



Reducing Neural Tube Defect Risk with Folic Acid

An Educational Program Targeted for Florida's Hispanic Women

Second Edition

Developed by
Cindy M. Robles, MS
Lynn B. Bailey, PhD
Gail P. A. Kauwell, PhD, RD, LDN
Linda B. Bobroff, PhD, RD, LDN
Gail C. Rampersaud, MS, RD, LDN

Food Science and Human Nutrition Department
Institute of Food and Agricultural Sciences
University of Florida

©2000. University of Florida. ©2006 (revised). University of Florida. Funded by a grant from the March of Dimes Florida Chapter.

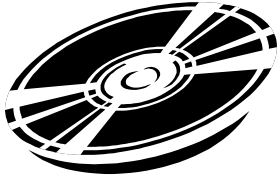
This material is for information purposes only and does not constitute medical advice. The opinions expressed in this material are those of the author(s) and do not necessarily reflect the views of the March of Dimes.

COOPERATIVE EXTENSION SERVICE, UNIVERSITY OF FLORIDA, INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES, Larry R. Arrington, Director, in cooperation with the United States Department of Agriculture, publishes this information to further the purpose of the May 8 and June 30, 1914 Acts of Congress; and is authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. The information in this publication is available in alternate formats. Information on copies for purchase is available from IFAS-Extension Bookstore, University of Florida, PO Box 110011, Gainesville, FL 32611-0011 or visit our Web site at: ifasbooks.ufl.edu. Information about alternate formats is available from IFAS Communication Services, University of Florida, PO Box 110810, Gainesville, FL 32611-0810. This information was published April 2006 as SP 368, Florida Cooperative Extension Service. Reviewed March 2006.

Contents of this Program

The contents include components to assist you in educating yourself, other health professionals/educators, and your clients or health program participants about the benefits of folic acid for overall health, and folic acid's role in reducing the risk for neural tube defects.

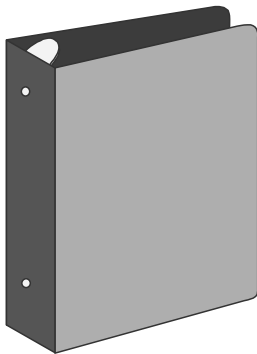
Training DVD



Train other health educators and your clients

- Video 1: “Prevention of Neural Tube Defects with Folic Acid: You Can Make a Difference” (21 minutes) – **for health educators only**
- Video 2: “Folic Acid Every Day” (10 minutes) – **for health educators or clients** (with automatic loop capability)

Educator's Guide



Provides the information and tools you and other health educators need to educate your clients. Includes sections on:

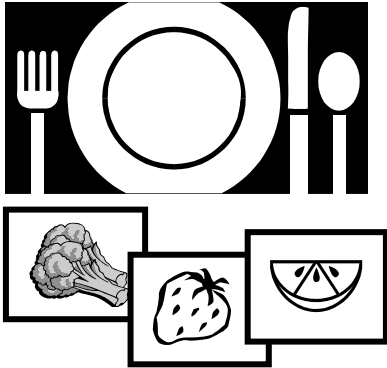
- Neural tube defects and folic acid
- Strategies for working with diverse audiences
- Strategies for working with diverse cultural/ethnic groups
- Frequently asked questions, plus
- Resource list



Lesson Plans, Presentation Materials, and Handouts



- Scripted interactive lesson plans with activities
- CD-ROM with PowerPoint® presentations, handouts/activity sheets, and overhead master copies
- Camera-ready handouts for clients



Folic acid flash cards activity

An interactive teaching tool used to teach clients about foods containing folic acid and naturally occurring food folate. Consists of:

- Laminated placemat with folic acid tally bar
- Set of 59 full color food flash cards

What tools in this program do you use to educate yourself or other health educators about the importance of folic acid?

- DVD: “Prevention of Neural Tube Defects With Folic Acid: You Can Make a Difference” and “Folic Acid Every Day” videos
- Educator’s Guide: Sections 1 through 4, and Section 7

What tools in this program do you use to educate your clients or program participants about the importance of folic acid?

- DVD: “Folic Acid Every Day” video
- Handouts, activity sheets: Section 5
- Lesson plans with presentation materials and activities: Section 6
- Folic acid flash card activity

Contents

Section 1: Learning about Folic Acid

Introduction	Guide 2
Purpose and Content of the Educational Guide	Guide 4
Folic Acid and Neural Tube Defects... What Health Educators Should Know	Guide 10

Section 2: Working with Diverse Audiences

Audiences 1

Section 3: Ethnic and Cultural Diversity

Cultures 1

Section 4: Frequently Asked Questions

FAQs 1

Section 5: Handouts

Quick Guide to Handouts	Handouts 2
Handouts, activity sheets, overheads	Pocket sheet holder

Section 6: Lesson Plans

Quick Guide to Lessons and Learning Tools	Lessons 2
Lesson 1: Learning About Neural Tube Defects	Lesson 1-1
Lesson 2: Protect Your Health for a Lifetime: Getting Enough Folic Acid	Lesson 2-1
Lesson 3: Food, Folate, and My Diet	Lesson 3-1
Lesson 4: Folate & My Life	Lesson 4-1

Section 7: Additional Resources

Resources 1

Section 1:

Learning about Folic Acid

Section 1: Learning about Folic Acid Introduction

Folic acid is a B vitamin that dramatically reduces the risk of one of the most serious and potentially preventable birth defects called **neural tube defects (NTDs)**. At least 3,000 pregnancies per year (more than 8 families per day) and 2,500 live births in the United States are affected by NTDs¹. In 1992, the United States Public Health Service (USPHS) recommended that all women of childbearing age in the United States who are capable of becoming pregnant should consume 0.4 milligrams (400 micrograms) of folic acid per day for the purpose of reducing their risk of having a pregnancy affected by spina bifida or other NTDs². This recommendation was supported by the 1998 National Academy of Sciences' Institute of Medicine (IOM) recommendation that women capable of becoming pregnant consume 400 micrograms of folic acid daily from supplements, fortified foods, or both in addition to consuming food folate from a varied diet³. These recommendations are based on the overwhelming scientific evidence that folic acid, when taken before and during early pregnancy, reduces the risk of an NTD-affected pregnancy.

Research has shown that having adequate folic acid intake before and during pregnancy also has been associated with a reduced risk for other birth defects such as heart defects, cleft lip/palate, and defects of the urinary tract and limbs⁴. Emerging research shows that folic acid may help reduce the risk for certain diseases or conditions including^{5,6}:

- Cardiovascular diseases like coronary heart disease and stroke.
- Certain cancers such as colon, breast*, and cervical* cancer.
- Diseases that affect the brain or mental function such as Alzheimer's disease, dementia, and depression.

* Benefits were seen for women who have other risk factors for this disease, such as a family history (breast cancer), high intake of alcoholic beverages (breast cancer), or infection with human Papillomavirus (cervical cancer).

Despite concerted efforts among government agencies and special interest organizations, many women of childbearing age remain unaware that periconceptional (i.e., the time beginning one month prior to conception and continuing through the first trimester of pregnancy) intake of folic acid can reduce the risk of an NTD-affected pregnancy. According to a national survey commissioned by the March of Dimes in 2005⁷, only seven percent of women of childbearing age are aware that folic acid should be taken prior to and early in pregnancy to reduce the risk of NTDs. Of the women who are aware of folic acid, only 26 percent of women reported hearing about folic acid from their health care providers.

Health educators can serve as influential sources of this critical information. The survey data clearly illustrate the urgent need for health educators to educate women about the

About 50 percent of all pregnancies in the U.S. are unplanned or mistimed (i.e., they occurred earlier than desired)⁸.

The unplanned pregnancy rate among teenagers may be as high as 95 percent⁹.

importance of taking folic acid every day to prevent birth defects, as well as making women aware of the other health benefits of folic acid. As a health educator, you also have a unique opportunity to influence, motivate, and support women as they make lifestyle changes that can protect their health and the health of future generations.

Section 1: Learning about Folic Acid Purpose and Content of the Educational Guide

This Guide seeks to promote public health recommendations on folic acid for the prevention of birth defects and for the promotion of general health. The United States Public Health Service (USPHS) and the Institute of Medicine, as a result of compelling scientific evidence, recommend that all women of childbearing age consume 400 micrograms of folic acid every day^{2,3}. The Institute of Medicine recommends that this amount of folic acid be obtained from a supplement or fortified foods, in addition to consuming food folate from a varied diet. This recommendation would also apply to teenage and younger girls who have reached menses.

In addition, Healthy People 2010, a set of health objectives for the nation established by the Centers for Disease Control and Prevention (CDC) and the Health Resources and Services Administration, includes two goals related to folic acid and birth defects¹⁰.

- Have 80 percent of nonpregnant women aged 15-44 years consuming at least 400 micrograms of folic acid every day from fortified foods or dietary supplements (up from 21 percent in the baseline years 1991-1994).
- Reduce the occurrence of spina bifida and other neural tube defects by 50 percent (from six new cases per 10,000 births from baseline years 1991-1994 to three new cases per 10,000 births).

The Institute of Medicine recommends³:

All women of childbearing age consume 400 micrograms of folic acid every day, from a supplement or fortified foods, in addition to consuming food folate from a varied diet.

Among the health care organizations that work to promote these recommendations is the National Council on Folic Acid (NCFA). The NCFA was organized in 1998 and now consists of a coalition of over 80 organizations committed to promoting consumption of folic acid for the prevention of serious birth defects, like *spina bifida* and *anencephaly* (visit NCFA's Web site at http://folicacidinfo.org/about_us.php for a complete list of member organizations). The Mission of the NCFA is to improve health by promoting the benefits and consumption of folic acid. The NCFA goals include, 1) to reduce folic acid preventable birth defects by recommending that women of childbearing age take 400 mcg of synthetic folic acid daily, from fortified foods and/or supplements, in addition to consuming food folate from a varied diet; and 2) to communicate and promote emerging and new science on folic acid, especially as it relates to maternal and child health.

In addition, a number of professional health care organizations have published position statements supporting the folic acid recommendations of the USPHS and the Institute of Medicine. They include the American Academy of Pediatrics, American College of Obstetrics and Gynecology, American Medical Association, and the Association of Women's Health, Obstetric and Neonatal Nurses.

Your professional role

You will learn from this program that educational efforts need to extend not only to those women who are contemplating pregnancy, but especially to those who are not. In addition to its role in preventing NTDs, folic acid has other health benefits and is needed by the body on a daily basis. This is important information that you should share with your clients to help motivate them to take folic acid.

As a health educator, you are a qualified, reliable, and trusted source of information for women of various economic and social groups who may not be reached or targeted by other folic acid/NTD messages, or who may be at a higher risk of having an NTD-affected pregnancy. Not only do you play a key role in educating women about folic acid, but you also have an exceptional opportunity to influence women's behaviors regarding vitamin consumption and food selection. This includes dispelling myths about vitamin consumption, providing strategies for overcoming barriers associated with daily use of vitamins, and helping women make healthy food choices.

This Guide was developed to provide you with information to help you learn more about folic acid and to supply you with the tools you need to effectively:

- 1) educate women of childbearing age about the role that **folic acid** plays in **reducing risk for NTDs**, as well as the **other health benefits of folic acid**;
- 2) promote the use of a **daily multivitamin or folic acid supplement**; and
- 3) show clients how to incorporate **folic acid fortified and folate-dense foods** into a varied diet.

Key components of the Guide include:

- **Training DVD:** The DVD contains two videos, one for training other health educators (“Prevention of Neural Tube Defects with Folic Acid: You Can Make a Difference”) and the other for educating your clients (“Folic Acid Every Day”). The video “Prevention of Neural Tube Defects with Folic Acid: You Can Make a Difference” provides information about neural tube defects, recommendations for folic acid intake, and includes motivational

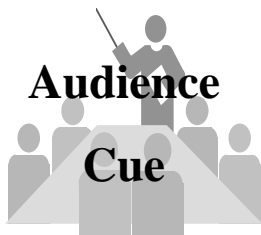
messages for you to emphasize the folic acid message to your clients. The video “Folic Acid Every Day” provides practical information about choosing vitamin supplements, identifying and overcoming barriers to taking vitamins, and identifying and selecting folic acid fortified and folate-rich foods.

- **Lesson plans, interactive teaching tools, and activities:** Most people learn by doing. This Guide provides lesson themes and plans, handouts, and interactive teaching tools and activities that can be adapted for a variety of educational settings. The activities and handouts were developed to actively engage the audience and can be used with individuals or in group settings. The handouts also can be used as stand alone tools for educating clients in time-constrained environments.
- **Cultural adaptability:** An important aspect of providing health messages to people is recognizing, understanding, and adapting the content and delivery to their cultural and ethnic values, beliefs, and lifestyles since these are key factors influencing health behavior and eating patterns. This Guide includes information on cultural diversity within our population, along with strategies for counseling and educating individuals of various cultural or ethnic backgrounds. Look for the **Culture Cue** boxes in the lesson plans.

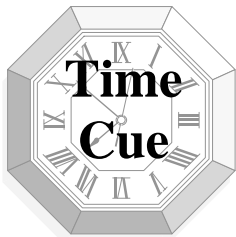


Culture Cues are designed to provide you with strategies for adapting the lesson plans for culturally/ethnically diverse populations.

- **Audience adaptability:** The attributes of your target audience, such as age, lifestyle, socioeconomic status, education level, marital status, and family planning status, affect the way you relay information or provide educational instruction. In addition, your teaching techniques and strategies may differ depending on whether you are counseling someone individually, presenting information in a group setting, or have a limited amount of time with clients. You are provided with strategies for adapting your program to various audiences or educational settings, or based on time constraints. Look for the **Audience Cue** and **Time Cue** boxes.



Audience Cues provide strategies for lesson plan adaptation based on audience type or educational setting.



Time Cues provide strategies for delivering an effective message in a limited amount of time.

- **Resources:** A list of resources that can provide additional or updated information and/or materials for you or your clients is included in this program. The list of resources includes organizations and Web sites, some of which can provide books, videos, and fact sheets.

Sidebars have been included throughout the Guide. These sidebars are intended for readers who want more detail about a particular topic. You may use this information for yourself, or you can incorporate it into educational programs for individuals or audiences who may want or need additional information.

Sidebars

The sidebars provide additional information and detail about a particular topic.

The lessons contained in this program were developed using elements from the **Health Belief Model and Experiential Learning Model**. The **Health Belief Model** is based on the concept that individuals are more likely to change their behavior if they perceive themselves to be at risk for a health problem or condition. Therefore, health messages should personalize the risk, identify the consequences of the condition, define actions and resulting benefits, identify and reduce barriers, and instruct and guide individuals about how to reduce risk.

The premise of the **Experiential Learning Model** is that knowledge is created through a concrete experience, followed by reflection and generalization. This process allows learners to gain control of experiences, make sense out of them, and successfully apply them. Elements from each model were incorporated into the lessons to enhance the learning process.

Section 1: Learning about Folic Acid Folic Acid and Neural Tube Defects...What Health Educators Should Know

What are Neural Tube Defects?

Neural tube defects (NTDs) are a group of congenital birth defects that affect the central nervous system. During embryonic development, the neural plate undergoes a change in shape to create an infolding and closure to form the neural tube, the structure that develops into the brain, spinal cord, and spine. Neural tube closure occurs between 22 and 28 days after conception. When the neural tube does not form correctly and does not completely close, a serious birth defect can develop that can result in defects of the spinal cord, brain, or both.

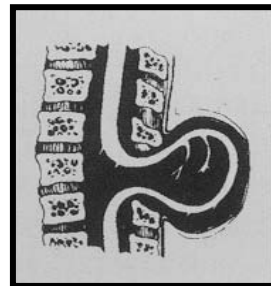
NTDs occur very early in pregnancy, even before most women know they are pregnant.

Box 1

Spina Bifida

Spina bifida occurs in two primary forms that may result in significant morbidity:

Meningomyelocele: Accounts for approximately 90 percent of spina bifida cases. It is characterized by protrusion of the spinal cord components (including nerves) outside the body and is usually accompanied by the more severe complications associated with spina bifida (i.e., paralysis, brain defects, hydrocephalus, reduced bladder and bowel control).



Meningocele: Accounts for approximately 10 percent of spina bifida cases. Only the spinal meninges (membrane that covers and protects the spine) protrude outside the body. This condition is usually corrected by surgery with little effect on the spinal cord nerves.

The most common NTDs are **spina bifida** and **anencephaly**. **Spina bifida** (Box 1) results from improper development of the lower portion of the neural tube (spine), and is characterized by protrusion of a portion of the spinal cord components outside the body, usually in the lumbar or lumbosacral regions. Complications resulting from spina bifida include varying degrees of disability, including lower extremity paralysis, learning disabilities, variable loss of bowel or bladder control, and hydrocephalus. Approximately 90 percent of infants born with spina bifida survive into adulthood and, along with their families, must learn to manage the complications associated with this condition¹¹.

Anencephaly (Box 2) results from improper development of the upper portion of the neural tube (brain). It is a fatal condition characterized by severe malformation of the brain and may be accompanied by facial abnormalities and absence of the skull. Many anencephaly-affected pregnancies result in miscarriage and infants born with this condition die soon after birth.

Box 2

Anencephaly

Anencephaly results in the absence of a major portion of the brain, skull, and scalp. The infant is born without a forebrain (the front part of the brain) and a cerebrum (the sensory, information processing, voluntary motor, and coordinating area of the brain). Anencephaly results in fetal death or death of the infant shortly after birth.



Risk Factors Associated with NTDs

As a health educator, it is important that you realize that all women of childbearing age who are capable of becoming pregnant are at risk for having an NTD-affected pregnancy. In fact, 90 percent to 95 percent of babies born with

spina bifida are born to parents with no family history of spina bifida¹². Folic acid may help prevent many (50 percent to 70 percent), but not all, cases of NTDs. Evidence suggests that the etiology of NTDs is multifactorial and may involve multiple genetic abnormalities that affect key enzymes in folate absorption and metabolism. However, there are other known or suspected risk factors that may put women at higher risk for an NTD-affected pregnancy¹²:

- **Previous NTD-affected pregnancy:** A woman who has had a prior NTD-affected pregnancy has almost 20 times the risk of having another affected pregnancy. A history of NTDs among other family members also increases risk.
- **Race/ethnicity:** NTDs are more common among women of Hispanic origin, particularly Mexican-American women born in Mexico, and among women from northern China, Northern Ireland, and the United Kingdom.
- **Use of antiseizure medications:** The anticonvulsant medications valproic acid and carbamazepine are teratogenic, and maternal use of these drugs during the periconceptual period may increase NTD risk two to four times that of the general population.
- **Low socioeconomic status:** Women in lower socioeconomic groups are more likely to have an NTD-affected pregnancy.
- **Maternal obesity:** Studies suggest that women with medically diagnosed obesity are at higher risk of having an NTD-affected pregnancy.
- **Maternal insulin-dependent diabetes mellitus:** Women with insulin-dependent diabetes may be at higher risk compared to women without insulin-dependent diabetes.
- **Maternal hyperthermia:** Maternal exposure to heat (e.g., hot tub, sauna, prolonged fever) during the periconceptual period has been associated with an increased risk of having a baby with an NTD.

Detection of an NTD-Affected Pregnancy

There are clinical tests available that can detect some neural tube defects during the pregnancy period. If the neural tube does not develop properly, alpha-fetoprotein (AFP), a protein produced by the fetus, will leak into the amniotic fluid and the mother's blood. Therefore, high levels of maternal blood AFP may indicate an NTD-affected pregnancy. Typically, an ultrasound test is conducted to confirm the diagnosis. Amniocentesis also may be used but is becoming a less common technique for confirming diagnosis. Some NTDs are also diagnosed during anatomic ultrasounds even without abnormal AFP levels. Unfortunately, not all NTDs can be detected by these methods. A small number of medical facilities are using intrauterine surgery to help correct NTD lesions.

Living with NTDs

The complications and secondary conditions associated with NTDs can place extensive economic, emotional, and physical burdens on affected children and their families, making this one of the most serious types of birth defects. The average lifetime medical costs associated with the treatment of an individual born with spina bifida have been estimated to be over \$635,000¹³, and for many individuals, can exceed \$1,000,000. Surgery to close the back usually takes place within the first 24 hours of an affected infant's life in order to decrease risk for infection and preserve the function of the spinal cord. Those suffering from paralysis due to spina bifida may require subsequent surgery and extensive medical care, including surgery for shunt placement to treat hydrocephalus. Individuals affected by NTDs may suffer from varying degrees of complications or secondary conditions associated with the disease. Secondary conditions related to spina bifida include learning disabilities, motility problems, depression, gastrointestinal

disorders, tendonitis, obesity, skin breakdown, latex sensitivity or allergy, and social and sexual issues. Additionally, a child’s emotional and social development can be hindered by the physical limitations associated with an NTD. Although advances in medical techniques have enabled many affected individuals to lead long and productive lives, the complications associated with NTDs impact children and their families for a lifetime.

The Role of Folic Acid in Reducing Risk for NTDs

Based on research studies (Box 3), intake of adequate amounts of folic acid is associated with reduced risk for NTDs. However, as the saying goes, “timing is everything!” The positive effects of folic acid supplementation were observed only with **periconceptual** use of folic acid. Periconceptual refers to the time beginning at least one month *before*

conception and continuing through the first trimester of pregnancy. Therefore, the studies indicate that folic acid must be taken before a woman conceives.

How does this research data translate into health messages for women of childbearing age? Recall that neural tube development occurs during the first

Box 3

Research Studies

Reduction of neural tube defect risk with folic acid has been demonstrated in both randomized controlled clinical trials and observational studies. A **randomized controlled clinical trial** compares outcomes (e.g., whether women had an NTD-affected pregnancy) between a treatment and control group, where the treatment group is provided folic acid and the control group is provided a placebo that does not contain folic acid. Study participants are randomly assigned to either the treatment or control group. In contrast, an **observational study** examines characteristics or behaviors of a population, and relates these behaviors to observed outcomes, such as examining whether women who took vitamins containing folic acid prior to pregnancy had a lower risk of having a baby with an NTD. A controlled clinical trial is more rigorous than an observational study because more factors can be controlled to minimize bias.

month of pregnancy when many women do not realize they are pregnant. Unfortunately, intake of folic acid following development of the neural tube will not reverse abnormalities that may have already occurred. Approximately 50 percent of pregnancies in the United States are unplanned or mistimed (i.e., occur earlier than desired)⁸. It is essential that ***all*** women of childbearing age who are capable of becoming pregnant take a supplement containing 400 micrograms of folic acid ***every day***, in addition to eating a healthy diet, to reduce the risk of NTDs. Periconceptional intake of folic acid will not eliminate all NTD cases since inheritable genetic factors account for some cases. However, it is estimated that the incidence of NTDs may be reduced by 50 percent to 70 percent², representing a substantial benefit.

Folic acid and other birth defects

Emerging research has shown evidence that the benefits of periconceptional use of folic acid consumption may extend beyond neural tube defect risk reduction. Studies have reported a significant association between folic acid intake and reduced risk for other birth defects, including heart defects, orofacial clefts, and urinary tract defects. There is some data supporting a role for folic acid in reducing the risk of limb defects. Adequate folate intake or folate status may be associated with improved pregnancy outcomes such as reducing the risk for preterm birth and low birth weight. Because folate is essential for the rapidly dividing tissues of the fetus, the Recommended Dietary Allowance (RDA) for folate is 50 percent higher during pregnancy³. Therefore, a multivitamin or folic acid supplement is recommended as part of standard prenatal care for women.

Recommended Folic Acid Intake for Women Capable of Becoming Pregnant

Based on strong scientific evidence, the USPHS recommended in 1992 that all women of childbearing age who are capable of becoming pregnant consume 400 micrograms/day folic acid to lower the risk of having an NTD-affected pregnancy². Women with a prior NTD-affected pregnancy are advised to consult their physicians for advice and may require higher intakes (Box 4).

The USPHS recommendation was supported by the 1998 National Academy of Sciences' Institute of Medicine's recommendation, which states that all women

capable of becoming pregnant consume **400 micrograms/day synthetic folic acid** from supplements or fortified foods, in addition to consuming food folate from a varied diet³. There are two key components of these recommendations:

- The recommendations apply to ***all*** women of childbearing age who are capable of becoming pregnant, including adolescents and teenagers, and women who are not planning to become pregnant.
- Because 50 percent of pregnancies (up to 90 percent to 95 percent of teen pregnancies) are unplanned^{8,9} and the neural tube closes early in pregnancy, folic acid must be taken ***every day***.

The IOM recommendation for reducing the risk of NTDs should not be confused with the Recommended Dietary Allowances (RDAs), which include

Box 4

Recommendations for Women with a Prior NTD-affected Pregnancy

The USPHS recommends that women who have had an NTD-affected pregnancy take 4000 micrograms/day (4 milligrams) folic acid to reduce risk of NTD recurrence. This level of folic acid was found to reduce NTD recurrence in a single study of women with prior history of NTD-affected pregnancies. *It is important that women do not take multivitamins to achieve this level of folic acid intake since excess amounts of other vitamins (e.g., vitamin A) may be harmful to the developing fetus.*

folate intake recommendations for other population groups including children, men, and older persons³. The IOM recommendation, specifically for women of childbearing age, calls for intake of 400 micrograms/day of **folic acid** from a supplement or fortified foods. This is based on studies that show that daily intake of 400 micrograms folic acid, **along with a diet that includes folate-rich foods**, can reduce the risk for an NTD-affected pregnancy. Women meeting the IOM recommendation will easily meet the RDA for folate for their age group.

Folate and Folic Acid . . . What's the Difference?

Throughout this Guide, you will encounter the terms folate and folic acid. Although they perform the same biological functions in the body, these terms represent two distinct forms of the vitamin (Box 5). Folate is the form of this water-soluble vitamin that is found naturally in foods. (Folate is sometimes referred to as a B vitamin, which is a term for a group of water-soluble vitamins.) This form of folate also may be referred to as “food folate” or “naturally occurring folate.” Folic acid is the synthetic form of the vitamin used in vitamin supplements and fortified foods. Many times the generic term “folate” is used to describe both forms of the vitamin. The body absorbs folic acid more readily than it does food folate (Box 6). Despite these differences, once in the blood stream, the biological function is the same. In other words, the body cannot distinguish between the two forms of the vitamin once they are absorbed. Consuming food folate offers the additional benefits provided by other nutrients and compounds commonly found in folate-dense foods, such as beta-carotene, vitamin C, fiber, and phytonutrients.

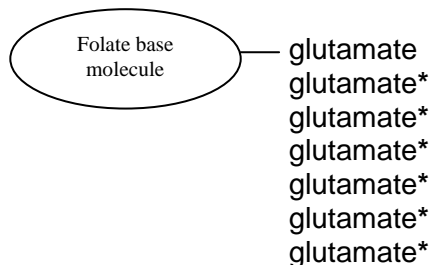
To meet the IOM recommendation, women of childbearing age are advised to consume 400 micrograms of synthetic folic acid in addition to food folate from a varied diet. Be aware that folic acid can only be obtained from vitamin supplements or fortified foods. For women to get the folic acid they need, they must concentrate on incorporating sources of folic acid, particularly a multivitamin or folic acid supplement, into their diets.

There is often confusion over the units of measure for folate. Micrograms dietary folate equivalent (mcg DFE) is a term used to take into account the difference in absorption between synthetic folic acid and food folate. DFEs are used to calculate **total** folate intake from a **varied diet** that includes synthetic and natural

Box 5

Folate and Folic Acid Structure

Folate, found naturally in foods, is a large molecule that includes a side chain consisting of several glutamate units (polyglutamate form). In order for the body to absorb folate, all of the glutamate units except one must be cleaved from the molecule using enzymes in the small intestine. In contrast, the side chain of **folic acid** contains only one glutamate unit (monoglutamate form). Therefore, folic acid can be directly absorbed without enzyme modification.



Folate (polyglutamate)
(*glutamate units must be removed for absorption)



Folic acid (monoglutamate)

sources of folate, and are the units used for the RDAs for folate. The following conversions apply³:

1 mcg DFE = 1 mcg food folate

1 mcg DFE = 0.6 mcg folic acid from fortified foods or as a supplement consumed with food

1 mcg DFE = 0.5 mcg folic acid as a supplement taken on an empty stomach

The IOM recommendation for NTD risk reduction is 400 micrograms of synthetic folic acid (not DFE) from a supplement or fortified foods. DFEs are not used to determine if a woman meets the IOM recommendation.

Additional Health Benefits of Folate

Besides reducing the risk of NTDs, folate has other potential health benefits. Folate is needed by the body on a daily basis and is essential for synthesis of DNA for proper cell division and healthy tissues. Folate also is required for amino acid metabolism; methylation reactions involving substrates such as DNA, collagen, and myelin; and remethylation of homocysteine to form methionine. Adequate folate ensures proper formation of red blood cells and folate-deficient diets can result in megaloblastic anemia (Box 7). Folate status is inversely associated with blood levels of homocysteine, a product of the body's metabolism. Elevated levels of homocysteine have been implicated as a risk factor for cardiovascular disease. Although the research is inconclusive, folate deficiency may also increase the risk for certain types of cancers such as

Box 6

Bioavailability

It is estimated that 50 percent of ingested food folate is absorbed. In contrast, approximately 85 percent of folic acid (consumed with food) and 100 percent of folic acid (consumed as a supplement on an empty stomach) are absorbed. Therefore, folic acid in food is 1.7 times (85 divided by 50) more bioavailable than food folate. A folic acid supplement taken on an empty stomach is 2 times (100 divided by 50) as bioavailable as food

colon, breast, and cervical cancer⁶. For breast and cervical cancer, the risks are magnified when low folate status is coupled with other risk factors for disease, such as family history or higher than moderate intake of alcohol for breast cancer, or infection with Human

Papillomavirus for cervical cancer.

Although research has not definitively confirmed that folate can reduce the incidences of these serious diseases, studies conducted thus far have shown promising results. Currently there are several randomized controlled trials in progress testing the effect of folic acid or B vitamin supplementation on the risk for vascular disease, as well as intervention studies evaluating the impact of folic acid

supplements on colon cancer risk. In addition to the direct health benefits associated with folic acid, consumption of a multivitamin containing folic acid also can provide the body with other vitamins and minerals that may not be obtained in adequate amounts from dietary sources.

Box 7

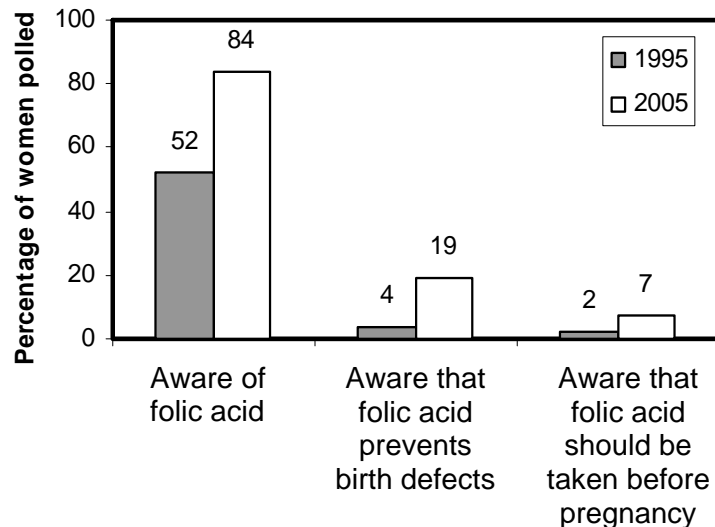
Folate and Disease

Folate is essential for the synthesis of DNA, which is required for cell division. When folate is in short supply and red blood cells cannot divide properly, megaloblastic anemia results. Red blood cells become larger, fewer in number, and have abnormal nuclei. When folate is in short supply, the amino acid homocysteine cannot be converted to methionine. Homocysteine accumulates in the blood and may increase the risk for cardiovascular disease. Conversion of homocysteine to methionine and subsequent biochemical processes are essential for adding methyl groups (CH₃) to DNA. The presence of methyl groups on DNA is thought to control gene expression and abnormal methylation of DNA has been linked to certain types of cancer.

Currently there is no consensus among professional organizations endorsing a recommendation for taking additional folic acid (i.e., above the RDA) specifically for chronic disease prevention.

Response to Folic Acid and NTD Messages

To assess women's knowledge and behavior related to the use of vitamins and folic acid in pre-pregnancy care, the March of Dimes, with funding from the Centers for Disease Control and Prevention (CDC), commissioned Gallup Polls in 1995, 1997, 1998, and yearly from 2000 to 2005, directed at women aged 18 to 45 years.



Recent (2005) data⁷ from these polls indicated that:

- Eighty-four percent of women are aware of folic acid in some way, but only 33 percent of women (including pregnant women) take a vitamin containing folic acid daily. Women obtain information about folic acid from magazines or newspapers (26 percent), radio or television (18 percent), or from their *health care providers (26 percent)*.
- Only 19 percent of women are aware that folic acid can help prevent birth defects.
- Only seven percent of women are aware that folic acid should be taken before pregnancy.

The graph demonstrates only modest increases over a ten-year period in women's awareness that folic acid prevents birth defects and should be taken prior to pregnancy. The fact that *only seven percent of all women polled knew that folic acid must be taken prior to pregnancy* demonstrates that there is still much more

work to be done with regard to educating women about the importance of taking folic acid every day. Women have indicated that they would be willing to take a vitamin supplement if their health care provider recommended it. This provides an opportunity for the health educator to play an active and important role in educating and influencing women to change their behavior regarding intake of vitamin supplements and selection of folate-rich foods. Mass media and education campaigns aimed at health professionals in Europe have been successful in substantially increasing the number of women taking folic acid-containing supplements. Therefore, public and professional education can make a difference in changing behaviors related to consumption of folic acid!

Meeting the Folic Acid Recommendations

The goal of public health recommendations on folic acid is to reduce the number of NTD-affected pregnancies by recommending that women of childbearing age take 400 micrograms of synthetic folic acid daily (from vitamin supplements and/or fortified foods), in addition to consuming food folate from a varied diet. To meet this goal, women of childbearing age must be educated about:

- selecting vitamin supplements containing recommended levels of folic acid and identifying and overcoming barriers associated with daily supplement use;
- identifying and selecting foods fortified with folic acid; and
- identifying and selecting foods rich in naturally occurring food folate.

Vitamin Supplements

Taking a vitamin supplement is the **best way** to ensure that a woman gets the recommended levels of folic acid. Vitamin supplements are available in two major forms: **1) multivitamin/mineral supplement preparations, and 2) single**

vitamin (e.g., folic acid) supplements. Multivitamins are widely available and can be purchased from grocery stores, drug stores, health food stores, chain discount stores, through home shopping television networks, or over the Internet. Many national brands, as well as store (private label) brands, are available. Most multivitamins contain 400 micrograms (0.4 milligrams) folic acid, which is the daily amount recommended by the IOM for reducing risk for NTDs. Check the Nutrition Facts panel and look for a multivitamin that provides 400 micrograms (100% of the Daily Value) of folic acid.

Folic acid supplements

also are readily available in pill form and generally provide from 400 to 800 micrograms of folic acid per pill. Unless under the care of a physician, women should be encouraged to avoid exceeding the Upper Tolerable Level (Box 8) of intake for folic acid (i.e., 1,000 micrograms/day)³.

There are some myths and barriers associated with vitamins. These may affect

your clients' willingness or ability to take a vitamin every day. Here are some common barriers, along with suggestions and motivators for overcoming them:

- **Swallowing pills is difficult.** Encourage your clients to try folic acid supplements. They are much smaller than multivitamin pills and easier to

Box 8

Upper Tolerable Level

Intakes of folic acid exceeding 1,000 micrograms/day may mask a vitamin B₁₂ deficiency. This is because the hematologic (hemoglobin, hematocrit, mean cell volume) symptoms of folate and vitamin B₁₂ deficiency are similar (i.e., megaloblastic anemia; see Box 7). The danger associated with increased intake of folic acid is that the folic acid may correct the hematologic indicators associated with a vitamin B₁₂ deficiency. However, severe and irreversible neurologic complications can occur if the vitamin B₁₂ deficiency remains untreated. The issue of masking a vitamin B₁₂ deficiency prompted the IOM to establish an Upper Tolerable Level (UL) of intake for folic acid of 1,000 micrograms/day, which is the maximum intake level that has been determined not to cause adverse effects. Masking is not expected to occur at folic acid intakes below this amount. Vitamin B₁₂ deficiency is more prevalent in older persons and is not common among women of childbearing age.

swallow. Adult chewable vitamins also are available. Dissolvable vitamins are available in some areas (consult your pharmacist about their availability in your area).

- **Vitamins increase appetite, causing weight gain.** There is no evidence to suggest that taking vitamins results in weight gain. In fact, daily use of a multivitamin can provide key nutrients to help clients maintain their health and vitality.
- **Vitamins cause stomach upset.** Sometimes the iron contained in multivitamins can cause stomach upset. Suggest to your clients that they take a vitamin supplement after eating a meal or just before bedtime to reduce the chance of stomach upset. Suggest taking a multivitamin without iron unless their doctor has advised them to take a multivitamin with iron. Taking a folic acid supplement instead of a multivitamin may reduce the chance of stomach upset.
- **Vitamins are expensive.** If cost is an issue, suggest to your clients that they select store brand items. When available, store brand items are less expensive than nationally advertised brands. Multivitamins are more expensive than folic acid supplements. Store brand folic acid supplements can be purchased for as little as one penny per pill.
- **It is difficult to remember to take a vitamin every day.** Advise your clients to put the vitamin bottle in a prominent location that is out of the reach of a child. If that is not an issue, advise placing it near something that is used every day. For example: with other medications, next to birth control pills, on the kitchen counter next to the coffee maker, or on the nightstand. Stress that *all medications*, including multivitamins and folic acid supplements, must *always* be kept out of the reach of children!

- **Vitamins aren't needed when we eat a healthy diet.** Sometimes we don't eat right. Because only certain foods contain folic acid and naturally occurring food folate (refer to "Fortified Foods" and "Food Folate" sections), it may be difficult to get the proper amount of folic acid every day through diet alone. Taking a supplement containing folic acid every day can ensure that a woman receives the adequate amount.

Fortified Foods

Effective January 1, 1998, the Food and Drug Administration (FDA) mandated that folic acid be added to enriched cereal-grain products (Box 9) including bread, rolls, and buns; flour (standard and self-rising); corn grits; corn meal; farina; rice; macaroni products; nonfat milk macaroni products and noodle products¹⁴. After much debate, the level of fortification chosen was 140 micrograms per

Box 9

Enriched Cereal Grains

The Enrichment Act of 1942 states that thiamin, riboflavin, niacin, and iron must be added to refined grain products. Thiamin, niacin, and iron are replaced in levels approximate to those lost during the refining process, while riboflavin is replaced at twice the level contained in the original whole grain product (twice restoration). Folic acid is now part of this enrichment package.

100 grams cereal-grain product. This level represents "twice restoration," or twice the amount of folate that is estimated to be lost during milling and processing of the cereal grain product. To know whether a product has been folic acid fortified, read the ingredient list. The term "folic acid" or "folate" will be listed along with the other vitamins that are part of the enrichment package. An important category of fortified foods is ready-to-eat breakfast cereals. Many ready-to-eat cereals provide from 100 to 400 micrograms of folic acid per serving, or 25% to 100% of the Daily Value for folate. Breakfast cereal manufacturers are continually

increasing the number of products containing 400 micrograms folic acid per serving. It is best to check the Nutrition Facts label to identify these products (Box 10).

Other food products affected by fortification include mixed dishes, which are combination foods containing fortified grain products (e.g., instant

rice dishes and soups containing enriched noodles), and many snack foods, including crackers, cakes, and cookies.

Although consuming a multivitamin or folic acid supplement every day is the surest way to get 400 micrograms of folic acid, fortified breakfast cereals and other folic acid fortified foods provide alternatives for women who cannot or will not take a vitamin pill on a daily basis. However, women who choose this approach will have to pay close attention to their total daily intake of these foods to ensure that they get enough folic acid **every day**.

Research indicates that grain fortification has increased intake of folic acid by over 200 micrograms/day, twice the amount originally estimated, and folic acid fortification has improved folate status in the United States. Serum and red blood cell folate concentrations in women aged 15 to 44 years were reported to be substantially higher after fortification compared to pre-fortification¹⁵. This increase

Box 10

**How to Read
Ready-to-eat Cereal Food Labels**

The folic acid content of breakfast cereals is stated as a **percent** of the Daily Value for folate, which is 400 micrograms. Examples:

<p>Nutrition Facts Serving size: 1 cup</p> <hr/> <p>Folic acid 25% Daily Value</p>	<p>Provides 100 micrograms of folic acid per 1 cup serving</p>
<p>Nutrition Facts Serving size: 1 cup</p> <hr/> <p>Folic acid 100% Daily Value</p>	<p>Provides 400 micrograms of folic acid per 1 cup serving</p>

in folate status coincided with a 26 percent to 27 percent reduction in the number of neural tube defects in the United States¹, which is significant yet far short of the estimated reduction in NTD incidence of 50 percent to 70 percent based on observational and intervention studies for women taking supplements containing folic acid.

Food Folate

In addition to taking a vitamin every day, women also should eat a healthy diet that includes food sources of folic acid (see above) and naturally occurring food folate. Naturally occurring food folate is not

widespread in the food supply and is concentrated only in certain foods. It may help to remember that folate is primarily concentrated in foods of plant origin.

Folate-rich food sources include:

- Orange juice, strawberries, oranges, and avocado.
- Dark green leafy vegetables such as spinach and greens (mustard, collard, turnip).
- Asparagus, okra, broccoli, and Brussels sprouts.
- Legumes such as dried beans (black, navy, kidney, pinto), dried peas (black-eyed), and lentils.
- Peanuts.

Box 11

Origin of “Folate”

The term “folate” originates from the word “foliage.”

Box 12

Orange Juice

According to national food surveys, one of the largest contributors of food folate in the American diet is orange juice.

Box 13

Peanuts and Allergies

Allergy to peanuts is one of the more common food allergies.

Meat (with the exception of liver) is not a concentrated source of food folate. Liver, which few Americans eat, also is high in cholesterol. Enriched grain products are not concentrated sources of naturally occurring *food folate*, but they are fortified with *folic acid*.

When we attempt to maximize folate intake, food preparation techniques come into play. Folate, because it is water soluble, easily leaches from food into cooking water.

To maximize folate intake:

- Consume fresh, uncooked fruits and vegetables (e.g., spinach salad, fresh uncooked fruits) often. Thoroughly wash all uncooked fruits and vegetables before eating.
- Steam, grill, or roast vegetables.
- Prepare foods in a microwave oven.
- Shorten cooking time.
- If foods are to be boiled, use only a small amount of liquid.
- Use the leftover liquid from cooked vegetables in soups or stews.

Foods come fresh, canned, frozen, or dried. Fresh products may not be a practical choice for all. Many individuals prefer or must choose frozen or canned fruits and vegetables over their fresh versions for a variety of reasons: availability, price, convenience, and longer shelf life. Individuals should never be discouraged from consuming cooked, canned, or frozen folate-rich foods. They can make a significant contribution to folate intake.

Interactions Between Folate and Drugs

Certain medications may interfere with folate absorption, metabolism, or excretion. These include antiseizure medications, certain antibiotics, medications used to treat rheumatoid arthritis or cancer, and certain antiinflammatory medications. Individuals taking these medications may have a higher folate

requirement. Anticonvulsant drugs, such as phenytoin, carbamazepine, primidone, and valproic acid act as folate antagonists and work by inhibiting enzymes essential for normal folate metabolism in the body. Individuals taking anti-convulsant medications may need additional folic acid supplementation as prescribed by a physician. Methotrexate is another drug that acts as a folate antagonist and is taken by a large number of women of childbearing age for a variety of nonneoplastic diseases such as arthritis and psoriasis. Other drugs that may affect folate status include the antimalarial drug pyrimethamine; the gastrointestinal anti-inflammatory agent sulfasalazine; antacids; some antiulcer medications; and nonsteroidal anti-inflammatory drugs (e.g., large therapeutic doses of aspirin and ibuprofen). Chronic alcohol consumption increases risk for folate deficiency and folate deficiency is common among chronic alcohol users. Excessive alcohol intake may displace other nutrients from the diet, including folate, and may interfere with the way the body uses and excretes folate. Therefore, chronic alcohol users may have increased folate needs.

A partial list of generic, name-brand, and over-the-counter drugs that may affect folate status is presented in Box 14. This list is not all-inclusive, and patients who may be taking one or more of these drugs should consult their physician concerning any potential interactions between their medications and folate.

Other Pregnancy Considerations

Folic acid intake has been associated with other pregnancy outcomes, including preterm birth, low birth weight, multiple births, and miscarriage. There have been several studies that report an association between adequate folate intake or status and a reduced risk for preterm birth or low birth weight¹⁶⁻¹⁸. However, a

Box 14	
Potential Drug Interactions with Folate	
Drug category or treatment	Examples*
Antacids, Antiulcer	Histamine-2 blockers, proton pump inhibitors
Antibiotics	Combination of Trimethoprim and a sulfonamide (Bactrim®, Septra®)
Anticancer	Methotrexate, Aminopterin
Anticonvulsants, antiseizure	Phenobarbital, Phenytoin (Dilantin®), Carbamazepine (Tegretol®), Primidone (Mysoline®), Valproic acid (Depakene®)
Antihistamines	Cimetidine (Tagamet®)
Anti-inflammatory	Sulfasalazine (Azulfidine®)
Antimalarial	Pyrimethamine
Beta-blockers and calcium-channel blockers	Some medications used to treat high blood pressure or other heart conditions
Diabetes	Metformin
Diuretics	Triamterene
Hypercholesterolemia	Cholestyramine (Locholest®, Questran®)
Nonsteroidal antianflammatory drugs (NSAIDS)	Aspirin, Ibuprofen
Rheumatoid arthritis	Methotrexate
Sulfonamides	Sulfamethoxazole, sulfamethazine
*This list is not all inclusive. Source: References 5, 20.	

randomized controlled trial found no association between folic acid supplementation and risk for preterm birth in Hungarian women¹⁹. At this time, the data are inconsistent with regard to the role folic acid may play in reducing the risk for preterm birth or low birth weight.

Some reports suggest the possibility of an increased occurrence of multiple births with the use of folic acid during the periconceptional period. A large randomized controlled trial reported a significant increase in multiple births in

women taking a multivitamin containing 800 micrograms of folic acid compared to women taking a pill containing only trace elements²¹. However, most studies do not support such an association, including a large intervention study in over 240,000 Chinese women in which those taking 400 micrograms of folic acid per day did not have an increased risk for twin pregnancies compared to women not taking folic acid²². Studies finding positive associations between folic acid intake and multiple births may be confounded by the use of assisted reproductive technology such as in vitro fertilization, which is now used more frequently, especially in older women.

A Hungarian randomized controlled trial reported a small but significant increase in miscarriage in women taking a multivitamin containing folic acid during the periconceptual period²³. However, other large intervention trials conducted in China²⁴ and the United Kingdom²⁵ failed to confirm such an association. On the contrary, several studies have associated low folate status with a higher risk for miscarriage^{26,27}.

Conclusion

All women of childbearing age capable of becoming pregnant should consume 400 micrograms of synthetic folic acid every day. This is in addition to eating a healthy and varied diet that includes foods fortified with folic acid and foods rich in naturally occurring food folate. The surest way to meet these recommendations is to consume a multivitamin or folic acid supplement providing 400 micrograms folic acid every day. Despite efforts, many women are unaware of folic acid and do not know that folic acid should be taken prior to and during pregnancy.

Your mission?

- Discuss folic acid as part of routine preventative health care for all women of childbearing age.
- Address and dispel myths and barriers associated with daily consumption of a vitamin supplement.
- Help your clients identify food sources of folic acid and naturally occurring food folate.

Anticipated results?

Reduce the risk for NTDs and other birth defects and the associated serious, long-term, and costly health issues.

Prognosis?

Women have indicated that they are more likely to make the necessary dietary and lifestyle changes *if* their health care provider recommends them. As a health educator, you **CAN** make a difference—take every opportunity to share the folic acid message with your clients!

References

1. Centers for Disease Control and Prevention. Spina bifida and anencephaly before and after folic acid mandate—United States, 1995-1996 and 1999-2000. *MMWR* 2004;53:362-365.
2. Centers for Disease Control. Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. *MMWR* 1992;41:1-7.
3. Institute of Medicine, National Academy of Sciences. *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline*. National Academy Press, Washington, DC, 1998.
4. Bailey LB, Berry RJ. Folic acid supplementation and the occurrence of congenital heart defects, orofacial clefts, multiple births, and miscarriage. *Am J Clin Nutr* 2005;81(suppl):1213S-1217S.
5. Bailey LB, Moyers S, Gregory III J. Folate. In: *Present Knowledge in Nutrition*, 8th edition. International Life Sciences Institute, Washington, DC, 2001.
6. Rampersaud GC, Kauwell, GPA, Bailey LB. Folate: A key to optimizing health and reducing disease risk in the elderly. *Journal of the American College of Nutrition* 2003;22:1-8.
7. March of Dimes. *Folic Acid and the Prevention of Birth Defects. A National Survey of Pre-pregnancy Awareness and Behavior Among Women of Childbearing Age 1995-2005*, 2005.
8. Henshaw SK. Unintended pregnancy in the United States. *Family Planning Perspectives* 1998;30:24-29,46.
9. Centers for Disease Control and Prevention. Surveillance for pregnancy and birth rates among teenagers, by State—United States, 1980 and 1990. *MMWR* 1993;42(SS-6):1-27.
10. U.S. Department of Health and Human Services. Healthy People 2010. Volume II(2nd edition). <http://www.healthypeople.gov/Publications/> Accessed March 2006.
11. Spina Bifida Association of America Web site. www.sbaa.org. Accessed March 2006.
12. Centers for Disease Control and Prevention. *Preventing Neural Tube Birth Defects: A Prevention Model and Resource Guide*. 1998.
13. Waitzman NJ, Romano PS, Grosse SD. Half-life of cost of illness estimates: the case of spina bifida. In: Wyszynski DF, ed. *Neural Tube Defects: From Origin to Treatment*. Oxford University Press. 2005.
14. Food Standards: “Amendment of the Standards of Identity for Enriched Grain Products to Require Addition of Folic Acid. Final Rule.” (Codified at 21 CFR Parts 136, 137, and 139.) 61 Federal Register 8781-8807. 1996.
15. Centers for Disease Control and Prevention. Folate status in women of childbearing age—United States, 1999. *MMWR* 2000;49(42):962-965.
16. Siega-Riz AM, Savitz DA, Zeisel SH, Thorp JM, Herring A. Second trimester folate status and preterm birth. *Am J Obstet Gynecol* 2004;191:1851-1857.
17. Shaw GM, Carmichael SL, Nelson V, Selvin S, Schaffer DM. Occurrence of low birthweight and preterm delivery among California infants before and after compulsory food fortification with folic acid. *Public Health Rep* 2004;119:170-173.
18. Ronnenberg AG, Goldman MB, Chen D, Aitken, IW, Willett WC, Selhub J, Xu X. Preconception homocysteine and B vitamin status and birth outcomes in Chinese women. *Am J Clin Nutr* 2002;76:1385-1391.
19. Czeizel AE, Dudas I, Metneki J. Pregnancy outcomes in a randomised controlled trial of periconceptional multivitamin supplementation. Final report. *Arch Gynecol Obstet* 1994;255:131-139.
20. Cabrera RM, Hill DS, Etheredge AJ, Finnell RH. Investigations into the etiology of neural tube defects. *Birth Defects Research (Part C)* 2005;72:330-344.
21. Czeizel AE, Metneki J, Dudas I. Higher rate of multiple births after periconceptional vitamin supplementation. *N Engl J Med* 1994;330:1687-1688.
22. Li Z, Gindler J, Wang H, Berry RJ, Li S, Correa A, Zheng JC, Erickson JD, Wang Y. Folic acid supplements during early pregnancy and likelihood of multiple births: a population-based cohort study. *Lancet* 2003;361:380-384.

23. Hook EB, Czeizel AE. Can terathanasia explain the protective effect of folic-acid supplementation on birth defects? *Lancet* 1997;350:513-515.
24. Gindler J, Li Z, Berry RJ, Zheng J, Correa A, Sun X, Wong L, Cheng L, Erickson JD, Wang Y, Tong Q. Folic acid supplements during pregnancy and risk of miscarriage. *Lancet* 2001;358:796-800.
25. Wald NJ, Hackshaw AK. Folic acid and miscarriage: an unjustified link. *Am J Med Genet* 2001;98:204.
26. Nelen WL, Blom HJ, Steegers EA, den Heijer M, Thomas CM, Eskes TK. Homocysteine and folate levels as risk factors for recurrent early pregnancy loss. *Obstet Gynecol* 2000;95:519-524.
27. George L, Mills JL, Johansson AL, Nordmark A, Olander B, Granath F, Cnattingius S. Plasma folate levels and risk of spontaneous abortion. *JAMA* 2002;288:1867-1873.

Additional Reading

- Bailey LB, Berry RJ. Folic acid supplementation and the occurrence of congenital heart defects, orofacial clefts, multiple births, and miscarriage. *Am J Clin Nutr* 2005;81(suppl):1213S-1217S.
- Botto LD, Moore CA, Khoury MJ, Erickson JD. Neural-tube defects. *New England Journal of Medicine* 1999; 341:1509-1519.
- Canfield MA, Collins JS, Botto LD, Williams LJ, Mai CT, Kirby RS, Pearson K, Devine O, Mulinare J. Changes in the birth prevalence of selected birth defects after grain fortification with folic acid in the United States: findings from a multi-state population-based study. *Birth Defects Research (Part A)* 2005;73:679-689.
- Hall JG, Solehdin F. Folic acid: it's good preventive medicine. *Contemporary Pediatrics* 1998;15:119-120,130,132,135,136.
- Havens DH, Leven BR. Good news for women and babies: folic acid prevents birth defects. *J Pediatr Health Care* 1999;13:255-258.
- Iqbal MM. Prevention of neural tube defects by periconceptional use of folic acid. *Pediatrics in Review* 2000; 21:58-66.
- Lumley J, Watson L, Watson M, Bower C. Periconceptional supplementation with folate and/or multivitamins for preventing neural tube defects (Cochrane Review). *Cochrane Database of Systematic Reviews*. 2001;3:CD001056.
- Morrow JD, Kelsey K. Folic acid for prevention of neural tube defects: pediatric anticipatory guidance. *J Pediatr Health Care* 1998;12:55-59.
- Schultz AW. Improving child and family health through primary prevention of neural tube defects. *Pediatric Nursing* 1999;25:419-422.
- Tinkle MB, Sterling BS. Neural tube defects: A primary prevention role for nurses. *Journal of Obstetric, Gynecologic, and Neonatal Nursing* 1997;26:503-512.
- Vozenilek GP. What they don't know could hurt them: increasing public awareness of folic acid and neural tube defects. *Journal of The American Dietetic Association* 1999;99(1):20-22.

Relevant Research Studies

- Berry RJ, Zhu L, Erickson JD, Song L, et al. Prevention of neural tube defects with folic acid in China. *The New England Journal of Medicine* 1999;341:1485-90.
- Bower C, Stanley FJ. Dietary folate as a risk factor for neural-tube defects: evidence from a case-control study in Western Australia. *Med J Aust* 1989;150:613-619.
- Czeizel AE, Dudas I. Prevention of the first occurrence of neural-tube defects by periconceptional vitamin supplementation. *The New England Journal of Medicine* 1992;327:1832-5.
- Daly L, Kirke P, Molloy A, et al. Folate levels and neural tube defects: implications for prevention. *JAMA* 1995;(27)21:1698-1702.
- Laurence KM, James N, Miller MH, et al. Double-blind randomized controlled trial of folate treatment before conception to prevent recurrence of neural-tube defects. *Br Med J* 1981;282:1509-1511.

- Mills J, Rhoads GG, Simpson JL, et al. The absence of a relation between the periconceptual use of vitamins and neural tube defects. *New England Journal of Medicine* 1989;321: 430-5.
- Milunsky A, Jick H, Jick SS, et al. Multivitamin/folic acid supplementation in early pregnancy reduces the prevalence of neural tube defects. *JAMA* 1989;262:2847-52.
- MRC Vitamin Study Research Group. Prevention of neural tube defects: Results of the Medical Research Council Vitamin Study. *Lancet* 1991;338:131-127.
- Mulinare J, Cordero JF, Erickson JD, et al. Periconceptual use of multivitamins and the occurrence of neural tube defects. *JAMA* 1988;260:3141-5.
- Shaw GM, Schaffer D, Velie EM, et al. Periconceptual vitamin use, dietary folate, and the occurrence of neural tube defects. *Epidemiology* 1995;6:219-226.
- Smithells RW, Nevin NC, Seller MJ, et al. Further experience of vitamin supplementation for the prevention of neural tube defect recurrences. *Lancet* 1983;1:1027-31.
- Vergel RG, Sanchez LR, Heredero BL, et al. Primary prevention of neural tube defects with folic acid supplementation: Cuban experience. *Prenat Diagn* 1990;10:149-152.
- Werler MM, Shapiro S, Mitchell AA. (1993): Periconceptual folic acid exposure and risk of occurrent neural tube defects. *JAMA* 1993;269:1257-1261.

Section 2:

Working with Diverse Audiences

Section II: Working with Diverse Audiences

Introduction

As a health educator, you will work with clients or program participants in a variety of settings: individual counseling sessions, small groups, or large groups. Consequently, you will encounter varying degrees of motivation or indifference toward behavior change. Because of this, you should consider client or group characteristics such as age, education level, socioeconomic status, and family planning status (i.e., pregnancy contemplators and noncontemplators) when planning your education strategy.

As you know, some individuals may be highly motivated to listen to your message and incorporate changes into their lifestyles. Others may believe that taking folic acid periconceptionally is of no advantage because they are not currently planning a pregnancy.

Other factors play a role in delivering your message. Time, or lack of time, is a primary constraint. You may have a short period of time to spend with a client or conducting a program and must deliver the message quickly and effectively.

Pregnancy Contemplators and Noncontemplators

Women who are currently contemplating pregnancy or actively trying to become pregnant will be more highly motivated to accept your message and incorporate changes in their lifestyles. Women not contemplating pregnancy may be less motivated because they feel the recommendation does not apply to them and they are not at risk. Even though statistics have shown that half of all pregnancies in the United States are unplanned or mistimed, the noncontemplator may feel confident that they are taking effective measures to avoid pregnancy.

Suggestions for working with noncontemplating women:

- Engage women in conversations concerning use of multivitamins or supplements. Stress the importance of including a multivitamin containing folic acid into their daily routine (e.g., the body needs folic acid every day for healthy tissues; folic acid can help prevent neural tube birth defects; multivitamins can provide other nutrients that may not be adequately supplied through the diet). Discuss and dispel myths and barriers associated with taking vitamins.
- Focus on the other health benefits of folate, such as the body's need for folate for healthy tissues, which can contribute to overall health, energy, and vitality. Older noncontemplating women may be interested in folate's possible role in reducing risk for heart disease, anemia, certain types of cancer, and cognitive diseases such as Alzheimer's disease, dementia and depression.
- Inform clients that many folate-rich foods are heart healthy and are generally low in fat, calories, and cholesterol. These foods provide other nutrients and food components such as vitamin C, potassium, fiber, and phytonutrients that contribute to good health.
- Stress that even though they may not be planning to become pregnant, their bodies are ready. Therefore, encourage them to maintain a healthy body so that when they begin to plan for a pregnancy, they will have a healthy body and a healthy baby.

Age

As we age, we change our perceptions and behaviors related to health and illness. These adaptations are based on biological, cognitive, social and personality processes that occur over our lifetime. For instance, it is well known that teenagers have a sense of invulnerability. This is why some of them engage in risk-taking behavior. Their goal? To achieve a sense of independence from authority figures (e.g., family, teachers, and even, the law). Young adults may define health as the absence of bad habits (such as smoking or excessive use of alcohol) and may

mostly focus on physical well-being. In contrast, as we move into middle age, definitions of health may include both physical and mental well-being.

Teenagers and young women may be less motivated to change their behavior related to taking folic acid, particularly if they are not contemplating pregnancy.

Suggestions for working with younger women:

- Adolescents want to be part of a solution. Therefore, emphasize that they can be actively involved in the solution for NTD risk reduction and that they have some control over their destiny relating to this issue.
- Many younger women are not contemplating pregnancy and, therefore, do not perceive themselves to be at risk. Focus on the other health benefits of folate, such as the body's need for folate on a daily basis for maintenance of healthy tissues.
- Relate this issue to things that they care deeply about, such as the impact of an NTD-affected pregnancy on friends and family.
- Many younger women are motivated to take vitamins so that they may "look and feel their best." To many women, this means having more energy, not feeling tired, feeling better physically and emotionally, or being happy or content. Although there may be little or no scientific evidence supporting these "benefits" of taking vitamins, they may serve as motivators for many women to take a vitamin every day.

Teens and adolescents are most likely to feel as if the folic acid/NTD message does not apply to them. This is partly because their peer relationships are very important to them, and peers become their preferred source of information. (As a corollary, adult sources of information are often viewed as suspect.)

It is your task to advise them that even though they are not mentally ready for pregnancy, their bodies *are* prepared (menstrual cycle). And, if they are sexually active, they are at risk for having a baby with a neural tube defect.

Suggestions for working with older women:

- Focus on the other health benefits of folate such as the potential for lowering risk for cardiovascular disease, prevention of anemia, and lowering risk for certain types of cancer, and cognitive diseases like Alzheimer's disease, dementia or depression.
- Focus on the body's need for folate to maintain healthy tissues. This emphasizes a daily need for folate for overall health and vitality.

Socioeconomic Status and Literacy Level

Income considerations will likely affect the client's ability to obtain medications, vitamins, or certain foods. The client's education and literacy level may affect how well they understand and respond to the verbal instructions or written materials you provide to them. Consider the following:

- Money will be an issue for low-income individuals. Consider this when recommending certain foods and vitamin supplements, and consider the types of stores where the client may shop.
- Be aware that Federal Food Stamps cannot be used to buy nonfood items such as vitamins.
- Make clients aware of the WIC eligible foods that are fortified with folic acid or rich in food folate (refer to Folate-in-a-Flash and Meals-in-a-Flash activity instructions in Lessons 3 and 4 for information about WIC foods).
- When applicable, make clients aware of the WIC Farmers' Market Nutrition Program, which can provide fresh, nutritious foods at an economical cost.

- For clients with low literacy levels, focus on the picture representations on the handouts. Use a highlighter pen to direct attention to pictures, graphics, or key words and phrases. Use the food flash cards to identify and describe recommended foods.

Women with Prior NTD-affected Pregnancies

Women with a prior NTD-affected pregnancy need special consideration since they are a high-risk group. Referral to a physician is essential, as these clients may require higher levels of folic acid supplementation (e.g., 4,000 micrograms/day) when planning a pregnancy. This level of folic acid should only be prescribed by a health care provider, and women should not attempt to obtain this amount from multivitamins alone since they may get too much of other vitamins (e.g., vitamin A) that could be dangerous to the health of their baby. These clients may desire genetic screening or counseling.

Individual and Group Counseling

Health educators may work with clients on an individual basis or in a group setting. Handouts and the placemat/food flash cards interactive activity can be used when working with clients individually. The lesson plans included with this Guide provide strategies and suggestions for adapting the materials to an individual or group learning environment (refer to the **Audience Cue** boxes).

Time Constraints

In many situations, an insufficient amount of time is available to provide the client with nutrition education and the proper skills and motivation necessary for behavior change. In these cases, handout materials can be used with key words and phrases highlighted to provide the client with needed information, ideas, and

strategies. Many of the handouts are designed so they can be used as stand alone educational tools if time does not permit a full discussion of folic acid with the client. Refer to the **Time Cue** boxes in the lesson plans for additional ideas on adjusting the lessons based on time constraints.

Sources

- Maibach E & Parrott RL (eds.). *Designing Health Messages*. Sage Publications, Thousand Oaks, CA, 1995.
- Penny G, Bennett P & Herbert M. *Health Psychology: A lifespan perspective*. Harwood Academic Publishers, Victoria, Australia, 1994.

Section 3:

Ethnic and Cultural Diversity

Section 3: Ethnic and Cultural Diversity Introduction

An important aspect of interacting with clients is recognizing, understanding, and appreciating the ethnic and cultural diversity that you will encounter. To be an effective educator you also must adapt your program or message to take into account the values, beliefs, and attitudes of the client (Box 1). It is important that you be aware of how your clients view their world and what may motivate or not motivate them to incorporate behavior changes in their lives.

In reality, we all have our own feelings, beliefs, stereotypes, and assumptions regarding people who look or act differently than ourselves. We are all influenced by our ethnic and cultural backgrounds, values, and beliefs. So we all have two tasks before us: 1) recognizing our own biases toward others who are different from us, and 2) not allowing those biases to interfere with how we view and educate clients.

Culture and Ethnicity

Culture is defined as the “beliefs, attitudes, values, customs, and habits accepted by a community of individuals¹.” It is “a shared system of values, beliefs, traditions, behavior, verbal, and nonverbal patterns of communication that hold a group of people together and distinguish them from other groups².” In short, culture is a way of life for a group of people. **Ethnicity** refers to membership in a group (usually a minority in the location) classed by race, religion, language,

Box 1

Values and Beliefs

Values are principles or ideals that people hold and usually justify one’s actions in moral or ethical terms. They are linked to choices in behavior.

A **belief** is a conviction that a phenomenon or object is true or real. Beliefs are easier to change than values.

nationality, or culture. Ethnic groups may be defined in part by their genetic inheritances and are held together by ties of language, culture, and nationalism. Within each ethnic group, there may be a wide variety of subgroups that possess their own history, beliefs, language and culture. It is a common misbelief that race, ethnicity, or geographic residence automatically places individuals into a particular cultural group.

In order to understand other ethnic and cultural groups, it is useful to first understand what we call the mainstream or majority culture in the United States. The majority culture is that which is shared primarily by the Anglo-Saxon, Protestant population.

Common characteristics, values, and beliefs shared by the mainstream culture include:

- High value placed on individualism
- Action oriented (must always act in a situation)
- Subscribes to the Protestant work ethic (i.e., hard work brings success)
- Future oriented (i.e., plan for the future)
- Believes in cause and effect relationships
- Believes the nuclear family as the ideal social unit
- Adheres to rigid time (time is a commodity)
- Believes man must master and control nature and the environment
- Believes all humans are more or less equal

The majority of the social systems in the United States were conceived and created predominantly by Caucasian peoples of western European descent. Health care, as it is currently administered in the United States, is no exception. Reading through the above list, you may recognize the extent to which these beliefs are integrated into our health care system. For instance, we encourage clients to be

proactive in preventive health care practices. This is both action oriented and future oriented.

As a health educator, it is important for you to recognize that the mainstream health care process for individuals from non-mainstream cultures may be partly or completely ineffective. This is because many of these other cultures do not assign high values to the beliefs that generally characterize the mainstream culture.

Working with Various Cultural and Ethnic Groups

As a health educator, you are not expected to be an expert on every cultural or ethnic group you may encounter. That said, here are a few general guidelines you can follow to better understand a client's **worldview** (Box 2) and effectively educator them.

Understanding that a client's worldview is nearly impossible to change is the first step in providing education. Your goal as a health

educator is to assist the client with positive behavioral change in the context of their existing worldview. This approach is clearly opposed to attempting to change one's overall values, health beliefs, or worldview.

When interacting with clients from different cultural or ethnic groups, it is important to recognize that individuals may be at various levels of acculturation.

Acculturation is the learning process—including attitudinal or behavioral

Box 2



Worldview

Worldview is one's outlook on life based on beliefs and values. Worldview may include aspects of religion, family values, and health beliefs and practices (including causes and treatment of illness and disease). A person's worldview is nearly impossible to change.

changes—that occur when an individual is exposed to another majority's culture. **Assimilation** is adapting oneself to the mainstream culture by adopting the customs, values, and mores of the new majority. You will encounter varying degrees of assimilation within our population; this can be influenced by such factors as level of education, social status, occupation, age at arrival, and years of residence in the United States. Some groups assimilate faster and to a greater degree than others. If you provide health care services in a medical setting, a brief review of your clients' medical records may provide you with relevant information (e.g., ethnic background, primary language spoken, or religion) that may be useful in identifying or understanding their worldviews.

There is no all-encompassing strategy to successfully interact with all cultures or ethnic groups. Seeking information directly from clients through open and respectful dialogue is the best way to evaluate their worldview, degree of assimilation, and health beliefs and practices. Few people would be offended by being asked about their beliefs, but be alert for cues that they may be

These strategies will help you learn more about your clients.

- Ask your clients about their cultural beliefs and values. A few pertinent questions might include:
 - *What is your cultural or ethnic background?*
 - *How long have you lived in the United States?*
 - *Do you follow the traditions of your cultural group? What are these traditions?*
 - *Do you follow any particular health or dietary customs based on culture, religion, or both? What are these customs?*
- Look for nonverbal cues (body position, eye contact) to indicate whether your client is comfortable with the interaction.
- Show respect through patience, effective listening, and sincerity.

uncomfortable with your questions. If you provide health care services in a medical setting, here are some suggestions for improving the caregiver/patient relationship across cultures³.

1. Both you and your patient want to have a satisfactory relationship. However, because your patient's culture will determine the characteristics of polite, caring, and sensitive behavior, you should not necessarily treat the patient in the same manner as you would want to be treated.
2. Maintain formality when first working with a patient from another culture. For example, it is best to address patients by their last name except when working with children or very young adults.
3. In many cultures it is disrespectful to look directly at another person, especially someone in authority. Therefore, don't be insulted if your patient does not maintain eye contact with you. Some patients may not ask questions about treatment because in their culture it makes someone "lose face."
4. Politely ask your patients about their beliefs concerning the cause for their illness, how to treat or cure it, or the ways to maintain health. These differ among cultures and may influence the strategies you choose to treat the patient.
5. Individuals from other cultures are often ridiculed by Western caregivers for seeking treatment from a folk healer or through alternative medicine practices. Consequently, patients are often afraid to mention their use of alternative treatments. Establish an open and honest line of communication with your patient, and do not discount beliefs that are not traditionally held by Western biomedicine.
6. The belief in supernatural effects may play a central role in your patient's health. For instance, a patient may believe that an illness has been caused by bewitchment, the evil eye, or punishment. In this case, the patient is not likely to take any responsibility for his or her cure, which may result in the failure to either follow medical advice or comply with the treatment plan.
7. Take an active role in inquiring about the patient's belief in the supernatural or use of nontraditional cures. In an indirect way, you may ask questions like:

“Many of my patients from (country, area) believe (state the belief). Do you?”

“Many of my patients visit (a folk healer, an acupuncturist, etc). Do you?”

8. In many cultures, the immediate and/or extended family is very important in making decisions regarding the health and medical treatment of the individual. Many times it is advantageous to involve the entire family in the treatment plan, and there may be greater likelihood of gaining the patient's compliance with the course of treatment.

9. A unique American trait is “the need to know.” However, as an act of trust, patients from other cultures often transfer responsibility for treatment entirely to the physician. Consequently, they may have no desire to know or may not be able to cope with “bad news” or details relating to treatment complications or outcomes. Be aware of signs indicating that a patient knows as much as he or she is able to handle.
10. If the belief in folk medicine or other alternative treatments is important to the patient, try to incorporate elements of these beliefs into the patient’s treatment plan (if not contradicted). This will foster trust between the patient and health care provider and may increase the likelihood that the patient will successfully follow the treatment plan.
11. If a patient believes that fate or God will determine whether the child she has is healthy or not, emphasize that we are fortunate to have medicine and vitamins so that we can do all we can for our children before leaving it up to destiny. You may also relate taking folic acid to child immunizations, since most parents are proactive in immunizing their children to reduce their risk for contracting disease. Taking folic acid every day is simply another and important preventive measure to ensure the health of their children.

Specific strategies and suggestions for addressing the needs of individuals in other ethnic or cultural groups have been integrated into the lesson plans included as part of this Guide. Refer to the **Culture Cue** boxes for this information.

Additional Resources

The following resources include Web sites of general interest or sites that can provide you with more information about cultural diversity, cultural characteristics, and minority health issues.

American Association of University Affiliated Programs (AAUAP)
Multicultural Council Resources
<http://www.aauap.org/otta/resource/default.htm>

American Medical Student Organization (AMSA)
<http://www.amsa.org/div/divres.cfm>

Association of Asian Pacific Community Health Organizations
<http://www.aapcho.org>

Bureau of Primary Health Care
<http://www.bphc.hrsa.gov>

The Center for Cross Cultural Health
<http://www.crosshealth.com>

Cross Cultural Health Care Program
<http://www.xculture.org>

Department of Health and Human Services (DHHS)
Initiative to Eliminate Racial and Ethnic Disparities in Health
<http://www.omhrc.gov/healthdisparities/index.htm>

Diversity Rx
<http://www.diversityrx.org>

Health Resources and Services Administration (HRSA)
<http://www.hrsa.gov>

Indian Health Service
<http://www.ihs.gov>

The National Alliance for Hispanic Health
<http://www.hispanichealth.org>

National Casa Project (Court Appointed Special Advocates for Children)
<http://www.casanet.org/program-management/diversity/index.htm>

National Center for Cultural Competence
<http://www.gucchd.georgetown.edu/nccc/>

National Clearinghouse for Alcohol and Drug Information
<http://www.health.org/features/multicultural/>

Office of Minority Health Resource Center
Cultural Competency
<http://www.omhrc.gov/OMH/Programs/2pgprograms/Cultural.htm>

Rhode Island Department of Health
Office of Minority Health
<http://www.health.ri.gov/chic/minority/index.php>

Transcultural Nursing Society
<http://www.tcns.org>

University of Washington EthnoMed
<http://ethnomed.org/>

References

1. Kittler PG & Sucher KP. *Food and Culture in America*. 2nd edition. West/Wadsworth Publishing, Belmont, CA, 1998.
2. Salimbene S. Cultural competence: A priority for performance improvement action. *J Nurs Care Qual* 1999;13:23-35.
3. Salimbene S & Graczykowski JW. 10 Tips for Improving the Caregiver/Patient Relationship Across Cultures. *When Two Cultures Meet: American Medicine and the Cultures of Diverse Patient Populations, Book 1, What Language Does Your Patient Hurt In? An 8-Part Series of Practical Guides to the Care and Treatment of Patients from Other Cultures*. Inter-Face International. Amherst Educational Publishing. Amherst, MA, 1995.

Other Sources

- Baer RD & Nichols J. *A Quick Guide to Ethnic Health Beliefs and Dietary Patterns*. 2nd edition. University of South Florida Health Education and Training Centers Project, Tampa, FL, 1998.
- Green LW & Kreuter MW. *Health Promotion Planning*. 3rd edition. Mayfield Publishing Co., Mountain View, CA, 1999.
- Katz JH. *The Counseling Psychologist*. Sage Publications, Beverly Hills, CA, 1985.
- Kittler PG & Sucher KP. *Food and Culture in America*. 2nd edition. West/Wadsworth Publishing, Belmont, CA, 1998.
- Lassiter SM. *Multicultural Clients: A Professional Handbook for Health Care Providers and Social Workers*. Greenwood Press, Westport, CT, 1995.
- Lieberman LS & Bobroff LB eds. *Cultural food patterns of Florida*. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, 1990.
- McFadden J (ed.). Historical approaches in transcultural counseling. In: *Transcultural counseling*. American Counseling Association, Alexandria, VA, 1993.
- Salimbene S. Cultural competence: A priority for performance improvement action. *J Nurs Care Qual* 1999;13:23-35.
- Terry RD. Needed: A new appreciation of culture and food behavior. *JADA* 1994;94:501-503.

Section 4:

Frequently Asked Questions

Section 4: Frequently Asked Questions

What is a neural tube defect?

Neural tube defects, or NTDs, are a type of congenital birth defect. This defect occurs when the neural tube, which becomes the brain and spinal cord of the developing fetus, fails to form properly. If the lower portion of the neural tube forms improperly, the spinal cord is affected. If the upper portion of the neural tube forms improperly, the brain is affected. The severity of the birth defect depends on the type and location of the lesion.

What are the types of NTDs?

The two most common types of NTDs are **anencephaly** and **spina bifida**, which account for 90 percent of NTDs that occur. Anencephaly results when the upper portion of the neural tube does not form properly. This results in malformation of the brain, and may also result in facial and cranial defects. Anencephaly is a fatal condition and infants with this defect die before or shortly after birth. Spina bifida results when the lower portion of the neural tube does not form properly. The result is a protrusion of spinal cord components outside of the body. **Meningocele** is a less severe form of spina bifida where spinal fluid and meninges (the membrane that covers the spinal cord) protrude from a sac through the skin on the back. This form of spina bifida is less severe because the spinal cord nerves are not included in the protruded tissue. This reduces the chances that the spinal cord nerves are damaged. **Myelomeningocele** is a more severe form of spina bifida where the spinal cord nerves protrude along with the meninges. Myelomeningocele is usually associated with damage to the spinal nerves and resulting complications. **Encephalocele** accounts for the remaining 10 percent of neural tube defects. Encephalocele is a defect where the brain protrudes outside the skull in a sac of skin. Children born with encephalocele usually live but often suffer from mental disabilities.

What complications are associated with neural tube defects?

Complications range from mild to very severe, depending on the location and severity of the lesion (lesions located higher on the spinal column result in more severe complications). Common complications include hydrocephalus (also known as water on the brain, an accumulation of fluid in the cranial cavity that

applies pressure on the brain and can affect mental function), paralysis, motility problems, variable loss of bladder and bowel control, and learning disabilities.

What are the costs associated with neural tube defects?

The costs associated with neural tube defects have been estimated to be over \$635,000 over the course of a lifetime¹, and may be well above \$1,000,000. These costs include ongoing medical care, surgeries for back closure and shunt placement (to relieve hydrocephalus), hospitalizations due to infection or other complications, and special equipment (e.g., leg braces, wheelchairs, catheters). There also are many physical and emotional tolls on families affected by neural tube defects.

Who is at risk for having a child with a neural tube defect?

Every woman capable of becoming pregnant is at risk for having a baby affected by a neural tube defect. In fact, 90 to 95 percent of all cases of spina bifida occur in families with no history of an NTD². The neural tube develops within the first month of pregnancy, before many women realize they are pregnant. In addition, over half of all pregnancies and 90 percent to 95 percent of teen pregnancies in the United States are unplanned or mistimed (i.e., occur earlier than desired)^{3,4}. Although all women of reproductive age are at risk, some women may be at higher risk than others. Factors that can increase risk include²:

- A prior NTD-affected pregnancy, or family history of NTDs
- Race/ethnicity (NTDs are more common among women of Hispanic origin, particularly Mexican-American women born in Mexico, and among women from northern China, Northern Ireland, and the United Kingdom.)
- Use of antiseizure medications
- Low socioeconomic status
- Maternal obesity
- Maternal insulin-dependent diabetes
- Maternal hyperthermia (e.g., hot tub or sauna use, elevated fever) during early pregnancy

How can you tell if you have an NTD-affected pregnancy?

The first step is to check maternal blood for the protein alpha-fetoprotein (AFP). This test is usually done 16 to 18 weeks after a woman's last menstrual period. Elevated AFP levels indicate that an NTD may be present and ultrasound is typically used to confirm the diagnosis. Many NTD cases are diagnosed without

the mother having the AFP blood test and are found when women go in for a routine screening ultrasound. However, these techniques cannot identify all NTD cases.

What happens if I find out I have an NTD-affected pregnancy?

An NTD-affected pregnancy is considered a high-risk pregnancy and you may be referred to a hospital, clinic, or physician that specializes in high-risk pregnancies. Genetic counseling is usually offered, and you may be able to speak with families affected by NTDs. A genetic counselor can assist you with medical decisions concerning your pregnancy.

What can be done to lower the risk of having an NTD-affected pregnancy?

Research has shown that daily consumption of 400 micrograms folic acid during the periconceptional period, that is, one month prior to conception through the end of the first trimester, can lower risk for an NTD-affected pregnancy by 50 percent to 70 percent⁵. Because other factors affect NTD risk, consuming folic acid will not eliminate all NTDs; however, the risk reduction is significant! In addition to consuming 400 micrograms folic acid, women should also consume food folate from a varied diet. ***Because half of all pregnancies and 90 percent to 95 percent of teen pregnancies are unplanned or mistimed (i.e., occur earlier than expected)^{3,4}, and the neural tube develops early during pregnancy (before many women know they are pregnant), all women capable of becoming pregnant should consume 400 micrograms folic acid every day.***

What is folic acid or folate? Is there a difference between folic acid and folate?

Yes, there is a difference between folic acid and folate. **Folate** is a water-soluble vitamin found naturally in some foods such as orange juice, strawberries, oranges, dark green leafy vegetables (spinach and other greens), broccoli, asparagus, and dried beans and peas (pinto, kidney, black-eyed peas, lentils). This form of the vitamin may be referred to as folate, food folate, or naturally occurring folate. **Folic acid** is the synthetic (man-made) form of the vitamin and is used in vitamin supplements and in fortified foods (enriched cereal grain products such as breakfast cereals, breads and rolls, pasta, and rice).

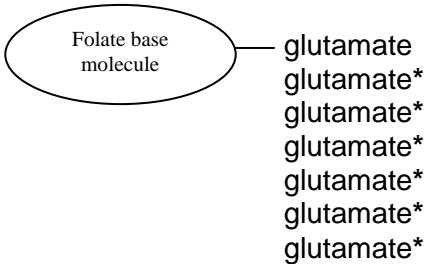
Structurally, folic acid and food folate are different (Box 1). Food folate consists of a large molecule made of several chemical ring structures and several glutamate molecules (polyglutamate). Folic acid consists of the same large molecule, but only has a single glutamate molecule (monoglutamate). Folate can only be absorbed by the body in the monoglutamate form. Therefore, enzymes located in the intestine must cleave the extra glutamate residues from food folate before it can be absorbed. Since folic acid is already in the monoglutamate form, it can be absorbed immediately without modification. For this reason, food folate is less bioavailable (absorbable) than folic acid because some food folate will pass through the intestinal tract without having the glutamate residues properly cleaved. Food folate is only about 50 percent bioavailable, whereas folic acid is approximately 100 percent bioavailable when consumed alone (such as taking a folic acid supplement on an empty stomach), and 85 percent bioavailable when consumed with other food (such as a breakfast cereal that is fortified with folic acid)⁶.

Be aware that the term “folate” may be used to describe food folate and folic acid. The term “folate” also is used when referring to blood or tissue concentrations of the vitamin.

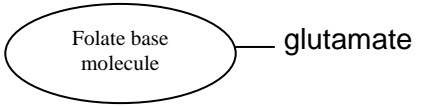
Box 1

Folate and Folic Acid

Folate, found naturally in foods, is a large molecule that includes a side chain consisting of several glutamate units (polyglutamate form). In order for the body to absorb folate all but one of the glutamate units must be cleaved from the molecule using enzymes in the small intestine. In contrast, the side chain of **folic acid** contains only one glutamate unit (monoglutamate form). Therefore, folic acid can be directly absorbed without enzyme modification.



Folate (polyglutamate)
(* glutamate units must be removed for absorption)



Folic acid (monoglutamate)

How much folic acid do women of childbearing age need to take?

The Institute of Medicine recommends that all women of childbearing age consume 400 micrograms of synthetic folic acid every day, along with eating a varied diet that includes food folate, to reduce their risk of having a baby with a neural tube defect⁶. Folic acid can be obtained through vitamin supplements, fortified foods, or a combination of the two. Food folate can be obtained from foods such as orange juice, dark green leafy vegetables, dry beans and peas such as pinto and kidney beans, broccoli, and strawberries. Women with a previous NTD-affected pregnancy who are trying to get pregnant should be under the care of a physician and may need 4,000 micrograms (4 milligrams, or 10 times the normal recommended amount) of folic acid every day. This level of folic acid should be taken only under the supervision of a physician. Women should not get this amount of folic acid by taking multivitamins, since this could provide potentially harmful amounts of other vitamins or minerals (e.g., vitamin A).

What is the RDA recommendation for folic acid across the lifespan?

The Institute of Medicine has established the following Recommended Dietary Allowances (RDA) for folate for various age groups⁶. Note that the IOM has a separate folic acid intake recommendation for women of childbearing age (400 micrograms). Also note that the RDAs are in units of “micrograms DFE.” See Section 1, page 18 of this Guide for an explanation of DFEs.

Age/gender group	Recommended Dietary Allowance (RDA) Micrograms DFE* per day
Infants (0-6 months)	65**
Infants (7-12 months)	80**
Children (1-3 years)	150
Children (4-8 years)	200
Children (9-13 years)	300
Teenagers (14-18 years)	400
Adults (19 years and older)	400
Pregnant women†	600
Lactating women	500

Source: Institute of Medicine, National Academy of Sciences. *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline*. National Academy Press, Washington DC, 1998.

* DFE = dietary folate equivalents.

** Adequate Intake amount.

† Women should continue to get 400 micrograms of folic acid from supplements or fortified foods until their pregnancy is confirmed and they begin prenatal care.

Where can I get folic acid?

Folic acid can be found in vitamin supplements such as single vitamin preparations, or as part of a multivitamin. Most multivitamins contain 400 micrograms of folic acid per tablet. Consuming a vitamin supplement with folic acid is the ***surest*** way of getting the folic acid needed to reduce risk of neural tube defects.

Folic acid also can be found in fortified foods such as fortified breakfast cereals and enriched cereal grain products including breads, rolls, pasta, and rice. Grain products that say “enriched” on the label have folic acid added to them. For example, cereals “enriched” with folic acid often contain between 100 micrograms and 400 micrograms per serving. Eating a serving of a fortified cereal that provides 400 micrograms folic acid (100% of the Daily Value) ***every day*** is one way that women can get the folic acid they need.

Are all grain foods fortified with folic acid? What about imported foods?

At this time, most whole grain foods are not “enriched” and therefore are not required by the Food and Drug Administration (FDA) to have folic acid added to them. However, products containing whole grains may be “enriched” by manufacturers. Foods imported from other countries may or may not contain folic acid. If manufacturers of imported products choose to enrich their products then they must follow FDA rules regarding fortification. To be sure, check the ingredients list on labels to see if it includes the words “folic acid.”

Why are foods fortified with folic acid?

The FDA approved folic acid fortification of cereal grain products to assist women with meeting the folic acid intake recommendation for reducing NTD risk⁷. There was much discussion regarding the amount of folic acid to be added to foods. Much of the debate focused on the potential masking of a vitamin B₁₂ deficiency (see next page). There are some indications that the current level of fortification (140 micrograms folic acid per 100 grams consumed product) may ***not*** be high enough for many women to meet the daily folic acid intake recommendation of 400 micrograms.

Has food fortification helped women get more folic acid or reduced the number of babies born with NTDs?

Folic acid fortification has improved folate status in the United States. Serum and red blood cell folate concentrations in women aged 15 to 44 years were reported to be substantially higher after fortification compared to pre-fortification⁸. This increase in folate status coincided with a 26 percent to 27 percent reduction in the number of neural tube defects in the United States⁹, which is significant yet far short of the estimated reduction in NTD incidence of 50 percent to 70 percent based on observational and intervention studies for women taking supplements containing folic acid⁵. Folic acid fortification also has been associated with significant reductions in NTD rates in Canada and Chile.

When do I need to take folic acid?

To be effective in reducing risk for neural tube defects, folic acid should be taken prior to and during the first trimester of pregnancy. This presents a problem because over half of all pregnancies are unplanned or mistimed, and many women do not know they are pregnant until after the neural tube develops. By the time a woman realizes she is pregnant, it is too late to reverse a defect if it has occurred. This is why it is recommended that ***all women of childbearing age take folic acid every day throughout their reproductive years.***

Can I take too much folic acid?

Thus far, there is no toxicity associated with high intakes of folic acid. The Upper Tolerable Level (UL) of intake established by the Institute of Medicine is 1,000 micrograms per day of ***folic acid*** (from vitamins or fortified foods)⁶. This amount of folic acid is not associated with toxicity, but instead was established because high doses of folic acid may "mask" symptoms associated with a deficiency of vitamin B₁₂. If left untreated, vitamin B₁₂ deficiency may lead to irreversible neurological damage. This UL does not include the folate obtained from folate-rich food sources (i.e., food folate from nonfortified foods). A multivitamin or folic acid vitamin supplement containing 400 micrograms folic acid taken once per day will easily meet the IOM recommendations for reducing risk of NTDs.

What is the easiest way to meet the folic acid intake recommendation?

The *easiest and surest way* to meet the recommendation is to take a multivitamin or folic acid supplement containing 400 micrograms folic acid every day. This will ensure that a woman gets the correct amount of folic acid. However, some women cannot or will not take a pill every day. In this case, folic acid also can be obtained through the diet with enriched cereal grain products. The easiest way to get folic acid through foods is to eat one serving each day of a fortified cereal that provides 400 micrograms folic acid, or 100% of the Daily Value. Some cereals provide 100 micrograms folic acid per serving (25% of the Daily Value). Check the “Nutrition Facts” label to determine which cereals contain 400 micrograms of folic acid per serving. Any method used for consuming folic acid should be accompanied by including folate-rich foods (dark green leafy vegetables, dried beans, dried peas, and orange juice) as part of a varied diet.

Can I meet the IOM recommendation just by eating foods rich in food folate?

No. Research studies show that in order to reduce risk, you must consume 400 micrograms of folic acid, preferably from a vitamin supplement, in addition to folate from a varied diet⁵. To date, intervention studies have tested only the effect of synthetic folic acid in combination with folate from a varied diet on NTD risk reduction. Researchers believe that food folate contributes to risk reduction, but data are incomplete to determine the extent of the contribution. Until more data are available, women should always include a source of folic acid (400 micrograms from a vitamin supplement, or alternatively fortified foods) in their daily diets, while eating a healthy and varied diet.

Is adequate folic acid intake beneficial for men, women beyond child bearing age, and children?

Yes, everyone needs an adequate intake of folic acid. Folate is a water-soluble B vitamin that everyone needs every day for good health. Folate is not stored in the body in large amounts and must be eaten or taken every day so the body has enough to function properly. Folate helps make DNA, which tells cells what they will be and how they will work. Because of its role in making DNA, folate is needed to make healthy red blood cells. Folate is important for proper growth and development and helps the body replace cells on a daily basis. Folate is needed for many reactions in the body and helps change one substance into another so the body can function properly.

References

1. Waitzman NJ, Romano PS, Grosse SD. Half-life of cost of illness estimates: the case of spina bifida. In: Wyszynski DF, ed. *Neural Tube Defects: From Origin to Treatment*. Oxford University Press. 2005.
2. Centers for Disease Control and Prevention. *Preventing Neural Tube Birth Defects: A Prevention Model and Resource Guide*. 1998.
3. Henshaw SK. Unintended pregnancy in the United States. *Family Planning Perspectives* 1998;30:24-29,46.
4. Centers for Disease Control and Prevention. Surveillance for pregnancy and birth rates among teenagers, by State—United States, 1980 and 1990. *MMWR* 1993;42(SS-6):1-27.
5. Centers for Disease Control. Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. 1992; *MMWR* 41:1-7.
6. Institute of Medicine, National Academy of Sciences. *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline*. National Academy Press, Washington, DC, 1998.
7. Food Standards: “Amendment of the Standards of Identity for Enriched Grain Products to Require Addition of Folic Acid. Final Rule.” (Codified at 21 CFR Parts 136, 137, and 139.) 61 Federal Register 8781-8807. 1996.
8. Centers for Disease Control and Prevention. Folate status in women of childbearing age--United States, 1999. *MMWR* 2000;49(42):962-965.
9. Centers for Disease Control and Prevention. Spina bifida and anencephaly before and after folic acid mandate—United States, 1995-1996 and 1999-2000. *MMWR* 2004;53:362-365.

Section 5:

Handouts, Activity Sheets, Overheads

Section 5: Handouts Quick Guide to Handouts



All handouts, lesson activity sheets, pre/post tests, and overhead masters are located in the pocket sheet holder. They are camera-ready and may be reproduced.

Note: All handouts, activity sheets, pre/post tests, and overhead masters are provided in English and Spanish.

<u>Handout</u>	<u>Description and Use</u>
Patty's Note	<ul style="list-style-type: none">◆ A story about having and caring for a child with a neural tube defect.
Vitamins and Folic Acid (double sided)	<ul style="list-style-type: none">◆ Includes information about multivitamins and folic acid supplements.◆ Addresses barriers to taking vitamins and includes suggestions for overcoming those barriers.
Folic Acid and Fortified Foods	<ul style="list-style-type: none">◆ Describes folic acid fortification of cereal-grain products.◆ Includes a selected list of fortified foods and their folic acid content.◆ Give to participants to help them identify and select foods fortified with folic acid.
Food Folate	<ul style="list-style-type: none">◆ Describes foods that are naturally rich in food folate.◆ Give to participants to help them identify and select foods that are rich in naturally occurring food folate.

Handout

Description and Use

BIG NEWS: Folic Acid Reduces
Neural Tube Defect Risk
(double sided)

◆ Fact sheet providing information about folic acid recommendations, vitamins, fortified foods, and foods rich in naturally occurring food folate.

Folic Acid Content of Selected Foods
And Vitamin Supplements

◆ A list of vitamins and selected fortified foods and their folic acid content.

Handouts/Activity Sheets Associated with Lesson Activities

Commitment to Change

◆ Use with Lesson 1.
◆ A contract to commit to consume 400 micrograms folic acid every day.

Vitamin Case Studies

◆ Use with Lesson 2.
◆ Includes five (5) case studies related to identifying and overcoming barriers and myths associated with vitamins.

Folic Acid Eatery

◆ Use with Lesson 3.
◆ An activity that uses a hypothetical restaurant menu to evaluate participants' food choices.

My Shopping Cart

◆ Use with Lesson 4.
◆ An activity to identify and evaluate vitamin supplements and foods purchased at the grocery store.

Handout

Description and Use

Case Studies (5)

- ◆ Use with Lesson 4.
- ◆ An activity to help participants evaluate diet and lifestyle changes relating to folic acid.

Commitment to Inform

- ◆ Use with Lesson 4
- ◆ A contract to commit to inform others about folic acid.

Pre/Post Tests

- ◆ Use with the appropriate lesson.
- ◆ Evaluates participants' knowledge before and after the educational lessons.

Overhead Masters

Overhead masters

- ◆ Use with Lessons 1, 2, and 3.
- ◆ Includes thirty-two slides to prepare overhead transparencies.

Section 6:

Lesson Plans

Section 6: Lesson Plans
Quick Guide to Lessons and Learning Tools

Lesson/Tool	Title/Subject	Activities	Comment
Training DVD (Video 1)	“Prevention of Neural Tube Defects Using Folic Acid: You Can Make a Difference” Presents information about neural tube defects and folic acid intake recommendations	None	Use for health educators only (approximately 21 minutes)
Training DVD (Video 2)	“Folic Acid Every Day” Presents information about vitamins, fortified foods, and folate-rich foods	None	Use for health educators or program participants (approximately 10 minutes)
Lesson 1	"Learning About Neural Tube Defects"	<ul style="list-style-type: none"> ▪ Ice-Breaker discussion ▪ Interactive presentation (slide show and discussion) ▪ How do you feel? (discussion) ▪ Commitment to Change (contract) 	Use handout when time is limited: <ul style="list-style-type: none"> ▪ Patty’s Note

(continued on next page)

Lesson/Tool	Title/Subject	Activities	Comment
Lesson 2	"Protect Your Health for a Lifetime: Getting Enough Folic Acid"	<ul style="list-style-type: none"> ▪ 2 interactive presentations (slide show and discussion) ▪ Folic Acid Trivial Pursuit (question and answer game) ▪ Vitamin Case Studies (activity) 	Use handouts when time is limited: <ul style="list-style-type: none"> ▪ BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk ▪ Vitamins and Folic Acid ▪ Vitamin Case Studies
Lesson 3	"Food, Folate, and My Diet"	<ul style="list-style-type: none"> ▪ Interactive presentation (slide show and discussion) ▪ Folic Acid Eatery (choosing foods from a menu) ▪ Folate-in-a-Flash (food flash cards) 	Use handouts when time is limited: <ul style="list-style-type: none"> ▪ BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk ▪ Folic Acid and Fortified Foods ▪ Folic Acid Content of Selected Foods and Vitamin Supplements ▪ Food Folate ▪ Folic Acid Eatery
Lesson 4	"Folate and My Life"	<ul style="list-style-type: none"> ▪ My Shopping Cart (selecting foods at the grocery store) ▪ Meals-in-a-Flash (food flash cards with placemat) ▪ Case Study (activity) ▪ My Commitment to Inform (contract) 	No slide show; activities only

(continued on next page)

Lesson/Tool	Title/Subject	Activities	Comment
Food flash cards	Folic acid fortified and folate-rich foods	<ul style="list-style-type: none"> ▪ Folate-in-a-Flash (Lesson 3) ▪ Meals-in-a-Flash (Lesson 4) 	<ul style="list-style-type: none"> ▪ Use food flash cards for discussion (see Lesson 3) ▪ Meals-in-a-Flash: use the placemat to construct meals ▪ Use the food flash cards with low literacy individuals

Lesson #1: Learning About Neural Tube Defects

Goal:

Increase awareness of neural tube defects and the recommendations for folic acid intake.

Estimated time: 45-60 minutes

Activities in the lesson:

Activity #1: Ice-Breaker

An interactive introduction to the program.

Activity #2: The Buchieri Family Story

An interactive discussion using a PowerPoint® or overhead presentation.

Activity #3: How Do You Feel?

An interactive discussion about the participants' feelings about NTDs.

Activity #4: My Commitment

A contract participants make with themselves to commit to changing their behavior to reduce their risk for having a baby with a neural tube defect.

Learning/behavioral objectives:

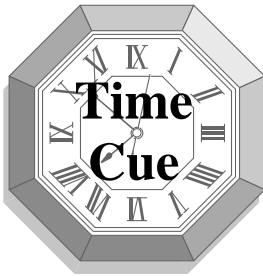
Following this lesson, participants will be able to:

1. State the areas of the body affected by neural tube defects, and identify some of the physical problems and complications associated with neural tube defects.
2. State some of the issues and concerns faced by families when a family member has a neural tube defect.

3. State why they are at risk for having a baby with a neural tube defect.
4. State the Institute of Medicine recommendation for reducing risk of neural tube defects.

Materials required:

- Overhead projector or computer with LCD projector
- PowerPoint® files (on CD-ROM) or overheads (prepare from enclosed camera-ready master copies)
- Script (enclosed)



If you cannot do this lesson because of time constraints, use the handout “Patty’s Note” which includes a personal story about neural tube defects.

ACTIVITY #1: ICE-BREAKER
Introduction

Purpose:

- To introduce participants to the program.

Materials required:

- Script
- Lesson #1 pre-test

Begin activity:

1. Greet all participants, and introduce yourself and your team (paraprofessionals, translators, or volunteers).

Hello, my name is _____, and I would like to welcome all of you to the program “Reducing Neural Tube Defect Risk with Folic Acid.” The following individuals will be helping with the program today: _____.

2. Distribute name tags. Suggest that the participants write their ethnicity under their name on their name tags.

Ask each woman to introduce herself to the other members of the group by sharing:

1. Name
2. Ethnic background
3. Fun fact

Use the format below to introduce yourself. Ask participants to use the same format you used.

My name is _____. My ethnic background is _____ (or you can say, “I am originally from _____”). One fun fact about myself is_____.

If you have volunteers or paraprofessionals helping you with the class ask them to follow the same format. Tell participants that they can introduce themselves just as you did.

3. Distribute the Lesson #1 pre-test and allow participants to have a few moments to complete the pre-test. Collect the pre-tests before proceeding.

Introducing the educational program: Ask the following questions to the participants to get them motivated to learn about folic acid and neural tube defects. Give participants a chance to answer each question.

“Reducing Neural Tube Defect Risk with Folic Acid” is an educational program that teaches Hispanic women how to reduce their risk of having a baby with a neural tube defect, one type of birth defect.

Q: *Does anyone know why this program was specifically designed for the Hispanic community?*

A: *This program was designed for Hispanic women who can become pregnant because they are at a higher risk for having a baby with a neural tube defect compared to Caucasian and African American women.*

Q: *How many of you are consulted by your family, friends, and community for information regarding health and food habits?*

A: *As Hispanic women and past/present/future caregivers and mothers, you are looked to by your family, friends, and community for information about health and food habits. You are an important link for spreading this message.*

Q: *Who knows about any discoveries regarding neural tube defects and folic acid?*

A: *Consuming 400 micrograms of folic acid daily at least one month before and during the first trimester of pregnancy reduces your risk of having a baby with a neural tube defect by 50 percent to 70 percent. That means that women who consume 400 micrograms of folic acid every day before they become pregnant could have a much lower chance of having a baby with a NTD than women who do not.*

ACTIVITY #2: INTERACTIVE DISCUSSION
The Buchieri Family Story

Purpose:

- To increase participants' knowledge about neural tube defects using the "experience" of a family's story.
- To inform participants about their risk of having a baby with a neural tube defect.
- To inform participants about folic acid's role in reducing their risk of having a baby with a neural tube defect.

Materials required:

- Overhead projector or computer with LCD projector
- PowerPoint® files (on CD-ROM) or overheads (prepare from enclosed camera-ready master copies)
- Script "The Buchieri Family Story"

Additional information:

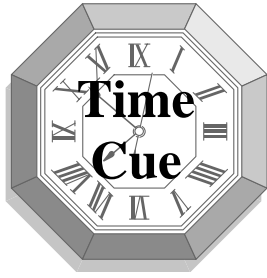
Sidebars providing more in-depth information have been included throughout the script. This information may be incorporated into the script as time permits. Look for the *Fast Facts!* boxes to the right of the lesson plan script.

Fast Facts!

Look for these boxes for more information about a topic.

Begin activity:

As you go through the slides, give participants a chance to answer each question. Be prepared to resolve any misconceptions.

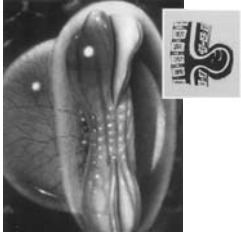


This presentation includes extensive interaction with the audience in the form of questions. If you have a limited amount of time to present this material, omit asking most of the questions. You may still want to ask a few questions to keep your audience interested and involved in the presentation.

Q: *What is a neural tube defect? Can anyone tell us?*

A: **SLIDE 1**

What is a neural tube?



- Forms baby's brain and spinal cord
- Develops during first weeks of pregnancy

Fast Facts!

Neural tube defects affect 3,000 pregnancies per year (over 8 families per day) in the United States.

*I will begin by showing you what a neural tube looks like. The neural tube is the part of the baby that becomes its brain and spinal cord. The top of the neural tube becomes the baby's brain while the bottom develops into the baby's spinal cord. **It is important for women to get enough folic acid before they become pregnant and during pregnancy so that the neural tube can develop properly.***

The picture in the inset shows a neural tube defect. Neural tube defects (or NTDs) occur when the neural tube does not form correctly. These defects occur during the first weeks of pregnancy.

Q: *Do you think most women know that they are pregnant when the neural tube is forming?*

A: *No. To begin with, more than half of all women who become pregnant didn't plan their pregnancies. Even if the pregnancy is planned, the neural tube closes so early in pregnancy that most women don't know they're pregnant until it's too late to prevent these birth defects.*

SLIDE 2



This is a picture of a baby born with spina bifida, a common type of neural tube defect. You can see that the baby's back doesn't look normal. There is a sac that looks like a large bubble (balloon) pushing out from the backbone. This occurs because the spinal cord has not formed properly and parts of it are exposed outside of the body.

Fast Facts!

There are three types of spina bifida

1. Meningocele
2. Myelomeningocele
3. Spina bifida occulta

Meningocele (least common type) occurs when the baby is born with a sac made of spinal fluid and meninges that sticks out of the baby's back.

Myelomeningocele: (most severe type) occurs when the sac (on the outside of the body) is filled with meninges, spinal fluid, spinal cord, and spinal nerves.

Spina bifida occulta: (least severe type) most people who have it are unaware of their defect.

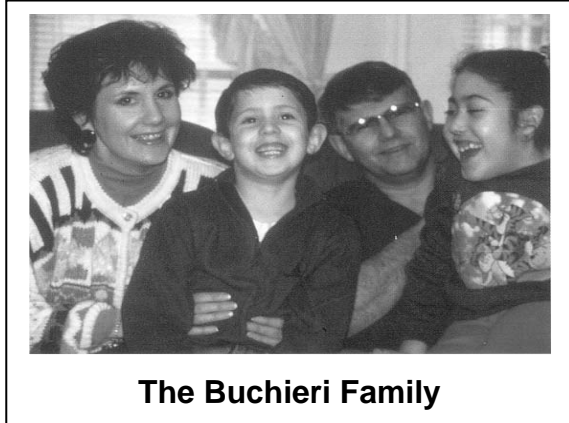
Q: *By looking at this picture, what type of problems do you think babies born with a neural tube defect experience?*

A: *Each neural tube defect case is unique. Therefore, babies born with neural tube defects may have:*

- *Paralysis → can't walk or can't walk without braces*
- *Loss/lack of bladder & bowel control*
- *Water on the brain (hydrocephalus) → learning disabilities (trouble learning)*
- *Respiratory complications → trouble breathing*

These problems occur because some of the spinal cord nerves have been damaged.

SLIDE 3



Q: *Here is a picture of a family that has been affected by neural tube defects. This is the Buchieri (pronounced boo-CARE-ee) family: Nancy, Joey, Mike, and Nicole. What can you tell us about this family by looking at this picture?*

[Allow a pause before asking the next question.]

Would you have guessed that both children have a neural tube defect?

A: *Both children have spina bifida. The happiness we see on the faces of this family is a result of a lot of hard work, dedication, and unconditional love. The family has faced many stresses because of the neural tube defects, and it hasn't been easy for them.*

SLIDE 4



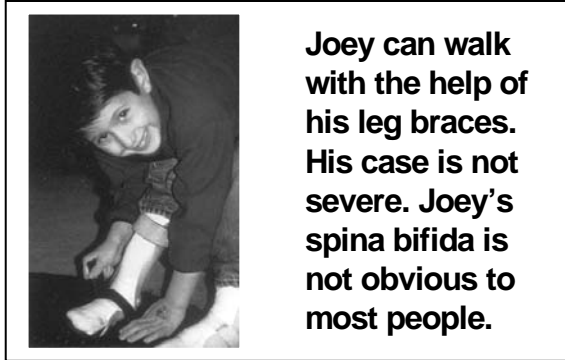
Nicole has a more severe case of spina bifida than her brother. She must use a wheelchair.

Q: *This is Nicole. She has a very severe case of spina bifida. She is paralyzed from the chest down. What kind of problems do you think Nicole has on a daily basis?*

A: *Nicole suffers from many problems:*

- 1. Respiratory problems. She needs to wear an oxygen mask and stops breathing occasionally.*
- 2. No control of bladder or bowel. (She has to wear diapers.)*
- 3. Needs to be fed through a tube. (She can't swallow.)*
- 4. Mentally disabled.*

SLIDE 5



This is Joey, Nicole's brother. Joey can walk with his leg braces. He has a very mild case of spina bifida. He has had several surgeries that have left scars on his back. Joey has had bladder problems such as overactive (spastic) bladder and urinary tract infections (UTIs).

Q: Now that we have shared the Buchieri family story with you, what kinds of issues and concerns do you think this family must manage on a daily basis?


- A: Some of the concerns faced by the Buchieri's include:***
- *Time constraints (because of extra care the children need).*
 - *Economic burden (due to cost of health care and special equipment needed by the children).*
 - *Emotional stress.*

Q: *Do you think YOU are at risk for having a baby with a neural tube defect?*

[Let the audience answer].

SLIDE 6

ANYONE can have an NTD-affected pregnancy!




A: *The fact is 90 percent to 95 percent of babies born with spina bifida are born into families that have no history of neural tube defects. So every woman who is capable of having children is at risk for having a baby born with this condition.*

Fast Facts!

Factors that increase the risk for having a baby with an NTD are:

- Previous NTD-affected pregnancy or family history of NTDs
- Race/ethnicity (Hispanic women, especially those born in Mexico, women from Northern China, Northern Ireland, and the United Kingdom are at higher risk)
- Use of antiseizure medications
- Low socioeconomic status
- Maternal obesity
- Maternal insulin-dependent diabetes
- Maternal hyperthermia



If you are educating Hispanic/Latina individuals, be sure to state that research shows that Hispanic/Latina women, especially those born in Mexico, may be at higher risk for having an NTD-affected pregnancy than whites or black women. The reason for this is unclear at this time. Women from Northern China, Northern Ireland, and the United Kingdom also have higher rates of NTDs.

Q: *We are fortunate that many dedicated scientists and doctors have spent time trying to find out how to reduce YOUR risk of having a baby with a neural tube defect. Does anyone know how you can reduce your risk of having a baby with a neural tube defect?*

A: SLIDE 7

Good News!

400 micrograms of folic acid every day plus a healthy diet lowers the risk of neural tube defects!



*The Institute of Medicine recommends that **all women** who can become pregnant consume 400 micrograms of synthetic folic acid every day in addition to consuming food folate from a varied diet. The Institute of Medicine made this recommendation after evaluating all of the scientific data concerning folic acid and neural tube defects. Taking 400 micrograms of folic acid every day could decrease the incidence of NTDs by 50 percent to 70 percent. This recommendation is supported by the March of Dimes, the Centers for Disease Control and Prevention, and professional medical associations such as The American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.*



For Hispanic/Latina individuals, the word “acid” (as related to folic acid) may suggest something negative or undesirable. Explain that folic acid is a “good” acid and a vitamin that is needed on a daily basis for good health.


Q: *Does anyone know why the recommendation is for ALL women who can become pregnant?*

A: SLIDE 8

YOU SHOULD...

TAKE FOLIC ACID
EVERY DAY

Even if you are not planning a pregnancy!




Folic acid pill

Fast Facts!

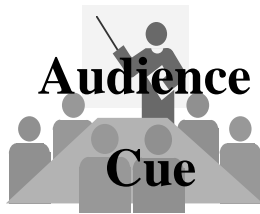
The recommended level of folic acid intake for women who have previously had an NTD-affected pregnancy is 4,000 micrograms per day. This is **10 times** the amount in the Institute of Medicine recommendation for women with no history of NTDs. This amount should only be taken under a physician's supervision.

*The recommendation includes all women who can become pregnant because folic acid must be taken **before** you become pregnant. Remember that the neural tube closes early during pregnancy—during the first month, and in the United States, more than **half of all pregnancies are unplanned or mistimed (occur earlier than desired)**. If folic acid is taken after you find out you are pregnant, it will not decrease your risk of having a baby with a neural tube defect. So it is **VERY important that women take folic acid every day!***

Audience Cue



The folic acid recommendation for women who have previously had an NTD-affected pregnancy is different (see the ***Fast Facts*** box). Inform the participants about this recommendation when you think it is appropriate. Make sure that they do not confuse it with the Institute of Medicine recommendation.



Reinforce the material by telling the Hispanic audience that doctors and nutritionists are recommending that all women who can become pregnant consume 400 micrograms folic acid every day. The authoritative role of the doctor should help reinforce behavior modification.

Note: The next slide is a summary slide to reinforce the main points of this activity.

SLIDE 9

A slide layout featuring two small photographs of women on the left. To their right is a grey box with the word "Remember" in bold. Below this is a larger grey box containing text about folic acid for Hispanic/Latina women. A dotted line with a downward-pointing triangle connects the "Remember" box to the text box.

Remember

Hispanic/Latina women have a higher risk

All women who can become pregnant should take 400 micrograms of folic acid **EVERY DAY**



Women who are not contemplating pregnancy may feel that the folic acid message “does not apply” to them, and you may encounter similar comments. Reiterate that over half of pregnancies are unplanned or mistimed (even with the wide availability and use of birth control). You can also mention folic acid is essential for overall health and well-being and that you will be discussing additional health benefits of folic acid in the following lessons.



For most cultural and ethnic groups, the extended family is very important. Encourage participants to spread the folic acid message to others in their immediate and extended families. These individuals may be more likely to heed the folic acid message when it is coming from another family member.

In some Hispanic/Latino subgroups, elder females are held in high esteem. If you have older women in your audience, encourage them to share the folic acid message with younger women in their families.

ACTIVITY #3: INTERACTIVE DISCUSSION

How do you feel?

Purpose:

To allow participants to reflect upon what they have learned and think about how they can reduce their risk of having a baby with a neural tube defect by getting enough folic acid.

Materials required:

- “How Do You Feel?” script and instructions

Begin activity:

Begin activity with the first question. Give participants a chance to answer each question. Be prepared to resolve any misconceptions.

Q: *When you saw the pictures of the baby with a neural tube defect, how did they make you feel?*

A: *There are several possible answers:*

- *Sad*
- *Scared (about my own risk or the risk of others in my family)*
- *Concerned or worried (about my own risk and/or about the baby)*
- *Motivated to reduce my risk*

Q: *How does it make you feel to know that YOU have a higher risk for having a baby with a neural tube defect?*

Remind participants that they are at increased risk due to their ethnicity. Also:

- All women who can get pregnant are at risk for having a baby with a neural tube defect.
- 50 percent of pregnancies in the United States are unplanned or mistimed (occur earlier than desired).
- The neural tube develops early in pregnancy before most women know they are pregnant.

Fast Facts!

- High rates of NTDs have been seen among the Hispanic population of the US, particularly those of Mexican descent.
- Hispanics have a very high fertility rate. Hispanics have 2 times more children than whites and 1.5 times more children than blacks.

Q: *Now that you know that you are at risk for having a baby with a neural tube defect, what do you think you can (will) do to reduce your risk?*

Note: This question should get the participants to think about what they can do to decrease their risk. This is important because it will allow them to think about behavioral changes they can make.

A: *There are specific things that you can do to decrease your risk:*

- 1. Take a vitamin supplement containing folic acid.*
- 2. Eat a healthy diet that includes foods fortified with folic acid.*
- 3. Eat foods that are rich in food folate.*

Note: Information relating to vitamins and food sources of folic acid and naturally occurring food folate are presented in Lessons 2, 3, and 4.



Some Hispanic subgroups may believe that disease conditions are the result of fate, or are a “curse” from God, their ancestors, or others. To these individuals, preventive measures such as consumption of folic acid may not reduce their perceived risk. Relate the folic acid preventive measure to other common preventive measures that they may be familiar with or can relate to, such as eating a healthy diet or having their child immunized. This may help individuals better understand why they should take folic acid every day.

ACTIVITY #4: CONTRACT**My Commitment to Change**

Purpose:

To make participants accountable for their desire to change their behavior so they will reduce their risk for having a baby with a neural tube defect.

Materials required:

- “My Commitment to Change” instructions
- Handout (camera-ready copy) – *My Commitment to Change* contract

Begin activity:

1. Distribute the “My Commitment to Change” contract.
2. Ask participants to make a commitment to change their behavior to reduce their risk for having a baby with a neural tube defect.
3. Encourage participants to tell others about their commitment, thereby spreading the folic acid message!

CONCLUSION

Q: *What are some of the most important things you have learned today about neural tube defects?*

A: *A few answers might be:*

- *Hispanic women are at higher risk for having a baby with a neural tube defect.*
- *Adding 400 micrograms of folic acid to your diet every day before you become pregnant can decrease your risk of having a baby with a neural tube defect.*
- *There are a variety of health problems/complications that are caused by NTDs. Some children are affected more severely than others.*
- *NTDs add a lot of stress to families.*

We will spend the rest of the program doing lessons and activities to teach you how to reduce your risk for having a baby with a neural tube defect.

Once the lesson has concluded, distribute the Lesson #1 post-test and have the participants complete the test.

Distribute the handout *Patty's Note* to the participants.

Lesson #2: Protect Your Health for a Lifetime: Getting Enough Folic Acid

Goal:

Increase the number of Hispanic women who consume 400 micrograms of folic acid every day by taking a vitamin supplement containing folic acid.

Estimated time: 45-60 minutes

Activities in this lesson:

Activity #1: Folic Acid Every Day: Protect Your Health for a Lifetime

An interactive discussion using a PowerPoint® or overhead presentation.

Activity #2: Getting Enough Folic Acid

An interactive discussion using a PowerPoint® or overhead presentation.

Activity #3: Folic Acid Trivia Game

Trivia game to reinforce folic acid and NTD facts.

Activity #4: Vitamin Case Studies

Activity to reinforce strategies for taking vitamin supplements.

Learning/behavioral objectives:

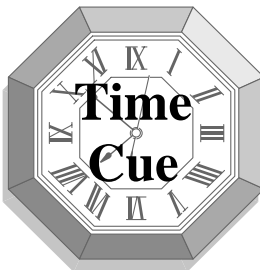
Following this lesson, participants will be able to:

1. State some of the health benefits associated with folic acid.
2. State the recommended level of folic acid intake to reduce the risk of neural tube defects.
3. Recognize how much folic acid is in a vitamin product by using the Supplement Facts label.

4. Name at least 3 barriers or myths associated with taking vitamins, and strategies for overcoming these barriers.
5. Be motivated to take a vitamin containing folic acid every day.

Materials required:

- Overhead projector or computer with LCD projector
- PowerPoint® files (on CD-ROM) or overheads (prepare from enclosed camera-ready master copies)
- Scripts “Folic Acid Every Day: Protect Your Health for a Lifetime” and “Getting Enough Folic Acid”
- Folic Acid Trivia Game instructions and questions
- Vitamin Case Studies instructions
- Handouts (camera-ready copies)
 1. *BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk*
 2. *Vitamins and Folic Acid*
 3. *Vitamin Case Studies*
- Optional: Folic Acid Now magnets (available through the March of Dimes) or other giveaways



If you cannot do this lesson because of time constraints, use the following handouts:

- ***BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk*** – includes information about neural tube defects, folic acid recommendations, vitamins, fortified foods, and foods with naturally occurring food folate.
- ***Vitamins and Folic Acid*** – includes information about multivitamins and folic acid supplements. Addresses myths and barriers associated with vitamins.
- ***Vitamin Case Studies*** – an activity to identify and overcome myths and barriers associated with vitamins.

ACTIVITY #1: Folic Acid Every Day: Protect Your Health for a Lifetime

Purpose:

- Increase participants' knowledge about the health benefits of folic acid.
- Motivate participants to take folic acid every day.

Materials required:

- Overhead projector or computer with LCD projector
- PowerPoint® file (on CD-ROM) or overheads (prepare from enclosed camera-ready master copies)
- Script “Folic Acid Every Day: Protect Your Health for a Lifetime”
- Lesson #2 pre-test

Additional information:

Sidebars providing more in-depth information have been included throughout the script. This information may be incorporated into the script as time permits. Look for the ***Fast Facts!*** boxes to the right of the lesson plan script.

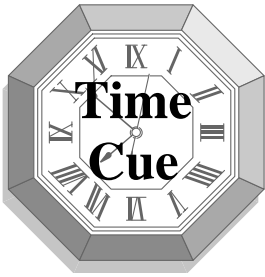
Fast Facts!

Look for these boxes for more information about a topic.

Begin activity:

As you go through the slides, give participants a chance to answer each question. Be prepared to resolve any misconceptions.

Distribute the Lesson #2 pre-test and allow participants to have a few moments to complete the pre-test. Collect the pre-tests before proceeding.



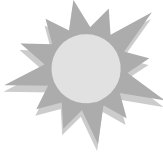
This presentation includes extensive interaction with the audience in the form of questions. If you have a limited amount of time to present this material, omit asking most of these questions. You may want to ask a few questions to keep your audience interested and involved in the presentation.



After participants answer the question (correctly or incorrectly), restate the question and the correct answer to reinforce the main point(s).

SLIDE 10

***Folic Acid
Every Day***



***Protect your Health
for a Lifetime!***

Today (tonight) we are going to talk about folic acid, a vitamin that you need every day of your life to keep your body healthy.

Q: *Can anyone tell us anything about folic acid?*

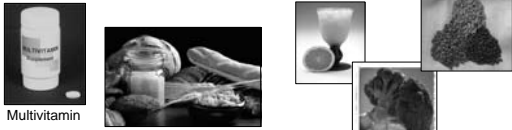
[Give participants time to answer.]

Let's first discuss where you find folic acid.

SLIDE 11

Where can you find folic acid?

<u>Man-made folic acid</u>	<u>Naturally occurring food folate</u>
◆ Multivitamin with folic acid ◆ Folic acid pill ◆ Folic acid fortified foods	◆ Certain foods




Fast Facts!

Folic acid is the man-made (synthetic) form of the vitamin found in supplements and fortified foods. Food folate is the form of the vitamin found naturally in certain foods. The term “folate” may be used to describe both forms of the vitamin. Synthetic folic acid is more bioavailable (or readily absorbable) than food folate.

Folic acid is a water-soluble B vitamin. There are two major forms of this vitamin. Man-made, or synthetic, folic acid is the man-made form of the vitamin that is added to vitamin supplements and fortified foods such as fortified breakfast cereals and enriched cereal grain products. Some foods do not have folic acid added to them but are rich in the naturally occurring form of the vitamin, called “food folate.” A few examples of these foods include orange juice, dried beans and peas, and broccoli.

Audience Cue




If you plan on doing Lesson 3 with participants, let them know that they will be learning more about fortified foods and foods naturally rich in folate in that lesson.

Q: *Does anyone know some of the health benefits of folic acid?*

SLIDE 12

Proven benefits of folic acid


- ◆ Need every day for healthy tissue
- ◆ Lowers risk for neural tube defects



Fast Facts!

Folic acid cannot prevent all cases of NTDs.

A: *Your body needs folic acid every day, and the only way you can get folic acid is from a vitamin supplement or certain foods. Folic acid is needed for making healthy cells and tissues, and this is important not only when you are young but throughout your entire lifetime. Also, scientists discovered that folic acid reduces the risk for neural tube defects if taken at the appropriate time. Two common types of neural tube defects are anencephaly, where the brain of the baby is affected, and spina bifida, where the spinal cord of the baby is affected. These are very serious birth defects. Research has shown that 50 percent to 70 percent of NTD cases could be prevented if women took folic acid every day.*



Audience Cue

Lesson 1 provides more information about spina bifida and anencephaly, including descriptions of these birth defects and the range of complications associated with spina bifida.

SLIDE 13

Folic acid recommendation



- ◆ 400 micrograms folic acid every day
- ◆ Eat a healthy, varied diet
- ◆ Supported by:
 - U.S. Public Health Service
 - Institute of Medicine
 - Various organizations



The effectiveness of folic acid in preventing neural tube defects prompted a recommendation that all women of childbearing age take 400 micrograms folic acid every day in addition to eating a healthy diet. This recommendation is supported by the U.S. Public Health Service, the Institute of Medicine, and several organizations such as the March of Dimes, the Spina Bifida Association, the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.




There are different levels of acculturation within a community. For example, in general, many Hispanic or Latina women acknowledge that they will someday want to become pregnant and they are typically considered to be pregnancy contemplators. Therefore, they may be more receptive to the folic acid message as it relates to future pregnancy and prevention of neural tube defects. However, younger Hispanic or Latina women brought up in a more Americanized culture may not be as open to the folic acid message delivered with only a focus on birth defect prevention. In this case, including information on the other health benefits of folic acid may be more effective.

Q: Does anyone know of any other health benefits of folic acid?

SLIDE 14

Other health benefits of folic acid

- ◆ May lower risk for
 - Other birth defects
 - Heart disease
 - Certain cancers
 - Cognitive (brain) diseases
- ◆ Improve overall health and vitality
- ◆ Good for the entire family




Fast Facts!

Heart Disease
There is strong evidence linking low blood folate with increased levels of blood homocysteine, which has been found to be a risk factor for heart disease.

Cancer
Evidence suggests that low blood folate may increase risk for certain types of cancer.

Cognitive Disorders
Emerging research suggests that folic acid may help to reduce the risk of diseases that affect the brain or mental function such as Alzheimer's disease, dementia, and depression.

A: Folic acid may lower your risk for other birth defects, heart disease, certain cancers, and cognitive diseases that affect the brain or mental function. Including folic acid in your diet is a good idea to improve your overall health and vitality because it helps to keep tissues in your body healthy. Because of these health benefits, folic acid is good for the entire family!



Based on data from focus groups conducted by the CDC, African-American women discussed heart disease more often than other cultural/ethnic groups as an issue with which they were very concerned.

If you are speaking to African-American women, emphasize the potential role of folic acid in reducing the risk for heart disease.

SLIDE 15



Be part of something important...

Take folic acid every day!

Folic acid is important for your health, and also can help reduce the risk for neural tube birth defects. You can be part of something important! Be sure to take folic acid every day to protect your health for a lifetime!



Women who are young and/or not contemplating pregnancy may feel that the folic acid message does not apply to them. Emphasize the following points:

- Over half of pregnancies in the United States are unplanned or mistimed (occur earlier than desired).
- The neural tube closes very early during pregnancy, before most women know they are pregnant.
- Even though she may not mentally be ready for pregnancy, a young woman's body has been ready for some time (i.e., menstrual cycle).
- The body needs folic acid every day for healthy tissue growth and good health.

Particularly for young women, taking folic acid is a great way for them to plan and be responsible for their present and future health!

ACTIVITY #2 INTERACTIVE DISCUSSION

Getting Enough Folic Acid

Purpose:

- To provide information and examples of how participants can increase their intake of folic acid by taking a vitamin supplement.

Materials required:

- Overhead projector or computer with LCD projector
- PowerPoint® files (on CD-ROM) or overheads (prepare from enclosed camera-ready master copies)
- Script “Getting Enough Folic Acid”

Additional information:

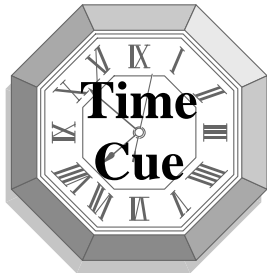
Sidebars providing more in-depth information have been included throughout the script. This information may be incorporated into the script as time permits. Look for the *Fast Facts!* boxes to the right of the lesson plan script.

Fast Facts!

Look for these boxes for more information about a topic.

Begin activity:

Give participants a chance to answer each question. Be prepared to resolve any misconceptions.



This presentation includes extensive interaction with the audience in the form of questions. If you have a limited amount of time to present this material, omit asking most of the questions. You may want to ask a few questions to keep your audience interested and involved in the presentation.

Q: *Does anyone here take vitamin supplements? Does your vitamin supplement contain folic acid?*

A: **SLIDE 16**

How do you get folic acid?

The best way is through multivitamins with folic acid

or

folic acid pills



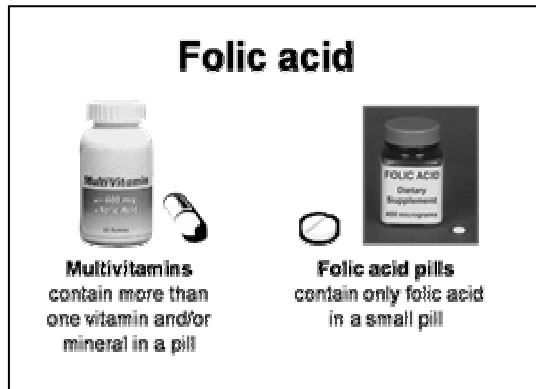
The best way to get folic acid is through a multivitamin that contains folic acid (most multivitamin supplements contain folic acid) or a folic acid pill. If you are taking a multivitamin containing folic acid, you are already helping to reduce your risk for having a baby with a neural tube defect, plus you are getting all of the other health benefits of folic acid!



Recent Caribbean immigrants may view multivitamin use as an “American” concept. State that vitamin supplements are safely used by many Americans and others throughout the world. The important thing is that a multivitamin allows us to obtain needed nutrients that may be low or missing from our diets.

Q: *Who can tell us the difference between a multivitamin and a folic acid supplement?*

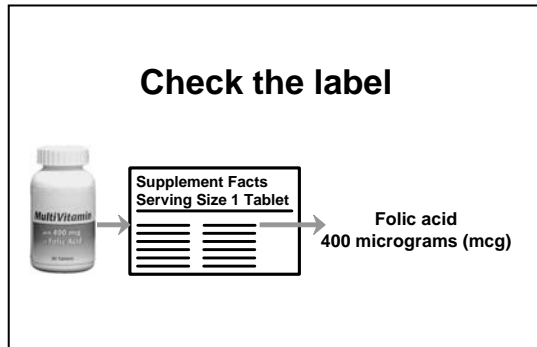
A: **SLIDE 17**



Multivitamins contain more than one type of vitamin and often contain several minerals in each pill. Folic acid pills contain only folic acid. You can get folic acid from either one—the important thing is that you take 400 micrograms folic acid every day!

Q: *How do you know if YOUR vitamin has the correct amount of folic acid?*

A: **SLIDE 18**



Fast Facts!

The Institute of Medicine recommends that individuals get no more than 1000 micrograms per day folic acid from vitamins and/or fortified foods unless they are under the care of a physician.

*Always check the label on the bottle to see how much folic acid is in the product. Look on the back of the bottle for the “Supplement Facts” label. Then look for “Folic Acid” (some labels may say “Folate”), and the label will list how much folic acid is in each tablet. Choose a product with **400 micrograms** folic acid per tablet, or 100% of the Daily Value. You should take no more than one pill per day.*



The folic acid recommendation for women planning a pregnancy who have had a previous pregnancy affected by an NTD is 4,000 micrograms (4 milligrams) every day. These women should be under the care of a physician. In this case, women should **NOT** attempt to obtain 4,000 micrograms of folic acid by taking several multivitamins on a daily basis as this may be hazardous to the mother’s and baby’s health.

SLIDE 19

Why should YOU take a multivitamin or supplement that contains folic acid?

- ◆ We don't always eat right
Healthy cells make a healthy body, and all cells need folic acid every day



- ◆ Reduce risk for birth defects




There are several benefits of taking a multivitamin containing folic acid or a folic acid pill. The truth is, we don't always eat right every day. Healthy cells make a healthy body, and all cells in the body need folic acid every day. Taking a multivitamin with folic acid or a folic acid pill can also reduce your risk for having a baby with a neural tube birth defect.

SLIDE 20

Do you think multivitamins...

- ◆ **Are too big?**
 - Folic acid pills
 - Chewable multivitamin
- ◆ **Increase appetite and cause weight gain?**
 - No scientific evidence
- ◆ **Cause upset stomach?**
 - Take after a meal
- ◆ **Cost too much?**
 - Store brands
 - Folic acid pills



Some people find it difficult to take vitamin pills every day. But you can be successful in getting the folic acid you need from multivitamins. Here are some solutions to problems you might encounter:

- *If you have problems because multivitamin pills are too large to swallow, try a folic acid pill, which is very small and may be easier for you to swallow. You also can try chewable multivitamins for adults.*
- *Some people think that taking multivitamins will cause them to have a larger appetite and gain weight. There is no scientific evidence that multivitamins cause weight gain. In fact, multivitamins can give you the nutrients you need to be active and successfully manage your weight.*
- *Some people get an upset stomach or experience nausea or constipation after taking multivitamins. Stomach upset is often caused by the iron in the multivitamin. If this happens to you, try taking a multivitamin after you eat your meal or before you go to bed. Unless your physician has recommended a multivitamin with iron, try a multivitamin without iron or take a folic acid pill instead of a multivitamin. This may help, especially if you do not like the “smell” of multivitamins.*
- *What if you think multivitamins are too expensive? Name brand items are usually more expensive than store brands, so look for store brand multivitamins and watch for when they are*

on sale! Also, folic acid pills are more economical than multivitamins and usually cost as little as a penny per pill.

Many women feel that they eat a healthy diet with plenty of fruits and vegetables so they don't need to take a vitamin supplement. It's difficult for us to eat right EVERY DAY, so taking a multivitamin is the best way to ensure that we get all the nutrients, including folic acid, that we need!



A **primary and important barrier among the Hispanic or Latin community** is that vitamins or supplements are thought to induce appetite and result in weight gain. Be prepared to resolve this misconception by informing the participants that vitamins can provide key nutrients to help them stay active so they can successfully manage their weight.

Another misconception held by some groups is that supplements should not be taken while a woman is pregnant or menstruating. Inform participants that it is safe and healthy to take 400 micrograms of folic acid any time of the month. Women who become pregnant should consult their doctor concerning use of prenatal vitamins.



Based on data from focus groups conducted by the CDC, the motivators and barriers for taking vitamins are similar among women who take vitamins sometimes (i.e., not on a daily basis) and those not taking vitamins. Therefore, the barriers and motivators mentioned in this lesson would apply to both groups.

SLIDE 21



Many people buy vitamins with good intentions, but forget to take them. Here are some ways to remember to take your vitamins. Put your multivitamins or folic acid pills in a place where you will see them every day, or next to an object that you use every day. This could be:

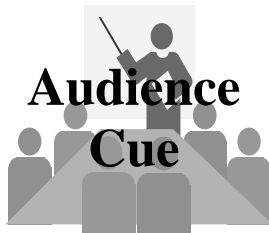
- *With your birth control pills or other medications that you take every day.*
- *Next to your toothbrush where you will see them when you brush your teeth.*
- *Next to the coffee pot where you will see them when you are making coffee or fixing breakfast or other meals.*

*Other places may work best for you! If you watch TV every day, or play a sport or have a hobby, you can put your vitamins near items associated with these activities. The best place for you is any place where you will see the bottle every day! **Always** remember to keep your vitamins out of the reach of children!*

Q: Those of you who take vitamins, why do you take them? And what do you do to remember to take your vitamin every day?

Ask participants to discuss why they take vitamins and their strategies for overcoming some of the barriers that have been discussed on the previous two slides. If no one volunteers to discuss this or no one is taking vitamins, mention some of the motivators for taking vitamins:

- **Because we don't always eat right and get all the nutrients we need**
- **To help prevent birth defects**
- **To prevent anemia**
- **Long term health benefits (preventing chronic disease)**
- **To help with premenstrual syndrome (PMS) symptoms**
- **Some women report feeling healthier and more energetic (refer to "Audience Cue" below)**
- **If a doctor suggested taking a vitamin and explained why it was important**



Based on data from focus groups conducted by the CDC, one of the most frequently mentioned motivators for taking vitamins was "to help me feel my best today." To many of these women, "feeling my best" meant:



- Having energy
- Not feeling tired
- Feeling better physically and emotionally
- Being happy or content

Although there may be little or no scientific data supporting these "benefits" of taking vitamins, they may serve as motivators for many women to take a vitamin supplement every day.

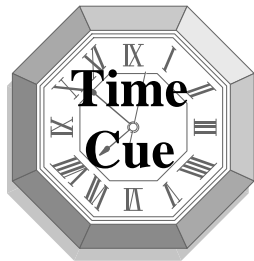
Q: *Now we know how to get folic acid into our diets. Does anyone know what else we need to do to be healthy and reduce the risk for neural tube defects?*

A: **SLIDE 22**

Folic acid plus a healthy diet!

	
<p>In addition to taking a multivitamin with folic acid or a folic acid pill...</p>	<p>Eat a healthy, varied diet</p> <ul style="list-style-type: none">◆ <i>Foods fortified with folic acid</i>◆ <i>Foods naturally rich in folate</i>

Along with getting 400 micrograms folic acid every day, you should eat a healthy varied diet that includes foods fortified with folic acid and foods that are naturally rich in food folate. In the next lesson, I'll tell you what foods to look for when you go to the grocery store or eat at a restaurant.



Based on your time constraints and audience characteristics, you may continue with the next activity and/or distribute the handouts *BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk* and *Vitamins and Folic Acid* to participants.

ACTIVITY #3: FOLIC ACID TRIVIA GAME

Purpose:

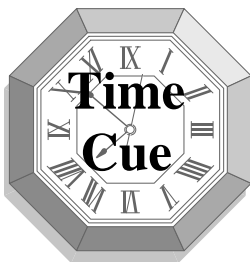
To test participants' knowledge about folic acid and neural tube defects.

Materials required:

- *Folic Acid Trivia Game* questions for instructor (enclosed)
- Folic acid magnets or other giveaways (if including prizes)



Some questions include information that was not specifically covered in the presentation activities but will give participants a chance to learn and remember this information.



This activity includes 12 trivia questions. You may reduce the number of questions to fit your time constraints. The most important questions will have a ★ next to them.

Begin activity:

1. Begin the activity by introducing the game “Folic Acid Trivia Game.”

Did you ever played a trivia game? Well, let’s play one now.

I have a list of questions that are worth one point each.

2. Ask participants questions. If they answer the question correctly you can restate the answer to reinforce the main concept. If the question is answered incorrectly, you can give another participant an opportunity to answer the question or you can take some time to review the part of the lesson to which the question relates. You may want to distribute folic acid magnets or other giveaways as prizes for correctly answered questions.

Note: You can conduct this activity by splitting the participants into “teams” and addressing questions to each team while keeping score. However, the goal is to reinforce the concepts. If you decide to play the trivia game using teams, make up rules as you see fit.

★ **Question 1:** True or False: Every woman who can become pregnant is at risk of having a baby with a neural tube defect.
Answer: True

★ **Question 2:** True or False: If you begin taking folic acid when you find out you are pregnant, you can reduce your risk of having a baby with a NTD.
Answer: False. You must take folic acid before becoming pregnant to reduce the risk of NTDs. By the time you discover you are pregnant, it is probably too late.

Note: Be sure to reinforce this “timing” message—it is perhaps the most important message that you can

give to women and is essential to successfully reducing the risk for neural tube defects!

★ **Question 3:** What daily level of folic acid is recommended to reduce NTD risk?

Answer: 400 micrograms.

Note: Women with a prior NTD-affected pregnancy should consult their physicians and are recommended to take 4,000 micrograms of folic acid every day when planning a pregnancy.

★ **Question 4:** True or False: The best and surest way of getting 400 micrograms folic acid is to take a multivitamin containing folic acid, or take a folic acid supplement.

Answer: True, but women should also eat a healthy diet that includes food sources of folic acid and food folate.

★ **Question 5:** True or False: Teenage girls do not need to worry about taking folic acid.

Answer: False. Once they begin to menstruate, teenage girls should take 400 micrograms folic acid every day. At this time their bodies need folic acid to prepare for womanhood. Their bodies also need folic acid for healthy, growing tissues.

★ **Question 6:** True or False: To reduce your risk for having a baby with an NTD, you should take a multivitamin or folic acid pill containing 400 micrograms folic acid, and eat a healthy diet that includes foods fortified with folic acid and folate-rich foods.

Answer: True. A healthy diet goes hand in hand with taking a vitamin containing folic acid.

★ **Question 7:** What will YOU do to consume more folic acid every day?

Answer: Take a multivitamin containing folic acid or a folic acid pill every day, and eat a healthy diet.

Question 8:

True or False: Vitamins will increase your appetite and cause weight gain.

Answer: False. This is a myth about vitamins. In fact, multivitamins help your body use the foods you eat to make energy so you can work and play. Therefore, they may be important for maintaining normal body weight. Taking a multivitamin with folic acid every day can contribute to overall health and vitality, while reducing risk for NTDs.

Question 9:

Maria is taking a multivitamin that contains 400 micrograms folic acid per tablet. She is trying to get pregnant and decides that “a little is good, but more is better.” She begins taking four multivitamin tablets every day. Is this a good practice?

Answer: No. The Institute of Medicine recommends that you do not take more than 1,000 micrograms folic acid per day. Maria should only take one tablet to effectively reduce her risk of having a baby with a neural tube defect. However, if Maria has had a prior NTD-affected pregnancy, she should immediately see her doctor because she will need a higher amount of folic acid from a supplement containing only folic acid.

Note: Taking more than one multivitamin per day could increase your intake of other vitamins and minerals that, when ingested in excess amounts, may be hazardous to your health. If you become pregnant it can also affect your baby’s health. For example, Vitamin A is toxic for babies if the mother takes too much.

Question 10:

Name three places that you could put your vitamin pills to remember to take them every day.

Answer: Answers will vary based on the participant. The question allows participants to brainstorm about where they would put the vitamin pill bottle. Some acceptable answers could be:

- *Near their toothbrush*
- *On their nightstand*

- *On their kitchen counter*
- *Near other medications that they take daily*
- *By their computer or television*
- *Next to their birth control pills*

Note: Remind participants they should keep all supplements out of the reach of children.

Question 11: True or False: Someone who is eating a healthy diet does not need to take folic acid supplements.

Answer: False. It is difficult to eat a healthy diet every day and get all the nutrients you need. Therefore, to ensure you get enough folic acid, it is best to include a multivitamin or folic acid supplement into your daily routine.

Question 12: True or False: Taking folic acid can prevent ALL cases of neural tube defects.

Answer: False: Taking folic acid before pregnancy may prevent from 50 percent to 70 percent of NTD cases. However, it cannot eliminate ALL NTDs because other factors play a role in NTD occurrence.

ACTIVITY #4: VITAMIN CASE STUDIES

Purpose:

Allows participants to solve problems related to barriers and myths associated with the use of vitamins.

Materials required:

- Instructions for “Vitamin Case Studies” (enclosed)
- Handout – *Vitamin Case Studies*



If doing this activity with a larger group, you can split the group into five teams and assign one case study to each team. Have each team present their case study question to the group.

Begin activity:

1. Distribute the case study handout and give participants a few minutes to complete the handout.
2. Discuss each case study and have participants volunteer their suggestions for solving each of the case studies.

As you discuss the case studies, reinforce the solution to the barrier or myth associated with taking vitamins. Elicit other suggestions from audience members if they seem feasible.

Case 1. Emphasize that in order to remember to take a vitamin pill every day, they should be placed in a visible location or near an

object that is used on a daily basis (but out of the reach of children).

Case 2. There is no evidence suggesting that vitamins increase appetite and cause weight gain. On the contrary, vitamins can provide the body with the nutrients needed to stay active and energetic.

Case 3. Name-brand vitamins that are advertised on TV will probably be the most expensive. Store-brand multivitamins are a good choice when cost is an issue. Folic acid pills are more economical than multivitamins and can be purchased for less than a penny a pill. Encourage participants to watch for store sales on multivitamins or folic acid supplements.

Case 4. Many people have trouble swallowing large pills. Folic acid supplements are much smaller and should be easier to swallow. Encourage participants to try a folic acid supplement if they have problems swallowing multivitamins.

Case 5. Stomach upset and nausea are common complaints when taking multivitamins, and the iron contained in the multivitamin is typically the cause. Suggest that participants take a multivitamin on a full stomach (after a meal) or just before bedtime to minimize stomach upset. Taking folic acid supplements also may solve this problem since they do not contain iron. Many people do not like the “smell” of multivitamins. Suggest the use of folic acid pills to alleviate this problem.

Conclusion:

Once the lesson has concluded, distribute the Lesson #2 post-test and have the participants complete the test.

Lesson #3: Food, Folate, and My Diet

Goal:

Increase the consumption of foods containing folic acid and naturally occurring food folate.

Estimated time: 25-40 minutes

Activities in this lesson:

Activity #1: Food, Folate, and My Diet

An interactive discussion using a PowerPoint® or overhead presentation.

Activity #2: Folic Acid Eatery

Choosing foods containing folic acid and/or naturally occurring food folate from a hypothetical restaurant menu.

Activity #3: Folate-in-a-Flash

Identification of foods containing folic acid and naturally occurring food folate using food flash cards.

Learning/behavioral objectives:

Following this lesson, participants will be able to:

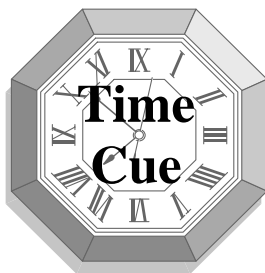
1. Name at least 3 foods that are fortified with folic acid.
2. Name at least 3 foods that are rich in naturally occurring food folate.
3. Recognize that foods rich in folate are also heart healthy.
4. State ways to incorporate fortified and folate-rich foods into the diet.

Materials required:

- Overhead projector or computer with LCD projector

- PowerPoint® files (on CD-ROM) or overheads (prepare from enclosed camera-ready master copies)
- Script “Food, Folate, & My Diet”
- Folic Acid Eatery activity instructions
- Handouts (camera-ready copies)
 1. *BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk*
 2. *Folic Acid and Fortified Foods*
 3. *Folic Acid Content of Selected Foods and Vitamin Supplements*
 4. *Food Folate*
 5. *Folic Acid Eatery*
- Folate-in-a-Flash food flash cards and activity instructions

If you cannot do this lesson because of time constraints, use the following handouts:



- ***BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk*** – includes information about neural tube defects, folic acid recommendations, vitamins, fortified foods, and foods with naturally occurring food folate.
- ***Folic Acid and Fortified Foods*** – describes folic acid fortification and cereal grain products. Includes a brief list of fortified foods and their folic acid content.
- ***Folic Acid Content of Selected Foods and Vitamin Supplements*** – a list of vitamins and selected fortified foods and their folic acid content.
- ***Food Folate*** – describes foods that are rich in naturally occurring food folate.
- ***Folate Acid Eatery*** – an activity using a hypothetical restaurant menu to identify foods fortified with folic acid or rich in naturally occurring food folate.

ACTIVITY #1 INTERACTIVE DISCUSSION

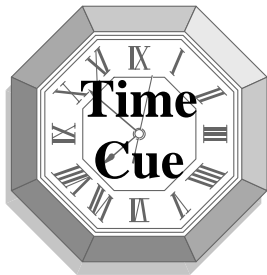
Food, Folate, & My Diet

Purpose:

- To increase participants' knowledge about foods fortified with folic acid or foods rich in naturally occurring food folate.
- To increase participants' awareness that folate-rich foods are also heart-healthy.
- To provide suggestions, strategies, and examples of how participants can increase their intake of foods fortified with folic acid or rich in naturally occurring food folate.

Materials required:

- Overhead projector or computer with LCD projector
- PowerPoint® files (on CD-ROM) or overheads (prepare from enclosed camera-ready master copies)
- Script "Food, Folate, & My Diet"
- Lesson #3 pre-test



This presentation includes extensive interaction with the participants in the form of questions. If you have a limited amount of time to present this material, omit asking most of these questions. However, you may want to ask a few questions to keep your audience interested and involved in the presentation.



If you think that participants are confused about or will confuse the words folate, folic acid, and food folate, define them. **Folate** is a generic term used to describe both folic acid and food folate. **Folic acid** is the synthetic form of the vitamin that is added to vitamins and fortified foods (i.e., cereal grain products and breakfast cereals). **Food folate** is found naturally in certain foods.

Begin activity:

Give participants a chance to answer each question. Be prepared to resolve any misconceptions.


Distribute the Lesson #3 pre-test and allow participants to have a few moments to complete the pre-test. Collect the pre-tests before proceeding.

Q: *Who eats cereal for breakfast or as a snack? What brands or varieties of cereals do you eat?*

A: **SLIDE 23**

Fortified breakfast cereals

- ◆ Many provide from 100 to 400 micrograms folic acid per serving
- ◆ Check the label!
- ◆ Look for 100% of the Daily Value (DV) for folic acid or folate



Fortified cereals are a great way to get more folic acid into your diet! Many fortified cereals provide from 100 to 400 micrograms folic acid in one serving (25% to 100% of the Daily Value). Check the label to see how much folate or folic acid your favorite cereal contains. Breakfast cereals can help you get the folic acid you need, especially if you are unable to take a vitamin every day. To get 400 micrograms of folic acid, look for a cereal that provides 100% of the Daily Value for folic acid or folate.




Some Hispanic/Latino subgroups have increased their consumption of cereals as they have adapted to life in the United States. Emphasize the benefits of consuming fortified cereals. Cereals are a good source of essential vitamins and minerals such as calcium; iron; vitamins A, C, D, B₆, and B₁₂; thiamin; riboflavin; niacin and folic acid. On average, fortified cereals provide one-fourth of the folic acid needed to meet the IOM recommendation. Many cereals provide 400 micrograms folic acid per serving.

Q: *There are other foods that are fortified with folic acid. Does anyone know what foods are fortified with folic acid?*

A: **SLIDE 24**

Enriched grain foods
How much man-made folic acid?

- ◆ Enriched bread, white
2 slices = 30 micrograms
- ◆ Enriched flour tortilla, 10 inches
1 each = 80 micrograms
- ◆ Enriched spaghetti, cooked
1 cup = 90 micrograms
- ◆ Enriched rice, cooked
1 cup = 95 micrograms



Fast Facts!

The Food and Drug Administration approved fortification to help women increase their intake of folic acid to help reduce their risk of having a baby with an NTD. Some foods that may not be fortified include whole-grain products (which are typically not enriched) and some imported foods. Check the ingredients list to see if folic acid has been added.

Foods that are fortified with folic acid include cereal grain foods that have the word “enriched” on the label. This includes

- *Enriched breads and rolls. Two slices of enriched bread have 30 micrograms folic acid.*
- *Foods made from enriched flour such as flour tortillas. A 10-inch flour tortilla has 80 micrograms folic acid.*
- *Enriched pasta, noodles and macaroni. One cup of enriched cooked spaghetti has 90 micrograms folic acid.*
- *Enriched rice. One cup of enriched cooked rice has 95 micrograms folic acid*

Other foods made from enriched flour, such as breaded foods and snack foods like crackers, cakes and cookies, also are fortified with folic acid. Think about which of these foods you enjoy. How can you add them to your diet to get more folic acid? Just remember that you must choose products that are enriched. For instance, if you eat 1 cup of enriched rice at dinner, you would get almost 100 micrograms of folic acid! You may already eat many of these foods and that's great!



Many Hispanics/Latinos and Asian Americans tend to have a high intake of rice. Reinforce the benefits of keeping this traditional food habit, but be sure that participants realize they must select rice that is **enriched**. Many imported brands of rice may not be enriched with folic acid (check the label).

Some Hispanic/Latino subgroups also may commonly consume flour tortillas. Inform them that a 10-inch tortilla made from enriched flour has about 80 micrograms of folic acid. However, tell them that it is better to eat flour tortillas that are not made with lard in order to reduce their intake of saturated fats. Enriched flour tortillas made with vegetable oil can be purchased from the supermarket.

Q: *What kinds of foods do you think have a lot of naturally occurring food folate?*


[Give participants a chance to answer.]

Who drinks orange juice?

A: **SLIDE 25**

Food folate

- ◆ Orange juice
- ◆ Oranges
- ◆ Strawberries
- ◆ Cantaloupe
- ◆ Avocado



Fast Facts!

Orange juice is a major contributor of food folate in the U.S. diet.

Good for you! You are getting a good amount of food folate with every glass of orange juice! Orange juice is a great source of folate and can be consumed either fresh, ready-to-drink, or from frozen concentrate. Orange juice contains other nutrients and food components such as vitamin C, potassium, and phytonutrients. You also can buy orange juice that has added calcium, which can help maintain strong bones. Other great sources of folate are oranges, strawberries, cantaloupe, and avocado.





In general, Hispanics/Latinos tend to have a high intake of fruit juices. As individuals adapt to American mainstream culture this food habit declines and consumption of sugary drinks (fruit flavored drinks and sodas) increases. When addressing Hispanic/Latino audiences, reinforce the benefits of keeping this traditional food habit. For example, 100 percent fruit juice like orange juice is a great way to get your Five-A-Day and increase your folate intake. Additionally, 100 percent fruit juices provide a number of other benefits such as various vitamins and minerals, and phytonutrients.

SLIDE 26

Food folate

- ◆ Dried beans and peas
 - Black, kidney, navy, pinto beans
 - Black-eyed peas
 - Chick peas (garbanzo beans)
 - Lentils
 - Peanuts



Dried beans including black, kidney, navy, and pinto are great sources of folate. Food items like black-eyed peas, chickpeas (garbanzo beans), lentils, and peanuts also are high in folate. These foods are generally inexpensive and very healthy.





In general, Hispanics/Latinos tend to have a high consumption of legumes. This traditional food may be eaten less frequently as individuals adapt to American mainstream culture. When addressing Hispanic/Latino audiences, reinforce the benefits of keeping these traditional food habits. For example, beans (black, kidney, navy, pinto, etc.) are low-fat, high-fiber foods rich in folate. Some Hispanic/Latino subgroups also may have a high intake of peas such as gandules (pigeon peas) and chickpeas (garbanzo beans). Inform participants that these food items are high in food folate.

Q: *Who eats spinach or other dark green leafy vegetables?*

A: **SLIDE 27**

Food folate

- ◆ Dark green leafy vegetables
 - Spinach
 - Greens: collard, mustard, turnip
- ◆ Other vegetables
 - Asparagus
 - Broccoli
 - Brussels sprouts
 - Okra



That's great! Dark green leafy vegetables such as spinach, and other greens such as mustard, turnip, and collard greens are folate-rich. Other vegetables such as asparagus, broccoli, Brussels sprouts, and okra also are folate-rich foods. These foods, especially when eaten uncooked or cooked in a small amount of water, are great sources of food folate!




In general, some Hispanics/Latinos and many low income communities tend to have low consumption of green vegetables. Consumption of greens may vary depending on nationality and educational level, but most importantly on economic status. When addressing such audiences, be sure to mention the benefits they may gain by adding these foods to their diets (i.e., high fiber, low calorie, and rich in vitamins and minerals). In some areas, the WIC program may allow Farmers' Market Nutrition Program coupons to be used at local farmers' markets where fresh produce can be purchased.





African Americans from all regions and individuals residing in the rural South tend to have high consumption of dark green leafy vegetables such as collard, mustard, and turnip greens. Encourage continued consumption of these foods, along with the water used to cook the greens (commonly known as “pot liquor”).

SLIDE 28



Food preparation

- ◆ Use less cooking water
 - Steam, microwave
 - Roast, grill
- ◆ Reuse cooking water



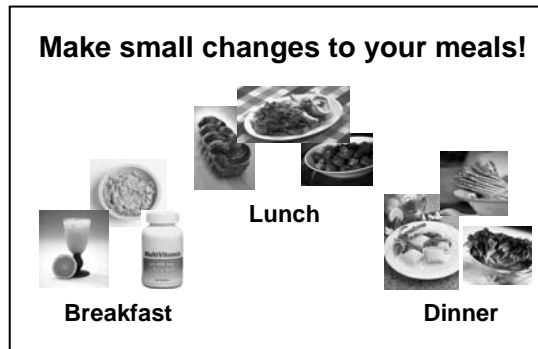
Folate is easily lost when food is heated or cooked in a lot of water. The primary loss is due to folate being leached into cooking liquid. Therefore, the way you cook/prepare your food matters.

For instance, a spinach salad is a better choice than cooked spinach. Snack-sized raw veggies and fruits are better choices than cooked and/or processed ones.

If you use only a little cooking water, you will retain more folate in the cooked foods. Steaming, microwaving, roasting or grilling are good ways to cook your vegetables because they use little or no water. Also, if you decide to boil your vegetables, reuse your cooking water by making soups or stews. This will help you keep the folate that was “lost” in the water (broth)!

Note: The next slide contains a combination of fortified and folate rich foods. Be prepared to resolve misconceptions about folate rich and folic acid fortified foods. We are using the general term, “folate” to describe folate rich and folic acid fortified foods.

SLIDE 29



Your goal is to feel confident that you can go home TODAY (TONIGHT) and get more folate in your diet. Here are a few suggestions to get you started. Don't think that you have to change your entire diet overnight. Begin by making small changes! For example, for breakfast, drink a glass of orange juice, or eat a serving of fortified cereal. Don't forget to take your multivitamin pill, too!

For lunch, try a green salad with some bread made with enriched flour. Include strawberries as a tasty snack.

For dinner, try adding asparagus or some dark greens to your pasta dinner. A great strategy is to combine fortified foods with folate-rich foods, such as rice and beans.

SLIDE 30

**Health benefits of
food folate**

- ◆ Healthy tissues
- ◆ May lower risk for
 - Heart disease
 - Certain cancers
 - Cognitive (brain) diseases
- ◆ Improve overall health and vitality
- ◆ Good for the entire family



There are several health benefits of food folate. Food folate helps maintain healthy tissues and can help prevent anemia. Scientists also think that food folate may lower risk for heart disease, certain cancers and certain diseases that affect the brain or mental function such as Alzheimer's disease, dementia, and depression. These foods can contribute to improving your overall health and vitality and are good to include in your entire family's diet!


Q: *When you think about foods that are rich in folate (like orange juice, vegetables, fruits, and dried beans), what else comes to mind about those foods? Do you consider these to be healthy foods? Why or why not?*

[Give participants a chance to respond to these questions.]

A: **SLIDE 31**

Foods rich in folate

- ◆ Low in calories
- ◆ Low in fat
- ◆ No cholesterol
- ◆ High fiber
- ◆ Rich in other vitamins & minerals



Heart-healthy foods

Many foods rich in folate are “heart-healthy” foods. They are naturally low in calories and fat, have no cholesterol because they are plant foods, and are high in fiber. They also provide other vitamins and minerals needed for good health. These are just a few more great reasons to include folate-rich foods into a healthy diet!





Based on data from focus groups conducted by the CDC, African-American women discussed heart disease more often than other cultural/ethnic groups as an issue with which they were very concerned.

If you are speaking to African-American women, emphasize the heart-healthy nature of foods rich in naturally occurring food folate.

Q: *Let's see how these foods fit into the recommendation for reducing risk of neural tube defects.*

A: **SLIDE 32**

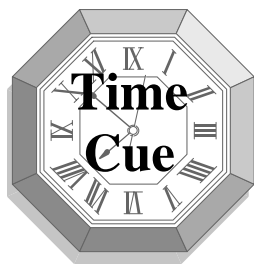
Protect your health AND reduce neural tube defect risk

	AND	
Get 400 micrograms of folic acid every day by taking a multivitamin or folic acid pill		Eat a healthy diet including folic acid fortified and folate-rich foods

The most important thing to remember is to consume 400 micrograms folic acid every day. The best and surest way to get folic acid is through a multivitamin or folic acid pill. You also should eat a healthy, varied diet that includes foods fortified with folic acid and foods rich in naturally occurring food folate.

Q: *Who can tell me what YOU can/will do to get more folate in your diet?*

Note: You will get a variety of answers. Encourage the use of a multivitamin or folic acid pill, along with eating a healthy diet. Be sure that specific foods mentioned are either folic acid fortified foods or foods rich in naturally occurring food folate. Be prepared to resolve any misconceptions.



Based on your time constraints and audience characteristics, you may continue with the next activity and/or distribute the handouts *BIG NEWS: Folic Acid Reduces Neural Tube Defect Risk, Folic Acid and Fortified Foods, Food Folate, and Folic Acid Content of Selected Foods and Vitamin Supplements* to participants.

ACTIVITY #2: FOLIC ACID EATERY

Purpose:

- To help participants recognize foods that are fortified with folic acid or rich in food folate.
- To enable participants to construct meals that include foods fortified with folic acid or rich in food folate.

Materials required:

- *Folic Acid Eatery* menu handout
- Pencils

Instructions:

1. This activity can be used in an individual or group setting. Give each participant the *Folic Acid Eatery* menu and a pencil.

You have decided that you want to get more folate in your diet—good for you! I have given you a menu from a restaurant where you are going to have a meal.

I want you to decide what you would order from this menu in order to get more folate in your diet. Foods included on this menu may have folic acid added to them (fortified) or may be foods rich in food folate. Remember this is only one meal so while you want to select foods with folic acid or food folate, you may have other opportunities throughout your day to increase your folate intake.

Money is no object! In fact, you see that there are no prices listed!!

I want you to be as realistic as possible. In other words, order the amount of food that you would typically order if you were going out to a restaurant for a meal.

2. Give the participants a few moments to mark their choices. You can then ask for volunteers to share the food items they selected. Specifically ask them WHY they chose certain menu items, that is, have them identify the particular food item(s) that is/are folic acid fortified or rich in food folate.

The following menu items include foods that are **fortified with folic acid**:

- **Bean burrito (flour tortilla)** – a 10-inch enriched flour tortilla contains 80 micrograms of folic acid.
- **Biscuits** – a biscuit made from enriched flour is fortified with 15 micrograms of folic acid.
- **Super-fortified cereal** – a serving of super-fortified breakfast cereal contains 400 micrograms folic acid.
- **Flour tortillas** – a 10-inch enriched flour tortilla contains 80 micrograms of folic acid.
- **Bread** – a slice of enriched bread contains approximately 15 micrograms of folic acid.
- **Hamburger (buns)** – a hamburger bun (both halves) contains approximately 30 micrograms folic acid.
- **Rice** – One cup of enriched rice (white or yellow) contains 95 micrograms of folic acid.
- **Sandwich (bread)** – each slice of enriched sandwich bread contains about 15 micrograms of folic acid.
- **Pasta salad** – one cup of cooked enriched pasta contains 80 to 90 micrograms of folic acid.
- **Tres leches (cake mix)** – one ounce of cake made with enriched flour contains 5 to 15 micrograms of folic acid.

These foods are **rich in naturally occurring food folate**. Use the following scale for folate content:

- No stars = fair or poor source of folate
- ★ = moderate source of food folate

★★ = good source of food folate

★★★ = excellent source of food folate

- **Beans** – ½ cup cooked beans = ★★★
- **Two eggs** – large = ★★
- **Orange juice** – 1 cup (8 ounces) orange juice = ★★
- **Romaine Caesar salad** – 1 cup romaine lettuce = ★
- **Lentil dip** – ½ cup cooked lentils = ★★★

ACTIVITY #3: FOLATE-IN-A-FLASH

Purpose:

Teaches participants to recognize folic acid fortified and folate-rich foods and consider how they might incorporate these foods into their diets.

Materials required:

- Food flash cards

Additional Information:

Note: The set of flash cards includes naturally occurring food sources of folate and foods fortified with folic acid. Participants may choose folic acid fortified foods as folate-rich sources. Resolve this misconception by explaining how fortified foods have folic acid (a synthetic form of the vitamin) added to them. Foods naturally rich in folate are not fortified with folic acid (i.e., no synthetic folic acid is added).

Instructions:

1. Ask participants to select a food card. Alternatively distribute food cards to each participant. **Note: Ask participants to keep the card face (food photo) side up since the answer to one of the questions is on the back of the card.**
2. Instruct each participant to think about the following two questions:
 - **Is the food item you have selected a folic acid fortified food, a folate-rich food, or neither?**
 - **Is this a food you would eat?**

3. Ask each participant to hold up (or bring to the front of the room) their food card, state the name of the food, and answer both of the questions.
4. When the participant has answered both questions, inform the participants about the food item. Information about each food item is located on the back of the food flash cards. Provide information such as:
 - Name of the food.
 - The serving size depicted on the card.
 - How best to consume (or prepare) the food:
 - For example, steam, microwave, or cook broccoli in a minimal amount of water to preserve folate.
 - Indicate how much folic acid (provided on the back of the card) or naturally occurring food folate is in this food item. Use the following scale for the folate-rich foods:

No stars = fair or poor source of folate

★ = moderate source of folate

★★ = good source of folate

★★★ = excellent source of folate

Note: This scale is based on the serving size depicted on the food card.

Note: Some foods in the food flash card set are WIC eligible (see next page).

Food Flash Cards and the Women, Infants, and Children (WIC) Program¹

The WIC program provides vouchers for pregnant, postpartum, and breast feeding women to purchase foods. The following foods in the food flash card set are eligible to be purchased by women on the WIC program depending on the woman's status; pregnant, (P), postpartum (PP), or breast feeding (BF). The folic acid content of fortified foods is denoted. Food folate content is denoted using the following scale:

No stars = poor to fair source of folate
 ★ = moderate source of folate
 ★★ = good source of folate
 ★★★ = excellent source of folate

Food	<u>Status</u>		
	P	PP	BF
Orange juice (100% juice); 1 cup = ★★	X	X	X
Apple juice (100% juice)	X	X	X
Milk	X	X	X
Ready-to-eat cereals ² and instant grits	X	X	X
Pinto beans ³ (dry only); ½ cup cooked = ★★★	X		X
Black beans ³ (dry only); ½ cup cooked = ★★★	X		X
Peas, black-eyed ³ (dry only); ½ cup cooked = ★★★	X		X
Chickpeas ³ (dry only); ½ cup cooked = ★★★	X		X
Carrots			X
Egg; 1 large = ★	X	X	X

¹ The foods and amounts listed are effective as of March 2006. Revisions may be made in the future based on proposed changes to the WIC food package. Check with your state WIC office for a current description of the food package in your state.

² Only specific ready-to-eat cereals are approved to be purchased by WIC checks. Look at the nutrition label and choose cereals that provide at least 25% of the Daily Value (DV) for folate or folic acid (i.e., at least 100 micrograms folic acid per serving).

³ Pregnant and breast feeding women will be given a check that specifies either dry beans or peanut butter (not both) may be purchased.

Lesson #4: Folate & My life

Goal:

Increase participants' confidence in their ability to consume 400 micrograms of folic acid in addition to a healthy diet every day.

Estimated time: 45-60 minutes

Activities in the lesson:

Activity #1: My Shopping Cart

An interactive activity that allows participants to evaluate their purchase of multivitamins or folic acid supplements, foods fortified with folic acid, or foods rich in naturally occurring food folate.

Activity #2: Meals-in-a-Flash

An interactive activity that allows participants to practice selecting meals that include a multivitamin or folic acid supplement, foods fortified with folic acid, or foods rich in naturally occurring food folate.

Activity #3: Case Study

An activity that gives participants the chance to evaluate the lifestyle characteristics of women in different situations and to make recommendations for lifestyle and dietary changes that facilitate meeting the Institute of Medicine's folic acid recommendation.

Activity #4: My Commitment to Inform

A contract that participants make with themselves to commit to inform one woman who can become pregnant about the Institute of Medicine's folic acid recommendation

Learning/behavioral objectives:

Following this lesson, participants will be able to apply skills learned related to:

1. Identifying and selecting a vitamin supplement containing folic acid.
2. Identifying and selecting foods fortified with folic acid.
3. Identifying and selecting foods rich in naturally occurring food folate.
4. Incorporating diet and lifestyle changes that promote health and reduce their risk for having a baby with a neural tube defect.
5. Recognizing and analyzing personal lifestyle and diet characteristics that may act as barriers to meeting the folic acid intake recommendation.

Materials required:

- Instructions for
 1. “My Shopping Cart” activity
 2. “Meals-in-a-Flash” activity
 3. “Case Study” activity
 4. “My Commitment to Inform” activity
- Food flash cards, tally chips, stars
- Meals-in-a-Flash placemat
- Pens/pencils
- Lesson #4 pre-test and post-test
- Handouts
 - *My Shopping Cart*
 - *Case Studies*
 - *Case Study question sheets*
 - *My Commitment to Inform*

Begin Activity:

Distribute the Lesson #4 pre-test and allow participants to have a few moments to complete the pre-test. Collect the pre-tests before proceeding.

ACTIVITY #1: MY SHOPPING CART

Purpose:

- Allow participants to evaluate the vitamin supplement and food choices they currently make.
- Develop participants' skills in choosing vitamin supplements and foods that will improve their intake of folic acid and naturally occurring food folate.

Materials Required:

- Instructions for “My Shopping Cart”
- Handout (camera ready copy) – *My Shopping Cart*
- Pens/pencils

Begin activity:

1. Introduce the activity and its purpose.
2. Distribute the handout *My Shopping Cart*.
3. Instruct participants to think about the foods and/or vitamin supplements they would usually buy at the supermarket (or drug store).
4. Ask each participant to circle the items they usually buy.
5. Ask participants to think about the following questions:
 - Which selected food items are folic acid fortified foods?
 - Which selected food items are folate-rich foods?
 - Did you select a vitamin supplement containing folic acid?

- Could you make different choices at the store to increase your intake of folic acid or folate rich foods, including selection of vitamins containing folic acid?

6. Ask the participants to volunteer to share their answers with the group.

Note: Be prepared to resolve misconceptions about foods fortified with folic acid, and folate-rich foods. Assist participants with selection of vitamin supplements, folic acid fortified foods, and folate rich foods.



You may do this activity in several ways:

- Ask participants to select foods both before and after you educate them about folic acid. This will allow them to evaluate their former and new food choices.
- Test the participants' knowledge about the difference between folic acid fortified foods and foods rich in naturally occurring food folate by having them select only folic acid fortified foods and/or foods rich in naturally occurring food folate from the shopping list.

ACTIVITY #2: MEALS-IN-A-FLASH

Purpose:

- Teach participants how to choose a daily meal plan that includes 400 micrograms folic acid through supplements and/or fortified foods, along with incorporating foods rich in naturally occurring food folate.

Materials required:

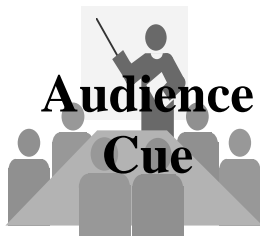
- Instructions for “Meals-in-a-Flash” activity
- Food flash cards, tally chips, stars
- “Meals-in-a-Flash” placemat

Additional information:

The set of flash cards includes foods that are fortified with folic acid, foods rich in naturally occurring food folate, and foods that have little or no folate.



This activity is ideally suited for working with individuals or in small groups since the placemat, food cards, and folic acid tally bar should be visible to all participants.



This activity can be done several ways:

- If working with a group of individuals, ask the participants to work together as a group and let them respond verbally when selecting meals.
- If working with individuals, complete the activity after you have educated them about folic acid and food folate to demonstrate what they have learned.
- Complete this activity before educating individuals about folic acid and have them select a daily menu that represents their current food choices. Make a note of the total folic acid and food folate for the day. Once educated, have them repeat the activity and compare the “before” and “after” folic acid and food folate totals. Reinforce their selection of a vitamin supplement and/or folic acid fortified and folate-rich foods.



A few ethnic or culturally specific foods have been included in the food flash cards. These foods include black beans, Cuban crackers, tortilla, pinto beans, chick peas (garbanzo beans), fried chicken, greens, cornbread, and okra.

Begin activity:

1. Tell participants that their goal is to put together daily meals (e.g., breakfast, lunch, dinner, plus snacks) that will add up to meet the IOM recommendation of 400 micrograms of folic acid while also incorporating folate-rich foods.

2. Ask participant(s) to be realistic when planning the amount of food consumed in each meal (i.e., standard serving sizes are typically smaller than what most people consider a “serving”).
3. Explain how folic acid and food folate will be tallied. Folic acid fortified foods include a color code on the back of the food card based on the amount of folic acid in the food. As foods are selected, place the corresponding color-coded chip on the folic acid daily tally starting at the bottom of the scale and continually working up. Food cards for a multivitamin and a folic acid supplement (400 micrograms) have been included for the participant to select (place the orange-colored tally chip corresponding to 400 micrograms if a supplement is selected). If the participant selects a supplement or selects the fortified cereal as part of their meal (providing 400 micrograms folic acid per serving), emphasize the need to continue the activity and select folate-rich foods as part of an overall healthy and varied diet.

The color-coded chips correspond to the following folic acid values:

- **Purple** – provides approximately 25 micrograms folic acid per serving (range of 12 – 36 micrograms)
- **Yellow** – provides approximately 50 micrograms folic acid per serving (range of 37 – 62 micrograms)
- **Blue** – provides approximately 75 micrograms of folic acid per serving (range of 63 – 86 micrograms)
- **Green** – provides at least 100 micrograms of folic acid per serving (range of 87 – 100 micrograms and greater)
- **Orange** – provides 400 micrograms folic acid per serving

Inform participants that only vitamins containing folic acid or folic acid fortified foods count toward the intake recommendation (400 micrograms folic acid daily), but foods rich in folate provide many other benefits and should be included every day for good health. The participant(s) will receive a star(s) based on the amount of natural food folate in their food selections. The number of stars awarded is depicted on the back of the food card. The following scale will be used:

No stars = fair or poor source of food folate

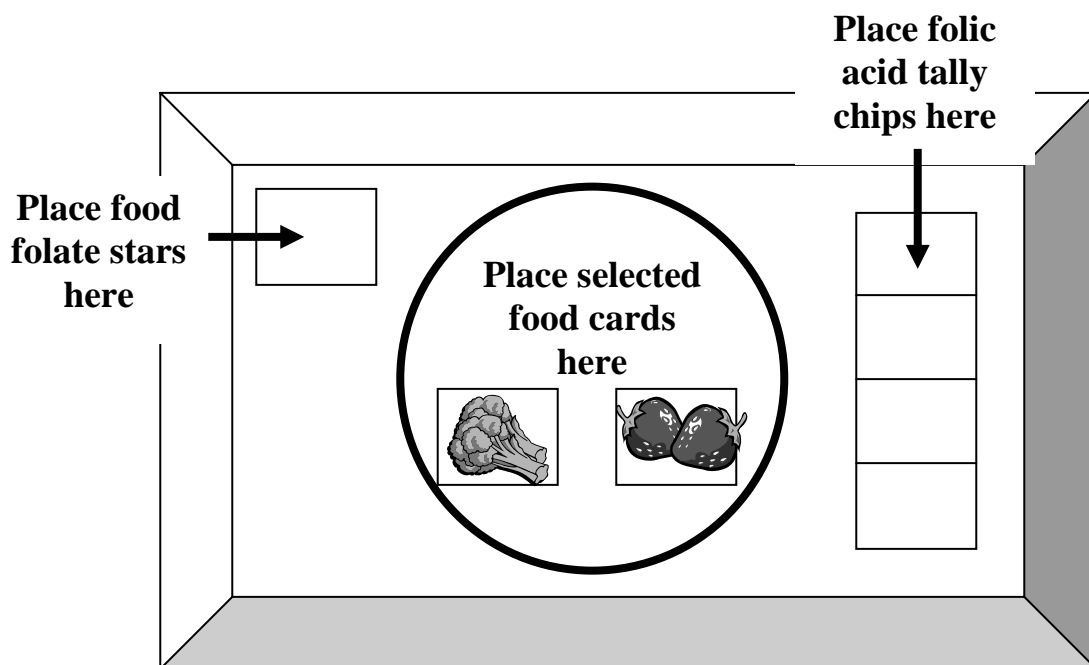
★ = moderate source of food folate

★★ = good source of food folate

★★★ = excellent source of food folate

Participants should try to get ten stars for the day (includes three meals and snacks).

Here is a guide for how to use the placemat, food cards, stars, and folic acid tally chips.



Emphasize the heart-healthy quality of folate-rich foods (e.g., low in fat and cholesterol, and high in fiber) and the additional health benefits of folic acid. For younger women who may be noncontemplators, you also might mention that these foods are typically low in calories when eaten in moderation.

4. Tell participants that first they will plan breakfast. Attach the selected Velcro-backed food cards to the plate area on the placemat. Once the participants select the food items for breakfast, tally the folic acid content of the meal by adding the appropriate colored chips to the folic acid daily tally (match the colored chips to the color code on the back of the foods card). Award stars for selection of folate rich foods (the number of stars for each source of food folate is on the back of the card). If participants have selected few or no folic acid fortified foods or folate rich foods, ask participants to think about the following questions:
 - What food item(s) can you add or replace to make this meal higher in folic acid?
 - What food item(s) can you add or replace to increase the amount of naturally occurring food folate provided by the meal?

If any foods are added or changed, place newly selected foods on the placemat and re-tally stars and folic acid total. Point out how the new foods increased folic acid or food folate intake.

5. After planning breakfast, remove all food cards and proceed with planning lunch and dinner in a similar manner. Snacks can also be planned. