

MI PRAMS Delivery



Daily Multivitamin Use Before Pregnancy, MI PRAMS 2007-2009

Daily folic acid supplementation of at least 400 micrograms (μg) has been shown by both randomized clinical trials and observational studies to reduce the frequency of infants born with neural tube defects (NTDs).¹ NTDs are a subgroup of birth defects that includes

spina bifida, anencephaly, and encephalocele, which have consequences ranging from fetal demise to physical and cognitive disabilities into adulthood.²

The United States Department of Agriculture (USDA) recommends an intake of

400 μg of dietary folate equivalents (DFEs) per day for women of childbearing age and 600 μg DFEs for pregnant women.³ This is equal to 400 μg of folate occurring naturally in food, 240 μg of folic acid (a synthetic form of folate) found in fortified foods, or 200 μg of folic acid added to

dietary supplements, such as multivitamins.

This issue of *MI PRAMS Delivery* examines pre-pregnancy multivitamin use among new mothers, as well as the association between life stress and daily multivitamin use, by socioeconomic status. \diamond

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Daily Multivitamin Trends During the Preconception Period, MI PRAMS 2001-2009

Michigan PRAMS collected information on preconception multivitamin use with the question, "During the month before you got pregnant with your new baby, how many times a week did you take a multivitamin, a prenatal vitamin, or a folic acid vitamin?" Women who replied "every day of the week" were

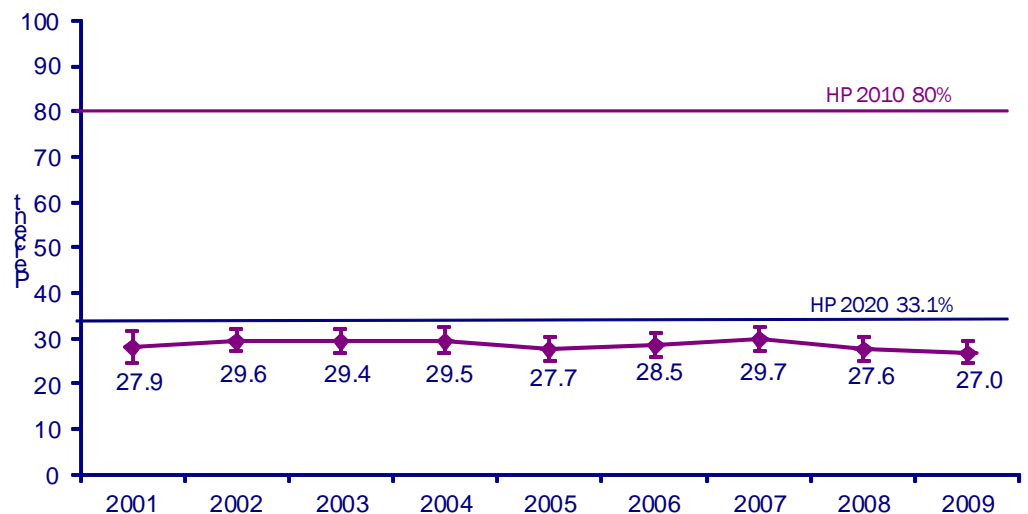
categorized as daily users.

The prevalence of pre-pregnancy multivitamin use has remained steady at slightly less than 30% since 2001, as shown in Figure 1 (p-value for linear trend = 0.39). The percent of pre-pregnancy daily multivitamin users was substantially lower than the Healthy People

