



Appendix D: Pharmacological Therapy for Osteoporosis ^{21-23, 28}

Generic Name	Strength (Brand name)	Route	Adult dose	Approximate annual cost of therapy ^A	PharmaCare coverage	Therapeutic considerations ^B
Bisphosphonates						
Alendronate	Tablets: 10 mg and 70 mg (Fosamax [®] , G)	Oral	10 mg once daily	\$393 (G) \$778	Limited Coverage	<p>Administration: swallow whole with full glass of water 30 min before first food of day; patients must not lie down for at least 30 min after dose</p> <p>To enhance absorption and decrease gastrointestinal side effects emphasize proper administration</p> <p>Contraindications: renal impairment [i.e., CrCl < 30 mL/min], hypocalcemia</p> <p>Precautions: upper gastrointestinal problems</p> <p>Adverse effects: abdominal pain, dyspepsia, nausea, esophagitis, esophageal ulcers, joint/muscle pain [may need to discontinue if persists], ocular inflammation, osteonecrosis of the jaw (ONJ) [more commonly reported with higher doses of bisphosphonates given intravenously i.e., as used in oncology], atypical femoral fractures [although rare, seems to be more common with long term bisphosphonate use and can present as thigh or groin pain], esophageal cancer [causality unknown], atrial fibrillation [data is conflicting, causality unknown]</p>
			70 mg once weekly	\$249 (G) \$560		
Alendronate plus cholecalciferol (Vitamin D ₃)	Tablets: 70 mg/5600 IU and 70 mg/2800 IU (Fosavance [®])	Oral	70 mg/ 5600 IU once weekly 70 mg/ 2800 IU once weekly	\$249	Limited Coverage	<p>Note: combination product containing vitamin D – adjust supplementation as needed</p> <p>See alendronate therapeutic considerations</p>
Etidronate plus calcium carbonate	Tablets: 400 mg etidronate; 1250 mg calcium carbonate, (Didrocal [®] , G)	Oral	One tablet once daily	\$92 (G) \$182	Regular Coverage	<p>Note: calcium carbonate 1250 mg = 500 mg elemental calcium</p> <p>Administration [etidronate]: swallow whole with full glass of water at bedtime 2 hours before or after eating; 90 day cycle: 400 mg etidronate once daily for 14 days followed by 1250 mg calcium carbonate daily for 76 days; then repeat</p> <p>See alendronate therapeutic considerations</p>
Risedronate	Tablets: 5 mg, 35 mg, and 150 mg (Actonel [®] , G)	Oral	5 mg once daily	\$302 (G) \$711	Limited Coverage ^C	See alendronate therapeutic considerations
			35 mg once weekly	\$229 (G) \$541		
			150 mg once monthly	\$635		
Zoledronic Acid	Solution for injection: 5 mg/ 100 mL (Aclasta [®])	Intravenous (IV)	5 mg once yearly	\$671	Limited Coverage	<p>Administration: IV infusion given over at least 15 minutes</p> <p>Precautions: ensure patient is well hydrated [at least 500 mL fluid prior to and following administration]</p> <p>Adverse effects: transient flu like syndrome, atrial fibrillation [uncommon, data conflicting], gastrointestinal effects [less than what is seen with oral bisphosphonates], renal dysfunction</p> <p>Also see alendronate therapeutic considerations for more information on contraindications, precautions and adverse effects</p>
Synthetic Parathyroid Hormone						
Teriparatide	Solution for injection: 2.4 mL pre-filled pen; delivers 20 mcg per dose; 28 doses per pen (Forteo [®])	Sub-cutaneous	20 mcg once daily	\$9628	No coverage	<p>Maximum lifetime exposure for an individual patient is 24 months.</p> <p>Administration: subcutaneous injection into the thigh or abdominal wall; administer initially under circumstances in which the patient can sit or lie down [may cause orthostatic hypotension]</p> <p>Contraindications: severe renal impairment, hypercalcemia, pregnancy</p> <p>Adverse effects: nausea, dizziness, leg cramps, transient hypercalcemia, syncope, osteosarcoma has been noted in rats receiving teriparatide (dose and duration dependent): the significance of this in humans is still unknown</p>

