DXA DRAFTING

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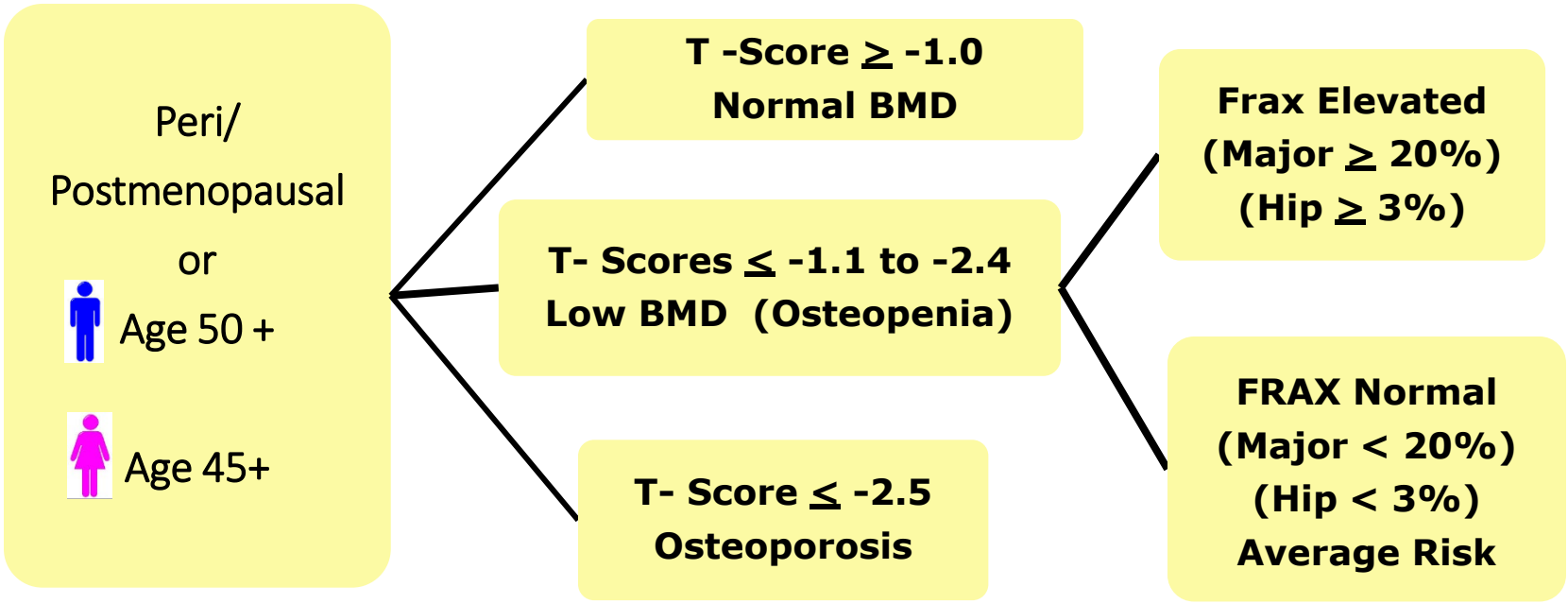
T-Score Interpretation



Use Z-Scores for males < 50 and for premenopausal females < 45
(No FRAX with Z-Scores)

Z-Score Interpretation

Z-SCORE > -2.0

Within expected range for age

PREMENOPAUSAL Females under age 45

OR

Males under age 50

Z-SCORE ≤ -2.0

Below expected range for age

Lumbar Spine Analysis

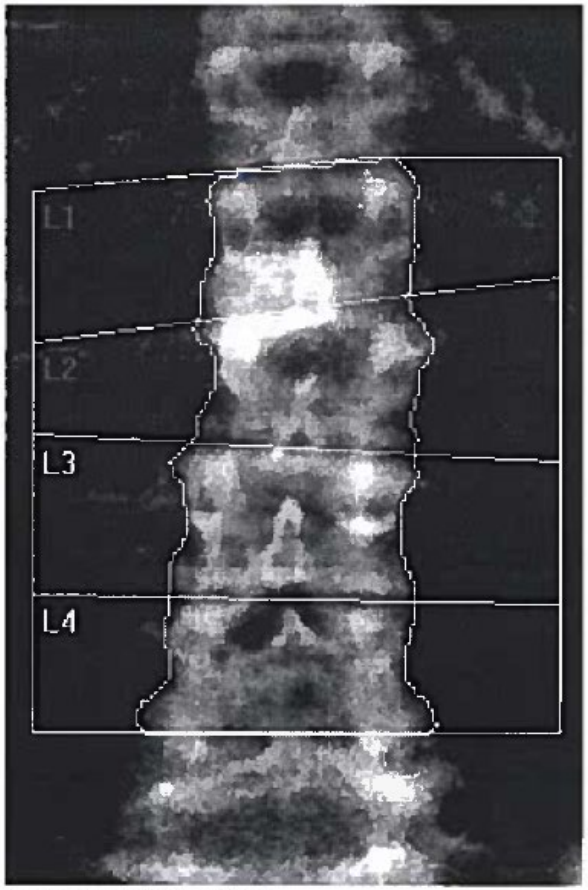
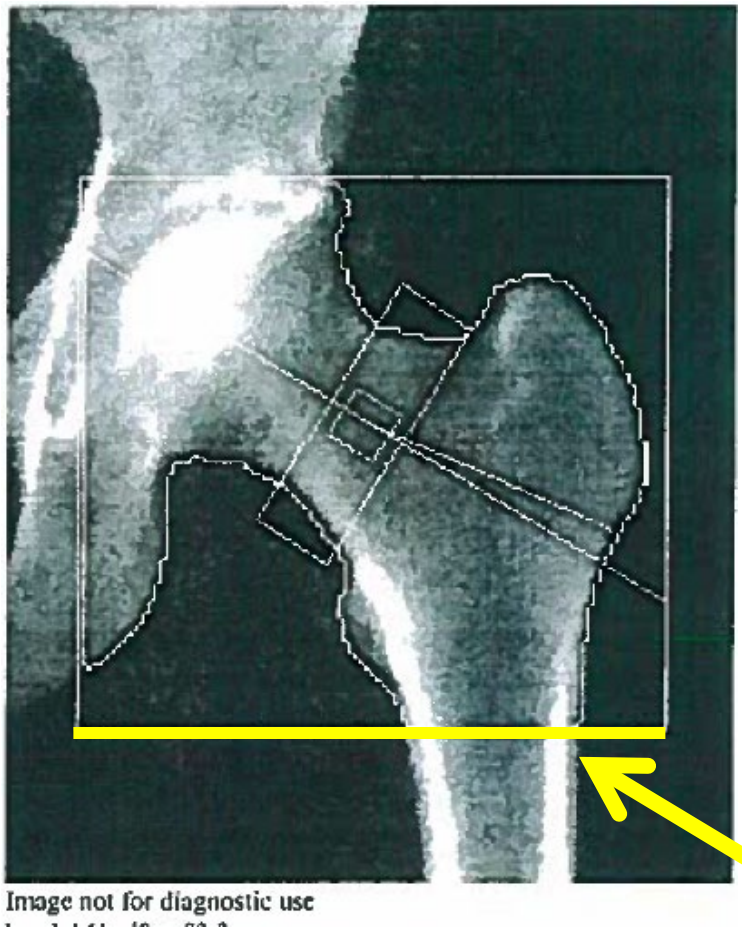


Image not for diagnostic use
k = 1.132, d0 = 48.8
116 x 126

- Point Modes (2 points level/ only 1 angles)
- Line Modes in the disc space (not in vertebral body)
- Must include at least 2 vertebral bodies
- ?Uninterpretable? Obtain forearm analysis

Hip Analysis



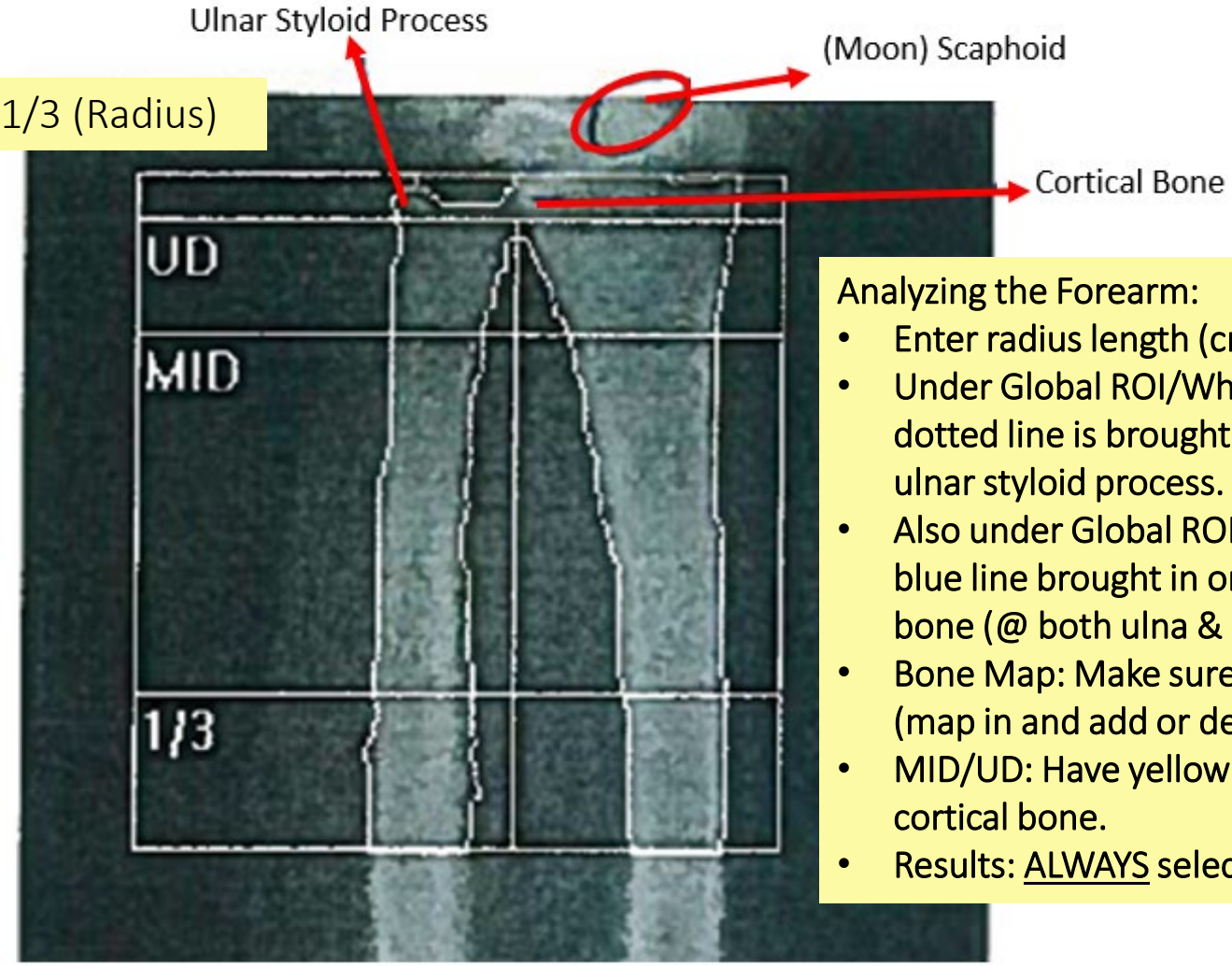
- Center Midline
- Box in ROI
- Neck box placement*
- Trochanteric line above midline

*NECK ROI

- One corner anchored in bone
- Should not contain ischium or greater trochanter
- Soft tissue visible on both sides
- Perpendicular to the femoral neck

Bottom line just under lesser trochanter

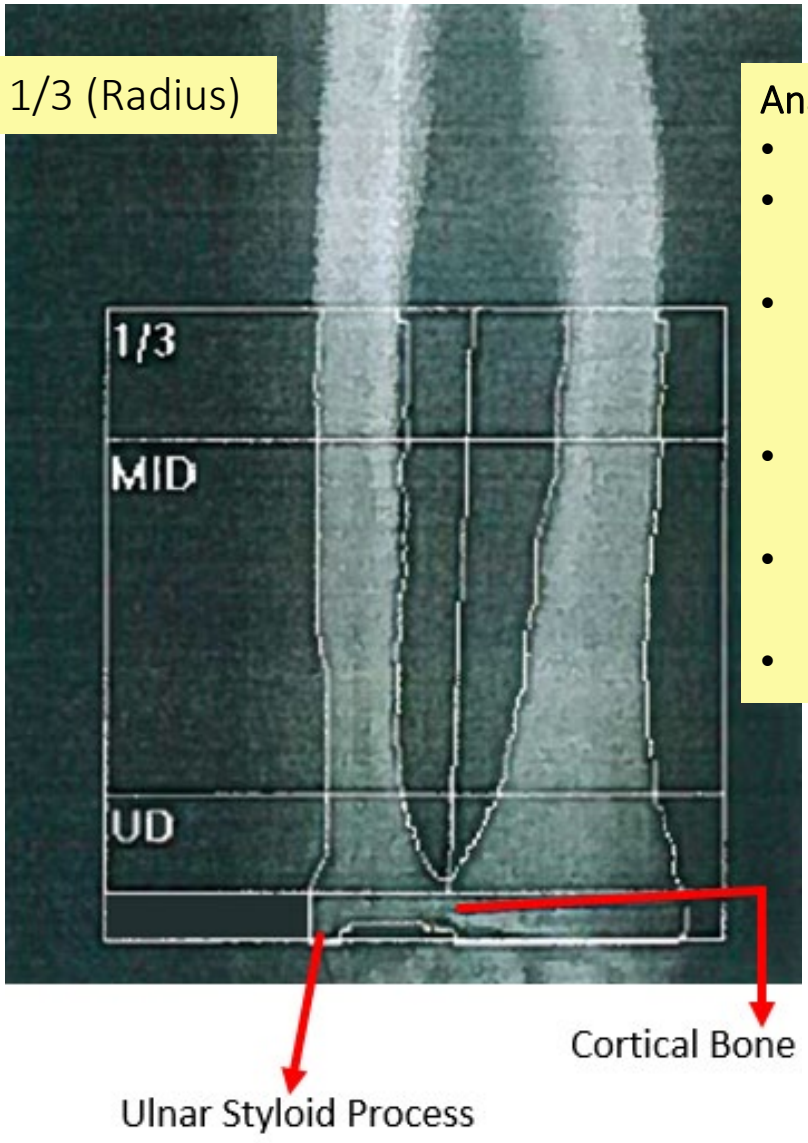
Left Forearm Analysis



Analyzing the Forearm:

- Enter radius length (cm)
- Under Global ROI/Whole Mode: The top yellow dotted line is brought down to touch @ the top of the ulnar styloid process.
- Also under Global ROI/Line Mode: Have the dotted blue line brought in on each side to where it touches bone (@ both ulna & radius).
- Bone Map: Make sure the system recognizes all bone (map in and add or delete if necessary)
- MID/UD: Have yellow dotted line touch just before cortical bone.
- Results: ALWAYS select radius results.

Right Forearm Analysis

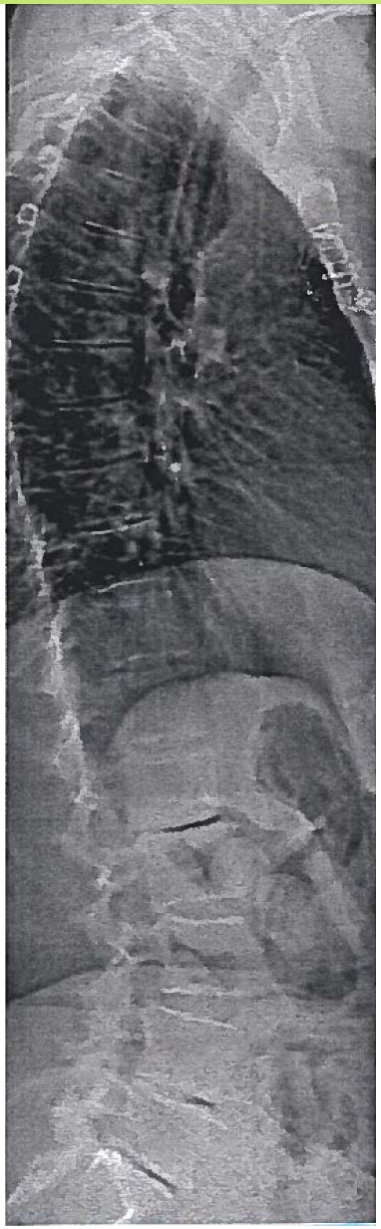


Analyzing the Forearm:

- Enter radius length (cm)
- Under Global ROI/Whole Mode: The top yellow dotted line is at the top of the ulnar styloid process.
- Also under Global ROI/Line Mode: Have the dotted blue line brought in on each side to where it touches bone (@ both ulna & radius)
- Bone map: Make sure the system recognizes all bone (map in and add or delete if necessary)
- MID/UD: Have yellow dotted line touch just before cortical bone.
- Results: ALWAYS select radius results.

HOLOGIC®

Vertebral Fracture Assessment



Vertebral Fracture Assessment (VFA): Effective 12/18/2008, exam only obtained when specifically ordered by the referring physician.

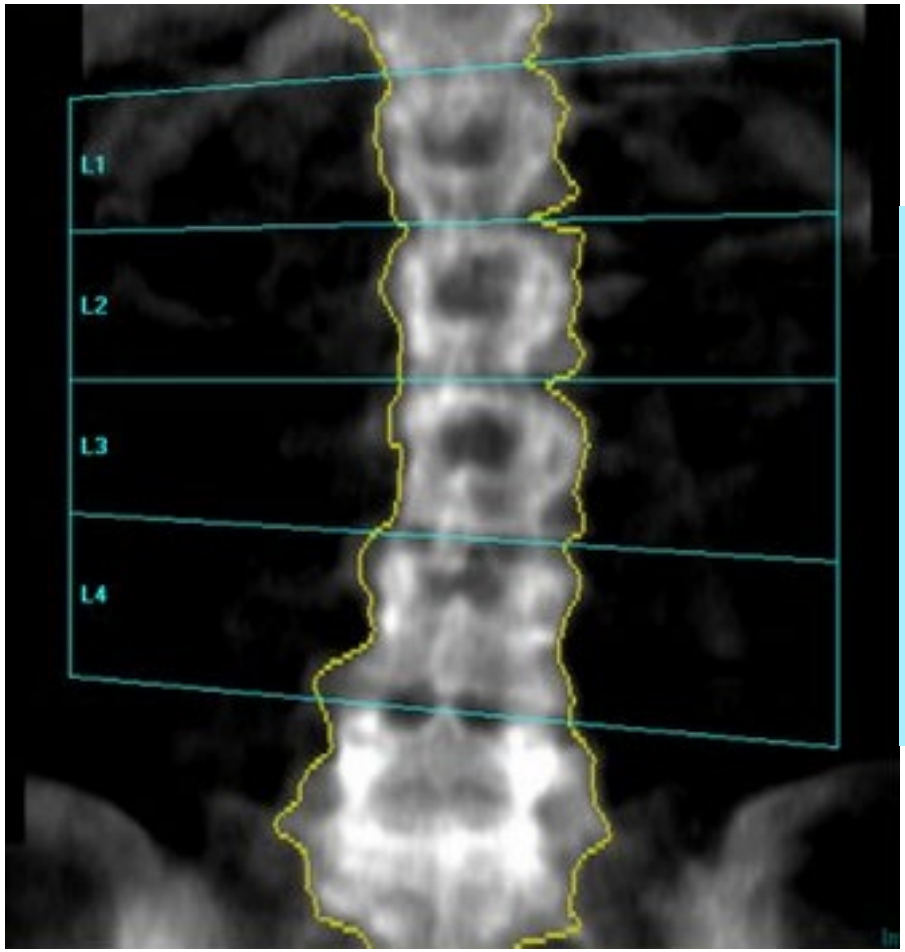
- Use Hologic /IVA imaging (Not IVA HD- it will not transfer to PACS)
- Default scan length to 18.1cm
- Show sacrum
- Show spinal fluid
- Scan up to at least T4

QA HOLOGIC

Q: Why are T-SCORES missing from HL7 Table?

A: The Databases are defaulted to report a T-Score @ age 45. The patient is post menopausal under age 45. Go to utilities/System Configuration/Report to edit “Report T-Score at age ___” (Make sure to edit back to age 45 after)

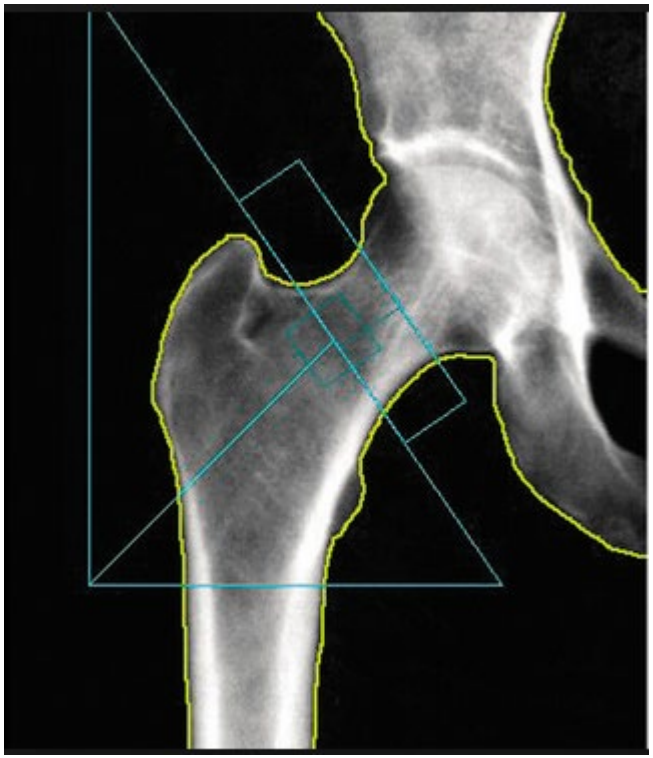
Lumbar Spine GE LUNAR



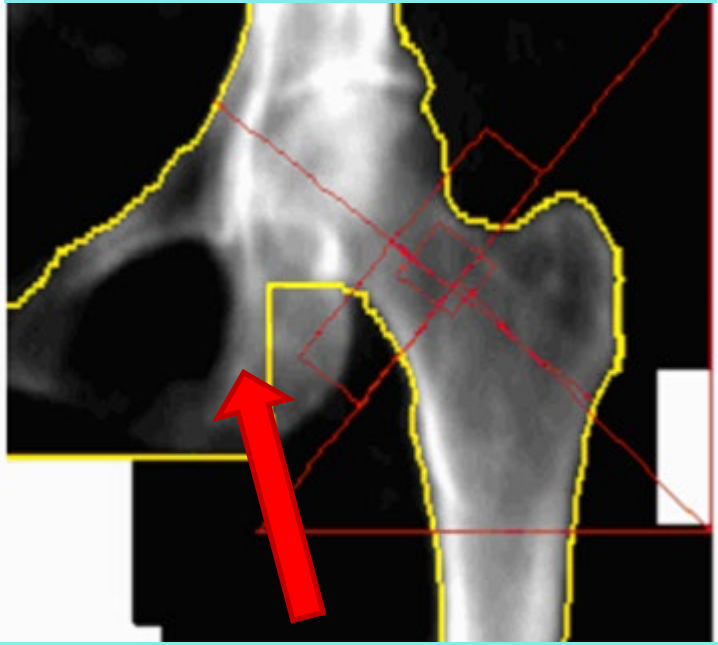
- Must use at least 2 vertebral bodies
- Line Modes in the disc space (not in Vertebral Body)
- ? Uninterpretable? - Obtain Forearm analysis

Hip GE LUNAR

CORRECT HIP ANALYSIS

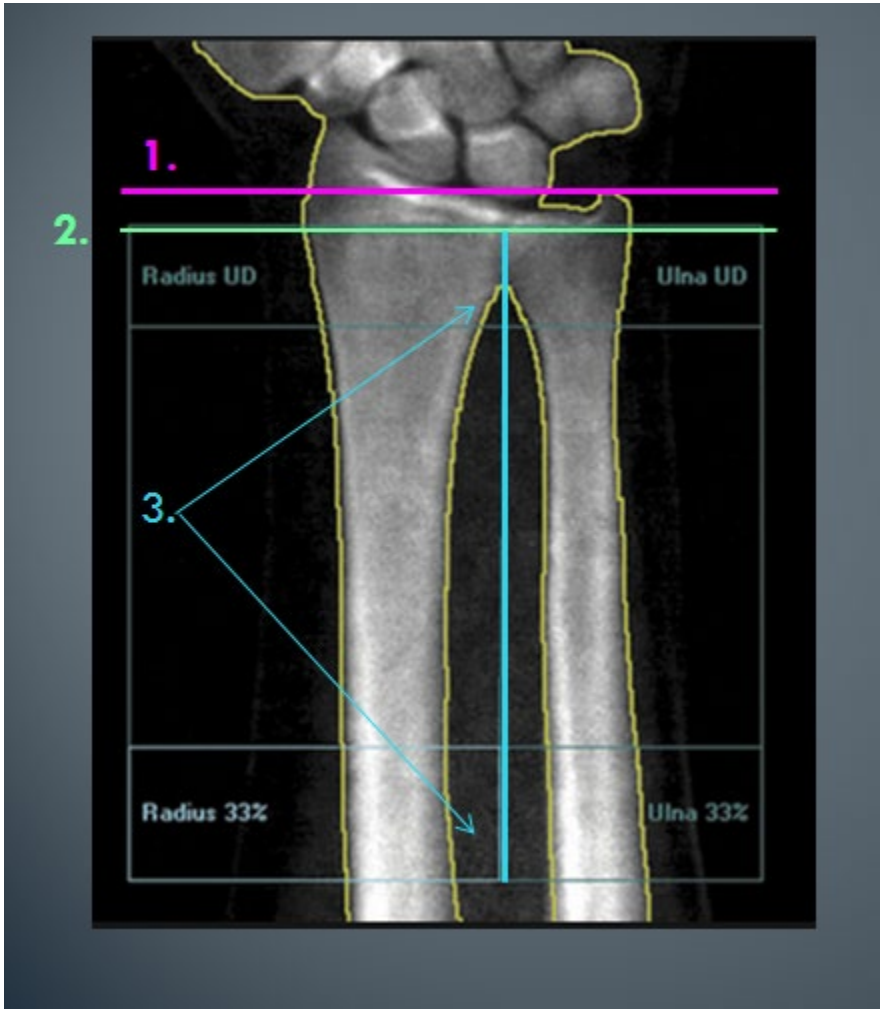


Correctly analyzed femoral neck with ischium painted out



See how the yellow line eliminates the ischium from being analyzed in the neck box?

