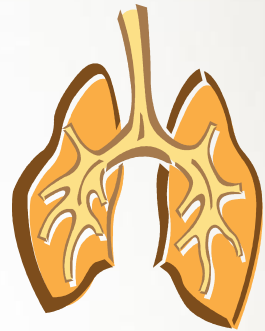
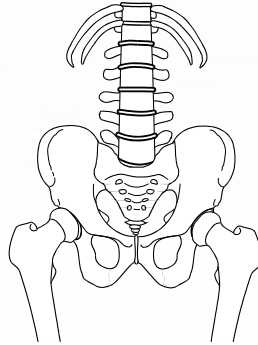
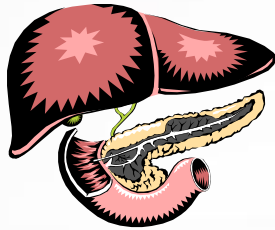
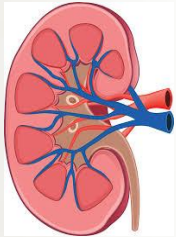


# Update: Osteoporosis & The Solid Organ Transplant Patient



**Bobo Tanner MD**  
**Anna Richmond NP**  
**Vanderbilt Osteoporosis Clinic**  
**Division of Rheumatology**  
*Oct 13, 2025*

## **BT Disclosures**

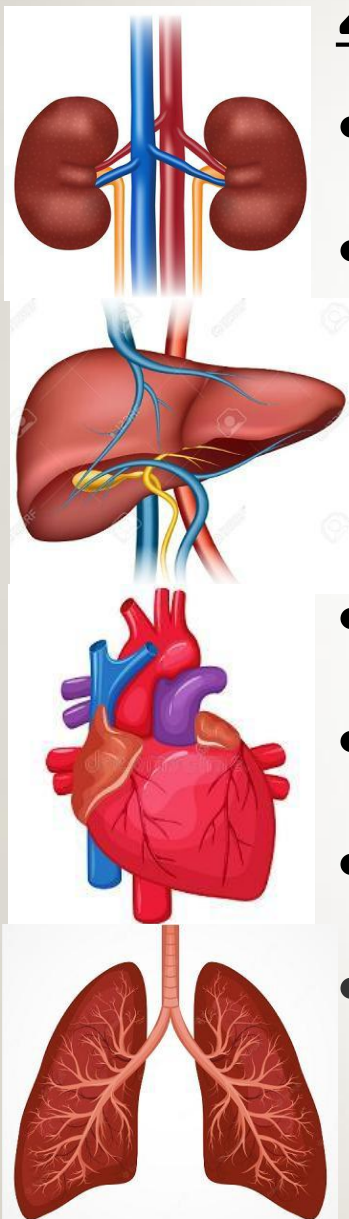
Research :

Research Support: Amgen

Advisory Panel: Kyowa Kirin

## 2024 Organ Transplants in US:

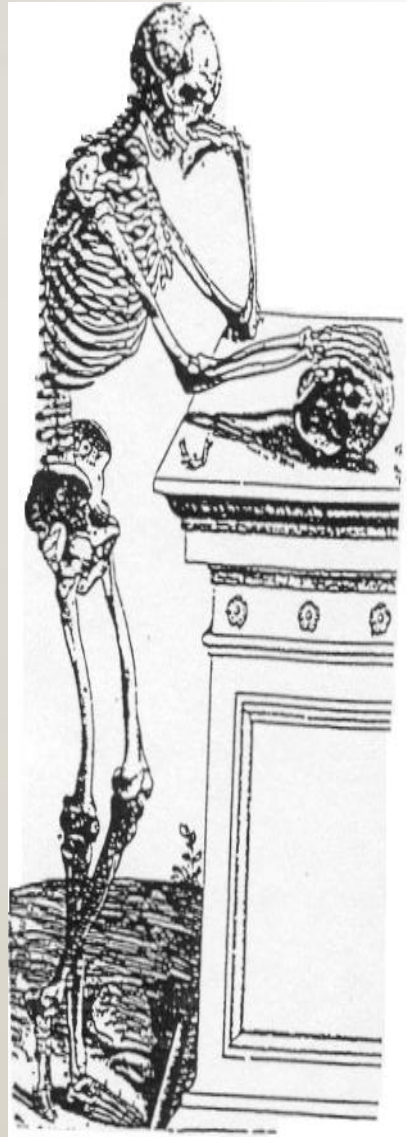
- 48,150 transplants, deceased & living donors
- Kidney : 27,760
- Liver : 11,458
- Heart: 4,572
- Lung: 3,340
- Pancreas w/w-out kidney: 847
- 76-97% survival in last 15 years
- 107,689 on the wait list, mostly kidney



# Agenda

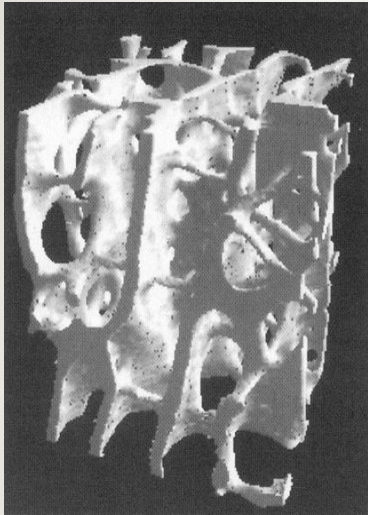
Why are you thinking about bone?

- Osteoporosis overview
- DXA Bone density testing
- Labs
- Medications & Management
- Cases & Organ Specific issues
- Take home points

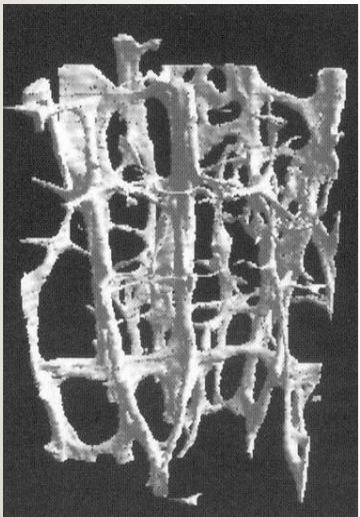


# Defining Osteoporosis:

Most common metabolic bone disease in adults



Normal Bone



Osteoporotic Bone

1. **Functional definition**: A systemic skeletal disease characterized by low bone mass and micro-architectural deterioration of bone tissue with a consequent increase in bone fragility and susceptibility to fracture.<sup>1</sup>
2. **Quantitative Definition**: WHO T-score  $\leq -2.5$
3. **Fracture Risk Definition**: FRAX 20% major fracture risk, or 3% hip fracture risk
4. **Presence of fractures**:  
Hip fracture, w/wout DXA  
Clinical vertebral, proximal humerus or pelvis fx with osteopenia

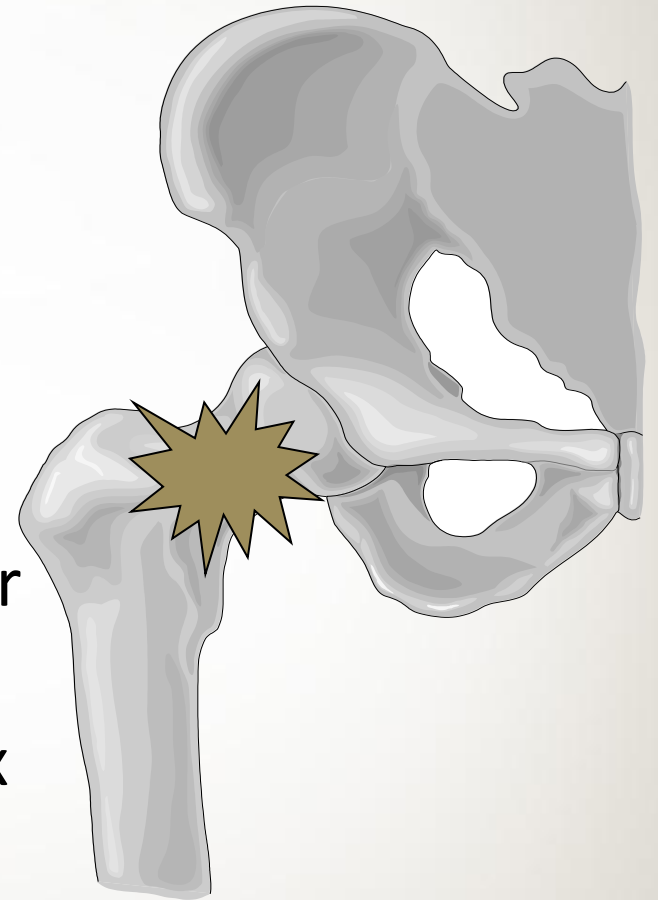
<sup>1</sup>Consensus Development Conference: Diagnosis, Prophylaxis, and Treatment of Osteoporosis. *Am J Med* 1991;90:107-110

<sup>2</sup> Kanis JBMR 1994

Siris, et. al., Osteoporos Int, 2014: 25; 14391443

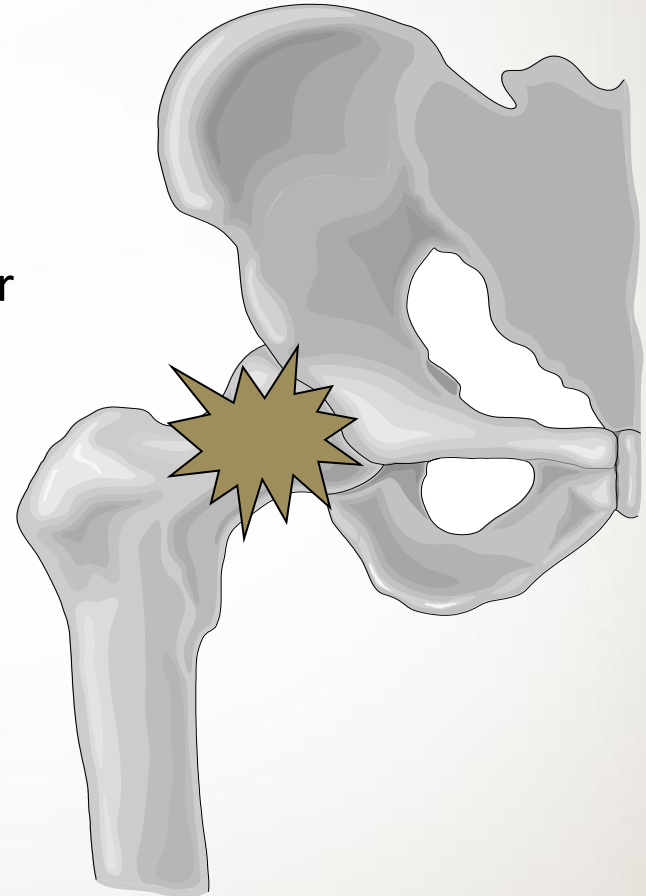
# Hip Fracture: Devastating Event

- Mortality rate same as breast cancer
- 20% excess mortality in the first year
- 50% incapacitation
- 20% of females need assisted living or nursing home
- 80% of 75 yo preferred death to hip fx & nsg hm
- Cooper C, et al. *Am J Epidemiol.* 1993;137:1001



# Hip Fracture: Devastating Toll: “The 4 Ds”

1. **Death**<sup>2,6</sup>  
Mortality rate same as breast cancer
2. **Disability**<sup>1,2</sup>  
50% incapacitation
3. **Dependence**<sup>1,2</sup>  
20% of females need assisted living or nursing home
4. **Delirium & dementia**<sup>3,4,5</sup>  
40% to 60% risk of delirium  
41% higher rate of dementia



<sup>1</sup>[www.share.iofbonehealth.org/WOD/2012](http://www.share.iofbonehealth.org/WOD/2012)

<sup>2</sup>Cooper C, et. al., *Am J Epidemiol* 1993;137:1001

<sup>3</sup>Gustafson et al. . *J Am Geriatr Soc* 1988;36:525–530.

<sup>3</sup>Givens et al *J Am Geriatr Soc*. 2008 Jun;56(6):1075-9

<sup>4</sup>Tsai C et al, *Medicine* 2014 93(26) :1-7

<sup>5</sup>Marcantonio et al *J Am Geriatr Soc*. 2011 Nov;59 Suppl 2:S282-8

<sup>6</sup>Panula et al *BMC Musculoskeletal Disorders* 2011, 12:105



# Previous Fractures Are Important



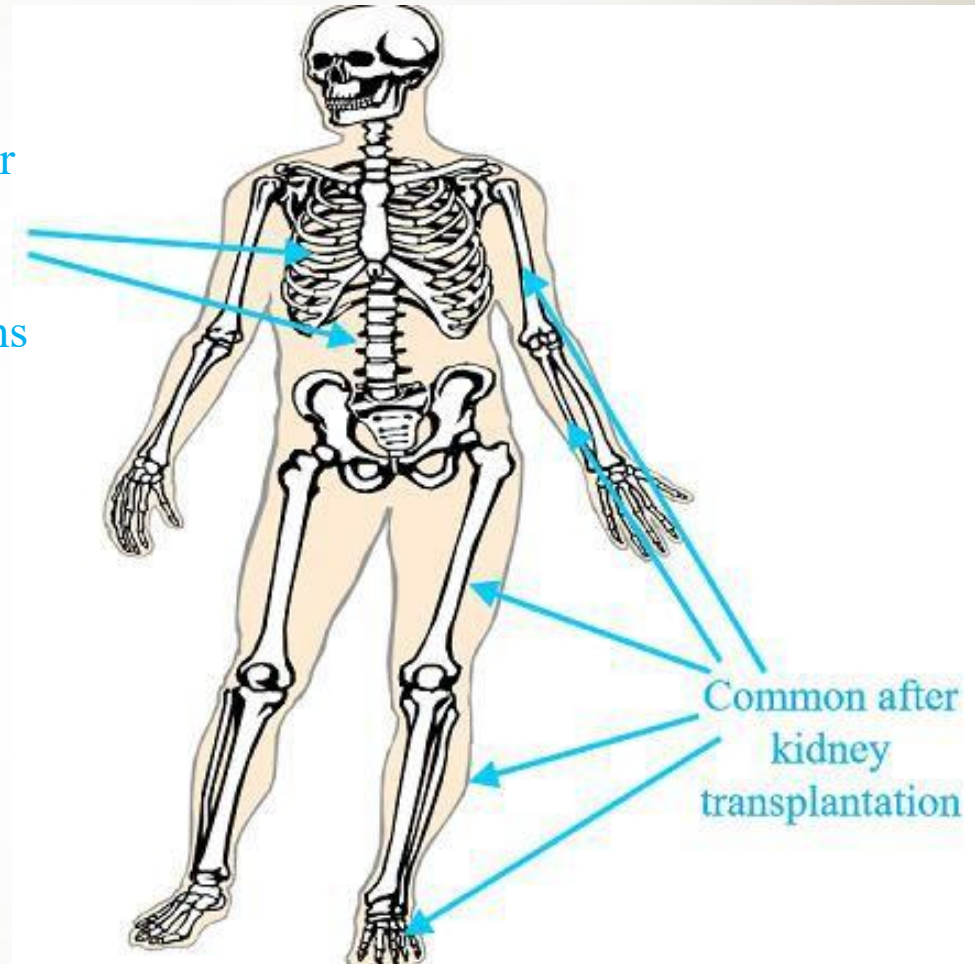


# Osteoporosis & Fracture After Transplant

| Organ  | Osteoporosis Prevalence                                        | Fracture Prevalence or Rate  | First Year Bone Loss                       |
|--------|----------------------------------------------------------------|------------------------------|--------------------------------------------|
| Kidney | Lumbar spine 17%-49%<br>Femoral Neck 11%-56%<br>Radius 22%-52% | 7%-44% prevalence            | Lumbar spine 4%-10%<br>Femoral neck 5%-8%  |
| Liver  | 46% overall                                                    | 24%-65% rate                 | Lumbar spine 2%-24%                        |
| Heart  | 50% overall                                                    | Vertebral 33%-36% prevalence | Lumbar spine 6%-10%<br>Femoral neck 6%-11% |
| Lung   | 73% overall                                                    | 18%-37% rate                 | Lumbar spine &<br>Femoral neck 2%-5%       |

# Specific Organ Transplant & Localizatio n of fractures

Common after  
lung, cardiac  
and liver  
transplantations



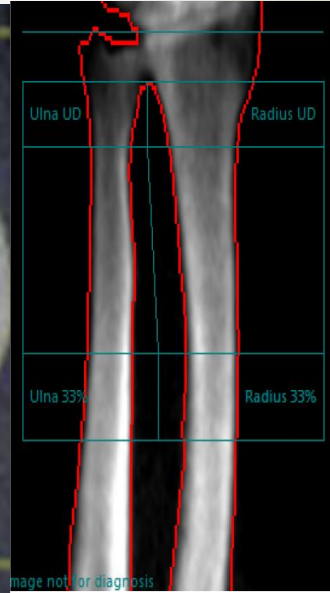
# When should DXA Bone Density testing be performed?



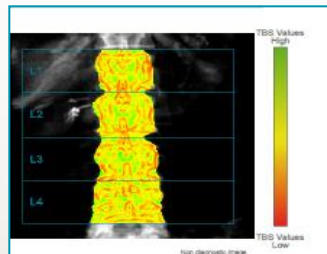
Lumbar Spine



Femoral Neck  
Total Hip



33% Radius



Trabecular Bone Score

# Medicare Will Reimburse for **DXA Bone Density Testing**

1997 Bone Mass Measurement Act

1. Women with estrogen deficiency (E28.39)\*
2. Spine x-ray evidence of fracture or OP (M48.54XA)\*
3. **Glucocorticoid therapy (3mos, 5 mg/d) (z79.52)\***
4. Primary Hyper-PTH (E21.0)\*
5. Follow-up OP treatment (23 months unless medical reason for **sooner e.g. steroids**) (M81.0)\*

*\*Note: ICD 10 codes are examples and may not work for your Medicare local carrier*

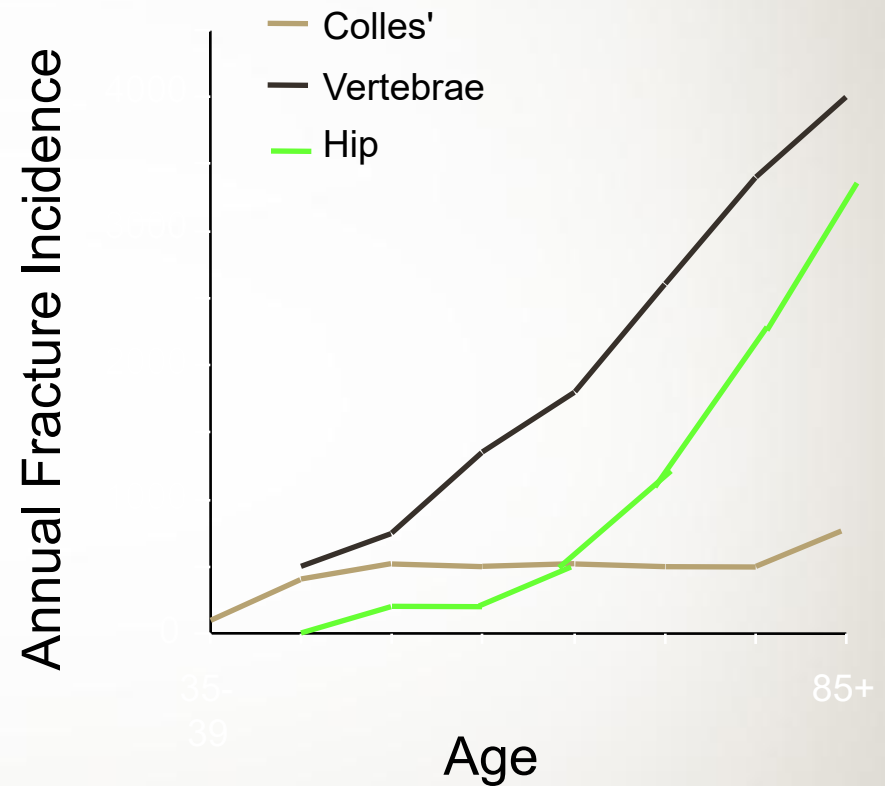
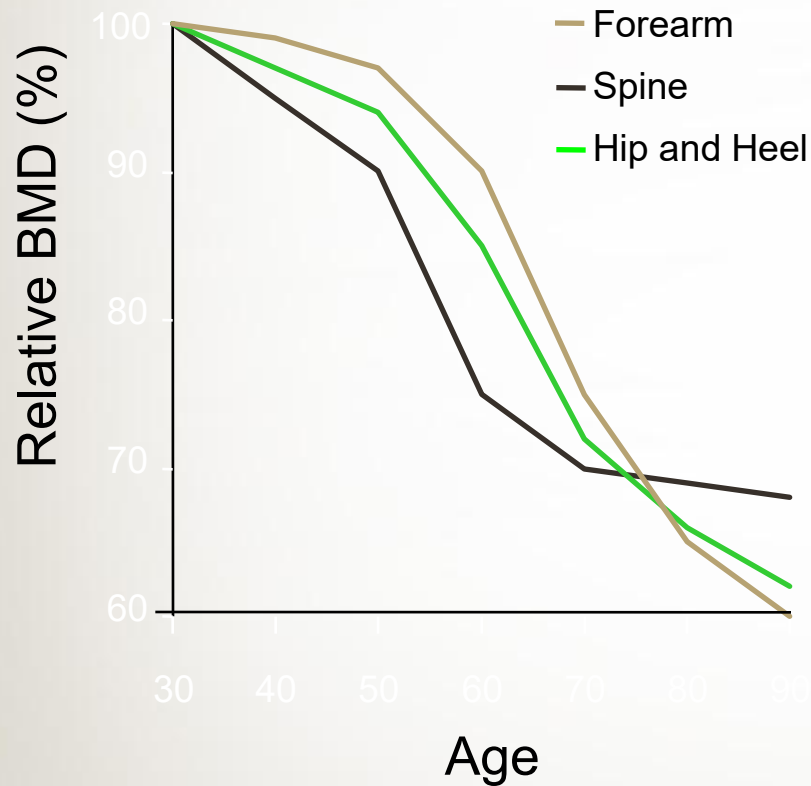
# When to Order DXA Bone Density testing

## Before transplantation:

- Transplant candidates have higher risk of bone disease vs. general pop
- Evaluate and manage bone health before the transplantation
- **DXA: lumbar spine, femoral neck, total hip, 33% radius**
- Trabecular Bone Score (if available with DXA software)
- Calculate FRAX® Fracture risk prediction
- Spine imaging: thoracic & lumbar spine, or vertebral fracture assessment (VFA) by DXA, look for occult vertebral fractures,
- **A normal DXA Bone Density does not protect against post transplant fractures**
- **Fractures can occur even mildly low bone density**
- Repeat DXA yearly while on glucocorticoid treatment

## As T-scores(BMD) Get Worse ,Fracture Risk Increases

\* Remember: Only ~1/3 of spine fractures are acutely painful



# How Do You Interpret DXA Bone Density Results?

World Health Organization (WHO) DXA Classification

T-score *Postmenopausal women, men  $\geq 50$*

Normal  $\geq -1$

Osteopenia  $< -1$  and  $> -2.5$

Osteoporosis  $\leq -2.5$

Severe  
Osteoporosis  $\leq -2.5$  with Fracture



# When Should You Send a Patient for Imaging of the Spine?

- Get a Lateral spine X-ray or VFA on a DXA or CT scan or MRI
- When the patient has **Osteopenia** (T-score is  $< -1.0$ ) and at least one :
  - Women age  $\geq 70$  years or men  $\geq$  age 80 years
  - Historical height loss  $> 4$  cm ( $>1.5$  inches)
  - Self-reported but undocumented prior vertebral fracture
  - Glucocorticoid therapy equivalent to  $\geq 5$  mg of prednisone or equivalent per day for  $\geq 3$  months

ISCD Official Position

[www.ISCD.org](http://www.ISCD.org)

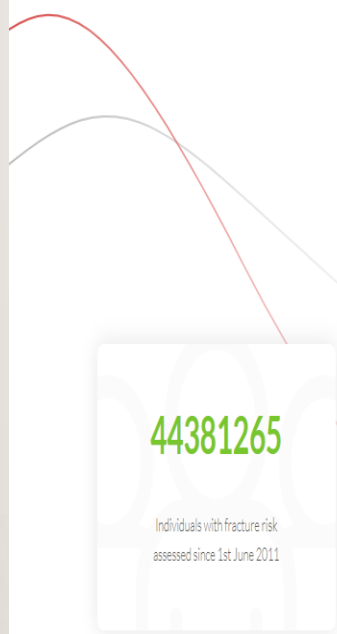
ISCD offers a 1/2 day Vertebral Fracture  
Recognition course

# Fracture Risk Prediction Tool: FRAX<sup>®</sup>

**FRAX**

[Home](#) [Online Calculation](#) [FRAXplus<sup>®</sup>](#) [Paper Charts](#) [About](#) [FAQ](#) [References](#) [MyFRAX<sup>®</sup>](#)

English ▾



Welcome  
**FRAX<sup>®</sup>**  
Fracture Risk Assessment Tool

44381265

Individuals with fracture risk assessed since 1st June 2011

The FRAX<sup>®</sup> tool has been developed to evaluate fracture risk. It is based on individualised models that integrate the risks associated with clinical risk factors as well as bone mineral density (BMD) at the femoral neck.

