Screen all of the following individuals:
- Female ≥ 65 years old
- Male ≥ 50 years old with 1 or more risk factors*
- All other individuals with 2 or more risk factors*
Note: Dietary & Lifestyle changes are intended for all patients as a precursor to screening and treatment

Dietary and lifestyle changes including smoking and alcohol cessation (intended for all patients as a precursor to screening and treatment of osteoporosis)

Obtain DXA

T > -1.5?
- No: Normal or slightly low result. Recheck DXA in 10yrs**
- Yes: Age ≥65?
  - No: Normal or slightly low result. Recheck DXA in 5yrs**
  - Yes: Lateral spine radiographs to diagnose vertebral fracture

Workup secondary causes; Consider bone turnover markers**** in the initial evaluation and follow up of osteoporosis patients. Elevated levels can predict more rapid rates of bone loss and higher fracture risk. Check: CMP, Phos, 25-hydroxy Vit D, CBC as part of initial work up.

Endocrine disorder or renal failure present?
- Yes: Refer to Endocrinology or Bone Specialist. If Endocrinology, see Endo table
- No: Back Pain or history of height loss ≥ 4 cm
  - Yes: Hx of Frailty fx?
    - Yes: Diagnosis Osteoporosis
    - No: T-1.5 to -2.49? Yes: Diagnosis Osteopenia
      - No (BMD ≤ -2.5) Diagnosis Osteoporosis

Pharmacological Treatment of Osteoporosis

Pharmacological Treatment of Osteopenia Evaluation & Treatment

Obstetrician-Gynecologist. 2013 Dec; 56 (4): 686-93

** AAFP and ACOG guidelines recommend 15 year follow up. Absolute hip fracture risk in 10 years is 0.9% for this cohort. Risk of developing osteoporosis is 10% in the next 15 years (NEJM, 2012). ISCD recommends every 2 years but does not provide evidence for rationale.

**DXA rechecks: Make concerted effort to obtain on same machine with same rad. technologist. If not possible, use results with discretion.


DXA=Dual-energy X-ray absorptiometry

***If patient does not meet clinical criteria for osteoporosis, insurance may not cover 24-hour urine and bloodwork

****Bone turnover markers are useful in assessing compliance and efficacy of therapy but should not be used to decide whether to initiate pharmacologic therapy

^ Consider Additional Labs if indicated (premenopausal, concern for hormone issue, concern for malignancy, etc..)
- 24 hour urine for calcium and creatinine
- 24 hour urine for cortisol
- FSH, LH
- Prolactin
- Magnesium
- Intact PTH
- 1, 25- dihydroxy Vitamin D
- TSH
- Serum Protein Electrophoresis/ urine protein electrophoresis
- Testosterone
Assess for the following risk factors before prescribing PTH/PTHrP analog:

- History of:
  - Radiation therapy to skeleton
  - Cancer of or metastasis to bone
  - Paget’s disease of bone
  - Nephrolithiasis
  - Hypercalcemia
  - Metabolic bone disease other than osteoporosis
  - Hyperparathyroidism
  - Pregnancy
  - Actively Breast feeding
  - Pediatric patient with open Epiphyses

Evidence of secondary causes of osteoporosis or multiple myeloma?

Yes → Investigate and treat secondary causes

No ➔ Back Pain or history of height loss ≥ 4 cm

Yes → Lateral spine radiographs to diagnose vertebral fracture

No ➔ Fracture during bisphosphonate therapy or T<2.5 with history of fragility fracture?

Yes ➔ Does patient have contraindications to PTH/PTHrP analog?*

No ➔ SDM for prescription of PTH/PTHrP analog

Yes ➔ DXA to establish severity of disease, treat as osteoporosis (BMD<−2.5), follow dietary and lifestyle modification pathways as well.

Was fragility fracture vertebral?

No ➔ Obtain DXA

T score > -1.5

Yes ➔ Follow dietary and lifestyle modification pathways and repeat DXA in 2 years.**

No ➔ Follow Dietary and Lifestyle pathways. Follow Osteoporosis BMD < -2.5 treatment pathway

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Fragility Fracture = fracture out of proportion to injury pattern

SPEP = serum protein electrophoresis

UPEP – Urine Protein Electrophoresis

Bone turnover markers are useful in assessing compliance and efficacy of therapy but should not be used to decide whether to initiate pharmacologic therapy

Consider Additional Labs if indicated (premenopausal, concern for hormone issue, concern for malignancy, etc.):

- 24 hour urine for calcium and creatinine
- 24 hour urine for cortisol
- FSH, LH
- Prolactin
- Magnesium
- Intact PTH
- 1, 25- dihydroxy Vitamin D
- TSH
- Serum Protein Electrophoresis/ urine protein electrophoresis
- Testosterone

**AAOS recommends 1 year. Choosing Wisely says never repeat sooner than 2.
Incidental Vertebral Fracture finding

Known Osteoporosis?

