JAMA | Original Investigation

Trends in Dietary Supplement Use Among US Adults From 1999-2012

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IMPORTANCE Dietary supplements are commonly used by US adults; yet, little is known about recent trends in supplement use.

OBJECTIVE To report trends in dietary supplement use among US adults.

DESIGN, SETTING, AND PARTICIPANTS Serial cross-sectional study using nationally representative data from the National Health and Nutrition Examination Survey (NHANES) collected between 1999 and 2012. Participants include noninstitutionalized adults residing in the United States, surveyed over 7 continuous 2-year cycles (sample size per cycle, 4863 to 6213).

EXPOSURES Calendar time, as represented by NHANES cycle.

MAIN OUTCOMES AND MEASURES In an in-home interview, participants were queried on use of supplements in the preceding 30 days to estimate the prevalence of use within each NHANES cycle, and trends were evaluated across cycles. Outcomes included use of any supplements; use of multivitamins/multiminerals (MVMM; defined as a product containing ≥10 vitamins and/or minerals); and use of individual vitamins, minerals, and nonvitamin, nonmineral supplements. Data were analyzed overall and by population subgroup (including age, sex, race/ethnicity, and educational status), and were weighted to be nationally representative.

RESULTS A total of 37 958 adults were included in the study (weighted mean age, 46.4 years; women, 52.0%), with an overall response rate of 74%. Overall, the use of supplements remained stable between 1999 and 2012, with 52% of US adults reporting use of any supplements in 2011-2012 (*P* for trend = .19). This trend varied by population subgroup. Use of MVMM decreased, with 37% reporting use of MVMM in 1999-2000 and 31% reporting use in 2011-2012 (difference, −5.7% [95% CI, −8.6% to −2.7%], *P* for trend < .001). Vitamin D supplementation from sources other than MVMM increased from 5.1% to 19% (difference, 14% [95% CI, 12% to 17%], *P* for trend < .001) and use of fish oil supplements increased from 1.3% to 12% (difference, 11% [95% CI, 9.1% to 12%], *P* for trend < .001) over the study period, whereas use of a number of other supplements decreased.

CONCLUSIONS AND RELEVANCE Among adults in the United States, overall use of dietary supplements remained stable from 1999-2012, use of MVMM decreased, and trends in use of individual supplements varied and were heterogeneous by population subgroups.

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JAMA. 2016;316(14):1464-1474. doi:10.1001/jama.2016.14403

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Dietary supplement products are commonly used by adults in the United States, with prior research indicating an increase in use between the 1980s and mid-2000s.[1,2] Although often used with an intention of improving or maintaining health, it was estimated that in 2007-2010 only 23% of all supplement products were used at the recommendation of a health care provider.[3] Instead, their use may be motivated, in part, by evidence suggesting that increased intake of some dietary constituents may be associated with reduced risk of outcomes, including cancer and cardiovascular disease.[4,5] Even so, results from observational studies have yielded mixed results regarding the health benefits of individual supplements or multivitamins/multiminerals (MVMM), and randomized clinical trials have often not supported benefits of these supplements, although the duration of many randomized clinical trials may have been insufficient to observe beneficial effects.[6-10] Furthermore, some research has indicated that the use of selected supplements at high doses may have adverse effects,[11] generating some skepticism regarding their use.[12]

Despite extensive research conducted on the role of dietary supplements in health, little is known about recent trends in supplement use. Most studies describing patterns of use were restricted to older adults, focused on select supplements, were unable to evaluate temporal trends, or did not capture use in the last decade.[1,2,13,14] Using data from the National Health and Nutrition Examination Survey (NHANES), this study was designed to quantify trends in supplement use among US adults from 1999 through 2012, with a focus on use of any supplement products and MVMM, defined as the use of any products containing 10 or more vitamins/minerals, as well as use of individual vitamins, minerals, and nonvitamin, nonmineral (NVNM) supplements.

Key Points

Question What changes have occurred in the use of dietary supplements by US adults between 1999 and 2012?

Findings In this serial cross-sectional study of 37 958 adults using the nationally representative National Health and Nutrition Examination Survey, self-reported use of any supplement products remained stable, with 52% reporting use in both 1999-2012 and 2011-2012. Patterns varied by individual supplements; use of multivitamin/multimineral products decreased, with 37% reporting use in 1999-2000 and 31% reporting use in 2011-2012.

Meaning Although any use of dietary supplement products remained stable from 1999 through 2012, patterns varied by individual supplements.

Methods

Study Population

Participants provided written informed consent and study procedures were approved by the National Center for Health Statistic's research ethics review board. The Memorial Sloan Kettering Cancer Center institutional review board determined that this analysis did not constitute human subjects research, and did not need human subjects approval. This serial cross-sectional study was conducted using data from NHANES, a nationally representative, cross-sectional survey of civilian, noninstitutionalized persons living in the United States.[15] This analysis includes 7 two-year cycles (1999-2000 through 2011-2012), with 1999-2000 representing the first cycle for which continuous data are available and 2011-2012 representing the most recent cycle for which data are available. Each cycle is an independent sample.

Supplement Use

NHANES participants were first asked if they used any prescription or nonprescription supplements in the prior 30 days. Persons indicating use were asked to show the interviewer the bottles of each supplement product taken (77.4% of supplement products were seen); a supplement product could be a capsule, tablet, pill, softgel, chew or gummy, or other product containing 1 or more supplements. When containers were not seen, participants were asked to recall each product taken. By linking to databases of supplement products and supplement product blends, use of MVMM, vitamins, minerals, and specific supplements was ascertained. More detail is provided in NHANES documentation,[16] and detailed information on how this information was used in analysis is provided in the eMethods in the Supplement.

From this information, variables were created for use of any supplement product in the prior 30 days and use of 4 or more supplement products, as well as the use of any vitamin, any mineral, and use of MVMM (defined as a product containing ≥10 vitamins/minerals).[17] This definition was created to capture products labeled as multivitamins in the market place (ie, supplements used by consumers as a nonspecific dietary supplement, commonly containing the recommended daily values of multiple vitamins and typically including minerals). However, this definition did not require any minerals to be in the formulation because several of the most popular multivitamin brands during the period of the surveys did not have minerals. The cutoff of 10 vitamins/minerals was used to separate common MVMMs from more specialized supplements such as vitamin B complex supplements and supplements developed for eye and bone health. However, to allow for comparison to prior NHANES analyses, a secondary MVMM variable, defined as products containing 3 or more vitamins and 1 or more mineral, was also analyzed.[3]

Variables were also created corresponding to individual vitamins, minerals, and NVNM supplements. To distinguish how supplements were consumed, results were analyzed both overall (ie, any use) and exclusive of MVMM supplements (eg, vitamin D not from MVMM). This is important because supplements consumed as part of MVMM are often consumed at lower doses than they are in individual or focused combination supplements, and because understanding how supplements are consumed can help inform understanding of trends. Primary analyses focused on any use during the prior 30 days.

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Statistical Analyses

The prevalence of supplement use, as determined by self-reported use in the prior 30 days, was assessed within each NHANES cycle. Survey-weighted logistic regression was used to calculate a *P* value for trend across cycles; the statistical significance of trends was evaluated using a 2-sided test at the α = .05 level. Ratios for the prevalence of use in 2011-2012 vs 1999-2000 are presented. In the presentation of results, a decrease corresponds to a ratio less than 1 and *P* for trend less than .05; an increase represents a ratio more than 1 and *P* for trend less than .05; and stable represents a *P* for trend of .05 or more. The absolute difference in the prevalence of use in 2011-2012 vs 1999-2000 are also presented.

