Osteoporosis Diagnosis and Management in PALTC

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Disclosures

I have no financial disclosures.

Objectives

After participating in this activity, the learner will demonstrate the ability to:

- ✓ Identify appropriate short and long stay nursing facility residents who benefit from FDA approved osteoporosis medications to prevent fractures.
- ✓ Establish a comprehensive osteoporosis treatment plan for nursing facility residents that includes bone heath nutrition, appropriate use of FDA approved osteoporosis medications, fall prevention, and weight bearing exercise.
- ✓ Identify appropriate short and long stay nursing facility residents for whom FDA approved osteoporosis medications should be withdrawn due to goals of care or duration of medication use.

THE GERONTOLOGICAL SOCIETY OF AMERICA®

Journals of Gerontology: Medical Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2018, Vol. 73, No. 6, 763–769
doi:10.1093/gerona/glx147
Advance Access publication August 31, 2017

OXFORD

Research Article

Fracture Risk Assessment in Long-term Care (FRAiL): Development and Validation of a Prediction Model

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Received: February 22, 2017; Editorial Decision Date: July 12, 2017

Decision Editor: Anne Newman, MD, MPH

Age

65 — 100 Year

Gender

Male | Female

Race

White | Black | Hispanic | Asian | Native American | Other/Unknown

Cognitive performance score

0 — 6 points

ADL Hierarchy scale

Extensive assistance 1: At least extensive assistance in personal hygiene or toilet use, and less than extensive in both eating and locomotion

Extensive assistance 2:...

Independent or mild dependence | Extensive assistance 1 | Extensive assistance 2 | Dependent | Total dependence

Locomotion in room

Independent or supervision | Limited assistance | Extensive assistance | Total dependence

Bladder continence

Mostly continent | Frequent incontinence | Total incontinence

Previous fall

No | Yes

Transer performance

Independent or supervision | Limited assistance | Extensive assistance | Total dependence

Easily distracted

No | Yes

Wandering

No | Yes

Osteoarthritis

No | Yes

BMI

15 — 50 kg/m2

Pressure ulcer

None | Any stage

Diabetes Mellitus

No | Yes

Acetylcholinesterase inhibitors

Use of acetylcholinesterase inhibitors

No | Yes

Alpha blockers

Use of alpha blockers

No | Yes

SSRIs

Use of selective serotonin reuptake inhibitors

No | Yes

Benzodiazepines

Use of benzodiazepines

No | Yes

Prediction of Fracture in Nursing Home Residents

Cynthia J. Girman, DrPH, Julie M. Chandler, PhD,* Sheryl I. Zimmerman, PhD,†‡§*
Allison R. Martin, MHA, William Hawkes, PhD,† J. Richard Hebel, PhD,†*
Philip D. Sloane, MD,‡‖ and Jay Magaziner, PhD†

OBJECTIVES: To investigate cross-validated methods of identifying patients at increased risk of fracture in nursing homes using readily available data.

DESIGN: Prospective cohort study with 18 months of follow-up.

SETTING: Forty-seven randomly selected nursing homes in Maryland.

PARTICIPANTS: One thousand four hundred twenty-seven white female nursing home residents aged 65 and older were followed for fracture for 18 months after baseline assessment.

MEASUREMENTS: Fracture ascertained by physician note or x-ray from chart abstraction; demographic and baseline data extracted from the Minimum Data Set (MDS).

RESULTS: Exploratory analyses on a random subset (67%) of the data (development sample) identified variables that might be important in predicting subsequent fracture and included variables for how the resident moved between locations in her room or adjacent corridor (mobility), age, weight, height, independence in eating and dressing, urinary incontinence, resistance to care, falls in the previous 6 months, a dementia score, and other activities of daily living. A simple scoring algorithm derived from a subset of these MDS variables showed good sensitivity (.70) but low specificity (.39) in the random validation sample

women at increased risk for fracture and may be useful in targeting fracture prevention programs. **J Am Geriatr Soc 50:1341–1347, 2002.**

Key words: nursing home residents; osteoporosis; low bone mineral density; fracture risk

