Bone Health In Cancer Care

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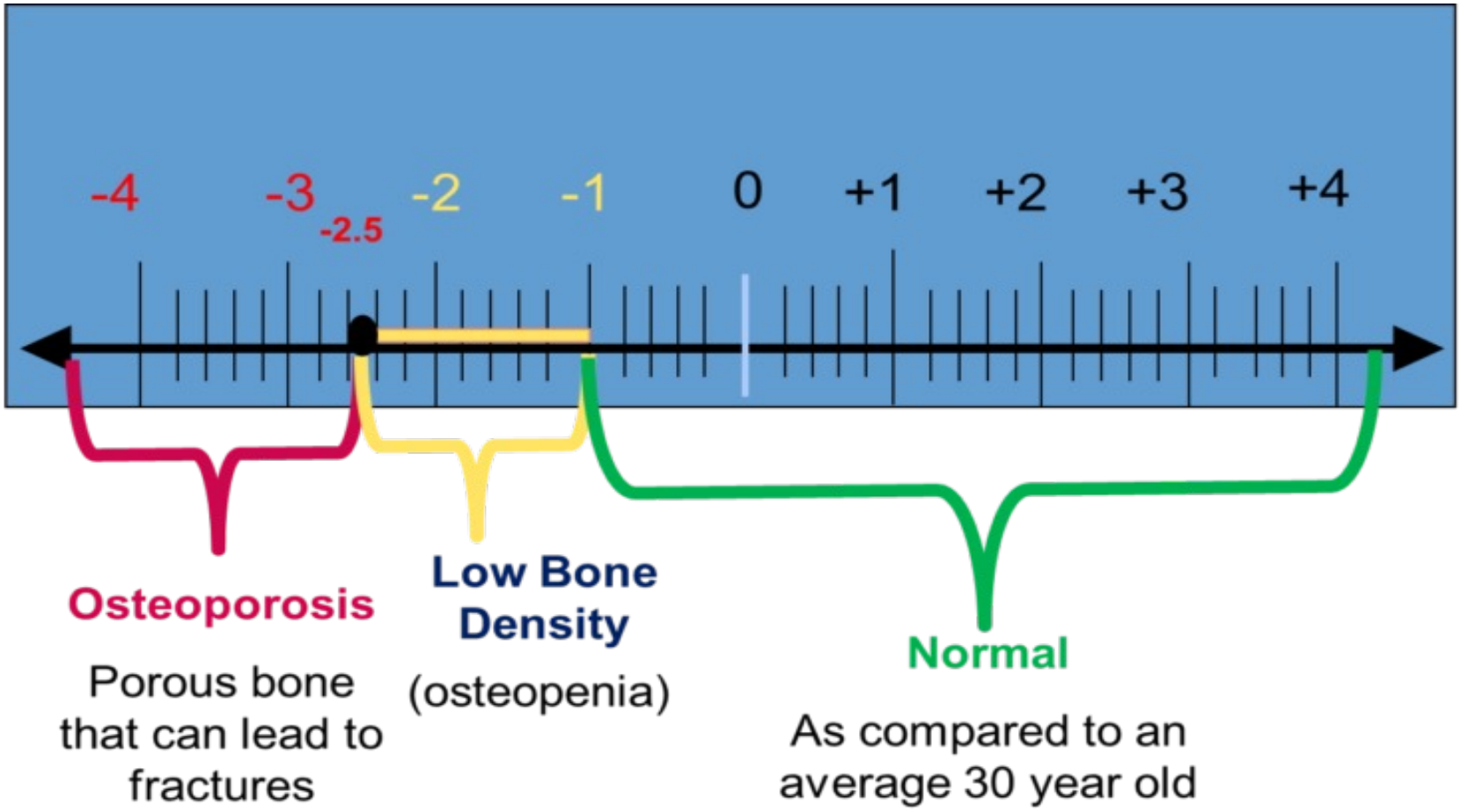
Objectives

- Summarize the basics of bone density results
- Review pharmacological management of cancer treatment-induced bone loss in multiple myeloma, breast and prostate cancer patients
- Describe institutional workflow for the dispensation of bone modifying agents (BMAs)

Background

- Cancer patients have an increased risk for developing bone loss and osteoporosis from anti-cancer treatments
- Bone loss occurring with cancer therapy can be up to tenfold higher than normal[1]
- Bone loss is associated with osteoporosis, decreased bone strength, poor quality of life, and increased mortality[1]
- As healthcare professionals, identification of cancer patient at increased risk for bone loss is essential

T-scores



American Bone Health. "Understanding Bone Density Results - Your T-score and Z-score Explained."

