

Guideline topic:

General comments

Search coverage

Patient searches

The patient search was conducted using the search strategy outlined below in conjunction with the patient search filter.

Date searched: **28 June 2010**

Sifted result: 142

Search strategies

The following are listings of the main Medline strategies used for this guideline. All conventions and symbols are from the Ovid implementation of Medline. Strategies used in other databases were substantially the same, though different terminology may have been used to take account of different thesauri used in non-Medline databases. Search filters were added to identify studies of a particular type (systematic review, RCT etc.) Listings of the search filters used by SIGN can be found on the SIGN Web site.

Patient & Generic Stem:

Patient search strategy

1 exp Osteoporosis/	36620
2 osteopor\$.tw.	38568
3 Fractures, Spontaneous/	5827
4 fragility fracture.tw.	319
5 (bone\$ adj2 fragil\$).tw.	982
((low or reduc\$ or decrease\$ or abnormal or age related or age-related) adj2 (bone mass or bone architecture or bone density or bone mineral)).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier]	6562
7 osteop\$eni\$.tw.	6293
8 1 or 2 or 3 or 4 or 5 or 6 or 7	5973

Generic stem

Fracture stem

1. (fracture\$ adj3 (prevent\$ or risk\$ or inciden\$ or frequenc\$)).tw.
2. ((hip\$ or vertebra\$ or spin\$ or wrist\$ or other or non-vertbra\$ or nonvertebra\$) adj2 fracture\$).tw.
3. ((fragility\$ or low impact\$ or low energy or osteoporotic) adj2 fracture\$).tw.

4. exp Fractures, Bone/

5. or/1-4

BMD and fracture stem

1. exp Osteoporosis/

2. Bone Density/

3. (bone adj2 (densit\$ or loss or mass or content or demineral\$ or strength or weak\$ or fragil\$ or decalcifi\$ or absor\$ or reabsor\$)).tw.

4. (fracture\$ adj3 (prevent\$ or risk\$ or inciden\$ or frequenc\$)).tw.

5. ((hip\$ or vertebra\$ or spin\$ or wrist\$ or other or non-vertebra\$ or nonvertebra\$) adj2 fracture\$).tw.

6. ((fragility\$ or low impact\$ or low energy or osteoporotic) adj2 fracture\$).tw.

7. exp Fractures, Bone/

8. BMD.tw.

9. fracture\$.ti.

10. (osteopor\$ or osteopen\$).tw.

11. (antifracture\$ or anti fracture).tw.

12. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11

Medline Search strategies used for specific key questions:

KQ1

1. (fracture\$ adj3 (prevent\$ or risk\$ or inciden\$ or frequenc\$ or rate\$ or number\$)).tw.

2. ((fragility\$ or low impact or low energy or osteoporo\$) adj3 fracture\$).tw.

3. 1 or 2

4. Risk Factors/

5. exp Fractures, Bone/

6. fracture\$.ti.

7. 5 or 6

8. 4 and 7

9. 3 or 8

10. exp Age Factors/

11. (age\$ or elder\$ or young\$ or old\$).ti.

12. Sex Factors/

13. (gender or sex or male\$ or female\$).ti.

14. exp Population Groups/

15. (ethnic\$ or race\$ or racial\$).ti.

