

## Multivitamin Use prior to Pregnancy in Rhode Island

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**EACH YEAR IN THE UNITED STATES, AN** estimated 3,000 pregnancies are affected by **neural tube defects (NTDs)**, including spina bifida (an incomplete closure of the spinal cord and spinal column) and anencephaly (severe underdevelopment of the brain).<sup>1,2</sup> NTDs are among the most common birth defects that contribute to perinatal mortality, infant mortality, and serious disability in surviving children.<sup>2</sup> Research indicates that daily consumption of 400 mcg of folic acid before pregnancy through the first trimester can reduce the occurrence of NTDs by 50%-70%, and some birth defects other than NTDs.<sup>1,2,3</sup> Although folic acid can be obtained from foods rich in naturally occurring folates or fortifying foods, not all women obtain adequate levels of folic acid through their diets. Therefore, the **United States Public Health Service (PHS)** and **Centers for Disease Control and Prevention (CDC)** recommend that all women of childbearing age who are planning on or capable of becoming pregnant take a daily multivitamin, which generally contains the recommended daily allowance of 400mcg of folic acid, to reduce their risk of having a pregnancy affected with NTDs.<sup>3</sup>

The purpose of this report is to 1) describe the trends in daily use of multivitamins prior to pregnancy among Rhode Island women with a live birth, and 2) identify disparities in preconception multivitamin use among subpopulations.

### METHODS

Data from the Rhode Island **Pregnancy Risk Assessment Monitoring System (PRAMS)** were analyzed to assess the multivitamin use prior to pregnancy in Rhode Island. PRAMS, a surveillance project of the CDC and state health departments, collects state-specific, population-based data on maternal behaviors and experiences before, during, and after delivery of a live infant.<sup>4</sup> The PRAMS

sample of women who have had a recent live birth is drawn from the state's birth certificate file.<sup>4</sup> Rhode Island has participated in PRAMS since 2002, and about 1,400 recent mothers respond to the survey each year.

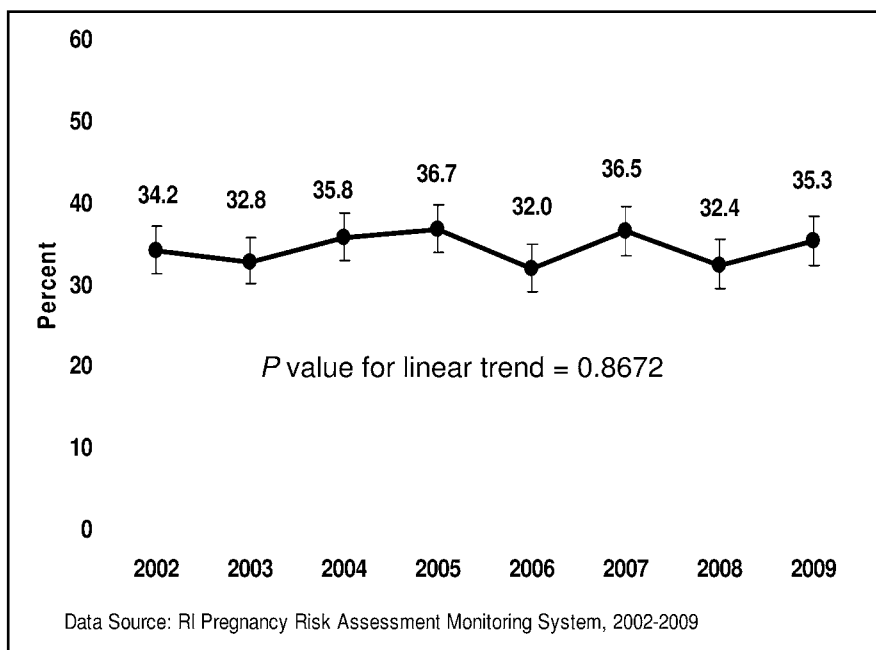


Figure 1. Trends in Daily Use of Multivitamin prior to Pregnancy among Rhode Island Women with a Live Birth, 2002-2009.