The high incidence of fracture, particularly in older white women,[1–3] and risk factors for osteoporotic fractures are well characterized in community-dwelling women,[4–10] but surprisingly few studies have assessed risk factors for fracture in nursing home residents, where the rate of fracture is dramatically higher,[6,11,12] and risk factors may differ. Fractures, particularly of the hip, are associated with significant morbidity and mortality in older adults and with high associated healthcare and hospitalization costs,[13–15] and these effects are likely magnified in the nursing home population. A recent large study of white female nursing home residents showed that high healthcare and hospital utilization rates continued well beyond the first 6 months after fracture of any type.[16] Risk factors for falls and fracture have been identified in a few nursing home studies conducted mostly in single institutions and include older age, lower body weight and body

Table 3. Scoring Algorithm for Predicting Fracture

Factor	Level	Observed 18-Month Fracture Rate, n (%)*	Scoring Algorithm To Obtain Score:
Age	65–74	10 (7.63)	
	75–84	55 (11.65)	Add 1
	85–94	97 (13.70)	Add 2
	≥95	18 (15.52)	Add 3
Weight, pounds	<170	174 (13.77)	Add 1
	≥170	6 (4.35)	
Height, inches	≤58	25 (15.92)	Add 2
	58 >height ≤63	106 (13.04)	Add 1
	>63	48 (11.16)	
Locomotion on unit	Independent	94 (17.34)	Add 2
	Supervision	7 (8.54)	Add 1
	At least limited assistance needed	77 (10.4)	
Fell in last 180 days	No	116 (11.47)	
	Yes	64 (15.53)	Add 1
Activities of daily living score	≤4	117 (15.90)	Add 1
	>4	60 (9.43)	
Minimum Data Set cognition scale score	≤3	77 (14.42)	Add 1
	>3	103 (11.98)	
Urinary incontinence	Usually continent or usually incontinent	154 (12.21)	
	Occasionally incontinent	25 (18.94)	Add 1
Score	≤4	42 (8.05)	
	>4	138 (15.25)	

*Observed number and percentage of women who fractured at each level of variable shown.

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Cutoff of 4:
Densitivity 70.2%,
Specificity 38.6%;
Odds Ratio 2.1
95% CI 1.4–3.0

DOI: 10.1111/jgs.18277

Journal of the
American Geriatrics Society

Development and validation of the fall-related injury risk in nursing homes (INJURE-NH) prediction tool

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Abstract

Background: Existing models to predict fall-related injuries (FRI) in nursing homes (NH) focus on hip fractures, yet hip fractures comprise less than half of all FRIs. We developed and validated a series of models to predict the absolute risk of FRIs in NH residents.

Methods: Retrospective cohort study of long-stay US NH residents (≥100 days in the same facility) between January 1, 2016 and December 31, 2017 (n = 733,427) using Medicare claims and Minimum Data Set v3.0 clinical assessments. Predictors of FRIs were selected through LASSO logistic regression in a 2/3 random derivation sample and tested in a 1/3 validation sample. Sub-distribution hazard ratios (HR) and 95% confidence intervals (95% CI) were estimated for 6-month and 2-year follow-up. Discrimination was evaluated via C-statistic, and calibration compared the predicted rate of FRI to the observed rate. To develop a parsimonious clinical tool, we calculated a score using the five strongest predictors in the Fine-Gray model. Model performance was repeated in the validation sample.

Results: Mean (Q1, Q3) age was 85.0 (77.5, 90.6) years and 69.6% were

TABLE 2 Predictors of fall-related injuries included in the final clinical 2-year risk prediction tool (INJURE-NH-Short)[a].