Generic Name	Strength (Brand name)	Route	Adult dose	Approximate annual cost of therapy ^A	PharmaCare coverage	Therapeutic considerations ^B
Selective Estrogen Receptor Modulators (SERMS)						
Raloxifene	Tablet: 60mg (Evista [®] , G)	Oral	60 mg once daily	\$542(G) \$715	Limited Coverage	Note: bone loss often resumes once treatment is stopped Contraindications: pregnancy, history of venous thromboembolic events (VTE) Precautions: consider baseline cardiovascular risk (increased risk of stroke and VTE) Adverse effects: vasomotor symptoms, flushing, leg cramps, flu syndrome, thromboembolic events [see above]
Calcitonin Peptides						
Calcitonin salmon	Nasal Spray: 200 IU per metered dose; 14 doses per bottle (Miacalcin NS, G)	Intra-nasal	200 IU intra-nasally once daily, alternate nostrils daily	\$614 (G) \$813	No Coverage	Note: salmon calcitonin is also available in an injectable form^P Adverse effects: common adverse effects appear to be localized, transient nasal reactions Health Canada is currently assessing the possibility of an increased risk of cancer with long-term use of calcitonin
RANK Ligand Inhibitor						
Denosumab	Solution for injection: 60 mg/ mL pre-filled syringe or vial (Prolia [™])	Sub-cutaneous	60 mg sub-cutaneously once every 6 months	\$660	Limited Coverage	Administration: subcutaneous injection into the upper arm, upper thigh, or abdomen Contraindications: hypocalcemia Adverse effects: cellulitis, dermatitis, eczema, rashes, pancreatitis, osteonecrosis of the jaw (rare)
Hormone Replacement Therapy (HRT)^{E, F}						
Conjugated estrogen	Tablets: 0.625 mg (Premarin (equine) [®] / C.E.S. [®])	Oral	0.625 mg once daily	\$38 (CES [®]) \$109.50 (Premarin)	Regular Coverage	Prescribe with progestin for women with an intact uterus Note: risk versus benefit needs to be taken into account when prescribing; consider using only in light of other available treatments Administration: use continuous or cyclical regimes and adjust dose as needed; topical – apply to skin, rotate sites Contraindications: history of thromboembolic events, breast cancer Adverse effects^G: nausea, vomiting, abdominal discomfort, breast tenderness thromboembolic events, breast cancer; topical - skin irritation
Micronized estradiol-17 β	Tablets: 0.5 mg (Estrace [®])	Oral	0.5 mg once daily	\$49	Regular Coverage	See conjugated estrogens therapeutic considerations.
Estradiol-17 β	Dermal patches: 50 mcg, 75 mcg, 100 mcg released per 24 hour (Sandoz Estradiol Derm) Dermal patches: 25mcg, 37.5 mcg, 50 mcg, 75 mcg, 100 mcg released per 24 hours (Estradot) Dermal patches: 25, 100 mcg released per 24 hours (Estraderm [®]) Dermal patches: 50, 75, 100 mcg released per 24 hours (Climara [®])	Trans-dermal	50 mcg patch applied twice weekly 50 mcg patch applied twice weekly 100 mcg patch applied twice weekly 50 mcg patch applied once weekly	\$192 \$307 \$451 \$295	Limited Coverage Limited Coverage ^H	Alternative to oral therapy Adjust dose as needed See conjugated estrogen therapeutic considerations

G-generics, IU-International Units

- A:** Prices are approximate retail cost, not including dispensing fee [as of December 2010]. Costs vary according to dose and choice of brand or generic product.
- B:** This is not an exhaustive list. Please review product monographs for complete details. Please review product monographs at http://webprod.hc-sc.gc.ca/dpd-bdpp/index_eng.jsp and regularly review current Health Canada advisories, warnings and recalls at: http://www.hc-sc.gc.ca/ahc-asc/media/advisories-avis/index_e.html
- C:** PharmaCare coverage is available through Special Authority for 5 mg and 35 mg tablets but not 150 mg tablets.
- D:** Osteoporosis is not an approved indication for calcitonin injectable in Canada. In patients with postmenopausal osteoporosis, the suggested recommended dose of salmon calcitonin injection is 100 international units every other day, administered subcutaneously or intramuscularly. Common side effects include nausea, vomiting, and flushing. Consider skin testing prior to first dose. [reference Micromedex Healthcare Series Web site. <http://www.thomsonhc.com.azproxy.samford.edu/home/dispatch>. Accessed June 20, 2010]
- E:** Only estrogens with a Health Canada approved indication for the relief of menopausal symptoms AND prevention of osteoporosis are listed
- F:** Usual doses listed. Use lowest effective dose, for the shortest period of time.
- G:** Estrogen alone is associated with an increased risk of stroke and deep vein thrombosis; combination estrogen and progesterone is associated with an increased risk of coronary heart disease, stroke, breast cancer, and venous thromboembolism [this risk seems to be less in women 50 – 59 years of age]
- H:** PharmaCare coverage is available through special authority for 50 mcg and 100 mcg patches but not the 75 mcg patches.

PharmaCare Coverage Definitions

G: generic(s) are available.

regular coverage: also known as regular benefit; does not require Special Authority; patients may receive full coverage*

partial coverage: Some types of regular benefits are only partially covered* because they are included in the Low Cost Alternative (LCA) program or Reference Drug Program (RDP) as follows:

LCA: When multiple medications contain the same active ingredient (usually generic products), patients receive full coverage* for the drug with the lowest average PharmaCare claimed price. The remaining products get partial coverage.

RDP: When a number of products contain different active ingredients but are in the same therapeutic class, patients receive full coverage* for the drug that is medically effective and the most cost-effective. This drug is designated as the Reference Drug. The remaining products get partial coverage.

limited coverage: requires Special Authority for coverage. Patients may receive full or partial coverage* depending on LCA or RDP status. These drugs are not normally regarded as first-line therapies or there are drugs for which a more cost-effective alternative exists.

no coverage: does not fit any of the above categories; *coverage is subject to drug price limits set by PharmaCare and to the patient's PharmaCare plan rules and deductibles. See <http://www.health.gov.bc.ca/pharmacare/> for further information.