Right Forearm GE LUNAR

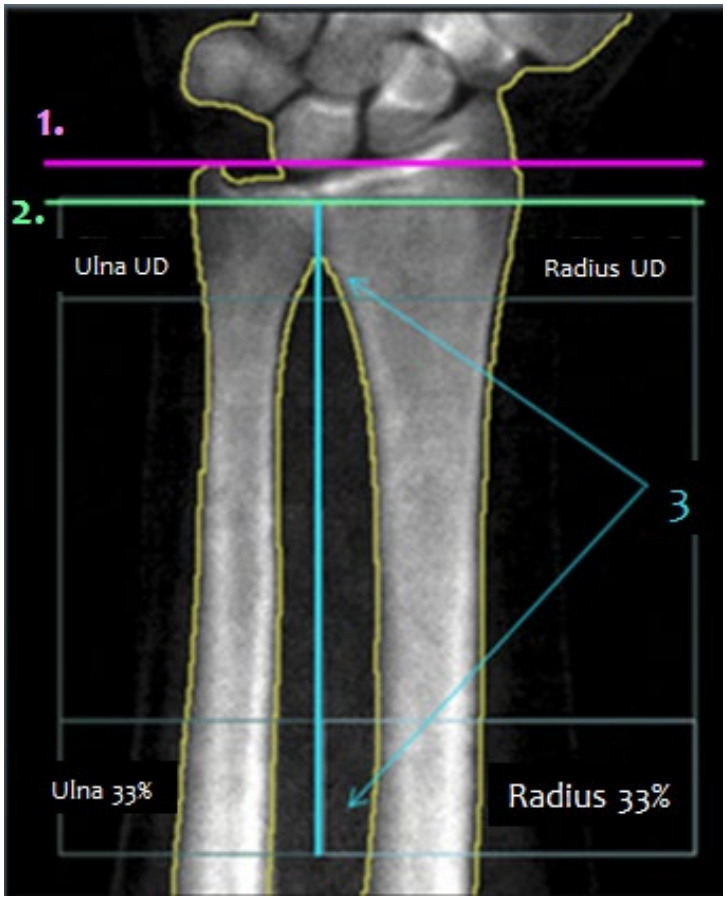


1. The reference line is located at the distal tip of the ulna styloid process

2. The UD ROI does not contain the radial endplate (UD= ultradistal)

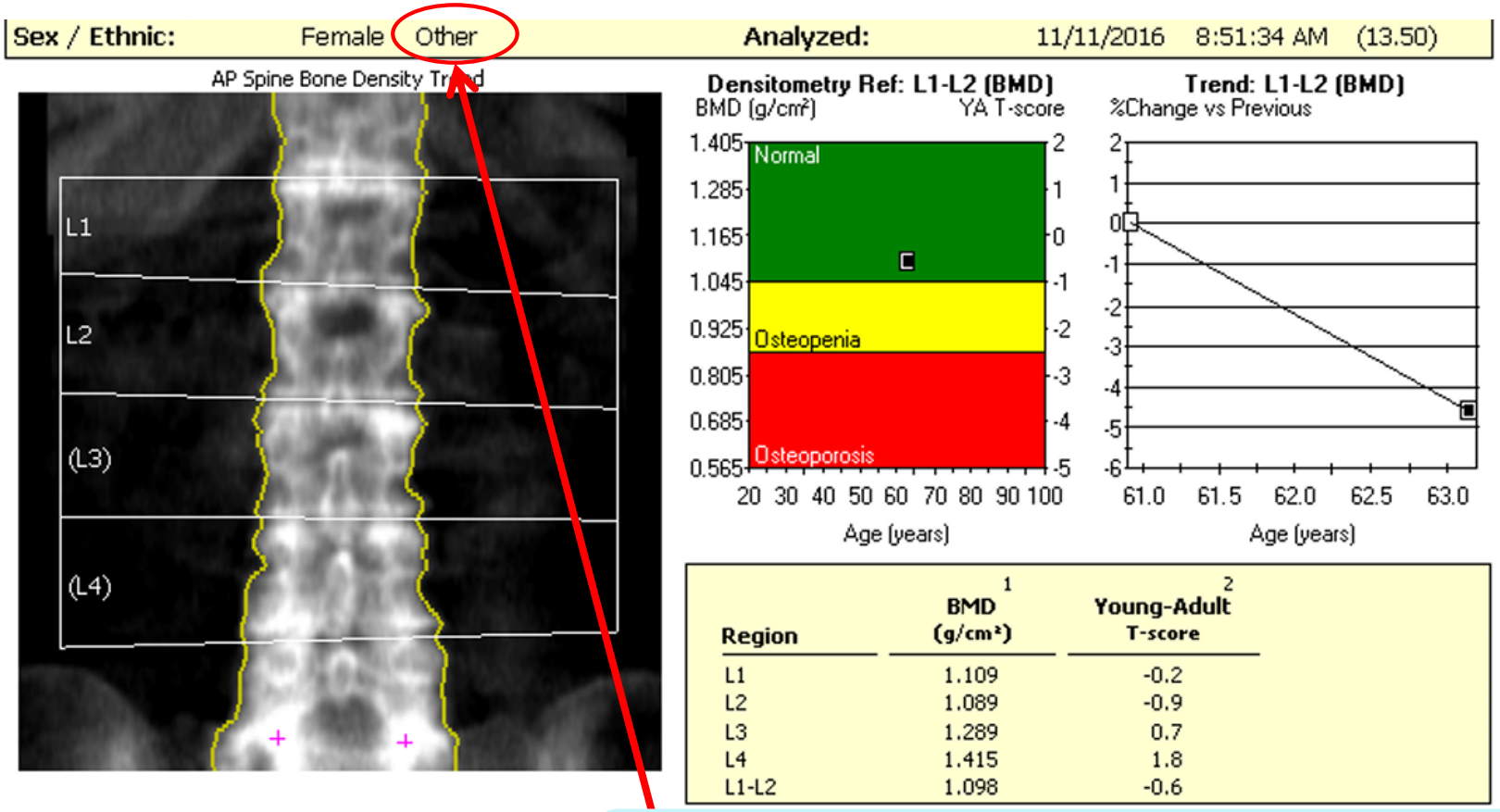
3. The vertical line in the center of the UD and 33% ROIs are located between the radius and ulna

Left Forearm GE LUNAR



1. The reference line is located at the distal tip of the ulna styloid process
2. The UD ROI does not contain the radial endplate (UD= ultradistal)
3. The vertical line in the center of the UD and 33% ROIs are located between the radius and ulna

Missing Z-Scores?



Region	BMD [1] (g/cm²)	Young-Adult [2] T-score
L1	1.109	-0.2
L2	1.089	-0.9
L3	1.289	0.7
L4	1.415	1.8
L1-L2	1.098	-0.6

If the patient marks “other” under ethnicity, use “Caucasian” so Z-scores populate.

Ethnicity must be selected in order to obtain a Z-score (same age, ethnicity, gender).

Trend: L1-L2

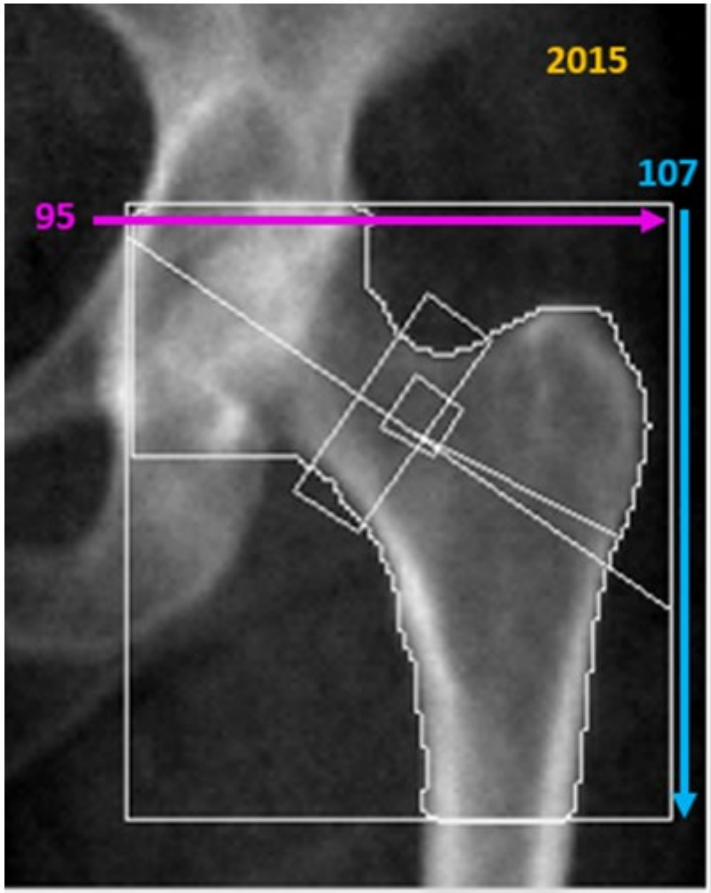
Measured Date	Age (years)	BMD [1] (g/cm²)	Change vs Previous (g/cm²)	Change vs Previous (%)
11/11/2016	63.1	1.098	-0.053	-4.6
08/21/2014	60.9	1.151	-	-

Too Much Femoral Shaft?

16 extra **data pixels** used to analyze the 2015 hip compared to 2012

4.6% increase in total hip BMD is likely artifactual

If the difference in **femoral shaft data pixels** is ≥ 5, have the technologist reanalyze.



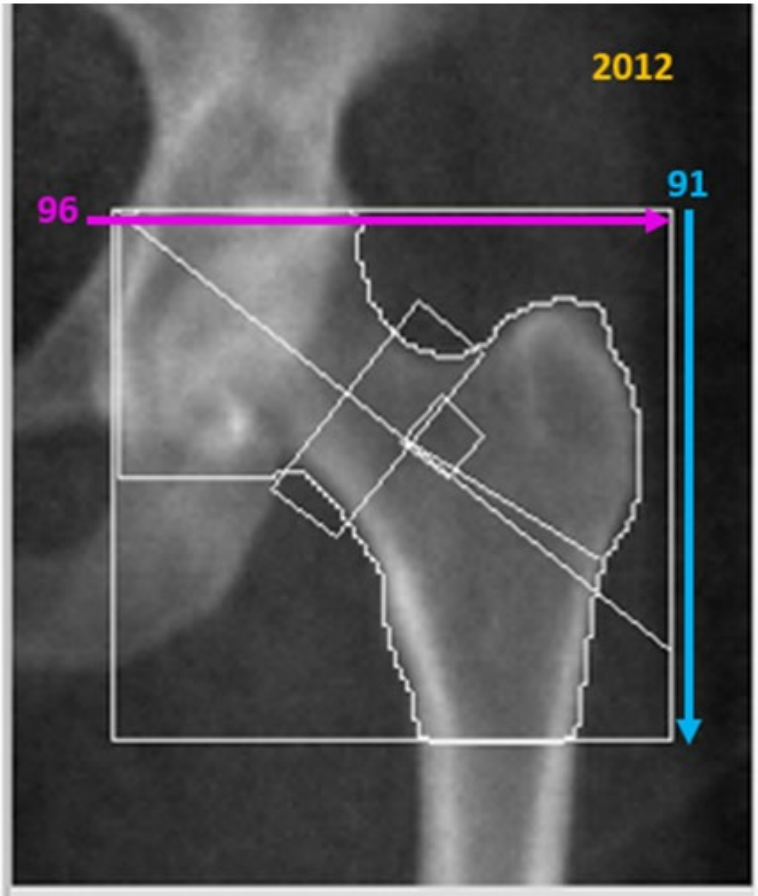


Image not for diagnostic use

95 x 107

NECK: 42 x 15

Image not for diagnostic use

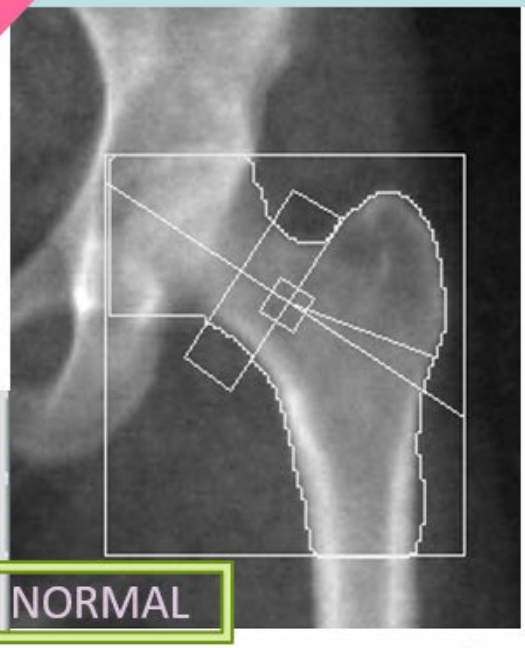
96 x 91

NECK: 41 x 15

Scan Date	BMD	T-Score	BMD Change (g/cm²) vs Previous
2015	0.838	-0.9	0.036 (4.6%)
2012	0.801	-1.2	-0.021 (-2.6%)

Too much femoral shaft

Analysis error = significant increase in bmd



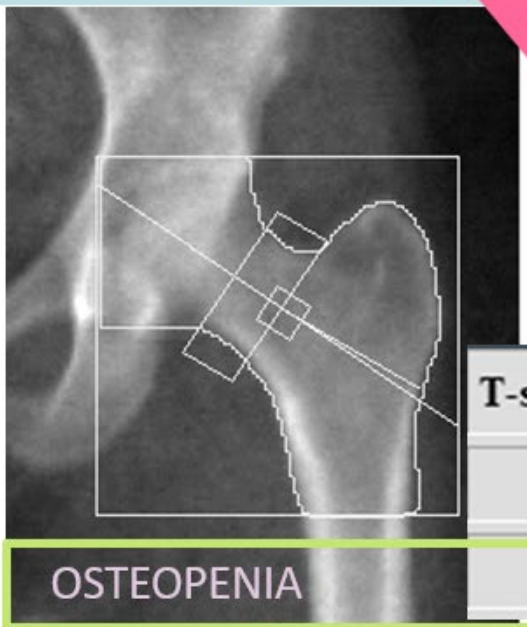
Region	T-score
Neck	-1.3
Total	-1.0

NORMAL

BMD Change (g/cm²) vs Previous	
09/25/2013	0.068 (9.0%)*
11/03/2010	-0.009 (-1.2%)
03/31/2008	-0.027 (-3.5%)

Same hip correctly analyzed

No significant change (correctly analyzed)

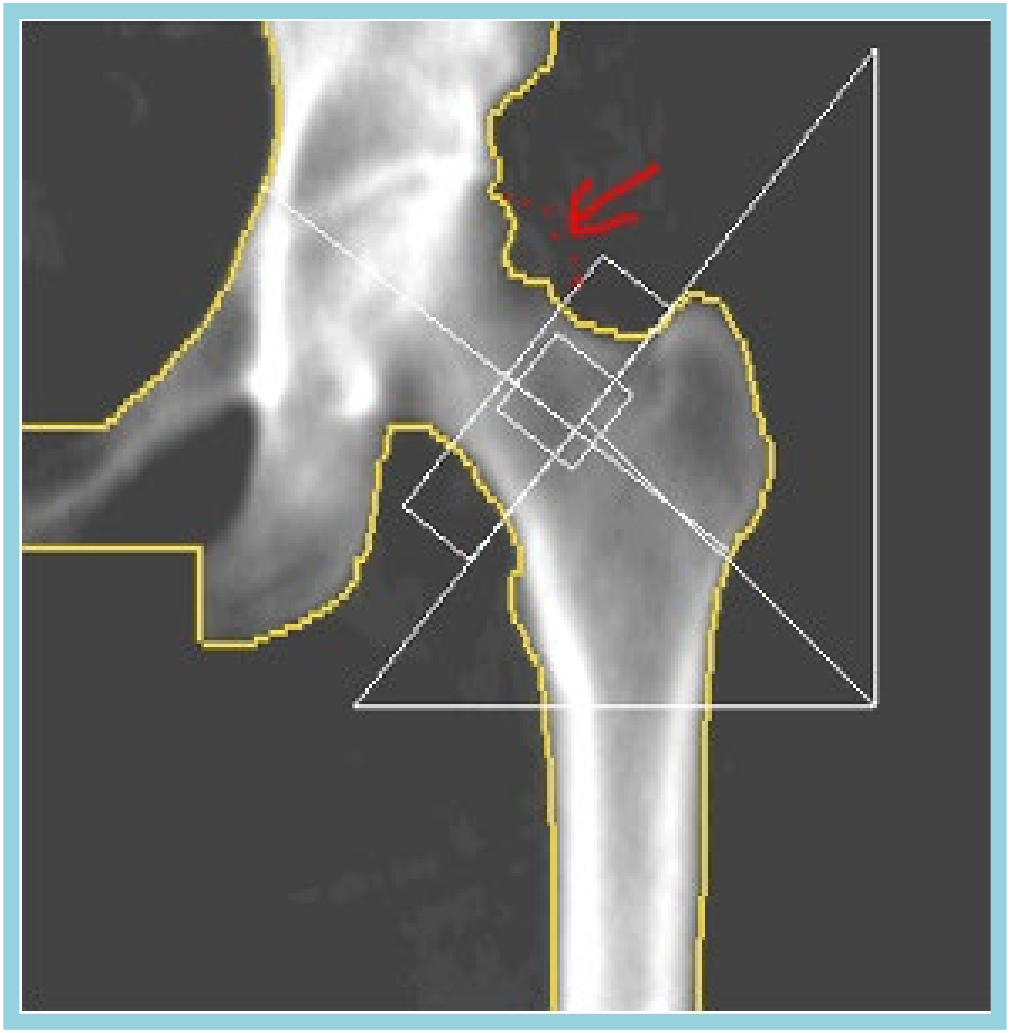


T-score	Region
-1.2	Neck
-1.5	Total

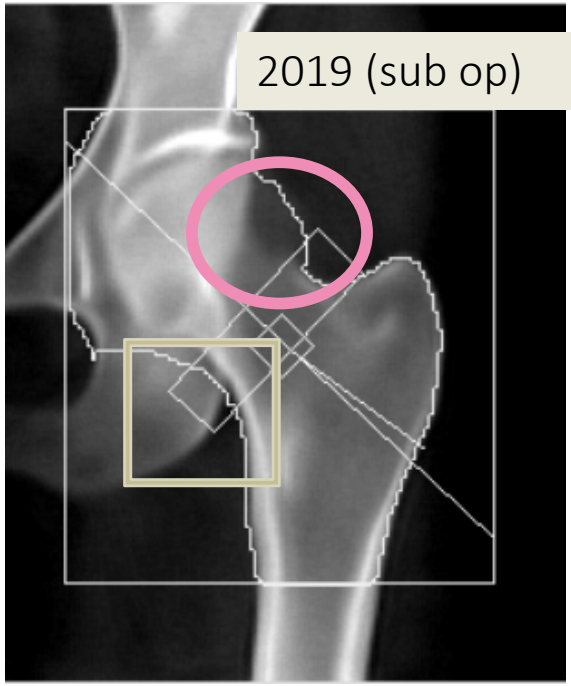
OSTEOPENIA

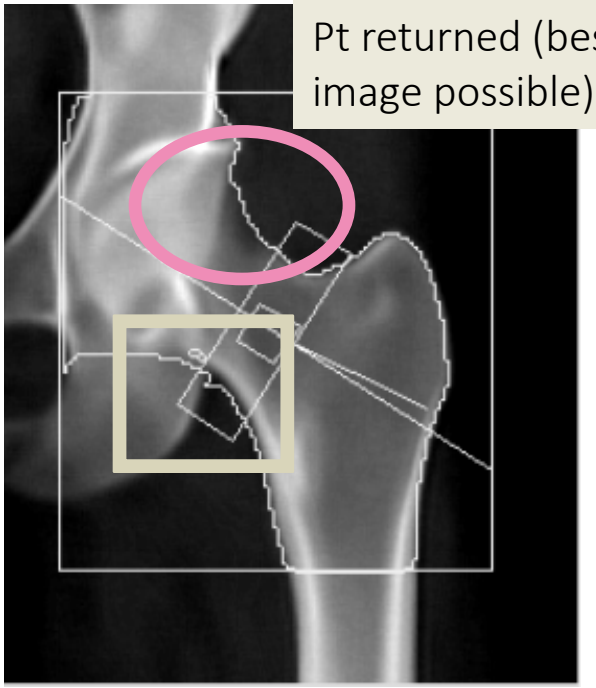
BMD Change (g/cm²) vs Previous	
09/25/2013	0.011 (1.5%)
11/03/2010	-0.009 (-1.2%)
03/31/2008	-0.027 (-3.5%)

Please Reanalyze to Include Entire Femoral Head!



