The University of Vermont
LARNER COLLEGE OF MEDICINE
OFFICE OF PRIMARY CARE & AHEC PROGRAM

Project ECHO
University of Vermont

Welcome to UVM ECHO:
Osteopenia Diagnosis and Treatment

Facilitators:
Jennifer Kelly, MD, Course Director
Amy Shah, DO, MPH, Presenter

Introduction to ZOOM for ECHO

- Please mute microphone when not speaking
- Please use camera as much as possible
- Test both audio & video before joining
- Communicate clearly during session:
  - Can use “raise hand” feature to comment
  - Speak clearly
  - Use chat function for technical issues
- Didactic session will be recorded for review or if you miss a session

- RECORDING OF SESSION TO BEGIN

CME Disclosures

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- UVM designates this educational activity for a maximum of 1.0 AMA PRA Category 1 Credits. Participants should claim only the credit commensurate with the extent of their participation in the activity.
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- Interest Disclosures:
  - No disclosures

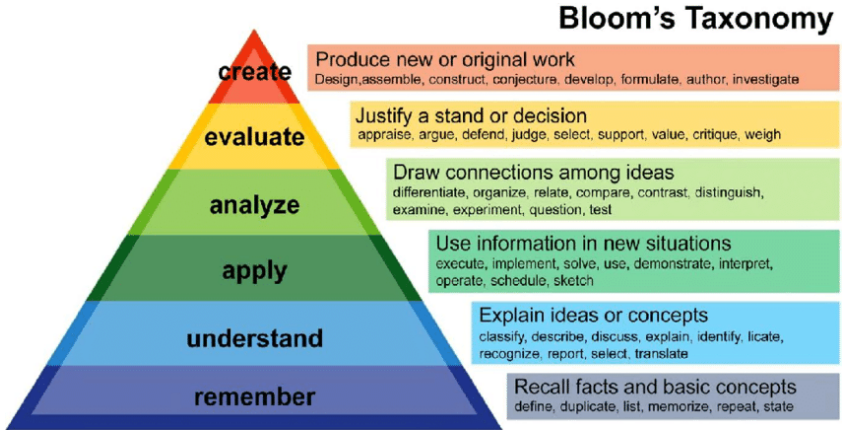
Agenda

- Objectives
- Summary from last session (2 min)
- Didactic Presentation (20 min)
- Case presentation
  - Clarifying questions
    - Participants first – then faculty panel
- Discussion of case
  - Concluding with the cohort's recommendations
- Summary
- Closing Announcements

Objectives

- Participants will be able to:

1. Identify what defines osteopenia
2. Discuss diagnostic methods, treatment criteria, and treatment options
3. Apply information to case presentations at the end of lecture



Summary from last session

- ***Insert here the top three or four learning points from the prior session, taking into account feedback from the participants, for example (from the osteoporosis into session)

  - Diagnosis is based on t-score < -2.5 or fragility fracture
    - DEXA interpretation is imperfect
    - DEXA may exclude areas of prior fracture or arthritis
  - Screening per NOF guidelines
    - Women 65+, Men 70+, earlier in selected circumstances
  - FRAX algorithm (WHO) estimates 10-yr fracture risk
    - Also has limitations: only hip; doesn't account for other risks (falls, steroids, etc); not for people on Rx
    - Underestimates risk
  - Trabecular bone score may help with borderline treatment decisions

Osteopenia: Diagnosis and Treatment

Amy Shah, DO, MPH

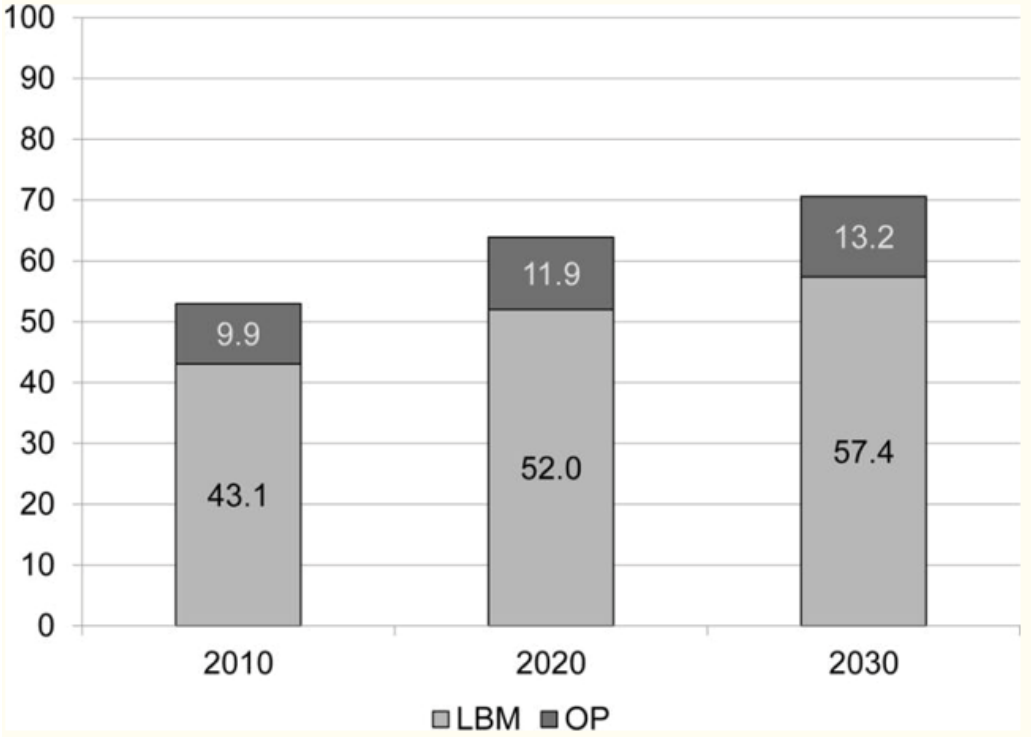
The University of Vermont
LARNER COLLEGE OF MEDICINE

Background

- It has long been known that fractures in postmenopausal people are associated with bone fragility.
- Integration of bone mineral density (BMD) reflects the bone strength
- BMD is determined by peak bone mass and subsequent bone loss

