SUPPLEMENTAL MATERIAL

Supplemental Methods

Modeling and variable selection strategy

We built separate models for each fall outcome using variable selection procedures and change-in-estimate methods established for epidemiologic analyses (32,33). Our approach entailed estimation of the RRs and 95% CI in two separate model building steps to assess and control for confounders and then to evaluate possible intermediate factors. First, we constructed base models adjusted for age and other confounders. Potential confounders were examined from among all baseline variables (exclusive of possible intermediate factors listed below) that were associated with at least one back pain variable, one fall outcome, or both in descriptive analyses. Of these, we retained those that met the 10% change in estimate definition for confounding when added to the model (32,33). Both models contained 6 confounding factors. The five common to both models were age, trouble with dizziness, history of arthritis, knee pain in the past year, and lower urinary tract symptom severity. Additionally, self-rated health was included as a confounder in the model for recurrent fall risk and BMI was included as a confounder in the model for any fall. Other factors considered as potential confounders including education level, smoking, and alcohol consumption did not meet the definition of confounding used this analysis, so adjustment for these was unnecessary (34).

Second, we evaluated the extent to which associations of back pain and fall risk from the base models were further explained by possible intermediate factors including each physical performance measure, IADL difficulty, depression, and CNS medication use. To accomplish this, we added potential intermediate variables one at a time to the base models and computed

the percent attenuation in the RR. We planned to retain in the final model any candidate intermediate variables whose inclusion in the base model attenuated the RR by at least 10%; however, no variables met this criterion consistently.

When potential intermediate variables were added one at time to the base model for recurrent falls, percentage change in the RRs ranged from +0.6% to –9.8%. Adjustment for CNS medication use strongly attenuated the RR for severe back pain (–9.8%), but attenuated RRs for other back pain categories to a lesser extent (–6.2% to -0.7%). When IADL difficulty was added to the base model, RRs were attenuated for back pain that was severe (–8.6%), occurred most/all of the time (–9.3%), and limited usual activities (–8.4%). Adjustment for other potential intermediate variables attenuated RRs by -7% or less. In analyses of any fall, attenuation in the RRs ranged from −7.8% to −3.1% after adjustment for IADL difficulty, from −7.1% to −2.3% after adjustment for CNS medication use, and from 0% to −5.8% after adjustment for any other potential intermediate variable. Therefore, we retained variables for CNS medication use and IADL difficulty in the final models. Because the possible intermediate variables were measured only at baseline, their temporal relation to back pain is unknown. Thus, we present RRs before (Table 2) and after adjustment (Figure 1) for possible intermediate variables to facilitate inference about their effects (33).

Supplemental Table 1. Risk ratios (RR) for falls in relation to back pain location: age and base model (confounding adjusted) estimates.

		Recurrent (≥2) Falls			Any Fall		
Back pain Locations	No.	% with ≥2 falls	Age-adjusted RR	Multivariable RR (95% CI)*	% with any fall	Age-adjusted RR	Multivariable RR (95% CI)†
No back pain	1861	8	1.0 (ref.)	1.0 (ref.)	19	1.0 (ref.)	1.0 (ref.)
Low back only	2317	11	1.44	1.24 (1.02, 1.51)	26	1.37	1.27 (1.13, 1.42)
Low back and ≥1 other site	1084	17	2.22	1.59 (1.29, 1.97)	31	1.62	1.35 (1.18, 1.54)
Any site other than low back	306	13	1.68	1.48 (1.07, 2.04)	27	1.44	1.33 (1.09, 1.62)

Abbreviations: ref, referent level; CI, confidence interval; LUTS, lower urinary tract symptoms.
* Adjusted for age, dizziness, history of arthritis, knee pain, LUTS, and self-rated health.
† Adjusted for age, dizziness, history of arthritis, knee pain, LUTS, and BMI category.

Supplemental Table 2. Risk ratios (RR) for falls in relation to back pain among older men according to baseline age, fall history in prior year, and hip pain or knee pain in prior year.

	≥2 Falls			Any Fall		
	No back pain	Any back pain		No back pain	Any back pain	
Strata‡	Multivariable RR (95% CI)*		P, interaction	Multivariable RR (95% CI)†		P, interaction
Age <75 years	1.0 (ref)	1.4 (1.0, 1.8)		1.0 (ref)	1.3 (1.1, 1.5)	
Age ≥75 years	1.0 (ref)	1.2 (0.9, 1.5)	0.69	1.0 (ref)	1.2 (1.0, 1.4)	0.37
No falls	1.0 (ref)	1.2 (0.9, 1.5)		1.0 (ref)	1.2 (1.0, 1.4)	
Fall history	1.0 (ref)	1.4 (1.1, 1.8)	0.94	1.0 (ref)	1.3 (1.1, 1.4)	0.58
No hip or knee pain	1.0 (ref)	1.3 (1.0, 1.7)		1.0 (ref)	1.2 (1.0, 1.3)	
Hip pain only	1.0 (ref)	1.1 (0.6, 2.0)		1.0 (ref)	1.1 (0.8, 1.6)	
Knee pain only	1.0 (ref)	1.0 (0.7, 1.4)		1.0 (ref)	1.3 (1.0, 1.6)	
Both hip and knee pain	1.0 (ref)	2.4 (1.1, 4.9)	0.13	1.0 (ref)	1.6 (1.1, 2.5)	0.30

Abbreviations: ref, referent level; CI, confidence interval; lower urinary tract symptoms (LUTS).
*Adjusted for age, dizziness, history of arthritis, knee pain, LUTS, self-rated health, CNS medication use, and IADL difficulty.
†Adjusted for age, dizziness, history of arthritis, knee pain, LUTS, BMI category, CNS medication use, and IADL difficulty.
‡Age was not included in models within age strata; knee pain and hip pain were not included in models within hip/knee pain strata.