

# Maternal and Family Health Priority Overview Women's Nutrition: Folic Acid



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# What is Folic Acid and Why is it Important?

### What is Folic Acid?

Folic acid and folate are terms used interchangeably to describe a complex B vitamin that is important to women's health.<sup>1</sup> Specifically, folate occurs naturally in some foods while folic acid is found commonly in enriched food products and multivitamins.<sup>2-3</sup> Sources of folate and folic acid can be found on page 6.



Folic acid is important because it protects against neural tube defects (NTDs), the most severe form of birth defect of the brain and spine, if taken prior to and during the first weeks of pregnancy. 1, 3-4 NTDs occur within the first 28 days after conception, generally before a woman knows she is pregnant.4 Maintaining optimal folic acid levels for women is a growing concern because



approximately half of all pregnancies in the United States are unplanned.<sup>5</sup>

# Folic Acid Recommendation

The current recommendations are that all women of childbearing age consume 400 micrograms (µg) of folic acid everyday.4 This can be done by eating foods that contain folate naturally, eating foods fortified with folic acid and taking a supplement.4,6 Research shows that a diet enhanced with a vitamin containing folic acid and enriched foods is best because folic acid is more readily absorbed by the bloodstream than

natural folate.7-8 Women are cautioned not to exceed 1,000 µg of folic acid to avoid masking a potential vitamin B12 deficiency.9 Women should consult their doctor about folic acid when planning a pregnancy. 9-10 Women with a prior NTD-affected pregnancy or on medications to treat digestive disorders, rheumatoid arthritis, type 2 diabetes, seizures and sleep disorders should also consult their doctor about appropriate folic acid intake as medications may influence folic acid absorption.11



### **Fast Facts about Folic Acid Nutrition**

- Folic acid taken before pregnancy may help prevent birth defects including spina bifida and anencephaly.
- It is recommended that all women of reproductive age take 400 micrograms of folic acid daily.
- Less than 30% of Wyoming women reported taking a multivitamin in the month before pregnancy in 2007 08.

### Folic Acid Nutrition: Data Sources, Awareness, and Consumption

### **DATA SOURCES**

Beneficial information pertaining to the health of Wyoming men, women, and children are collected through surveillance projects and vital records. Access to this information allows the Maternal and Family Health Section (MFH) to better understand the health needs of Wyoming residents. Information specific to the MFH priority of women's folic acid use was collected through the Wyoming Pregnancy Risk Assessment Monitoring System (PRAMS) and Wyoming Vital Statistics Services.

### **Wyoming Vital Statistics Services**

Vital Statistics Services is the custodian for official records for Wyoming residents regarding birth, death, marriage, and divorce. Information collected on the birth certificate is a pivotal resource for MFH because of the comprehensive data including demographics, maternal outcomes and exposures. The data received from Vital Statistics Services do not reveal personal identifying information.<sup>12</sup>

### **Wyoming PRAMS**

Maternal behaviors, exposures and attitudes prior to, during, and after pregnancy have been studied since 1987 through the Centers for Disease Control and Prevention (CDC) surveillance project called PRAMS. In participating areas, PRAMS collects state-specific data from women who have recently given birth to a live infant and were randomly chosen through the state's birth certificate file. Information collected through PRAMS is used to monitor maternal and child health, identify emerging health issues, and measure progress in health behaviors. PRAMS has been actively collecting data in Wyoming since 2007.<sup>13</sup>



### **FOLIC ACID AWARENESS**

87.4% of women who participated in PRAMS in 2007-08 correctly identified that folic acid may help prevent some birth defects.

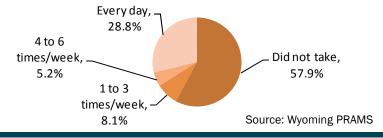


#### FOLIC ACID CONSUMPTION

Folic acid is contained in most multivitamins,<sup>3</sup> but women should read the label to be sure. Frequency of multivitamin use is one way researchers measure folic acid intake for women.

Although most Wyoming women who were surveyed by PRAMS in 2007- 08 knew of the benefits of taking a multivitamin with folic acid (see above), only 29% of women surveyed by PRAMS in 2007- 08 reported taking a daily multivitamin in the month before getting pregnant. While frequency of intake varied among the women, over half reported not taking a multivitamin at all prior to getting pregnant. Figure 2 illustrates the frequency of intake among PRAMS participants in 2007-08.