[Calculate now](#)

## Calculation Tool

Please answer the questions below to calculate the ten-year probability of fracture with or without BMD.

Continent  Country

[About the risk factors ⓘ](#) Individuals with fracture risk assessed since 1st June 2011 : 11,238,516

## Questionnaire

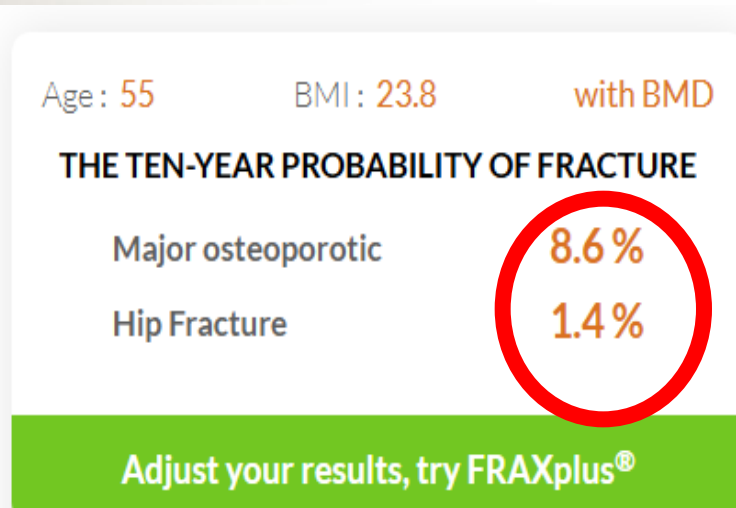
|                                  |                                                                       |                                                 |                                                                              |
|----------------------------------|-----------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------|
| 1. Age (between 40 and 90 years) | <input type="text" value="71"/>                                       | 12. Femoral neck BMD                            | <input type="text" value="GE-Lunar"/> X ▾ <input type="text" value="g/cm²"/> |
| 2. Sex                           | <input checked="" type="radio"/> Female <input type="radio"/> Male    | <a href="#">Calculate</a> <a href="#">Clear</a> |                                                                              |
| 3. Weight                        | kg <input type="text" value="0"/> kg/cm <input type="text" value=""/> |                                                 |                                                                              |
| 4. Height                        | cm <input type="text" value="0"/>                                     |                                                 |                                                                              |
| 5. Previous Fracture             | <input checked="" type="checkbox"/> X                                 |                                                 |                                                                              |
| 6. Parent Fractured Hip          | <input checked="" type="checkbox"/> X                                 |                                                 |                                                                              |
| 7. Current smoking               | <input checked="" type="checkbox"/> X                                 |                                                 |                                                                              |
| 8. Glucocorticoids               | <input checked="" type="checkbox"/> X                                 |                                                 |                                                                              |
| 9. Rheumatoid arthritis          | <input checked="" type="checkbox"/> X                                 |                                                 |                                                                              |
| 10. Secondary osteoporosis       | <input checked="" type="checkbox"/> X                                 |                                                 |                                                                              |
| 11. Alcohol 3 or more units/day  | <input checked="" type="checkbox"/> X                                 |                                                 |                                                                              |

2025 New website: <https://www.fraxplus.org/calculation-tool?country=9>

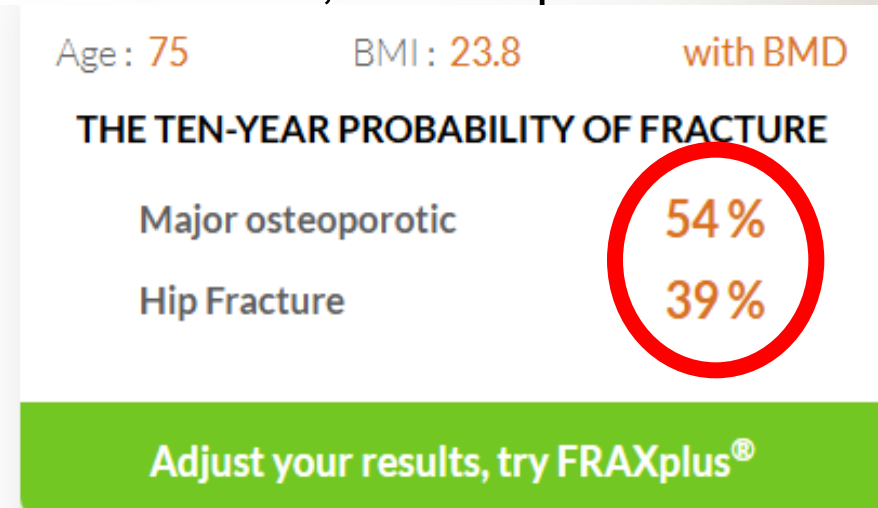
# Osteopenia & Fracture Risk (FRAX®)

Two women with the same femoral neck T-score of -2.3  
***Osteopenia***

55 yo white female, BMI of 24  
No additional clinical risk factors



75 yo white female, BMI of 24  
Maternal history of hip fracture  
Prior humerus Fx, chronic prednisone use



Despite the same diagnosis, their fracture risk is markedly different

## Standard Lab Tests To Look For Secondary Causes of Bone Loss

### Primary

1. CBC
2. Chemistry Profile
3. Phosphorus
4. Magnesium
5. PTH
6. TSH
7. 25-OH Vitamin D
8. 24 hr. urine calcium, creat.
9. Total testosterone<sub>(men 50–69 years)</sub>

### Further consideration:

- SPIEP, free light chains, UPIEP
- Celiac profile/IgA
- Iron/Ferritin
- Homocysteine
- Prolactin
- Urine /salivary cortisol, DST
- Tryptase, urine methylhistamine
- Bone Turnover Markers
  - (P1NP, C-telopeptide, BSAP)
- Vitamin B6

Note: *Biotin may interfere with assays*

# 3 Rare Bone Conditions Not to Miss

(treatable)

1. Hypophosphatemia- low serum phos, bone/muscle pain, fractures, high urine phos, elevated FGF -23 hormone: look for mesenchymal tumor, resect for cure
2. Hypophosphatasia-low serum alkaline phosphatase( $\leq 30$ ), fractures, **elevated Vit B6**, abnml ALPL gene; treat with asphotase-alpha to stop fractures
3. Hypoparathyroidism- low serum calcium, low PTH level, treat with 1-84 PTH to stabilize

## **Non-Prescription Treatment for Bone Health and Fracture Prevention**

1. Correct Vitamin D levels, 25-OH Vitamin D above 30ng/mL, with vitamin D3
2. Get adequate calcium through diet ~1,000mg daily, 600mg max per serving, use calcium citrate to “fill in gap”; verify with 24 hr urine, it does not help to take more calcium than needed.

