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***Weekly***

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# Use of Vitamins Containing Folic Acid Among Women of Childbearing Age --- United States, 2004

Neural tube defects (NTDs) are serious birth defects of the spine (spina bifida) and brain (anencephaly), affecting approximately 3,000 pregnancies each year in the United States (1). Periconceptional consumption of the B vitamin folic acid reduces the occurrence of NTDs by 50%--70% (2). To prevent these defects, the U.S. Public Health Service (1992) and Institute of Medicine (1998) issued separate recommendations that all women capable of becoming pregnant consume 400  $\mu\text{g}$  of folic acid daily, and the Food and Drug Administration mandated fortification of cereal grain products with folic acid to increase women's daily intake (3,4). Fortification of the U.S. food supply with folic acid has resulted in a 26% reduction in NTDs (1). However, even with fortification, not all women receive adequate levels of folic acid from their diets. Therefore, increasing the use of vitamins containing folic acid remains an important component of NTD prevention (3). To monitor the use of vitamins containing folic acid among women of childbearing age, the Gallup Organization has conducted a series of surveys for the March of Dimes Birth Defects Foundation since 1995. This report presents results from the 2004 survey, which indicated that although no substantial increase in the proportion of women who use vitamins containing folic acid\* daily occurred during 1995--2003, a substantial increase was observed in 2004, with 40% of women aged 18--45 years reporting daily consumption of a vitamin containing folic acid. This report also presents information about women's dieting behaviors. Regardless of dieting status, public health programs should stress the importance of women in their childbearing years consuming 400  $\mu\text{g}$  of folic acid daily through supplements, fortified foods, and a diet containing folate-rich foods.

The Gallup surveys are conducted via a random-digit--dialed telephone interview of a proportionate stratified sample of approximately 2,000 women (5). The response rate for the 2004 survey was 36% (2,012 women); since 1995, response rates have ranged from 24% to 52%. Statistical estimates were weighted to reflect the total population of women aged 18--45 years in the contiguous United States who resided in households with telephones. The margin of error for estimates based on the total sample size is  $\pm 3\%$ . The methods used have been described previously (5). The survey includes questions about women's awareness of and knowledge about folic acid, their use of vitamins containing folic acid and, new in 2004, questions about dieting.

In 2004, 40% of women reported taking vitamins containing folic acid, compared with 32% in 2003. This increase was consistent across most demographic characteristics; however, non-white, young, and less educated women remain the least likely to report taking a vitamin containing folic acid daily (Table 1). In contrast to the increase in consumption, awareness of and knowledge about folic acid remained unchanged. Women's awareness decreased 2 percentage points in 2004 to 77%. Their knowledge that folic acid prevents birth defects (24%) and that it should be taken before pregnancy (12%) increased slightly, from 21% and 10% in 2003, respectively (Figure).

Twenty-four percent of women aged 18--45 years reported dieting during the preceding 6 months. Of these, 44% were taking a vitamin containing folic acid daily and were nearly 30% more likely to be taking folic acid than non-dieters (odds ratio [OR] = 1.3; 95% confidence interval [CI] = 1.1--1.5 [ $p < 0.01$ ]). In addition, 48% of dieting women were on a low-carbohydrate diet. Women who reported being on a low-carbohydrate diet tended to have at least some college education (72%) and an income of  $\geq \$50,000$  (50%), compared with women who were on other diets or were not dieting (Table 2). Of the women on a low-carbohydrate diet, 49% reported taking a daily vitamin containing folic acid and were approximately 50% more likely to do this than women on other diets (OR = 1.5; 95% CI =

1.2--2.0 [ $p < 0.01$ ]). In addition, women on low-carbohydrate diets were 40% more likely than women on other diets to believe that folic acid is important for women of childbearing age (OR = 1.4; 95% CI = 1.1--1.9 [ $p < 0.05$ ]).

