MAKE NO BONES ABOUT IT: UNDERSTANDING THE PHARMACIST’S ROLE IN OSTEOPOROSIS MANAGEMENT

Jill Hiers, Pharm.D., BCPS
Outline

- Definition of osteoporosis/osteopenia
- Disease prevalence/burden
- Risk Factors
- AACE Guidelines/ACP Guidelines
- Diagnosis/Screening
- FRAX score calculator
- Bone Healthy Lifestyle
- Fall Prevention
- Calcium/Vitamin D
- Osteoporosis Pharmacotherapy
- Pharmacist/pharmacy technician role in osteoporosis
Pharmacist Objectives

At the end of this presentation, the pharmacist will be able to:

1. Define osteoporosis and osteopenia
2. Calculate a FRAX score
3. Describe bone mineral density results
4. Discuss bone healthy lifestyle options with patients
5. Explain calcium and vitamin D recommendations
6. Calculate estimated dietary calcium intake
7. Discuss counseling points for available osteoporosis therapies
8. Define the potential role of the pharmacist in osteoporosis management
At the end of this presentation, the pharmacy technician will be able to:

1. Define osteoporosis and osteopenia
2. Calculate a FRAX score
3. Describe bone mineral density results
4. List bone healthy lifestyle options
5. Describe calcium and vitamin D recommendations
6. Calculate estimated dietary calcium intake
7. List common osteoporosis pharmacotherapy agents
About Me

- Graduate of University of Connecticut School of Pharmacy
- PGY-1 residency at Lahey Clinic
- Elliot Health System clinical pharmacist since 2007
  - Expanded ambulatory care program in 2008
    - Prior to 2008, one anticoagulation clinic (current: four)
    - Elliot Senior Health Primary Care: medication therapy management, medication adherence program for seniors (MAPS), osteoporosis management consults
  - Started residency program in 2008
    - 2 PGY-1 residents
  - Current role
    - Geriatric consults, comprehensive medication management, free monthly blood pressure screenings
Bone Remodeling

- Osteocytes (bone cells that make up bone matrix)
- Osteoblasts (bone-forming cells)
- Osteoclasts (bone-resorbing cells)
- Parathyroid hormone (PTH)
- RANK-L
Bone Remodeling

Osteoporosis

Osteoporosis versus Osteopenia

- Osteoporosis versus osteopenia

Disease prevalence

- Public health impact: Affects approximately 54 million women and men over the age of 50
  - 10.2 million with osteoporosis; over 43.4 million with osteopenia
- By 2020, expected to increase to 64.4 million
- By 2030, expected to further increase to 71.2 million
- New Hampshire expected to have 40% increase by 2030
- More than 2 million osteoporotic fractures occur annually (70% in women)


54 Million Americans Affected By Osteoporosis and Low Bone Mass. Available at: https://www.nof.org/news/54-million-americans-affected-by-osteoporosis-and-low-bone-mass/ Last accessed October 18, 2018
Economic Impact

- By the year 2025, osteoporotic fractures are estimated to cost Medicare $25 billion annually.

- Only 1 in 4 women post-osteoporotic fracture indicated for bone density screening are screened and properly treated.

- Up to 80% of those with low bone mineral density are inadequately diagnosed and treated.


Risk Factors

- Uncontrollable risk factors:
  - Female age over 50
  - Male age over 70
  - Post-menopause
  - Family history of low bone density
  - Ethnicity
  - Low body weight (less than 127 lb)/small/thin
  - Previous broken bones/loss of height

Last accessed October 18, 2018
Risk Factors

- Modifiable Risk Factors
  - Inadequate calcium and/or vitamin D
  - Inactivity
  - Diet
    - Excessive sodium, caffeine, protein
    - Inadequate fruits and vegetables
  - Smoking
  - Excessive alcohol
  - Extreme weight loss

Last accessed October 18, 2018
Risk Factors

- Medical conditions that increase risk of bone loss:
  - Rheumatoid arthritis
  - Insulin-dependent diabetes
  - Hyperthyroidism (or over-supplementation with levothyroxine)
  - Osteogenesis Imperfecta
  - Hypogonadism
  - Pre-mature menopause (age less than 45)
  - Chronic malnutrition
  - Chronic liver disease

Risk Factors

- Medications that increase risk of bone loss:
  - Glucocorticoids (prednisone 5 mg daily or more x 3 months or more)
  - GnRH agonists (leuprolide, goserelin)
  - Aromatase inhibitors
  - Phenytoin
  - Phenobarbital
  - Carbamazepine
  - Heparin
  - Medroxyprogesterone acetate
  - Proton pump inhibitors

Medications That Can Cause Bone Loss, Falls And/Or Fractures. Available at: [https://osteoporosis.ca/about-the-disease/what-is-osteoporosis/secondary-osteoporosis/medications-that-can-cause-bone-loss-falls-andor-fractures/](https://osteoporosis.ca/about-the-disease/what-is-osteoporosis/secondary-osteoporosis/medications-that-can-cause-bone-loss-falls-andor-fractures/). Last accessed October 18, 2018
RG is a 74 year old Caucasian female with a past medical history of hypertension, rheumatoid arthritis, and hypothyroidism. She is 5 feet tall, and weighs 108 pounds. She drinks 3 cups of regular coffee daily. She does not currently exercise. She does not smoke, and drinks 1 ETOH beverage daily. She does eat dairy products and gets some calcium in her diet. She has no previous history of fractures, but her mother had osteoporosis and had a hip fracture. She has no known drug allergies.
RG’s current medications are:
- Levothyroxine 50 mcg before breakfast on an empty stomach (last TSH within normal limits)
- Lisinopril 10 mg daily
- Prednisone 10 mg daily
Patient Case

- What risk factors does RG have for developing osteoporosis?
- Which of these are modifiable? Which of these are not?
Osteoporosis Treatment Guidelines

- AACE (American Academy of Clinical Endocrinologists) Guidelines
  - Last updated in 2016
  - Addresses diagnosis, pharmacologic therapy, monitoring, and duration of therapy
  - Task force working on 2018 update

- ACP (American College of Physicians) Guidelines
  - Released in 2017
  - Addresses similar topics as AACE guidelines

- National Osteoporosis Foundation (NOF)
Diagnosis

- Bone mineral density (BMD) test
- Dexa-scan (dual-energy X-ray absorptiometry) of the hip and spine
- Reported as a “T score”
  - Standard deviation from reference bone density of young adult of same sex
- “Z scores” also reported
  - Compare bone density to reference bones of someone own age (not routinely used)
Diagnosis

Understanding Bone Density Results. Available at: https://americanbonehealth.org/about-bone-density/understanding-the-bone-density-t-score-and-z-score/. Last accessed October 18, 2018.
Osteoporosis Diagnosis

- T score less than -2.5
- Low trauma hip or spine fracture, regardless of BMD
- Osteopenia with fragility fracture (humerus, pelvis, distal forearm)
- Osteopenia with high risk for fracture
Screening Recommendations

- Women age 65 and older
- All post-menopausal women with history of fractures and/or taking glucocorticoids longer than 3 months
- Post-menopausal women:
  - Low body weight less than 127 pounds
  - Family history of osteoporotic fracture
  - Early menopause (less than age 40)
  - Current smoking
  - Excessive alcohol consumption
  - Hypogonadism
  - Hyperparathyroidism
  - Hyperthyroidism

- Secondary Osteoporosis

Screening Recommendations

- Men older than 70
- Men between ages 50-69 with the following conditions:
  - Previous fractures
  - Hypogonadism
  - Hyperparathyroidism
  - Hyperthyroidism
  - Chronic glucocorticoids greater than 3 months
  - Current smoking
  - Excessive alcohol consumption