(HP) 2010 goal of 80%.⁴

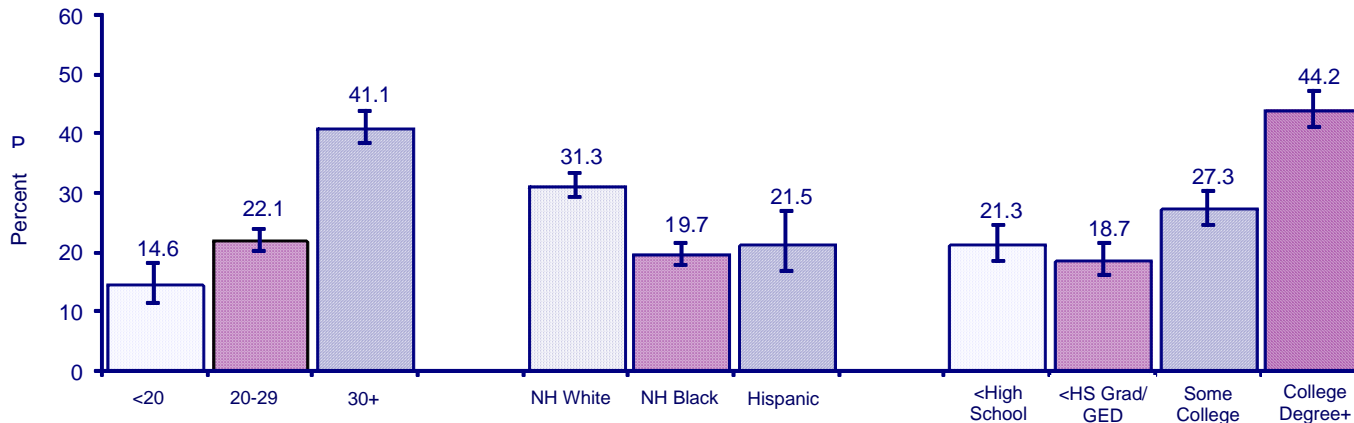
The new HP 2020 goal is 33.1%, a 10% increase above the multistate, 2007 PRAMS estimate of 30.1%.⁵ This aim is achievable with renewed and sustained focus on folic acid outreach to women of child-bearing age in Michigan. \diamond

Figure 1. Trends in Pre-pregnancy Daily Multivitamin Use, MI PRAMS 2001-2009



Demographic Characteristics of Women Taking a Multivitamin Every Day Before Pregnancy, MI PRAMS 2007-2009

Figure 2. Prevalence of Pre-pregnancy Daily Multivitamin Use by Maternal Age, Race/Ethnicity, and Education, MI PRAMS 2007-2009



As shown in Figure 2, over 41% of women who were at least 30 years old at the time of survey took multivitamins daily during the pre-pregnancy period. This is significantly higher than women in their twenties (22.1%) and teens (14.6%).

Non-Hispanic white mothers had the highest prevalence of pre-pregnancy daily multivitamin use at 31.3%, while non-Hispanic black (19.7%) and Hispanic (21.5%) prevalences were much lower.

Daily pre-pregnancy multi-

vitamin use was also much higher among women with at least some college education than those with a high school diploma or less.

An increase in prevalence by insurance was found for daily pre-pregnancy multivitamin use (Figure 3): women with private insurance before pregnancy had the highest prevalence and those with no insurance had the lowest.

The percent of married women who took a daily multivitamin (37.7%) was much higher than women who were

not married (14.8%), as was the percent of mothers with an intended pregnancy (38.4%), versus those with an unintended pregnancy (15.1%).

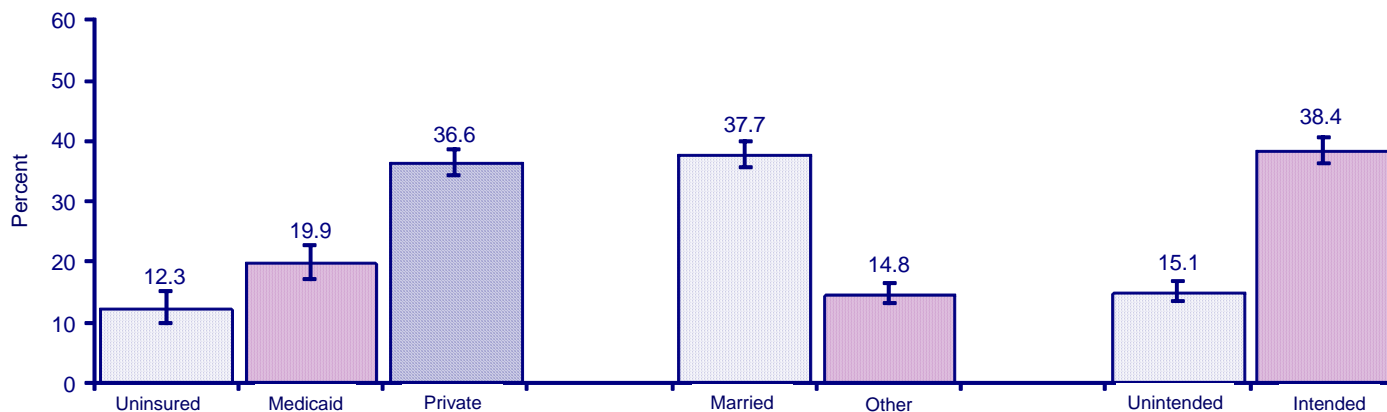
These results highlight the importance of promoting pre-pregnancy multivitamin use. Only groups with the highest prevalences reached the HP 2020 goal of 33.1% taking a multivitamin before pregnancy.