16. exp Menopause/
17. (post menopaus\$ or post-menopaus\$ or pre menopaus\$ or pre-menopaus\$ or menopaus\$ or fertility).ti.
18. Family Health/
19. ((famil\$ or parent\$ or sibling\$ or relative\$) adj2 histor\$).tw.
20. Pedigree/
21. exp HIV/
22. (human immunodeficiency virus\$ or HIV).ti.
23. exp HIV Infections/
24. (Acquired Immunodeficiency Syndrome or AIDS).ti.
25. Celiac Disease/
26. (coeliac disease or celiac disease).tw.
27. (coeliac or celiac).ti.
28. exp Diabetes Mellitus/
29. diabet\$.ti.
30. ((previous\$ or recent or prior or second or earlier or history) adj fracture\$).tw.
31. history of fracture\$.tw.
32. Hyperparathyroidism, Primary/
33. (hyperparathyroid\$ or hyper parathyroid\$).tw.
34. exp Thyroid Diseases/
35. (hyperthyroid\$ or hypothyroid\$ or goiter or graves or hyperthyroxin\$ or thyroiditis).tw.
36. (thyroid adj2 (disease\$ or disorder\$ or dysgen\$)).tw.
37. Anorexia Nervosa/
38. (anorexia nervosa or anorexic).tw.
39. exp Liver Diseases/
40. ((liver or hepatic) adj2 (disease\$ or disorder\$ or cirrho\$ or chronic\$)).tw.
41. exp Kidney Diseases/
42. (kidney adj2 (disease\$ or disorder\$ or chronic\$)).tw.
43. (nephritis or nephropath\$).tw.
44. Spinal Injuries/
45. paraplegia/ or quadriplegia/
46. ((spine or spinal) adj2 injur\$).tw.
47. (parapleg\$ or quadrapleg\$ or tetrapleg\$).tw.
48. Depression/
49. exp Depressive Disorder/
50. (depression or depressive).tw.
51. mood disorder\$.tw.
52. (immobility or immobile or bedridden or bed ridden).tw.
53. exp Multiple Sclerosis/
54. multiple sclerosis.tw.
55. exp Craniocerebral Trauma/
56. ((brain or head) adj2 (injur\$ or trauma\$ or insult\$)).tw.

57. exp Nervous System Diseases/
58. ((neuro\$ or nervous) adj3 (disease\$ or disorder\$ or dysfunction\$ or function\$)).tw.
59. exp "schizophrenia and disorders with psychotic features"/dt
60. ((antipsycho\$ or anti psycho\$ or neuroleptic\$ or tranquili?e\$) adj2 (drug\$ or medication\$ or agent\$)).tw.
61. (antipsychotics or anti psychotics or neuroleptics or tranquili?ers).tw.
62. exp Antipsychotic Agents/
63. exp Aromatase Inhibitors/
64. aromatase inhibitor\$.tw.
65. exp Adrenal Cortex Hormones/
66. ((oral\$ or nasal\$ or inhal\$) adj2 (steroid\$ or corticosteroid\$ or corticoid\$)).tw.
67. (steroid\$ or corticosteroid\$ or corticoid).ti.
68. exp Gonadotropin-Releasing Hormone/
69. (GnRH or gonadotropin\$).tw.
70. (Luteini?ing\$ or LHRH).tw.
71. Medroxyprogesterone Acetate/
72. (Medroxyprogesterone Acetate or DMPA or depo or provera).tw.
73. Thiazolidinediones/
74. Thiazolidinedione\$.tw.
75. exp Diabetes Mellitus/dt [Drug Therapy]
76. exp Anticonvulsants/
77. exp Epilepsy/de, dt [Drug Effects, Drug Therapy]
78. (anticonvuls\$ or anti convuls\$ or antiepileptic\$ or anti epileptic\$).tw.
79. exp Anticoagulants/
80. (anticoagulant\$ or anti coagulant\$ or warfarin or heparin).tw.
81. exp Sodium Potassium Chloride Symporter Inhibitors/
82. loop diuretic\$.tw.
83. Furosemide/ or furosemide.tw.
84. Bumetanide/ or Bumetanide.tw.
85. Ethacrynic Acid/
86. Ethacrynic Acid/ or Ethacrynic Acid.tw.
87. Torsemide/ or Torsemide.tw.
88. exp Hydroxymethylglutaryl-CoA Reductase Inhibitors/
89. (statin\$ or (reducatse adj3 inhibitor\$)).tw.
90. exp Adrenergic beta-Antagonists/
91. ((beta adj2 antagonist\$) or betablocker\$ or beta blocker\$).tw.
92. or/10-91
93. 92 and 9
94. (fracture\$ and risk\$).ti.
95. 93 or 94
96. (tool\$ or score\$ or assessment\$).ti.
97. 95 not 96

