for COVID-19 vaccination only on the basis of that condition; however, any decision to prioritize patients with osteoporosis for vaccination should be based on specific indications and/or related policies and procedures.
- General bone health measures (i.e., calcium and vitamin D supplementation, weight-bearing exercises, and maintenance of a balanced diet) should not be interrupted at the time of vaccination or thereafter.
- Evidence does not suggest that osteoporosis therapy either increases the risk or severity of COVID-19 infection, alters the disease course, or interferes with the efficacy or side effect profile of COVID-19 vaccination.
- Oral bisphosphonates should be continued without interruption or delay in patients receiving COVID-19 vaccination.
- There should be a one week interval between IV bisphosphonate infusion and COVID-19 vaccination to allow for distinguishing between putative acute phase reactions resulting from either IV bisphosphonate administration or COVID-19 vaccination.

- There should be an interval of four to seven days between treatment with denosumab and COVID-19 vaccination to allow for the potential occurrence of injection site reactions with either treatment; alternatively, denosumab treatment could be administered in the opposite arm or alternative site (abdomen or upper thigh) if it is necessary to administer concomitantly with COVID-19 vaccine; denosumab injections should not be delayed more than seven months after the previous denosumab dose.
- Teriparatide and abaloparatide should be continued in patients receiving COVID-19 vaccination.
- Raloxifene should be continued in patients receiving COVID-19 vaccination.

### What are the complications typically associated with osteoporosis?

- **Pain** - osteoporosis may lead to pain, especially pain in the lower back. Health care professionals should note the following: pain may refer to an unpleasant sensory and emotional experience arising from actual or potential tissue damage; acute pain may refer to pain that typically lasts less than three to six months; pain that is directly related to soft tissue damage or other specific injury; chronic pain may refer to pain that lasts more than three to six months; chronic pain can range from mild to severe.
- **Fractures** - fractures from osteoporosis typically occur in the spine, sacrum, hip, and wrist. Health care professionals should note that osteoporosis-related fractures may lead to balance problems that may increase the risk of falls and future fractures.
- **Vertebral compression fracture (VCF)** - a vertebral compression fracture (VCF) may refer to a fracture that occurs when one or more bones in the spine weaken and crumple. VCFs may result from experiencing a fall, minor fall, or in some cases, bending or carrying heavy loads. Health care professionals should note the following signs/symptoms of a VCF: sudden, severe back pain; worsening of pain when standing or walking; pain when bending or twisting; loss of height; deformity (e.g., humpback).
- **Decreased mobility** - due to related pain, fractures, and VCFs, osteoporosis may lead to decreased mobility for some individuals (note: decreased mobility may refer to a state in which an individual has a limitation in independent, purposeful

physical movement). Health care professionals should note the following signs/symptoms of decreased mobility: inability to intentionally move; inability to perform activity as instructed; limited range of motion (ROM); hesitation to attempt movement due to pain or fear of pain.

- **Falls** - due to related pain, fractures, VCFs, and decreased mobility, osteoporosis may lead to falls. Specific information regarding falls may be found below. The information found below was derived from materials provided by the Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention [CDC], 2021).
  - The term fall may refer to an event which results in an individual coming to rest on the ground or a lower level.
  - Falling once doubles older adults' chances of falling again.
  - One out of five falls causes a serious injury such as broken bones or a head injury.
  - Over 800,000 patients a year are hospitalized because of a fall injury, most often because of a head injury or hip fracture.
  - Each year at least 300,000 older adults are hospitalized for hip fractures.
  - Falls are the most common cause of traumatic brain injuries (TBI).
  - Many individuals who fall, even if they are not injured, become afraid of falling; falling-related fear may cause an individual to cut down on his or her everyday activities; when an individual is less active, he or she may become weaker, which increases his or her risk of falling.
  - Fall risk factors include the following: difficulties with walking and balance; lower body weakness; vitamin D deficiency; use of medicines, such as benzodiazepines or antidepressants; vision problems; foot pain or poor footwear; home hazards or dangers (e.g., broken or uneven steps; throw rugs; clutter).
  - Most falls are caused by a combination of risk factors (e.g., difficulties with walking and balance combined with home hazards).
  - Strategies to prevent falls include the following: review medications to determine if one or more medications may lead to dizziness,

lightheadedness, and/or sedation; exercise; vision checks; removing home hazards; installing railings on both sides of stairs; installing grab bars inside and outside of the tub or shower and next to the toilet; improving household lighting, when applicable; use non-slip mats in the bathtub and on shower floors.