Yes → Pharmacological Treatment of Osteoporosis

No → Workup secondary causes:
Check: 25-hydroxy Vit D, CMP, CBC, Phosphorus, and add testosterone if male.^

Endocrine disorder or renal failure present?

Yes → Refer to Endocrinology. See Endo table

No → Lateral spine radiographs to assess for unstable fractures

^ Consider Additional Labs if indicated (premenopausal, concern for hormone issue, concern for malignancy, etc.)
- 24 hour urine for calcium and creatinine
- 24 hour urine for cortisol
- FSH, LH
- Prolactin
- Magnesium
- Intact PTH
- 1, 25- dihydroxy Vitamin D
- TSH
- Serum Protein Electrophoresis/ urine protein electrophoresis
- Testosterone
High FRAX* or moderate FRAX and other menopausal symptoms?

Yes

High FRAX or Moderate FRAX

Moderate FRAX

Risk factors for HT?

no

Dietary and lifestyle changes and repeat DXA in 5 years

If patient not interested

If patient has diagnosis of osteopenia and other menopausal symptoms, consider post-menopausal hormone therapy

* High FRAX = Overall fracture risk ≥ 20% or hip fracture risk ≥ 3%
  Moderate FRAX ≥ 10% to < 20%

** AACE 2020 guidelines

Treat: See Osteoporosis Treatment pathway
Lifestyle Changes

Patient has breast cancer?

Yes

Determine which team of experts manages Osteoporosis; Share clinical pathway

No

Prescribe Calcium, Vitamin D, and exercise; Also see dietary changes

Does patient smoke?

Yes

Advise not to use tobacco products, including e-cigarettes

Assess Readiness to Change related to tobacco cessation

Recommend stage appropriate lifestyle treatment and supports for smoking cessation

Stage appropriate education on smoking cessation

No

Does patient have a positive Audit-C?

Yes

Advise to decrease consumption of alcohol due to increased fall and fracture risk

Assess Readiness to Change related to alcohol consumption

Recommend stage appropriate lifestyle treatment and supports for reduced alcohol consumption

Stage appropriate education on decreasing alcohol consumption

No

Fall Risk Screening

High fall risk?

Yes

PT & OT assessment. Dietary & Lifestyle changes.

No

Dietary Changes
Pharmacological Treatment of Osteoporosis

GFR < 30?
- Yes → Refer to Endo or Osteoporosis specialist
- No → T score less than -3.5

T score less than -3.5
- Yes → PTH Analog
  - Yes → DXA in 2 yrs
  - No → Start the bisphosphonate Alendronate
    - Follow up in 6 months to eval compliance and how tolerating medication. Consider checking bone markers
    - Change to oral risedronate (ACP 2017 guidelines)
    - Has patient failed 2 oral bisphosphonates?
      - Yes → DXA in 2 yrs*
      - No → Tolerate & compliant?
        - Yes → DXA in 2 yrs*
        - No → Stable or improved?
          - Yes → Continue for total of 5yrs. Then recheck DXA
          - No → Stable or improved?
            - Yes → Change to oral bisphosphonate
            - No → Initial BMD ≤-3.5?
              - Yes → Drug holiday 2yrs and recheck DXA
              - No → No drug holiday. Continue treatment and recheck DXA in 2yrs

GI disorder? Esophageal disorder? Hx of Roux-En-Y? Can’t sit upright 30+ mins or swallow pill?
- No → Start zoledronic acid**
- Yes → Recheck DXA in 2 yrs

Stable or improved?
- Yes → Shared decision making for Rx of denosumab, or cont. zoledronic acid
- No → Patient chooses denosumab?
  - Yes → Pharmacological Treatment #2
  - No → Restart previous treatment

No drug holiday. Repeat DXA in 2 yrs.
Pharmacological Treatment #2

Is patient premenopausal or under 18?
- Yes: denosumab is contraindicated do not prescribe.
- No:
  - Administer denosumab every 6 months subcutaneously
  - Check serum calcium, serum creatinine, phosphorus & magnesium 10 days post administration to rule out hypocalcemia.
  - Repeat DXA in 2 years
  - Stable or improved?
    - Yes: Continue denosumab and repeat DXA in 2 years
    - No: SDM for treatment with PTH analog

Are Epiphyseal plates closed?
- Yes: SDM for treatment with PTH analog or continue with zoledronic acid.
- No: Refer to Endo or osteoporosis specialist

Is patient interested in PTH analog?
- Yes: Prescribe PTH analog
- No: Go to Start Zoledronic Acid in pharmacological treatment pathway

After 2 yrs stop PTH analog and start Osteoporosis algorithm from beginning**