Because most supplemental vitamins/minerals are consumed in the form of MVMM and the total use was of most interest, trends in the Tables are shown for total supplement use. However, results are also presented exclusive of MVMM if the trends with and without MVMM markedly varied. Detailed trends, both overall and exclusive of MVMM, are provided in eTables in the Supplement. Throughout the text, the discussion of trends refers to overall trends in any use of a given dietary supplement (regardless of whether consumed as part of a MVMM), unless otherwise noted.

Although data were analyzed for a large number of supplements, the focus was on supplements fitting the following criteria: (1) a high prevalence of use (>10% during any cycle), and (2) a large change in use over the study period (>3-fold change). Given potential heterogeneity by population subgroup, results are presented by age (20-39 y, 40-64 y, ≥65 y), sex, self-reported race/ethnicity (non-Hispanic white, non-Hispanic black, Mexican American), and education (highest attained degree:<high school, high school/some college, ≥4 y of college)

Sensitivity analyses were conducted for regular use (defined as use ≥15 days/mo) and age-adjusted trends. To address whether the trends were consistent over the study period, joinpoint regression analyses were conducted and the annual percentage change before and after potential inflection points were calculated using Joinpoint Regression Program Software (National Cancer Institute), version 4.2.0.[18]

NHANES is a stratified, complex, multistage probability-based survey that oversamples certain groups, and as such, all participants are assigned analytic weights to account for their unequal sampling probability and nonresponse. Analyses were conducted using Stata (College Station), version 13.1.

Results

Over these 7 NHANES cycles, 38 024 adults 20 years or older completed an in-home interview, wherein supplement use was ascertained. Sixty-six persons were excluded due to missing information on supplement use, leaving 37 958 persons (sample size per cycle, 4863-6213). The overall response rate was 74%, with the cycle-specific response rate ranging from 67.4% to 78.3%.[19]

In 2011-2012, 52% (95% CI, 49%-55%) of US adults reported using any supplement product in the preceding 30 days (**Table 1**). Supplement use was associated with several sociodemographic variables. For example, supplement use increased with age, with 72% (95% CI, 69%-75%) of adults 65 years or older reporting use compared with 40% (95% CI, 35%-45%) of adults aged 20-39 years. Women (58% [95% CI, 55%-62%]) were also more likely to use supplements than men (45% [95% CI, 42%-49%]). Use was highest among non-Hispanic white adults (58% [95% CI, 55%-62%]) and lowest among Mexican Americans (29% [95% CI, 25%-33%]). There was an educational gradient, with use highest among the most highly educated: 65% (95% CI, 61%-69%) among participants with 4 or more years of college education compared with 37% (95% CI, 34%-40%) among those with less than a high school education.

Overall, there was no change in overall supplement use, with 52% reporting use in 1999-2000 and in 2011-2012 (difference, 0.0% [95% CI, −3.6% to 3.6%]) (**Table 2**). There was also no change in the use of 4 or more supplement products, with 9.9% reporting use of 4 supplement products in 2011-2012 (difference, 1.1% [95% CI, −0.8% to 3.0%]). However, use of MVMM (defined as a product containing ≥10 vitamins/minerals) decreased from 37% to 31% (difference, −5.7% [95% CI, −8.6% to −2.7%]). The trend in MVMM (alternatively defined as use of products containing ≥3 vitamins and ≥1 mineral) also significantly decreased, with use decreasing from 39% to 36% (difference, −3.6% [95% CI, −6.8% to −0.4%]). Use of any vitamin remained stable, with 48% (95% CI, 45% to 50%) reporting use in 2011-2012, although use of any vitamin (excluding MVMM) increased. Use of any mineral or element decreased from 42% to 39% (difference, −3.0% [95% CI, −6.5% to 0.4%]), although use of mineral or elements was stable when excluding MVMM.

There was a decrease in the use of several vitamins and minerals overall (Table 2), including vitamin C, vitamin E, and selenium. The decreases in these supplements persisted when excluding MVMM (eTable 1 in the Supplement). Although use of most vitamins and minerals decreased, this was not universal. For example, vitamin D, the most commonly used vitamin in 2011-2012, remained stable overall; however, use excluding MVMM increased almost 4-fold (5.1% in 1999-2000 vs 19% in 2011-2012; difference, 14% [95% CI, 12%-17%]). Use of lycopene-containing supplements (mostly MVMM) increased among men almost 9-fold (1.9% in 1999-2000 vs 16% in 2011-2012; difference,14% [95% CI, 12%-16%]). The use of lycopene also increased among women, although use was markedly lower than among men.

Use of several NVNM supplements increased (**Table 3**; eTable 2 in the Supplement). Omega-3 fatty acids increased almost 7-fold, with 1.9% of adults reporting use in 1999-2000 and 13% in 2011-2012 (difference, 11% [95% CI, 9.4%-13%]). Omega-3 fatty acids were the most commonly used NVNM in 2011-2012. This trend was primarily driven by the 9-fold increase in fish oil (1.3% in 1999-2000 vs 12% in 2011-2012; difference, 11% [95% CI, 9.1% to 12%]), although use of alpha-linolenic acid or flaxseed also increased. Omega-6 and omega-9 fatty acid supplement use increased, as did use of

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Table 1. Supplement Use in Prior 30 Days Among US Adults by Population Characteristics, 2011-2012[a]

		Any Supplement Use	
	No. of Participants	No. of Participants	Weighted % (95% CI)[b]
Overall	5556	2715	52 (49-55)
Age group, y			
20-39	1957	718	40 (35-45)
40-64	2352	1171	54 (50-58)
≥65	1247	826	72 (69-75)
Sex			
Men	2737	1167	45 (42-49)
Women	2819	1548	58 (55-62)
Race/ethnicity			
Non-Hispanic white	2038	1169	58 (55-62)
Non-Hispanic black	1455	640	41 (37-45)
Mexican American	540	177	29 (25-33)
Other Hispanic	578	243	38 (33-42)
Non-Hispanic Asian	793	404	52 (45-58)
Other/mixed race	152	82	48 (41-55)
Education			
<High school	1330	510	37 (34-40)
High school	1168	511	46 (42-50)
Some college	1657	826	51 (47-56)
≥4 y of college	1397	866	65 (61-69)
Self-reported health status			
Excellent	470	251	61 (54-67)
Very good	1278	707	58 (53-62)
Good	1885	884	47 (43-50)
Fair or Poor	1069	489	49 (43-54)

[a] Among adults 20 years or older.

[b] Data were weighted to be nationally representative.

coenzyme Q10, cranberry, green tea or epigallocatechin gallate, methylsulfonylmethane, and probiotics.

Use of echinacea decreased, as did use of garlic, ginkgo biloba, ginseng, and para-aminobenzoic acid. Use of glucosamine and chondroitin did not significantly change, nor did use of amino acids or fiber.

Trends by age, sex, race/ethnicity, and education were also evaluated (eTables 3-6 in the Supplement). Any supplement use decreased among adults aged 20-39 years, was stable among those aged 40-64 years, and increased among those 65 years or older (**Figure 1**; eTable 3 in the Supplement). Although women reported more supplement use than men, trends were stable in both groups (Figure 1; eTable 4 in the Supplement). Use of any supplements remained stable among non-Hispanic white adults and Mexican American adults, but increased among non-Hispanic black adults (Figure 1; eTable 5 in the Supplement). Use of supplements remained stable among those with less than a high school education, but decreased among those in higher education groups (Figure 1; eTable 6 in the Supplement).