- **Weight gain/obesity** - due to related pain, fractures, VCFs, decreased mobility, and/or fall-related complications, osteoporosis may lead to weight gain and/or obesity. Specific information regarding obesity may be found below.
  - Obesity may refer to a condition characterized by abnormal or excessive fat accumulation, which may impair health.
  - The fundamental cause of obesity is an energy imbalance between the calories consumed and the calories expended.
  - An individual may be considered to be obese when his or her body mass index (BMI) is greater than or equal to 30 kg/m<sup>2</sup>; body mass index (BMI) may refer to a value derived from an individual's height and weight.
  - Health care professionals may use the following formula to calculate an individual's BMI: BMI = weight (kg) / height (m)<sup>2</sup>; health care professionals may also use the following formula to calculate an individual's BMI: BMI = weight (lb) / [height (in)]<sup>2</sup> x 703.
  - Health care professionals should note that BMI does not measure body fat directly.
  - Health care professionals should note the following: BMI can be used to help determine if an individual is underweight, at a normal weight, overweight, and obese.
  - Underweight - an individual may be considered to be underweight if his or her BMI is less than 18.5 kg/m<sup>2</sup>.
  - Normal weight - an individual may be considered to be at a normal weight if his or her BMI is between 18.5 - 24.9 kg/m<sup>2</sup>.
  - Overweight - an individual may be considered to be overweight if his or her BMI is between 25.0 - 29.9 kg/m<sup>2</sup>.

- Obese - an individual may be considered to be obese if his or her BMI is greater than or equal to 30.0 kg/m<sup>2</sup>.
- Obesity may be subdivided into the following categories: Class 1 (BMI of 30 kg/m<sup>2</sup> to < 35 kg/m<sup>2</sup>); Class 2 (BMI of 35 kg/m<sup>2</sup> to < 40 kg/m<sup>2</sup>); Class 3 (BMI of 40 kg/m<sup>2</sup> or higher) (note: Class 3 obesity may be categorized as extreme or severe obesity).
- **Impaired skin integrity** - due to related pain, fractures, VCFs, decreased mobility, and/or fall-related complications, osteoporosis may lead to impaired skin integrity. Specific information regarding impaired skin integrity may be found below.
  - Skin integrity may refer to skin health.
  - Impaired skin integrity may refer to a skin diagnosis that can be used to identify relatively unhealthy skin that may show damage, disruption, loss of functionality, and/or may not be intact.
  - The risk factors associated with impaired skin integrity include the following: pressure, trauma, moisture, injury involving the skin, immobility, poor nutrition, poor hydration, inadequate hygiene, impaired mental status, and age.
  - Health care professionals may adequately identify, evaluate, and assess impaired skin integrity by conducting an adequate patient assessment. An adequate patient assessment, as it relates to the presence of impaired skin integrity, is one that safely and effectively identifies impaired skin integrity, while attempting to determine the potential cause, type, intensity, pain, and related complications associated with impaired skin integrity. Health care professionals should note that impaired skin integrity-related patient assessments may occur at any point in the health care process and may be used to both identify and monitor impaired skin integrity. Health care professionals should also note that an adequate patient assessment regarding impaired skin integrity may include the following elements: etiology determination, nutritional and hydration status determination, mobility determination, impaired tissue integrity/condition, wound characteristics, recognition of high-risk areas, pressure injury evaluation, signs of itching, patient pain and discomfort, patient vital signs, patient management goals, and health care documentation.

- When assessing patients, health care professionals should devote a portion of their attention to impaired skin integrity-related high-risk areas. Such high-risk areas include areas of the skin that covers: the shoulders, elbows, knees, as well as the tailbone and hip bones. Such areas are high risk because they cover bony prominences of the human body, which are especially susceptible to extended pressure and, thus, especially susceptible to impaired skin integrity. Health care professionals should note the following: if a patient is experiencing impaired skin integrity in a high risk area, the area should be monitored and routinely observed; health care professionals should make special efforts to address impaired skin integrity in high-risk areas in a timely manner; a failure to address impaired skin integrity in high-risk areas in a timely manner may result in extended damage, disruption, and loss of functionality; a failure to address impaired skin integrity in high-risk areas in a timely manner may also result in infections, which often possess the potential for high patient morbidity and mortality rates; patients with decreased mobility may be at a higher risk for impaired skin integrity in high-risk areas.
- Skin moisturizers may be used to address and manage impaired skin integrity. Essentially, skin moisturizers help prevent skin drying and subsequent skin damage. Health care professionals should note that skin moisturizers may be available as an ointment, cream, or lotion.
- **Pressure injuries** - due to related decreased mobility and impaired skin integrity, osteoporosis may lead to pressure injuries. Specific information regarding pressure injuries may be found below. The information found below was derived from materials provided by the Joint Commission (Joint Commission, 2022).
  - A pressure injury, also referred to as a pressure ulcer or bedsore, may refer to localized damage to the skin and/or underlying soft tissue, usually over a bony prominence.
  - Pressure injuries typically result from intense and/or prolonged pressure.
  - A pressure injury can present as intact skin or an open ulcer.
  - When evaluating the presence of pressure injuries, health care professionals should attempt to identify the stage or type of pressure injury.



- Stage 1 pressure injury - Stage 1 pressure injuries are characterized by intact skin with a localized area of non-blanchable erythema (i.e., Stage 1 pressure injuries are characterized by a superficial reddening of the skin that, when pressed, does not turn white).
- Stage 2 pressure injury - Stage 2 pressure injuries are characterized by partial-thickness skin loss with exposed dermis; a Stage 2 pressure injury wound bed is typically viable, pink or red, moist, and may present as an intact or ruptured serum-filled blister; adipose (fat) is not visible and deeper tissues are not visible; granulation tissue, slough and eschar are not present. Slough may refer to a layer or mass of necrotic or dead tissue. Eschar may refer to dead tissue that sheds or falls from the skin.
- Stage 3 pressure injury - Stage 3 pressure injuries are characterized by full-thickness loss of skin, in which adipose (fat) is visible in the ulcer and granulation tissue and epibole are often present (note: epibole may refer to rolled wound edges); slough and/or eschar may be visible; the depth of tissue damage varies by anatomical locations; undermining and tunneling may occur; fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed.
- Stage 4 pressure injury - Stage 4 pressure injuries are characterized by full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage, or bone in the ulcer; slough and/or eschar may be visible; epibole, undermining and/or tunneling often occur; depth varies by anatomical location.
- Unstageable pressure injury - unstageable pressure injuries are characterized by full-thickness skin and tissue loss in which the extent of the tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar; if slough or eschar is removed, a Stage 3 or Stage 4 pressure injury may be revealed. Health care professionals should note the following regarding an unstageable pressure injury: stable eschar on an ischemic limb or the heel(s) should not be removed; stable eschar may refer to eschar/dead tissue that is dry, adherent, and intact without erythema or fluctuance.
- Deep tissue pressure injury - deep tissue pressure injuries are characterized by intact or non-intact skin with localized area or persistent

non-blanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood-filled blister; pain and temperature changes often preceded skin color changes; discoloration may appear differently in darkly pigmented skin. Health care professionals should note the following regarding a deep tissue pressure injury: deep tissue pressure injuries typically result from intense and/or prolonged pressure and shear forces at the bone-muscle interface; the wound may evolve rapidly to reveal the actual extent of tissue injury, or may resolve without tissue loss; if necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle, or other underlying structures are visible, this indicates a full-thickness pressure injury (unstageable, Stage 3 or Stage 4).

## Section 1 Summary

Osteoporosis may refer to a condition in which the bones become thinner, weaker, and more likely to fracture or break. Health care professionals should work to identify patients suffering from osteoporosis via osteoporosis screening. Health care professionals should note that osteoporosis may lead to several complications, as well as impact patients' health, overall well-being, and quality of life.

## Section 1 Key Concepts

- Health care professionals should be familiar with osteoporosis concepts central to patient care.
- Individuals suffering from osteoporosis typically have less bone mass and strength.
- Osteoporosis typically develops without any symptoms or pain, and it is usually not discovered until the weakened bones cause painful fractures.
- Women are four times more likely to develop osteoporosis than men.

## Section 1 Key Terms

Osteoporosis - a condition in which the bones become thinner, weaker, and more likely to fracture or break

Older adult - an individual 65 years or older

Sedentary lifestyle - an inactive lifestyle characterized by prolonged periods of sitting and/or lying down and a lack of physical activity

Physical activity - any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level

Osteopenia - a condition characterized by low bone mass that is not severe enough to be called osteoporosis

Bone mineral density (BMD) test - a procedure that measures an individual's bone mineral density and compares it to that of an established norm or standard in order to establish a specific score, which may be used to identify the presence of osteoporosis and/or to determine the individual's risk for fractures

Coronavirus disease 2019 (COVID-19) - a respiratory illness that can spread from person to person, which is caused by a virus known as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

Pain - an unpleasant sensory and emotional experience arising from actual or potential tissue damage

Acute pain - pain that typically lasts less than three to six months; pain that is directly related to soft tissue damage or other specific injury

Chronic pain - pain that lasts more than three to six months

Vertebral compression fracture (VCF) - a fracture that occurs when one or more bones in the spine weaken and crumple

Decreased mobility - a state in which an individual has a limitation in independent, purposeful physical movement

Fall - an event which results in an individual coming to rest on the ground or a lower level

Obesity - a condition characterized by abnormal or excessive fat accumulation, which may impair health

Body mass index (BMI) - a value derived from an individual's height and weight

Skin integrity - skin health

Impaired skin integrity - a skin diagnosis that can be used to identify relatively unhealthy skin that may show damage, disruption, loss of functionality, and/or may not be intact

Pressure injury (also referred to as a pressure ulcer or bedsore) - localized damage to the skin and/or underlying soft tissue, usually over a bony prominence

Slough - a layer or mass of necrotic or dead tissue

Eschar - dead tissue that sheds or falls from the skin

Epibole - rolled wound edges

Stable eschar - eschar/dead tissue that is dry, adherent, and intact without erythema or fluctuance

## **Section 1 Personal Reflection Question**

How can health care professionals use osteoporosis screening recommendations to effectively identify patients suffering from osteoporosis?