Background

- Osteoporosis: T-score of -2.5 or lower
- Osteopenia: T-score that is higher than -2.5 but less than -1.0



IMPORTANCE

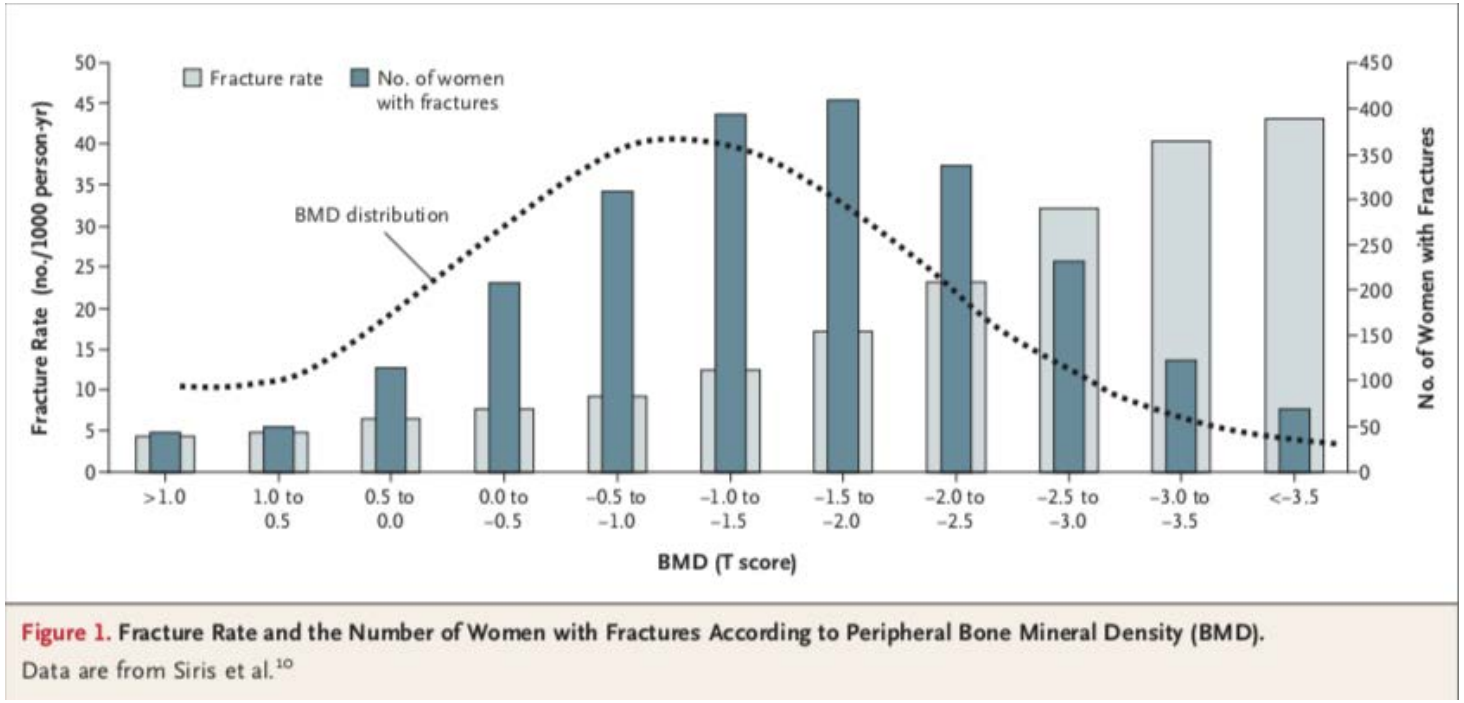
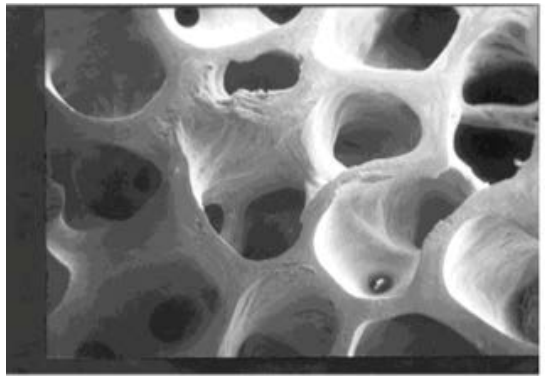
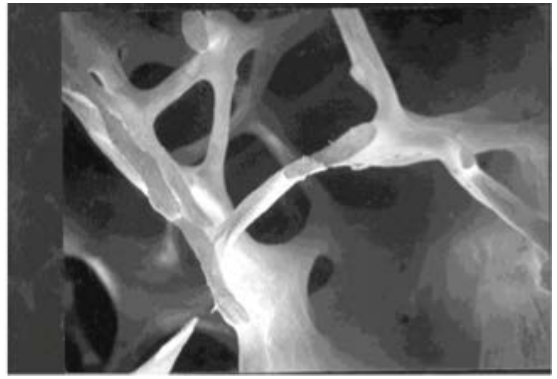


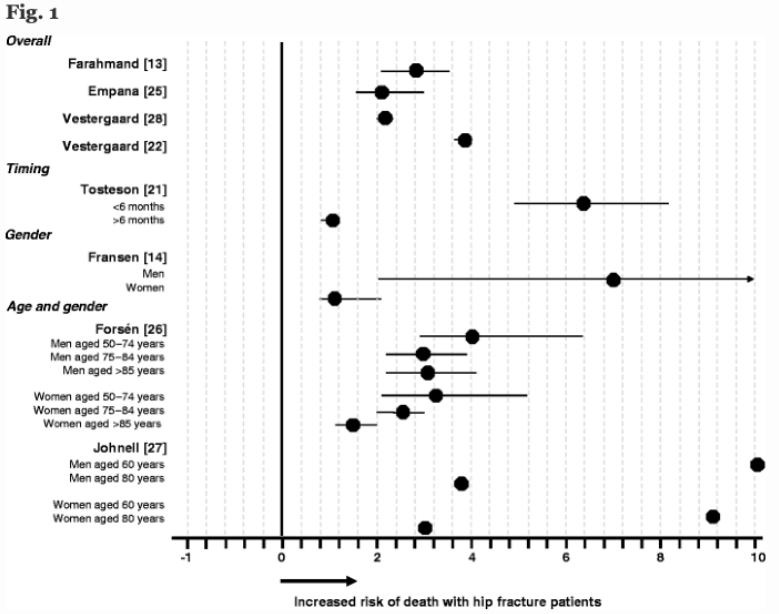
Figure 1. Fracture Rate and the Number of Women with Fractures According to Peripheral Bone Mineral Density (BMD).
Data are from Siris et al.[10]