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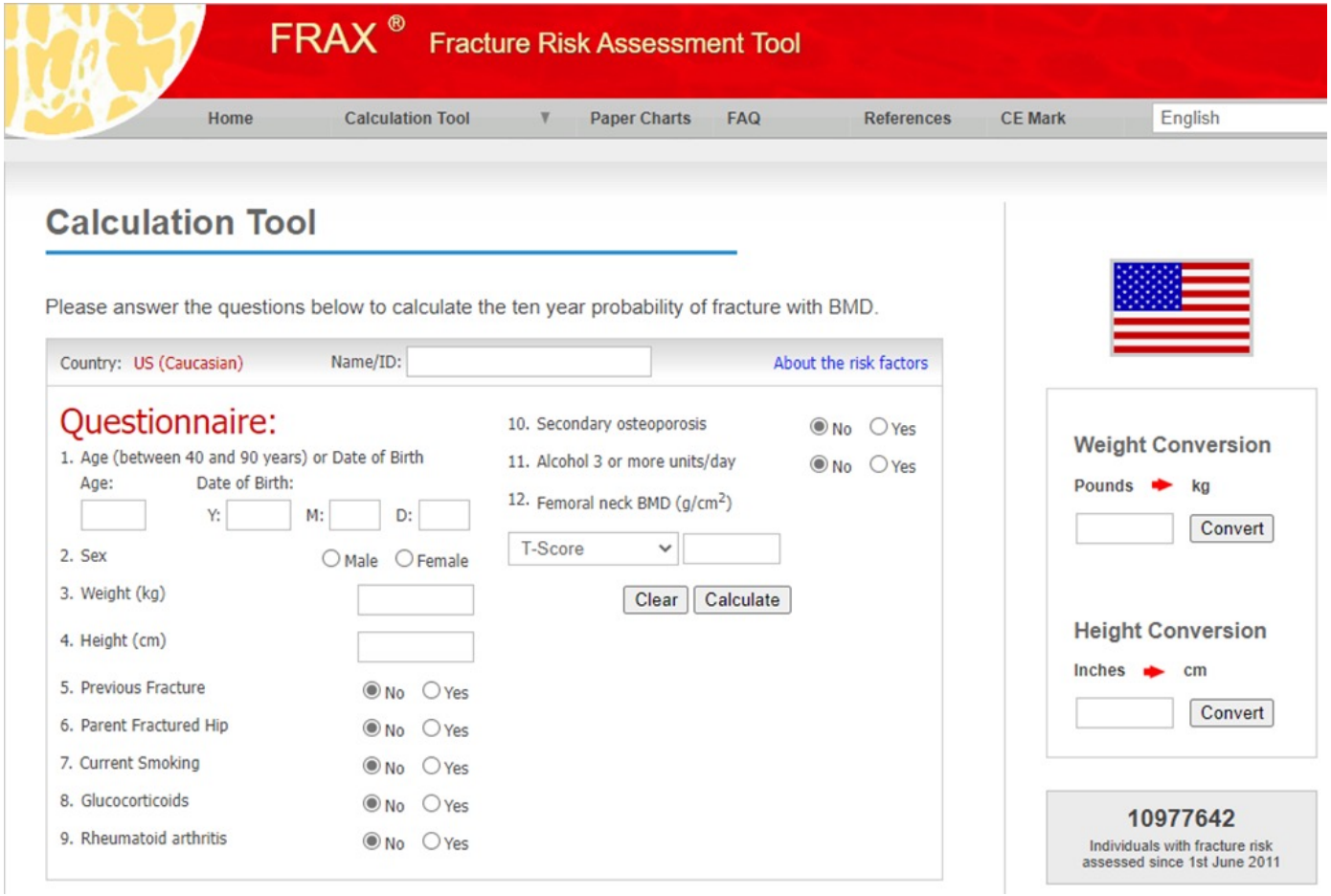
Z-scores

Z-score	Meaning
+1–2	Bone density is higher than in others of the same age, sex, and body size.
0	Bone density is the same as in others of the same age, sex, and body size.
-1	Bone density is lower than in others of the same age, sex, and body size.
-2	Doctors consider scores higher than this to be normal.
-2.5	This score or lower indicates secondary osteoporosis

Medical News Today. "Z-scores for Bone Density: Chart, Meaning, and More."

Fracture Risk Assessment Tool



FRAX® Fracture Risk Assessment Tool. Centre for Metabolic Bone Diseases, University of Sheffield, UK

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Multiple Myeloma

Myeloma and bone cells interact leading to activation of osteoclasts and suppression of osteoblasts

Up to **80%** of patients present with osteolytic bone lesions at diagnosis[5]

The risk to develop a fracture is approximately **60%**[5]

Treatment:

Bisphosphonates or denosumab

Radiation therapy

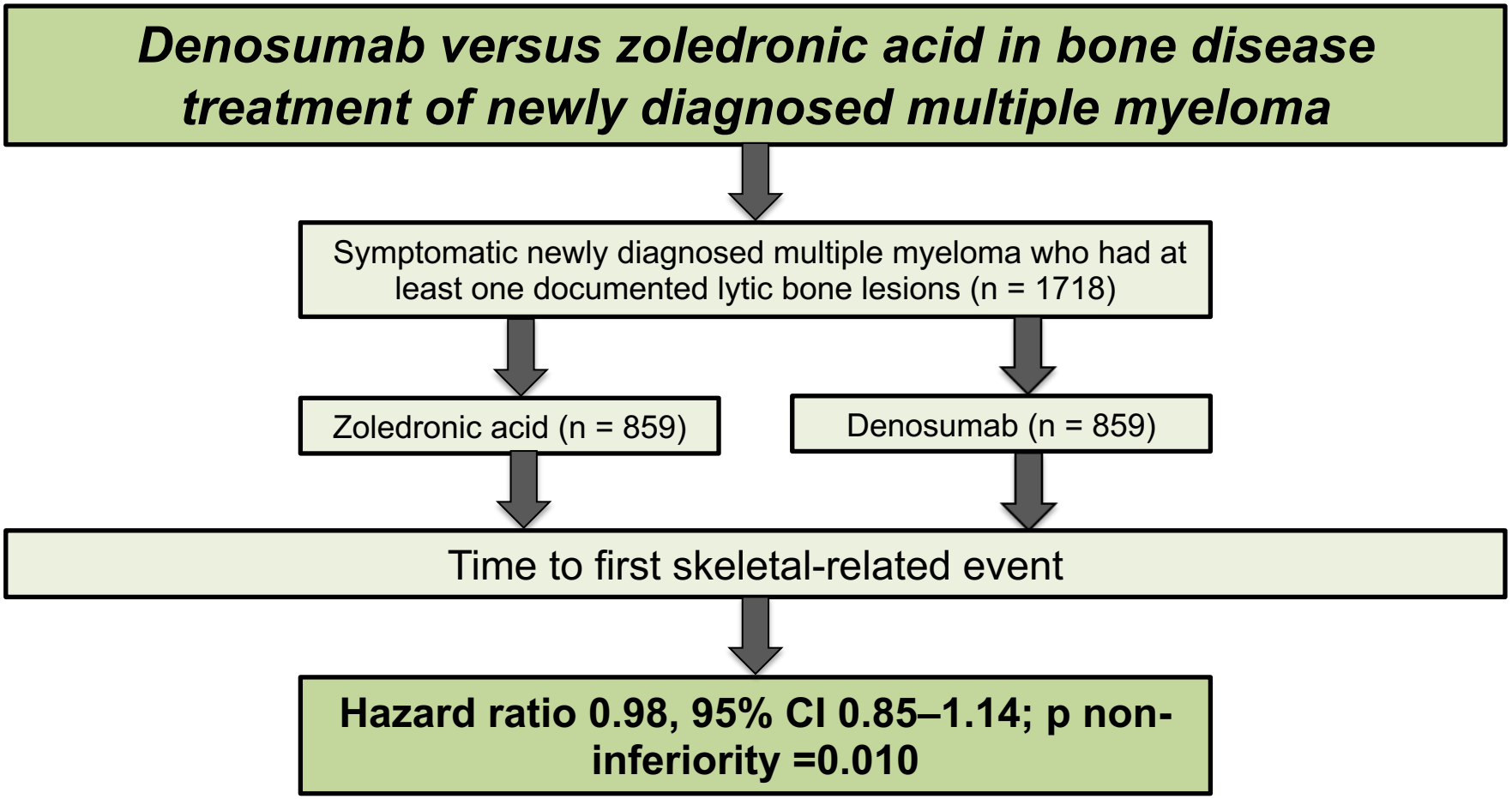
Orthopedic interventions

Vertebroplasty or kyphoplasty

Multiple Myeloma

- BMAs (bone modifying agents) should be given together with primary multiple myeloma therapy:
  - **Bisphosphates**
  - **Denosumab (*renal insufficiency)**
- Regardless of documented bone disease
- Duration of therapy is up to 2 years
- Monthly vs. every 3 months
- Rebound osteoporosis after denosumab

Zoledronic acid vs denosumab



Raje et al., "Denosumab Versus Zoledronic Acid in Bone Disease Treatment of Newly Diagnosed Multiple Myeloma: An International, Double-blind, Double-dummy, Randomised, Controlled, Phase 3 Study"

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Breast Cancer

Breast cancer survivors had a 68% higher risk of osteopenia and osteoporosis than cancer-free women[8]

Chemotherapy	Aromatase inhibitors (AIs)	Tamoxifen	Ovarian Shutdown
Ovarian failure	Anastrazole, letrozole, exemestane	Premenopausal women	Surgical or medical

Breast Cancer

- Per NCCN guidelines, monitor bone health in patients receiving AIs or with ovarian failure secondary to treatment
- Baseline and periodically after
- Management is like patients without breast cancer
- Bisphosphonates and denosumab are preferred
- Estrogen, progesterone or selective ER modulators are not recommended for treatment
- Duration of therapy not established, typically 3-5 years

Breast Cancer

Zoledronic acid:	
Bone loss associated with aromatase inhibitor therapy in postmenopausal patients:	4 mg IV once every 6 months or 5 mg IV once every 12 months
Early stage, adjuvant therapy in postmenopausal patients:	4 mg IV once every 6 months or 4 mg once every 3 months
Denosumab:	
Aromatase inhibitor-induced bone loss in females with breast cancer:	60 mg SUBQ once every 6 months

Prostate Cancer

- Androgen deprivation therapy (ADT) has several adverse effects including bone loss and/or osteoporosis
- Castrate levels of testosterone are associated with reduced serum estrogen converted from testosterone
- Management is same to patients without prostate cancer
- Baseline bone mineral density should be considered prior to the start of ADT
- **Treatment options:**
  - Denosumab 60 mg SC every 6 months
  - Zoledronic acid 4 mg IV once every 6-12 months or 5 mg IV once every 12 months
  - Alendronate 70 mg PO once weekly

BMAs

Shared risks:

- Medication-related osteonecrosis of the jaw
  - Dental clearance
- Electrolyte abnormalities:
  - Daily supplementation with calcium and vitamin D

Bisphosphonates:

- Acute kidney injury and proteinuria
  - Follow recommended infusion times and creatinine clearance adjustments
  - Denosumab
- Flu-like symptoms

Denosumab:

- Rebound bone loss and fractures
  - Administer single dose of bisphosphonate or maintenance denosumab every 6 months

Dental Clearance

Miami Cancer Institute:

OPTION 1	• Patient has dental community visit and sends clearance letter to medical records department
OPTION 2	• Patient is seen by internal MCI dentist that documents recommendations for moving forward with treatment
OPTION 3	• Patient signs a waiver understanding risks of receiving BMA

EXCEPTION: Hypercalcemia of Malignancy

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Summary

- Cancer patients have an increased risk for bone-loss and related events through multiple mechanisms
- FRAX® tool evaluates the fracture risk of patients using clinical factors and bone mineral density at the femoral neck
- BMAs are essential in the care of oncology patients for prevention of skeletal-related events
- Institutions should assess the need to establish a dental clearance workflow prior to the dispensation of BMAs

References

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