## **Section 2: Osteoporosis Prevention Recommendations**

Osteoporosis can dramatically impact an individual's health, overall well-being, and quality of life. Fortunately, individuals can prevent osteoporosis by following osteoporosis prevention recommendations. Specific osteoporosis prevention recommendations may be found below. The information found within this section of the course was derived from materials provided by the National Institute of Arthritis and Musculoskeletal and Skin Diseases unless, otherwise, specified (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2019). Health care professionals should note the following: patients over the age of 50 and/or other patients that may be at risk for osteoporosis due to specific risk factors (e.g., a history of heavy alcohol consumption; tobacco use/smoking; sedentary lifestyle) should receive education and counseling on osteoporosis prevention recommendations; health care professionals should work to ensure patients safely and effectively follow osteoporosis prevention recommendations, when applicable.

## Osteoporosis Prevention Recommendations

- **Physical activity** - individuals should engage in physical activity to help prevent osteoporosis. Specific information and recommendations regarding physical activity may be found below. The information found below was derived from materials provided by the U.S. Department of Health and Human Services (U.S. Department of Health and Human Services, 2018).

### Physical Activity Recommendations for Adults

- Adults should move more and sit less throughout the day. Some physical activity is better than none. Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefits.
- For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.
- Additional health benefits are gained by engaging in physical activity beyond the equivalent of 300 minutes (5 hours) of moderate-intensity physical activity a week.
- Adults should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

### Physical Activity Recommendations for Older Adults

- As part of their weekly physical activity, older adults should do multicomponent physical activity that includes balance training, as well as aerobic and muscle-strengthening activities.
- Older adults should determine their level of effort for physical activity relative to their level of fitness.
- Older adults with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.

- When older adults cannot do 150 minutes of moderate-intensity aerobic activity a week because of chronic conditions, they should be as physically active as their abilities and conditions allow.

### Physical Activity Recommendations for Adults With Chronic Health Conditions and Adults With Disabilities

- Adults with chronic conditions or disabilities, who are able, should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.
- Adults with chronic conditions or disabilities, who are able, should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.
- When adults with chronic conditions or disabilities are not able to meet the above key guidelines, they should engage in regular physical activity according to their abilities and should avoid inactivity.
- Adults with chronic conditions or symptoms should be under the care of a health care professional. Individuals with chronic conditions can consult a health care professional or physical activity specialist about the types and amounts of activity appropriate for their abilities and chronic conditions.

### Physical Activity Recommendations for Safe Physical Activity

- Individuals should understand the risks, yet be confident that physical activity can be safe for almost everyone.
- Individuals should choose types of physical activity that are appropriate for their current fitness level and health goals, because some activities are safer than others.
- Individuals should increase physical activity gradually over time to meet key guidelines or health goals. Inactive people should “start low and go

slow” by starting with lower intensity activities and gradually increasing how often and how long activities are done.

- Individuals should protect themselves by using appropriate gear and sports equipment, choosing safe environments, following rules and policies, and making sensible choices about when, where, and how to be active.
- Individuals should be under the care of a health care provider if they have chronic conditions or symptoms. Individuals with chronic conditions and symptoms can consult a health care professional or physical activity specialist about the types and amounts of activity appropriate for them.
- **Adequate nutrition** - adequate nutrition can also help individuals prevent osteoporosis. Specific information and recommendations regarding adequate nutrition may be found below. The information found below was derived from materials provided by the U.S. Department of Health and Human Services (U.S. Department of Health and Human Services, 2020).
  - From 12 months through older adulthood, individuals should follow a healthy dietary pattern across their lifespan to meet nutrient needs, help achieve a healthy body weight, and reduce the risk of chronic disease (note: the term healthy dietary pattern may refer to the combination of foods and beverages that constitutes an individual’s complete dietary intake over time; a description of a customary way of eating or a description of a combination of foods recommended for consumption).
  - Individuals should focus on meeting food group needs with nutrient-dense foods and beverages, and stay within calorie limits - nutrient-dense foods provide vitamins, minerals, and other health-promoting components and have no or little added sugars, saturated fat, and sodium. A healthy dietary pattern consists of nutrient-dense forms of foods and beverages across all food groups, in recommended amounts, and within calorie limits (note: the term nutrient-dense foods may refer to the foods and beverages that provide vitamins, minerals, and other health-promoting components and have little added sugars, saturated fat, and sodium).
  - Individuals should note that the core elements that make up a healthy dietary pattern include the following: vegetables of all types; fruits, especially whole fruit; grains, at least half of which are whole grain; dairy, including fat-free or low-fat milk, yogurt, and cheese, and/or lactose-free

versions and fortified soy beverages and yogurt as alternatives; protein foods, including lean meats, poultry, and eggs; oils, including vegetable oils and oils in food, such as seafood and nuts.