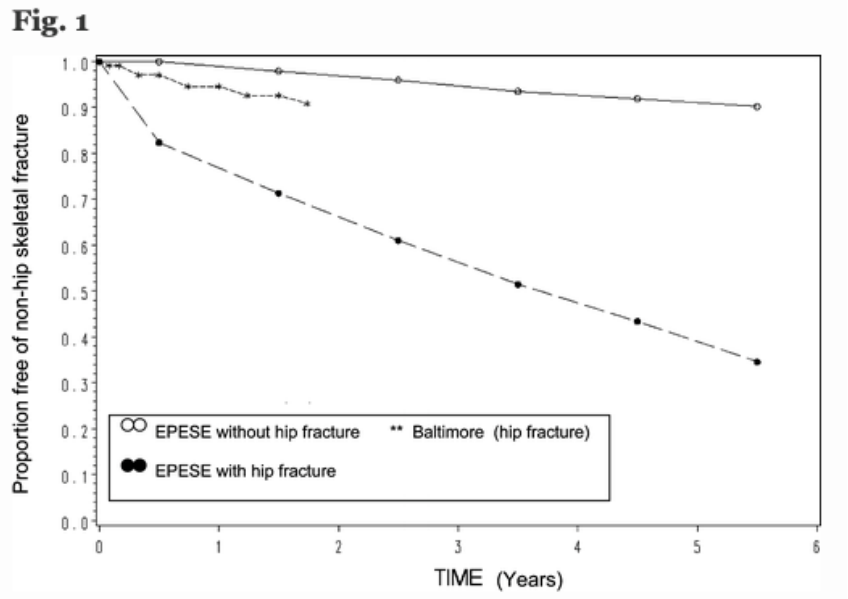


Siris ES, et. al. Identification and Fracture Outcomes of Undiagnosed Low Bone Mineral Density in Postmenopausal Women. JAMA. 2001;826(22):2815-2822

Medical Impact



- Meta-analysis: All show a statistically significant increased risk in future fractures (hip and other site) in patients already with a hip fracture

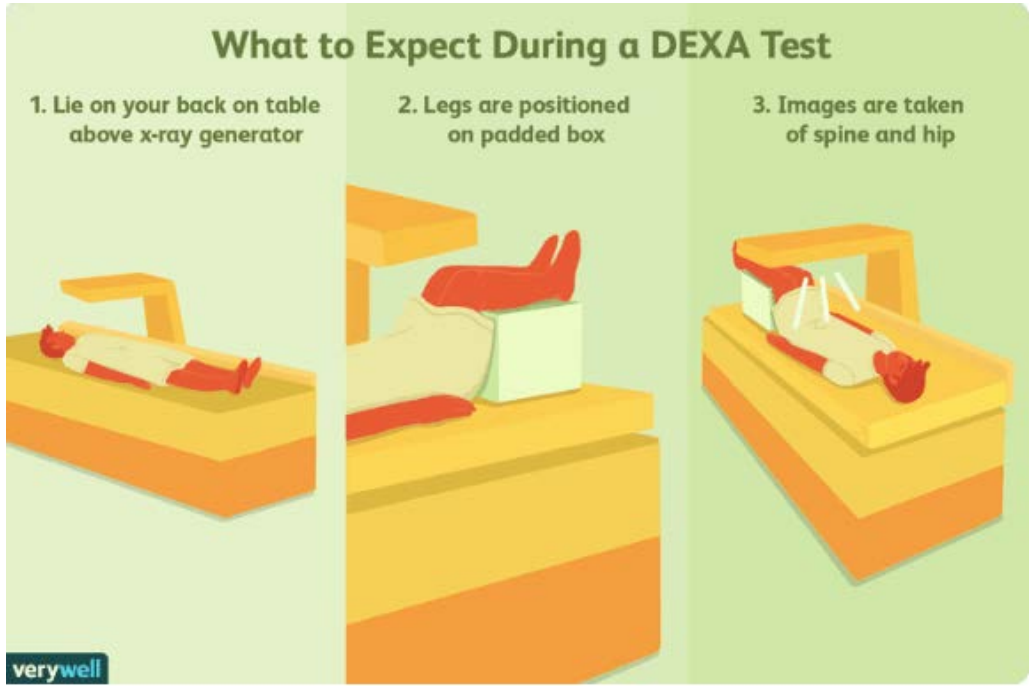


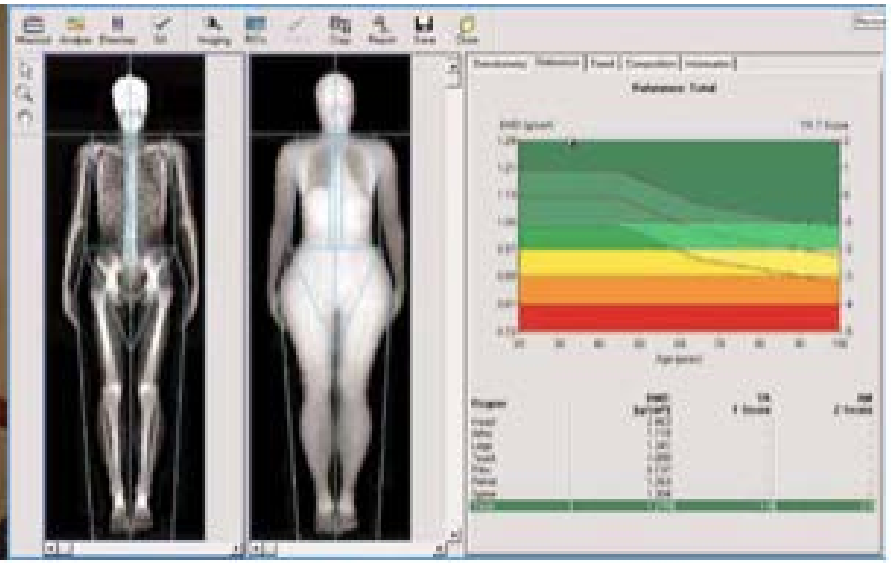
Baltimore Hip Studies and the Established Populations for Epidemiologic Studies of the Elderly (EPESE) – time to non hip skeletal fracture based on hip fracture status

WHO TO TEST?