KQ2 and 3

98. Hydroxyproline/
99. hydroxyproline.tw.
100. Alkaline Phosphatase/
101. (alkaline phosphatas\$ or BAP or BSAP).tw.
102. (telopeptide\$ or CTX or NTX).tw.
103. Collagen Type I/
104. Osteocalcin/
105. osteocalcin.tw.
106. (deoxypyridinoline or D pyr or DPD).tw.
107. exp Biological Markers/
108. (biomarker\$ or marker\$).ti.
109. or/98-108
110. Absorptiometry, Photon/
111. (absorptiometr\$ or photodensitometr\$ or densitometr\$ or dexa or dxa or dpx).ti.
112. exp Radiography/
113. (radiograph\$ or x ray\$ or xray\$).ti.
114. exp Tomography/
115. tomography.ti.
116. (CT or CAT).ti.
117. Rheumatoid Factor/
118. (rheumatoid factor or RhF).tw.
119. Parathyroid Hormone/
120. (parathyroid hormone\$ or parathorome\$ or pth?1-34? or pth?1-84?).tw.
121. (hypothyroid\$ or hyperthyroid\$).tw.
122. exp Ultrasonography/
123. (ultrasound or ultrasonograph\$).tw.
124. (bone\$ adj2 (geometry or shape\$ or angle\$)).tw.
125. or/110-124
126. FRAX.tw.
127. QFracture\$.tw.
128. calculated osteoporosis risk estimation.tw.
129. Osteoporosis Risk Assessment Instrument.tw.
130. Osteoporosis self-assessment tool.tw.
131. Osteoporosis Index.tw.
132. Fracture Index.tw.
133. Male Osteoporosis Risk Estimation Score.tw.
134. fracture risk calculat\$.tw.
135. (dubbo and fracture).tw.
136. or/126-135

137. algorithms/
138. (algorithm\$ or risk assessment or risk estimation or risk calculator or screening tool\$).tw.
139. (fracture\$ adj2 (predict\$ or screen\$)).tw.
140. or/137-139
141. (fracture\$ adj3 risk\$).tw.
142. (109 or 125) and 141
143. 136 or 139 or 142
144. fracture\$.ti.
145. 140 and 144
146. 143 or 145

KQ4

147. denosumab.tw.
148. ibandronate.tw.
149. ibandronic acid.tw.
150. 148 or 149
151. risedronate.tw.
152. Risedronic acid.tw.
153. risedronate sodium.tw.
154. or/151-153
155. Alendronate/
156. alendronic acid.tw.
157. alendronate.tw.
158. 155 or 156 or 157
159. Etidronic Acid/
160. etidronic acid.tw.
161. etidronate.tw.
162. or/159-161
163. zoledronate.tw.
164. zoledronic acid.tw.
165. 163 or 164
166. strontium ranelate.tw.
167. teriparatide.tw.
168. Teriparatide/
169. 167 or 168
170. parathyroid hormone/
171. parathyroid hormone\$.tw.
172. 170 or 171
173. Calcitonin/
174. calcitonin.tw.
175. 173 or 174