The overall decrease in use of MVMM was largely driven by a decrease among adults aged 40-64 years, with no change observed among older adults (eTable 3 and eFigure 1 in the Supplement). Use of MVMM decreased significantly among non-Hispanic white adults, but remained stable among non-Hispanic black adults and Mexican American adults (eTable 5 and eFigure 1 in the Supplement). Use of MVMM decreased for both men and women (eTable 4 and eFigure 1 in the Supplement) and for all education groups (eTable 6 and eFigure 1 in the Supplement).

Subgroup-specific estimates are presented in **Figure 2** for the most commonly used vitamin or mineral, vitamin D, and in eFigure 2 in the Supplement for the most commonly used NVNM, fish oil. Use of vitamin D (exclusive of MVMM) and fish oil increased in all population subgroups. However, when including MVMM, increased use of vitamin D was observed only in those 65 years and older (eTable 3 in the Supplement), women (eTable 4 in the Supplement), and non-Hispanic black adults (eTable 5 in the Supplement). When exploring use among adult women of childbearing age (20-44 years) (eTables 7-8 in the Supplement), use of any supplement products and MVMM decreased. Use of folic acid–containing supplements decreased; however, use of folic acid exclusive of MVMM remained stable.

Trends were relatively comparable for regular use (eTable 9-10 in the Supplement) and when adjusting for age (eTable 11 in the Supplement).

No significant joinpoints were observed for overall supplement use or MVMM (eTable 12 in the Supplement). However, a significant joinpoint, indicating a change in trend, was observed for a number of supplements. Most notably, lycopene increased dramatically prior to 2003-2004 (annual percentage change, 130% [95% CI, 62% to 226%]), decreasing thereafter (annual percentage change, −4.5% [95% CI, −7.2% to −1.6%]).

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Table 2. Trends in Overall Supplement Use and Use of MVMM, Vitamins and Minerals, and Common MVMM Components Among US Adults, 1999-2000 through 2011-2012[a,b,c]

	30-d Prevalence of Use, Weighted % (95% CI)[d]							*P* Value for Trend	2011-2012 vs 1999-2000	
	1999-2000 (n = 4863)	2001-2002 (n = 5396)	2003-2004 (n = 5028)	2005-2006 (n = 4972)	2007-2008 (n = 5930)	2009-2010 (n = 6213)	2011-2012 (n = 5556)		Ratio	Difference
Summary Use										
Any supplement product	52 (49 to 54)	51 (50 to 53)	54 (51 to 57)	54 (51 to 56)	49 (45 to 53)	50 (47 to 52)	52 (49 to 55)	.19	1.0 (0.93 to 1.1)	0.0 (−3.6 to 3.6)
Excluding MVMM	34 (32 to 37)	34 (32 to 36)	36 (33 to 39)	36 (33 to 38)	34 (31 to 38)	34 (32 to 36)	39 (36 to 42)	.06	1.1 (1.0 to 1.3)	5.0 (1.0 to 8.9)
≥4 supplement products	8.7 (7.5 to 10)	9.8 (8.3 to 12)	10 (8.7 to 12)	9.9 (8.5 to 11)	9.0 (7.1 to 11)	7.8 (6.8 to 9.0)	9.9 (8.6 to 11)	.60	1.1 (0.92 to 1.4)	1.1 (−0.8 to 3.0)
MVMM[e]	37 (35 to 39)	38 (35 to 40)	38 (36 to 41)	40 (38 to 42)	33 (30 to 36)	32 (31 to 34)	31 (29 to 33)	<.001	0.85 (0.78 to 0.92)	−5.7 (−8.6 to −2.7)
MVMM (alternative definition)[f]	39 (37 to 42)	40 (38 to 42)	42 (40 to 44)	43 (41 to 45)	36 (33 to 40)	37 (35 to 38)	36 (34 to 38)	<.001	0.91 (0.83 to 0.99)	−3.6 (−6.8 to −0.4)
Any vitamin	47 (44 to 50)	47 (46 to 49)	49 (46 to 52)	49 (47 to 51)	44 (41 to 48)	45 (43 to 47)	48 (45 to 50)	.30	1.0 (0.94 to 1.1)	0.8 (−3.1 to 4.6)
Excluding MVMM	25 (23 to 28)	27 (25 to 28)	28 (25 to 31)	26 (24 to 28)	26 (23 to 29)	26 (24 to 28)	31 (28 to 34)	.047	1.2 (1.1 to 1.4)	5.7 (1.9 to 9.5)
Any mineral or element	42 (39 to 45)	43 (41 to 45)	45 (43 to 48)	46 (43 to 49)	40 (36 to 43)	39 (38 to 41)	39 (37 to 41)	<.001	0.93 (0.85 to 1.0)	−3.0 (−6.5 to 0.4)
Excluding MVMM	18 (16 to 20)	20 (18 to 22)	22 (20 to 25)	20 (18 to 22)	19 (16 to 22)	17 (16 to 18)	18 (17 to 20)	.05	1.0 (0.89 to 1.2)	0.3 (−2.0 to 2.6)
Increased Use[c]										
Lutein or zeaxanthin	8.5 (5.8 to 12)	18 (17 to 20)	22 (20 to 24)	21 (20 to 23)	18 (16 to 20)	12 (11 to 13)	10 (9.2 to 12)	.02	1.2 (0.82 to 1.8)	1.9 (−1.6 to 5.3)
Lycopene (men only)[g]	1.9 (1.2 to 2.9)	2.9 (2.3 to 3.8)	21 (19 to 24)	25 (23 to 27)	22 (20 to 26)	18 (16 to 20)	16 (14 to 18)	<.001	8.7 (5.5 to 14)	14 (12 to 16)
Vitamin B_{12} (cobalamin), excluding MVMM[g]	5.7 (4.7 to 6.8)	5.6 (4.8 to 6.5)	5.9 (5.0 to 7.0)	6.8 (5.6 to 8.2)	6.8 (5.6 to 8.3)	6.1 (5.5 to 6.7)	8.1 (6.9 to 9.5)	.002	1.4 (1.1 to 1.8)	2.4 (0.8 to 4.1)
Vitamin D, excluding MVMM[g]	5.1 (4.3 to 6.1)	8.7 (7.7 to 9.9)	8.5 (7.1 to 10)	8.6 (7.7 to 9.6)	11 (9.4 to 12)	15 (14 to 16)	19 (17 to 22)	<.001	3.8 (3.0 to 4.6)	14 (12 to 17)
Decreased Use[c]										
Boron	24 (22 to 26)	25 (23 to 27)	26 (23 to 28)	25 (23 to 27)	19 (17 to 22)	20 (19 to 21)	17 (16 to 18)	<.001	0.7 (0.63 to 0.78)	−7.2 (−9.6 to −4.9)
Calcium[g]	38 (35 to 41)	39 (37 to 41)	42 (39 to 45)	44 (41 to 46)	36 (33 to 40)	37 (35 to 38)	35 (33 to 37)	.002	0.93 (0.84 to 1.0)	−2.8 (−6.2 to 0.5)
Chromium	28 (26 to 30)	30 (28 to 32)	30 (28 to 33)	32 (30 to 34)	28 (25 to 31)	28 (26 to 30)	27 (25 to 28)	.041	0.94 (0.84 to 1.0)	−1.8 (−4.6 to 1.0)
Copper	31 (28 to 33)	31 (29 to 33)	32 (30 to 34)	34 (32 to 36)	29 (26 to 31)	29 (27 to 31)	27 (25 to 28)	<.001	0.87 (0.8 to 0.96)	−3.8 (−6.5 to −1.1)
Iodine	29 (27 to 31)	29 (27 to 31)	28 (26 to 31)	28 (26 to 31)	22 (20 to 25)	22 (21 to 24)	20 (18 to 21)	<.001	0.68 (0.61 to 0.75)	−9.4 (−11.9 to −6.8)
Iron[g]	31 (27 to 34)	29 (27 to 30)	27 (25 to 29)	27 (24 to 30)	21 (19 to 23)	21 (20 to 22)	19 (17 to 20)	<.001	0.61 (0.53 to 0.7)	−12 (−15 to −8.3)
Magnesium	33 (30 to 35)	34 (32 to 36)	35 (33 to 38)	37 (35 to 39)	31 (28 to 34)	30 (29 to 32)	28 (27 to 30)	<.001	0.87 (0.79 to 0.96)	−4.2 (−7.2 to −1.1)
Manganese	28 (26 to 31)	30 (28 to 32)	31 (28 to 33)	32 (30 to 34)	28 (26 to 31)	28 (26 to 30)	26 (25 to 27)	.009	0.91 (0.83 to 1.0)	−2.5 (−5.1 to 0.2)
Molybdenum	25 (23 to 28)	27 (26 to 29)	27 (25 to 30)	26 (25 to 28)	21 (18 to 24)	21 (20 to 23)	18 (17 to 19)	<.001	0.71 (0.64 to 0.79)	−7.4 (−9.8 to −5.0)
Phosphorus	25 (23 to 27)	24 (23 to 26)	25 (22 to 27)	23 (22 to 25)	18 (16 to 21)	18 (17 to 20)	15 (14 to 17)	<.001	0.61 (0.53 to 0.7)	−9.6 (−12 to −6.9)
Potassium	28 (26 to 30)	28 (26 to 30)	28 (26 to 31)	28 (26 to 30)	23 (20 to 25)	22 (21 to 24)	18 (16 to 19)	<.001	0.63 (0.55 to 0.71)	−10 (−13 to −7.8)
Selenium[g]	28 (26 to 31)	30 (28 to 32)	30 (28 to 33)	32 (30 to 34)	28 (25 to 31)	27 (26 to 29)	26 (24 to 27)	.002	0.9 (0.82 to 0.99)	−2.8 (−5.4 to −0.1)
Selenium, excluding MVMM[g]	2.6 (2.2 to 3.2)	2.6 (2.1 to 3.3)	2.1 (1.4 to 3.1)	1.5 (1.2 to 2)	1.1 (0.7 to 1.6)	0.9 (0.6 to 1.4)	0.7 (0.4 to 1.2)	<.001	0.28 (0.16 to 0.48)	−1.9 (−2.5 to −1.3)
Vanadium	22 (20 to 25)	22 (21 to 24)	24 (21 to 26)	23 (21 to 25)	18 (16 to 21)	18 (17 to 20)	14 (13 to 16)	<.001	0.65 (0.57 to 0.74)	−7.9 (−10 to −5.3)
Vitamin A[g]	36 (33 to 38)	37 (35 to 40)	37 (35 to 40)	39 (37 to 42)	33 (30 to 36)	33 (31 to 34)	31 (30 to 33)	<.001	0.88 (0.81 to 0.96)	−4.3 (−7.2 to −1.4)
Vitamin B_1 (thiamin)	37 (35 to 40)	38 (36 to 41)	38 (35 to 41)	40 (38 to 43)	33 (30 to 36)	32 (31 to 34)	30 (28 to 32)	<.001	0.81 (0.74 to 0.89)	−6.9 (−10 to −3.8)