- Women ≥ 65 years
- Men ≥70 years
- Postmenopausal women <65 years of age and men <65 that have clinical risk factors for fracture
- Postmenopausal women and men >50 who have an adult age fracture, to diagnose and determine degree of osteoporosis

DXA SCAN

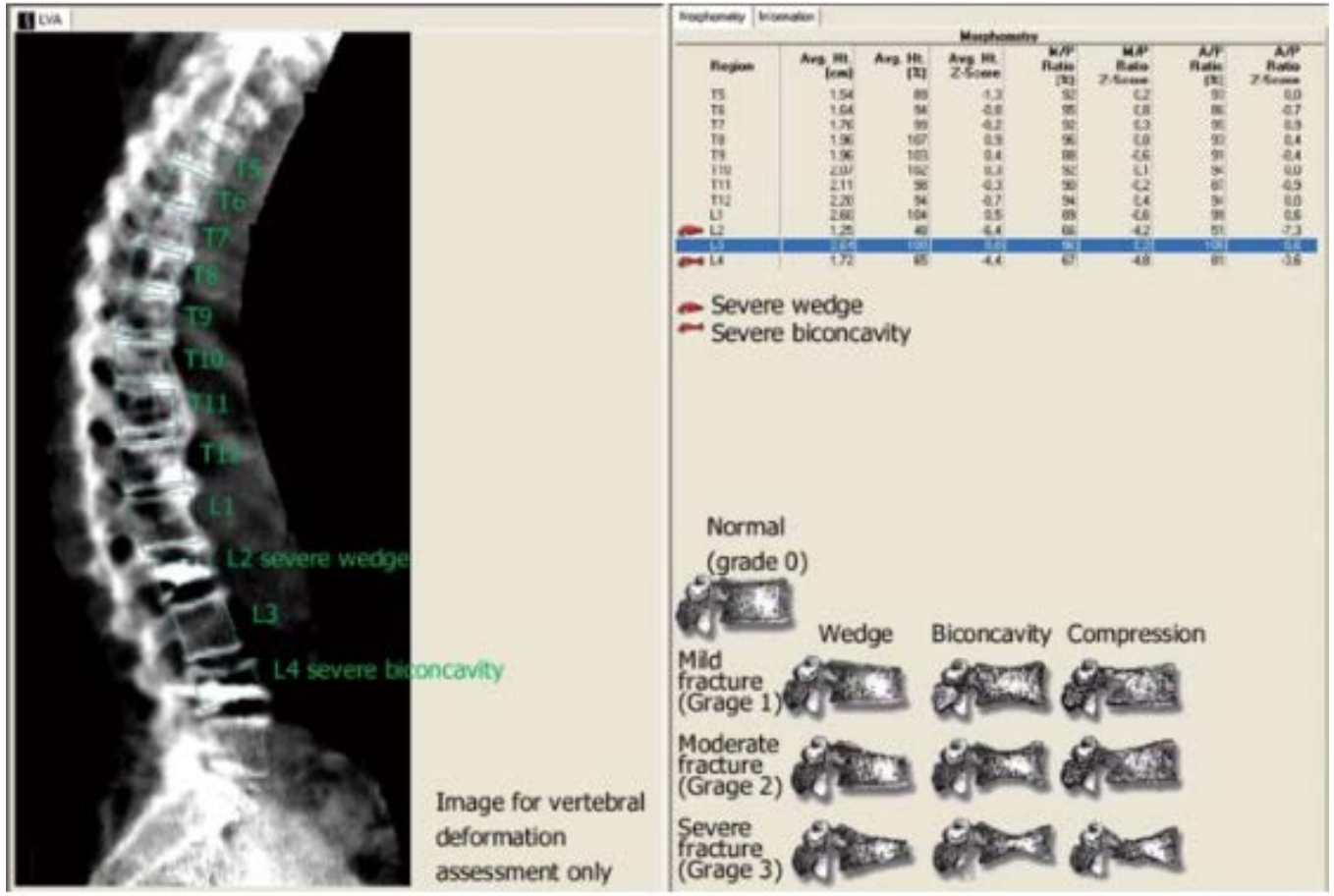

What to Expect During a DEXA Test
1. Lie on your back on table above x-ray generator
2. Legs are positioned on padded box
3. Images are taken of spine and hip
verywell



VERTEBRAL IMAGING

Vertebral fractures constitute a diagnosis of osteoporosis
Single vertebral fracture significantly increases risk of hip and other site fractures
Assess with:

