APPENDIX 1. Assessing and Managing Patients at Risk for Fracture

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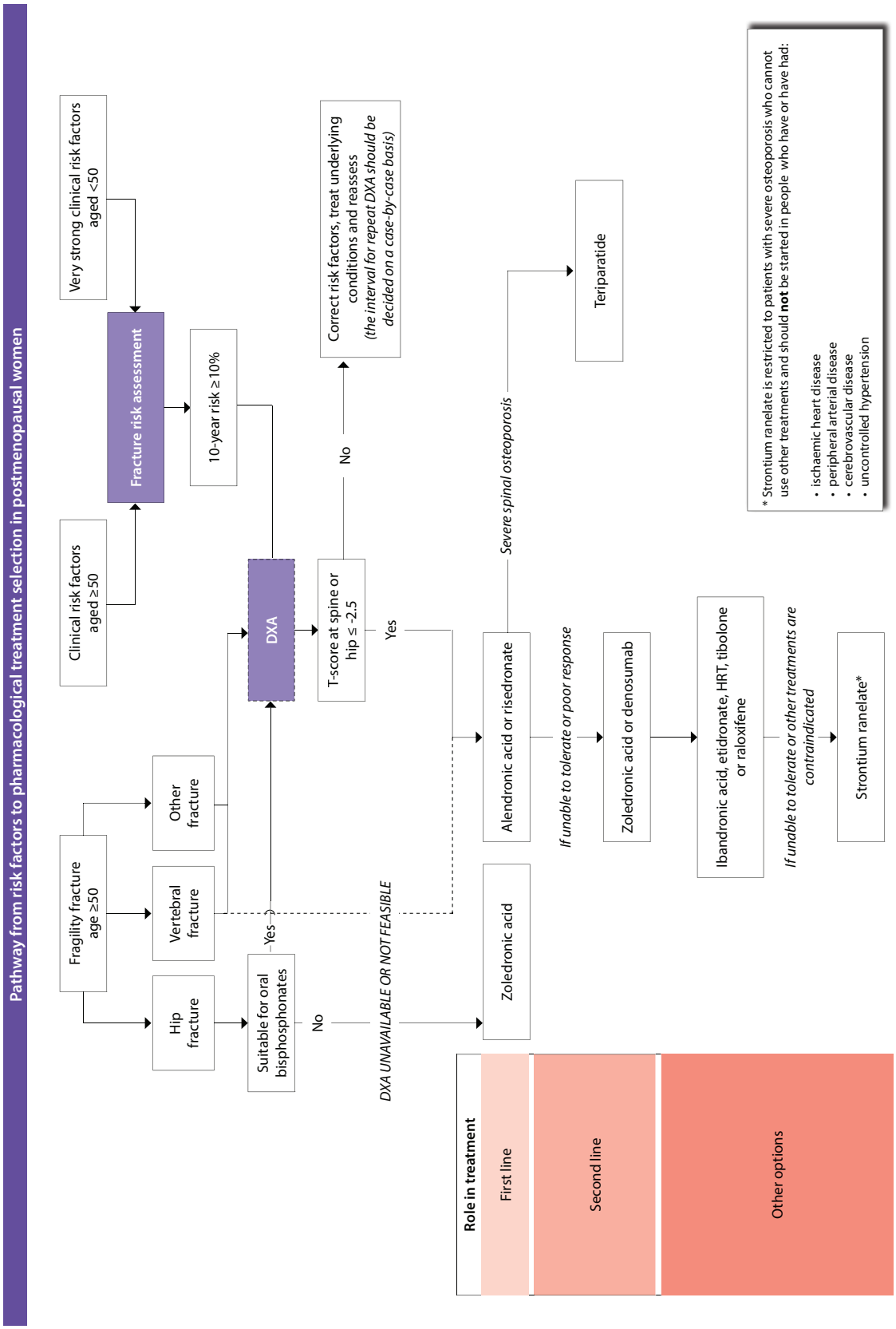

APPENDIX 2. Treatment of Osteoporosis: Bisphosphonates

Drug	Dosing	Recommendations [Level of Evidence]	Contraindications Adverse Effects	NNT[a]
alendronate alendronate + vit D	70 mg orally weekly	Reduces vertebral, non-vertebral and hip fractures 1st line: Menopausal women at high fracture risk [High Evidence] 1st line: Patients on long-term glucocorticoid therapy [High Evidence] Men at high risk of fracture [Very Low Evidence]	• Contraindicated in renal failure or pregnancy • Rare reports of osteonecrosis of jaw and atypical femoral fractures • With oral bisphosphonates, GI side effects are most common • Nausea, abdominal pain, loose bowel movements, heartburn, difficulty or pain upon swallowing • Oesophageal irritation occurs in ≥1% but <10% of users • Can cause musculoskeletal pain (muscle, bone and joints) (rarely severe)	**Vertebral** alendronate: 15* risedronate: 15** or 20* zoledronic acid: 13† **Hip** alendronate: 91* risedronate: 91† zoledronic acid: 91†
risedronate risedronate + calcium	35 mg orally weekly 150 mg orally monthly - all taken on an empty stomach, only with water 35mg orally weekly with food risedronate 35mg taken once weekly (day 1 of 7), calcium carbonate 1250mg (500mg elemental calcium) taken daily for the remaining 6 days (days 2-7)			
zoledronic acid	Zoledronic acid: 5 mg IV annually IV infusion over 15 mins		In addition to above (excluding GI symptoms) : flu-like symptoms up to 3 days, especially after first infusion; atrial fibrillation (rare)	
Cyclical etidronate etidronate + calcium. .	200 mg OD 400 mg OD x 14 days, then calcium carbonate 1250 mg (500 mg elemental calcium) OD x 76 days	3rd line: for menopausal women intolerant of 1st line therapies [Low Evidence] No evidence of reduction in hip or nonvertebral fractures	Etidronate is 100x less potent than other bisphosphonates and should only be considered if nothing else is feasible and risk of fracture is high	**Vertebral**: 30*