- 176. tibolone.tw.
- 177. Raloxifene/
- 178. raloxifene.tw.
- 179. 177 or 178
- 180. exp Hormone Replacement Therapy/
- 181. (((hormone\$ or estrogen or oestrogen) adj2 therap\$) or HRT).ti.
- 182. 180 or 181
- 183. exp Calcium/ad, tu, th [Administration & Dosage, Therapeutic Use, Therapy]
- 184. calcium.ti.
- 185. exp Vitamin D/ad, tu, th [Administration & Dosage, Therapeutic Use, Therapy]
- 186. vitamin d.ti.
- 187. *Diphosphonates/
- 188. bisphosphonate\$.ti.
- 189. or/150,154,158,162,165-166,169,172,175,177,183-188
- 190. ae.fs.
- 191. to.fs.
- 192. ct.fs.
- 193. 190 or 191 or 192
- 194. Atrial Fibrillation/
- 195. fibrillation.ti.
- 196. (atypical adj2 fracture\$.ti.
- 197. ((shaft or tibial) adj2 fracture\$.ti.
- 198. exp Esophageal Neoplasms/
- 199. ((esophageal or oesophageal or throat) adj2 (neoplasm\$ or cancer\$)).ti.
- 200. Osteonecrosis/
- 201. osteonecrosis.ti.
- 202. (harm\$ or adverse or side effect\$.ti.
- 203. or/190-202
- 204. 203 and 189

KQ5

- 205. Time Factors/
- 206. ((vacation or holiday or break or cessation or suspen\$) adj2 (medication or treatment or drug)).tw.
- 207. (("1" or "2" or "3" or "4" or "5") adj2 year\$ adj2 duration).tw.
- 208. ((one or two or three or four or five) adj2 year\$ adj2 duration).tw.
- 209. ((six or seven or eight or nine or ten) adj2 year\$ adj2 duration).tw.
- 210. (("6" or "7" or "8" or "9" or "10") adj2 year\$ adj duration).tw.
- 211. (duration or long term or long?term or cessation or suspen\$ or stop\$.ti.
- 212. or/205-211
- 213. 212 and 189

KQ6

- 214. exp Fractures, Bone/
- 215. fracture\$.tw.
- 216. (osteopor\$ or osteopen\$).tw.
- 217. bisphosphonate\$.tw.
- 218. (antifracture\$ or anti fracture).tw.
- 219. exp Osteoporosis/
- 220. disphosphonate\$.tw.
- 221. exp Diphosphonates/
- 222. (anti resorp\$ or antiresorp\$).tw.
- 223. *"Bone Density Conservation Agents"/
- 224. or/214-223
- 225. exp Drug Monitoring/
- 226. Monitoring, Physiologic/
- 227. ((monitor\$ or assess\$ or measure\$ or response or respond\$) adj4 (treatment\$ or medication\$ or agent\$ or drug\$)).ti.
- 228. ((monitor\$ or assess\$ or measure\$ or response or respond\$) adj4 (bone density or bone mineral or BMD)).ti.
- 229. ((monitor\$ or assess\$ or measure\$ or response or respond\$) adj4 (biomarker\$ or marker\$ or turnover)).ti.
- 230. or/225-229
- 231. 224 and 230
- 232. (response\$ or respond\$ or monitor\$ effective\$ or serial or routine or regular or repeat\$ or schedule\$ or value\$).ti.
- 233. ((monitor\$ or assess\$ or measure\$ or response or respond\$) adj2 (treatment\$ or medication\$ or agent\$ or drug\$ or therap\$)).tw.
- 234. ((monitor\$ or repeat measure\$ or respond\$ or change) adj2 (bone density or bone mineral or BMD)).tw.
- 235. ((monitor\$ or assess\$ or measure\$ or response or respond\$) adj2 (biomarker\$ or marker\$ or turnover)).tw.
- 236. or/232-235
- 237. (BMD or bone mineral density or bone density or densitometry).ti.
- 238. (DXA or dexta or absorptiometry).ti.
- 239. (marker\$ or biomarker\$ or turnover).ti.
- 240. ultrasound.ti.
- 241. (x-ray\$ or xray\$ or radiograph\$).ti.
- 242. (tomograph\$ or scan\$ or image\$ or QCT or pQCT).ti.
- 243. or/237-242
- 244. 236 and 243
- 245. 244 and 224
- 246. 231 or 245

KQ7

- 247. exp Patient Compliance/
- 248. (adhere\$ or comply or compliance or concord\$ or persist\$).ti.
- 249. (compliance and persist\$).tw.
- 250. (persist\$ and adhere\$).tw.