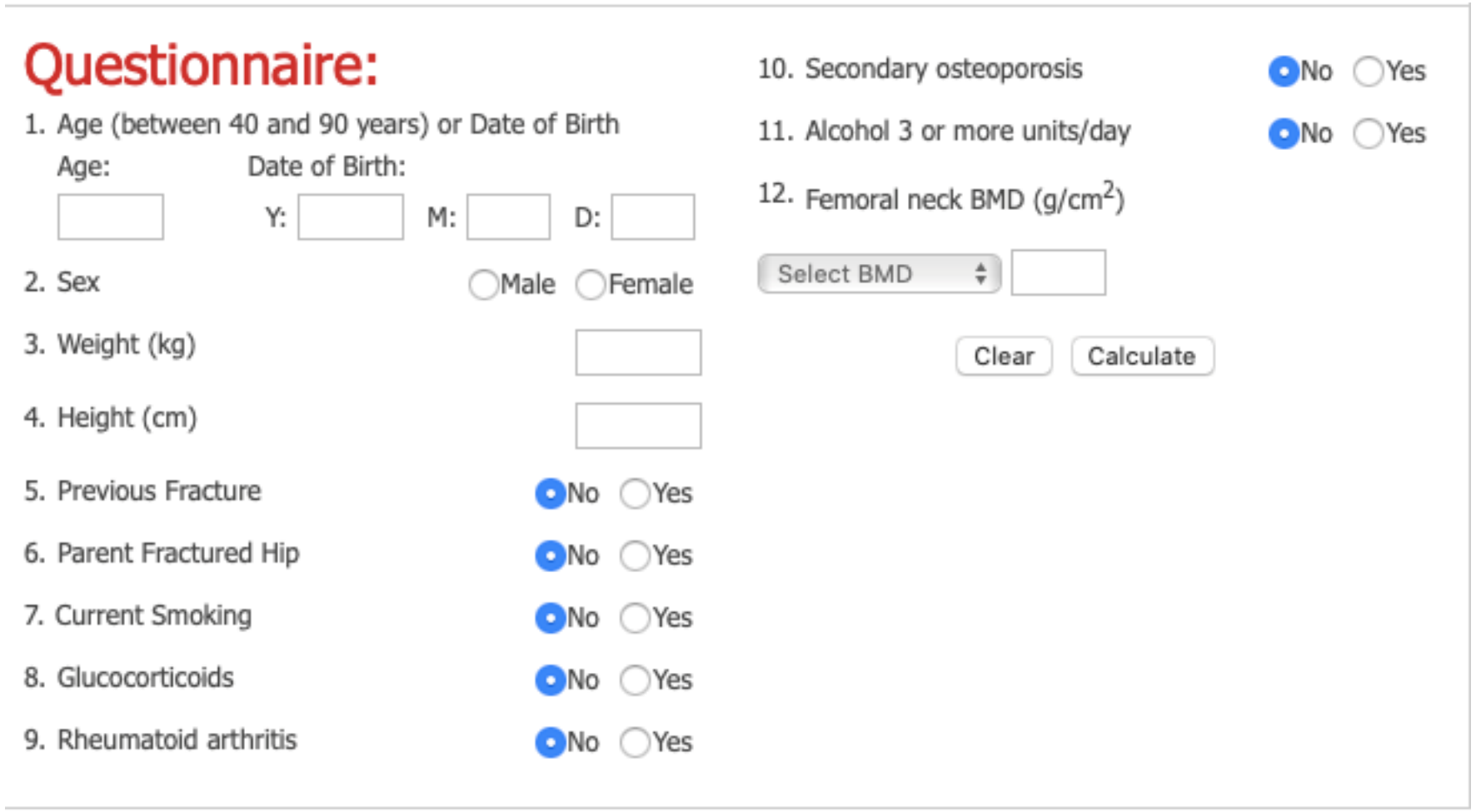
- Vertebral fracture assessment or
- T-spine and L-spine xrays



Who to treat?

- Osteopenia + fragility fracture = treat
- Osteopenia + no clinical evidence of fracture = ?

Fracture risk Algorithm (FRAX)



Questionnaire:

1. Age (between 40 and 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/day ● No ○ Yes
12. Femoral neck BMD (g/cm^2)

Select BMD

Clear Calculate

FRAX Score Limitations

- Several known determinant of fracture risk are not included in the FRAX score
  - Vitamin D deficiency
  - Bone turnover markers
- Algorithm does not take into account well known “dose effects” like glucocorticoid doses. Only asks for glucocorticoid use
- May underestimate fracture risk in individuals with increased propensity for falls, recent fractures, lumbar spine BMD much lower than femoral neck, secondary osteoporosis
- Can only be used in untreated patients

Lab Workup

- CBC
- 25-OH Vitamin D
- BMP
  - Calcium, creatinine
- TSH
- PTH
- Serum/urine electrophoresis
- Testosterone (men)
- Hypogonadism resulting from tx of breast cancer with aromatase inhibitors use of androgen deprivation therapy
- Bone turnover markers***

TREATMENT

- LIFESTYLE CHANGES
  - Smoking cessation
  - Alcohol cessation
  - Weight bearing exercises
  - Fall prevention

TREATMENT

- Calcium and vitamin D
  - Total intake of 1200-1500mg of calcium per day (through diet, supplement, or both)
  - 800-1000 iU of vitamin D per day

Table 9 Estimating daily dietary calcium intake

Step 1: Estimate calcium intake from calcium-rich foods[a]			
Product	# of servings/day	Estimated calcium/serving, in mg	Calcium in mg
Milk (8 oz.)	_____	×300	= _____
Yogurt (6 oz.)	_____	×300	= _____
Cheese (1 oz. or 1 cubic in.)	_____	×200	= _____
Fortified foods or juices	_____	×80 to 1,000[b]	= _____
			Subtotal = _____
Step 2: Add 250 mg for nondairy sources to subtotal above			+250
			Total calcium, in mg = _____

Pharmacologic Therapy

- Debate about baseline treatment with anti-osteoporotic in every osteopenic patients
- Antiresorptive medications: bisphosphonates, SERM, estrogen hormone therapy/combination therapy, RANK-L modulator
- Anabolic: recombinant PTH

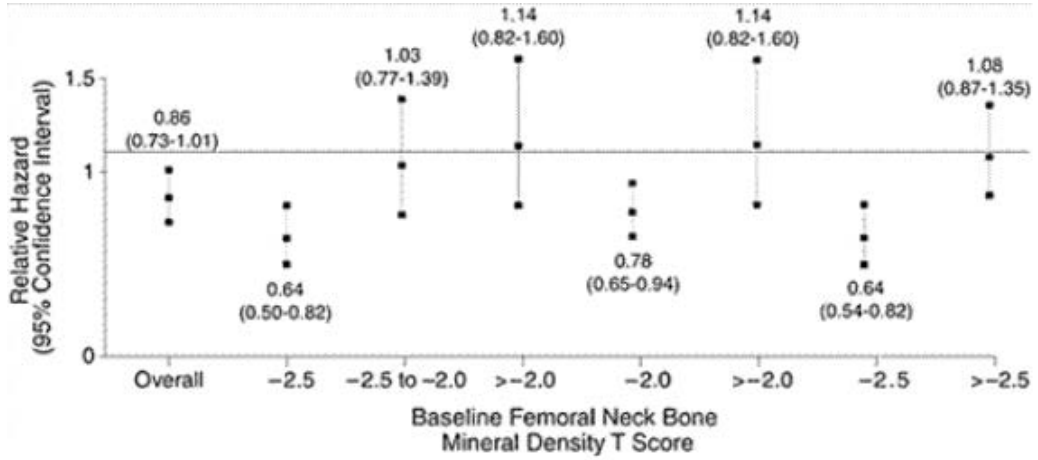
FDA approved treatments

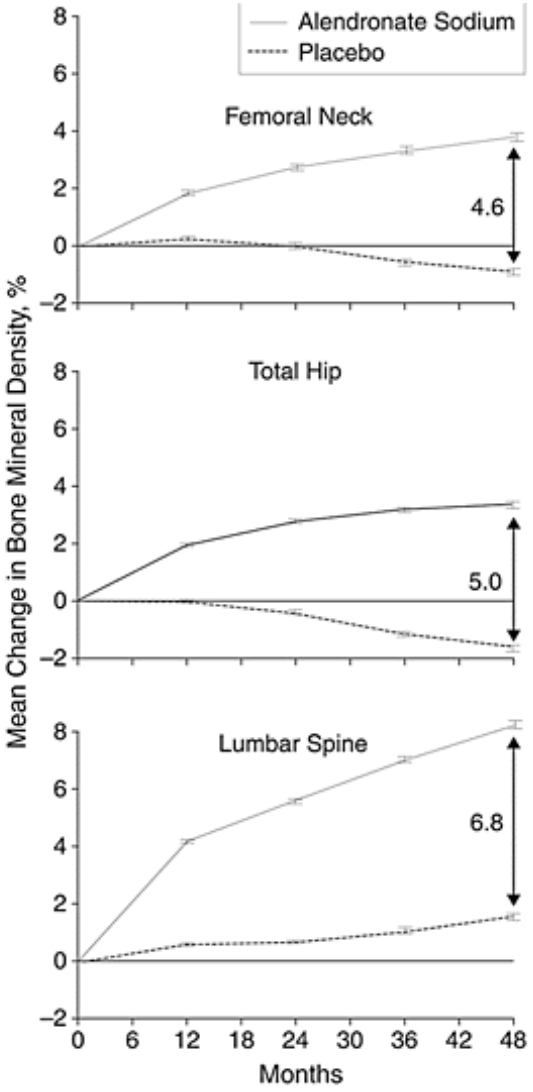
Fracture Intervention Trial (FIT), 1998

Table 1.—Baseline Characteristics of the Randomized Participants

	Placebo (n = 2218)	Alendronate Sodium (n = 2214)
Age, %, y		
<65	33.3	34.5
65-74	53.7	52.6
75-80	13.0	12.9
Mean (SD)	67.7 (6.1)	67.6 (6.2)
Bone mineral density, %, g/cm^2		
Femoral neck, SDs below peak*		
>2.5	36.6	37.0
2.0-2.5	32.0	32.8
1.5-2.0	31.4	30.2
Mean (SD)	0.593 (0.06)	0.592 (0.06)
Posterior-anterior spine, mean (SD)	0.842 (0.13)	0.841 (0.13)
History of fractures since age 45 y, %	35	36

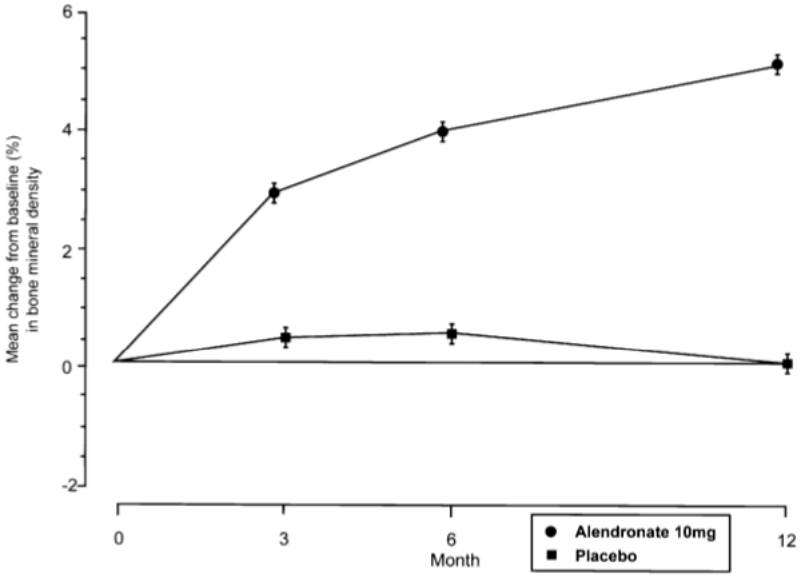
- Randomized, blinded, placebo-controlled trial done between 1992-1997
- 4,432 postmenopausal women with low BMD and no vertebral fractures