A logistic regression model containing all six demographic variables showed that after controlling for the other factors, all variables except race/ethnicity

were significant predictors of daily multivitamin use. This means that the differences in multivitamin use found across race/ethnicity in Figure 2 can be explained by the other five variables.

The strongest predictors of less than daily multivitamin use were no insurance before pregnancy and unintended pregnancy: each was associated with a 65% decrease in odds of multivitamin use. This illustrates an opportunity for health care providers of the uninsured to play a role in preventing NTDs. ◊

Figure 3. Prevalence of Pre-pregnancy Daily Multivitamin Use by Pre-pregnancy Insurance, Marital Status, and Pregnancy Intention, MI PRAMS 2007-2009



Associations Between Types of Life Stressors and Daily Pre-pregnancy Multivitamin Use Among Women of , MI PRAMS 2007-2009

Research has shown that measures of socioeconomic status (SES), namely household income and education, were among several predictors of daily multivitamin use among non-pregnant women of childbearing age.⁶ Given that women of low SES may also experience more life stressors than those of higher SES,⁷ MI PRAMS data from 2007-2009 were used to determine whether types of stressful life events around the time of pregnancy were associated with daily multivitamin use at the time of conception, by SES group. The data were stratified by maternal education level (high school diploma or less = low, at least some college = high), as it is commonly used as a proxy for SES. (See the Epi Corner on Page 4 for more information on proxy measures.)

A multi-part question asked MI PRAMS respondents to report whether or not the stressors listed in Figure 4 had happened during the 12 months before delivery. These stressors were grouped into three types: financial, partner, and family stress. Since the timeframe for the life stressors question also includes the prenatal period, the stress variables were used as

proxy measures for each type of stress during the preconception period.

Two multivariate logistic regression models were constructed to assess the relationship between financial, partner, and family related stressors and daily pre-pregnancy multivitamin use. The confounding effects of age, insurance, and pregnancy intention (for both SES groups) were controlled for in the regression models.

Table 1 shows that after adjusting for the other types of life stress and confounders, women in the low SES group who experienced partner related stress were 30% less likely to take a daily multivitamin than women of low SES without partner stressors. Financial and family stress did not have significant effects on daily multivitamin use in the low SES group.

Among women with high SES, financial stress was associated with a slight decrease in daily multivitamin use, as was partner related stress (Table 2). Interestingly, women of high SES who experienced

Figure 4. Descriptions and Grouping of Life Stressors Measured by MI PRAMS, 2007-2009

Financial Stressors

- ◆ I lost my job even though I wanted to go on working
- ◆ My husband or partner lost his job
- ◆ I was homeless
- ◆ I moved to a new address
- ◆ I had a lot of bills I couldn't pay

Partner Stressors

- ◆ I got separated or divorced from my husband or partner
- ◆ I argued with my husband or partner more than usual
- ◆ My husband or partner said he didn't want me to be pregnant
- ◆ My husband or partner or I went to jail

Family Stressors

- ◆ A close family member was very sick and had to go into the hospital
- ◆ Someone very close to me had a bad problem with drinking or drugs
- ◆ Someone very close to me died

family stress were 20% more likely to take daily multivitamins before pregnancy. Unfortunately, further information is not available to explain causes of this protective association.

