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## BACKGROUND

- Compared to the general population, people with HIV (PWH) are at increased risk for reduced bone mineral density (BMD)
- The reasons underlying this accelerated bone loss appear to involve numerous factors including those related to HIV-1 itself, immune reconstitution, and direct effects of antiretroviral therapy (ART).
- Current guidelines by the HIV Medicine Association of the Infectious Disease Society of America and the European AIDS Clinical Society recommend BMD screening by dual-energy x-ray absorptiometry (DXA) for all postmenopausal women with HIV (regardless of age) and all men with HIV aged 50 and older

## METHODS

- Study Design:** Retrospective cross-sectional analysis of 300 people with HIV aged 65 and older with regular follow-up at University of Colorado Infectious Disease Clinic
- Data Extraction:** Demographic and laboratory data were collected by manual review of electronic medical and stored using REDCap
- BMD Classification:** Diagnostic thresholds established by the World Health Organization based on DXA t-score were used (See Figure). The Fracture Risk Assessment Tool (FRAX) was used to calculate 10-year risk of major osteoporotic fractures and hip fractures utilizing DXA T-scores if available

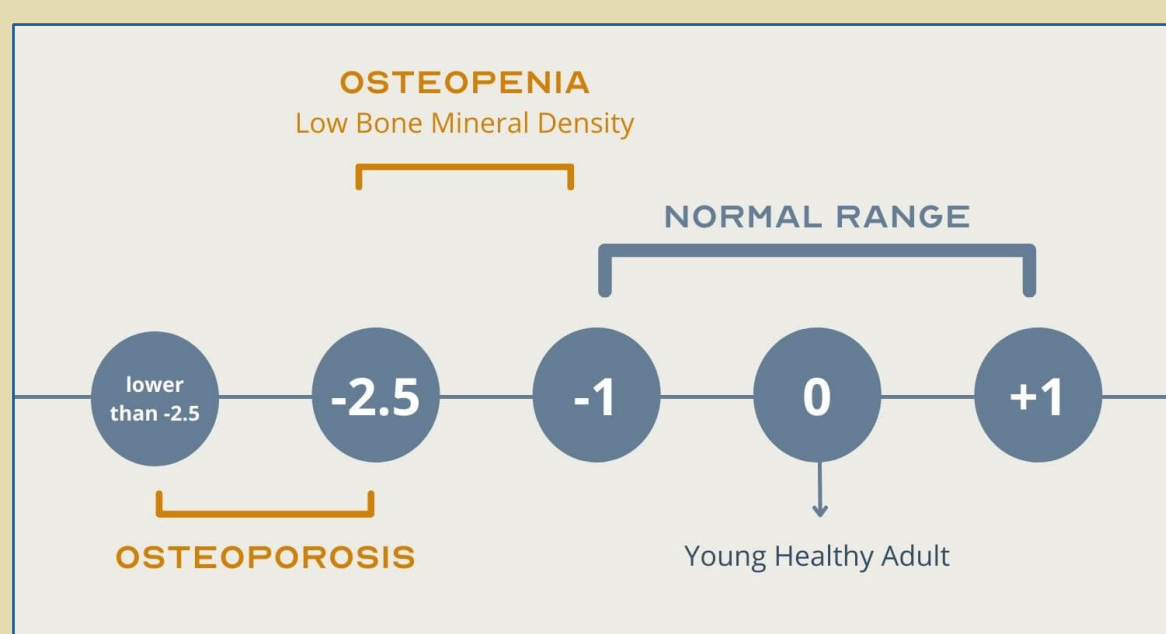


Figure: BMD Classifications by DXA T-score

**Objective:** assess BMD screening practices and results among PWH aged 65 years and older, at the highest risk for low BMD, falls, and ultimately fractures

## RESULTS

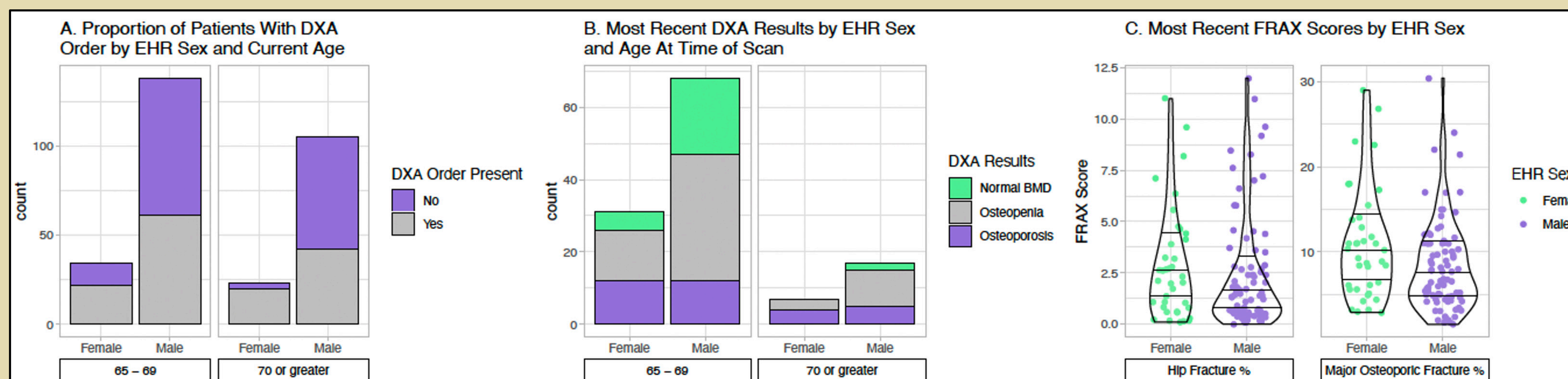
**Study Participants:** All participants in the study met the criteria for BMD screening by the HIVMA recommendations

- 52% of all participants had a DXA ordered (74% of women and 42% of men)
- Of those with a DXA order, 55% had a record of a single scan and 30% had two or more available results
- The mean age at first DXA was 64.7 years (SD 6.1)
- BMD Screening Results:**
  - 13% of women and 27% of men had normal BMD
  - 45% of women and 53% of men had osteopenia
  - 42% of women and 20% of men had osteoporosis
  - Women were more likely than men to have higher FRAX scores for risk of both major osteoporotic (median of 9.8% for women and 6.8% for men) and hip fractures (median of 2.2% for women and 1.4% for men).