Screening Recommendations

- **AACE**: Repeat dxa scan every 1-2 years while on treatment until findings are stable
  - Medicare will pay every 2 years
- **ACP**: Repeat dxa scan every 5 years while on treatment
  - Every 15 years if normal bone density results (weak evidence, low grade recommendation)

RG has a BMD test done. Her bone density results show the following:

- T score -2.4 at femoral neck
Patient Case

- What is RG’s diagnosis based on her BMD?
- Does RG require any treatment?
FRAX Score Calculator

- Fracture Risk Assessment Tool
- Uses risk factors, age, height, weight, sex
- Calculates 10 year risk of major fracture and hip fracture
- Patients with T score less than -2.5 (osteoporosis) should receive pharmacologic treatment regardless of FRAX score
- Patients with T score -1.1 to -2.4 (osteopenia) with 20% or greater risk of major fracture and/or 3% or greater risk of hip fracture should receive pharmacologic treatment

Fracture Risk Assessment Tool. Available at: https://www.sheffield.ac.uk/FRAX/tool.jsp. Last accessed October 18, 2018
FRAX Score Calculator

Please answer the questions below to calculate the ten year probability of fracture with BMD.

1. Age (between 40-90 years) or Date of birth:
   - Age: [ ]
   - Date of birth: [Y] [M] [D]

2. Sex: [ ] Male [ ] Female

3. Weight (kg): [ ]

4. Height (cm): [ ]

5. Previous fracture: [ ] No [ ] Yes

6. Parent fractured hip: [ ] No [ ] Yes

7. Current smoking: [ ] No [ ] Yes

8. Glucocorticoids: [ ] No [ ] Yes

9. Rheumatoid arthritis: [ ] No [ ] Yes

10. Secondary osteoporosis: [ ] No [ ] Yes

11. Alcohol 3 or more units per day: [ ] No [ ] Yes

12. Femoral neck BMD (g/cm²): [Select DXA] [ ]

Clear [ ] Calculate [ ]
Patient Case

- What is RG’s FRAX score?
- Should RG receive pharmacologic treatment?
- What else should RG be counseled on at this time?
A bone healthy lifestyle is for everyone, regardless of diagnosis!
Bone Healthy Lifestyle

- Regular exercise
  - Weight bearing and muscle strengthening
  - Consider physical therapy referral
- Quit smoking
- Limit alcohol to 2 or less drinks a day
- Healthy diet
- Fall prevention
- Adequate calcium and vitamin D

Prevention and Healthy Living. Available at: https://www.nof.org/preventing-fractures/prevention/prevention-and-healthy-living/. Last accessed October 18, 2018
Increased Fall Risk

- Neurologic conditions
  - Parkinson’s disease, seizure, stroke, dementia, orthostatic hypotension
- Impaired vision
- Impaired hearing
- Deconditioning
- Medications
  - Sedatives, hypnotics, anti-hypertensives, narcotics
- Environmental factors

Fall Prevention

- Proper footwear
- Canes/walkers
- Avoid clutter/scatter rugs
- Grab bars/handrails
- Review medications
  - Beer’s criteria
- Adequate vitamin D
- Physical therapy (balance)
RG’s current medications are:

- Levothyroxine 50 mcg before breakfast on an empty stomach (last TSH within normal limits)
- Lisinopril 10 mg daily
- Prednisone 10 mg daily

What medication(s) that RG takes may increase her fall risk?
Calcium and Vitamin D

- **Calcium**
  - Builds bones and keeps them strong
  - Try to get calcium in diet first, then use supplements
  - Calcium citrate preferred over calcium carbonate in the elderly (better absorption)

- **Vitamin D**
  - Helps body use and absorb calcium
  - Prevents falls
  - Skin makes vitamin D through UV-B rays in sunlight
  - Many are vitamin D deficient due to use of sunscreen and/or geographical location
Calcium Recommendations (AACE/NOF)