These results suggest that life stress, specifically that related to a woman's partner, may decrease daily pre-pregnancy vitamin use for women of low SES; and both financial and partner related stress may have small negative effects on

vitamin use for women of high SES. Conversely, family stress may play an unexpected protective role for women of high SES, but this association was only apparent after controlling for confounding factors.

In conclusion, the presence of different types of life stressors may not affect women across SES groups uniformly, although further research is needed to either verify or refute the current results. ◊

Table 1. Associations Between Types of Stress and Pre-pregnancy Daily Multivitamin Use Among Mothers with **Low** SES, MI PRAMS 2007-2009

Type of Stress	Crude Prevalence Ratio	95% Confidence Interval	Adjusted Prevalence Ratio	95% Confidence Interval
Financial Stress	0.7	(0.6 - 0.9)	0.9	(0.7 - 1.1)
No Financial Stress	1.0	Reference	1.0	Reference
Partner Stress	0.6	(0.5 - 0.7)	0.7	(0.6 - 0.9)
No Partner Stress	1.0	Reference	1.0	Reference
Family Stress	0.8	(0.7 - 1.0)	1.0	(0.8 - 1.2)
No Family Stress	1.0	Reference	1.0	Reference

Table 2. Associations Between Types of Stress and Pre-pregnancy Daily Multivitamin Use Among Mothers with **High** SES, MI PRAMS 2007-2009

Type of Stress	Crude Prevalence Ratio	95% Confidence Interval	Adjusted Prevalence Ratio	95% Confidence Interval
Financial Stress	0.6	(0.5 - 0.7)	0.9	(0.8 - 1.0)
No Financial Stress	1.0	Reference	1.0	Reference
Partner Stress	0.8	(0.6 - 0.7)	0.9	(0.9 - 1.0)
No Partner Stress	1.0	Reference	1.0	Reference
Family Stress	1.0	(0.9 - 1.1)	1.2	(1.0 - 1.3)
No Family Stress	1.0	Reference	1.0	Reference

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Michigan Department
of Community Health



Rick Snyder, Governor
Olga Dazzo, Director

For More Information Contact:

MI PRAMS

Division of Genomics,
Perinatal Health, & Chronic
Disease Epidemiology,
Bureau of Disease Control, Prevention and Epidemiology,
Michigan Department of
Community Health
201 Townsend Street
P.O. Box 30195
Lansing, MI 48909
Phone: 517-335-9509
Fax: 517-335-9195
E-mail:
pramsmi@michigan.gov

Epi Corner: Proxy Measures

When information about an exact indicator, exposure, or outcome is not present in the available data, an alternative approach is to use a similar variable. This is known as using a proxy measure.

Examples of proxy measures in action are the variables for financial, partner, and family stress depicted on Page 3. The analysis was conducted in order to investigate the effect of these different types of stress on daily multivitamin use during

the pre-pregnancy period. However, the life stressors were measured for the 12 months before *delivery*, which leads to a discrepancy in the time periods being measured. The stessor variables were therefore used as proxy measures for the pre-pregnancy stressor variables. The substitution was made under the assumption that life stressors would be constant across multivitamin user groups between the two time periods (i.e. non-differential).

Another example is the accepted practice of using education as a proxy for SES when other measures of SES are not available in the current data.

Proxy measures offer a "next best" way to estimate associations when the actual needed information is not available; although, the tradeoff is measurement error, and most often, this error cannot be quantified. ◇

$$Y \approx Y^*$$

About MI PRAMS

The Pregnancy Risk Assessment Monitoring System (PRAMS), a population based survey, is a collaborative between CDC and MDCH that provides data about risk factors for infant mortality.

It is a combination mail/telephone survey designed to monitor selected self-reported maternal behaviors and experiences of mothers that occur before and during pregnancy, as well as in the early postpartum period. Information regarding the health of the infant is also collected for analysis.

Annually, over 2,000 Michigan women who deliver a live birth are selected at random to participate from a frame of eligible birth certificates. Women who deliver a low birth weight infant and black mothers are oversampled in order to ensure adequate representation. The results are weighted to represent resident mothers who delivered a live birth in Michigan during the specified calendar year. ◇

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