Ischium in Femoral Neck ROI (SUB OP)





W/ HOLOGIC- Ischium included in Neck ROI artifactually increases BMD

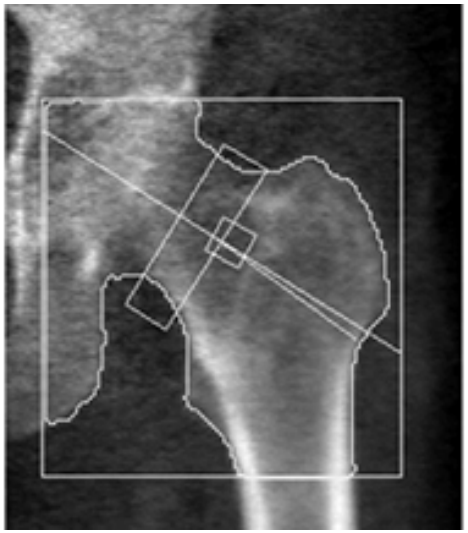
*The inconsistent femoral head analysis is likely contributing to bmd change between images also

Region	BMD [g/cm^2]	T-score	Z-score
Neck	0.704	-1.3	0.5
Total	0.797	-1.2	0.3

Region	BMD[g/cm^2]	T-score	Z-score
Neck	0.649	-1.8	0.0
Total	0.789	-1.3	0.3

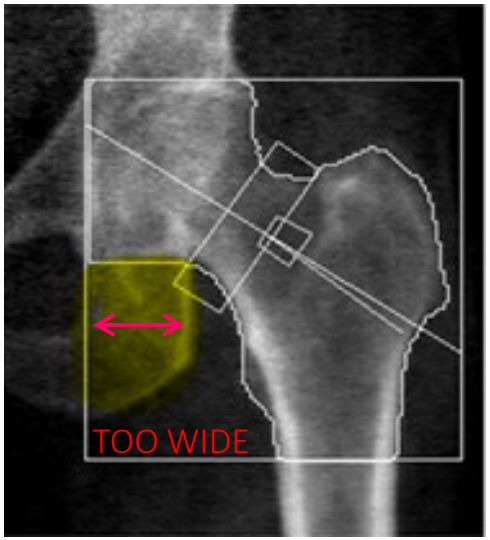
Reduce Ischium

2016



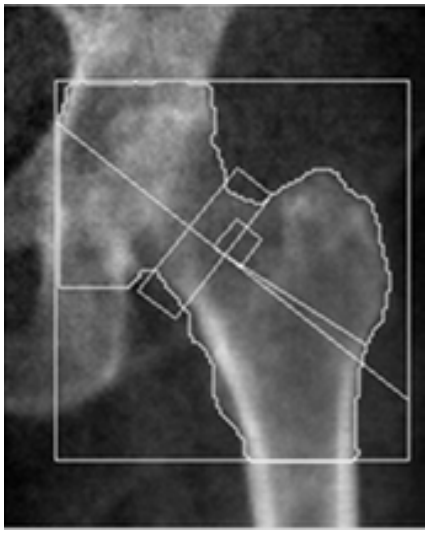
Region	T-score
Neck	-2.8
Total	-1.0

2018 SUB-OP



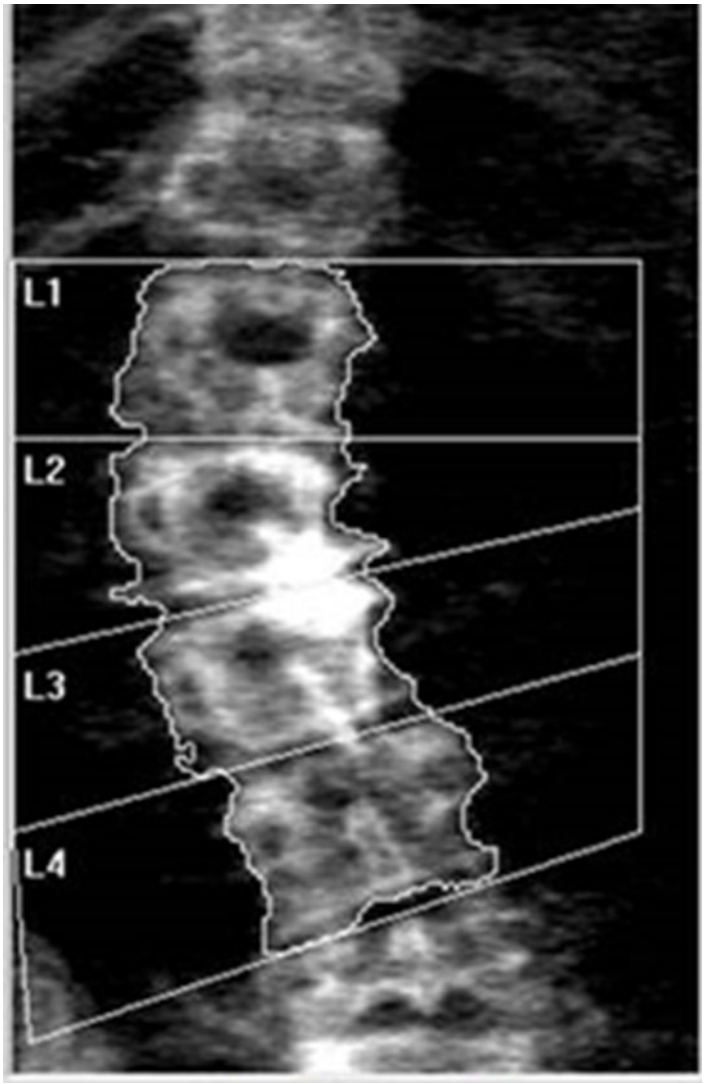
Region	T-score
Neck	-1.3
Total	-1.3

Pt returned
(Ischium Reduced)



Region	T-score
Neck	-2.1
Total	-0.8

Lumbar Levels
(when to exclude)

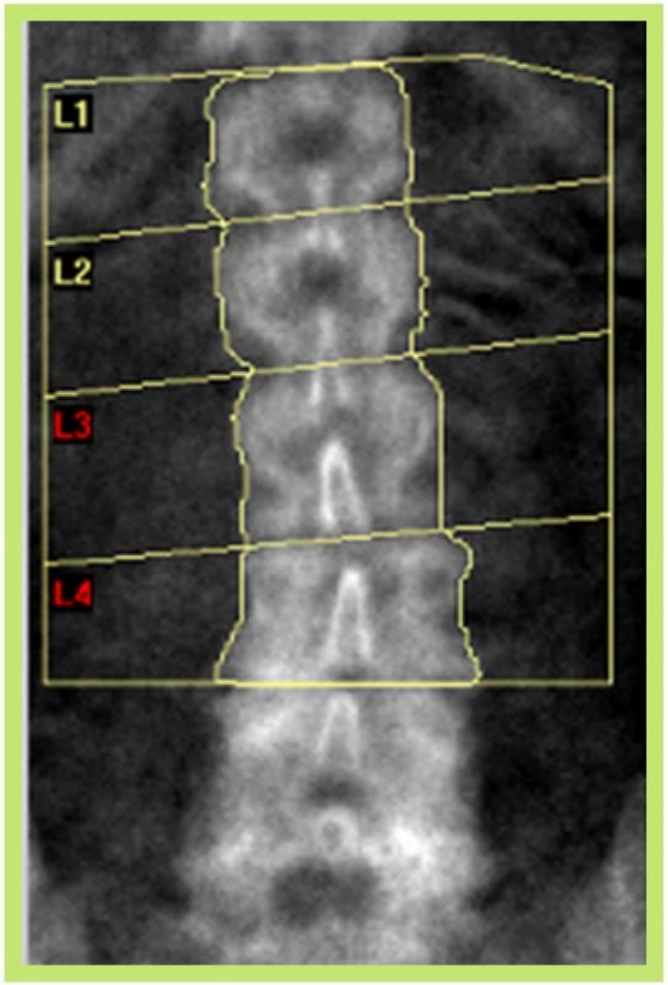


- Noticeable sclerosis, prior augmentation, hardware or other artifact overlying the vertebral body
- T-scores for adjacent vertebrae differ by +1 standard deviation
- T and Z-scores for the lumbar spine are noticeably higher than other sites scanned

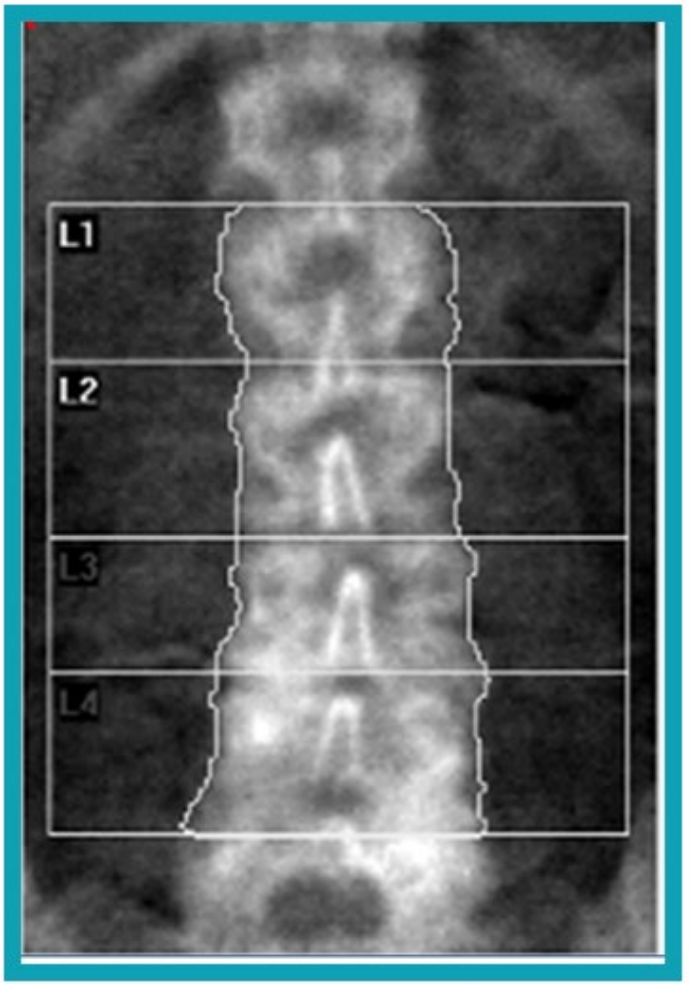
Region	T-Score
L1	-2.3
L2	-0.1
L3	-0.5
L4	-2.6
TOTAL	-1.5

L2 and L3 should be excluded

Do Levels Match Prior Analysis?



2019

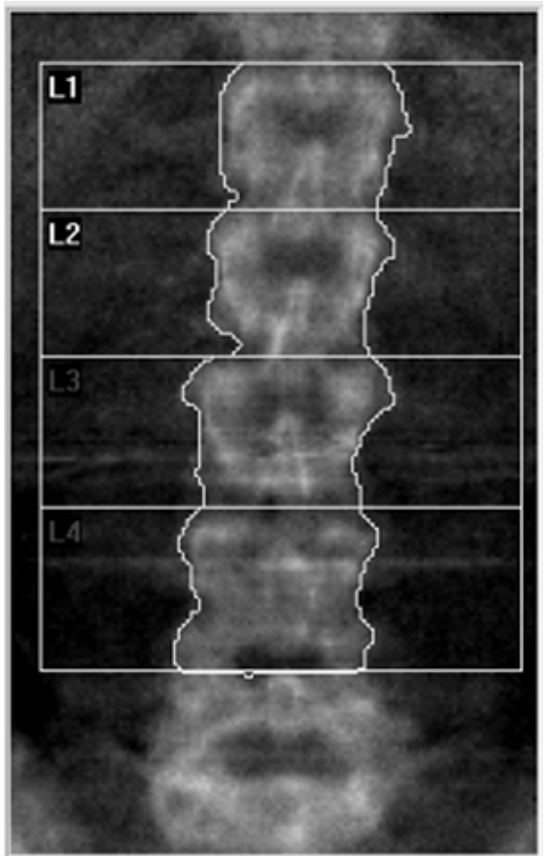


2017

Are the Correct Levels Analyzed?

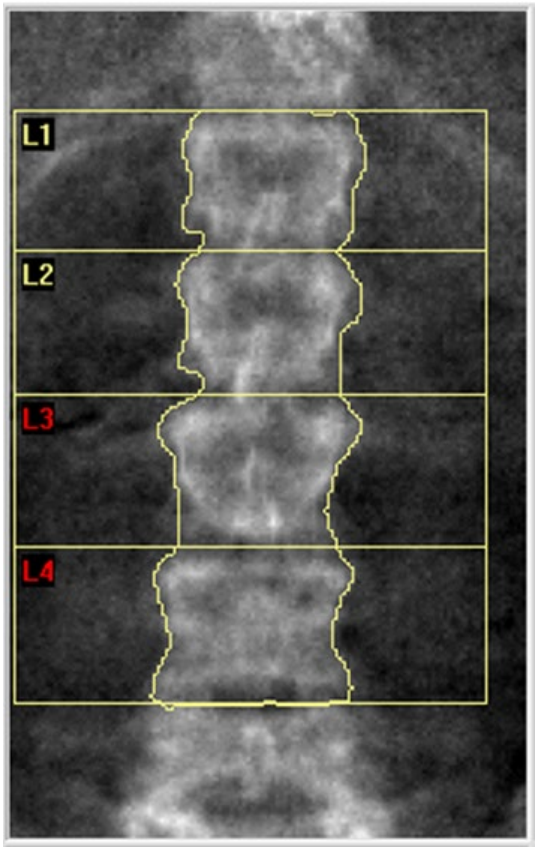
BASELINE EXAM 2015

Region	T-SCORE
L1	-1.0
L2	-1.2
L3	-2.1
L4	-2.8
L1-L2	-0.8
L3-L4	-2.7
L1-L4	-1.9



WRONG LEVELS ELIMINATED! DICTATED AS NORMAL …PT HAD OSTEOPOROSIS!

Follow- Up (2018)



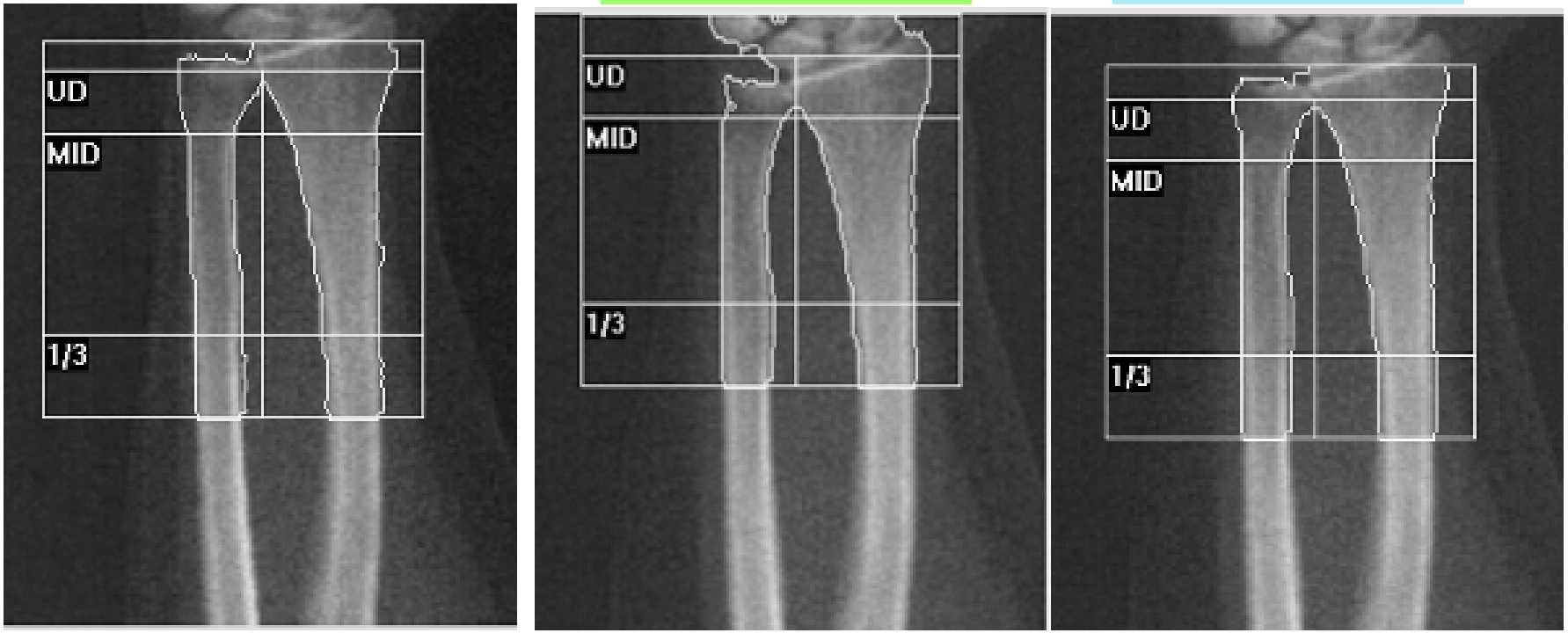
Region	T-SCORE
L1	-1.6
L2	-1.6
L3	-2.5
L4	-2.8
L1-L2	-1.3
L3-L4	-2.9
L1-L4	-2.2

3 YRS LATER… still untreated

2019

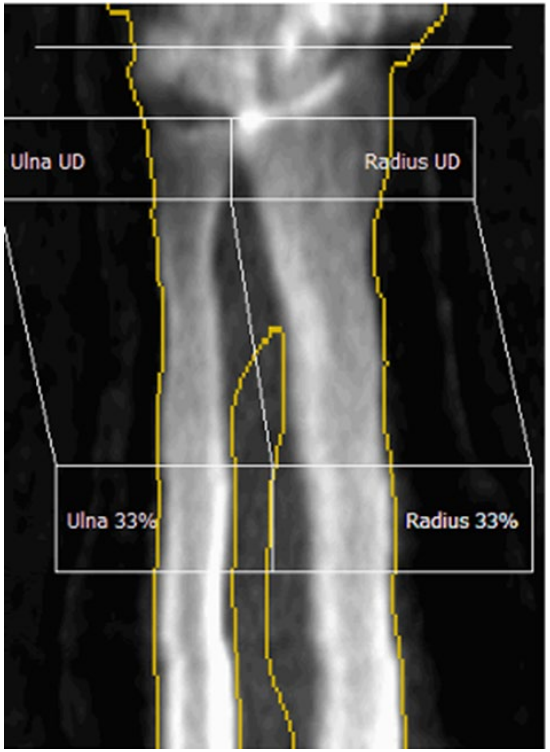
2014 Incorrectly Analyzed

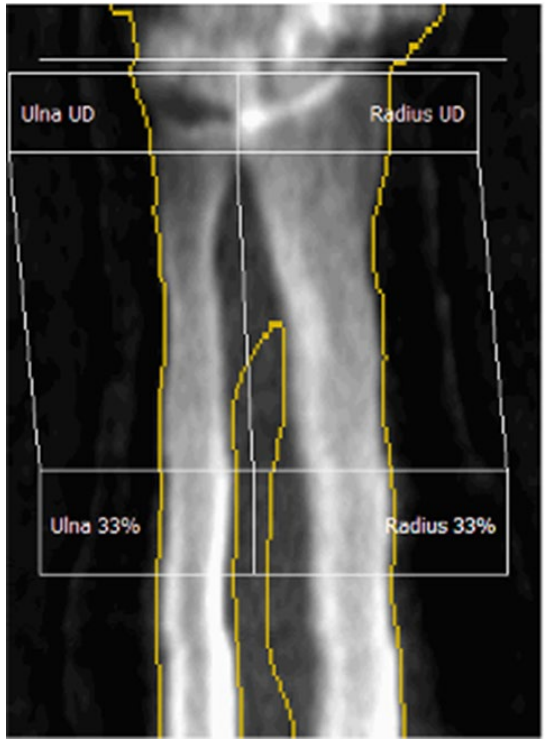
2014 Reanalyzed Correctly

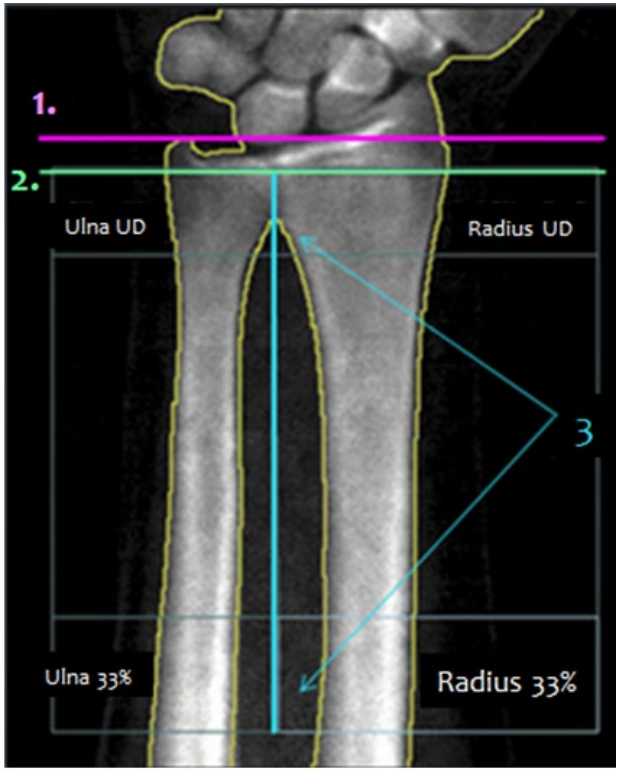


Carpal bones in the analysis

Include Screen Shots in Your Email to Help the Techs!







Please reanalyze to match the example provided

1. The reference line is located at the distal tip of the ulna styloid process
2. The UD ROI does not contain the radial endplate (UD= ultradistal)
3. The vertical line in the center of the UD and 33% ROIs are located between the radius and ulna

Updated DXA Contact List

Contact Brian Avery for up-to-date DXA contact list:

Brian.Avery@riaco.com

Zixencrypt

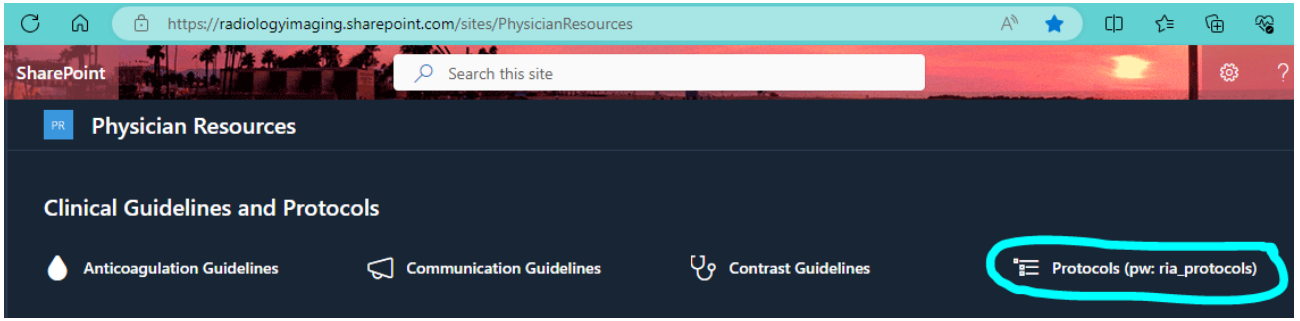
Encrypt all emails containing patient information by typing zixencrypt in the subject line.

Do not include patient information in the subject line.

IE: Zixencrypt- DXA 2.10.19 forearm analysis

How to Draft DXA in Clario

- Log onto Share Point and access RIA protocols:



- Select Drafting with Clario:

Study Description

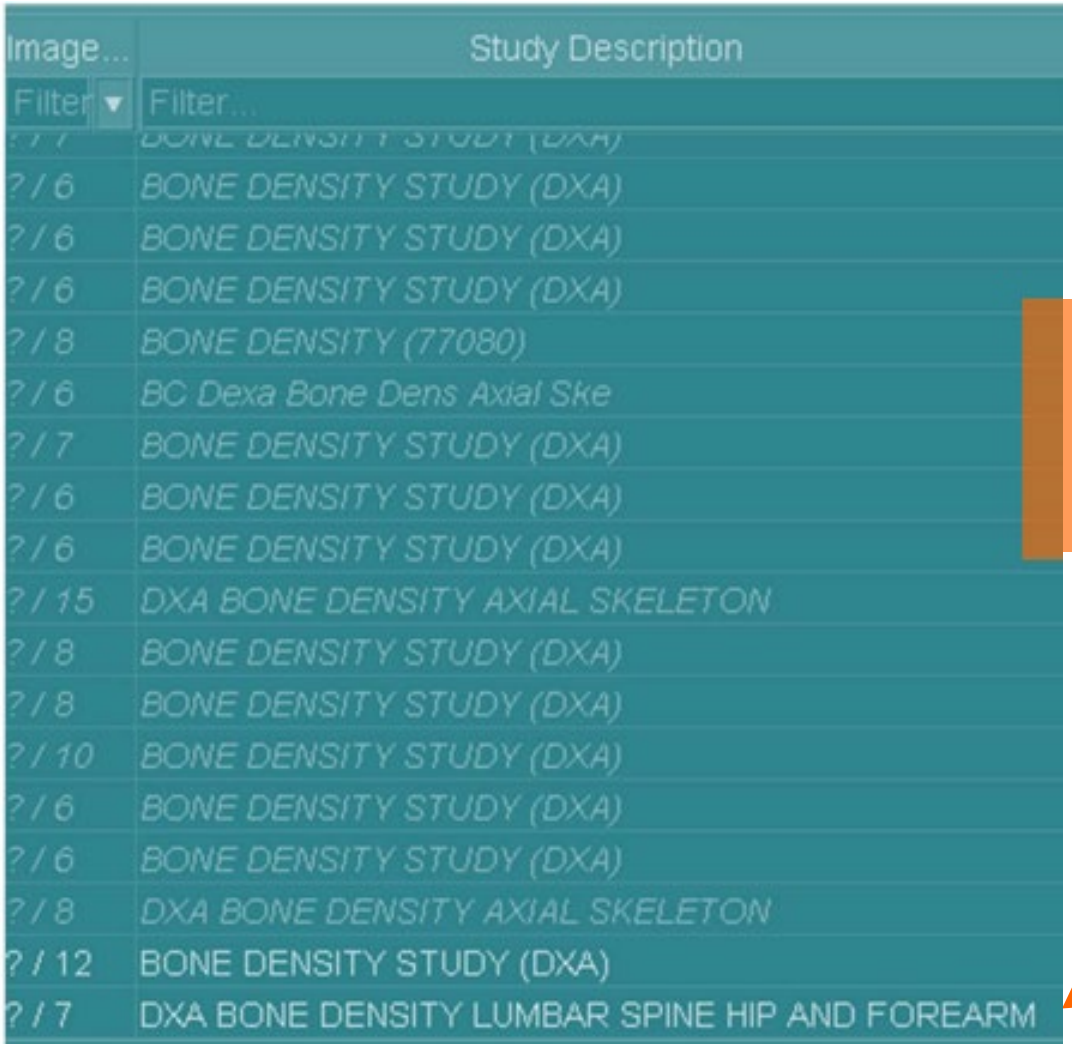
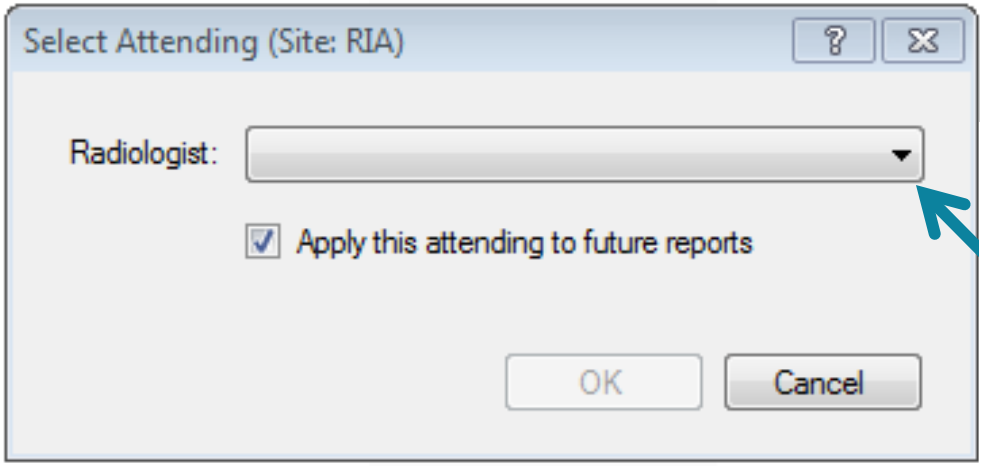


Image...	Study Description
Filter	Filter...
? / 6	BONE DENSITY STUDY (DXA)
? / 6	BONE DENSITY STUDY (DXA)
? / 6	BONE DENSITY STUDY (DXA)
? / 8	BONE DENSITY (77080)
? / 6	BC Dexa Bone Dens Axial Ske
? / 7	BONE DENSITY STUDY (DXA)
? / 6	BONE DENSITY STUDY (DXA)
? / 6	BONE DENSITY STUDY (DXA)
? / 15	DXA BONE DENSITY AXIAL SKELETON
? / 8	BONE DENSITY STUDY (DXA)
? / 8	BONE DENSITY STUDY (DXA)
? / 10	BONE DENSITY STUDY (DXA)
? / 6	BONE DENSITY STUDY (DXA)
? / 6	BONE DENSITY STUDY (DXA)
? / 8	DXA BONE DENSITY AXIAL SKELETON
? / 12	BONE DENSITY STUDY (DXA)
? / 7	DXA BONE DENSITY LUMBAR SPINE HIP AND FOREARM

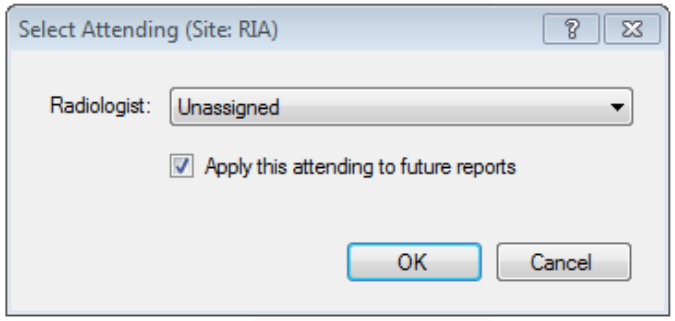
Open this window enough to see the entire description

Make sure a forearm is imaged if ordered !

