

FOLIC ACID SUPPLEMENTATION by Wayne J. Millar

In 1999, the rate of open neural tube defects, the two most common of which are spina bifida and anencephaly, was 5.6 for every 10,000 births.¹ These defects occur in the first four weeks of pregnancy, usually before most women know they are pregnant.² The prevalence of open neural tube defects tends to be lower among children of women who have taken folic acid supplements around the time of conception.³⁻⁵

Folic acid is a B-vitamin that facilitates nucleic acid synthesis, which is necessary for normal cell replication. Naturally occurring folates are found in broccoli, spinach, Brussels sprouts, corn, legumes, and oranges.

If women relied only on dietary intake, a substantial proportion of the childbearing population would receive a lower level of folic acid than is recommended for preventing neural tube defects.⁶ A diet that conforms to Canada's Food Guide for Healthy Eating would provide about 0.2 milligrams of folic acid a day. The Society of Obstetricians and Gynaecologists of Canada recommends that women who could become pregnant should take a multivitamin containing 0.4 to 1.0 milligrams of folic acid every day, in addition to the amount that would be found in a healthy diet.⁷ Health Canada advises that daily folic acid supplementation be started at least two to three months before conception and continued throughout the first trimester.⁸

Less than half

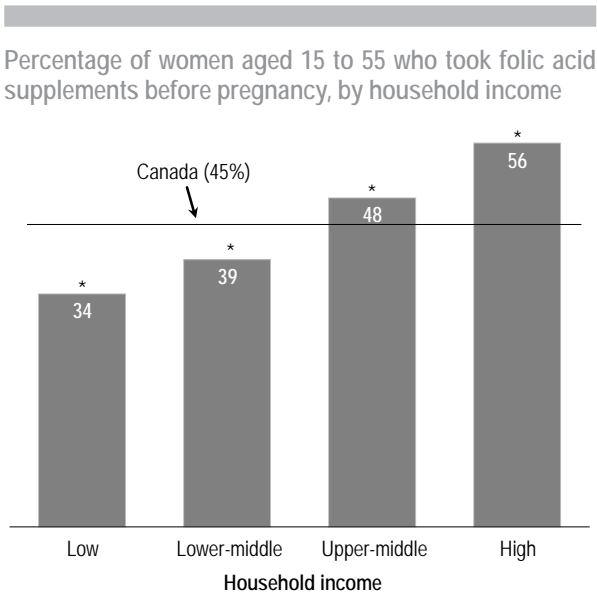
In 2000/01, as part of the Canadian Community Health Survey, women aged 15 to 55 who had given birth in the previous five years were asked questions about their pregnancy, including, "Did you take a vitamin supplement containing folic acid before your (last) pregnancy, that is, before you found out that you were pregnant?" Of the estimated 1.5 million women in this age range who had given birth, 45% reported that they had used vitamin supplements containing folic acid before their last pregnancy.

The older the mother, the more likely she was to have used folic acid supplements. The figure ranged from 33% among women aged 15 to 24 to 48% at age 30 or older.

Although unplanned pregnancies occur in all marital status groups, pregnancies among married women are more likely to be planned, and therefore, may be more likely to involve the use of folic acid supplements before conception.⁹ Close to half (48%) of women who were married had taken folic acid supplements, compared

with 31% who were not married.

Folic acid supplementation was associated with several socio-economic factors. Use tended to be higher among urban than rural mothers, and among those in higher-income households. Level of education was also associated with use, which was lowest among women with less than high school



Data source: 2000/01 Canadian Community Health Survey
 * Significantly different from rate for Canada (p < 0.05)

Use of folic acid supplements before pregnancy among women who gave birth in previous five years, 2000/01

	Estimated population	Took folic acid	
	'000	'000	%
Total	1,525	690	45
Age			
15-24	191	63	33*
25-29	375	163	43
30-55	960	465	48*
Marital status			
Married	1,296	620	48*
Not married	229	70	31*
Missing	F	F	F
Province/Territory			
Newfoundland	25	11	44
Prince Edward Island	7	3	43
Nova Scotia	43	22	50
New Brunswick	35	16	45
Québec	346	105	30*
Ontario	607	311	51*
Manitoba	55	25	46
Saskatchewan	51	22	43
Alberta	163	81	49*
British Columbia	184	91	49*
Yukon Territory	2	1	42
Northwest Territories	3	1	31*
Nunavut	3	1	41
Rural/Urban			
Rural	271	110	41*
Urban	1,254	580	46*
Household Income			
Low	229	78	34*
Lower-middle	367	145	39*
Upper-middle	505	242	48*
High	337	187	56*
Missing	88	38	43
Education			
Less than high school graduation	202	67	33*
High school graduation	313	132	42*
Some postsecondary	138	49	35*
College/University graduation	860	439	51*
Missing	F	F	F
Immigrant status			
Immigrant	357	150	42
Non-immigrant	1,162	539	46*
Missing	F	F	F