Figure 1: Multivitamin Intake the Month before Pregnancy among Wyoming Women Who Participated in PRAMS, 2007-08



### **Folic Acid Nutrition: Neural Tube Defects and Pregnancy Intention**

### **NEURAL TUBE DEFECTS**

Neural tube defects (NTDs) is a term used to define birth defects of the brain or spinal cord.<sup>14</sup> Most often these defects refer to anencephaly and spina bifida.<sup>15</sup> Anencephaly is the absence of most or all of the brain and skull; with rare exception all birth defects of the brain are fatal at birth.<sup>14, 16-17</sup> Spinal NTDs, collectively called spina bifida, can occur anywhere along the spinal column and are found in varying degrees of severity. <sup>17-19</sup> The most common and severe form of spina bifida is called myelomeningocele (or meningomyelocele) and is characterized by an incomplete spinal canal that causes the spinal cord and meninges to protrude from the back.<sup>14, 19</sup> Infants born with severe cases of myelomeningocele are living into adulthood, but they are burdened with multiple medical procedures, health complications and much higher medical costs than infants not born with spina bifida.<sup>20-22</sup>

In Wyoming, NTDs affected 0.26 per 1,000 live births during 2006-2010.<sup>12</sup> This was lower than national estimate of 1 per 1,000 live births in 2006.<sup>23</sup> NTD occurrence by race and ethnicity in Wyoming is displayed in Figures 2 and 3.

Figure 2 shows that the rate of NTDs was lower among Hispanic women who had a rate of 0.208 per 1,000 live births compared to non-Hispanic women (0.267 per 1,000 live births).

Figure 2: The Rate of Neural Tube Defects in Wyoming and by Ethnicity in Wyoming per 1,000 live births, 2006-2010

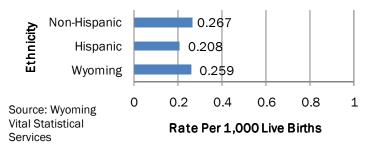
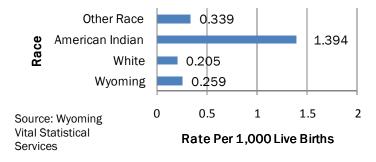


Figure 3: The Rate of Neural Tube Defects in Wyoming and by Race in Wyoming per 1,000 live births, 2006-2010

Figure 3 illustrates that white women had the lowest rate of NTDs at 0.205 per 1,000 live births, while American Indian women had an NTD rate of 1.394, and women of all other race had a rate of 0.339.



### **PREGNANCY INTENTION**

Pregnancy intention refers to the timing of a woman's most recent pregnancy. Women whose pregnancy is considered intended either planned the pregnancy at that time or wanted to become pregnant sooner. Women with unintended pregnancies either wanted to become pregnant later or not at all.

Results from PRAMS 2007- 08 indicate that daily multivitamin use was 39.0% among women with intended pregnancies. Women with unintended pregnancies reported significantly lower daily multivitamin intake at 14.8% (p < 0.001).



## Folic Acid Nutrition: Disparities among Women and Folic Acid Intake



### **DISPARITIES**

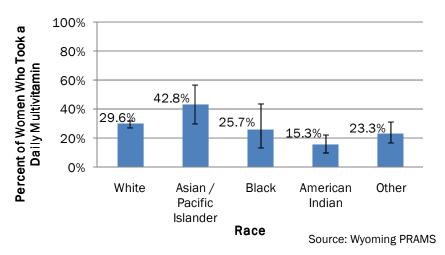
Healthy People 2020 defines a health disparity as "a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion." <sup>24-25</sup>

The information detailed in this section identifies additional sub-populations of women in Wyoming who participated in PRAMS. PRAMS is described on page 2.

#### Race

The results of women categorized by race and daily multivitamin intake in 2007-08 are displayed in Figure 4. The percent of women who took a daily multivitamin varied from 15.3% among American Indian women to 42.8% among Asian/Pacific Islander women; daily multivitamin use was significantly different between American Indian women and white women (p<0.001). Statistical analysis also indicated that American Indian women who gave birth in 2007-08 were half as likely to take a daily multivitamin when compared to white women. (Odds Ratio 0.52. 95% CI: 0.33-0.80)

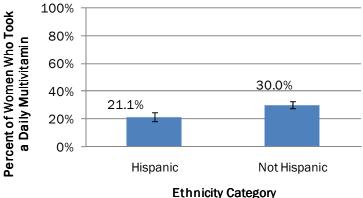
# Figure 4: The Percent of Wyoming Women Who Took a Daily Multivitamin the Month before Pregnancy by Race, 2007-08