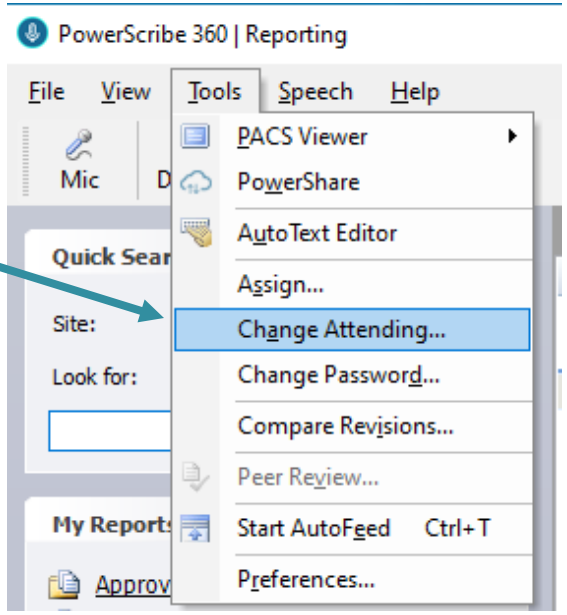
Select Attending (PS360)



Scroll down and select unassigned

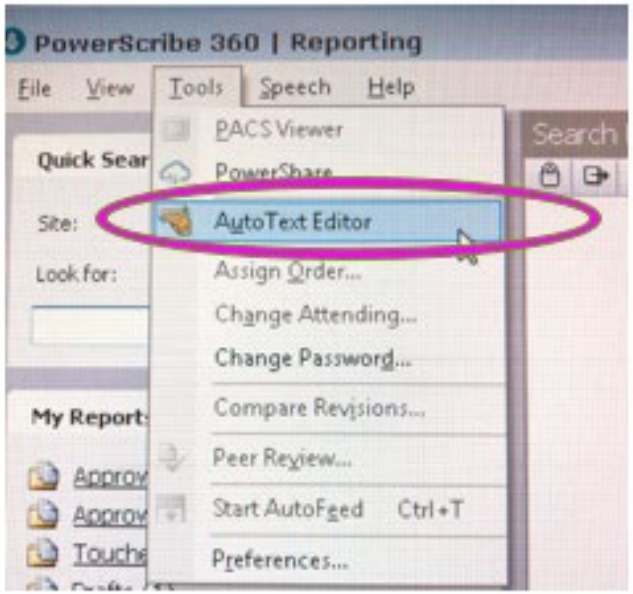


If you accidently pick a radiologist, edit under tools:

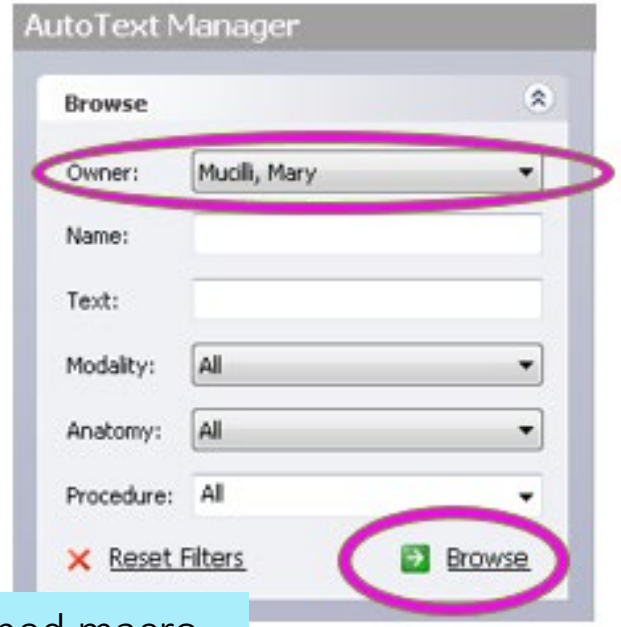


Cloning Macros

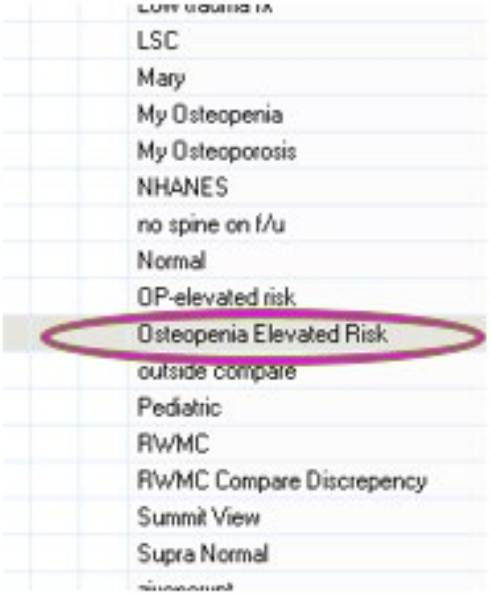
1. Select Auto Text Editor



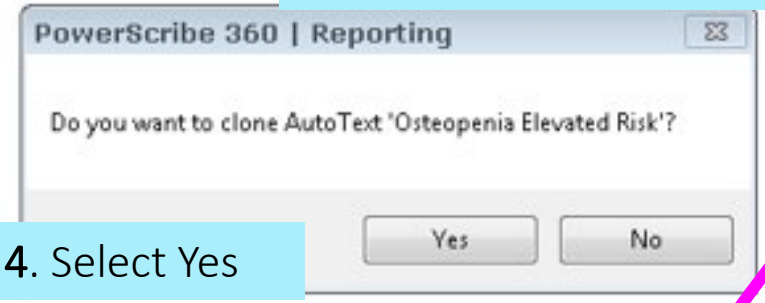
2. Select the person you want to clone from and browse



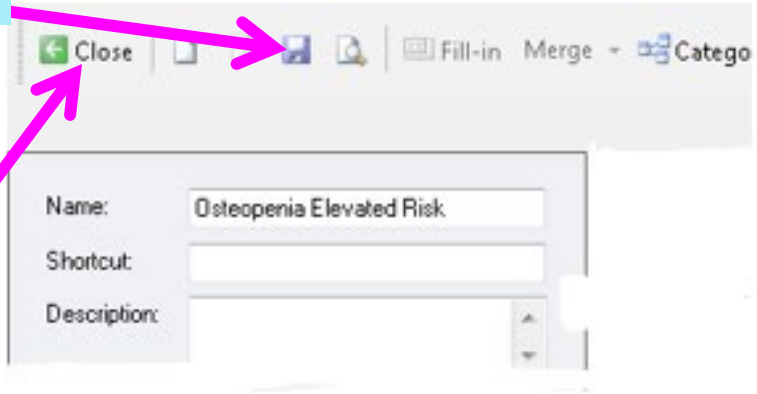
3. Double click on the macro you want to clone



5. Save the cloned macro



4. Select Yes

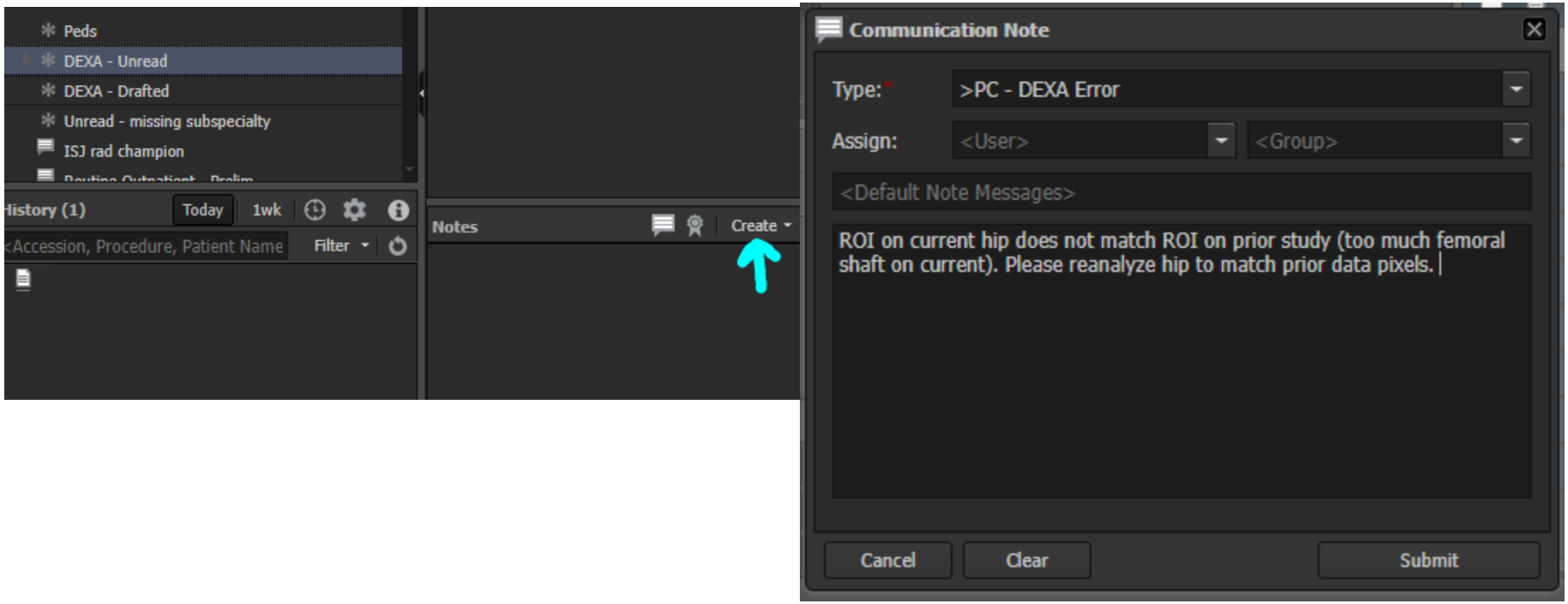


6. Close

DXA Error Correction Process

If possible, contact the dxa technologist directly and leave a communication note in clario.

RA's- if you are reading between patients and do not have time to contact techs create a communication note:



Waiting for Correction

- If a communication note is put in for DXA error correction, the call center will reach out to the DXA technologist
- Once error is corrected, the call center will notify DXA drafters
- If the technologist can be reached through InteleViewer/Clario messenger, please contact them directly instead of using the call center

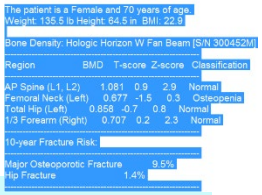
(Clario workflow is new- please contact Jessica.Grahf@riaco.com with workflow updates, suggestions, and corrections)

(If you accidently mess up, select UNDO (Ctl+Z) until your table comes back, otherwise, call tech to have them resend HL7 table)

DRAFTING STEPS

1. COPY TABLE (MACRO DXA), Paste in results **[ ]**
   - Clean up table if it is not aligned properly
2. Is the questionnaire scanned? (both pages)?
   - Ethnicity selected matches scan?
   - Does pt have hypercalcemia or hyperparathyroidism? If so, forearm should be included
3. Order scanned? (VFA?)
4. Technical Quality
   - Priors?
     - Significant increase or decrease in BMD (spine 0.036), (hip 0.028), (forearm 0.030)?
     - Pixels match? (current vs prior)
     - Priors reanalyzed? (macro 609 paperwork should be scanned)
   - Were any vertebral bodies eliminated? (macro combo-edit as needed)
     - Is the spine reliable? (If all vertebral bodies were included, consider macro sclerosis)
5. Go back to top of macro and fill in the blanks
6. Check FRAX- Elevated if (major ≥20% minor ≥ 3%) Use ***macro eliminate frax (Slide 14)*** *if pt checks NO FRAX CRF,* or list item from ***(Slide 14).***
7. Contributed By:
8. Correct (top of PS360) (*only use draft If you need to save the exam for yourself to edit later*)
9. Go back to Clario worklist and open DEXA-Drafted tab and unlock the exam (the rads will pick them up once unassigned)
10. If you want to assign to someone, don't unlock, instead use the symbol with a circle around check mark, pop up screen will allow you to type in name.

Drafting ISJ DXA Exams



Your HL7 Table will automatically appear in PS360 when you open the exam:
Copy Table: (highlight & Ctrl+C)

Dictate (Macro DXA)

Paste (Ctrl +V) table in the Results **[ ]** and begin drafting

RESULTS:

The patient is a Female and 70 years of age.
Weight: 135.5 lb Height: 64.5 in BMI: 22.9

Bone Density: Hologic Horizon W Fan Beam [S/N 300452M]

Region	BMD	T-score	Z-score	Classification
AP Spine (L1, L2)	1.081	0.9	2.9	Normal
Femoral Neck (Left)	0.677	-1.5	0.3	Osteopenia
Total Hip (Left)	0.858	-0.7	0.8	Normal
1/3 Forearm (Right)	0.707	0.2	2.3	Normal

10-year Fracture Risk:

Major Osteoporotic Fracture 9.5%
Hip Fracture 1.4%

Red boxes around all lines in the table indicate the table has been pasted in the [ ] Correctly

If you accidently hit copy instead of paste and lose your table: click the undo button

Reserving Drafts for Radiologists

Message the Radiologist with a link to your draft if:

- The exam requires Vertebral Fracture Analysis (VFA)
- Abnormal anatomy is present
- You have a difficult case/ need help
- You have a draft in your queue that does not appear on the worklist
- You have drafted or need help drafting an addendum
- You notice they have not picked up a draft from the previous workday

Macro DXA

DXA BONE DENSITY

EXAM DATE AND TIME: [ ]

REASON FOR EXAM: [ ].

INDICATIONS: [ ].

CLINICAL RISK FACTORS:
1. [ ]

FAMILY HISTORY:
Family history of osteoporosis: [None.]

Parental hip fracture: [None.]

CURRENT MEDICATIONS: [ ]

TECHNICAL QUALITY: The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

RESULTS:
[ ]

Bone density test results of the [ ][ ] are diagnostic of low bone density. Low bone density in one or more skeletal sites is indicative of generalized low bone density.

At this facility, the Least Significant Change in BMD with 95% confidence utilized is 0.036 g/cm2 at the L1-L4 Spine, 0.028 g/cm2 at the Total Hip, and 0.030 g/cm2 at the 1/3 Radius.

COMPARISON: [None.]

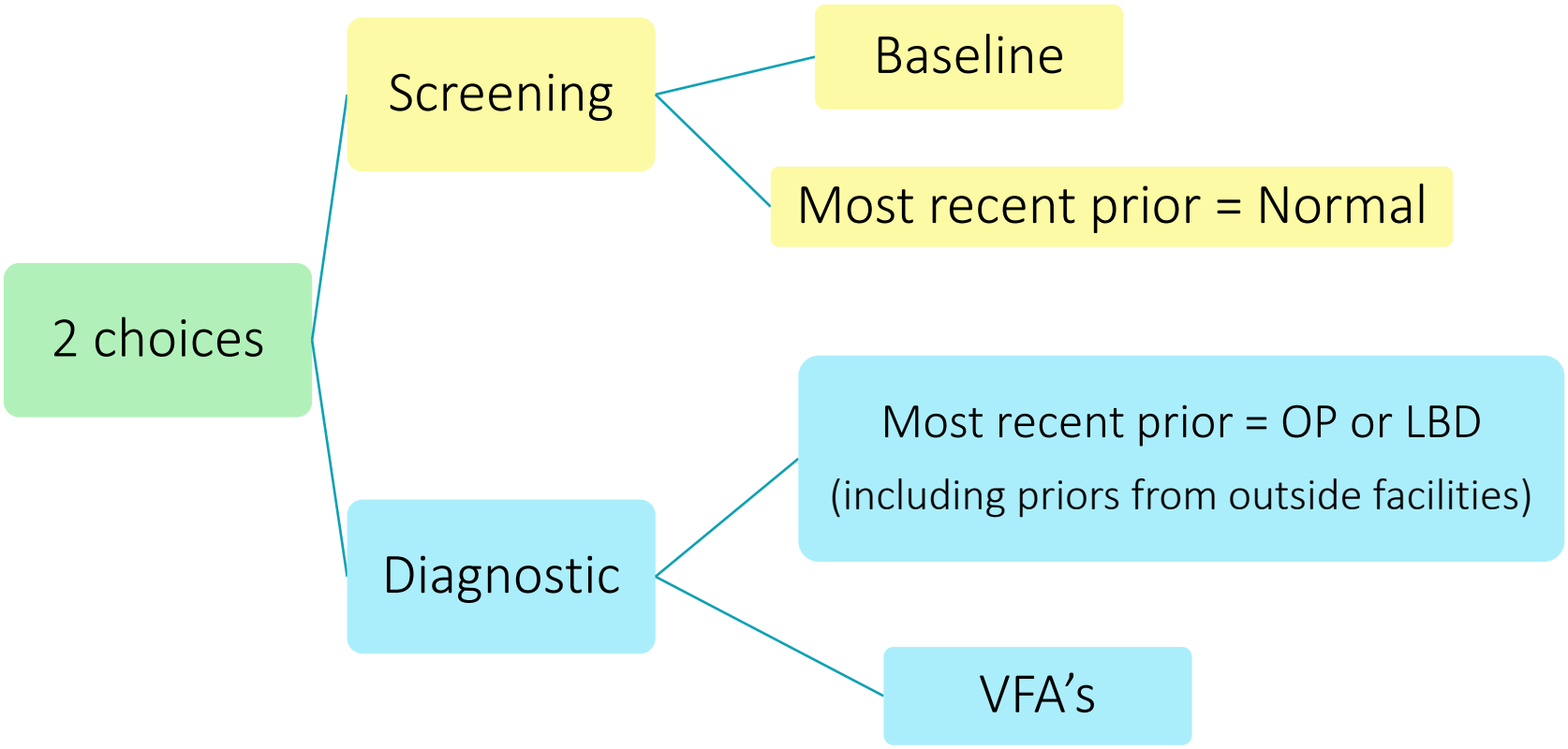
IMPRESSION: This patient has [ ]. The 10-year fracture risk estimate is [ ].[ ] Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density exam is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Reason for Exam

DXA BONE DENSITY

EXAM DATE AND TIME: [ ]

REASON FOR EXAM: [ ]



INDICATIONS: [ ]

Indication Verbiage for Screening Exams:

- Postmenopausal. Baseline exam for this facility.
- Fragility fracture of the right hip with little or no trauma. Baseline exam for this facility.
- Height loss greater than one inch during lifetime. Baseline exam for this facility.
- Postmenopausal. Follow up exam. *(used if most recent prior normal)*
- Premenopausal with a history of relatively low dietary calcium intake and low body weight. Baseline exam for this facility.

If only 2 clinical risk factors are present, combine into the indications section (slide 43)

Indication Verbiage for Diagnostic Exams:

- History of Osteoporosis. Follow up exam.
- History of low bone density. Follow up exam.
- History of osteoporosis diagnosed on an outside study. Baseline exam for this facility.
- History of low bone density diagnosed on an outside study. Baseline exam for this facility.
- 80 year old male with a history of osteoporosis and height loss (1.5 inches). Follow up exam.
- *VFA exams may use screening or diagnostic verbiage.*

Clinical Risk Factors

No FRAX- Unique Impression

FRAX calculation risk (secondary osteoporosis)

Personal Information		
Gender: _____ Race/Ethnicity: ◻ White/Caucasian ◻ Black/African American ◻ Hispanic/Latino ◻ Asian/Pacific Islander		
Clinical Risk Factors – Biological Female	**Yes**	**No**
Are you postmenopausal (periods have stopped completely)?		
Are you perimenopausal (experiencing menopausal symptoms)?		
Are you premenopausal (still having regular periods)?		
Did you have premature menopause (before the age of 45)?		
Are you currently or have you in the past year been on Estrogen Therapy (patch or pill only)?		
Clinical Risk Factors – Biological Male	**Yes**	**No**
Do you have a history of prostate cancer?		
If yes, are you taking medication to treat prostate cancer? *Check the medication name under "Medications"*		

Clinical Risk Factor Verbiage:

- CRF- Personal history of secondary osteoporosis due to premature menopause before age 45.
- CRF- Long term and current use of *drug name*, an agent affecting estrogen levels (Z79.818).

Prostate Cancer Medications

- Abiraterone
- Abiraterone
- Apalutamide
- Bicalutamide
- Camcevi
- Casodex
- Darolutamide
- Degarelix
- Eligard
- Enzalutamide
- Erleada
- Fensolvi
- Firmagon
- Goserelin
- Leuprolide
- Lupron
- Nubeqq
- Orgovyx
- Relugolix
- Trelstar
- Triptodur
- Triptorelin
- Xtandi
- Yonsa
- Zoladex
- Zytiga

Clinical Risk Factors (continued)

- No FRAX- Unique Impression
- FRAX calculation risk
- FRAX calculation risk (secondary osteoporosis)

General Clinical Risk Factors	Yes	No	Clinical Risk Factor Verbiage- *CRF*
In the last 14 days (about 2 weeks), have you had imaging with IV contrast or barium or a nuclear medicine test?			
Have you ever experienced a Hip or Spine fracture?	●		*CRF*- History of a _____ fracture.
If yes, please indicate where: ○ left hip ○ right hip ○ spine			
Have you ever experienced a fragility fracture due to little or no trauma after the age of 40 (Excluding hands, feet or skull)?	●		*CRF*- Reported history of fragility fracture with little or no trauma.
Are you currently or in the past two years been on a specific drug therapy for osteoporosis/low bone density?	●		
Do you have a history of diagnosed rheumatoid arthritis (not osteoarthritis or any other types)?	●		*CRF*- History of rheumatoid arthritis.
Do you have a history either current or in the past of long-term oral steroid therapy (Greater than 3 months in your lifetime)?	●		*CRF*- Long term systemic steroid therapy. *(FRAX)*
If yes, which type of oral steroid was it? ● Prednisone greater than 5mg ○ inhaled			*CRF*- Long term inhaled steroid therapy.
Do you have type 1 (insulin dependent) diabetes?	●		*CRF*- Personal history of secondary osteoporosis due to _____.
Do you have untreated long-standing hyperthyroidism (overactive thyroid)?	●		*CRF*- Personal history of secondary osteoporosis due to _____.
Do you have a diagnosis of hyperparathyroidism or hypercalcemia? and if yes, a forearm must be performed.	●		*CRF*- Personal history of hyperparathyroidism.
Do you have a history of long-term use (5 years or more) of thyroid replacement therapy such as Levothyroxine?	●		*CRF*- Long term thyroid replacement therapy.
Do you have adult osteogenesis imperfecta?	●		*CRF*- Personal history of secondary osteoporosis due to _____.
Did you have a previous surgery to remove bowel or stomach?	●		*CRF*- Personal history of secondary osteoporosis due to _____.
Do you currently take a proton pump inhibitor (PPI) such as Omeprazole?	●		
If yes, have you taken the PPI for 5 or more years?	●		*CRF*- Long term use of Proton Pump Inhibitor (PPI) medication
Do you have hypogonadism?	●		*CRF*- Personal history of secondary osteoporosis due to _____.
Do you have anorexia nervosa or bulimia?	●		*CRF*- Personal history of secondary osteoporosis due to _____.
Do you have a chronic liver disorder?	●		*CRF*- Personal history of secondary osteoporosis due to _____.
Do you have a personal history of breast cancer?	●		*CRF*- Personal history of breast cancer with *type of treatment*.
If yes, what treatment you have had: ○ chemotherapy ○ radiation ○ aromatase inhibitor ○ other			
Do you currently smoke cigarettes?	●		*CRF*- Current cigarette smoker.
Do you drink more than 2 alcoholic drinks daily?	●		*CRF*- Moderate alcohol consumption.
Do you exercise more than 2x per week?		●	*CRF*- Reported suboptimal exercise history.
Have you regularly consumed 2 or more dairy (cheese, yogurt, etc.) servings per day most of your life?		●	*CRF*- Relatively low dietary calcium intake.
Have you experienced height loss **greater than one** inch over your lifetime?	●		*CRF*- Height loss greater than one inch during lifetime.

