Monitoring of vitamin B-12 nutritional status in the United States by using plasma methylmalonic acid and serum vitamin B-12.

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BACKGROUND: Various definitions, criteria, tests, and cutoffs have been used to define vitamin B-12 status; however, a need exists for the systematic study of vitamin B-12 status in the United States because of concerns about high folic acid intakes and the potential for associated adverse effects.

OBJECTIVE: The objective was to determine the effect of different cutoff choices on outcomes and of the different degrees of serum vitamin B-12 status, definable by the concurrent use of a functional and circulating marker as the first steps to developing a data-based consensus on the biochemical diagnosis of vitamin B-12 deficiency.

DESIGN: Data from NHANES, a nationally representative cross-sectional survey, were examined for adults aged >19 y (mean ± SD age: 45 ± 1 y) from 1999 to 2004 (n = 12,612).

RESULTS: Commonly used cutoffs had a greater effect on prevalence estimates of low vitamin B-12 status with the use of vitamin B-12 than with the use of methylmalonic acid (MMA; 3-26% and 2-6%, respectively). A cutoff of >148 pmol/L for vitamin B-12 and of ≤210 nmol/L for MMA resulted in significant misclassifications. Approximately 1% of adults had a clear vitamin B-12 deficiency (low vitamin B-12 and elevated MMA); 92% of adults had adequate vitamin B-12 status. A high percentage of younger women characterized the group with low vitamin B-12 and normal MMA (2% of adults) and may have falsely reflected low vitamin B-12. Adults with elevated MMA (5%) only were demographically similar (ie, by age and race) to the deficient group and may have included some individuals with early vitamin B-12 deficiency.

CONCLUSIONS: These analyses indicate the challenges of assessing vitamin B-12 status when uncertainties exist about the appropriate cutoffs. Future studies should determine definable endpoints to achieve this goal.

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