

Putting Prevention Into Practice

An Evidence-Based Approach

Vitamin, Mineral, and Multivitamin Supplementation to Prevent Cardiovascular Disease and Cancer

Howard Tracer, MD, Medical Officer, U.S. Preventive Services Task Force
Program, Agency for Healthcare Research and Quality

Matthew Justus, DO, General Preventive Medicine Resident
Uniformed Services University of the Health Sciences, U.S. Navy

Case Study

A 53-year-old patient, J.B., with no significant medical history presents for a wellness visit. J.B.'s father had a stroke at 65 years of age, and J.B.'s older brother was diagnosed with colon cancer at 60 years of age. The patient has an estimated 10-year cardiovascular risk of 3.4% and a body mass index of 29 kg per m². The rest of their history and physical examination is unremarkable.

Case Study Questions

1. J.B. says that a friend recommended taking a supplement to prevent cardiovascular disease (CVD) and cancer. Based on the U.S. Preventive Services Task Force (USPSTF) recommendation statement, which one of the following supplement recommendations for prevention of CVD and cancer is correct?

- A. Recommend beta carotene because the benefits outweigh the harms.
- B. Recommend vitamin E because the benefits outweigh the harms.

See related USPSTF Clinical Summary in the online version of this issue.

This PPIP quiz is based on the recommendations of the USPSTF. More information is available in the USPSTF Recommendation Statement and supporting documents on the USPSTF website (<https://www.uspreventiveservicestaskforce.org>). The practice recommendations in this activity are available at <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/vitamin-supplementation-to-prevent-cvd-and-cancer-preventive-medication>.

This series is coordinated by Joanna Drowos, DO, contributing editor.

A collection of Putting Prevention Into Practice published in *AFP* is available at <https://www.aafp.org/afp/ppip>.

CME This clinical content conforms to AAFP criteria for CME. See CME Quiz on page 494.

Author disclosure: No relevant financial relationships.

- C. Recommend a multivitamin because there is convincing evidence that the benefits outweigh the harms.
- D. Recommend beta carotene and vitamin E because both supplements have strong evidence of benefit.
- E. Do not recommend beta carotene, vitamin E, or a multivitamin because evidence shows net harm for taking beta carotene, no net benefit of taking vitamin E, and insufficient evidence to assess the balance of benefits and harms of multivitamin supplements.

2. Which of the following statements about vitamin, mineral, and multivitamin supplements are correct?

- A. Vitamin, mineral, and multivitamin supplements may have anti-inflammatory and antioxidant effects.
- B. Less than 25% of adults report using a dietary supplement in the prior 30 days.
- C. It is not known what proportion of CVD and cancer might be potentially prevented with vitamin or mineral supplementation.
- D. High doses of vitamin A are not associated with harms.

3. Based on the USPSTF recommendation statement, which one of the following harms did the USPSTF find to be associated with beta carotene supplementation?

- A. Increased risk of colon cancer in people with a history of a colon polyp.
- B. Increased risk of lung cancer in people who smoke or have occupational exposure to asbestos.
- C. Increased risk of prostate cancer.
- D. Increased risk of breast cancer.
- E. Increased risk of skin cancer.

Answers appear on the following page.

PUTTING PREVENTION INTO PRACTICE

Answers

1. The correct answer is E. The USPSTF concluded that the harms of beta carotene supplementation outweigh the benefits and that there is no net benefit of supplementation with vitamin E for the prevention of CVD or cancer. The USPSTF thus recommends against the use of beta carotene or vitamin E supplements for the prevention of CVD or cancer (D recommendation). The USPSTF found insufficient evidence to determine the balance of benefits and harms of supplementation with multivitamins for the prevention of CVD or cancer (I statement).¹

2. The correct answers are A and C. Studies have found in-vitro anti-inflammatory and antioxidant effects of some vitamins and minerals.² However, the USPSTF found inadequate evidence from clinical trials on the benefits of supplementation for most vitamins, minerals, and multivitamins (with the exception of beta carotene and vitamin E) in preventing CVD or cancer. According to National Health and Nutrition Examination Survey data, 52% of surveyed U.S. adults reported using at least one dietary supplement in the prior 30 days.³ High doses of vitamin A may be hepatotoxic or teratogenic.¹

3. The correct answer is B. The USPSTF concluded that there is adequate evidence that beta carotene causes small harms in increasing the risk for lung cancer in people at higher risk (i.e., people who smoke or have occupational exposure to asbestos). There is adequate evidence that supplementation with beta carotene provides no benefit in preventing other types of cancer.

The views expressed in this work are those of the authors and do not reflect the official policy or position of the Uniformed Services University of the Health Sciences, the U.S. Navy, the U.S. Department of Defense, or the U.S. government.

References

1. Mangione CM, Barry MJ, Nicholson WK, et al. Vitamin, mineral, and multivitamin supplementation to prevent cardiovascular disease and cancer: US Preventive Services Task Force recommendation statement. *JAMA*. 2022;327(23):2326-2333.
2. O'Connor EA, Evans CV, Ivlev I, et al. Vitamin and mineral supplements for the primary prevention of cardiovascular disease and cancer: updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA*. 2022;327(23):2334-2347.
3. Cowan AE, Jun S, Gahche JJ, et al. Dietary supplement use differs by socioeconomic and health-related characteristics among U.S. adults, NHANES 2011-2014. *Nutrients*. 2018;10(8):1114. ■



TOGETHER WE
empower

75 YEARS OF
SUPPORTING
FAMILY MEDICINE

JOIN TODAY
aafp.org/membership

 AAFP
AMERICAN ACADEMY OF FAMILY PHYSICIANS