Characteristic	Multivariable SHR (95% CI)	MDS v3.0 item(s)[b]	Score assigned
ADL short form score[c]		G0110E1, H1, I1, J1	
13–16	REF		0
9–12	1.82 (1.72–1.92)		1
0–8	2.27 (2.14–2.41)		2
Recent fall		J1800, 1900A-C	
No fall	REF		0
Fall without injury	1.41 (1.37–1.45)		1
Fall resulting in injury	1.76 (1.71–1.82)		2
Hospitalized in 1 year baseline[d]		n/a	
No	REF		0
Yes	1.48 (1.45–1.52)		1
Ability to walk in room		G0110C1	
Total dependence (4)	REF		0
Extensive assistance (3)	1.59 (1.53–1.65)		1
Independent to limited assistance (0–2)	1.95 (1.89–2.01)		2
History of fractures other than hip		I4000	
No	REF		0
Yes	2.02 (1.94–2.12)		2

Score ≥7 had an average predicted 2-year FRI risk of 15.9%.

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Journal of the American Medical Directors Association

Volume 22, Issue 1, January 2021, Pages 28-35.e3

Controversies in Care

Are Nursing Home Residents With Dementia Appropriately Treated for Fracture Prevention?

Joshua D. Niznik PharmD, PhD [a b c], Xintong Li MS [b], Meredith A. Gilliam MD, MPH [a], Laura C. Hanson MD, MPH [a], Sherrie L. Aspinall PharmD, MS [c d e], Cathleen Colon-Emeric MD [f], Carolyn T. Thorpe PhD, MPH [b c]

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https://doi.org/10.1016/j.jamda.2020.11.019

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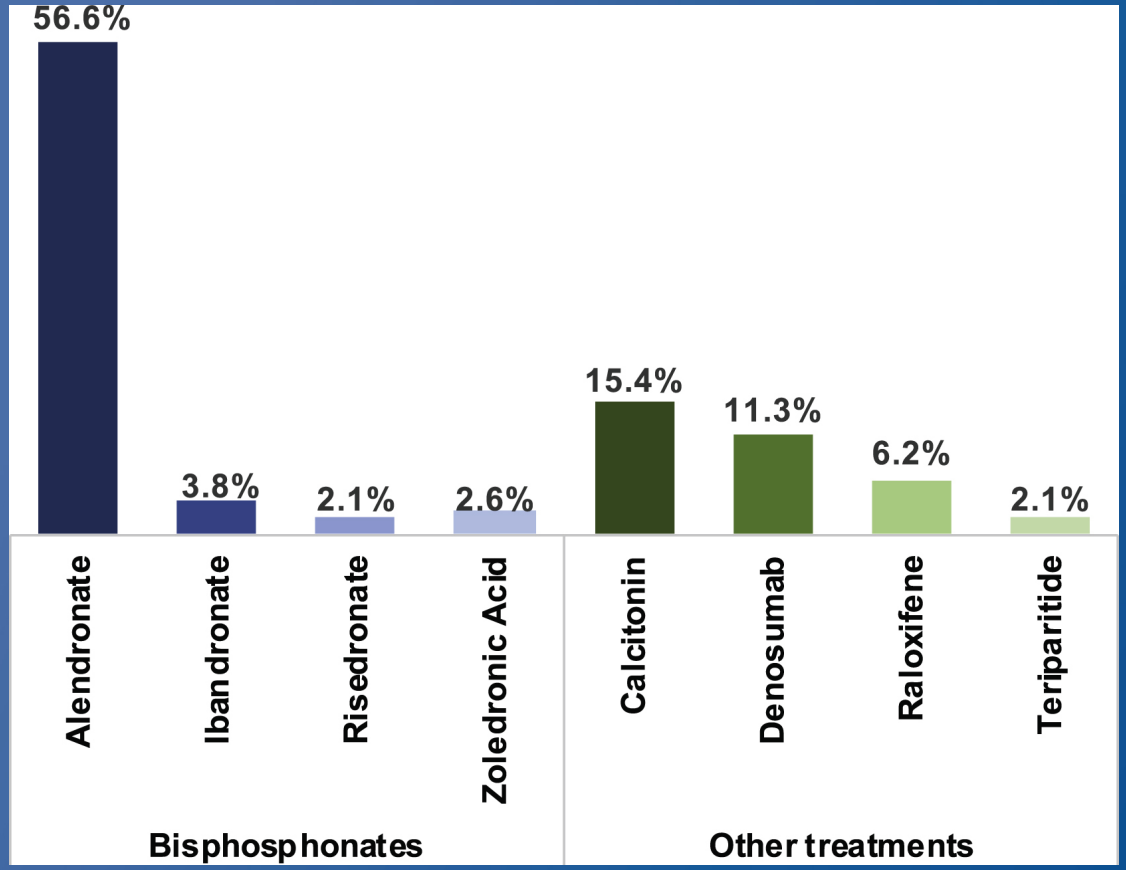
2015-2016 Medicare Claims, Part D prescriptions and MDS data