- Alcoholic beverages - adults of legal drinking age can choose not to drink, or to drink in moderation by limiting intake to two drinks or less in a day for men and one drink or less in a day for women, when alcohol is consumed. Drinking less is better for health than drinking more. There are some adults who should not drink alcohol, such as women who are pregnant.
- Male adults and male older adults should take in approximately 2,000 to 3,000 calories per day, depending on activity level.
- Female adults and female older adults should take in approximately 1,600 to 2,400 calories per day, depending on activity level.
- **Calcium and vitamin D intake/supplementation** - to build on the previous recommendation, individuals should ensure their diet consists of adequate amounts of calcium and vitamin D to help prevent osteoporosis. Calcium and vitamin D are important nutrients for preventing osteoporosis and helping bones reach peak bone mass. Health care professionals should note the following sources of calcium: low-fat dairy products; dark green leafy vegetables, such as bok choy, collards, and turnip greens; broccoli; sardines and salmon with bones; calcium-fortified foods such as soymilk, tofu, orange juice, cereals, and breads. Health care professionals should also note the following: vitamin D is necessary for the absorption of calcium from the intestine; vitamin D is made in the skin after exposure to sunlight; some foods naturally contain enough vitamin D, including fatty fish, fish oils, egg yolks, and liver; other foods that are fortified with vitamin D are a major source of the mineral, including milk and cereals. To ensure individuals take in adequate amounts of calcium and vitamin D per day, health care professionals should provide patients with age-related calcium and vitamin D recommendations. Specific age-related calcium and vitamin D recommendations may be found below.
  - Individuals 0 to 6 months old should take in 200 mg/day of calcium and 400 IU/day of vitamin D.
  - Individuals 6 to 12 months old should take in 260 mg/day of calcium and 400 IU/day of vitamin D.



- Individuals 1 to 3 years old should take in 700 mg/day of calcium and 600 IU/day of vitamin D.
- Individuals 4 to 8 years old should take in 1,000 mg/day of calcium and 600 IU/day of vitamin D.
- Individuals 9 to 13 years old should take in 1,300 mg/day of calcium and 600 IU/day of vitamin D.
- Individuals 14 to 18 years old should take in 1,300 mg/day of calcium and 600 IU/day of vitamin D.
- Individuals 19 to 30 years old should take in 1,000 mg/day of calcium and 600 IU/day of vitamin D.
- Individuals 31 to 50 years old should take in 1,000 mg/day of calcium and 600 IU/day of vitamin D.
- Male individuals 51 to 70 years old should take in 1,000 mg/day of calcium and 600 IU/day of vitamin D.
- Female individuals 51 to 70 years old should take in 1,200 mg/day of calcium and 600 IU/day of vitamin D.
- Individuals over the age of 70 should take in 1,200 mg/day of calcium and 800 IU/day of vitamin D.
- **Weight loss** - when discussing osteoporosis with patients, health care professionals should consider promoting weight loss, when applicable. Specific weight loss recommendations may be found below.
  - Set realistic weight loss goals - when applying weight loss services to patients, it is important that health care professionals set realistic weight loss goals. Realistic weight loss goals can help patients stay motivated, build confidence, and, perhaps most importantly, commit to weight loss. Health care professionals should note the following weight loss goal: one to two pounds per week for a period of approximately six months or until a patient reaches a healthy weight based on BMI. Health care professionals should also note the following: a diet that is individually planned to help create a deficit of 500 - 1,000 kcal/day may be used to help patients achieve a weight loss of one to two pounds per week.