### **Ethnicity**

Hispanic women in Wyoming were significantly less likely to take a daily multivitamin compared to non-Hispanic women (p<0.001). (Figure 5)

Figure 5: The Percent of Wyoming Women Who Took a Daily Multivitamin the Month Before Pregnancy by Ethnicity, 2007-08



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Source: Wyoming PRAMS

# Folic Acid Nutrition: Disparities among Wyoming Women and Folic Acid Intake, continued...



### **Maternal Age**

Daily multivitamin intake among Wyoming women who gave birth in 2007 and 2008 ranged from 14.9% among teens to 43.2% among women 35 or more years of age. The percentage of women who took a daily multivitamin increased with increasing age, and results are displayed in Table 1. Teens and young women 20-24 years of age reported a similar daily intake, but were both significantly less likely to take a daily multivitamin compared to women 25 years of age or older (p<0.001). Although the percentage of women 35 years or older reported a higher intake than women 25-34 years, the difference was not significant (p=0.0587).

Table 1: The Percent of Wyoming Women Who Took a Daily Multivitamin the Month before Pregnancy by Age Group, 2007-08

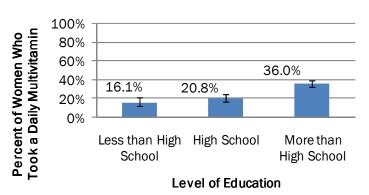
| Age Group   | Percent of<br>Women | 95% Confidence<br>Interval |
|-------------|---------------------|----------------------------|
| < 20 years  | 14.9%               | 9.8%-21.9%                 |
| 20-24 years | 20.4%               | 17.0%-24.4%                |
| 25-34 years | 34.7%               | 31.4%-38.1%                |
| ≥ 35 years  | 43.2%               | 35.3%-51.3%                |

Source: Wyoming PRAMS

#### **Level of Education**

Level of maternal education was divided into three categories: received less than a high school education, received a high school education, and received more than a high school education. Figure 6 illustrates that daily multivitamin intake increased in Wyoming as a woman's education level increased. The range of daily intake spanned from 16.1% among those with less than a high school education to 36.0% for those women with more than a high school education. Folic acid intake was not statistically different between women who received a high school education and women who received less than a high school education. A significantly higher percentage of women who received more than a high school education took a daily multivitamin the month before pregnancy compared to both other education levels (p<0.001).

Figure 6: The Percent of Wyoming Who Took a Daily Multivitamin the Month before Pregnancy by Level of Education, 2007-08



Source: Wyoming PRAMS

### Women, Infant & Child (WIC) Participation during Pregnancy

WIC is a nutritional subsidy program for children, infants and pregnant women who meet income guidelines. Because participants must be  $\leq 185\%$  of the federal poverty level, WIC is used as a measure of poverty. Only 19.9% (95% CI: 16.8%-23.5%) of Wyoming women that received WIC during their most recent pregnancy reported taking a daily multivitamin during the month before getting pregnant. This is significantly lower than the percentage of women who did not receive WIC (33.4%, 95% CI: 30.5%-36.5%) (p<0.001).

# Folic Acid Nutrition: Healthy People 2020, Website Resources, and Sources of Folic Acid

### **HEALTHY PEOPLE 2020**

"Healthy People provides science-based, 10 year national objectives for improving the health of all Americans." <sup>26</sup> Healthy People 2020 established 4 overall goals for this decade:

- 1. Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death;
- 2. Achieve health equity, eliminate disparities, and improve the health of all groups;
- 3. Create social and physical environments that promote good health for all;
- 4. Promote quality of life, healthy development, and healthy behaviors across all life stages.<sup>26</sup>

To achieve these goals, objectives have been set for a variety of indicators that are used to measure progress. Some of these objectives also apply to the priorities set by the Maternal and Family Health Section of the Wyoming Department of Health to improve the health of Wyoming women and families.

### The Goal for Folic Acid Intake

The Healthy People 2020 goal for folic acid intake is to have at least 26.2% of women of childbearing age consume 400 µg of folic acid from fortified foods or dietary supplements everyday of the week.<sup>6</sup>

### **Wyoming's Status**

In 2007-08, 28.8% of women surveyed by PRAMS reported taking a daily multivitamin. MFH recognizes that Wyoming has exceeded the HP 2020 goal, but considers this percentage low. Data presented in this document indicate that there are sub-populations of women who may be at risk for lower folic acid intake.

### **WEBSITE RESOURCES**

The **National Council on Folic Acid<sup>27</sup>** offers insight to the latest research regarding folic acid. Go to <a href="http://www.folicacidinfo.org/">http://www.folicacidinfo.org/</a> to find out what's new!