Note: loop and thiazide diuretics, steroids can affect urine calcium

3. Exercise & Tai Chi : to provide a mechanical load to bone and for improved balance
4. Avoid cigarette smoking and heavy alcohol consumption

# Osteoporosis Medications

- Goal: reduce risk of fracture
- Antiresorptive medications:
  - Bisphosphonates: *Beware Renal( $eGFR \geq 35$ ) & GI (GERD, stricture)*
    - Oral: alendronate , residronate, ibandronate
    - IV : zoledronate (Reclast®) slow infusion
  - Denosumab (Prolia®) *subcut. every 6 months*
    - New in 2025 :Generics available
    - *In CKD: Monitor for hypocalcemia weekly for the first month after Dmab administration and monthly thereafter*
- Anabolic drugs: Ideally Use First
  - teriparatide (Forteo®), *self injection nightly, x 2yrs*
  - abaloparatide (Tymlos®), *self injection nightly, x 2 yrs*
  - romosuzumab (Evenity®) *subcut, office, monthly x 1 yr*



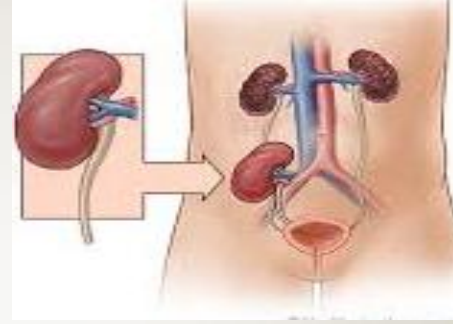
## Medication Side effect Concerns

- Rebound bone loss/vert fractures with Dmab stop
  - Transition with bisphos & monitor
- Osteonecrosis of Jaw: rare, post invasive dental work, use chlorhexidine mouth wash , abx ( bisphosphonates & densoumab),f/u
- Atypical femur fracture: rare, after 4-5 years treatment, “drug holiday”, ask about thigh pain (Bisphos. & densoumab), x-ray femur if 3yrs on therapy
- Osteosarcoma:(theoretical) PTH analogues & radiation
- Hypercalcemia: anabolic medications
- Hypocalcemia : denosumab, renal patients
- MI & CVA: romosuzumab

# Long term monitoring

- Labs: Vit D, calcium, creatinine, BTMs
- Annual DXA bone density (hips, spine, 33% radius)
- Bone Turnover Markers (PINP, Bone Spec. Alk Phos, C-Telopeptide)
- Spine X-rays /MRI if height loss, back pain
- Femur imaging if thigh pain or >3 yrs on bisphos or dmab (ISCD guidelines)
- Re-evaluate , maybe change medication if worse
- Consider “drug holiday”(careful with denosumab)

# Kidney Transplant Patients



**Bone loss:** greatest in 1<sup>st</sup> 6-18 months post txp, 4-9%

Assoc. with low estradiol & testost., age, GCS, rxn, PTH, loop diuretics, opiates

- IV Zol prior to Kidney tplant attenuated bone loss in forearm vs. placebo

**Fractures:** risk factors :previous fracture, age, diabetics,  
locations: hips, long bones, feet vs. spine & ribs

Post transplant: 34% increase in hip fractures compared to continued dialysis pts.

**Treatment concerns:** Bisphosphonates & possible renal toxicity, give slowly  
Teriparatide/abaloparatide & hyperparathyroidism  
Denosumab & hypocalcemia

Labelled bone biopsy sometimes required in renal transplant patients to evaluate for adynamic bone prior to bisphosphonate therapy

# Kidney/Pancreas T'plant Case

64 yo female , school administrator

- Age 50 **kidney and pancreas transplant**, steroids per protocol.

## Fracture history & DXA:

- Age 51-64 :**distal radius fx**, femoral condyle fx, **prox humerus fx, wrist fx**
- Age 51 DXA, lumbar spine L1-L2 1.0, femoral neck -1.9, total hip -1.4.
- **Age 64 DXA**, lumbar spine L1-L2 -0.3, **femoral neck -2.9, total hip -2.7**

## Nutrition & labs:

- Age 56 VEGAN.
- Age 58 Vitamin D deficiency, level was 24, age 60 was 23, at 64 is 19
- Parathyroid hormone elevated at 177

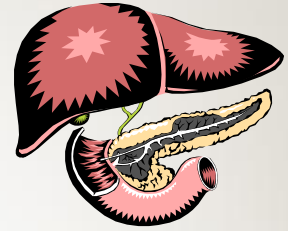
Other risk factors: Age 15 Type 1 diabetes , resolved after transplant.

Severe HAs, sees Neuro, punctate lesions on MRI

# Kidney/Pancreas T'plant Case

- Next?
- Labs?
- Treatment?
  - non-prescription
  - Rx
- Next DXA ?
- Other monitoring?

# Liver Transplant Patients



## Bone loss:

3.5-24% in first year

Risk factors: Cholestatic liver disease

Previous fracture

High MELD scores,

Low BMI,

Post menopausal

Older age

## Fractures:

24-65%

Ribs and spine most common

Highest in 1<sup>st</sup> 6-12 months

Risk factors: Prior fracture, Prednisone dose, Women with PBC

**Treatment issues:** Liver activates vitamin D to 25-OH Vitamin D  
Bisphosphonates have been used in PBC  
Anabolic therapy may be appropriate if low turnover

Crawford BAL et al *Ann Intern Med.* 2006;144:239-248

Abate et al *Endocrine Practice* 27 (2021) 426-432

Yadav et al *Nutr Clin Pract* 2013 28: 52

## Liver Transplant Case

61 yo female, retired

Age 60 liver transplant for alcoholic cirrhosis, steroids per protocol

Fracture history: age 60 fall, left tibia fracture, healed with boot.