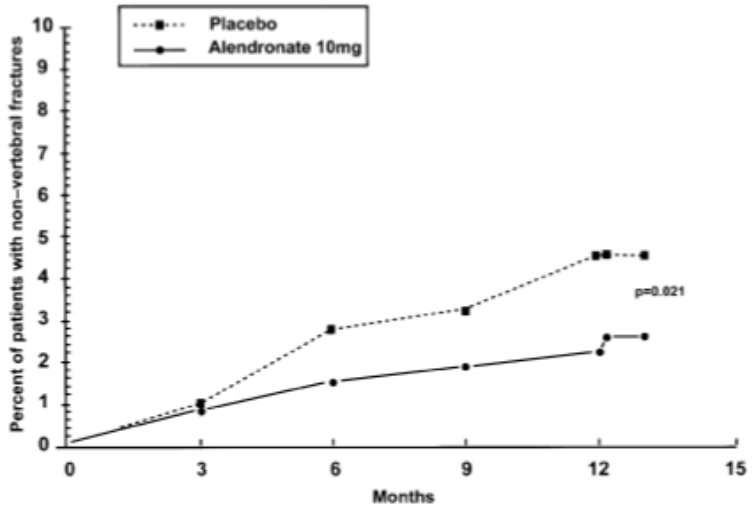




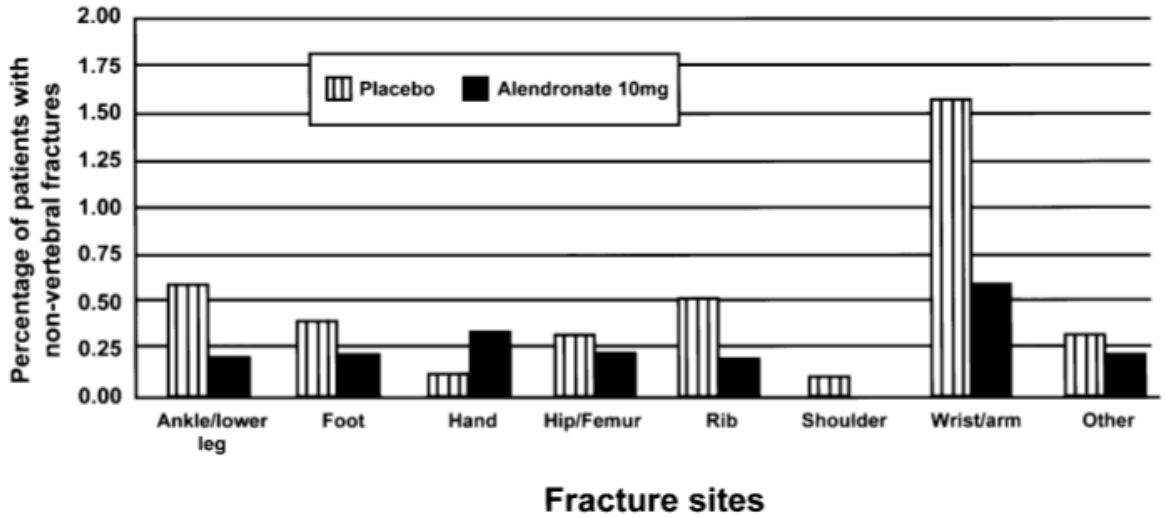
Cummings SR, et. al. *JAMA.* 1998 Dec 23-30; 280(24):2077-82

FOSIT study, 1999





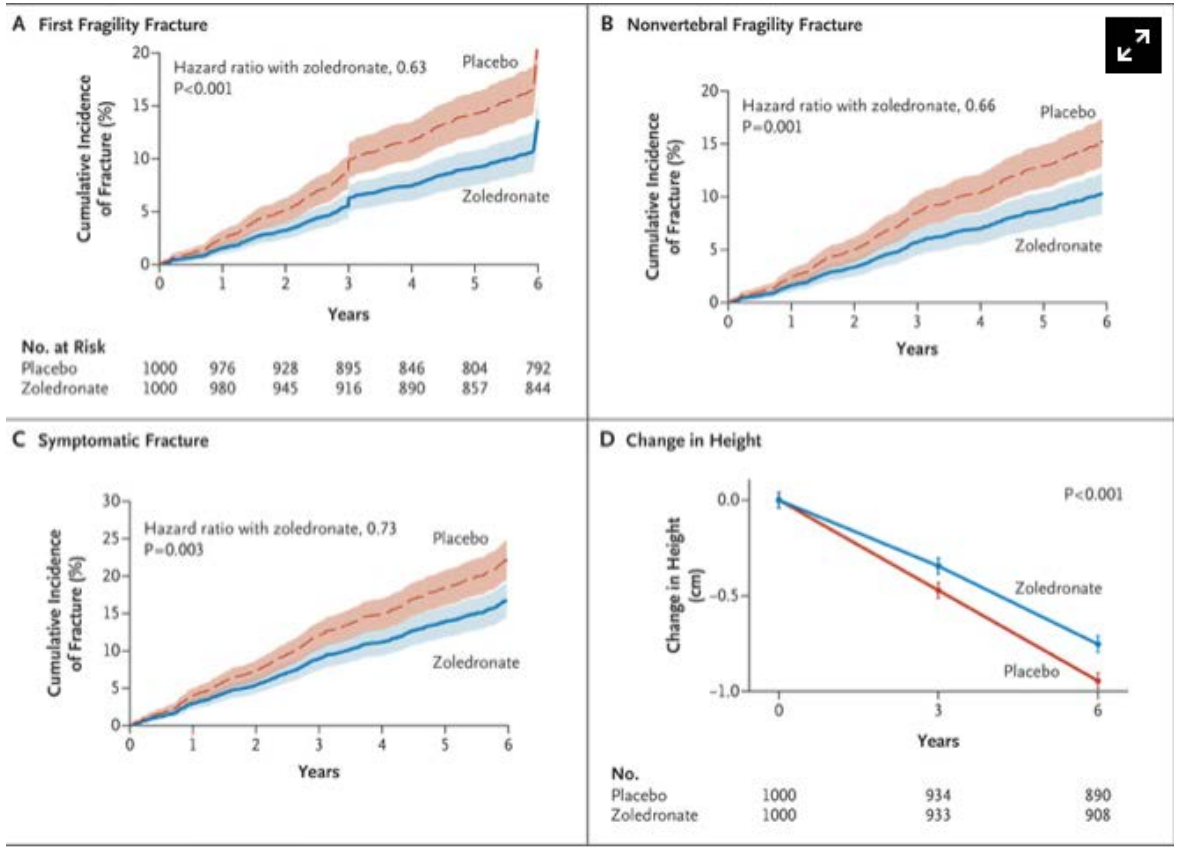
- 1,908 postmenopausal women with L-spine T-score of -2 or more
- Received alendronate 10mg daily or placebo once daily for 1 year



Pois HA, et. al.. *Osteoporos Int.* 1999; 9(5):461-8.