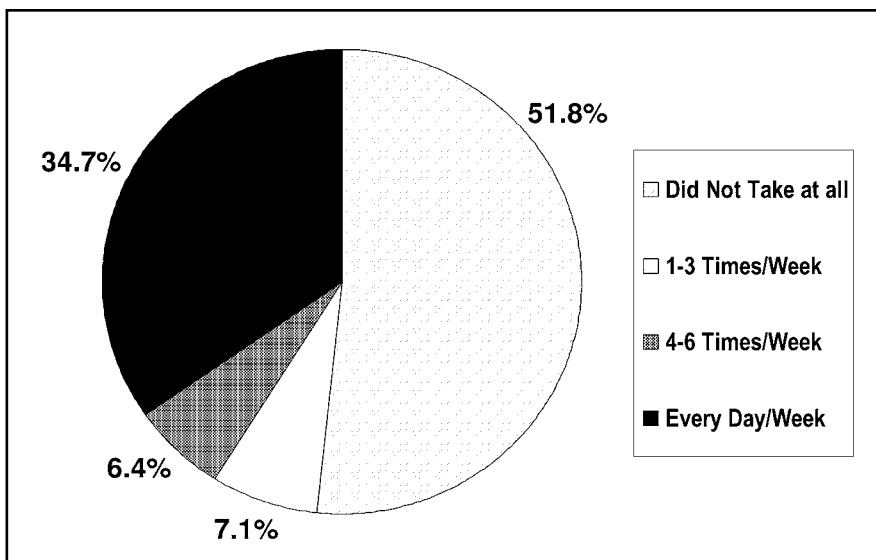


Figure 2. Multivitamin Use prior to Pregnancy among Rhode Island Women with a Live Birth, 2004-2008.

Table 1. Prevalence of Daily Multivitamin Use Prior to Pregnancy by Selected Characteristics, Rhode Island, 2004-2008 PRAMS

	Sample Size <sup>1</sup>	% Daily Multivitamin Use	95% CI <sup>2</sup>	P-Value
<b>Overall</b>	6935	34.7	(33.4 - 36.1)	
<b>Maternal Age</b>				<0.0001
< 20	674	21.6	(18.1 - 25.6)	
20-24	1385	19.1	(16.8 - 21.7)	
25-29	1727	32.5	(29.9 - 35.1)	
≥ 30	3149	46.2	(44.1 - 48.3)	
<b>Maternal Ethnicity</b>				<0.0001
Hispanic	1516	25.4	(22.9 - 28.0)	
Non-Hispanic	4401	36.3	(34.7 - 38.0)	
<b>Maternal Race</b>				<0.0001
White	5615	36.1	(34.6 - 37.6)	
Black	710	24.1	(20.5 - 28.1)	
American Indian	96	20.2	(12.3 - 31.3)	
Asian/Pacific Isl.	305	37.6	(31.2 - 44.6)	
<b>Maternal Education</b>				<0.0001
< High School	1142	25.1	(22.2 - 28.2)	
High School	1935	23.1	(21.0 - 25.4)	
> High School	3574	44.5	(42.6 - 46.4)	
<b>Household Income</b>				<0.0001
< \$25K	2504	21.1	(19.3 - 23.1)	
\$25K - <\$50K	1215	30.2	(27.2 - 33.3)	
≥ \$50K	2517	50.5	(48.3 - 52.8)	
<b>Marital Status</b>				<0.0001
Married	4160	44.0	(42.2 - 45.7)	
Not married	2775	21.1	(19.4 - 23.0)	
<b>Insurance before Pregnancy</b>				<0.0001
No Insurance	1403	17.3	(15.1 - 19.8)	
Public	1514	25.5	(23.0 - 28.2)	
Private	4000	44.0	(42.2 - 45.8)	
<b>Parity</b>				0.0012
1 <sup>st</sup> Born	3050	37.1	(35.1 - 39.2)	
2 <sup>nd</sup> or Higher	3722	32.6	(30.9 - 34.4)	
<b>WIC Participation</b>				<0.0001
Yes	3075	23.3	(21.5 - 25.1)	
No	3768	43.8	(41.9 - 45.7)	
<b>Pregnancy Intendedness</b>				<0.0001
Intended	4256	44.5	(42.7 - 46.2)	
Unintended	2582	19.4	(17.7 - 21.3)	

Data Source: Rhode Island Pregnancy Risk Assessment Monitoring System, 2004-2008.

<sup>1</sup> Sample size in each category; unknown and missing categories were excluded.

<sup>2</sup> 95% Confidence Interval.

The 2002-2009 PRAMS data were analyzed to assess the trends of daily multivitamin use in Rhode Island and the 2004-2008 aggregated data were analyzed to identify disparities among subgroups.

Multivitamin use prior to pregnancy was assessed using a survey question, "During the month before you got pregnant with your new baby, how many times a week did you take a multivitamin or a prenatal vitamin? These are pills that contain many different vitamins and minerals." The response categories included were 1) I didn't take a multivitamin or a prenatal vitamin at all, 2) one to three times a week, 3) four to six times a week, and 4) every day of the week. To identify disparities among subpopulations, the proportion of women who used a daily multivitamin was examined by selected characteristics, such as

maternal age, ethnicity, race, education, annual household income, marital status, health insurance type before pregnancy, parity, WIC (the Special Supplemental Nutrition Program for Women, Infants, and Children) participation status, and pregnancy intendedness.

