

# Abstract

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## Demographic differences and trends of vitamin D insufficiency in the US population, 1988-2004.

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**BACKGROUND:** Vitamin D insufficiency is associated with suboptimal health. The prevalence of vitamin D insufficiency may be rising, but population-based trends are uncertain. We sought to evaluate US population trends in vitamin D insufficiency.

**METHODS:** We compared serum 25-hydroxyvitamin D (25[OH]D) levels from the Third National Health and Nutrition Examination Survey (NHANES III), collected during 1988 through 1994, with NHANES data collected from 2001 through 2004 (NHANES 2001-2004). Complete data were available for 18 883 participants in NHANES III and 13 369 participants in NHANES 2001-2004.

**RESULTS:** The mean serum 25(OH)D level was 30 (95% confidence interval [CI], 29-30) ng/mL during NHANES III and decreased to 24 (23-25) ng/mL during NHANES 2001-2004. Accordingly, the prevalence of 25(OH)D levels of less than 10 ng/mL increased from 2% (95% CI, 2%-2%) to 6% (5%-8%), and 25(OH)D levels of 30 ng/mL or more decreased from 45% (43%-47%) to 23% (20%-26%). The prevalence of 25(OH)D levels of less than 10 ng/mL in non-Hispanic blacks rose from 9% during NHANES III to 29% during NHANES 2001-2004, with a corresponding decrease in the prevalence of levels of 30 ng/mL or more from 12% to 3%. Differences by age strata (mean serum 25[OH]D levels ranging from 28-32 ng/mL) and sex (28 ng/mL for women and 32 ng/mL for men) during NHANES III equalized during NHANES 2001-2004 (24 vs 24 ng/mL for age and 24 vs 24 ng/mL for sex).

**CONCLUSIONS:** National data demonstrate a marked decrease in serum 25(OH)D levels from the 1988-1994 to the 2001-2004 NHANES data collections. Racial/ethnic differences have persisted and may have important implications for known health disparities. Current recommendations for vitamin D supplementation are inadequate to address the growing epidemic of vitamin D insufficiency.

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