[a] NNT: number needed to treat (in comparison to placebo) to prevent 1 fracture over 3 yrs (except where indicated) in women;
* with previous vertebral fracture
* without previous vertebral fracture
† with or without previous vertebral fracture
CHD: coronary heart disease; VTE: venous thromboembolism

Sources: 1) Jin M, Jensen B. Osteoporosis (OP): Treatment Comparison Chart. Rx Files 2016. Available at: www.RxFiles.ca.; **2)** Papaioannou A, Morin S, Cheung AM, et al. 2010 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary. *CMAJ*. Nov 23 2010;182(17):1864-1873; **3)** Toward Optimized Practice (TOP) Osteoporosis CPG Committee 2016 Feb. *Diagnosis and Management Of Osteoporosis*. Edmonton, AB: Toward Optimized Practice. Kennel KA, Drake MT. Adverse Effects of Bisphosphonates: Implications for Osteoporosis Management. *Mayo Clinic Proceedings*. 2009;84(7):632-638.

APPENDIX 3. Treatment of Osteoporosis: Other Agents

Drug	Dosing	Recommendations [Level of Evidence]	Contraindications Adverse Effects	NNT[a]
Denosumab	60 mg SC twice yearly	1st line: Patients at high fracture risk or high-risk women who have failed or not tolerated other therapies [High Evidence] Reduces risk of fractures in vertebrae, hip and other sites in women with osteoporosis	Pain in the muscles, arms, legs or back. Skin condition with itching, redness and/or dryness. Slight increase risk of cellulitis Possible risk of serious infection (mostly immunocompromised patients) Osteonecrosis of jaw (rare)	**Vertebral**: 20 **Hip**: 67
Raloxifene	60 mg orally daily	Postmenopausal women at high risk of vertebral fracture [High Evidence] No evidence of reduction in hip or nonvertebral fractures	Increased risk of thromboembolic events Risks need to be weighed against benefits, especially in patients with or at risk of CHD (in whom treatment reduces vertebral fracture and breast cancer risk at the same absolute rate that it increases the VTE and fatal stroke risk)	**Vertebral:** 29†
Hormone Therapy (estrogen +/- progesterone)	Available in oral (daily) and patch (1x or 2x weekly) formulations	Women requiring treatment for menopausal symptoms who are also at high risk of fracture [High Evidence]	Increased risk of thromboembolic events Increased risk of breast cancer only after 10 years of use Risks should be weighed against benefits if used solely for fracture prevention	**Vertebral**: 385 **Hip**: 345† (over 5 yrs)
Teriparatide	20 mcg SC daily	1st line: Postmenopausal women with *severe* osteoporosis [High Evidence] Recommended treatment for severe osteoporosis in men and in patients on glucocorticoid therapy May decrease pain from vertebral fractures Limited to 2 years lifetime exposure	Hypercalcuria, hypercalcaemia Possible dizziness, nausea and leg cramps	**Vertebral**: 11* (over 1.5 yrs)
Calcitonin	20–100 IU daily for 2–4 wks (injected) Dose not standardized	Not approved for osteoporosis but reduces acute pain of vertebral fractures [Low Evidence]	Rare: Systemic effects (nausea, vomiting, dizziness, flushing with sensation of heat, polyuria and chills) Pain at injection site, facial flushing, metallic taste, hypersensitivity (rare)	

[a] NNT: number needed to treat (in comparison to placebo) to prevent 1 fracture over 3 years (except where indicated) in women;
* with previous vertebral fracture
* without previous vertebral fracture
† with or without previous vertebral fracture
CHD: coronary heart disease; g: generic drug; VTE: venous thromboembolism

Sources: 1) Jin M, Jensen B. Osteoporosis (OP): Treatment Comparison Chart. Rx Files 2016. Available at: www.RxFiles.ca.; **2)** Papaioannou A, Morin S, Cheung AM, et al. 2010 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary. *CMAJ.* Nov 23 2010;182(17):1864-1873; **3)** Toward Optimized Practice (TOP) Osteoporosis CPG Committee 2016 Feb. *Diagnosis and Management Of Osteoporosis.* Edmonton, AB: Toward Optimized Practice.