- Promote physical activity, when applicable - it should not be a surprise that health care professionals should promote physical activity when applying weight loss services to patients. Health care professionals should note the following: adequate physical activity can help patients lose weight and maintain a healthy weight.
- Promote adequate nutrition, when applicable - it should also not be a surprise that health care professionals should promote adequate nutrition when applying weight loss services to patients. Health care professionals should note that adequate nutrition can help patients lose weight and maintain a healthy weight.
- Encourage patients to self-monitor their weight - patients should be encouraged to self-monitor their weight in order to lose weight and maintain a healthy weight. The term self-monitor, as it relates to weight loss and maintenance, may refer to the act of observing and recording aspects of behavior related to weight, weight loss, and weight maintenance (e.g., calorie intake per day). Health care professionals should note the following: when applying weight loss services to older adults, health care professionals should encourage caregivers to monitor older adult's weight.
- Encourage patients to apply portion control - some patients should be encouraged to apply portion control in order to lose weight and maintain a healthy weight. Portion control may refer to a method of moderating an individual's diet by determining the number of calories in each serving of food, and limiting consumption to fall below a predetermined number of calories to help individuals lose weight and maintain a healthy weight. Health care professionals should note the following: portion control can help individuals take an active role in their weight loss; portion control may be most beneficial to patients who are highly motivated to lose weight. Health care professionals should also note the following: when applying weight loss services to older adults, health care professionals should encourage caregivers to assist in portion control.
- Encourage patients attempting to lose weight to seek support from family and friends - individuals who successfully lose weight and keep it off typically rely on support from others to help maintain motivation, a healthier lifestyle, and continued weight loss/healthy weight management.

Health care professionals should note that this recommendation may be especially relevant to older adults who may completely rely on their family for support.

- Encourage patients attempting to lose weight to take part in support groups - in addition to family and friends, health care professionals should consider recommending support groups to patients attempting to lose weight. Support groups can help patients suffering from obesity make connections with other individuals who can help them maintain motivation, a healthier lifestyle, and continued weight loss/healthy weight management. Additionally, support groups can help patients suffering from obesity avoid some of the complications associated with obesity such as: low self-esteem, relationship problems, social isolation, and suicidal ideation. Health care professionals should note the following: various types of support groups exist; an individual may participate in more than one support group at a time to cope or manage his or her obesity.
- **Engage in tobacco cessation, when applicable** - as previously mentioned tobacco use/smoking is a risk factor for developing osteoporosis. Thus, health care professionals should engage patients in tobacco cessation when working to prevent osteoporosis. Specific information regarding tobacco cessation may be found below. The information found below was derived from materials provided by the CDC (CDC, 2022).
  - Tobacco cessation may refer to the process of stopping tobacco use/smoking.
  - Often the first step to tobacco cessation is a decision and commitment by an individual to stop smoking.
  - Nicotine is the addictive substance in tobacco.
  - Tobacco dependence is a chronic, relapsing disorder that, like other chronic diseases, often requires repeated intervention and long-term support.
  - Research indicates that the majority of individuals who use tobacco want to quit, but most try to quit multiple times before succeeding.

- Health care professionals in a variety of settings play a critical role in helping individuals quit using tobacco; even brief advice from a health care professional can make it much more likely that patients will try to quit.
- Research indicates that counseling and tobacco cessation medications approved by the U.S. Food and Drug Administration (FDA), significantly increases success in quitting tobacco; counseling and related medications can double a patient's chances of quitting.
- Health care professionals should note the following medications approved by the FDA for tobacco cessation: nicotine gum, nicotine lozenge, nicotine patch, nicotine nasal spray, nicotine inhaler, bupropion SR, and varenicline.
- When attempting to engage patients in tobacco cessation, health care professionals should note the following: ask every patient about his or her tobacco use at every visit; offer patients, who use tobacco, tobacco cessation help at every visit; advise patients who use tobacco that quitting is one of the most important things they can do for their health; offer evidence-based tobacco cessation treatment, including counseling and medication; offer referrals to additional tobacco cessation resources, including quitlines (e.g., 1-800-QUIT-NOW); follow up with patients to provide support throughout the quitting process.
- When engaging patients in tobacco cessation, health care professionals should encourage patients to choose a specific quit date; think about all the ways quitting will improve their lives and health; get rid of temptations (e.g., tobacco products in the home); think about what they learned from past quit attempts.
- When engaging patients in tobacco cessation, health care professionals should encourage patients to plan ways to distract themselves from tobacco-related urges; have objects nearby to hold in the hands or put in the mouth, when needed; limit or monitor tobacco-related triggers (e.g., coffee; alcohol); be prepared to manage tobacco-related withdrawal symptoms (e.g., decreased concentration, irritability, anxiety, depressed mood, insomnia, and increased eating); engage in physical activity.
- **Medications** - FDA approved medications may be used to prevent osteoporosis. Specific information regarding the medications that may be used to prevent

osteoporosis can be found below. Health care professional should note that some of the medications found below may also be used to treat osteoporosis.