251. (compliance and adhere\$.tw.
252. or/247-251
253. exp Osteoporosis/
254. Bone Density/
255. (bone adj2 (densit\$ or loss or mass or content or demineral\$ or strength or weak\$ or fragil\$ or decalcifi\$ or absor\$ or reabsor\$)).tw.
256. (fracture\$ adj3 (prevent\$ or risk\$ or inciden\$ or frequenc\$)).tw.
257. ((hip\$ or vertebra\$ or spin\$ or wrist\$ or other or non-vertebra\$ or nonvertebra\$) adj2 fracture\$.tw.
258. ((fragility\$ or low impact\$ or low energy or osteoporotic) adj2 fracture\$.tw.
259. exp Fractures, Bone/
260. BMD.tw.
261. fracture\$.ti.
262. (osteopor\$ or osteopen\$.tw.
263. (antifracture\$ or anti fracture).tw.
264. 253 or 254 or 255 or 256 or 257 or 258 or 259 or 260 or 261 or 262 or 263
265. 252 and 264
266. bisphosphonate\$.ti.
267. disphosphonate\$.ti.
268. exp Diphosphonates/
269. (anti resorp\$ or antiresorp).ti.
270. or/266-269
271. 252 and 270
272. 265 or 271

KQ8 answered by systematic review

KQ9

273. exp Dietary Proteins/
274. (protein\$ adj2 (egg\$ or milk or fish or meat\$ or vegetable\$ or plant\$ or diet\$ or food\$ or supplement\$)).tw.
275. (protein\$ adj2 (intake or ingest\$ or drink\$)).tw.
276. exp Fatty Acids/
277. fatty acid\$.tw.
278. omega.tw.
279. exp Fruit/
280. vegetables/
281. (fruit\$ or berry or berries or nuts or seed\$ or vegetable\$ or legume\$.tw.
282. Potassium Citrate/
283. potassium citrate.tw.
284. Sodium Bicarbonate/
285. sodium bicarbonate.tw.
286. potassium bicarbonate.tw.

287. alkali\$ salt\$.tw.
288. (acid adj (load or balance)).tw.
289. vitamin k1/
290. vitamin k1.tw.
291. ascorbic acid/
292. ascorbic acid.tw.
293. vitamin c.tw.
294. exp Vitamin A/
295. vitamin a.tw.
296. exp Homocysteine/
297. homocysteine.tw.
298. exp Vitamin B Complex/
299. exp Folic Acid/
300. exp Riboflavin/
301. (vitamin b or folate or folic acid or riboflavin\$).tw.
302. Magnesium/
303. Boron/
304. Silicon/
305. (magnesium or boron or silicon).tw.
306. exp Sodium, Dietary/
307. (diet\$ adj2 (salt or sodium)).tw.
308. (intake adj2 (salt or sodium)).tw.
309. Caffeine/
310. (caffein\$ or coffee\$).tw.
311. Tea/
312. (tea adj3 (consumption or drink\$ or green)).tw.
313. Cacao/
314. (chocolate or cocoa).tw.
315. Vitamin A/
316. vitamin a.tw.
317. exp Sodium, Dietary/
318. (diet\$ adj2 (salt or sodium)).tw.
319. (intake adj2 (salt or sodium)).tw.
320. retinol.tw.
321. Vitamin E/
322. vitamin e.tw.
323. Caffeine/
324. coffee/ or tea/
325. caffeine.tw.
326. dietary pattern\$.tw.
327. (diet\$ adj2 pattern\$).tw.

328. or/273-327

KQ10

329. (fracture\$ adj3 (prevent\$ or risk\$ or inciden\$ or frequenc\$)).tw.

330. ((fragility\$ or low impact\$ or low energy or osteopor\$) adj2 fracture\$).tw.