72,639 residents
78% > 80 ys
82% female
63% moderate/severe dementia
60 % osteoporosis dx



11% treated

Journal of the American Medical Directors Association, 2021-01-01, Volume 22, Issue 1, Pages 28-35.e3,

JAMDA 23 (2022) 1928–1934

JAMDA

journal homepage: www.jamda.com

Controversies in Care

Controversies in Osteoporosis Treatment of Nursing Home Residents

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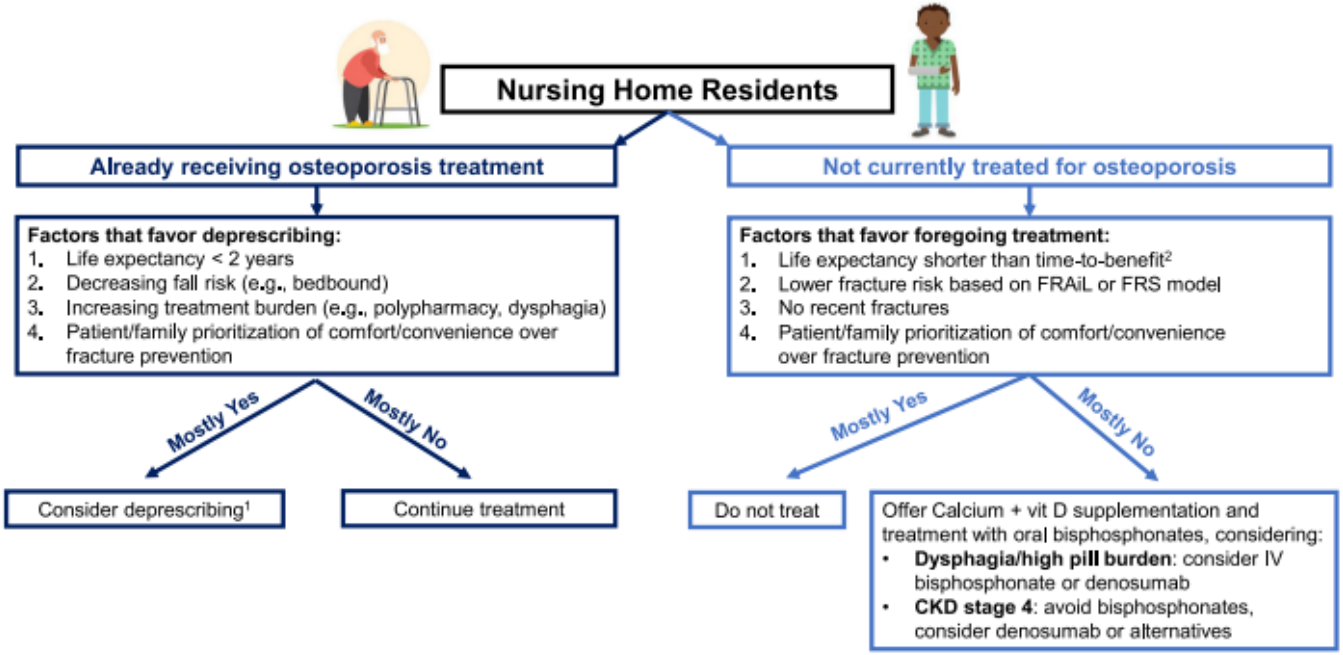
ARTICLE INFO

Article history:
Received 13 June 2022
Received in revised form
26 September 2022
Accepted 30 September 2022

Keywords:
Osteoporosis
hip fracture
pharmacotherapy
nursing homes
Clinical Scenarios

ABSTRACT

Osteoporotic fractures are a common and serious health problem for older adults living in nursing homes (NHs). Risk of fracture increases with age and dementia status, yet gaps in evidence result in controversies around when to start and stop treatment for osteoporosis in NH residents, particularly those who have high fracture risk but have limited life expectancy. In this article, we discuss these areas of controversy. We provide an overview of current guidelines that explicitly address osteoporosis treatment strategies for NH residents, review the evidence for osteoporosis medications in NH residents, and use these sources to suggest practical recommendations for clinical practice and for research. Three published guidelines (from the United States, Canada, and Australia) and several studies provide the current basis for clinical decisions about osteoporosis treatment for NH residents. Practical approaches may include broad use of vitamin D and selective use of osteoporosis medication based on risks, benefits, and goals of care. Clinicians still lack strong evidence to guide treatment of NH residents with advanced dementia, multimorbidity, or severe mobility impairment. Future priorities for research include identifying optimal approaches to risk stratification and prevention strategies for NH residents and evaluating the risk-benefit profile of pharmacologic treatments for osteoporosis NH residents across key clinical strata. In the absence of such evidence, decisions for initiating and continuing treatment should reflect a patient-centered approach that incorporates life expectancy, goals of care, and the potential burden of treatment.



1 With denosumab, consider risk of "rebound fractures" after drug discontinuation in patients with continued fall risk. Continued drug use or transition to 1+ years of bisphosphonate may be warranted.
2 Time-to-benefit is 1 year to have a 0.4–1% absolute risk reduction in having a nonvertebral fracture (NNT ~100–270)

Fig. 1. Flow diagram of practical considerations for pharmacologic fracture prevention treatment for older nursing home residents.

J.D. Niznik et al. / JAMDA 23 (2022) 1928–1934

Recommendations

We recommend use of a clinical screening tool, such as history of fracture þ/ FRAiL or FRS model, when feasible, to identify candidates for osteoporosis treatment.

We do not recommend routinely incorporating BMD into decision making, because of barriers to testing for most NH residents, although it may be useful for considering fracture risk when available.

Candidates for osteoporosis treatment should undergo individualized decision making incorporating life expectancy, goals of care, and other personal factors.

Recommendations for FDA approved osteoporosis medications and nutritional supplements:

Available therapies, particularly bisphosphonates, are likely to be at least as effective for NH residents with sufficient life expectancy as they are in community dwelling older adults

Although supplementation with vitamin D and calcium is a low-risk intervention for which even a modest benefit may outweigh the risk, there is no evidence for reduced fracture risk in immobile residents or those approaching end-of-life.

Decision making should reflect a patient-centered approach that considers pill burden, dysphagia, and risk for adverse effects relative to risk for fracture.

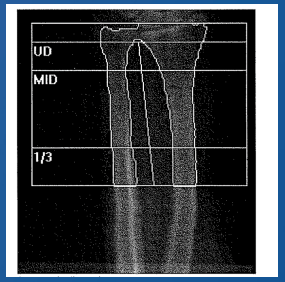
The choice to use bisphosphonates should be positively influenced by a resident's ambulatory status and risk for falls, preserved renal function, and life expectancy of least 1 year. Consider whether the magnitude of fracture risk reduction is clinically meaningful to the patient (0.4%-1% absolute risk reduction for nonvertebral fractures at 1 year, increasing with longer duration of treatment).

Consider deprescribing bisphosphonates if life expectancy is less than 2 years, unless fracture risk is particularly high and patient goals continue to prefer treatment. Evidence for treatments other than bisphosphonates is limited and cannot be recommended with certainty. If denosumab is used, attention should be given to duration of use and risk for rebound fractures after deprescribing.

Fracture Risk Reduction Recommendations

Multifaceted fracture-prevention interventions that combine screening and pharmacologic treatment options with nonpharmacologic strategies are likely to have a synergistic effect on health outcomes.

Recommendations should not be strictly applied based on care setting, but rather based on individual clinical considerations as relevant to patient-centered decision making.



Include forearm if ordering DEXA for older adults

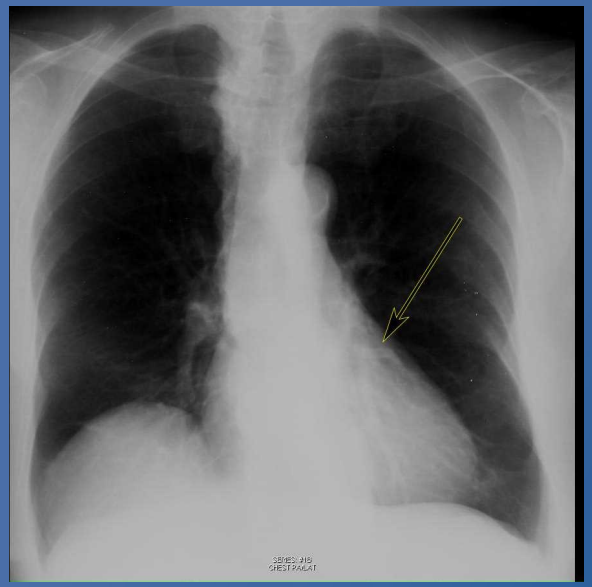
Deep dive into medications old and new, but first…

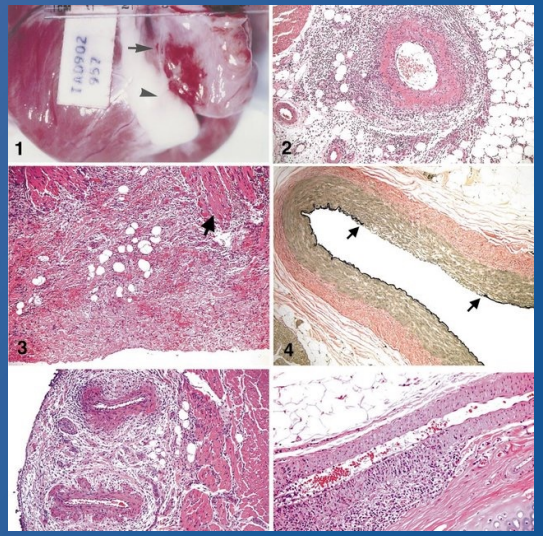
Weight bearing exercise

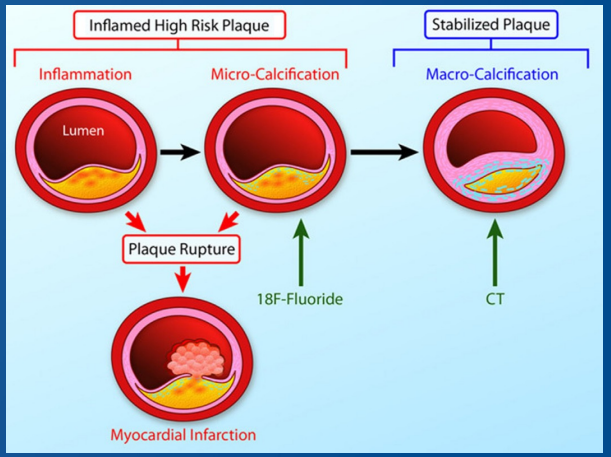
Identify 800 mg calcium per day
through calcium rich foods and beverages

Optimal serum vitamin D 25 hydroxy level 35-50 ng/ml
supplement of 1000-2000 units/day

Why I am depositing calcium in my blood vessels but experiencing calcium loss from my bones?