- Bisphosphonates - bisphosphonates (e.g., alendronate [Fosamax]; ibandronate [Boniva]) may be used to help preserve bone density and strength; bisphosphonates work by slowing down bone loss, which can lower the chance of fractures; alendronate is indicated for the treatment and prevention of osteoporosis in postmenopausal women.
- Estrogen agonist/antagonist - an estrogen agonist/antagonist, also known as a selective estrogen receptor modulator (SERM), and tissue-selective estrogen complex (TSEC), are both approved to treat and prevent osteoporosis in postmenopausal women; an estrogen agonist/antagonist is not estrogen, however, an estrogen agonist/antagonist has estrogen-like effects on some tissues and estrogen-blocking effects on other tissues; the aforementioned action helps improve bone density, lowering the risk for some fractures.
- Estrogen and hormone therapy - estrogen and combined estrogen and progestin (hormone therapy) are approved to prevent osteoporosis and fractures in postmenopausal women (note: due to the potential side effects, researchers recommend that women use hormone therapy at the lowest dose, and for the shortest duration of time).

## Section 2 Summary

Osteoporosis may be prevented. Individuals can prevent osteoporosis by following the recommendations found above.

## Section 2 Key Concepts

- Individuals can prevent osteoporosis by following osteoporosis prevention recommendations.
- Patients over the age of 50 and/or other patients that may be at risk for osteoporosis due to specific risk factors (e.g., a history of heavy alcohol consumption; tobacco use/smoking; sedentary lifestyle) should receive education and counseling on osteoporosis prevention recommendations; health care

professionals should work to ensure patients safely and effectively follow osteoporosis prevention recommendations, when applicable.

## Section 2 Key Terms

Healthy dietary pattern - the combination of foods and beverages that constitutes an individual's complete dietary intake over time; a description of a customary way of eating or a description of a combination of foods recommended for consumption

Nutrient-dense foods - foods and beverages that provide vitamins, minerals, and other health-promoting components and have little added sugars, saturated fat, and sodium

Self-monitor (as it relates to weight loss and maintenance) - the act of observing and recording aspects of behavior related to weight, weight loss, and weight maintenance

Portion control - a method of moderating an individual's diet by determining the number of calories in each serving of food, and limiting consumption to fall below a predetermined number of calories to help individuals lose weight and maintain a healthy weight

Tobacco cessation - the process of stopping tobacco use/smoking

## Section 2 Personal Reflection Question

How can health care professionals effectively provide osteoporosis prevention recommendations to patients in need?

## Section 3: Osteoporosis Treatment Recommendations

When treating patients suffering from osteoporosis, health care professionals should follow osteoporosis treatment recommendations to optimize patient care and patient outcomes. Specific osteoporosis treatment recommendations may be found below. The information found within this section of the course was derived from materials provided by the National Institute of Arthritis and Musculoskeletal and Skin Diseases unless, otherwise, specified (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2019).

## Osteoporosis Treatment Recommendations

- **Observe/monitor patients suffering from osteoporosis** - patient observation can be essential to osteoporosis patient care. Health care professionals should observe patients' to ensure they do not fall, and to note any changes in a patient's walk and/or gait that may be related to osteoporosis. Health care professionals should note the following: health care professionals should effectively document any relevant patient observations/information; in order for health care documentation to be considered effective, it must function as a viable form of communication, as well as a means to establish a detailed record of health care administration; effective health care documentation may be used as a method to review patient cases and to ensure all aspects of an individual patient's health care are noted and evaluated to maximize therapeutic outcomes.
- **Work to identify patients suffering from substance abuse** - in addition to osteoporosis, patients may also be suffering from substance abuse (note: substance abuse may refer to the harmful or hazardous use of a substance such as alcohol, illicit drugs, and prescription drugs). Health care professionals should work to identify patients suffering from substance abuse to increase patient safety and to help prevent substance abuse-related complications (e.g., falls). Health care professionals should note the following signs of alcohol and/or illicit drug use: slurred speech, an active tremor, shakiness, poor coordination, sweating, nausea, vomiting, aggression, agitation, compulsive behavior, craving, red eyes, dry mouth, drowsiness, involuntary eye movements, dilated pupils, nasal congestion, mouth sores, reduced consciousness, lack of pain sensation, intolerance to loud noises, dizziness, confusion, lack of awareness to surroundings, and needle marks.
- **Apply fall precautions to patients suffering from osteoporosis** - as previously mentioned, patients suffering from osteoporosis may be susceptible to falls. Thus, health care professionals should consider fall precautions when caring for patients suffering from osteoporosis. Health care professionals should note that fall precautions constitute the basics of patient safety and should be applied in all health care facilities to all patients. Specific fall precautions may be found below.