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## Editorial Note:

The reported increase in consumption of a vitamin containing folic acid among women of childbearing age from 32% in 2003 to 40% in 2004 suggests a substantial change in behavior. This change has not been previously observed in the March of Dimes survey. Although this increase is encouraging, no clear rationale explains the reported change, and results should be interpreted with caution.

The findings in this report suggest that the proportion of reproductive-age women not consuming vitamins containing folic acid daily is 60%; therefore, efforts are needed to increase supplement use in conjunction with a healthy diet to lower the incidence of NTDs. CDC is developing a program focused on ensuring that every woman of childbearing age has optimal nutrition throughout her lifetime by encouraging women to consume 400  $\mu\text{g}$  of folic acid daily from supplements, fortified food, or both, in addition to consuming food folate from a varied diet, ensuring that they consume 100% of the recommended daily value of folic acid.

The survey results indicated that nearly 25% of reproductive-age women in the United States had dieted during the preceding 6 months. Nearly half of dieting women reported being on low-carbohydrate diets, which could reduce the amount of fortified and folate-rich foods they consume. These women have a particular need to supplement their diets with 400  $\mu\text{g}$  of folic acid daily because many of the enriched and fortified foods usually consumed are limited in low-carbohydrate diets. In comparison with other women participating in the survey, women on a low-carbohydrate diet tended to have a higher level of education and household income. Women most likely to take vitamins containing folic acid also tended to have higher education and household income levels, and the association between women's diet and consumption of vitamins containing folic acid might be confounded by their level of education and household income.

Increasing understanding of when and why a woman chooses to take a vitamin containing folic acid is important for public health efforts directed at achieving the 2010 national health objective to increase to 80% the number of women consuming 400  $\mu\text{g}$  of folic acid daily (objective no. 16--16a) (6). The fact that 40% of reproductive-age women are now consuming 400  $\mu\text{g}$  of folic acid every day represents an important step toward meeting that objective; however, the proportion of women not consuming a vitamin containing folic acid is 60%, underscoring the need for continued public health efforts to increase folic acid consumption. These percentages only include supplementation from a vitamin containing folic acid and not consumption of fortified foods.

The findings in this report are subject to at least two limitations. First, although the response rates for previous studies have not been substantial, the low response rate in 2004 could indicate a difference between the women who respond and those who do not. The majority of respondents to the survey were white; however, respondents' age, household income, and education level were distributed evenly. Second, 2004 is the first year for which data have been collected on dieting behavior; thus, associations between dieting behavior and vitamin consumption cannot be made, and further study is needed to validate these results.

Although verifying independently the increase in vitamin consumption is difficult, this increase suggests a potential impact on the number of pregnancies affected by an NTD. The increase in

consumption of vitamins containing folic acid could translate to an estimated 200 fewer infants born with NTDs<sup>†</sup> in the United States. Supplement use in conjunction with food fortification represents an important combination of strategies for achieving reductions in NTDs (*1*). However, if women's dietary habits change in a manner that reduces consumption of fortified foods, supplementation becomes even more important. Public health programs that emphasize the need to consume folic acid daily from supplements, fortified food, or both, in addition to consuming food folate from a varied diet, might reduce the number of infants born with NTDs. Therefore, continued efforts are needed to ensure that all women capable of becoming pregnant consume 400  $\mu\text{g}$  of folic acid daily.

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\*Women who reported taking a multivitamin, prenatal vitamin, or a folic acid only supplement in response to the question, "What type of vitamin or mineral supplements do you take?" were coded as taking a vitamin containing folic acid (consistent with all previous surveys).

<sup>†</sup>Number of women in the United States (aged 15--44 years): 61,576,997 (7). Number of women taking a vitamin containing folic acid in 2003 (32%): 19,704,639. Number of women taking a vitamin containing folic acid in 2004 (40%): 24,630,799. Number of additional women taking a vitamin containing folic acid in 2004: 4,926,160. Number of additional pregnancies with enough folic acid in 2004 (pregnancy rate for women aged 15--44 years: 104.00 per 1,000): 512,321 (8). Number of pregnancies affected by spina bifida (SB) (rate: 4.04 per 10,000 with prenatal ascertainment): 207 (9). Number of pregnancies affected by anencephaly (AN) (rate: 3.36 per 10,000 with prenatal ascertainment): 172 (9). Number of total pregnancies affected by SB/AN: 379. Number of pregnancies unaffected by an NTD (based on a 50% reduction): 190 (3).