(continued)

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	30-d Prevalence of Use, Weighted % (95% CI)[d]							P Value for Trend	2011-2012 vs 1999-2000	
	1999-2000 (n = 4863)	2001-2002 (n = 5396)	2003-2004 (n = 5028)	2005-2006 (n = 4972)	2007-2008 (n = 5930)	2009-2010 (n = 6213)	2011-2012 (n = 5556)		Ratio	Difference
Vitamin B_2 (riboflavin)	37 (35 to 40)	38 (36 to 40)	38 (35 to 41)	40 (38 to 43)	33 (30 to 36)	32 (31 to 34)	30 (28 to 32)	<.001	0.82 (0.75 to 0.9)	−6.8 (−9.9 to −3.6)
Vitamin B_3 (niacin)	37 (35 to 40)	38 (36 to 40)	38 (35 to 41)	40 (38 to 43)	34 (30 to 37)	33 (31 to 35)	31 (29 to 33)	<.001	0.84 (0.76 to 0.92)	−6.1 (−9.2 to −2.9)
Vitamin B_5 (pantothenic acid)	34 (32 to 37)	36 (34 to 38)	36 (33 to 38)	38 (35 to 40)	32 (29 to 35)	31 (29 to 33)	30 (28 to 31)	<.001	0.87 (0.79 to 0.96)	−4.5 (−7.5 to −1.4)
Vitamin B_6 (pyridoxine)	38 (36 to 41)	39 (37 to 41)	39 (37 to 42)	41 (39 to 44)	35 (32 to 38)	34 (32 to 36)	32 (30 to 35)	<.001	0.85 (0.78 to 0.93)	−5.6 (−8.8 to −2.4)
Vitamin B_9 (folic acid)	38 (35 to 40)	38 (36 to 41)	39 (36 to 42)	41 (38 to 44)	35 (32 to 38)	34 (32 to 36)	33 (30 to 35)	<.001	0.87 (0.78 to 0.95)	−5.1 (−8.5 to −1.7)
Vitamin B_{12} (cobalamin)[g]	38 (35 to 40)	39 (37 to 41)	39 (36 to 41)	41 (39 to 44)	36 (32 to 39)	35 (33 to 37)	35 (33 to 37)	.001	0.92 (0.85 to 1.0)	−2.9 (−6.1 to 0.2)
Vitamin C	42 (39 to 44)	42 (40 to 45)	43 (40 to 46)	45 (42 to 47)	38 (34 to 41)	37 (35 to 38)	36 (34 to 38)	<.001	0.86 (0.79 to 0.93)	−5.9 (−9.0 − 2.8)
Vitamin E	41 (38 to 43)	41 (40 to 43)	42 (39 to 45)	42 (40 to 45)	35 (32 to 38)	34 (32 to 36)	34 (32 to 36)	<.001	0.83 (0.76 to 0.91)	−6.9 (−10 to −3.6)
Zinc	35 (32 to 38)	36 (34 to 38)	37 (35 to 39)	39 (37 to 42)	32 (29 to 35)	32 (30 to 33)	30 (28 to 32)	<.001	0.86 (0.78 to 0.94)	−5.0 (−8.1 to −1.8)
Stable Use[c]										
Biotin	30 (27 to 32)	30 (28 to 32)	31 (28 to 34)	33 (31 to 35)	29 (26 to 33)	30 (28 to 32)	29 (27 to 31)	.51	0.98 (0.89 to 1.1)	−0.5 (−3.5 to 2.5)
Calcium, excluding MVMM[g]	13 (12 to 15)	15 (14 to 17)	17 (15 to 20)	16 (14 to 18)	15 (12 to 17)	13 (13 to 14)	14 (12 to 15)	.15	1.0 (0.86 to 1.2)	0.4 (−1.9 to 2.8)
Choline	5.1 (4 to 6.3)	5.1 (4.1 to 6.3)	4.5 (3.8 to 5.4)	6.3 (5 to 7.8)	4.6 (3.6 to 5.7)	4.7 (4.1 to 5.5)	6.3 (5.5 to 7.3)	.23	1.2 (0.95 to 1.6)	1.3 (−0.2 to 2.7)
Inositol	4.9 (4 to 6)	5.2 (4.2 to 6.4)	4.7 (3.9 to 5.5)	6.3 (5.1 to 7.7)	5.1 (4 to 6.4)	4.6 (4 to 5.2)	6.5 (5.5 to 7.6)	.16	1.3 (1.0 to 1.7)	1.5 (0.1 to 3.0)
Iron, excluding MVMM[g]	2.9 (2.6 to 3.2)	3.1 (2.5 to 3.9)	3.1 (2.5 to 3.8)	3.2 (2.4 to 4.3)	3.8 (3 to 4.8)	2.9 (2.4 to 3.5)	3 (2.5 to 3.7)	.65	1.1 (0.85 to 1.3)	0.2 (−0.5 to 0.8)
Lycopene, excluding MVMM (men only)[g]			0.8 (0.4 to 1.5)	0.7 (0.3 to 1.3)	0.6 (0.4 to 1.1)	0.5 (0.2 to 0.9)	0.7 (0.3 to 1.4)	.24	5.6 (1.3 to 24)	0.5 (0.1 to 1.1)
Vitamin A, excluding MVMM[g]	3.1 (2.7 to 3.5)	4.1 (3.3 to 5.1)	3.2 (2.6 to 3.9)	3.4 (2.7 to 4.2)	3 (2.4 to 3.7)	2.8 (2.1 to 3.7)	3.5 (2.8 to 4.4)	.43	1.1 (0.88 to 1.5)	0.4 (−0.4 to 1.3)
Vitamin D[g]	37 (34 to 39)	38 (36 to 40)	39 (36 to 42)	41 (39 to 43)	36 (33 to 39)	39 (37 to 41)	40 (38 to 43)	.14	1.1 (1.0 to 1.2)	3.9 (0.5 to 7.4)
Vitamin K	24 (22 to 26)	24 (23 to 26)	27 (24 to 29)	28 (26 to 30)	25 (22 to 27)	25 (24 to 27)	23 (22 to 25)	.53	0.97 (0.86 to 1.1)	−0.8 (−3.6 to 2.0)