Data analyses were performed using survey data analysis (SUDAAN) software, which accounts for the complex sample design of the survey. The trend was examined using logistic regression analysis with linear trend test and the disparities among subgroups were examined using the chi-square tests. All unknown and missing responses were excluded from the analysis.

## RESULTS

### Trends in Daily Use of Multivitamin prior to Pregnancy

Between 2002 and 2009, the proportion of Rhode Island women who reported daily use of multivitamins prior to pregnancy fluctuated somewhat, ranging from 32.0% (95% CI: 29.1%-35.0%) to 36.7% (95% CI: 33.9%-39.7%). However, a statistical test for linear trends revealed that the proportion did not significantly improve during those periods ( $p = 0.8672$ ). (Figure 1) Rhode Island's rates for daily use of multivitamins prior to pregnancy fell far below the Healthy People 2010 objective of 80%.

### Prevalence of Multivitamin Use prior to Pregnancy

Among Rhode Island women with a live birth during 2004-2008, 51.8% (95% Confidence Interval: 50.4%-53.2%) reported not taking a multivitamin at all prior to conception, 7.1% (95% CI: 6.4%-7.8%) reported taking one to three times per week, and 6.4%

(95% CI: 5.7%-7.7%) taking four to six times per week. About one third of Rhode Island recent mothers (34.7%, 95% CI: 33.4%-36.1%) reported taking a multivitamin daily as recommended by the PHS and CDC. (Figure 2)

### Daily Multivitamin Use by Selected Characteristics

The 2004-2008 aggregated data shows that the percentage of women who took a daily multivitamin prior to pregnancy varied significantly by socio-demographic characteristics. Mothers who were older than 30 years (46.2%), Non-Hispanic (36.3%), White (36.1%), Asian or Pacific Islander (37.6%), married (44.0%), and non-WIC participants (43.8%) were more likely to report daily use of multivitamins, compared to their counterparts. Mothers who had more than a high school

education (44.5%), annual household incomes greater than \$50,000 (50.5%), private health insurance (44.0%), a first born child (37.1%), and an intended pregnancy (44.5%) were also more likely to report daily use of multivitamins, compared to their counterparts. (Table 1)

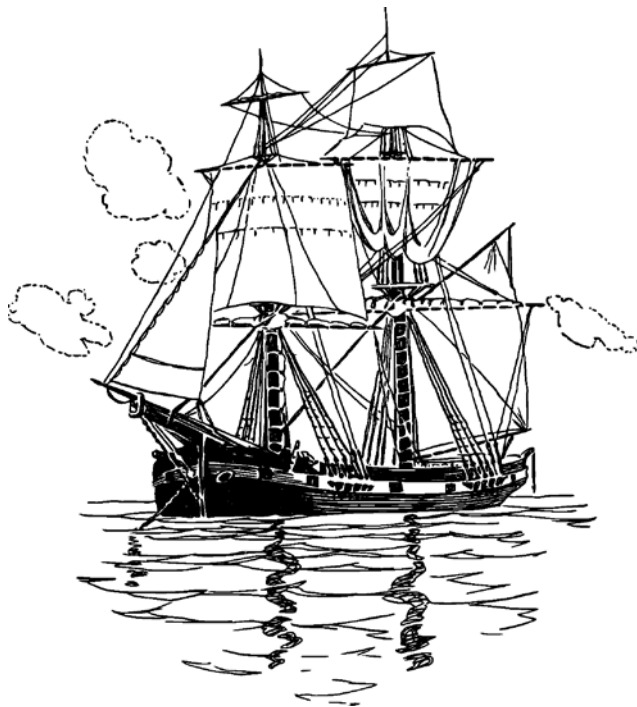
## DISCUSSION

The findings of this report clearly demonstrates that the majority of women in Rhode Island do not take a daily multivitamin prior to pregnancy, no progress was made during 2002-2009, and there are considerable disparities among subpopulations in multivitamin use.

Because NTDs occur within the first month after conception, before most women are aware of their pregnancy, and because nearly 40% of pregnancies in Rhode Island are unplanned, it is important for all women of childbearing age to get enough folic acid, not just those who are planning to become pregnant.<sup>3</sup>

The Rhode Island Department of Health's Birth Defects Program is working with maternal and child health programs to educate women of reproductive age and health care providers about the importance of folic acid and multivitamin use. Specifically, the Birth Defects Program, with funding from the CDC, has purchased multivitamins for distribution to uninsured women who receive negative pregnancy tests at Title X funded family planning clinics. Additionally, the Program is working with the New England Birth Defects Consortium to distribute multivitamins to WIC participants at selected clinics in Rhode Island.

Health care providers can play a critical role in educating women of childbearing age about the importance of adequate folic acid consumption to reduce the risk of NTDs. They can incorporate information about folic acid into their helath encounters with women of childbearing age.



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## Disclosure of Financial Interests

The authors and/or their significant others have no financial interests to disclose.

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