- **Women**

<table>
<thead>
<tr>
<th>Age</th>
<th>Calcium</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 and younger</td>
<td>1000 mg daily</td>
</tr>
<tr>
<td>Older than 50</td>
<td>1200 mg daily</td>
</tr>
</tbody>
</table>

- **Men**

<table>
<thead>
<tr>
<th>Age</th>
<th>Calcium</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 and younger</td>
<td>1000 mg daily</td>
</tr>
<tr>
<td>Older than 70</td>
<td>1200 mg daily</td>
</tr>
</tbody>
</table>


Calcium/Vitamin D. Available from: [https://www.nof.org/patients/treatment/calciumvitamin-d/](https://www.nof.org/patients/treatment/calciumvitamin-d/). Last accessed October 18, 2018
Calcium Supplement Risks

- Calcium daily intake over 1500 mg daily increased all-cause mortality (prospective longitudinal cohort study)
- Over-supplementation with calcium increases cardiovascular risks (3 prospective cohort studies; 1 meta-analysis)
- Low calcium intake (less than 700 mg daily) increases cardiovascular risks (prospective cohort study)

Calculating Dietary Calcium

- Percent daily value based on 1000 mg calcium
  - $30\% = 300$ mg
- Non-dairy sources: 250 mg
- Add total, make up for lack of dietary calcium with supplements

<table>
<thead>
<tr>
<th>Product</th>
<th>Servings Per Day</th>
<th>Calcium (mg)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk (8 oz.)</td>
<td>X 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yogurt (6 oz.)</td>
<td>X 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheese (1 oz. or 1 cubic inch)</td>
<td>X 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortified Foods &amp; Juices</td>
<td>X 80 - 1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated total from other foods Note: Increase this amount if you get more than 250 mg of calcium from other foods.</td>
<td></td>
<td></td>
<td>250</td>
</tr>
</tbody>
</table>

Total Daily Calcium Intake, in mg

Calcium/Vitamin D. Available from: [https://www.nof.org/patients/treatment/calciumvitamin-d/](https://www.nof.org/patients/treatment/calciumvitamin-d/). Last accessed October 18, 2018
Calcium rich foods

- Milk
- Cheese
- Yogurt
- Fortified cereals and juices
- Broccoli
- Kale
- Tofu
- Salmon
- See complete list from NOF website

Calcium/Vitamin D. Available from: https://www.nof.org/patients/treatment/calciumvitamin-d/. Last accessed October 18, 2018
Calcium Supplements

- Calcium carbonate
  - Requires acidic environment for absorption

- Calcium citrate
  - Does not require acidic environment for absorption

- Limit to 500 mg or less at one time for best absorption

- Remember, most multivitamins contain some amount of elemental calcium and vitamin D!
RG currently drinks 1 cup of skim milk daily and eats one serving of yogurt daily. She does not currently take calcium supplements.

- What is RG’s daily calcium goal?
- What is her estimated dietary calcium?
- Does RG require supplements?
- If yes, what supplement and what dose would you recommend?
## Vitamin D Recommendations

- **Men and Women (AACE):** 1000-2000 units daily
- **Men and Women (NOF):**
  - Age 50 and younger: 400-800 units daily
  - Older than 50: 800-1000 units daily

- **Men and Women (IOM):**
  - Age 70 and younger: 600 units daily
  - Older than 70: 800 units daily

Calcium/Vitamin D. Available from: [https://www.nof.org/patients/treatment/calciumvitamin-d/](https://www.nof.org/patients/treatment/calciumvitamin-d/). Last accessed October 18, 2018

Vitamin D Repletion

- Target vitamin D level 30*-50 ng/mL
- Vitamin D repletion:

<table>
<thead>
<tr>
<th>Serum 25-hydroxyvitamin D (ng/mL)</th>
<th>Suggested dosing regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>Ergocalciferol 50,000 units once weekly x 12 weeks, then once monthly</td>
</tr>
<tr>
<td>5-15</td>
<td>Ergocalciferol 50,000 units once weekly x 4 weeks, then once monthly</td>
</tr>
<tr>
<td>16-30</td>
<td>Ergocalciferol 50,000 units once a month</td>
</tr>
</tbody>
</table>

- Recheck level 6-12 months after repletion

*IOM says 20 ng/mL adequate for most of the population, however, Endocrine Society supports 30-50 ng/mL to guarantee sufficiency

Patient Case

RG has a vitamin D level done that comes back at 14 ng/mL.

- How would you recommend RG have her vitamin D repleted? What level would you target?
- When would you recommend she have her vitamin D level checked again?
- After repletion, what is RG’s daily recommended vitamin D intake?
Pharmacologic Therapy (AACE)

- **1st line therapy:**
  - Alendronate, risedronate, zoledronic acid, denosumab
  - Ibandronate 2\textsuperscript{nd} line

- **Patients who can’t tolerate oral:**
  - Denosumab, zoledronic acid, teriparatide

- **Patients with severe osteoporosis (T score less than -3.0):**
  - Teriparatide x 2 years followed by anti-resorptive

- **Patients with spinal issues:**
  - Raloxifene or ibandronate (have spine-specific evidence)

Pharmacologic Therapy (ACP)

- 1st line therapy:
  - Alendronate, risedronate, zoledronic acid, denosumab
- Recommends against using raloxifene or estrogen-based therapy

Bisphosphonates

- Alendronate (Fosamax®, Binosto®)
- Risedronate (Actonel®, Atelvia®)
- Zoledronic acid (Reclast®)
- Ibandronate (Boniva®)

Ibandronate not recommended first line due to uncertain non-vertebral and hip fracture risk reduction
Bisphosphonates

- Mechanism of action: Inhibits bone resorption
- Efficacy: Reduces vertebral and non-vertebral fractures by 30-50%
- Must be getting adequate calcium/vitamin D to be effective
# Bisphosphonates

<table>
<thead>
<tr>
<th>Bisphosphonate (first line)</th>
<th>Dose</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alendronate</td>
<td>10 mg daily or 70 mg weekly</td>
<td>Administer on empty stomach, do not eat or lie down for 30 minutes</td>
</tr>
<tr>
<td>Risedronate</td>
<td>5 mg daily or 35 mg weekly or 150 mg monthly</td>
<td>Actonel: Administer on empty stomach, do not eat or lie down for 30 minutes Atelvia: Administer immediately breakfast with 4 oz. water; do not lie down for 30 minutes</td>
</tr>
<tr>
<td>Zoledronic Acid</td>
<td>5 mg IV annually or every 2 years (prevention)</td>
<td>Administer over 15 minutes</td>
</tr>
</tbody>
</table>

Bisphosphonates

- Common adverse effects:
  - GI (oral) - do not lie down for 30-60 minutes
  - Headache, musculoskeletal pain, rash

- Rare adverse effects:
  - Osteonecrosis of jaw (associated with dental procedures)
  - Esophageal cancer
  - Atypical fractures
  - Atrial fibrillation

Bisphosphonates

- **Orals:**
  - Take on an empty stomach
    - Wait 30 minutes for food or other medications (alendronate, Actonel®)
    - Wait 60 minutes for food or other medications (ibandronate)
  - Take with food (Atelvia®)
  - Administered daily, weekly, or monthly
  - Remain upright for 30-60 minutes!

Bisphosphonates

- **Intravenous:**
  - Zoledronic acid: infuse over 15 minutes every 1-2 years (2 years for prevention)
    - Infusion reaction: pre-treat with acetaminophen
  - Ibandronate: Administer as IV push over 15-30 seconds every 3 months

Bisphosphonates

- Renal considerations
  - Alendronate and zoledronic acid
    - Not recommended for CrCl less than 35 ml/min
  - Risedronate and ibandronate
    - Not recommended for CrCl less than 30 ml/min

Cockcroft-Gault equation is used to renally adjust medication dosages

Serum creatinine needs to be stable to be accurate

Use actual body weight if it is less than ideal body weight (IBW)

Use adjusted body weight if patient is obese (30% over IBW)

DO NOT routinely round serum creatinine to 1 mg/dL in patient’s with low muscle mass

Multiple online calculators (MDCalc, Globalrph)
Creatinine Clearance

\[
eCrCl = \frac{(140 - \text{Age}) \times \text{Weight (kg)}}{72 \times \text{Creatinine}_{\text{serum}} \text{ (mg/dL)}} \times 0.85 \text{ if female}
\]
RG is 74 years old, 5 feet tall, and weighs 108 pounds. Her last serum creatinine was stable at 0.9 mg/dL.

- What is RG’s creatinine clearance?
Denosumab (Prolia®)

- Monoclonal antibody against RANKL, a cytokine essential for osteoclast survival
- Increases spine and hip BMD; reduces spinal fracture risk by 68% and hip fracture by 40%
- Need adequate calcium and vitamin D to be effective
- Administration: 60 mg subcutaneously every 6 months
- No renal dose adjustments
  - CrCl less than 30 ml/min increases risk of hypocalcemia
- Adverse effects: infections, hypocalcemia
- REMS

Raloxifene (Evista®)

- Selective estrogen receptor modulator (SERM)
- Reduces vertebral fractures by 30-50%; no good evidence for non-vertebral or hip fractures; (bonus: lowers LDL)
- Adverse effects:
  - Hot flashes, leg cramps; low risk of VTE (1%)
- 60 mg daily orally
- Contraindicated with history of VTE
- Interacts with bile acid sequestrants (decreases absorption), warfarin (decreased INR), and levothyroxine (separate by 12 hours)
- Similar agent estrogen/bazedoxifene more for menopausal symptoms
- NOT recommended by ACP

Teriparatide (Forteo®)

- Recombinant human parathyroid; regulates bone metabolism, intestinal calcium absorption, and renal tubular calcium and phosphate reabsorption
- Reserved for high risk (T score less than -3.0)
- Decreases vertebral fractures by 65%; no good evidence for hip
- Not for use in hypercalcemia, bone mets, Paget’s disease
- Adverse effects: nausea, orthostatic hypotension; increased osteosarcoma in rats
- Administration: 20 mcg daily subcutaneously (limit to 2 years of therapy)

Abaloparatide (Tymlos®)

- Approved last year (not part of the AACE guidelines yet)
- Similar MOA as teriparatide
- 80 mcg subcutaneous injection daily (limit to 2 years of therapy)
- Like teriparatide, increased risk of osteosarcoma (seen in rats)
- Reserved for severe osteoporosis

Tymlos. Available from: https://www.tymlos.com/what-is-tymlos. Last accessed October 20, 2018
Romosozumab (Evenity®)

- In the pipeline for osteoporosis treatment
- Anti-sclerostin monoclonal antibody
  - Sclerostin is involved in osteoblast activity
- ARCH trial (romosozumab versus alendronate) showed improvement in spine fracture risk (6.2% versus 11.9%, p < 0.001)
- Waiting for FDA approval

Saag, KG, Paterson, J, Brandi ML, et al. Romosozumab or Alendronate For Fracture Prevention in Women with Osteoporosis. NEJM. 2017; 377:1417-1427
Miscellaneous agents

- **Hormone replacement therapy:**
  - Not recommended by current guidelines
  - Usually only used if patient is also using for postmenopausal symptom management

- **Calcitonin (Miacalcin®):**
  - Not recommended by current guidelines
  - Usually reserved for bone pain caused by compression fractures
  - Nasal or injectable
  - Nasal spray: alternate nostrils daily
  - Increased malignancy risk (pituitary adenoma)

Patient Case

Given RG’s T score = -2.4 and her FRAX score of 48% risk of major fracture and 34% risk of hip fracture, her PCP wants to start her on pharmacologic treatment. RG prefers oral therapy over injectable, and would like to only take a medication once a month.