Abbreviation: MVMM, multivitamin/multimineral.

[a] Among adults 20 years and older.

[b] Results are presented for any use of each individual supplement, regardless of whether taken as an individual supplement or as a combination supplement, such as a MVMM. Results are also presented exclusive of MVMM if the 2 trends markedly varied.

[c] A decrease corresponds to a ratio less than 1 and *P* value for trend less than .05. An increase represents a ratio more than 1 and *P* value for trend less than .05. Stable represents a *P* value for trend of .05 or more.

[d] Data were weighted to be nationally representative. If the relative standard error exceeded 30%, data were suppressed (empty cells), consistent with National Health and Nutrition Examination Survey reporting guidelines.[20]

[e] Defined as supplement products containing 10 or more vitamins/minerals.

[f] Defined as supplements containing 3 or more vitamins and 1 or more minerals.

[g] Both trends are presented because the trend markedly varied for overall use and use excluding MVMM. Detailed information on each trend, both overall and exclusive of MVMM, is presented in eTable 2 of the Supplement.

Discussion

In this large, nationally representative survey of US adults, supplement use remained stable from 1999-2012, with 52% of adults reporting use of supplements in the prior 30 days in 1999-2000 and 2011-2012. Use of MVMM (defined as a product containing ≥10 vitamins/minerals) decreased from 37% to 31%. Trends varied for individual supplements, and across age, sex, race/ethnicity, and education.

The stable trend in overall supplement use stands in contrast to earlier studies reporting their increase between the 1980s and early 2000s.[1,2] With the present data, it is clear that the use of supplements among US adults has stabilized. This stabilization appears to be the balance of several opposing trends, with a major contributing downward factor being the decrease in use of MVMM. This trend may reflect increased scrutiny of MVMM,[12] following several studies showing no benefit.[7,10,21] Furthermore, in the mid-to-late 2000s, several expert bodies released statements or recommendations concluding that there is either insufficient or no evidence to support use of MVMM or supplements to prevent chronic disease.[22-24] It is also possible that the economic downturn in the late 2000s may have also affected trends in use. The Physicians' Health Study II randomized clinical trial demonstrated that daily MVMM use modestly reduced total cancer incidence in men[25]; however, this study was published in 2012, and would not have influenced our findings.

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Table 3. Trends in Use of Nonvitamin, Nonmineral Specialty Supplements Among US Adults, 1999-2000 through 2011-2012[a,b]