### DXA Completion, stratified by sex

DEXA Completion	Female (57)	Male (243)
DEXA Ordered (%)	42 (73.7)	103 (42.4)
DEXA Completed (%)	38 (67)	85 (35)
- Single Scan Completed (%)	20 (35.1)	59 (24.3)
- Multiple Scans Completed (%)	18 (31.6)	26 (10.7)
No DEXA Completed (%)	4 (7.0)	18 (7.4)
No DEXA Ordered (%)	15 (26.3)	140 (57.6)

### Figure: DXA Results Stratified by Sex



DXA – dual-energy X-ray absorptiometry scan; EHR – electronic medical records; BMD – bone mineral density; FRAX – fracture risk assessment tool

### Demographics stratified by sex

	Overall	Female	Male
n	300	57	243
<b>Demographics and Social History</b>			
Age (mean (SD))	69.84 (4.35)	70.00 (4.75)	69.80 (4.26)
Race/ Ethnicity (%)			
Black/African American, N.H	73 (24.3)	26 (45.6)	47 (19.3)
Hispanic, regardless of race	32 (10.7)	8 (14.0)	24 (9.9)
Other, N.H.	10 (3.3)	5 (8.8)	5 (2.1)
White/Caucasian, N.H.	185 (61.7)	18 (31.6)	167 (68.7)
BMI (mean (SD))	26.23 (5.10)	28.16 (6.30)	25.77 (4.68)
BMI Category (%)			
Healthy	136 (45.3)	19 (33.3)	117 (48.1)
Overweight	108 (36.0)	18 (31.6)	90 (37.0)
Obese	56 (18.7)	20 (35.1)	36 (14.8)
Smoking History (%)			
Never	119 (39.7)	23 (40.4)	96 (39.5)
Past	126 (42.0)	23 (40.4)	103 (42.4)
Current	55 (18.3)	11 (19.3)	44 (18.1)
Alcohol Use History (%)			
Never	99 (33.0)	28 (49.1)	71 (29.2)
Past	91 (30.3)	13 (22.8)	78 (32.1)
Current	110 (36.7)	16 (28.1)	94 (38.7)
Insurance Type (%)			
Medicaid	3 (1.0)	1 (1.8)	2 (0.8)
Medicare	110 (36.7)	22 (38.6)	88 (36.2)
Medicare Advantage	146 (48.7)	27 (47.4)	119 (49.0)
Private Insurance	37 (12.3)	6 (10.5)	31 (12.8)
Unknown/Other	4 (1.3)	1 (1.8)	3 (1.2)
<b>HIV History</b>			
Time Since HIV Diagnosis (%)			
<5 years	7 (2.3)	0 (0.0)	7 (2.9)
5-10 years	17 (5.7)	5 (8.8)	12 (4.9)
>10 years	274 (91.3)	51 (89.5)	223 (91.8)
Unknown or Not reported	2 (0.7)	1 (1.8)	1 (0.4)
ART Treatment Length >5yrs (%)	291 (97.0)	56 (98.2)	235 (96.7)
Previous TDF Exposure (%)			
Yes	243 (81.0)	48 (84.2)	195 (80.2)
No	52 (17.3)	9 (15.8)	43 (17.7)
Unknown or Not reported	5 (1.7)	0 (0.0)	5 (2.1)
Viral Load (%)			
<50	269 (89.7)	48 (84.2)	221 (90.9)
50-200	19 (6.3)	6 (10.5)	13 (5.3)
>200	12 (4)	3 (5.3)	9 (3.7)
<b>Risk Factors and Outcomes</b>			
Previous Fragility Fracture (%)	125 (41.7)	29 (50.9)	96 (39.5)
Documented Fall Risk (%)	133 (44.3)	33 (57.9)	100 (41.2)
Glucocorticoid Use (%)	20 (6.7)	1 (1.8)	19 (7.8)
Identifiable Cause of Secondary Osteoporosis (%)	223 (74.3)	42 (73.7)	181 (74.5)

**Conclusion:** Although screening guidelines are clear, older PWH are under-screened and under-treated for low BMD, according to guidelines for both PWH and for the general population

## DISCUSSION

- Only 67% of women and 35% of men had appropriate BMD screening
- Screening rates did not differ by presence of fracture risk
- Rates of osteopenia and osteoporosis in this study were higher than national estimates for both men and women ≥65 regardless of HIV status. More than 75% of those screened met criteria for low BMD
- Of those that were screened, an inappropriately low number (33%) of those with a diagnosis of osteoporosis were started on appropriate pharmacologic treatment
- Improved awareness of heightened risk and vulnerability to low BMD in PWH is needed among providers. Effective and systematic screening with appropriate follow-up for bone disease is crucial to reduce fracture risk and improve the quality of life of PWH.

## ACKNOWLEDGEMENTS

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