National Center on Birth Defects and Developmental Disabilities<sup>28</sup> offers information on folic acid as well as how to prevent birth defects before and during pregnancy. Check out <a href="http://www.cdc.gov/ncbddd/jump/">http://www.cdc.gov/ncbddd/jump/</a> pregnancy.html or call 800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 for information.

### Natural Food Sources of Folate\*9:



Avocado Asparagus Bananas Beef Liver Black-Eyed Peas Cantaloupe Eggs Great Northern Beans Green Peas Lentils Oranges Orange Juice Peanuts Romaine Lettuce Spinach Turnip Greens

### **Enriched Food Sources of Folic Acid\*9:**

Enriched Breads
Enriched Flour
Enriched Pasta
Enriched Rice
Fortified Breakfast Cereals



\*Items are listed alphabetically by group. This is not a complete list of all food sources of folate/folic acid.

### MFH Strategies to Improve Folic Acid Nutrition among Wyoming Women

Wyoming Maternal and Family Health Section selected women's nutrition as a state priority for the 2011-2015 Maternal and Child Health Needs Assessment. The needs assessment is a federally mandated application for Title V funding whereby states identify priorities for maternal, infant and child health improvement for the next five years.

The focus areas for this priority:

- 1. Increase folic acid intake among Wyoming women of reproductive age
- 2. Encourage adequate weight gain during pregnancy

For a list of all MFH priorities, please see back page.

### **FOLIC ACID NUTRITION STRATEGIES**



MFH will continue to collect specific folic acid information through PRAMS to support both of these strategies to improve folic acid intake among Wyoming women. PRAMS, described on page 2, helps MFH identify and monitor populations of Wyoming women at-risk for inadequate daily folic acid intake.

### **Increase Folic Acid Awareness**

MFH partners with the Wyoming March of Dimes (MOD) Chapter to assure that messages regarding folic acid as it relates to a healthy pregnancy are dispersed throughout the Wyoming population. For the benefit of all Wyoming nurses, MFH and MOD compiled the March of Dimes Nursing Module Library which includes one module specific to folic acid.

For American Indian clients, MOD created a culturally sensitive informational booklet titled *The Coming of the Blessing, a Pathway to a Healthy Pregnancy* that contains information about having a healthy pregnancy, including the importance of folic acid. MFH and MOD distributes this booklet to Indian Health Services and local county Public Health Nursing offices.

MFH also implemented a pilot program, called *Women Together for Health*, which emphasizes a healthy lifestyle among women of reproductive age. In this multi-week promising-practice program, parish nurses teach women in a classroom setting about healthy behaviors such as the benefits of proper nutrition which

### **Provide Access to Prenatal Vitamins**

MFH is working to increase folic acid consumption among Wyoming women by supplying prenatal vitamins that contain folic acid to Public Health Nursing offices, Family Planning Clinics and the Wyoming Migrant Health Program for distribution.

In Public Health Nursing offices, vitamins are given to women, pre-conceptually or prenatally, who are unable to purchase vitamins themselves.



Family Planning Clinics distribute the vitamins through the Preconception Health Project (PHP). PHP targets women who had a negative pregnancy test and offers materials related to planning a pregnancy as well as three months of prenatal vitamins.

The Wyoming Migrant Health Program is a public health outreach program designed to improve the health status of seasonal and migrant farm workers and their families whose primary source of income comes from agricultural work.

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### Maternal and Family Health



### Maternal & Family Health Mission

Maternal and Family Health provides leadership to ensure that all Wyoming women, children and families, including those with special health care needs, have access to prevention services and public health programs to create a strong foundation for optimal lifelong health.

Web address: http://health.wyo.gov

## **Maternal and Family Health Priorities for 2011-2015**

- 1. Promote healthy nutrition among women of reproductive age.
  - \*Promote folic acid intake among Wyoming women of reproductive age.
  - \*Promote a healthy prepregnancy body mass index and adequate weight gain during pregnancy.
- 2. Promote healthy nutrition and physical activity among children and adolescents.
- 3. Build and strengthen services for successful transitions for children and youth with special health care needs.
- 4. Reduce the rate of unintentional injury among children and adolescents.
- 5. Design and implement initiatives that address sexual and dating violence.
- 6. Reduce the rate of teen births.
- 7. Reduce the percentage of women who smoke during pregnancy.
- 8. Build and strengthen capacity to collect, analyze, and report on data for children and youth with special health care needs.
- 9. Support behaviors and environments that encourage initiation and extend duration of breastfeeding.