

# Review: Prophylactic use of vitamin D reduces falls in older persons

Bischoff-Ferrari HA, Dawson-Hughes B, Willett WC, et al. **Effect of vitamin D on falls: a meta-analysis.** JAMA. 2004;291:1999-2006.

## QUESTION

In older persons, is prophylactic use of vitamin D effective for preventing falls?

## METHODS

**Data sources:** MEDLINE and the Cochrane Controlled Trials Register (January 1960 to February 2004), EMBASE/Excerpta Medica (January 1991 to February 2004), and the American Society for Bone and Mineral Research conference abstracts (1995 to 2002). Bibliographies of relevant studies were reviewed, and experts in the field were contacted for unpublished studies.

**Study selection and assessment:** Randomized controlled trials (RCTs) that compared prophylactic use of any type of vitamin D with a control condition in community-dwelling or institutionalized older persons (mean age of study participants had to be  $\geq 60$  y). Studies were also required to have a methods section that stated how falls (the outcome) were defined and ascertained. After the selection process, study quality was further assessed against specified criteria that included allocation concealment, blinding, and withdrawals.

**Outcomes:** Low-trauma falls defined as unintentionally coming to rest on the ground, floor, or other lower level.

## MAIN RESULTS

5 RCTs ( $n = 1237$ ) (mean age 70 y, 81% women) met the selection criteria. Comparisons included cholecalciferol, 800 IU/d plus calcium, 1200 mg/d with calcium, 1200 mg/d (2 RCTs); cholecalciferol, 400 IU/d plus calcium, 800 to 1000 mg/d from dairy products with placebo (1 RCT); calcitriol, 0.5  $\mu\text{g}/\text{d}$  with placebo (1 RCT); and  $1\alpha$ -calcidiol, 1  $\mu\text{g}/\text{d}$  with placebo (1 RCT). Meta-analyses were done using fixed- and random-effects models. Both analyses showed that fewer patients in the vitamin D group than in the control group had  $\geq 1$  fall (Table). Furthermore, a sensitivity meta-analysis of the

10 “potentially appropriate for inclusion RCTs” (10 001 participants) showed that fewer patients in the vitamin D group than in the control group had  $\geq 1$  fall (relative risk reduction 13%, 95% CI 4 to 20).

## CONCLUSION

In older persons, prophylactic use of vitamin D is effective for reducing falls.

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### Vitamin D prophylaxis vs a control condition (e.g., calcium or placebo) in older persons at 3 months to 3 years\*

Outcome	Number of trials (n)	Weighted event rates		RRR (95% CI)	NNT (CI)
		Vitamin D	Control		
Participants who had $\geq 1$ fall	5 (1237)	30%	37%	19% (6 to 31)	15 (9 to 52)

\*Abbreviations defined in Glossary; weighted event rates, RRR, NNT, and CI calculated from data in article using a random-effects model.

## COMMENTARY

Falls are a serious concern in older persons because of their high prevalence and potential to lead to severe morbidity or mortality. Any intervention to decrease this epidemic would be welcome. The meta-analysis of 5 RCTs by Bischoff-Ferrari and colleagues suggests that a daily supplement of vitamin D can reduce falls in older persons by 19%. A number needed to treat of 15 is impressive, and the inexpensive cost of vitamin D supplementation makes this recommendation even more compelling.

Are there any cautions to a program of vitamin D supplementation in older adults? Perhaps if one is reluctant to treat while a mechanism of action is yet to be determined. The authors cite a plausible argument that vitamin D enhances muscle strength, noting evidence for cell growth after stimulation of the “highly specific nuclear vitamin D receptor” in human muscle. Indeed, the rapid onset of benefit (in 2 to 3 mo in 2 of the selected 5 RCTs) parallels results seen in studies emphasizing exercise intervention (1), which has a somewhat more easily understood mechanism of action on muscle.

3 of the 5 RCTs stipulated calcium supplementation along with vitamin D. Hypercalcemia was not reported, and of the 4 trials that

measured postintervention levels of vitamin D, no cases of hypervitaminosis D occurred. However, use of calcium supplementation and the optimal dose of either calcium or vitamin D are unclear.

A recent Cochrane Review of falls in the elderly (2) lists risk factor intervention, muscle strengthening and balance training, and withdrawal of psychotropic medications as interventions “likely to be beneficial.” Such steps should certainly be continued. Now, health care providers should consider routine vitamin D supplementation for older persons as recommended by Bischoff-Ferrari and colleagues in this review.

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## References

- Campbell AJ, Robertson MC, Gardner MM, et al. Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *BMJ*. 1997;315:1065-9.
- Gillespie LD, Gillespie WJ, Robertson MC, et al. Interventions for preventing falls in elderly people. *Cochrane Database Syst Rev*. 2003;(4):CD000340.