

Abstract

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Prospective study of predictors of vitamin D status and cancer incidence and mortality in men.

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BACKGROUND: Vitamin D has potent anticancer properties, especially against digestive-system cancers. Many human studies have used geographic residence as a marker of solar ultraviolet B and hence vitamin D exposure. Here, we considered multiple determinants of vitamin D exposure (dietary and supplementary vitamin D, skin pigmentation, adiposity, geographic residence, and leisure-time physical activity-to estimate sunlight exposure) in relation to cancer risk in the Health Professionals Follow-Up Study.

METHODS: Among 1095 men of this cohort, we quantified the relation of these six determinants to plasma 25-hydroxy-vitamin D [25(OH)D] level by use of a multiple linear regression model. We used results from the model to compute a predicted 25(OH)D level for each of 47,800 men in the cohort based on these characteristics. We then prospectively examined this variable in relation to cancer risk with multivariable Cox proportional hazards models.

RESULTS: From 1986 through January 31, 2000, we documented 4286 incident cancers (excluding organ-confined prostate cancer and nonmelanoma skin cancer) and 2025 deaths from cancer. From multivariable models, an increment of 25 nmol/L in predicted 25(OH)D level was associated with a 17% reduction in total cancer incidence (multivariable relative risk [RR] = 0.83, 95% confidence interval [CI] = 0.74 to 0.92), a 29% reduction in total cancer mortality (RR = 0.71, 95% CI = 0.60 to 0.83), and a 45% reduction in digestive-system cancer mortality (RR = 0.55, 95% CI = 0.41 to 0.74). The absolute annual rate of total cancer was 758 per 100,000 men in the bottom decile of predicted 25(OH)D and 674 per 100,000 men for the top decile; these respective rates were 326 per 100,000 and 277 per 100,000 for total cancer mortality and 128 per 100,000 and 78 per 100,000 for digestive-system cancer mortality. Results were similar when we controlled further for body mass index or physical activity level.

CONCLUSIONS: Low levels of vitamin D may be associated with increased cancer incidence and mortality in men, particularly for digestive-system cancers. The vitamin D supplementation necessary to achieve a 25(OH)D increment of 25 nmol/L may be at least 1500 IU/day.

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