## Table 1

TABLE 1. Percentage of women aged 18–45 years who reported taking folic acid daily, by selected sociodemographic characteristics — United States, 2003–2004\*

Characteristic	2003	2004
Race		
White	34	43
Non-white	28	31
Ethnicity		
Hispanic	29	38
Non-Hispanic	33	40
Age group (yrs)		
18–24	25	31
25–34	34	39
35–45	35	46
Education		
<High school	21	19
High school	28	32
College (any)	37	48
Annual household income		
<\$25,000	24	30
\$25,000–\$39,999	31	40
\$40,000–\$49,999	39	48
≥\$50,000	38	46
Women not pregnant	30	37
Total	32	40

\* Statistical estimates were weighted to reflect the total population of women aged 18–45 years in the contiguous United States who resided in households with telephones.

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## Table 2

TABLE 2. Prevalence of dieting behaviors among women, by selected characteristics — United States, 2003–2004\*†

Characteristic	Dieting		Non-dieting (%)
	Low-carbohydrate diet (%)	Other (%)	
<b>Age group (yrs)</b>			
18–24	6	19	24
25–34	38	29	33
35–45	45	50	40
<b>Marital status</b>			
Single/Never married	19	28	32
Married	66	58	54
Divorced	10	10	8
Separated	4	2	3
Widowed	<1	<1	1
<b>Pregnancy status</b>			
Not pregnant	96	96	94
Pregnant	2	3	5
<b>Race</b>			
White	71	73	69
Non-white	27	25	29
<b>Ethnicity</b>			
Hispanic	14	10	12
Non-Hispanic	84	89	86
<b>Education</b>			
<High school	5	14	11
High school	23	23	28
College (any)	72	61	59
<b>Annual household income</b>			
<\$25,000	14	25	29
\$25,000–\$39,999	18	17	18
\$40,000–\$49,999	10	11	10
≥\$50,000	50	38	30
<b>Take folic acid daily</b>			
Yes	49	40	39
No	50	60	61

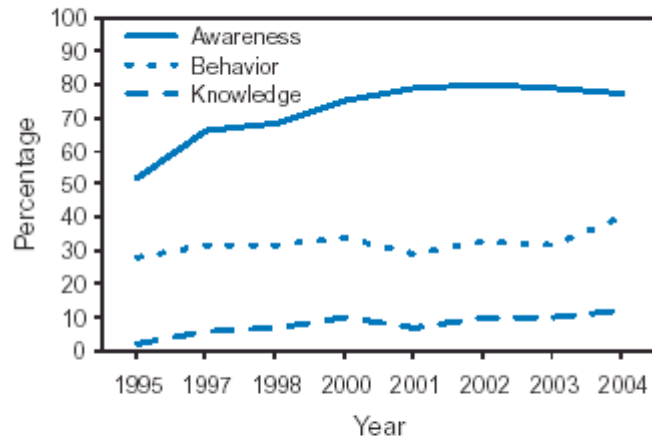
\* Refused/don't know responses not included.

† Statistical estimates were weighted to reflect the total population of women aged 18–45 years in the contiguous United States who resided in households with telephones.

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**Figure**

FIGURE. Percentage of women aware of\* or knowledgeable about† folic acid and percentage using vitamins containing folic acid daily, by year — United States, 1995–2004§



\* Includes women who had heard, read, or seen anything about folic acid.

† Includes women who knew that folic acid should be taken before pregnancy.

§ Statistical estimates were weighted to reflect the total population of women aged 18–45 years in the contiguous United States who resided in households with telephones.

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