Types of Osteoporosis Drugs

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Anti-resorptives

Bisphosphonates: bind to resorptive sites on bony surfaces & inhibit osteoclasts

Denosumab: Rank-L inhibitor Ab

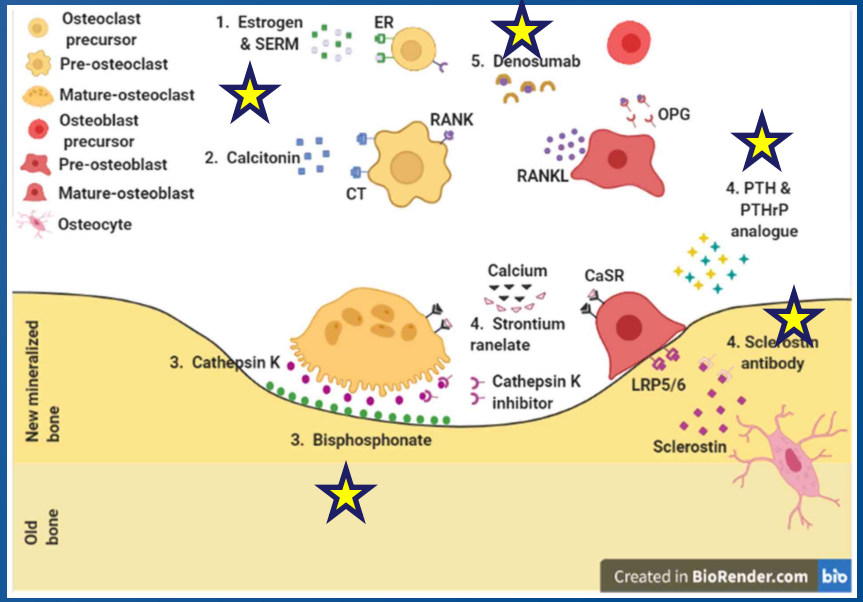
Raloxifene: selectively binds estrogen receptors

Anabolic agents

Teriparatide: parathyroid hormone analog

Abaloparatide: PTH-RP analog

Romosozumab: sclerostin antibody



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CLINICAL GUIDELINE

Pharmacologic Treatment of Primary Osteoporosis or Low Bone Mass to Prevent Fractures in Adults: A Living Clinical Guideline From the American College of Physicians

Amir Qaseem, MD, PhD, MHA; Lauri A. Hicks, DO; Itziar Etxeandia-Ikobaltzeta, PharmD; Tatyana Shamliyan, MD, MS; and Thomas G. Cooney, MD; for the Clinical Guidelines Committee of the American College of Physicians*

Description: This guideline updates the 2017 American College of Physicians (ACP) recommendations on pharmacologic treatment of primary osteoporosis or low bone mass to prevent fractures in adults.

Methods: The ACP Clinical Guidelines Committee based these recommendations on an updated systematic review of evidence and graded them using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) system.

Audience and Patient Population: The audience for this guideline includes all clinicians. The patient population includes adults with primary osteoporosis or low bone mass.

Recommendation 1a: *ACP recommends that clinicians use bisphosphonates for initial pharmacologic treatment to reduce the risk of fractures in postmenopausal females diagnosed with primary osteoporosis (strong recommendation; high-certainty evidence).*

Recommendation 1b: *ACP suggests that clinicians use bisphosphonates for initial pharmacologic treatment to reduce the risk of fractures in males diagnosed with primary osteoporosis (conditional recommendation; low-certainty evidence).*

Recommendation 2a: *ACP suggests that clinicians use the RANK ligand inhibitor (denosumab) as a second-line pharmacologic treatment to reduce the risk of fractures in postmenopausal females diagnosed with primary osteoporosis who have contraindications to or experience adverse effects of bisphosphonates (conditional recommendation; moderate-certainty evidence).*

Recommendation 2b: *ACP suggests that clinicians use the RANK ligand inhibitor (denosumab) as a second-line pharmacologic treatment to reduce the risk of fractures in males diagnosed with primary osteoporosis who have contraindications to or experience adverse effects of bisphosphonates (conditional recommendation; low-certainty evidence).*

Recommendation 3: *ACP suggests that clinicians use the sclerostin inhibitor (romosozumab, moderate-certainty evidence) or recombinant PTH (teriparatide, low-certainty evidence), followed by a bisphosphonate, to reduce the risk of fractures only in females with primary osteoporosis with very high risk of fracture (conditional recommendation).*

Recommendation 4: *ACP suggests that clinicians take an individualized approach regarding whether to start pharmacologic treatment with a bisphosphonate in females over the age of 65 with low bone mass (osteopenia) to reduce the risk of fractures (conditional recommendation; low-certainty evidence).*

Ann Intern Med. doi:10.7326/M22-1034 **Annals.org**
For author, article, and disclosure information, see end of text.
This article was published at Annals.org on 3 January 2023.

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Ann Intern Med. 2023;
10.7326/M22-1034.
doi:10.7326/M22-1034

Bisphosphonate Drug Holiday

Annals of Internal Medicine

ORIGINAL RESEARCH

Comparative Fracture Risk During Osteoporosis Drug Holidays After Long-Term Risedronate Versus Alendronate Therapy

A Propensity Score–Matched Cohort Study

Kaleen N. Hayes, PharmD, PhD; Kevin A. Brown, PhD; Angela M. Cheung, MD, PhD; Sandra A. Kim, MD; David N. Juurlink, MD, PhD; and Suzanne M. Cadarette, PhD

Background: An osteoporosis drug holiday is recommended for most patients after 3 to 5 years of therapy. Risedronate has a shorter half-life than alendronate, and thus the residual length of fracture protection may be shorter.

Objective: To examine the comparative risks of drug holidays after long-term (≥3 years) risedronate versus alendronate therapy.

Design: Population-based, matched, cohort study.

Setting: Province-wide health care administrative databases providing comprehensive coverage to Ontario residents aged 65 years or older between November 2000 and March 2020.

Patients: Persons aged 66 years or older who had long-term risedronate therapy and a drug holiday were matched 1:1 on propensity score to those who had long-term alendronate therapy and a drug holiday.

Measurements: The primary outcome was hip fracture within 3 years after a 120-day ascertainment period. Secondary analyses included shorter follow-up and sex-specific estimates. Cox proportional hazards models were used to estimate hazard ratios (HRs) for fracture risk between groups.

Results: A total of 25 077 propensity score–matched pairs were eligible (mean age, 81 years; 81% women). Hip fracture rates were higher among risedronate than alendronate drug holidays (12.4 and 10.6 events, respectively, per 1000 patient-years; HR, 1.18 [95% CI, 1.04 to 1.34]; 915 total hip fractures). The association was attenuated when any fracture was included as the outcome (HR, 1.07 [CI, 1.00 to 1.16]) and with shorter drug holidays (1 year: HR, 1.03 [CI, 0.85 to 1.24]; 2 years: HR, 1.14 [CI, 0.96 to 1.32]).

Limitation: Analyses were limited to health care administrative data (potential unmeasured confounding), and some secondary analyses contained few events.

Conclusion: Drug holidays after long-term therapy with risedronate were associated with a small increase in risk for hip fracture compared with alendronate drug holidays. Future research should examine how best to mitigate this risk.

Primary Funding Source: Canadian Institutes of Health Research.

Ann Intern Med. 2022;175:335-343. doi:10.7326/M21-2512 **Annals.org**
For author, article, and disclosure information, see end of text.
This article was published at Annals.org on 11 January 2022.

Why:

the drug is incorporated into skeleton and continues to exert an anti-resorptive effect after the discontinuation of drug

When:

Oral: after 5 years, IV after 3 years

Why to Restart:

Within the 3-5 year holiday → if high risk for fracture

Reproducible bone loss (5%) on at least two DXAs taken at least two years apart

Evidence of bone loss on one DXA at two sites

Evidence of bone loss on one DXA at either site and accompanied by a fasting C-terminal telopeptide >600 pg/ml

Take Home Points

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- ✓ Validated PALTC fracture risk assessments
- ✓ Guidelines provide roadmap for PALTC osteoporosis treatment plan
- ✓ Vitamin D supplementation, dietary calcium, weight bearing, and fall prevention are included in PALTC treatment plan for bone health
- ✓ Consider deprescribing FDA approved osteoporosis medications when life expectancy is less than 2 years