331. ((hip\$ or vertebra\$ or spin\$ or wrist\$ or other or non-vertbra\$ or nonvertebra\$) adj2 fracture\$).tw.

332. exp Fractures, Bone/

333. Osteoporotic Fractures/

334. exp Osteoporosis/

335. fracture\$.ti.

336. (osteopor\$ or osteopen\$).ti.

337. or/329-336

338. exp Patient Care Team/

339. exp Preventive Health Services/

340. ((service\$ or program\$ or care or model\$ or intervention\$ or pathway\$) adj2 (multifaceted or integrated or multimodal or multifaceted or coordinated or co-ordinated)).tw.

341. (care pathway\$ or treatment pathway\$ or management pathway\$).tw.

342. ((service\$ or program\$ or care) adj2 delivery).tw.

343. (nurse\$ adj2 (clinic or clinics)).tw.

344. (healthcare adj2 (delivery or model\$ or integrate\$)).tw.

345. (health care adj2 (delivery or model\$ or integrate\$)).tw.

346. (health service\$ adj2 (delivery or model\$ or integrate\$)).tw.

347. or/338-346

348. 337 and 347

349. Recurrence/pc [Prevention & Control]

350. ((secondary fracture\$ or recurrent fracture\$ or subsequent fracture\$) adj2 prevent\$).tw.

351. 349 and 337

352. 350 or 351

353. (fracture\$ adj2 (clinic or clinics)).tw.

354. (fracture\$ adj2 (service\$ or team\$)).tw.

355. fracture liaison.tw.

356. or/353-355

357. (after adj2 fracture\$).tw.

358. (post adj2 fracture\$).tw.

359. postfracture.tw.

360. 357 or 358 or 359

361. (pathway\$ or service\$ or program\$ or model\$).tw.

362. 360 and 361

363. (discharge\$ adj3 (treat\$ or assess\$ or follow\$ or identif\$)).tw.

364. 363 and 337

365. or/348,352,356,362,364

KQ11

- 366. kyphoplast\$.tw.
- 367. vertebroplast\$.tw.
- 368. (vertebr\$ adj2 augment\$).tw.
- 369. pvp.tw.
- 370. fracture\$.tw.
- 371. 369 and 370
- 372. 366 or 367 or 368 or 371
- 373. compression fracture\$.tw.
- 374. spinal fracture/
- 375. (osteopor\$ or osteopen\$ or fragility\$ or compression or low energy or nontrauma\$ or non trauma\$).tw.
- 376. ((spine or spinal or vertebra\$) adj2 (fracture\$ or deform\$)).tw.
- 377. 373 or 374 or 376
- 378. 377 and 375
- 379. Transcutaneous Electric Nerve Stimulation/
- 380. TENS.tw.
- 381. 379 or 380
- 382. 378 and 381
- 383. exp Physical Therapy Modalities/
- 384. physiotherap\$.tw.
- 385. physical therap\$.tw.
- 386. (manipulat\$ or stretch\$ or breath\$ or massage).tw.
- 387. (acupuncture or hydrotherap\$ or traction or strapping or brace).tw.
- 388. (temperature or hypotherm\$ or ice or cold or hypertherm\$ or hot or heat).tw.
- 389. (electrotherap\$ or ultrasound or diatherap\$).tw.
- 390. or/383-389
- 391. 378 and 390
- 392. exp Analgesia/
- 393. analgesi\$.tw.
- 394. (pain adj2 (relief or releave or reduc\$ or decreas\$ or medication or free)).tw.
- 395. or/392-394
- 396. 378 and 395
- 397. *Spinal Fractures/dt, rh, th [Drug Therapy, Rehabilitation, Therapy]
- 398. Calcitonin/
- 399. calcitonin.tw.
- 400. 398 or 399
- 401. antidepress\$.tw.
- 402. 381 or 390 or 395 or 400 or 401
- 403. serotonin.tw.
- 404. 402 or 403

405. 378 and 404