As a reminder, RG’s creatinine clearance is estimated to be over 35 ml/min
Patient Case

- What treatment option would you recommend, and what dosage?
- What lab work, if any, should RG have prior to starting treatment?
- What major counseling points would you discuss with RG?
- How long should RG be treated for?
- When should she have a follow-up bone mineral density done?
Treatment Duration (AACE)

- Limit teriparatide and abaloparatide to 2 years (follow with anti-resorptive therapy)
- Consider a “drug holiday” for moderate-risk patients after 5 years of oral bisphosphonate therapy
- Consider a “drug holiday” for high-risk patients after 6-10 years of oral bisphosphonate therapy
- Consider a “drug holiday” for zoledronic acid after 3 years of consecutive annual therapy for moderate-risk or 6 years for high-risk
- Can use raloxifene or teriparatide for high risk patients during a bisphosphonate drug holiday
- No drug holidays with denosumab

Treatment Duration (ACP)

- Treat women for 5 years (weak evidence, low grade recommendation)
  - No difference between alendronate 5 years versus 10 years
  - No difference between zoledronic acid 3 years versus 6 years
Up to 80% of those with low bone mineral density are inadequately diagnosed and treated.

How can pharmacists and pharmacy technicians improve outcomes related to osteoporosis?
Role of Ambulatory Care Pharmacist

- Osteoporosis consults
- FRAX score calculation
- Vitamin D and calcium management
- Non-pharmacologic education
  - Diet, exercise, smoking cessation, decreased ETOH intake, fall prevention
- Pharmacologic management
  - Review all available therapies with patient
  - Recommend medications, order appropriate lab work, order follow-up
- Fall prevention
  - Review of medications for fall risk
  - Education
The Role of the Retail Pharmacist

- FRAX score calculation (if have BMD results)
- Calcium and vitamin D product selection
- Non-pharmacologic education
  - Diet, exercise, smoking cessation, decreased ETOH intake, fall prevention
- Counseling on prescribed pharmacologic treatment
- Fall prevention
  - Review of medication profile for increased fall risk
  - Education
- Peripheral bone density screening
The Role of the Pharmacy Technician

- Eyes and ears for the pharmacist!
- Walkers/Canes/Shoes (fall risk)
- Recommending pharmacist counseling when buying calcium or vitamin D products
- Recommending continued pharmacist counseling for those using pharmacologic treatment for low bone density
Conclusion

- Osteoporosis is a highly-prevalent disease with high morbidity and mortality
- Osteoporosis is predicted to use a large amount of health care dollars, and it needs to be better diagnosed and managed
- Osteoporosis management requires both non-pharmacologic and pharmacologic interventions
- Pharmacists and pharmacy technicians can help patients best manage their osteoporosis
References


2. Calcium/Vitamin D. Available from: https://www.nof.org/patients/treatment/calciumvitamin-d/ . Last accessed October 18, 2018


6. Fracture Risk Assessment Tool. Available at: https://www.sheffield.ac.uk/FRAX/tool.jsp . Last accessed October 18, 2018


9. Medications That Can Cause Bone Loss, Falls And/Or Fractures. Available at: https://osteoporosis.ca/about-the-disease/what-is-osteoporosis/secondary-osteoporosis/medications-that-can-cause-bone-loss-falls-andor-fractures/ . Last accessed October 18, 2018


16. 54 Million Americans Affected By Osteoporosis and Low Bone Mass. Available at: https://www.nof.org/news/54-million-americans-affected-by-osteoporosis-and-low-bone-mass/ Last accessed October 18, 2018