### DXA

- Age 60 (pre-tplant) **DXA**, lumbar spine -1.6, femoral neck -1.1, total hip -0.3, RX alendronate, GI upset
- Age 61 post tplant **DXA** Lumbar spine L1-L2 -1.4, femoral neck -1.6 (0.815), total hip -0.8
- **FRAX: 22% MOF**, 2.6% hip fracture risk. BHOOF guidelines she would benefit from receiving treatment to reduce her risk of fracture.

Labs : post tplant

24-hour urine calcium, normal at 126 mg.

Vitamin D is 35

Hypomagnesemia, level was 1.5. now on MG supplement

CKD 3b, eGFR 39

## Liver Transplant Case (cont'd)

- Next?
- Labs?
- Treatment?
  - non-prescription
  - Rx
- Next DXA ?
- Other monitoring?





# Heart Transplant Patients

**Bone loss:** 3-11% in first year

**Fractures:** 14-36% in first year,  
22-35% long term  
fractures occur at osteopenic T-scores ( -1.5)

**Treatment issues:** 92% vitamin D deficient  
20% CKD III



# ISHLT Heart Transplant Guidelines 2010

## Pre-transplant

- Screen & treat all candidates
- Spine x-ray adults to screen for vert. fractures
- Target Vit D level 30ng/mL
- Baseline DXA for adults
- Rx Bisphosphonates for OP
- Calcium, physical activity

## Post Transplant

- Rx Bisphosphonates first year
  - Activated vit D is not first line Rx
  - Don't use Calcitonin
- DXA again a 1 year
- If  $\geq -1.5$  & no GCS: stop bisph.
- DXA again 2 yrs if osteopenia
- DXA again 3 yrs if nml
- Monitor for fractures

**Note :** Guidelines were pre denosumab, abaloparatide and trabecular bone score

# Case

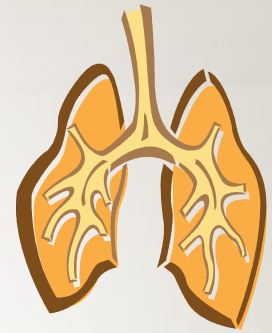


- 69 yo w ♀
- Age 26- TAH, BSO; Rx estrogens “few years”
- Age 33- DXA Bone Density test= “low”
- Failed treatments:
  - SQ calcitonin-GI
  - alendronate -GI
  - raloxifene–Hot flashes
- Age 50: Ischemic heart dz
- Age 55- DXA hip T-score= -3.5
  - Rx risedronate x 2yrs
- Age 57: Cardiomyopathy
- Heart T’plant list

# Case (cont'd)



- Age 59- cardiac transplant
  - prednisone 5mg/day
  - re-started risedronate = GI issues
  - switched to ibandronate
- Age 64 DXA Femoral Neck T-score = -2.4
- What would you do next?
  - Optimize vit D & calcium?
  - Stop ibandronate?
  - Switch to anabolic medication?
  - “Drug holiday” and monitor DXA?
  - Request bone health consult?



## Lung Transplant Patients

**Highest incidence of osteoporosis compared to other patients with solid organ transplant.**

**Bone loss:** 2-5% in first year  
37% osteoporosis at time of t'plant ( previous steroids)

**Fractures:** 18-37% in first year  
fractures occur at T-score of -1.5

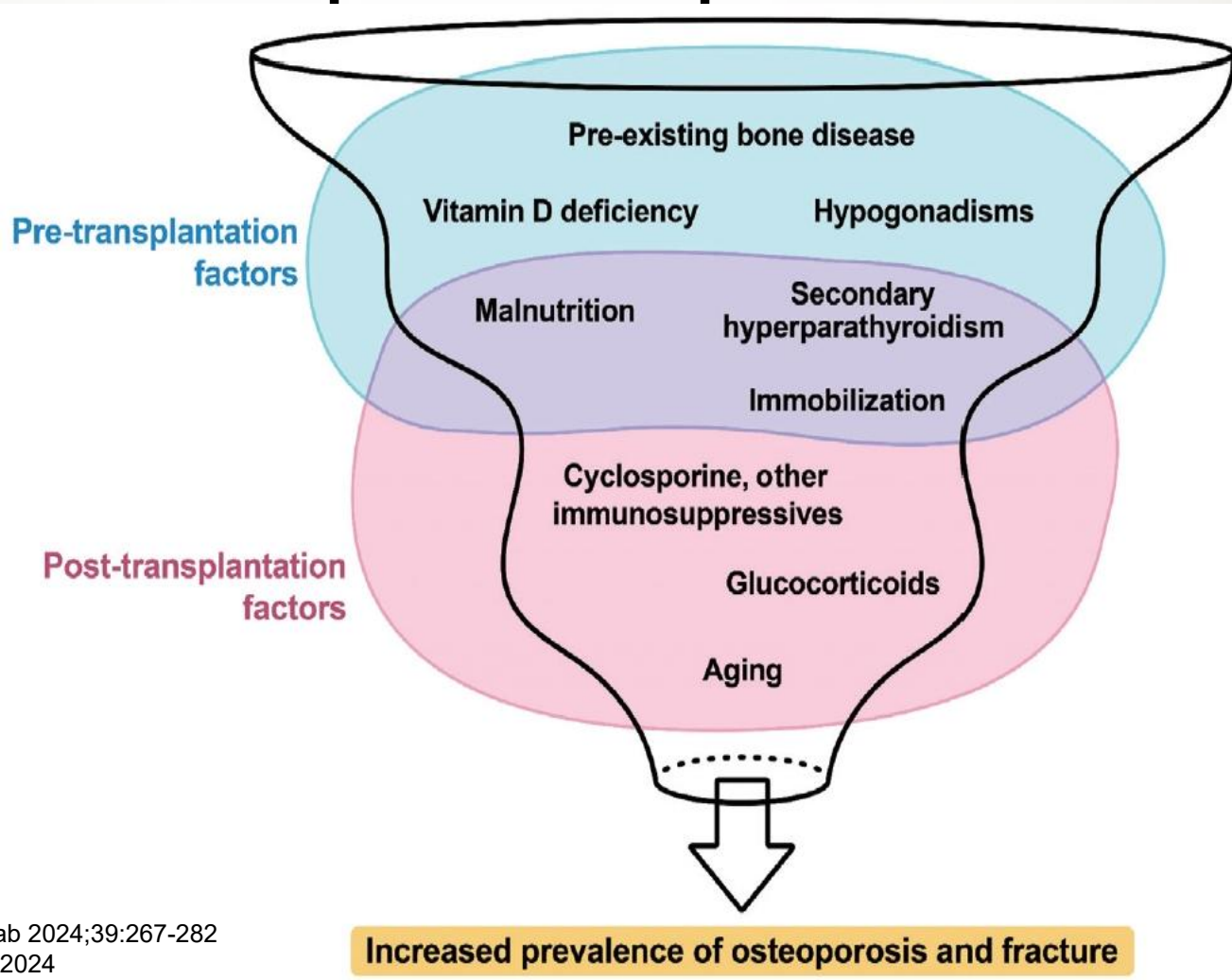
**Treatment issues:** often an opportunity to treat before t'plant  
Teripartide treatment appears to be more successful than in kidney transplant.

