

**Risk of Second Hip Fracture Persists for Years After Initial Trauma**

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**Purpose:** Secondary prevention following hip fracture is underprescribed. This may be due to the lack of knowledge of who to target and when to target them. Presently secondary prevention is directed at women who suffer from high rates of second hip fracture, particularly in the early years post fracture. The risk of second hip fracture by certain times also depends on the death rate (competing risk) yet previous studies have failed to censor who have died. Here we estimate and compare the risk of second hip fracture for surviving women and men in the 10 years post fracture.

**Methods:** We retrieved 38,383 hospitalization records of patients aged 60 years or older, who were discharged alive after index admission for surgical treatment of a nonpathologic hip fracture from April 1, 1990 to March 31, 2005 from our jurisdiction's administrative health database, and had no hip fracture hospitalizations before April 1, 1990. The outcome variable was the time between discharge date for index hospitalization and admission date for a subsequent hip fracture. We estimated the conditional probability function of second hip fracture using the ratio of the cumulative incidence of second hip fracture over the complement of the cumulative incidence of death by follow-up year. We tested for differences in the conditional probability function of second hip fracture between women and men using Pepe's 2-sample test and a proportional-odds model. By fitting this model, we obtained a series of odds ratios (ORs) comparing the risk of another fracture between surviving women and men for every follow-up year and the weighted average of these ORs. We tested whether the serial ORs are equal using time-dependence test.

**Results:** During 10 of follow-up, 21,428 (56%) died before sustaining second hip fracture, and 2902 (8%) sustained second hip fracture. In women and men combined, the percentage of second hip fracture for the surviving post-fracture population increased steadily with time, reaching 34% (95% confidence interval [CI]: 33-35) by 10 years. The percentage was higher in women than in men: 2% vs 2%, 5% vs 4%, 9% vs 7%, 15% vs 13%, and 35% vs 30% at 1 year, 2, 3, 5, and 10 years, respectively (figure, left panel 2-sample test:  $P = 0.02$ , crude OR = 1.25 [95% CI: 1.13-1.39]). However, after adjustment for baseline age, fracture type, period, and hospital length of stay, the percentage of second hip fractures among survivors did not differ between women and men, OR = 1.09 (95% CI: 0.98-1.21) (figure, right panel). The time-dependence test rejected the equality hypothesis for serial ORs of second hip fracture for women relative to men ( $P = 0.02$ ).

**Conclusion:** Challenging common belief, we report that women and men remaining alive post hip fracture are at an equal risk of second hip fracture, and therefore both should be considered for secondary prevention. The risk of second hip fracture persists for at least 10 years among hip fracture survivors. Secondary prevention should be considered early post fracture; however, patients with a delay to secondary prevention therapy may still benefit at any stage post fracture.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.

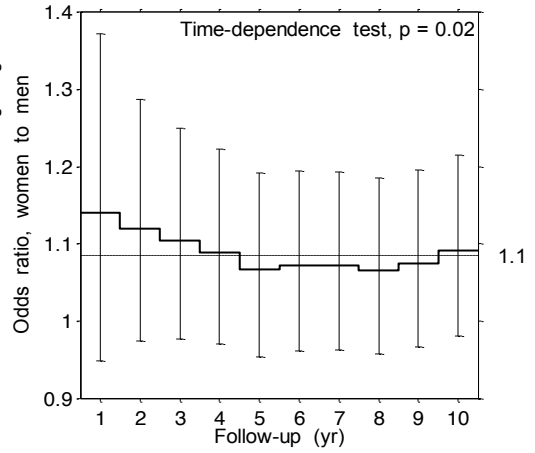
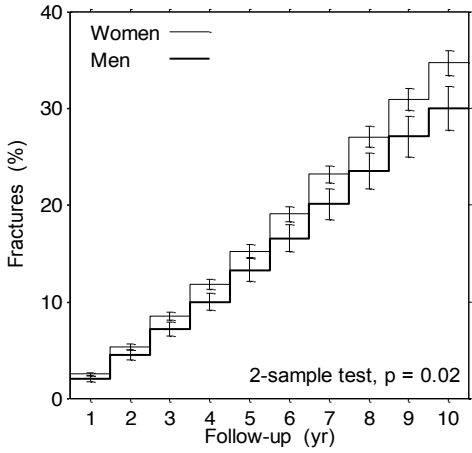


Figure. Risk of second hip fracture given a death did not occur by follow-up year, for women and men, (left panel). Adjusted odds ratios for second hip fracture comparing women and men, by follow-up year (right panel). The dashed line represents the weighted average of the adjusted odds ratios. Vertical bars represent 95% confidence intervals.