	30-d Prevalence of Use, Weighted % (95% CI)[c]							P Value for Trend[d]	Prevalence in 2011-2012 vs 1999-2000	
	1999-2000 (n = 4863)	2001-2002 (n = 5396)	2003-2004 (n = 5028)	2005-2006 (n = 4972)	2007-2008 (n = 5930)	2009-2010 (n = 6213)	2011-2012 (n = 5556)		Ratio	Difference
Increased Use										
Coenzyme Q10	1.1 (0.8 to 1.7)	1.5 (1.0 to 2.1)	2.5 (2.0 to 3.1)	3.9 (3.3 to 4.6)	2.8 (2.2 to 3.7)	2.6 (2.1 to 3.2)	2.8 (2.1 to 3.7)	<.001	2.4 (1.5 to 3.9)	1.6 (0.7 to 2.5)
Cranberry		1.2 (0.8 to 1.9)	1.3 (1.0 to 1.7)	1.9 (1.4 to 2.6)	1.7 (1.2 to 2.3)	1.5 (1.1 to 1.9)	2.4 (1.8 to 3.1)	<.001	6.1 (3.0 to 12.3)	2.0 (1.3 to 2.7)
Green tea or EGCG	0.8 (0.5 to 1.2)	1.6 (1.2 to 2.1)	2.8 (2.1 to 3.7)	5.5 (4.3 to 6.9)	3.3 (2.7 to 4.0)	3.2 (2.5 to 4.1)	2.9 (2.0 to 4.2)	<.001	3.7 (2.1 to 6.4)	2.1 (1.0 to 3.3)
Methylsulfonyl-methane	0.5 (0.3 to 0.9)	1.0 (0.8 to 1.4)	1.9 (1.2 to 3.0)	1.9 (1.5 to 2.4)	2.4 (1.8 to 3.1)	1.8 (1.5 to 2.3)	1.9 (1.5 to 2.4)	<.001	3.6 (2.0 to 6.4)	1.4 (0.8 to 1.9)
Omega-3 fatty acids of any type	1.9 (1.4 to 2.6)	2.8 (2.0 to 3.8)	4.1 (3.1 to 5.3)	7.1 (5.6 to 9.0)	11 (8.9 to 13)	11 (10 to 13)	13 (11 to 15)	<.001	6.8 (4.9 to 9.3)	11 (9.4 to 13)
Fish oil/EPA/DHA/DPA	1.3 (0.9 to 1.9)	1.7 (1.1 to 2.5)	3.0 (2.3 to 3.9)	5.5 (4.0 to 7.6)	9.2 (7.5 to 11)	10 (9.1 to 12)	12 (11 to 14)	<.001	9.1 (6.2 to 13.5)	11 (9.1 to 12)
Alpha-linolenic acid or flaxseed		1.0 (0.8 to 1.4)	1.4 (0.9 to 2.2)	2.1 (1.6 to 2.7)	2.8 (2.1 to 3.7)	1.8 (1.4 to 2.3)	2.1 (1.5 to 2.8)	<.001	2.6 (1.3 to 5.0)	1.3 (0.5 to 2.0)
Omega-6 fatty acids	0.7 (0.4 to 1.2)	0.9 (0.6 to 1.3)	1.4 (0.8 to 2.4)	2.4 (1.9 to 3.1)	2.4 (1.8 to 3.0)	1.5 (1.1 to 2.1)	2.2 (1.6 to 2.9)	<.001	3.1 (1.6 to 6.0)	1.5 (0.8 to 2.2)
Omega-9 fatty acids	0.6 (0.3 to 1.0)	0.7 (0.4 to 1.1)	1.1 (0.6 to 1.9)	1.7 (1.2 to 2.4)	2.1 (1.5 to 2.8)	1.2 (0.9 to 1.6)	1.8 (1.3 to 2.5)	<.001	3.2 (1.7 to 6.0)	1.2 (0.5 to 1.9)
Probiotic		1.0 (0.6 to 1.4)	0.9 (0.6 to 1.4)	1.8 (1.5 to 2.2)	0.8 (0.6 to 1.2)	1.3 (1.1 to 1.6)	2.2 (1.6 to 2.9)	.003	2.4 (1.2 to 4.9)	1.3 (0.4 to 2.1)
Decreased Use										
Echinacea	1.9 (1.4 to 2.5)	1.3 (1.0 to 1.8)	1.3 (0.9 to 2.0)	1.5 (1.1 to 2.0)	1 (0.8 to 1.3)	0.6 (0.4 to 1.0)	0.7 (0.5 to 1.1)	<.001	0.38 (0.22 to 0.65)	−1.2 (−1.8 to −0.6)
Garlic	4.6 (4.1 to 5.3)	3.6 (2.9 to 4.5)	2.6 (2.0 to 3.5)	2.9 (2.3 to 3.7)	2.1 (1.5 to 3.0)	1.7 (1.4 to 2.2)	1.5 (1.1 to 1.9)	<.001	0.31 (0.24 to 0.41)	−3.2 (−3.9 to −2.5)
Ginkgo biloba	4.6 (3.7 to 5.7)	5.0 (4.0 to 6.3)	2.9 (2.3 to 3.7)	3.7 (3.1 to 4.4)	2.5 (1.8 to 3.5)	2.4 (1.9 to 3.0)	2.0 (1.4 to 2.7)	<.001	0.43 (0.28 to 0.64)	−2.6 (−3.8 to −1.5)
Ginseng	6.0 (4.8 to 7.4)	7.0 (5.9 to 8.4)	4.1 (3.4 to 5.0)	4.2 (3.5 to 4.9)	2.4 (1.6 to 3.5)	1.9 (1.4 to 2.6)	1.6 (1.1 to 2.2)	<.001	0.26 (0.18 to 0.39)	−4.4 (−5.8 to −3.0)
Para-aminobenzoic acid	4.5 (3.5 to 5.7)	4.1 (3.4 to 4.9)	3.1 (2.4 to 3.9)	3.4 (2.5 to 4.7)	1.9 (1.4 to 2.7)	1.3 (1.1 to 1.6)	2.2 (1.6 to 3.0)	<.001	0.49 (0.33 to 0.72)	−2.3 (−3.5 to −1.0)
Stable Use										
Amino acids	4.5 (3.4 to 5.9)	4.7 (4.1 to 5.4)	4.3 (3.5 to 5.2)	5.0 (4.2 to 5.9)	3.8 (2.9 to 4.8)	3.4 (2.9 to 3.9)	4.3 (3.6 to 5.1)	.11	0.96 (0.69 to 1.3)	−0.2 (−1.6 to 1.2)
Bilberry	0.6 (0.4 to 1.2)	1.6 (1.0 to 2.5)	1.6 (1.1 to 2.4)	3.0 (2.5 to 3.7)	1.7 (1.3 to 2.2)	1.1 (0.8 to 1.6)	1.4 (0.9 to 2.2)	.47	2.1 (1.0 to 4.5)	0.7 (0.0 to 1.5)
Bromelain	0.8 (0.5 to 1.3)	1.4 (1.0 to 2.0)	0.8 (0.6 to 1.3)	1.6 (1.3 to 2.1)	1.2 (0.8 to 1.8)	1.1 (0.8 to 1.5)	1.0 (0.6 to 1.6)	.88	1.2 (0.62 to 2.3)	0.2 (−0.4 to 0.8)
Chondroitin	1.8 (1.3 to 2.6)	2.4 (2.0 to 2.9)	3.1 (2.0 to 4.7)	3.6 (2.9 to 4.6)	3.3 (2.6 to 4.3)	2.8 (2.4 to 3.3)	2.2 (1.7 to 2.9)	.30	1.2 (0.77 to 1.9)	0.4 (−0.5 to 1.3)
Fiber	2.3 (1.7 to 3.0)	2.5 (2.2 to 2.9)	2.5 (1.9 to 3.2)	3.5 (2.6 to 4.7)	3.3 (2.6 to 4.4)	2.0 (1.6 to 2.6)	2.4 (1.6 to 3.5)	.95	1.0 (0.63 to 1.7)	0.1 (−1.1 to 1.2)
Ginger	1.7 (1.2 to 2.4)	2.0 (1.5 to 2.7)	1.4 (1.0 to 1.9)	2.1 (1.6 to 2.9)	1.5 (1.1 to 2.0)	1.4 (1.0 to 2.1)	1.5 (1.1 to 2.0)	.24	0.89 (0.55 to 1.4)	−0.2 (−0.9 to 0.6)
Glucosamine	2.9 (2.3 to 3.8)	3.5 (2.9 to 4.2)	4.9 (3.5 to 6.7)	5.2 (4.2 to 6.5)	4.6 (3.7 to 5.8)	3.9 (3.3 to 4.7)	3.5 (2.9 to 4.2)	.37	1.2 (0.87 to 1.6)	0.6 (−0.4 to 1.5)
Grape seed	1.8 (1.1 to 2.9)	2.7 (1.8 to 4.1)	1.8 (1.4 to 2.4)	2.2 (1.8 to 2.7)	1.3 (1.0 to 1.8)	2.2 (1.7 to 2.8)	1.7 (1.0 to 2.8)	.42	0.97 (0.47 to 2.0)	−0.1 (−1.3 to 1.2)
Quercetin	0.8 (0.6 to 1.1)	1.3 (0.9 to 1.8)	1.3 (0.8 to 2.0)	1.5 (1.2 to 1.9)	0.9 (0.7 to 1.2)	1.1 (0.8 to 1.4)	1.0 (0.6 to 1.7)	.79	1.2 (0.66 to 2.3)	0.2 (−0.4 to 0.8)
Saw palmetto (men only)	2.5 (1.8 to 3.6)	3.2 (2.6 to 4.1)	4.2 (2.9 to 5.9)	4.3 (3.4 to 5.5)	2.3 (1.6 to 3.2)	2.2 (1.7 to 2.9)	2.7 (2.2 to 3.4)	.08	1.1 (0.71 to 1.6)	0.2 (−0.9 to 1.2)
Soy		1.7 (1.2 to 2.4)	1.9 (1.6 to 2.4)	2.0 (1.3 to 3.0)	1.9 (1.4 to 2.7)	1.4 (1.0 to 1.9)	1.7 (1.3 to 2.2)	.84	1.3 (0.66 to 2.5)	0.4 (−0.5 to 1.3)

Abbreviations: DHA, docosahexaenoic acid; DPA, docosapentaenoic acid; EGCG, epigallocatechin gallate; EPA, eicosapentaenoic acid; MVMM, multivitamin/multimineral.