Clinical Risk Factors (continued)

- History of long term systemic steroid therapy.
- History of long term inhaled steroid therapy
- History of a left hip fracture.
- Bilateral hip replacements.
- Personal history of multiple sclerosis.
- Personal history of breast cancer with prior chemotherapy.
- Personal history of breast cancer with current aromatase inhibitor therapy.
- History of autism.
- Long-term growth hormone therapy.
- Reported history of fragility fracture with little or no trauma.
- Prior vertebral augmentation at T-12.
- Long term and current use of *DRUG NAME*, an agent affecting estrogen levels (Z79.818).

Correctly ordered risk factors: Greatest risk 1st!

Clinical risk factors:

1. Postmenopausal.
2. History of osteoporosis.
3. Rheumatoid arthritis.
4. Long term systemic steroid therapy.
5. Height loss greater than one inch during lifetime
6. Low body weight.

Patients with 2 clinical risk factors

Combine both risks into a sentence under indications and delete the clinical risk factor section of the report:

EXAMPLES:

- Postmenopausal with low body weight. Follow up exam.

- Male with height loss of greater than one inch during lifetime and reported suboptimal exercise history. Baseline exam for this facility.

- Personal history of secondary osteoporosis due to premature menopause before age 45. Baseline exam for this facility.

- History of low bone density diagnosed on an outside study. Baseline exam for this facility.

Clinical Risk Factor List Example 1

Indications: History of low bone density. Follow up exam.

REPEAT in the list!

Clinical risk factors:

MORE CRITICAL RISKS LISTED FIRST!

1. Postmenopausal.
2. History of low bone density.
3. History of multiple fragility fractures with little or no trauma.
4. Personal history of osteogenesis imperfecta.
5. Height loss greater than one inch during lifetime.
6. Moderate alcohol consumption.
7. Reported suboptimal exercise history.

Clinical Risk Factor List Example 2

MORE CRITICAL RISKS LISTED FIRST!

Indications: Long term and current use of Lupron, an agent affecting estrogen levels. Baseline exam for this facility.

REPEAT in the list!

Clinical risk factors:

1. History of left hip fracture.
2. Long term and current use of Lupron, an agent affecting estrogen levels.
3. Long term steroid therapy.
4. Current cigarette smoker.
5. Moderate alcohol consumption.

FAMILY HISTORY:

Family history of osteoporosis: [Family History]

Parental hip fracture: [Parental Hip Fracture]

Family History	Yes	No
Is there a family history of osteoporosis?		
*Did or have either of your parents ever experienced a hip fracture in their lifetime?		

Family hx of osteoporosis:

[Yes.]

[No.]

[Unknown.]

Parental hip fracture:

[Mother.]

[Father.]

[Yes.]

[No.]

CURRENT MEDICATIONS: [Medications]

Medications and Supplements	Yes	No	Medications and Supplements	Yes	No
Leuprolide for prostate cancer			Calcium		
Relugolix for prostate cancer			Vitamin D/D3		
Enzalutamide for prostate cancer			Multivitamins		
Lupron for prostate cancer			Estrogen by patch or orally		
Eligard for prostate cancer			Aromatase		
Orgovyx for prostate cancer			Arimidex		
Goserelin for prostate cancer			Femara		
Triptorelin for prostate cancer			Fosamax (Alendronate)		
Degarelix for prostate cancer			Actonel (Risedronate)		
Abiraterone for prostate cancer			Boniva (Ibandronate)		
Bicalutamide for prostate cancer			Forteo (Teriparatide)		
Apalutamide for prostate cancer			Reclast (Zoledronic Acid)		
Zoladex for prostate cancer			Prolia (Denosumab)		
Trelstar for prostate cancer			Evenity (Romosozumab)		
Firmagon for prostate cancer			Evista (Raloxifene)		
Yonsa for prostate cancer			Miacalcin (Calcitonin)		
Zytiga for prostate cancer			Tymlos (Abaloparatide)		
Casodex for prostate cancer			Zometa		
Darolutamide for prostate cancer			Thyroid Replacement		
Please list any other medications that you take for bone loss, if any:					

- No current medications are listed.
- Calcium. Multivitamin. Vitamin D. Hormone replacement therapy. Fosamax.
- Calcium. Evista. Levothyroxine. Other medications as listed.

TECHNICAL QUALITY

The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

(Remove this statement if technical quality is compromised)

INSERT APPROPRIATE MACROS UNDER THE TECHNICAL QUALITY STATEMENT:

- 609 *(priors reanalyzed)*
- No spine on f/u
- Sclerosis
- Spine unreliable but imaged
- Combo *(edit appropriately)*
- Lumbar level compare change
- Hypercalcemia
- Hyperparathyroidism

TECHNICAL QUALITY:

The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

(Remove this statement if technical quality is compromised)

Macro 609

Dictate macro 609 under the technical quality statement

MACRO 609:

Please Note:

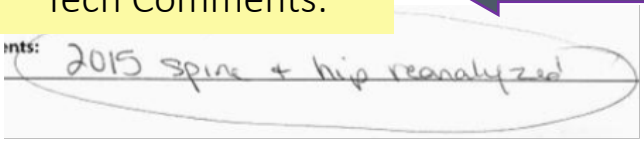
Previous exams have been reanalyzed to be compliant with current ISCD guidelines. Reanalysis has resulted in a change in the patient's previously reported results and/or BMD values.

Use Macro 609 if:

- Previous DXA scan(s) were reanalyzed due to analysis errors.
- Current exam was performed on GE/Lunar Encore 17 or Hologic Horizon (default to current ISCD guidelines) devices. Current guidelines base T-scores for all patients vs. white female database and z-scores upon patient's gender. Patients prior results were reported with previous guidelines that based both T and Z-scores by gender.

Notification Methods

Tech Comments:



Macro Paper Scanned with Documents (preferred method of notification)

Macro 609 to be used for this case

For one or both of the Following Reasons:

- Previous DXA scan(s) were reanalyzed due to analysis errors.
- The current exam was performed on the new GE/Lunar Encore 17 or Hologic Horizon DXA operating system which has been defaulted to current ISCD guidelines. Guidelines now state to base T-scores for all patients vs. White Female database and Z-scores upon the patient's gender. The patient's prior results were reported with previous guidelines that based both T and Z-scores by gender.

Thus:

- Current analysis(') made to be compliant with ISCD guidelines.
- Reanalysis has resulted in a change in the patient's previously reported results and/or BMD values.

TECHNICAL QUALITY:
The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.
(Remove this statement if technical quality is compromised)

Macro No Spine on F/U & Macro Sclerosis

Macro No Spine on F/U:

Due to degenerative or sclerotic changes within the lumbar spine appreciated on prior imaging, the spine was not felt to be a reliable site to measure bone mineral density and as such was not imaged on today's exam.

Use if :

- Spine not imaged – reported as unreliable on prior exam

Macro Sclerosis:

There is evidence of degenerative and sclerotic changes within the lumbar spine which elevates the spine bone mineral density values. The other sites are a more accurate representation of the patient's true bone mineral density. For this reason, future exams should include imaging of the patient's non-dominant forearm.

Use if:

- Spine unreliable due to severe sclerosis/degenerative changes
- T & Z-Scores noticeably elevated compared to hip or forearm
- Forearm was not imaged (but should have been)

TECHNICAL QUALITY:

The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

(Remove this statement if technical quality is compromised)

Macro Spine Unreliable but Imaged

Due to degenerative and sclerotic changes, the spine was not felt to be a reliable site to measure bone mineral density and as such was not evaluated on today's exam.

You can also add : For this reason, future exams should include imaging of the left hip and left forearm only.

Delete Spine info from HL7 - Spine information should not be included in the exam if you use this macro!

TECHNICAL QUALITY:
The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.
(Remove this statement if technical quality is compromised)

MACRO COMBO

(Insert under technical quality statement anytime vertebral bodies are eliminated, edit (discogenic sclerosis when necessary))

For the lumbar spine measurements, only the [ ] levels were included. The [ ] excluded due to discogenic sclerosis which potentially elevates bone mineral density values. [,] ***(this box is optional- see option 4)***

Forearm not included *(but should have been)*

Pick 1: For this reason, future exams should include imaging of the patient's non-dominant forearm.

Other sites have a more severe diagnosis than spine

Pick 2: The other sites are a more accurate representation of the patient's true bone mineral density.

(Spine Z-scores elevated (compared to hip & forearm), severe sclerosis, poor delineation of vertebral bodies)

Option 3: use when spine is extremely unreliable and should not be included on a follow up exam
For this reason, future exams should include imaging of the **patient's left hip and left forearm only.**

(Pick 1 edited to say)

Option 4: Delete box if all sites have the same diagnosis or spine diagnosis matches the most severe diagnosis of the other imaged sites. (See beginners guide to drafting for examples)

TECHNICAL QUALITY:

The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

(Remove this statement if technical quality is compromised)

Macro Lumbar Level Compare Change:

On the current study, there is an artifact overlying the vertebral body of L1 which makes that measurement invalid. Today's analysis of the lumbar spine is based on L2-L4 only. The prior studies were reanalyzed to exclude L1 in order to allow appropriate comparison with today's exam.

Macro New System:

PLEASE NOTE: The new [SYSTEM NAME] operating systems have been defaulted to current ISCD guideline recommendations. Previously reported data has been reanalyzed based on these updated and current guidelines. These latest guidelines base T-scores for all patients versus a white female database and Z-scores upon the patient's gender and ethnicity. This patient's prior results were reported with previous guidelines that based both T and Z-scores by gender and ethnicity.

[SYSTEM NAME]- Pick list includes:

1. Hologic Horizon DXA
2. GE/Lunar enCORE DXA

(More detailed info about this macro provided in the comparison section (slide 73))

TECHNICAL QUALITY:

The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

(Remove this statement if technical quality is compromised)

Macro Hypercalcemia:

The standard protocol is to obtain a forearm analysis if hypercalcemia is suspected. Unfortunately, this view was not obtained on 1/11/2017. If the patient is hypercalcemic, she can be rescheduled at no charge to obtain a forearm analysis.

Macro Hyperparathyroidism:

The patient has a history of hyperparathyroidism. The forearm was not evaluated during this examination. The patient may benefit from additional forearm imaging at no charge due to history of hyperparathyroidism.

TECHNICAL QUALITY:
The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.
(Remove this statement if technical quality is compromised)

MISC. Approved Verbiage

- Hips were not imaged due to the history of bilateral replacements.
- Patient's weight exceeded table limits. As such, only a forearm analysis could be obtained.
- Please note: Due to discogenic sclerosis and prior embolism coil artifact, the spine is not a reliable site to measure bone density. For this reason, future exams should be of the patients forearm only.

Edited- Macro Spine Unreliable but Imaged

- For the lumbar spine measurements, only the [ ] levels were included. The [ ] excluded due to prior vertebral augmentation which potentially elevates bone mineral density values.

Macro (combo) – edit as needed

- The right hip was evaluated on the prior DXA exam from 1/31/2018. Unfortunately, this view was not obtained on 5/8/2019. For comparison purposes, the patient can be rescheduled at no charge to obtain a right hip analysis.

Technical Quality Statement Removed

TECHNICAL QUALITY:

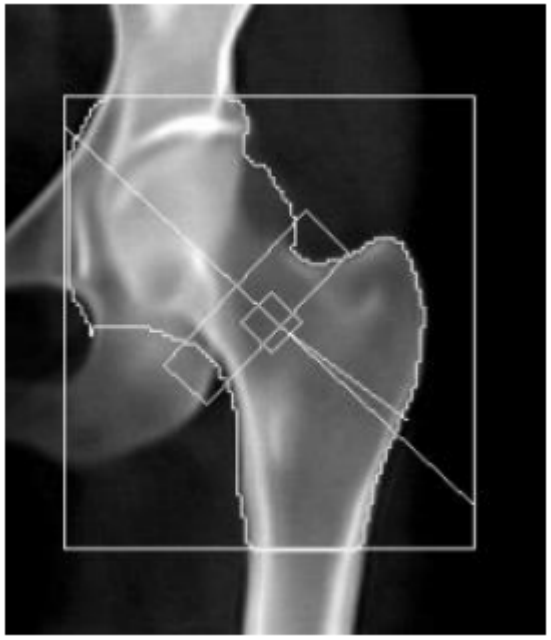
The images were reviewed applying ISCD performance standards for positioning, acquisition, and analysis.

(Remove this statement if technical quality is considered)

Macro 301

There is evidence of degenerative and sclerotic changes within the lumbar spine which elevates the spine bone mineral density values. For this reason, future exams should include imaging of the patient's nondominant forearm.

Macro Future Forearm



Due to technical issues encountered with imaging Ms. XXX's left hip, she is being contacted to return at her earliest convenience to repeat imaging of her left hip. At that time, imaging of her non-dominant forearm will also be obtained, and an addended report will be dictated.

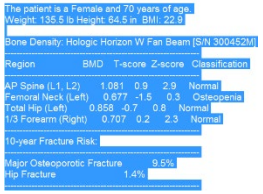
ISJ Exams

RESULTS:
Paste Results Table Here

Your HL7 Table will automatically appear in PS360 when you open the exam:
Copy Table: (highlight & Ctrl+C)

Dictate (Macro DXA)

Paste (Ctrl +V) table in the Results [ ] and begin drafting



RESULTS:
The patient is a Female and 70 years of age.
Weight: 135.5 lb Height: 64.5 in BMI: 22.9

Bone Density: Hologic Horizon W Fan Beam [S/N 300452M]

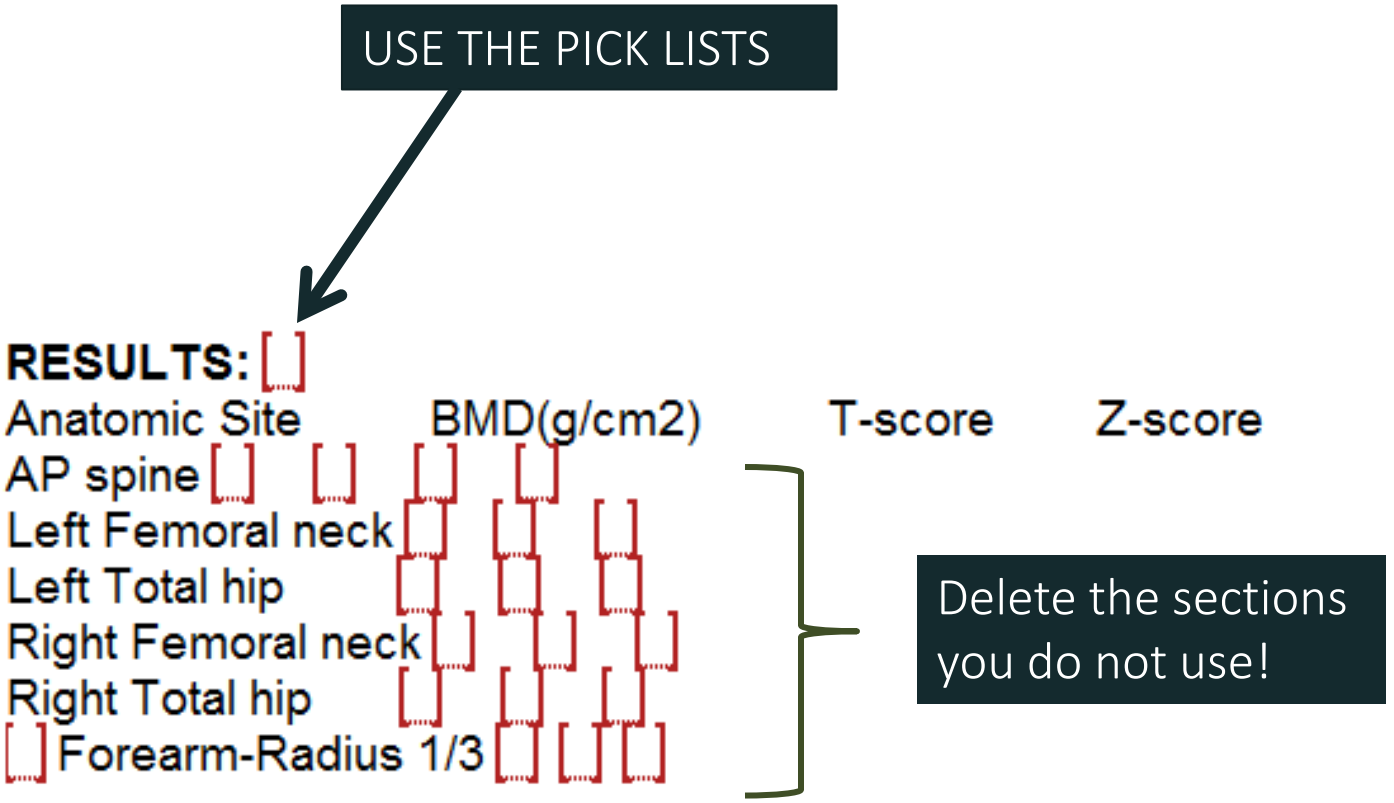
Region	BMD	T-score	Z-score	Classification
AP Spine (L1, L2)	1.081	0.9	2.9	Normal
Femoral Neck (Left)	0.677	-1.5	0.3	Osteopenia
Total Hip (Left)	0.858	-0.7	0.8	Normal
1/3 Forearm (Right)	0.707	0.2	2.3	Normal

10-year Fracture Risk:

Major Osteoporotic Fracture 9.5%
Hip Fracture 1.4%

Red boxes around all lines in the table indicate the table has been pasted in the [ ] Correctly

RESULTS Hospital Exams



Use this table for addendums (MACRO Hospital Table)!

FRAX Criteria

Fracture -Low trauma & adult *(do not count skull, hands and feet)*

No Frax for Pts with prior hip or vertebral fx. *(Low trauma pelvic fx **DO FRAX**)*

Parental Hip FX

Current Smoking

Glucocorticoids (oral 5+mg) for > 3 months ***In lifetime***

RA- Confirmed diagnosis only

Secondary Osteoporosis: aka OP caused by certain medical conditions

- Premature menopause (<45 yrs)
- Type 1 (insulin dependent) Diabetes
- Osteogenesis imperfecta
- Hyperthyroidism (untreated, long standing)
- Hypogonadism
- Chronic malnutrition
- Malabsorption
- Chronic liver disease

} Previous surgery to remove bowl or stomach

frax.shef.ac.uk/FRAX/tool.aspx?country=9 (scroll to bottom of frax calculator to see risk factors)

Alcohol - 3 or more drinks a day

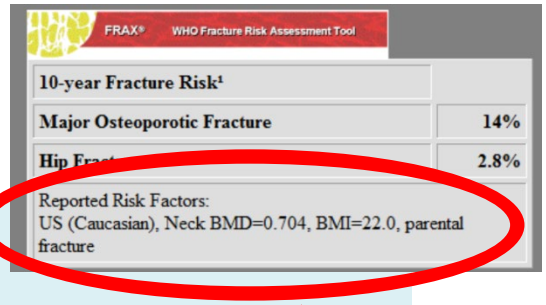
Bioidentical Hormone replacement **DO FRAX** slide 63

Off (pill or patch) HRT for **1 year** - **DO FRAX**

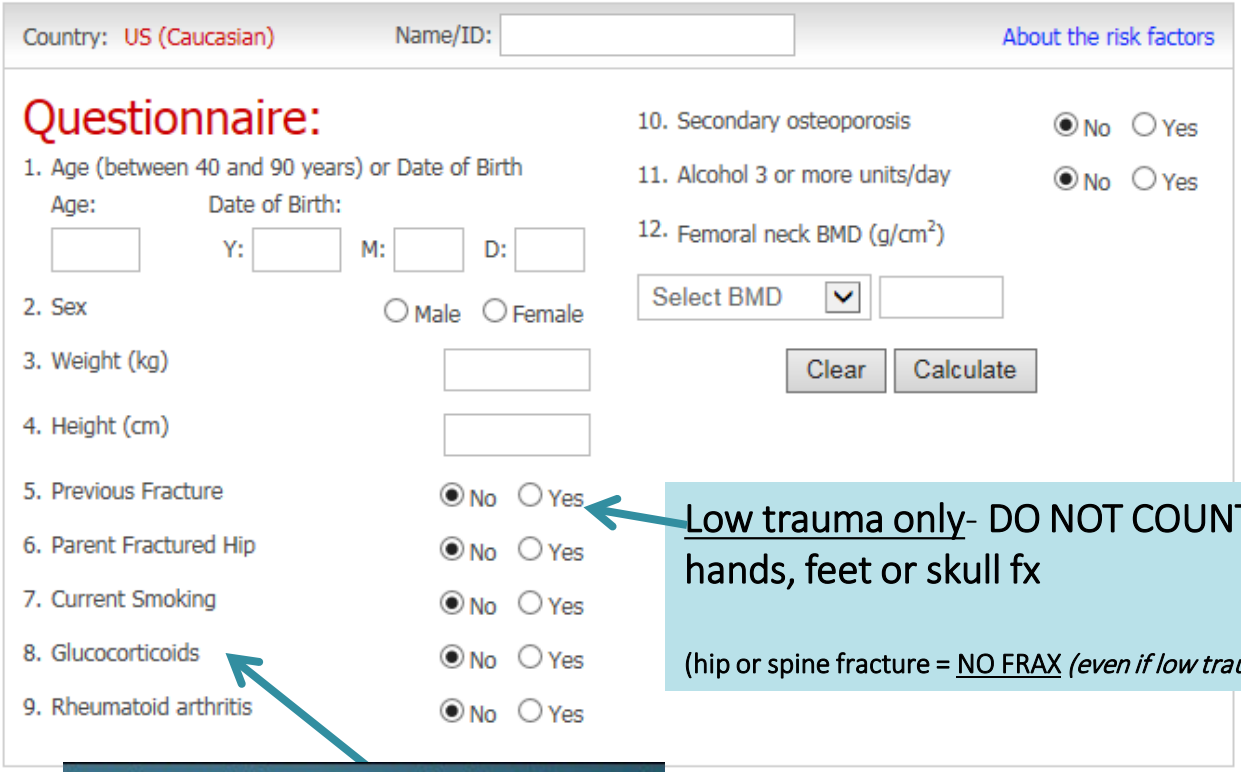
Off Bisphosphonates (Actonel, Boniva, Fosamax **(pamidronate)** etc.) **off 2 years – DO FRAX**

FRAX (10-year Probability of Fracture):
Major Osteoporotic Fracture: [ ]
Hip Fracture: [ ]

Calculating FRAX



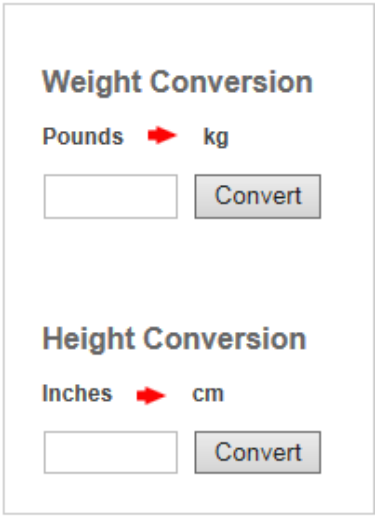
- **Elevated FRAX=** Major OP Fx ≥ 20% Hip FX ≥ 3%
- Follow FRAX criteria
- If the technologist does not include appropriate risk factors or ethnicity recalculate: https://www.sheffield.ac.uk/FRAX/tool.aspx?country=9



Low trauma only- DO NOT COUNT hands, feet or skull fx

(hip or spine fracture = NO FRAX *(even if low trauma)*)

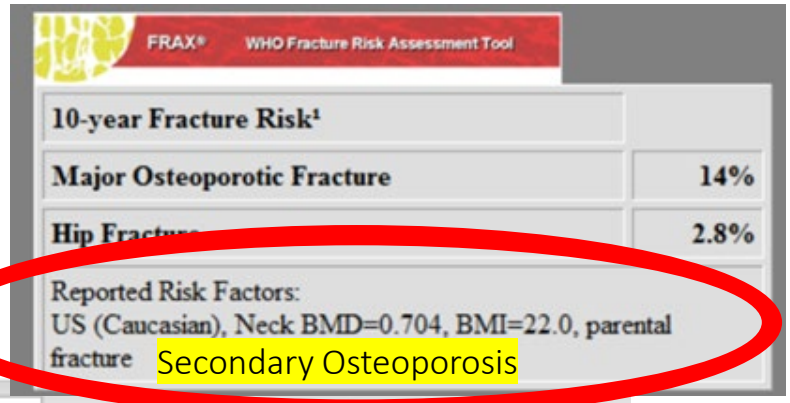
(oral 5+mg) for > 3 months *In lifetime*



06859876
Individuals with fracture risk assessed since 1st June 2011

Calculating FRAX

Check Reported Risk Factors box to verify all risk factors were included by tech in calculation. (especially Secondary OP)



Country: US (Caucasian) Name/ID: About the risk factors

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth

Age: Date of Birth: Y: M: D:

10. Secondary osteoporosis ◉ No ○ Yes
11. Alcohol 3 or more units/day ◉ No ○ Yes
12. Femoral neck BMD (g/cm^2)

Secondary Osteoporosis:

- Premature menopause (<45 yrs)
- Type 1 (insulin dependent) Diabetes
- Osteogenesis imperfecta
- Hyperthyroidism (untreated, long standing)
- Hypogonadism
- Chronic malnutrition
- Malabsorption
- Chronic liver disease

} Bowel or stomach removed

Macro's (Eliminate FRAX or Not Reported FRAX)

FRAX not reported: [ ]

PICK LIST:

1. (All T-scores at or above -1.0)
2. (One or more T-scores at or below -2.5)
3. (Treated for osteoporosis)
4. Treated for osteoporosis (HRT)
5. LBD forearm otherwise normal – (T-scores for spine total, hip total and femoral neck at or above -1.0)(Forearm T-scores are diagnostic of low bone density)
6. (Premenopausal female)
7. (Prior hip fracture)
8. (Prior vertebral fracture)
9. (Male under the age of 50)

- All exams should have FRAX or Eliminate FRAX
- ISJ HL7 tables include FRAX / Eliminate FRAX
- Please correct cases that have incorrectly (included/ excluded/ miscalculated) FRAX.