### Fall Precautions

- Familiarize the patients with their environment
- Have patients demonstrate call light use, when applicable

- Maintain call light within reach
  - Keep patients' personal possessions within safe reach of the individual patient
  - Have sturdy handrails in patients' rooms, bathrooms, and hallways
  - Place the patient's bed in a low position when a patient is resting in bed; raise the patient's bed to a comfortable height when the patient is transferring out of bed, when applicable
  - Keep patients' bed brakes locked
  - Keep wheelchair wheel locks in the locked position when stationary, when applicable
  - Keep nonslip, comfortable, well-fitting footwear on the patient
  - Use night lights or supplemental lighting
  - Keep floor surfaces clean and dry
  - Clean up all spills promptly
  - Keep patient care areas uncluttered
  - Follow safe patient handling practices
- **Screen patients suffering from osteoporosis to determine if they are at risk for falls** - to build on the previous recommendation, health care professionals should screen patients suffering from osteoporosis to determine if they are at risk for falls. Health care professionals can effectively screen patients to determine if they are at risk for falls by using the Stay Independent 12-question tool (note: the Stay Independent 12-question tool may be used to screen older adult patients). Specific information regarding the Stay Independent 12-question tool may be found below. The information found below was derived from materials provided by the CDC (CDC, 2021).
    - Stay Independent 12-question tool - the Stay Independent 12-question tool can help health care professionals determine if an older adult is at risk for falls. The Stay Independent 12-question tool includes the following questions, which older adults should honestly answer and health care professionals should appropriately score: I have fallen in the past year; I



use or have been advised to use a cane or walker to get around safely; sometimes I feel unsteady when I am walking; I steady myself by holding onto furniture when walking at home; I am worried about falling; I need to push with my hands to stand up from a chair; I have some trouble stepping up onto a curb; I often have to rush to the toilet; I have lost some feeling in my feet; I take medicine that sometimes makes me feel light-headed or more tired than usual; I take medicine to help me sleep or improve my mood; I often feel sad or depressed. Health care professionals should note the following: each "yes" answer to questions 1 and 2 should receive 2 points; each "yes" answer to questions 3 - 12 should receive 1 point; each "no" answer to any of the 12 questions should receive zero points; health care professionals should add up the total number of points once the older adult answered all 12 questions to the best of his or her ability. Health care professionals should also note the following: if an older adult's total score is 4 points or more, he or she may be at risk for falling.

### Section 3 Summary

Osteoporosis can be treated. Health care professionals should follow osteoporosis treatment recommendations when caring for patients suffering from osteoporosis in order to optimize patient care and patient outcomes.

### Section 3 Key Concepts

- Following osteoporosis treatment recommendations can help health care professionals safely and effectively administer health care to patients suffering from osteoporosis.

### Section 3 Key Terms

Substance abuse - the harmful or hazardous use of a substance such as alcohol, illicit drugs, and prescription drugs

Visual acuity - the clarity of vision that may be determined by testing an individual's ability to discern letters or numbers at a given distance according to a fixed standard

Snellen eye test - a visual acuity test that may be used to determine the smallest letters an individual can read on a standardized chart held 20 feet away from the individual

Eye occluder - a tool that may be used to occlude either eye without pressure

Orthostatic blood pressure - a form of blood pressure that occurs when standing up from sitting or lying down

Simple numerical pain intensity scale - a numerically based method, which may be used by health care professionals to help patients rate their pain from 0 - 10, with 0 meaning no pain and 10 meaning severe pain or worst possible pain

Wong/Baker faces rating scale - a pain assessment tool consisting of faces associated with numerical values

Pain Assessment in Advanced Dementia (PAINAD) scale - a pain assessment tool that can be used by health care professionals to assess pain in older adult patients with advanced dementia

Medication reconciliation - a process of comparing the medications an individual is taking (or should be taking) with newly ordered medications (Joint Commission, 2022)

Telehealth - the use of electronic information and telecommunication technologies to support and promote long-distance clinical health care, patient and professional health-related education, public health, and health administration

Live video (within the context of telehealth services) - a live stream, two-way interaction between a patient and a health care professional(s) where both parties are communicating from different locations

Real time (within the context of telehealth services) - the actual time during which a meeting, interaction, process, or event occurs; live

Store-and-forward - a type of telehealth which involves the transmission of recorded health information (e.g., an x-ray or prerecorded video) through electronic communication systems to a health care professional who evaluates the information and provides a health care-related service to a patient(s)

Remote patient monitoring - the use of telehealth-related technologies to collect individuals' health care-related data in one location and electronically transmit it to health care professionals in a different location for assessment and recommendations

Mobile health - the use of mobile communication devices (e.g., smart phones and tablets) to support health care, public health, and education

### Section 3 Personal Reflection Question

How can health care professionals use the above recommendations to safely and effectively care for patients suffering from osteoporosis?

### Conclusion

Osteoporosis may refer to a condition in which the bones become thinner, weaker, and more likely to fracture or break. Health care professionals should be familiar with osteoporosis concepts, as well as osteoporosis screening, prevention, and treatment recommendations in order to optimize patient care and patient outcomes. Finally, health care professionals should work to identify individuals suffering from osteoporosis by following osteoporosis screening recommendations.



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