[a] Among adults 20 years or older.

[b] A decrease corresponds to a ratio less than 1 and *P* value for trend less than .05. An increase represents a ratio more than 1 and *P* value for trend less than .05. Stable represents a *P* value for trend of .05 or more.

[c] Data are weighted to be nationally representative. If the relative standard error exceeded 30%, data were suppressed (empty cells), consistent with National Health and Nutrition Examination Survey reporting guidelines.[20]

[d] Detailed information on each trend, both overall and exclusive of MVMM is presented in eTable 3 in the Supplement.

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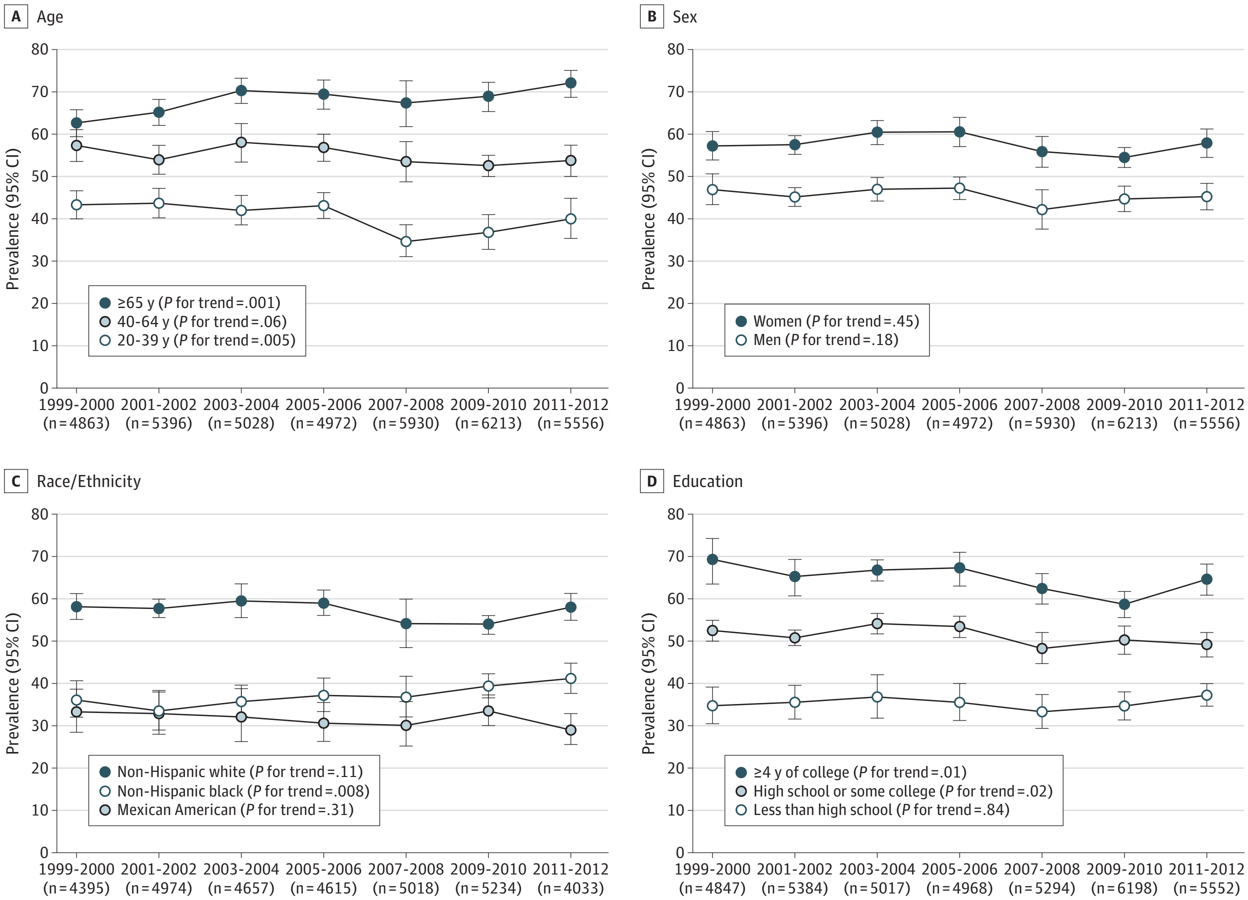
Figure 1. Trends in Any Supplement Use by Age, Sex, Race/Ethnicity, and Education Among US Adults



Data are weighted to be nationally representative. Error bars indicate 95% CIs.

Beyond the decrease for MVMM, a decrease was also observed in use of most vitamins and minerals, including antioxidants vitamins C, E, and selenium. These trends persisted when limited to non-MVMM supplements, indicating that these downward trends were not solely due to the decrease in MVMM use, but also to the decrease in use of individual or smaller combinations containing these antioxidants. This decrease likely reflects increasing skepticism regarding antioxidant supplements,[12] following the publication of studies that demonstrated no or adverse effects on various outcomes.[9,11,26-28]

Despite the decrease in MVMM and many vitamins/minerals, not all decreased. Although overall vitamin D supplement use remained stable, a marked increase in vitamin D supplement use exclusive of MVMM was observed. This indicates that this increase is not due to increased inclusion of vitamin D in MVMM supplements but rather to an increase in individual vitamin D supplements or more focused combinations. This increase aligns with a growing body of research evaluating the potential beneficial effects of vitamin D on a number of health outcomes, including fractures, cancer, cardiovascular disease, and multiple sclerosis.[29-32] Such research likely increased public awareness about the potential benefits of vitamin D and testing for vitamin D insufficiency,[33] contributing to the increase observed here and in a recent study of older adults.[14]

Use of lycopene-containing supplements also increased. A significant joinpoint for lycopene use was observed in 2005-2006, at which time lycopene was used by 25% of men. This increase in the early 2000s followed well-publicized research suggesting that consumption of lycopene-rich tomato products was associated with reduced risk of prostate cancer.[4] This trend was almost entirely driven by MVMM; this increase was due to increased inclusion of lycopene in MVMM formulations, not increased use of individual lycopene supplements.

Use of omega-3 fatty acid-containing supplements also increased; this trend was largely driven by an increase in fish oil supplements, although an increase in alpha-linolenic acid or flaxseed was also observed. This increase, which has been observed previously,[13,14] likely reflects increased research and subsequent media attention for the potential benefits of fish or omega-3 fatty acid intake and fish oil supplements on risk of cancer and cardiovascular disease.[5,34,35] The ongoing Vitamin D and Omega-3 Trial (VITAL), when complete, may provide valuable information

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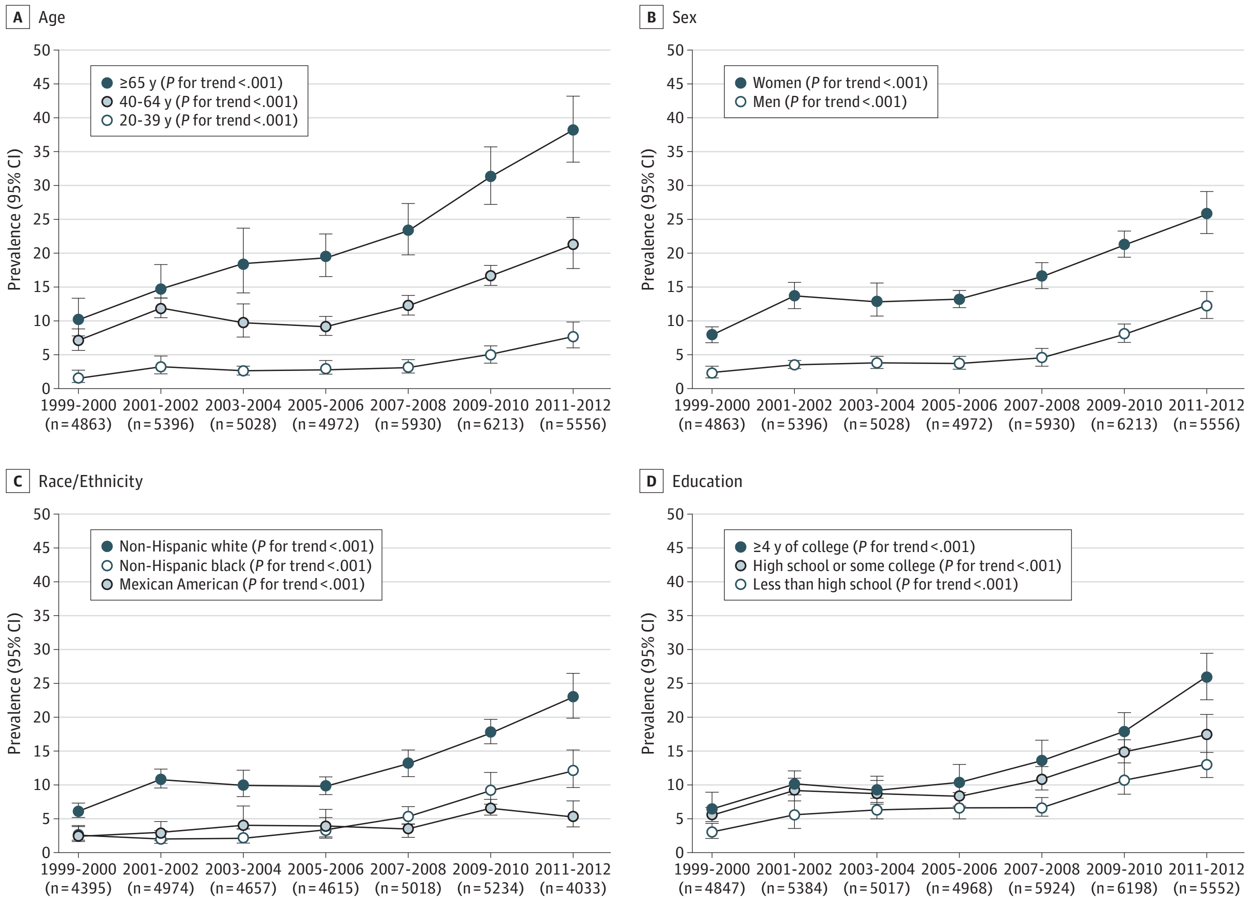
Figure 2. Trends in Use of Vitamin D (Excluding Multivitamin/Multimineral) by Age, Sex, Race/Ethnicity, and Education Among US Adults



Data are weighted to be nationally representative. Error bars indicate 95% CIs.

to guide consumers and clinicians regarding the effects of omega-3 fatty acids and vitamin D.[36]

Not all NVNM supplements increased; many remained stable and a decrease was observed for several, including those that were among the most popular in the early 2000s,[37] including ginseng, ginkgo biloba, and garlic. The decline in ginkgo biloba may be related to a 2002 randomized clinical trial observing no effect of ginkgo biloba on memory function, its primary indication.[38] Furthermore, although glucosamine and chondroitin remained stable, a significant joinpoint was observed in 2005-2006, after which use declined. This may have been due to the 2006 Glucosamine/Chondroitin Arthritis Intervention Trial (GAIT), which found no effect of these supplements on joint structure or function.[8]

The trend in any supplement use varied by age, with use decreasing among young adults, stable among middle-aged adults, and increasing among older adults. A recent study of adults aged 62 to 85 years found that supplement use among older adults increased from 51.8% in 2005-2006 to 63.7% in 2010-2011[14]; an increase among older adults was also observed in our study, but this increase was not observed for other age groups. Use of MVMM decreased significantly among non-Hispanic white adults and more highly educated groups. The reasons for these patterns are unclear. It is possible that the difference in trends in MVMM use by age group may reflect a cohort effect, but a longer time frame would be needed to address this question. It is also possible that differences in trends by population subgroup reflect that research translates into behavior change more quickly in certain population subgroups,[39,40] although differences across subgroups also likely reflect underlying health status and socioeconomic differences.[3]

This study has several important strengths. It was conducted using data from a large nationally representative survey. Supplement use was assessed during an in-home interview, in which participants provided detailed information on supplements used over the prior 30 days; supplement bottles were seen for the majority of supplements, likely increasing accuracy of exposure measurement. Furthermore, these data were collected as part of a continuous national survey, allowing for evaluation of trends over a 14-year period.

This study also has several important limitations. First, it was a study of the noninstitutionalized, civilian population, and did not capture use among adults in nursing homes or the military. Second, supplements were assessed in the

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preceding 30 days, which may have underestimated any use over the preceding year for supplements that may vary seasonally, such as those commonly taken for colds; however, this would not influence the ability to detect trends in use over time. Third, although the analysis used the most recently available data (through 2011-2012), it is unknown whether or how these findings reflect dietary supplement use at present. Fourth, the study focused on any use in the preceding 30 days, although sensitivity analyses evaluated trends in regular use of supplements. The analyses did not incorporate information on dose, as the intention was to assess prevalence of use in the population use of these supplements, rather than population-level exposure. It also did not incorporate information about adherence. Fifth, the serial cross-sectional study design precluded longitudinal measurement of supplement use within the same individuals.

Conclusions

Among adults in the United States, overall use of dietary supplements remained stable from 1999-2012, use of MVMM decreased, and trends in use of individual supplements varied and were heterogeneous by population subgroups.

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Author Contributions: Drs Kantor and Rehm had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Drs Kantor and Rehm shared first authorship. Drs Kantor Rehm contributed equally to the manuscript.
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Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

Funding/Support: This study was supported by grants P30CA008748 and K05CA154337 from the National Cancer Institute of the National Institutes of Health.

Role of the Funder/Sponsor: The National Cancer Institute of the National Institutes of Health had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

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