Estrogen-Only Medicines				
Brand Name	**Generic Name**	**Product Type**	**Treatment for BMD**	**Not BMD Treatment**
Alora	estradiol	Patch	NO FRAX	
Cenestin	synthetic conjugated estrogens	Pill	NO FRAX	
Climara	estradiol	Patch	NO FRAX	
Delestrogen	estradiol valerate	Injection (Shot)	NO FRAX	
Divigel	estradiol	Gel	NO FRAX	
Elestrin	estradiol	Gel	NO FRAX	
Enjuvia	synthetic conjugated estrogens	Pill	NO FRAX	
Esclim	estradiol	Patch	NO FRAX	
Estrace	estradiol	Pill	NO FRAX	
		Vaginal Cream		DO FRAX
Estraderm	estradiol	Patch	NO FRAX	
Estrasorb	estradiol	Skin Cream	NO FRAX	
Estring	estradiol	Vaginal Insert		DO FRAX
EstroGel	estradiol	Gel	NO FRAX	
Evamist	estradiol	Skin Spray (Transdermal)	NO FRAX	
Femring	estradiol acetate	Vaginal Ring		DO FRAX
Femtrace	estradiol acetate	Pill	NO FRAX	
Menest	esterified estrogen	Pill	NO FRAX	
Menostar (only used to prevent osteoporosis)	estradiol	Patch	NO FRAX	
			NO FRAX	
Minivelle	estradiol	Patch	NO FRAX	
Ogen	estropipate	Pill	NO FRAX	
		Vaginal Cream		DO FRAX
Ortho-Est	estropipate	Pill	NO FRAX	
Osphena (not estrogen only)	ospemifene	Pill	NO FRAX	
Premarin	conjugated estrogens	Pill	NO FRAX	
		Vaginal Cream		DO FRAX
		Injection (Shot)	NO FRAX	
Vagifem	estradiol	Vaginal Tablet		DO FRAX
Vivelle	estradiol	Patch	NO FRAX	
Vivelle-Dot	estradiol	Patch	NO FRAX	
PROGESTIN-ONLY Medicines				
Brand Name	**Generic Name**	**Product Type**		
Prometrium	micronized progesterone	Pill	NO FRAX	
Provera	medroxyprogesterone acetate	Pill	NO FRAX	
Combination Estrogen and Progestin Medicines				
Brand Name	**Generic Name**	**Product Type**		
Activella	estradiol/ norethindrone acetate	Pill	NO FRAX	
Angeliq	estradiol/ drospirenone	Pill	NO FRAX	
Climara Pro	estradiol/ levonorgestrel	Patch	NO FRAX	
Combipatch	estradiol/ norethindrone acetate	Patch	NO FRAX	
Femhrt	norethindrone acetate/ ethinyl estradiol	Pill	NO FRAX	
Prefest	estradiol/ norgestimate	Pill	NO FRAX	
Prempro	conjugated estrogen/ medroxyprogesterone	Pill	NO FRAX	
Combination Estrogen and Hormone Medicines				
Brand Name	**Generic Name**	**Product Type**		
Duavee	conjugated estrogen/bazedoxifene	Pill	NO FRAX	
Natural/Herbal/ Bioidentical Hormone Treatments				
Brand Name	**Generic Name**	**Product Type**		
Biote		Pellets		DO FRAX
Sotto Pelle		Pellets		DO FRAX
Estroven	NO Hormones	Pill		DO FRAX

Vaginal cream, vaginal insert, vaginal tablet, & vaginal ring treatment = DO FRAX
Pellets and Estroven= DO FRAX

If hormone replacement treatment for BMD has been discontinued for 1 year, DO FRAX

Medication list:
https://www.fda.gov/consumers/free-publications-women/menopause-medicines-help-you#estonly

Treatment & FRAX

Medications	DO FRAX IF
Bisphonates Risedronate (Actonel) Alendronate (Fosamax) Ibandronate (Boniva) Zoledronic Acid (Reclast) (Zometa) Pamidronate (Aredia) Etidronate (Didronel)	• OFF 2 years • ON < 2months
Selective Estrogen Receptor Modulators (SERM) Tamoxifen (Nolvadex, Soltamox) Raloxifene (Evista) Bazedoxifene (Conbriza, Viviant, Duavee, Duavive)	• Off 1 year
Monoclonal Antibodies Denosumab (Prolia) Romosozumab (Evenity)	• Off 1 year
Parathyroid Hormone Teriparatide (Forteo) Abalopartide (Tymlos)	• Off 1 year
Synthetic HRT/ Medications on prior slide (*ON TREATMENT*) Premarin (Pro), Enjuvia (Pro), Cenestin (Pro), Manest (Pro), Ogen, Ortho-Est, all HRT considered on treatment (see previous slide)	• Off 1 year
Miacalcin (Calcitonin)	• Off 1 year
Progesterone	• Off 1 year

Bone density test results of the [ ][ ] are diagnostic of low bone density. Low bone density in one or more skeletal sites is indicative of generalized low bone density.

Delete this section if all sites are NORMAL or OSTEOPOROTIC

USE THE MACRO BOXES

Bone density test results of the [lumbar spine, left femoral neck, left total hip,][and right forearm] are diagnostic of low bone density. Low bone density in one or more skeletal sites is indicative of generalized low bone density.

Bone density test results of the [lumbar][spine] are diagnostic of low bone density. Low bone density in one or more skeletal sites is indicative of generalized low bone density.

Macro LSC

(Least Significant Change)

LSC statements are included with MACRO DEXA & MACRO DEXA HOSPITAL

(Delete LSC statement for baseline exams)

ROI	LSC (g/cm^2)
Spine (L1-L4)	0.036
Total hip	0.028
1/3 Radius	0.030

Only report bmd changes that are **significant** *(≥ the LSC value in the positive or negative direction)* according to the LSC for the respective ROI.

Examples:

- The lumbar spine BMD has decreased by -0.056 g/cm^2 (significant decrease)
- The left total hip BMD has increased by 0.028 g/cm^2 (significant increase)
- The right forearm BMD has decreased by – 0.045 g/cm^2 (significant decrease)

COMPARISON: [Comparison]

ISJ Comparison

Macro 406	Compared with the previous bone density test, there has been a significant increase in bone density. The relative risk for fracture has probably increased.
Macro 407	Compared with the previous bone density test, there has been no significant change in bone density.
Macro 408	Compared with the previous bone density test, there has been a significant decrease in bone density. The relative risk for fracture has probably increased.
Macro 409	Compared with the previous bone density test, the current results suggest a mixed trend at various anatomic sites. The relative risk of fracture of fracture remains unchanged.

MIXED TREND (MACRO 409) – should only be used when a significant increase (not as a result of sclerosis) and a significant decrease occur in different ROI's of the same patient. (RARE)

COMPARISON: [Comparison]

Examples of Edited Comparison Macros

Macro 408

COMPARISON: [**9.23.2016.** Compared with the previous bone density test, there has been a significant decrease in bone density within the left total hip and no significant change within the lumbar spine. ~~The relative risk for fracture has probably increased.~~

Edit macros as necessary: Remove the risk statement if BMD has not decreased within all sites

Macro 407

Compared with the previous bone density test, there has been no significant change in bone density within the lumbar spine or right total hip. The left forearm was not previously imaged.

Macro 409

Compared with the previous bone density test, the current results suggest a mixed trend at various anatomic sites. Bone density within the left total hip significantly increased and bone density within the lumbar spine decreased significantly. The relative risk of fracture remains unchanged.

Comparing DXAS Between Different ISJ Sites

Macro (ISJ vs Different ISJ Compare)

(eliminate the LSC macro for studies with outside comparison)

The previous exam was performed at our [ISJ Site] location using [Hologic/ GE] technology. Compared with the previous bone density test, the current results suggest [an increase / a decrease] in bone density within the [region] and [an increase / a decrease] in bone density within the [region]. Because the prior study was performed on a different scanning unit, direct comparison of the numerical measurements is not fully reliable due to lack of cross calibration.

If the ISJ site name is not indicated on the prior exam (ex: exams from 2004 and prior) use scanner model:

COMPARISON: 8/25/2004. The previous exam was performed using Hologic Discovery C technology. Compared with the previous bone density test, the current results suggest a decrease in bone density within the lumbar spine and left total hip. Because the prior study was performed on a different scanning unit, direct comparison of the numerical measurements is not fully reliable due to lack of cross

DELETE RATE OF CHANGE BOX FROM IMPRESSIONS WHEN USING THIS MACRO

Macro Compare Hospital

Use for all hospital sites, addendums, and ISJ exams (when HL7 table fails to send)

Compared with the previous exam, the lumbar spine bone density has [increased/decreased] by [amount] g/cm2 ([%]), which [is/is not] statistically significant. The [side/part] bone density has [increased/decreased] by [amount] g/cm2 ([%]), which [is/is not] statistically significant.

If copy and paste the last line if you need to compare additional ROI's *(forearm, bilateral hips)*

Outside Compare Hospital Macro

Previous bone density results from [name of facility] have been submitted for comparison. Compared with the most recent exam, performed using [GE or Hologic technology] on [date], there has been a [amount] g/cm2 ([%]) [increase /decrease] in bone density within the lumbar spine and a[amount] g/cm2 ([%]) [increase/decrease] in bone density within the left total hip. The statistical significance of any variation is uncertain due to dissimilar technology and lack of cross calibration between the sites.

Outside Compare Macros Continued…

MACRO Qualitatively: (Prior from outside site w/ similar equipment)

The previous exam was performed at our Southwest location using Hologic technology. Qualitatively, compared with the previous exam, the lumbar spine bone density has [increased/decreased] by [amount] g/cm2 ([%]), and left total hip bone density has [increased/decreased] by [amount] g/cm2 ([%]). The statistical significance of any variation is uncertain due to lack of cross calibration between the sites.

Macro Qualitatively 2: (Prior numerical values, NO IMAGES)

Previous numerical values are provided from [facility] ; however, images are unavailable for comparison. Qualitatively, compared with the previous exam, the lumbar spine bone density has [increased/decreased] by [amount] g/cm2 and left total hip bone density has [increased/decreased] by [amount] g/cm2. The statistical significance of any variation is uncertain due to lack of cross calibration between the sites.

System Upgrade/ New System

For follow up **MALE patients** and **FEMALES** of **NON-WHITE ETHNICITY**

Example: Male patient (BMD decreased -0.001 and diagnosis changed from osteoporotic to normal due to the system upgrade from Hologic Discovery W to Hologic Horizon W)

Hologic Horizon W 2019	BMD g/cm^2	T-Score	Z-Score
1/3 forearm	0.654	-0.7	-1.3

Hologic Discovery W 2017	BMD g/cm^2	T-Score	Z-Score
1/3 forearm	0.655	-3.1	-1.4

Use * MACRO NEW SYSTEM: PLEASE NOTE: The new [SYSTEM NAME] operating systems have been defaulted to current ISCD guideline recommendations. Previously reported data has been reanalyzed based on these updated and current guidelines. These latest guidelines base T-scores for all patients versus a white female database and Z-scores upon the patient's gender and ethnicity. This patient's prior results were reported with previous guidelines that based both T and Z-scores by gender and ethnicity.

[SYSTEM NAME]- Pick list includes:

1. Hologic Horizon DXA
2. GE/Lunar enCORE DXA

* This macro combines Macro GE/Lunar Encore and Macro Hologic Horizon
(insert under technical quality)
Slide 53

Macro ROC Unreliable

Use if LUMBAR SPINE is unreliable and the increase in BMD from prior study is elevated by sclerosis or artifact

(Example: Bone density significantly increased in spine and all other sites sig. decreased)

Compared with the previous bone density test, the lumbar spine bone density has increased by [amount] g/cm2 ([%]). This increase is likely artifactual due to calcific degenerative changes which may artifactually elevate the bone mineral density values. The [side/part] bone density has [increased/decreased] by [amount] g/cm2 ([%]), which [is/is not] statistically significant.

Example:

COMPARISON: 7/27/2017. Compared with the previous bone density test, the lumbar spine bone density has increased by [0.171 g/cm2] ([23.4%]). This increase is likely artifactual due to calcific degenerative changes which may artifactually elevate the bone mineral density values. The [left total hip] bone density has [increased] by [0.002] g/cm2 ([0.3%]), which is not statistically significant.

Hospital Specific Compare Macros

Macro RWMC Compare Discrepancy

Please Note: The spine (or hip) labeling has been changed when compared to the prior exam to be compliant with current ISCD guidelines. This change makes trending the lumbar spine (or hip) bone density inaccurate. Thus, current trending values in the lumbar spine (or hip) should be disregarded. This exam will act as the new baseline for trending bone density in the lumbar spine (or hip).

- RWMC is not able to reanalyze priors
- Not limited to RWMC- if prior reanalysis is warranted but not possible due to outdated priors or equipment updates

Macro Summit View Compare:

The previous exam was performed at this facility using GE Lunar technology on [DATE]. The current operating system is an Hologic Horizon W device. The prior database has been converted in order to provide a qualitative comparison. Qualitatively, compared with the previous exam, the lumbar spine bone density has [increased/decreased] by [amount] g/cm2 and the [side and part] bone density has [increased/decreased] by [amount] g/cm2. The statistical significance of any variation is uncertain due to lack of cross calibration between the sites.

Manual Rate of Change Calculation

New BMD - Old BMD = △

△ / Old BMD x 100 = % Change

Measured Date	Age (years)	Trend: L1-L2 [1] BMD (g/cm²)	Change vs Previous (g/cm²)	Change vs Previous (%)
11/11/2016	63.1	1.098	-0.053	-4.6
08/21/2014	60.9	1.151	-	-

Example:

1.098 - 1.151 = -0.053

-0.053/1.151= -0.0460 x 100 = -4.6%

Impression (Generic)

Rate of change: If no comparison delete
(next slide for rate of change examples)

IMPRESSION:

This patient has [] . The 10-year fracture risk estimate is []. [] Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density exam is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Delete fracture risk estimate statement from impressions for pts on treatment medication or HRT for LBD/OP

Pick List:

1. Normal
2. Osteopenia
3. Osteoporosis
4. Established Osteoporosis

NO FRAX but Elevated Fracture Risk in impression

Pick List:

1. Average
2. Elevated

FRAX NORMAL

ELEVATED FRAX

Rate of Change Impression Field

If baseline exam or weird mixed trend: DELETE

IMPRESSION:

This patient has [] . The 10-year fracture risk estimate is []. [] Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density exam is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Examples:

- There has been no significant change in bone density since 2015.
- There has been a statistically significant increase in bone density since 2017.
- There has been a statistically significant decrease in bone density since 2016.

If only one site changed:

- There has been a significant decrease in bone density within the left total hip since 2016. *(In the comparison section indicate other sites have not changed)*

Unique Impressions

- Osteopenia Elevated risk
- Low Trauma Fx
- Impression Prior Hip or Vertebral Fx
- Established Osteoporosis
- Osteoporosis Elevated Risk
- Supra Normal
- Z-Score Impression
- 605, Stabilization, 606 *(response to treatment)*

Macro MY Osteopenia Elevated risk

(use in place of the generic impression macro)

This patient has low bone density (Osteopenia) with an elevated future fracture risk and fulfills criteria for treatment based upon fracture risk estimates. A laboratory evaluation for secondary causes of osteoporosis can begin with a CBC, comprehensive metabolic panel, TSH, 25-OH vitamin D level, and 24-hour urine calcium. Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

WITH CHANGE STATEMENT INCLUDED:

IMPRESSION: Ms. XXX's bone density has significantly decreased since 2011. She has low bone density (Osteopenia) with an elevated future fracture risk and fulfills criteria for treatment based upon fracture risk estimates. A laboratory evaluation for secondary causes of osteoporosis can begin with a CBC, comprehensive metabolic panel, TSH, 25-OH vitamin D level, and 24-hour urine calcium. Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Macro Low Trauma FX

WHEN TO USE: *(fragility fracture + (LBD or Normal))*
Patient has a history of a fragility fracture of the long bones (humerus, forearm, femur, tib-fib), spine, ribs, pelvis and T-scores indicate Normal or LBD diagnosis.

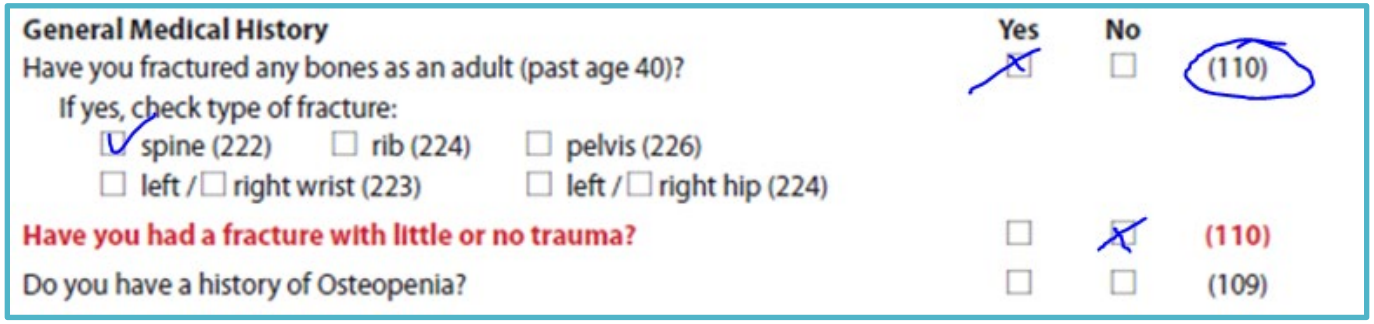
IMPRESSION: This patient has [low bone density (osteopenia) or normal bone density]. However, if the patient's recent [hip/vertebral/proximal humeral/rib/pelvic/distal forearm] fracture qualifies as a fragility fracture, the risk of subsequent major osteoporotic fractures may be elevated. If not already performed, a laboratory evaluation for secondary causes of osteoporosis can begin with a CBC, comprehensive metabolic panel, TSH, 25-OH vitamin D level, and 24-hour urine calcium. A follow-up bone density test is recommended in two years or as clinically warranted to monitor overall bone density and effectiveness of any therapeutic changes you may institute.

Low trauma fx = sentinel event (most important patients to treat)

Reference article: The clinical diagnosis of osteoporosis: a position statement from the National Bone Health Alliance Working Group (nih.gov)

Macro Impression Prior Hip or Vertebral FX

WHEN TO USE: Pts with normal or LBD and prior hip or vertebral fx (resulting from trauma)



General Medical History	Yes	No	
Have you fractured any bones as an adult (past age 40)?	☒	☐	(110)
If yes, check type of fracture:			
☑ spine (222) ☐ rib (224) ☐ pelvis (226)			
☐ left / ☐ right wrist (223) ☐ left / ☐ right hip (224)			
Have you had a fracture with little or no trauma?	☐	☒	(110)
Do you have a history of Osteopenia?	☐	☐	(109)

IMPRESSION: This patient has [LBD or Normal BMD] with an elevated future fracture risk due to a prior [Hip/ Vertebral] fracture and fulfills criteria for treatment based upon NOF/ISCD recommendations. A laboratory evaluation for secondary causes of osteoporosis can begin with a CBC, comprehensive metabolic panel, TSH, 25-OH vitamin D level, and 24-hour urine calcium. Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Established Osteoporosis

WHEN TO USE: T-Score @ or below -2.5 and hx of one or more fractures

IMPRESSION: This patient has [established osteoporosis] based on reported fracture history and T-Scores. The 10-year fracture risk estimate is elevated. A laboratory evaluation for secondary causes of osteoporosis can begin with a CBC, comprehensive metabolic panel, TSH, 25-OH vitamin D level, and 24-hour urine calcium. A follow-up bone density test is recommended in 2 years or as clinically warranted to monitor overall bone density and the effectiveness of any therapeutic changes you may institute.

Table 5 Defining osteoporosis by BMD

WHO definition of osteoporosis based on BMD

Classification	BMD	T-score
Normal	Within 1 SD of the mean level for a young-adult reference population	T-score at −1.0 and above
Low bone mass (osteopenia)	Between 1.0 and 2.5 SD below that of the mean l evel for a young-adult reference population	T-score between −1.0 and −2.5
Osteoporosis	2.5 SD or more below that of the mean level for a young-adult reference population	T-score at or below −2.5
Severe or established osteoporosis	2.5 SD or more below that of the mean level for a young-adult reference population with fractures	T-score at or below −2.5 with one or more fractures

Although these definitions are necessary to establish the presence of osteoporosis, they should not be used as the sole determinant of treatment decisions

Clinician's Guide to Prevention and Treatment of Osteoporosis
https://static1.squarespace.com/static/5d7aabc5368b54332c55df72/t/5d9f679cbc775a5f22c91b61/1570727839254/Cosman2014_Article_ClinicianSGuideToPreventionAnd.pdf

Macro Osteoporosis ER

This patient has osteoporosis and an elevated relative risk of future fracture.
** A laboratory evaluation for secondary causes of osteoporosis can begin with a CBC, comprehensive metabolic panel, TSH, 25-OH vitamin D level, and 24-hour urine calcium. A follow-up bone density test is recommended in 2 years or as clinically warranted to monitor overall bone density and the effectiveness of any therapeutic changes you may institute.

When to use:

- Patient has never been diagnosed with Osteoporosis:
  (Use Macro My Osteoporosis ER as is)

- Patient has been diagnosed with Osteoporosis, was never treated with medication and bmd is decreasing:
  (*Edit macro to say ** If not already performed, a laboratory evaluation..)*

- If the patient was diagnosed with OP and refused meds:
  (Use Macro My Osteoporosis)

Macro Supra Normal

ALL Z-scores are $\geq$ 2.5

The patient's measured bone mineral density appears elevated relative to age-matched individuals using Z-score analysis. Statistically, this may be normal for this patient but can also be seen with a diffusely sclerotic process within the bones. Differential considerations for generalized increased bone density in adults is broad including but not limited to myeloproliferative disorders/myelosclerosis, sickle cell disease, hyperthyroidism /hypoparathyroidism, renal osteodystrophy, osteoblastic metastasis, mastocytosis, lymphoma/leukemia, fluorosis, osteopetrosis, and Paget's disease.

EXAMPLE NEXT SLIDE

Macro Supra Normal

Bone Density: Hologic Horizon W Fan Beam [S/N 300398M]

Region	BMD	T-score	Z-score	Classification
AP Spine (L1, L2, L3)	1.267	2.3	3.2	Normal
Femoral Neck (Left)	1.114	2.4	3.4	Normal
Total Hip (Left)	1.244	2.5	3.1	Normal

10-year Fracture Risk:

ALL Z-Scores ≥ 2.5

IMPRESSION: The patient has normal bone density. However, the measured bone mineral density appears elevated relative to age-matched individuals using Z-score analysis. Statistically, this may be normal for this patient but can also be seen with a diffusely sclerotic process within the bones. Differential considerations for generalized increased bone density in adults is broad including but not limited to myeloproliferative disorders/myelosclerosis, sickle cell disease, hyperthyroidism /hypoparathyroidism, renal osteodystrophy, osteoblastic metastasis, mastocytosis, lymphoma/leukemia, fluorosis, osteopetrosis, and Paget's disease.

Macro Z-Score Impression

within or below

The patient's bone mineral density is [] the expected range for age using age-matched criteria and Z-score analysis.

For premenopausal females, males younger than 50 and especially children, Z-scores, not T-scores are preferred. A Z-score of -2.0 and lower is below the expected range for age and a Z-score above -2.0 is within the expected range for age. The diagnosis of osteoporosis in children and adolescents should not be made on the basis of densitometric criteria alone. A BMD Z-score greater than -2.0 does not preclude the possibility of skeletal fragility and increased fracture risk. (Referenced from the International Society of Clinical Densitometry-ISCD). A follow-up bone density exam is suggested in 2 years or as clinically warranted to monitor bone density.

Macro Z-Score Impression

(edit for each patient)

Example: Edited for Adult Male

The patient's bone mineral density is [] the expected range for age using age-matched criteria and Z-score analysis.

