

# Absolute risk for subsequent fracture was similar in women and men

Center JR, Bliuc D, Nguyen TV, Eisman JA. Risk of subsequent fracture after low-trauma fracture in men and women. *JAMA*. 2007;297:387-94.

**Clinical impact ratings:** GIM/FP/GP ★★★★★☆ Geriatrics ★★★★★☆☆

## QUESTION

What is the risk for subsequent fracture after initial low-impact fracture in women and men?

## METHODS

**Design:** Inception cohort followed for median 16 years in women and 15 years in men (Dubbo Osteoporosis Epidemiology Study).

**Setting:** Community study in Dubbo, New South Wales, Australia.

**Patients:** 1242 patients  $\geq$  60 years of age (905 women [mean age 78 y] and 337 men [mean age 77 y] at time of incident fracture) who had an initial low-impact fracture (caused by a fall from a standing height or less) between January 1989 and April 2005. Patients with skull, finger, and toe fractures or an underlying condition that could predispose to pathologic fracture were excluded.

**Prognostic factors:** Smoking, alcohol, and dietary calcium intake; comorbid conditions and medications; anthropomorphic measurements; bone mineral density of the lumbar spine and femoral neck; quadriceps strength; and body sway.

**Outcomes:** Subsequent fracture.

## MAIN RESULTS

Among 905 women with initial fracture, 253 had a subsequent fracture over 4076 person-years (median 3.25 y) of follow-up. Among 337 men with initial fracture, 71 had a subsequent fracture over 1248 person-years (median 2.13 y) of follow-up. Absolute refracture risks were similar between women and men (62/1000 person y, 95% CI 55 to 70/1000 person y and 57/1000 person y, CI 45 to 72/1000 person y, respectively), and these rates persisted across all age groups and most initial fracture types. Given the smaller number of men with initial fracture, the relative risk for refracture was almost twice as high in men as in women (3.47 [CI 2.69 to 4.48] vs 1.97 [CI 1.71 to 2.26]). For women and men, the refracture risk was equivalent to or greater than the initial fracture risk for a woman 10 years older. Using multivariate analysis, the adjusted hazard ratios for refracture showed that greater body sway (men 1.56, CI 1.01 to 2.41; women 1.00, CI 0.83 to 1.21), lower calcium intake (men 2.22,

CI 1.37 to 3.58; women 1.09, CI 0.95 to 1.25), and lower levels of physical activity (men 1.81, CI 1.17 to 2.82; women 1.01, CI 0.85 to 1.19) were more important factors for men than for women, whereas age was more important for women than for men (women 1.33, CI 1.10 to 1.61; men 1.06, CI 0.65 to 1.73). Smoking was important for both, but the magnitude was greater in men than in women (men 2.43, CI 0.99 to 5.94; women 1.43, CI 1.03 to 2.00).

## CONCLUSIONS

After initial low-impact fracture, women and men 60 years of age had similar absolute risks for subsequent fracture, across all age groups and most initial fracture types. Men had a refracture risk equivalent to that of a woman 10 years older.

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## COMMENTARY

Previous studies have shown increased risk for subsequent fracture after hip, vertebral, and wrist fractures (1), but the study by Center and colleagues is the first to comprehensively examine the subsequent risk for all fracture types after an initial low-impact fracture. The authors found a relatively high risk for subsequent fracture among both men and women with initial fracture. Given that few persons are screened or treated for osteoporosis after a fracture (2), this is not necessarily surprising.

While the numbers of secondary fractures are substantial, from the perspective of a patient having his or her first fracture, the authors may have overstated the absolute risk for subsequent fracture for survivors by not accounting for the competing risk for death (3). Patients with such osteoporotic fractures as hip fractures have an increased risk for dying (4), such that they would not have the "opportunity" to sustain another fracture. Thus, a better understanding of predictors of mortality after a fracture is needed to accurately differentiate individuals at risk for dying from those who are likely to live long enough to have second fractures.

It is important to note that the authors also found that of persons who had a second fracture, about 60% of women and 50% of men had the second fracture  $>$  2 years after the initial fracture. This has significant clinical implications. Many second fractures occur  $>$  6 months after the initial fracture; thus, there is time to implement such secondary prevention measures as fall prevention, vitamin D supplementation, or pharmacologic interventions. Bisphosphonates are currently being studied in secondary prevention of fractures (5).

This study underscores the often-forgotten fact that a fracture is not a normal outcome of aging, but a potent risk factor for future fracture. It is strongly recommended that both women and men with fracture be vitamin D-replete and be considered for pharmacologic treatment, which may prevent second fractures.

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