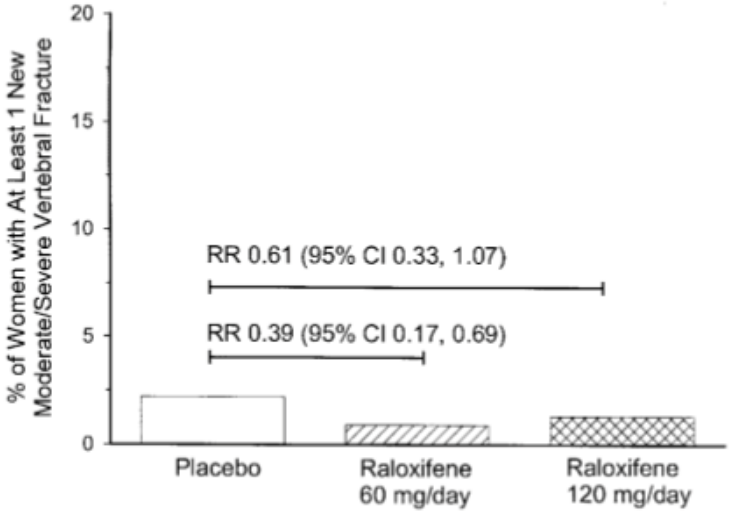
FRACTURE PREVENTION WITH ZOLEDRONATE, 2018

- Baseline characteristics
  - Mean age was 71±5 years
  - T-score at femoral neck was -1.6±0.5
  - Median 10 year risk of hip fracture was 2.3%



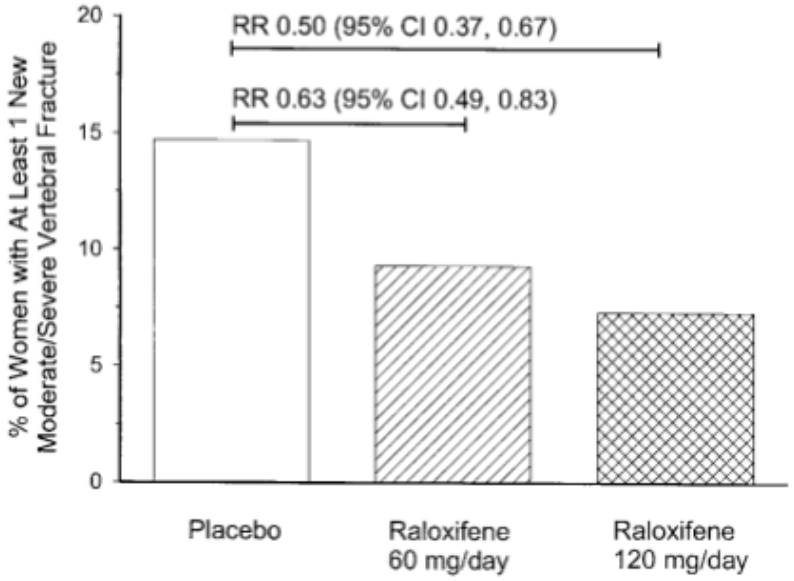
Reid IR, et. al. Fracture Prevention with Zoledronate in Older Women with Osteopenia. N Engl J Med. 2018 Dec 20; 379(25):2407-2416

MORE Trial - raloxifene



- RCT of 7,705 post menopausal women with T-score <-2.5 or osteopenia with a history of vertebral fracture

- Reduce risk of vertebral fracture by 30% in patients with prior vertebral fracture and by about 55% in patients without prior fracture



Siris E. et. Al, *Osteoporos Int* (2002) 13:907–913

Monitoring

- DXA scan every 1-2 years
- Yearly height measurement
- Calcium and vitamin D supplementation
- Treatment duration assessment
- Utility of bone turnover markers

SUMMARY

- Osteopenia is defined as low bone mass with T-score between -1 to -2.5
- DXA scan is used to diagnose osteopenia and should be ordered for every post menopausal women >65 and men >70. Earlier than this depends on risk factors
- Treatment for every osteopenic patient should always include calcium, vitamin D, lifestyle modification (smoking and alcohol cessation), and weight bearing exercises
- Pharmacologic treatment is dependent on risk fractures and FRAX Score
- FDA approved treatments include bisphosphonates and raloxifene
- Monitoring includes DXA scan every 1-2 years, risk assessment, labs, and possible bone turnover markers

References

- Cosman F, et. Al. Clinicians Guide to Prevention and Treatment of Osteoporosis. Osteoporos Int. 2014; 25(10): 2359-2381.
- Cummings SR, et. al. Effect of alendronate on risk of fracture in women with low bone density but without vertebral fractures: results from the Fracture Intervention Trial. JAMA. 1998 Dec 23-30; 280(24):2077-82
- Harris ST, et. al. Effect of combined risedronate and hormone replacement therapies on bone mineral densities in postmenopausal women. J Clin Endocrinol Metab. 2001 May;86(5):1890-7
- Muller D, et. al. Cost-effectiveness of different strategies for selecting and treating individuals at increased risk of osteoporosis or osteopenia: a systematic review. Value Health. 2012 Mar; 15(2):284-98
- Pois HA, et. al. Multinational, placebo-controlled, randomized trial of the effect of alendronate on bone density and fracture risk in postmenopausal women with low bone mass: result of FOSIT study. Osteoporos Int. 1999; 9(5):461-8.
- Reid IR, et. al. Fracture Prevention with Zoledronate in Older Women with Osteopenia. N Engl J Med. 2018 Dec 20; 379(25):2407-2416
- Rossouw JE, et. al. Risks and benefits of estrogen plus progestin in health postmenopausal women: principal results from the Womens Health Initiative randomized control trial. JAMA. 2002 Jul 17;288(3):321-33
- Schwarts AV, et. al. Efficacy of continued alendronate for fractures in women with and without prevalent vertebral fracture: the FLEX trial. J Bone Miner Res. 2010 May; 25(5): 976-82.
- Siris ES, et. al. Identification and Fracture Outcomes of Undiagnosed Low Bone Mineral Density in Postmenopausal Women. JAMA. 2001;826(22):2815-2822

Case presentation

RECORDING TO BE STOPPED FOR CASE PRESENTATION

Cases/HIPAA

- Names
- Address
- DOB
- Phone/Fax #
- Email address
- Social Security #
- Medical Record #

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This material is intended for use in improving patient care.

It is privileged and strictly confidential and is to be used only for the evaluation and improvement of patient care.

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- Please complete evaluation forms for each session
  - CME will be processed once session evaluation form is received at UVM
- UVM Project ECHO materials available at www.vtahec.org
- Please contact us with any questions/suggestions
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  - ahec@uvm.edu

Thank you!