For ~~premenopausal females,~~ males younger than 50 ~~and especially children~~, Z-scores, not T-scores are preferred. A Z-score of -2.0 and lower is below the expected range for age and a Z-score above -2.0 is within the expected range for age. ~~The diagnosis of osteoporosis in children and adolescents should not be made on the basis of densitometric criteria alone.~~ A BMD Z-score greater than -2.0 does not preclude the possibility of skeletal fragility and increased fracture risk. (Referenced from the International Society of Clinical Densitometry-ISCD). A follow-up bone density exam is suggested in 2 years or as clinically warranted to monitor bone density.

Patients on Treatment

These macros replace the fracture risk statement in the impression

Macro 605- BMD increased in all sites while on treatment
Macro Stabilization- BMD increased in some sites but not all, or no significant change in BMD
Macro 606- BMD decreased significantly (in any site) while on treatment

Macro 605: Your current form of therapy has resulted in a significant improvement in bone density. The relative risk of fracture has likely decreased A follow-up bone density test is recommended in two years or as clinically warranted to monitor overall bone density and effectiveness of any therapeutic changes you may institute.

Macro Stabilization: Your current form of therapy has resulted in stabilization in bone density. The relative risk of fracture has likely stabilized or possibly even decreased. A follow-up bone density test is recommended in two years or as clinically warranted to monitor overall bone density and effectiveness of any therapeutic changes you may institute.

Macro 606: Bone density has decreased significantly while on pharmacologic treatment. Determine the level of adherence to your osteoporosis treatment regimen including adequate daily calcium and vitamin D. If compliance is not considered to be an issue, re-evaluate the possibility of a new or occult secondary cause for significant bone loss. A laboratory evaluation for secondary causes of osteoporosis can begin with a CBC, comprehensive metabolic panel, TSH, 25-OH vitamin D level, and 24-hour urine calcium. A follow-up bone density test is recommended in two years or as clinically warranted to monitor overall bone density and effectiveness of any therapeutic changes you may institute.

DXA with VFA

- Draft as a normal dxa using Macro (DEXA with VFA)
- Reason for exam : DIAGNOSTIC (FOR ALL VFA's)
- Link to a radiologist with a note: " VFA on Doe, Jane"
- The radiologist will fill out the last section under the impression: Vertebral Fracture Assessment was performed on [] levels and shows [].

T & Z-SCORES

Prior exam read using T-scores (premenopausal female under age 45)

INDICATIONS: Previous positive results based upon T-score analysis. Please note, current criteria state for premenopausal females, Z-scores, not T-scores are preferred. A Z-score of -2.0 and lower is below the expected range for age and a Z-score above -2.0 is within the expected range for age. A BMD Z-score greater than -2.0 does not preclude the possibility of skeletal fragility and increased fracture risk. (Referenced from the International Society of Clinical Densitometry-ISCD).

Due to the patient's risk factors, results had been provided in both T and Z-scores.

CLINICAL RISK FACTORS:

1.Personal history of multiple sclerosis.
2.History of intermittent steroid therapy.
3.Reported suboptimal exercise history.
4.Relatively low dietary calcium intake.

IMPRESSION: Based upon T-score criteria, the patient's bone density test results are diagnostic of low bone density. Using age-matched criteria and Z-score analysis, the patient's bone mineral density is within the expected range for age . Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

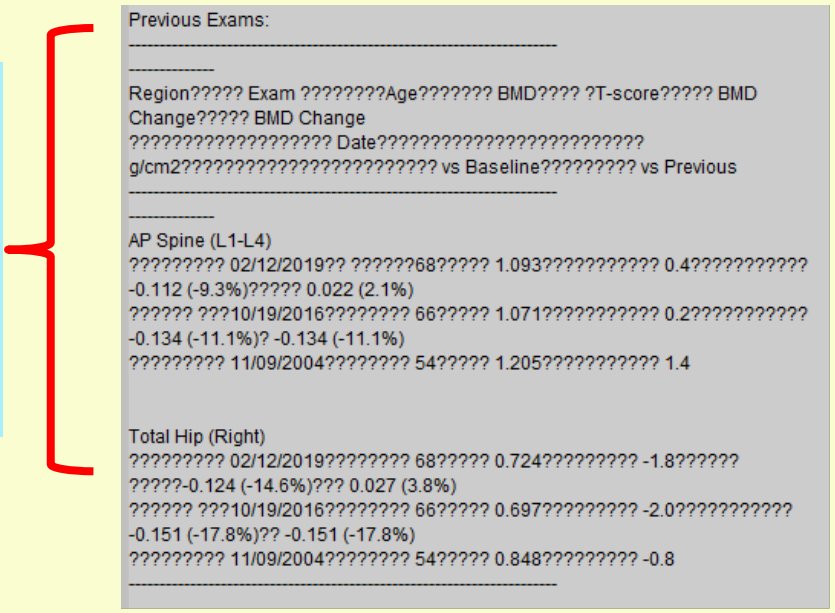
Addendums

- The DXA technologist will provide addendum information/ additional images to the **(CONTRIBUTED BY DRAFTER)** (If you pick up a SUB OP exam and the patient must return for additional images please flag the exam for Physician Connect)

- DXA tables should be **manually entered in the hospital format** to avoid :

DO NOT MAKE THE SAME MISTAKE!

The technologist provided the HL7 table in an email (COPY AND PASTE was used to insert into addendum)



Previous Exams:

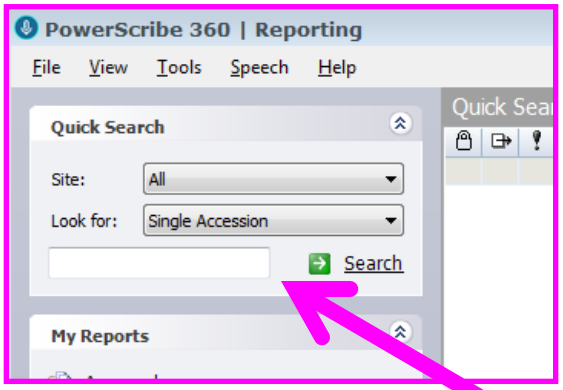
Region????? Exam ????????Age??????? BMD???? ?T-score????? BMD Change????? BMD Change
????????????????????? Date?????????????????????????????
g/cm2?????????????????????????????? vs Baseline????????? vs Previous
---

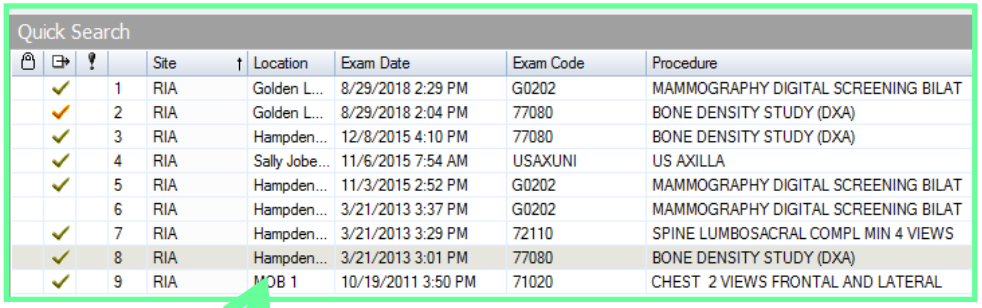
AP Spine (L1-L4)
????????? 02/12/2019?? ??????68????? 1.093??????????? 0.4???????????
-0.112 (-9.3%)????? 0.022 (2.1%)
?????? ???10/19/2016???????? 66????? 1.071??????????? 0.2???????????
-0.134 (-11.1%)? -0.134 (-11.1%)
????????? 11/09/2004???????? 54????? 1.205??????????? 1.4

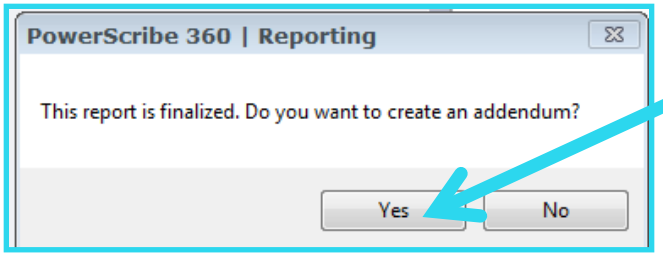
Total Hip (Right)
????????? 02/12/2019???????? 68????? 0.724????????? -1.8??????
?????-0.124 (-14.6%)??? 0.027 (3.8%)
?????? ???10/19/2016???????? 66????? 0.697????????? -2.0???????????
-0.151 (-17.8%)?? -0.151 (-17.8%)
????????? 11/09/2004???????? 54????? 0.848????????? -0.8

- Use Macro **Compare Hospital** to enter comparison information

How to Draft Addendums







1.	**In PS360 Search for the exam that needs addendum**
2.	**Select the exam by left clicking**
3.	**Select Yes in the pop up box**
4.	**Draft the addendum and Save Draft**
5.	**Link the addendum with a message to the radiologist (Ideally, who signed off on the original dictation). IE: (I've drafted an addendum (compare outside); could you please sign ?)**

Sample Addendum 1
Typographical Error

This addendum has been created to clarify a typographical error in the recommendations section of the initial bone density report dated 3/21/2017.

The patient's bone density test results are diagnostic of low bone density (Osteopenia) not Osteoporosis.

RECOMMENDATIONS:
This patient has osteopenia with an average future fracture risk. Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Contributed By: Mary K. Mucilli, BS, CBDT

Sample Addendum 2
Ordering MD Requested Additional Imaging

This addendum has been created upon further consultation with the clinician. The patient was initially seen at our facility on 9/29/2017 for bone density (DXA) imaging of the patient's right forearm and right hip. The patient returned 10/12/2017 (at no charge) for additional imaging of his left hip and left forearm. Below are the updated bone density table results:

Bone Density: Hologic Horizon W Fan Beam [S/N 300696M]

Region	BMD	T-score	Z-score	Classification
Femoral Neck (Left)	0.769	-0.7	-0.1	Normal
Total Hip (Left)	0.877	-0.5	-0.4	Normal
Femoral Neck (Right)	0.744	-0.9	-0.2	Normal
Total Hip (Right)	0.918	-0.2	-0.2	Normal
1/3 Forearm (Left)	0.668	-0.4	-1.6	Normal
1/3 Forearm (Right)	0.595	-1.7	-3.0	Osteopenia

Include patients name when possible

The impression and recommendations remain unchanged. Mr. XXXXX has low bone density. A follow-up bone density exam is suggested in two years or as clinically warranted to monitor bone density.

Contributed By: Mary K. Mucilli, BS, CBDT

Sample Addendum 3
Prior Results Available for Comparison

This addendum has been created upon review of prior images. We now have a previous bone density (DXA) exam from The Women's Imaging Center performed on an Hologic device dated 6/6/2012 available for comparison. Due to dissimilar vertebral bodies measured, the lumbar spine cannot be compared. Qualitatively, compared with the previous exam, the left total hip bone density has decreased by 0.017 g/cm2 (1.9%). The statistical significance of any variation is uncertain due to lack of cross calibration between the sites.

As a reference, at this facility, the Least Significant Change in BMD with 95% confidence utilized is 0.036 g/cm2 at the L1-L4 Spine, 0.028 g/cm2 at the Total Hip, and 0.030 g/cm2 at the 1/3 Radius.

The overall World Health Organization classification of low bone mineral density (Osteopenia) remains unchanged. Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density exam is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Contributed By: Mary K. Mucilli, BS, CBDT

Sample Addendum 4
Clarification of Comparison Data

This addendum has been created to clarify the comparison data provided for Mr. XXXXX . Mr. XXXXX's previous bone density exam was performed at our PSL location on 4/8/2016 using Hologic technology. Due to an increase in degenerative and/or sclerotic changes, the spine was not felt to be reliable site to measure bone mineral density and as such was not evaluated on the current exam. Qualitatively, compared with the previous exam, the left hip bone density has decreased by 0.051 g/cm2 (5.8%). The statistical significance of any variation is uncertain due to lack of cross calibration between the sites. The left forearm was not previously imaged.

The overall World Health Organization classification of low bone mineral density (Osteopenia) remains unchanged. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Contributed By: Mary K. Mucilli, BS, CBDT

Sample Addendum 5
Multiple Priors Available for Comparison

This addendum has been created upon review of prior images. We now have prior outside results performed on a GE Lunar device from Internal Medicine Southwest dated 2/27/2015, 2/22/2013, 10/1/2010, 4/16/2008, and 3/27/2006 available for comparison. Comparison data is only available for the left total hip. The lumbar spine was not previously imaged and databases do not allow for inputting of outside radius/forearm results. Compared with the most recent exam, the left hip bone density has increased by 0.078 g/cm2 (10.8%). The statistical significance of any variation is uncertain due to lack of cross calibration between the sites.

The overall World Health Organization classification of low bone mineral density (Osteopenia) remains unchanged. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Contributed By: Mary K. Mucilli, BS, CBDT

Sample Addendum 6

Patient Returned for Additional Imaging After Sub-op

This addendum has been created to clarify previous reported bone density results. The patient was seen for a follow-up bone density exam (DEXA) on 3/4/2019. Due to a concern over left hip positioning, the patient was asked to return at no charge to repeat left hip imaging and to obtain left forearm imaging. The patient returned 3/21/2019.

PLEASE NOTE THAT THESE RESULTS HAVE CHANGED THE PATIENT'S DIAGNOSIS FROM NORMAL TO OSTEOPENIA.

Below are the results:

Please Note:

Previous exams have been reanalyzed to be compliant with manufacturer and ISCD guidelines. Reanalysis has resulted in a change in previously reported BMD values.

RESULTS: Hologic Horizon W

Anatomic Site	BMD(g/cm2)	T-score	Z-score
AP spine L1-L4	1.061	0.1	2.3
Femoral neck (Lt)	0.649	-1.8	0.0
Total hip (Lt)	0.789	-1.3	0.3
Forearm-Radius 1/3 (Lt)	0.612	-1.2	0.9

FRAX (10-year Probability of Fracture):
Major Osteoporotic Fracture: 9.8 %
Hip Fracture: 1.8 %

At this facility, the Least Significant Change in BMD with 95% confidence utilized is 0.036 g/cm2 at the L1-L4 Spine, 0.028 g/cm2 at the Total Hip, and 0.030 g/cm2 at the 1/3 Radius.

COMPARISON: 2/14/2017. Compared with the previous exam, the lumbar spine bone density has increased by 0.051 g/cm2 (5.1%), which is statistically significant. The left hip bone density has increased by0.044 g/cm2 (5.9%), which is statistically significant. The left forearm is not previously imaged.

IMPRESSION: Ms. XXXXXX has low bone density (Osteopenia) with an average future fracture risk. Your current form of therapy has resulted in a significant improvement or stabilization in bone density. The relative risk of fracture has likely stabilized. A follow-up bone density test is recommended in two years or as clinically warranted to monitor overall bone density and effectiveness of any therapeutic changes you may institute.

Contributed By: Mary K. Mucilli, BS, CBDT

Sample Addendum 7

DO NOT COPY AND PASTE TABLES INTO ADDENDUMS!

Draft View

RESULTS:
The patient is a Female and 68 years of age.
Weight: 124.1 lbs Height: 65.0 BMI: 20.7

Bone Density: Hologic Discovery C Fan Beam [S/N 87219]

Region	BMD	T-Score	Z-Score	Classification
AP Spine (L1-L4)	1.093	0.4	2.4	Normal
Femoral Neck (Right)	0.575	-2.5	-0.8	Osteoporosis
Total Hip (Right)	0.724	-1.8	-0.4	Osteopenia
Left Forearm-Radius 1/3	0.450	-2.4	-0.5	Osteopenia

10-Year Fracture Risk:

FRAX not reported because: Some T-score for Spine Total or Hip Total or Femoral Neck at or below -2.5

Previous Exams:

Region	Exam Date	Age	BMD g/cm2	T-score	BMD Change vs Baseline	BMD Change vs Previous
AP Spine (L1-L4)						
	02/12/2019	68	1.093	0.4	-0.112 (-9.3%)	0.022 (2.1%)
	10/19/2016	66	1.071	0.2	-0.134 (-11.1%)	-0.134 (-11.1%)
	11/09/2004	54	1.205	1.4		
Total Hip (Right)						
	02/12/2019	68	0.724	-1.8	-0.124 (-14.6%)	0.027 (3.8%)
	10/19/2016	66	0.697	-2.0	-0.151 (-17.8%)	-0.151 (-17.8%)
	11/09/2004	54	0.848	-0.8		

Report View

Previous Exams:

Region????? Exam ????????Age??????? BMD???? ?T-score????? BMD Change????? BMD Change
??????????????????? Date????????????????????????????
g/cm2????????????????????????????? vs Baseline????????? vs Previous

AP Spine (L1-L4)
????????? 02/12/2019?? ??????68????? 1.093??????????? 0.4???????????
-0.112 (-9.3%)????? 0.022 (2.1%)
?????? ???10/19/2016???????? 66????? 1.071??????????? 0.2???????????
-0.134 (-11.1%)? -0.134 (-11.1%)
????????? 11/09/2004???????? 54????? 1.205??????????? 1.4

Total Hip (Right)
????????? 02/12/2019???????? 68????? 0.724????????? -1.8??????
?????-0.124 (-14.6%)??? 0.027 (3.8%)
?????? ???10/19/2016???????? 66????? 0.697????????? -2.0???????????
-0.151 (-17.8%)?? -0.151 (-17.8%)
????????? 11/09/2004???????? 54????? 0.848????????? -0.8

This addendum has been created in order to clarify the updated bone density results and comparison data. Due to technical issues, the data in the initially addended report dated 2/28/2019 failed to populate correctly. Below are updated results and comparison data: (ENTERED USING **MACRO HOSPITAL TABLE & MACRO COMPARE HOSPITAL**)

Sample Addendum 8

Sub-op With Incorrectly Labeled Vertebral Bodies

This addendum has been created to clarify previously reported bone density results. The patient was seen for follow-up bone density exam (DXA) on 9/8/2018. Due to concern over vertebral body labeling, the patient was asked to return at no charge to repeat lumbar spine imaging . The patient returned 10/27/2018. **PLEASE NOTE THAT THESE RESULTS HAVE CHANGED THE PATIENTS'S DIAGNOSIS FROM OSTEOPOROSIS TO OSTEOPENIA.**

Below are the results:
[Macro Hospital table (do not copy & paste)]

At this facility, the Least Significant Change in BMD with 95% confidence utilized is 0.036 g/cm2 at the L1-L4 Spine, 0.028 g/cm2 at the Total Hip, and 0.030 g/cm2 at the 1/3 Radius.

Bone density test results of the lumbar spine, left femoral neck and left total hip are diagnostic of low bone density. Low bone density in one or more skeletal sites is indicative of generalized low bone density.

COMPARISON: 10/22/2016. [Macro Compare Hospital]

IMPRESSION: PLEASE NOTE THIS PATIENT WAS REANALYZED. THIS PATIENT HAS LOW BONE DENSITY (OSTEOPENIA) WITH AN AVERAGE FUTURE FRACTURE RISK. THE PRIOR EVALUATION DEMONSTRATED OSTEOPOROSIS HOWEVER THOSE RESULTS ARE NOT CONSIDERED ACCURATE. PATIENT PREFERENCES, CLINICAL JUDGMENT AND THESE BONE DENSITY RESULTS SHOULD HELP GUIDE MANAGEMENT DECISIONS. A FOLLOW-UP BONE DENSITY IS RECOMMENDED IN 2 YEARS OR AS CLINICALLY WARRANTED TO MONITOR BONE DENSITY AND THE EFFECTIVENESS OF ANY THERAPEUTIC CHANGES YOU MAY INSTITUTE.

Contributed By: Jessica Grahf, RRA, RT (R)(QM)
THIS DOCUMENT HAS BEEN ELECTRONICALLY SIGNED:
KEVIN LAMPERT, MD **(Thank You for the verbiage and format help Dr. Lampert!)**

Sample Addendum 9

Ordered With a Forearm and Forearm Not Imaged

DXA BONE DENSITY LUMBAR SPINE HIP AND FOREARM

This addendum has been created upon review of prior images and to incorporate left forearm imaging as initially ordered. The patient was initially seen at our facility on 2/12/2019 for bone density (DXA) imaging of the right hip and lumbar spine. The patient returned to 2/28/2018 (at no charge) for additional imaging of the left forearm. We now have an outside exam from Colorado Mountain Medical dated 10/21/2016, available for comparison.

RESULTS:
[Macro Hospital Table]
[Macro Not Reported Frax]
At this facility, the Least Significant Change in BMD with 95% confidence utilized is 0.036 g/cm2 at the L1-L4 Spine, 0.028 g/cm2 at the Total Hip, and 0.030 g/cm2 at the 1/3 Radius.

COMPARISON: Previous bone density results from [Colorado Mountain Medical] have been submitted for comparison. Compared with the most recent exam, performed using [GE lunar technology] on [10/19/2016], there has been a [0.022] g/cm2 ([2.1%])[increase] in bone density within the lumbar spine and a [0.027] g/cm2 ([3.8%]) [increase] in bone density within the left total hip. The statistical significance of any variation is uncertain due to dissimilar technology and lack of cross calibration between the sites. [Macro Outside Comparison]

IMPRESSION: This patient has osteoporosis and an elevated relative risk of future fracture. Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Contributed By: Jessica Grahf, RRA, RT (R)(QM)

National Jewish Pediatric DXA

RESULTS: GE Lunar Prodigy Advance
Anatomic Site BMD (g/cm2) Z-score
AP spine L1-L4 0.604 -2.8
Left Forearm-Radius 1/3 0.602 Not Supported

Enter "Not Supported for Forearm Z-Scores

PLEASE NOTE: Combined NHANES/Lunar Reference Population does not support the patient's age for Left Forearm Densitometry.

Macro (NHANES)
Insert under results table

Use Macro Age Matched and Macro Z-Scores edited in the impression field

Macro Age Matched:

The patient's bone mineral density is [above/below] the expected range for age using age-matched criteria and Z-score analysis.

Assign to Dr. Chang or Dr. Hsieh (with a notification message)

Macro Z-Scores: (edit for each patient)

For adolescents and children, Z-scores, not T-scores are preferred. A Z-score of -2.0 and lower is below the expected range for age and a Z-score above -2.0 is within the expected range for age.

The diagnosis of osteoporosis in children and adolescents should not be made on the basis of densitometric criteria alone. A BMD Z-score greater than -2.0 does not preclude the possibility of skeletal fragility and increased fracture risk. (Referenced from the International Society of Clinical Densitometry-ISCD). A follow-up bone density exam is suggested in two years or as clinically warranted to monitor bone density.

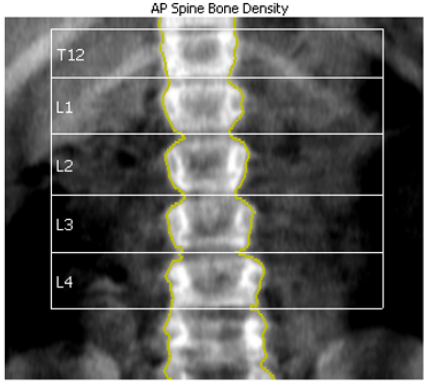
[redacted]

National Jewish Health
1400 Jackson St.
Denver, Colorado 80206

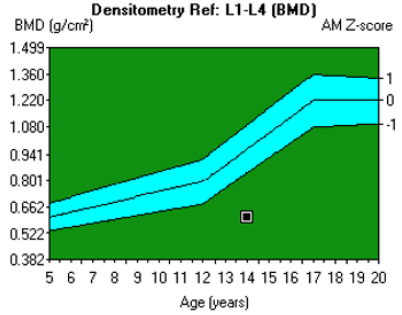
[redacted]

Patient:	[redacted]	**Facility ID:**	
Birth Date:	[redacted] 14 years	**Referring Physician:**	PIA HAUK
Height / Weight:	136.5 cm 55.7 kg	**Measured:**	[redacted]/2019 11:22:34 AM (13.60)
Sex / Ethnic:	Male White	**Analyzed:**	[redacted]2019 11:25:19 AM (13.60)

AP Spine Bone Density

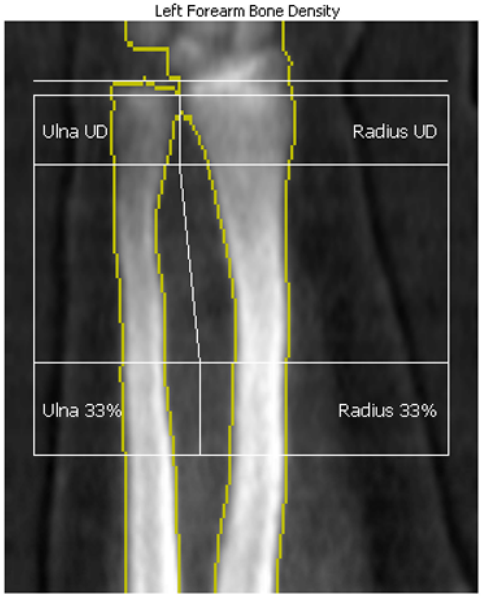


Densitometry Ref: L1-L4 (BMD)



Region	BMD[1] (g/cm²)	Age-Matched[2,3] Z-score
L1	0.623	-2.2
L2	0.593	-3.0
L3	0.570	-3.2
L4	0.629	-2.7
L1-L4	0.604	-2.8

Left Forearm Bone Density



Reference Chart: No reference data for Left Forearm [Radius 33%] region. USA (Combined NHANES/Lunar) Reference Population did not support the patient's Age for Left Forearm Densitometry.

