

## ARTICLES

# Prospective Study of Serum Vitamin D and Cancer Mortality in the United States

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**Background:** Vitamin D has been hypothesized to reduce cancer mortality through its effects on incidence and/or survival. Epidemiologic studies of the association of 25-hydroxyvitamin D [25(OH)D] and the risk of cancer, however, have been largely limited to incident cancers at a few sites.

**Methods:** A total of 16818 participants in the Third National Health and Nutrition Examination Survey who were 17 years or older at enrollment were followed from 1988–1994 through 2000. Levels of serum 25(OH)D were measured at baseline by radioimmunoassay. Cox proportional hazards regression models were used to examine the relationship between serum 25(OH)D levels and total cancer mortality (in the entire population or according to race/ethnicity, sex, age, and retinol status) and mortality from specific cancers. Because serum was collected in the south in cooler months and the north in warmer months, we examined associations by collection season. All statistical tests were two-sided.

**Results:** We identified 536 cancer deaths in 146578 person-years. Total cancer mortality was unrelated to baseline vitamin D status in the entire population, men, women, non-Hispanic whites, non-Hispanic blacks, Mexican Americans, and in persons younger than 70 or 70 years or older. We found no interaction between vitamin D and season or vitamin D and serum retinol. Colorectal cancer mortality was inversely related to serum 25(OH)D level, with levels 80 nmol/L or higher associated with a 72% risk reduction (95% confidence interval = 32% to 89%) compared with lower than 50 nmol/L,  $P_{\text{trend}} = .02$ .

**Conclusions:** Our results do not support an association between 25(OH)D and total cancer mortality, although there was an inverse relationship between 25(OH)D levels and colorectal cancer mortality.

## CONTEXT AND CAVEATS

### Prior knowledge

Based on epidemiologic studies, vitamin D has been hypothesized to reduce cancer mortality.

### Study design

Cox proportional hazard regression models were used to examine the relationship between serum vitamin D level measured in participants in a nationwide survey of health and nutrition and cancer mortality.

### Contribution

This study found that total cancer mortality was not related to vitamin D status but that higher levels of vitamin D may be associated with a reduced risk of colorectal cancer mortality.

### Implications

inverse associations between a surrogate for vitamin D status and cancer mortality reported previously are not supported by the results of this study.

### Limitations

This study lacked power to clarify associations between vitamin D status and particular cancers for which there were insufficient deaths, and it relied on a single measurement to reflect serum vitamin D status.

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