Raven et al. *JCEM Case Reports*, 2024, 2, 1–4 <https://doi.org/10.1210/jcemcr/luae026>

Shane et al. *Am J Med*. 1996 Sep;101(3):262-9.

Hariman et al. *Journal of Osteoporosis* .2014, <http://dx.doi.org/10.1155/2014/573041>

# Funnel Effect on Bone Health in the Transplant Population



# Bone Health & Solid Organ Transplantation:

## 2019 ECTS Recommendations

- Glucocorticoids(GCs): use lowest dose possible for graft survival
- Tacrolimus may limit GCs use;more modest BMD reduction than cyclosporine
- Sirolimus & everolimus (mTOR inhibitors), reduce bone turnover, mostly decreased resorption & reduce GCs use, good for bone?
- Other meds, MMF, may reduce use of GCs, therefore good for bone?

# Bone & Solid Organ Transplantation:

## 2019 ECTS Recommendations (cont'd)

- **Kidney:** KDIGO CKD-MBD 2017 guidelines:
  - first 12 months p tplant, eGFR > 30 ml/min, low BMD:
  - Consider vitamin D, calcitriol/alfacalcidol, and/or antiresorptive agents, possible labelled bone bx
  - After that year, what next?
- **Liver:** pre-tplant DXA, spine x-ray, again 3-6 mos p tplant, may require more Vit D, start BPs early p tplant, DMAB if renal insuff or can't take BPs, Dmab well-tolerated ,increased BMD p tplant liver, kidney, pancreas
- **Heart:** Pre-plant labs, DXA spine x-ray, correct Mg; Rx BPs p tplant
- **Lung:** Pre-tplant DXA , spine imaging, Vit D ,BPs



# NP Perspective

## Pediatric Transplant Patients

- Long term survival after t'plant
- 6 X incidence of fx compared to healthy pop.
- High risk for vertebral fractures & scoliosis
- Delayed growth and skeletal maturation
- DXA hard to interpret: short stature, skeletal delay
- DXA scores don't correlate well with fracture risk
- Bone biopsies decreased bone turnover, high matrix mineralization.

# When Should I Refer A Patient To An Osteoporosis Clinic?

- When you do not feel comfortable treating with osteoporosis medications
- When the patient has not tolerated OP meds
- When a patient has already been taking an oral bisphosphonate for 3-5 years
- When a patient has CKD 3b or worse
- When a patient continues to have fractures
- Unexplained or difficult to treat bone related labs

## 3 Reasons Patients Object to Taking Osteoporosis Medications

1. Cost
2. Fear of medication side effects
3. Lack of understanding about risks of osteoporosis and fractures

*Often, they want someone to sit and review these details with them*

**“Don’t believe everything you read on the internet”- Abraham Lincoln**

# “I don’t want all my teeth to fall out”

- American Association of Oral and Maxillofacial Surgeons' Position Paper on Medication-Related Osteonecrosis of the Jaws - 2022 Update
- **Osteonecrosis of the jaw:** Exposed bone or bone that can be probed through an intraoral or extraoral fistula(e) in the maxillofacial region that has persisted for more than 8 weeks.
- **Rates of ONJ**
  - Placebo 0-0.02%
  - IV Reclast (zoledronic acid)  $\leq 0.02\%$  ( $\leq 2$  per 10,000)
  - oral bisphosphonates  $\leq 0.05\%$  ( $\leq 5$  per 10,000)
  - denosumab 0.04% to 0.3%
  - romosozumab 0.03% - 0.05%
- the risk of MRONJ among osteoporotic patients exposed to BPs following tooth extraction range from **0 to 0.15 %**
- For osteoporotic patients exposed to DMB, the risk for MRONJ following tooth extraction was **1 %**

## **“I heard once you start taking those bone medications you can’t stop”**

- Rebound bone loss after stopping Prolia (denosumab) is a real concern and thus requires an exit strategy when discontinuing therapy
  - FREEDOM extension trial showed 10 years of denosumab therapy to be safe and effective
- Drug holidays – really refers to bisphosphonate therapy
- Treatment of osteoporosis is different for each patient, it is possible to be off therapy for years and then re-institute therapy if worsening bone density, increased risk for fracture or if a fracture occurs

# “bisphosphonates are first line”

- In patients who are at very high risk for fracture such as those with recent fractures and/or very low BMD (T score < -3.0) **anabolic therapy** with Forteo (teriparatide), Tymlos (abaloparatide), or Evenity (romosozumab) may be more appropriate/effective than treatment with bisphosphonate

# Benefits of osteoporosis treatment

- Prevention – of fractures
- Promotion of independence, quality of life



# Take Home Points

- Fractures affect morbidity & mortality
- Transplants increase fracture risk
- Evaluate bone health pre-transplant and treat
  - DXA, Labs, nutrition, exercise, fall prevention
- A normal DXA Bone Density does not protect against post transplant fractures
- Height loss may be the only sign of a compression fracture
- Anabolic meds work best if used first
- All medications require monitoring and are not used forever

- Questions for us?

## Resources:

- [www.bonehealthandosteoporosis.org](http://www.bonehealthandosteoporosis.org) Bone Health and Osteoporosis Foundation
- [www.ISCD.org](http://www.ISCD.org) Internat. Soc. Clinical Densitometry
- [www.IOF.org](http://www.IOF.org) Internat. Osteoporosis Foundation

Thank you for concern about your patient's bone health!

***October 20<sup>th</sup> is World Osteoporosis Day!***