Region	BMD[1,9] (g/cm²)
Radius UD	0.330
Ulna UD	0.194
Radius 33%	0.602
Ulna 33%	0.517
Both UD	0.278
Both 33%	0.563
Radius Total	0.467
Ulna Total	0.360
Both Total	0.422

PEDIATRIC DXA

DXA BONE DENSITY

EXAM DATE AND TIME: 4/10/2019 12:12 PM

REASON FOR EXAM: Screening.

INDICATIONS: Steroid dependent (asthma). Baseline exam for this facility.

TECHNICAL QUALITY: The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

RESULTS: GE Lunar Prodigy Advance
Anatomic Site BMD (g/cm2) Z-score
AP spine L1-L4 0.604 -2.8
Left Forearm-Radius 1/3 0.602 Not Supported

Macro NHANES

PLEASE NOTE: Combined NHANES/Lunar Reference Population does not support the patient's age for Left Forearm Densitometry.

COMPARISON: None.

IMPRESSION: The patient's bone mineral density is below the expected range for age using age-matched criteria and Z-score analysis. For adolescents and children, Z-scores, not T-scores are preferred. A Z-score of -2.0 and lower is below the expected range for age and a Z-score above -2.0 is within the expected range for age.

The diagnosis of osteoporosis in children and adolescents should not be made on the basis of densitometric criteria alone. A BMD Z-score greater than -2.0 does not preclude the possibility of skeletal fragility and increased fracture risk. (Referenced from the International Society of Clinical Densitometry-ISCD). A follow-up bone density exam is suggested in two years or as clinically warranted to monitor bone density.

Contributed By: Mary K. Mucilli, BS, CBDT

For RWMC cases there is a weird scenario: Old dxa exams were performed and dictated by another radiology group. Those old images are stored on the DXA machine and there is no known record of them elsewhere. Therefore, if we ask the technologists to go in and reanalyze the data on the old images, the system will save only the reanalyzed exam. This may cause a problem with record keeping/ prior result verification. Fortunately, this problem should only affect a few patients.

Per Mary and Dr. Chedda – if you encounter this problem, do not ask the technologists to reanalyze prior exam. Instead, use the new labeling as the new baseline and under technical quality insert Macro (RWMC Compare Discrepancy):

Please Note:
The spine (or hip) labeling has been changed when compared to the prior exam to be compliant with current ISCD guidelines. This change makes trending the lumbar spine (or hip) bone density inaccurate. Thus, current trending values in the lumbar spine (or hip) should be disregarded. This exam will act as the new baseline for trending bone density in the lumbar spine (or hip).

Banner - Summit View

Upgraded from a GE-LUNAR PRODIGY to HOLOGIC HORIZON W

Please use Macro Summit View Compare :

The previous exam was performed at this facility using GE Lunar technology on [DATE]. The current operating system is an Hologic Horizon W device. The prior database has been converted in order to provide a qualitative comparison. Qualitatively, compared with the previous exam, the lumbar spine bone density has [increased/decreased] by [amount] g/cm2 and the [side and part] bone density has [increased/decreased] by [amount] g/cm2. The statistical significance of any variation is uncertain due to lack of cross calibration between the sites.

Body Composition Analysis

INVISION SALLY JOBE
Imaging by RIA and HealthONE

Patient Name _____ Patient Age _____ DOB _____
MRN# _____ Exam Date & Time _____
Referring Physician _____ Tech/Site _____
Indication _____

DXA BODY COMPOSITION ANALYSIS

TECHNIQUE: Body composition analysis was performed on your patient using a fan beam DXA unit. The DXA instrument differentiates body weight into the components of lean soft tissue, fat soft tissue and bone mass based on the differential attenuation by tissues of two different x-ray energies. DXA is considered the criterion method of body composition analysis. Percent Body Fat, Body Mass Index, Fat Mass Index, Visceral Fat Classification and Body Composition analysis results are listed below.

BODY COMPOSITION ANALYSIS RESULTS

Body Fat: _____%
Truncal Fat _____%

Total Body Mass _____kg.
Total Fat Mass _____kg.
Total Lean Mass _____kg.

Whole Body BMD _____(g/cm²) BMC _____(g)
Whole Body T-score _____ Whole Body Z-score _____

Body Mass Index _____ Height _____ Weight _____
Fat Mass Index (Fat Mass/Height kg/m²) _____
Visceral Fat Classification (Est. VAT Area cm²) _____

Percent Body Fat Reference Ranges

Gender	Normal % Fat	Overweight % Fat	Obesity % Fat
Adult Male	4-25%	25-30%	>30%
Adult Female	12-29%	29-35%	>35%

FMI Class	Severe Fat Deficit	Moderate Fat Deficit	Mild Fat Deficit	Normal	Excess Fat	Obese Class I	Obese Class II	Obese Class III
M	<2	2 to <2.3	2.3 to <3	3 - 6	> 6 to 9	> 9 to 12	>12 to 15	>15
F	< 3.5	3.5 to < 4	4 to <5	5 - 9	> 9 to 13	> 13 to 17	> 17 to 21	>21

Table 1. Classification ranges for FMI that match the prevalences of the World Health Organization (WHO) body mass index (BMI) classifications in young adults. Unlike BMI (a measure of excess weight), FMI is a gender specific measure of excess fat not confounded by lean tissue.

Visceral Fat Classification

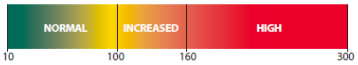
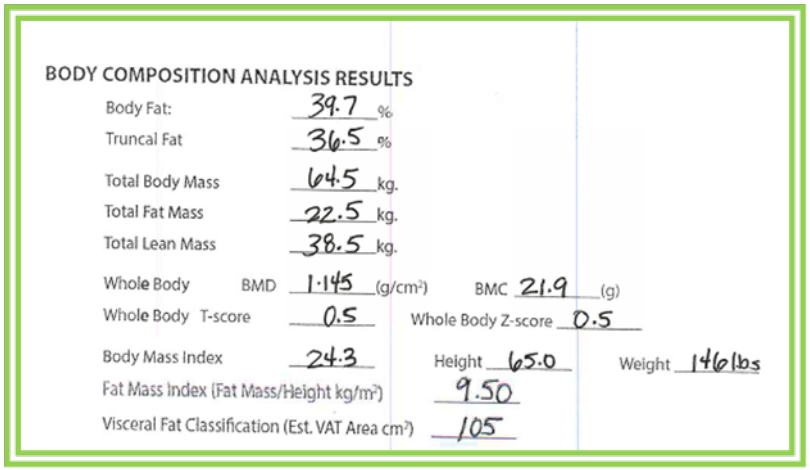


Figure 5. Visceral fat thresholds associates with metabolic risk factors for coronary heart disease.[12,13]



DXA techs will fill out the worksheet and drafters plug the numbers in the Body Comp Macro

Follow DXA format and plug in #'s from the worksheet
If the shire body comp macro appears as default use
Macro: BCA

DXA BODY FAT COMPOSITION/DXA WHOLE BODY

EXAM DATE AND TIME: [5/10/2019 11:50 AM]

REASON FOR EXAM: [Screening].

INDICATIONS: [Postmenopausal 51-year-old female. Baseline exam for this facility].

COMPARISON: [None]

TECHNIQUE: Body composition analysis was performed on your patient using a fan beam unit. The body weight into the components of lean soft tissue, fat soft tissue and bone mass based on the diffe two different x-ray energies. DXA is considered the criterion method of body composition analysis. E Ratio, and Body Composition analysis results are listed below along with appropriate reference tables

TECHNICAL QUALITY: The images were reviewed, applying ISCD performance standards for posi

BODY COMPOSITION ANALYSIS RESULTS:
Body Fat: [39.7] %
Truncal Fat: [36.5] %

Total Body Mass: [64.5] kg.
Total Fat Mass: [22.5] kg.
Total Lean Mass: [38.5] kg.

Whole Body Bone Density: BMD [1.145] g/cm2 BMC [21.9] g
Whole Body T-score: [0.5]
Whole Body Z-score: [0.5]

Body Mass Index: [24.3] Height: [65.0] Weight: [146 pounds]
Fat Mass Index: [9.50]
Visceral Fat Classification: [105]

Percent Body Fat Reference Ranges:
Normal Male 4 - 25%
Normal Female 12 - 29%

Where to find the numbers if the worksheet is missing/ incorrect:

BODY COMPOSITION ANALYSIS RESULTS:

Body Fat: 21.9 %
Truncal Fat: 21.2 %

Total Body Mass: 97.0 kg.
Total Fat Mass: 21.3 kg.
Total Lean Mass: 75.7 kg.

Change (g) to (kg)

Whole Body Bone Density: BMD 1.370 g/cm2 BMC 3432.2 g
Whole Body T-score: 3.0
Whole Body Z-score: 1.5

Body Mass Index: 28.8 Height: 73.5 Weight: 221.4 pounds
Fat Mass Index: 6.10
Visceral Fat Classification: 84.5

Adipose Indices:

Measure	Result	T-score	Z-score
Total Body % Fat	21.9	-0.4	-1.0
Fat Mass/Height² (kg/m²)	6.10	-0.1	-0.6
Android/Gynoid Ratio	0.79		
% Fat Trunk/% Fat Legs	0.87	-0.4	-1.2
Trunk/Limb Fat Mass Ratio	0.95	-0.3	-1.1
Est. VAT Mass (g)	408		
Est. VAT Volume (cm³)	441		
Est. VAT Area (cm²)	84.5		

Lean Indices:

Measure	Result	T-score	Z-score
Lean/Height² (kg/m²)	20.7	0.8	0.6
Appen. Lean/Height² (kg/m²)	9.69	0.9	0.8

Est. VAT = Estimated Visceral Adipose Tissue

1440x
Zoom: 1

Results Summary:

Region	Area [cm²]	BMC [(g)]	BMD [g/cm²]	Fat[(g)]	Lean [(g)]	Lean + BMC[(g)]	Total [(g)]	% Fat [(%)]	T-score	PR (Peak Reference)	Z-score	
L Arm	273.67	268.87	0.982	1177.8	5374.2	5643.1	6820.9	17.3				
R Arm	269.02	258.22	0.960	1160.4	5187.4	5445.7	6606.1	17.6				
Trunk				9736.9	35162.4	36096.0	45832.9	21.2				
L Leg	457.41	781.26	1.708	3841.5	11494.3	12275.5	16117.0	23.8				
R Leg	435.70	721.36	1.656	4106.6	11710.3	12431.7	16538.2	24.8				
Subtotal	2271.16	2963.34	1.305	20023.2	68928.6	71892.0	91915.2	21.8				
Head	234.91	468.86	1.996	1234.5	3336.9	3805.7	5040.2	24.5				
Total	**2506.07**	**3432.20**	**1.370**	**21257.7**	**72265.5**	**75697.7**	**96955.4**	**21.9**	**3.0**	**124**	**1.5**	**114**

Total BMD CV 1.0%, ACF = 1.017, BCF = 0.985
TBAR1209 - NHANES BCA calibration

Results Summary:

Region	Fat[(g)]	Lean + BMC[(g)]	Total[(g)]	% Fat	% Fat T-score	% Fat Z-score
L Arm	1178	5643	6821	17.3	-0.8	-1.4
R Arm	1160	5446	6606	17.6	-0.9	-1.4
Trunk	9737	36096	45833	21.2	-0.5	-1.1
L Leg	3841	12276	16117	23.8	-0.4	-0.6
R Leg	4107	12432	16538	24.8	-0.3	-0.4
Subtotal	20023	71892	91915	21.8	-0.5	-1.0
Head	1234	3806	5040	24.5		
Total	**21258**	**75698**	**96955**	**21.9**	**-0.4**	**-1.0**
Android (A)	1449	5501	6950	20.8		
Gynoid (G)	4088	11484	15572	26.3		

Total BMD CV 1.0%, ACF = 1.017, BCF = 0.985
TBAR1209 - NHANES BCA calibration

RESEARCH DXAS

Reason for exam on all research studies should be **Screening** *(Regardless of prior results)*

REASON FOR EXAM: Screening. Nonalcoholic steatohepatitis (NASH). Follow-up exam.

INDICATIONS: Research patient participating in a clinical trial for the treatment of nonalcoholic steatohepatitis (NASH), sponsored by Madrigal.

CLINICAL RISK FACTORS:
1. Surgically induced early menopause at age 39.
2. History of low bone density.
3. Height loss.
4. Hyperparathyroidism.
5. Chronic liver disorder.
6. Long-term thyroid replacement therapy.

FAMILY HISTORY:
Family history of osteoporosis: Mother and sister.

Parental hip fracture: None.

CURRENT MEDICATIONS: Calcium. Multivitamin. Vitamin D. Levothyroxine.

TECHNICAL QUALITY: The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

RESULTS:
Bone Density: Hologic Horizon W Fan Beam [S/N 300696M]

Region	BMD	T-score	Z-score	Classification
AP Spine (L1-L4)	0.871	-1.6	0.6	Osteopenia
Femoral Neck (Left)	0.651	-1.8	0.1	Osteopenia
Total Hip (Left)	0.813	-1.1	0.5	Osteopenia
1/3 Forearm (Left)	0.696	0.0	2.2	Normal

10-year Fracture Risk:

Major Osteoporotic Fracture 11%
Hip Fracture 1.9%

Previous Exams:

Region	Exam Date	Age	BMD g/cm2	T-score vs Baseline	BMD Change vs Baseline	BMD Change vs Previous
AP Spine (L1-L4)	/2020	71	0.871	-1.6	-0.045 (-4.9%)	-0.068 (-7.3%)
	/2018	68	0.940	-1.0	0.023 (2.5%)	0.020 (2.2%)
Total Hip(Left)	/2020	71	0.813	-1.1	0.009 (1.2%)	-0.063 (-7.2%)
	/2018	68	0.877	-0.5	0.073 (9.1%)	0.049 (5.9%)
1/3 Forearm (Left)	/2020	71	0.696	0.0	-0.003 (-0.4%)	0.017 (2.5%)
	/2018	68	0.679	-0.3	-0.020 (-2.8%)	-0.063 (-8.5%)

Bone density test results of the lumbar spine, left femoral neck, and left total hip are diagnostic of low bone density. Low bone density in one or more skeletal sites is indicative of generalized low bone density.

At this facility, the Least Significant Change in BMD with 95% confidence utilized is 0.036 g/cm2 at the L1-L4 Spine, 0.028 g/cm2 at the Total Hip, and 0.030 g/cm2 at the 1/3 Radius.

COMPARISON: 10/10/2018. Compared with the previous bone density test, the current results suggest a mixed trend at various anatomic sites.

IMPRESSION: This patient has low bone density (Osteopenia). The 10-year fracture risk estimate is average. There has been a statistically significant decrease in bone density of the lumbar spine and left total hip since 2018. Patient preferences, clinical judgment and these bone density results should help guide management decisions. A follow-up bone density exam is recommended in 2 years or as clinically warranted to monitor bone density and the effectiveness of any therapeutic changes you may institute.

Shire Research Body Composition Analysis & DXA

DXA BODY COMPOSITION ANALYSIS

EXAM DATE AND TIME: 9/4/2018 8:30 AM

INDICATIONS: Research patient participating in a clinical trial for the treatment of eosinophilic esophagitis, sponsored by Shire Plc.

COMPARISON: 12/11/2017. Compared with the previous exam, the total body bone mineral density has increased by 0.044 g/cm2 (3.9%), which is statistically significant.

TECHNIQUE: Body composition analysis was performed on your patient using a fan beam Hologic Discovery DXA unit. The DXA instrument differentiates body weight into the components of lean soft tissue, fat soft tissue and bone mass based on the differential attenuation by tissues of two different x-ray energies. DXA is considered the criterion method of body composition analysis. Body Mass Index, Waist to Hip Ratio, and Body Composition analysis results are listed below along with appropriate reference tables.

TECHNICAL QUALITY: The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.

BODY COMPOSITION ANALYSIS RESULTS:
Body Fat: 38.7 %
Truncal Fat: 41.6 %
Total Body Mass: 11.6 kg.
Total Fat Mass: 45.0 kg.
Total Lean Mass: 67.9 kg.
Whole Body Bone Density: 1.292 g/cm2.
Whole Body Z-score: 1.5
Body Mass Index: 33.6 Height: 74.75 inches

Waist to Hip Ratio: 0.96 Weight: 267.4 pounds

Several clinical trials may be ongoing simultaneously. Indicate which clinical trial and name of sponsor. If more info is needed, ask Brian Avery or the DXA tech.

Insert contributed by statement at the bottom of the report.

DXA BONE DENSITY
EXAM DATE AND TIME: 9/4/2018 8:00 AM
REASON FOR EXAM: Screening.

MACRO DXA Shire

INDICATIONS: Research patient participating in a clinical trial for the treatment of eosinophilic esophagitis, sponsored by Shire Plc.

CLINICAL RISK FACTORS:
1. Dysphagia.

FAMILY HISTORY:
Family history of osteoporosis: None.
Parental hip fracture: None.

CURRENT MEDICATIONS: Budesonide versus placebo.

TECHNICAL QUALITY: The images were reviewed, applying ISCD performance standards for positioning, acquisition, and analysis.
RESULTS:
The patient is a Male and 17 years of age.
Weight: 267.4 lb Height: 74.8 in BMI: 33.6
Bone Density: Hologic Horizon W Fan Beam [S/N 300696M]

Region BMD Z-score

AP Spine (L1-L4) 1.080 0.7

Previous Exams:

Region Exam Age BMD T-score BMD Change BMD Change
Date g/cm2 vs Baseline vs Previous

AP Spine (L1-L4)
09/04/2018 17 1.080 0.7 0.078 (7.7%) 0.063 (6.2%)
12/11/2017 16 1.017 0.5 0.014 (1.4%) 0.014 (1.4%)
08/04/2017 15 1.003 0.5

These are all pediatric cases: Use Macro Age Matched & Macro Z-scores.

At this facility, the Least Significant Change in BMD with 95% confidence utilized is 0.036 g/cm2 at the L1-L4 Spine, 0.028 g/cm2 at the Total Hip, and 0.030 g/cm2 at the 1/3 Radius.

COMPARISON: 12/11/2017. Compared with the previous bone density test, there has been a significant increase and improvement in bone density.

IMPRESSION:
The patient's bone mineral density is within the expected range for age using age-matched criteria and Z-score analysis. For adolescents and children, Z-scores, not T-scores are preferred. A Z-score of -2.0 and lower is below the expected range for age and a Z-score above -2.0 is within the expected range for age. The diagnosis of osteoporosis in children and adolescents should not be made on the basis of densitometric criteria alone. A BMD Z-score greater than -2.0 does not preclude the possibility of skeletal fragility and increased fracture risk. (Referenced from the International Society of Clinical Densitometry-ISCD). A follow-up bone density exam is suggested in two years or as clinically warranted to monitor bone density.

Contributed By: Mary K. Mucilli, BS, CBDT

Transgender & Gender Non-conforming Individuals (TGNC) ISCD guidelines

TGNC Individuals

T-scores

- Use a uniform Caucasian (non-race adjusted) female normative database

Z-scores

- Use normative database that matches the gender identity of the individual
- If requested by provider, Z-scores can also be calculated using the normative database that matches the sex recorded at birth

Gender–Nonbinary Individuals

- Use the normative database that matches the sex recorded at birth

https://iscd.org/learn/official-positions/adult-positions/

Clinical Risk Factors

(located on page 1 of the questionnaire)

OLD QUESTIONNAIRE

Personal Information

Gender: ☐ Female ☐ Male

Race: ☐ Caucasian ☐ Hispanic ☐ African-American ☐ Asian ☐ Other

≤128lbs = low body weight even if BMI is normal

Current weight: _____

BMI: ____ BMI 18.5-25 (normal)

Current height: _____ inches

Height loss: _____ inches

Only if ≥ 1 inch

Female Medical History:	Yes	No	
Have you gone through menopause? If yes, at what age? _____	☐	☐	(101)
Are you currently experiencing any menopausal symptoms?	☐		
Do you have amenorrhea (absence of periods for 8-12 months)?	☐		
Have you had any of the following conditions:			
Hysterectomy (uterus removed)?	☐		
Ovaries removed?	☐		
Personal history of breast cancer?	☐		

General Medical History	Yes	No	
Have you fractured any bones as an adult (past age 40)?	☐		
If yes, check type of fracture: ☐ spine (222) ☐ rib (224) ☐ pelvis (226) ☐ left / ☐ right wrist (223) ☐ left / ☐ right hip (224)			
Have you had a fracture with little or no trauma?	☐		
Do you have a history of Osteopenia?	☐		
Have you had an abnormal x-ray report (showing bone loss)?	☐		
Is there a family history of Osteoporosis?	☐		
Has either parent experienced a hip fracture?	☐		
Do you have a history of Osteoporosis?	☐	☐	(105)
Are you on a specific drug therapy for Osteoporosis?	☐	☐	**(114)**
Do you currently smoke cigarettes? How long? _____	☐	☐	**(103)**
Do you drink more than 2 alcoholic drinks daily?	☐	☐	**(104)**
Do you exercise more than 2x per week?	☐	☐	(209)
Have you consumed 2 or more dairy servings per day most of your life?	☐	☐	(219)

(Form continues on back - flip page to complete.)

CLINICAL RISK FACTORS:

1. [ ]

- Postmenopausal.
- History of low bone density.
- History of osteoporosis.
- Personal history of breast cancer with *TYPE OF TREATMENT*.
- Reported history of fragility fracture with little or no trauma.
- Height loss greater than one inch during lifetime.
- History of an abnormal x-ray showing possible bone loss.
- Current cigarette smoker.
- Moderate alcohol consumption
- Reported suboptimal exercise history.
- Relatively low dietary calcium intake.
- Low body weight.

Risk factors should be listed in order by risk (greatest – lowest) see example in green on slide 42.

Clinical Risk Factors Continued (on page 2 (OLD QUESTIONNAIRE

General Medical History (cont'd):	Yes	No	
Do you have any of the following conditions:			
Hyperthyroidism (over-active thyroid)	☐	☐	(215)
Anorexia Nervosa or Bulimia	☐	☐	(214)
Long term Steroid therapy (>3 months)	☐	☐	**(112)**
Alcoholism	☐	☐	(204)
Hyperparathyroidism	☐	☐	(113)
Rheumatoid Arthritis	☐	☐	**(205)**
Chronic Liver disorder	☐	☐	(213)
Previous surgery to remove bowel or stomach	☐	☐	(212)

Untreated long-standing hyperthyroidism

Diagnosed RA

Steroids -specify Inhaled or systemic (oral ≥ 5mg for > 3months)

**Obtain forearm if hypercalcemia (or hyperparathyroidism) is suspected

Please complete the table below to indicate any medications you currently take or have previously taken:

✔	Medication Name	Currently Take	Previously Taken	Adverse Reaction	Dose	Duration of Use
500	Calcium supplement					
501	Multivitamin					
515	Vitamin D					
502	**Estrogen therapy**					
503	Natural / herbal HRT					
504	**Estrogen + Progesterone**					
505	**Fosamax (Alendronate)**					
506	**Actonel (Risedronate)**					
507	**Boniva (Ibandronate)**					
508	**Forteo (Teriparatide)**					
513	**Reclast (Zoledronic Acid)**					
516	**Prolia (Denosumab)**					
517	**Zometa (Intravenous)**					
509	**Miacalcin (Calcitonin)**					
510	**Evista (Raloxifene)**					
511	Tamoxifen					
512	Arimidex					
514	Femara					
207	**Steroids, Prednisone**					
115	Thyroid replacement					
217	Cancer Chemotherapy					
119	Dilantin					
120	Heparin					
	Other:					

PPI (≥ 1 year)
AcipHex (rabeprazole sodium)
Dexilant (dexlansoprazole)
Nexium (esomeprazole magnesium)
Prevacid (lansoprazole)
Prilosec (omeprazole)
Protonix (pantoprazole sodium)
Vimovo (esomeprazole magnesium and naproxen)
Zegerid (omeprazole &s odium bicarbonate)

Treatment meds and frax info on slides (63-64)

Aromatase inhibitors Arimidex,(anastrozole), Femara (letrozole), Aromasin (exemestane), Teslac (testolactone)

Thyroid replacement therapy ≥ 5 yrs. (HYPOTHYROIDISM)

- History of long term inhaled steroid therapy.
- History of long term systemic steroid therapy.
- Rheumatoid arthritis.
- Hyperthyroidism.
- Anorexia Nervosa or Bulimia.
- Hyperparathyroidism.
- Chronic liver disorder.
- Bowel or stomach resection.
- Long term thyroid replacement therapy.
- Long term use of proton pump inhibitor (PPI) medication.

List risk factors in order: Greatest risk first!

REFERENCES

1. The International Society for Clinical Densitometry (2019) Official positions of the International Society for Clinical Densitometry. https://iscd.org/learn/official-positions/adult-positions/. Accessed December 1, 2020.
2. Siris ES, Adler R, Bilezikian J, et al. The clinical diagnosis of osteoporosis: a position statement from the National Bone Health Alliance Working Group. *Osteoporos Int*. 2014;25(5):1439-1443. doi:10.1007/s00198-014-2655-z
3. Clinician's Guide to Prevention and Treatment of Osteoporosis https://static1.squarespace.com/static/5d7aabc5368b54332c55df72/t/5d9f679cbc775a5f22c91b61/1570727839254/Cosman2014_Article_ClinicianSGuideToPreventionAnd.pdf

Please contact Jessica.Grahf@riaco.com with updates, corrections, and suggestions.