Data source: 2000/01 Canadian Community Health Survey

* Significantly different from value for Canada ($p < 0.05$)

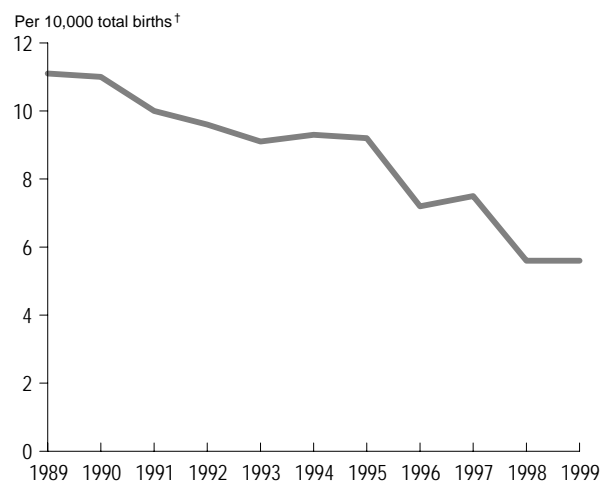
F Coefficient of variation greater than 33.3%

graduation, and highest among postsecondary graduates. The percentage of immigrant mothers who had used folic acid supplements was lower than the figure for those who were Canadian-born: 42% versus 46%.

Declining rates of neural tube defects

The 1999 level of open neural tube defects in Canada—5.6 per 10,000 births—was substantially lower than the rate of 11.1 per 10,000 in 1989.¹ Factors other than taking folic acid supplements probably contributed to this decline. Food fortification with folic acid is not likely involved, as it was not mandated in Canada until 1998. However, prenatal screening to detect congenital anomalies may have resulted in some women opting for therapeutic abortion.¹⁰ For instance, in England and Wales, the incidence of neural tube defects fell from 3.2 per 1,000 births in the early 1970s to 0.1 per 1,000 births in 1997. About 40% of this decline was attributed to prenatal screening and termination of pregnancy, with the remainder accounted for by a decline in incidence, that coincided with an increase in dietary folate.¹¹

Rate of neural tube defects, Canada, 1989 to 1999

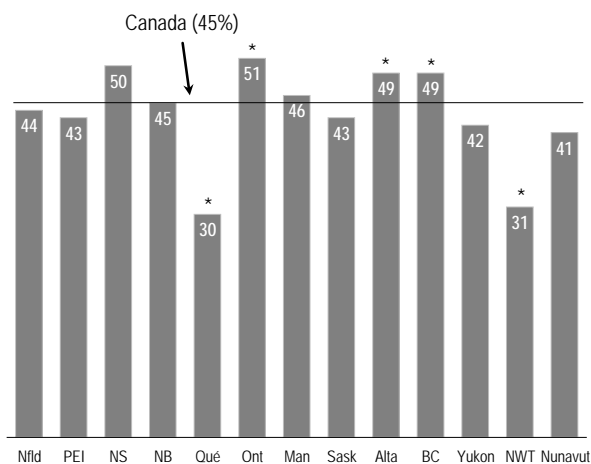


Data source: Health Canada, Canadian Congenital Anomalies Surveillance System

Note: Excludes Nova Scotia

† Live births and stillbirths

Percentage of women aged 15 to 55 who took folic acid before pregnancy, by province/territory



Data source: 2000/01 Canadian Community Health Survey
* Significantly different from rate for Canada ($p < 0.05$)

Provincial and territorial rates of folic acid supplementation varied from 30% in Québec and 31% in the Northwest Territories to 51% in Ontario. Rates in Alberta and British Columbia were also above the national level.

In Québec, where the reported use of folic acid supplementation is low, the rate of neural tube defects is relatively high.⁷ However, in Newfoundland, where the level of folic acid supplementation matches the national figure, the rate of neural tube defects is the same as in Québec.⁷

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Data source

Use of vitamin supplements containing folic acid before pregnancy was estimated using data from the first cycle of the Canadian Community Health Survey (CCHS), which was conducted from September 2000 to October 2001.¹² The survey covers the population aged 12 or older who were living in private households at the time. It does not include residents of Indian reserves, Canadian Forces Bases, or some remote areas. The response rate for the first cycle was 85%; the total sample size was 131,535.

All differences were tested to ensure statistical significance; that is, they did not occur simply by chance. To account for survey design effects, standard errors and coefficients of variation were estimated using the bootstrap method.¹³⁻¹⁵ A significance level of $p < 0.05$ was applied in all cases.

The information about the use of folic acid supplements is based on a sample of 7,875 women aged 15 to 55 who had given birth in the previous five years, representing a population of 1.5 million women. The survey did not ask the women if they had planned their pregnancy or about their knowledge of folic acid. No information is available about the dosage of folic acid or the frequency of use. The percentage of women taking folic acid may be underestimated, because some women may not know that multivitamins contain it.

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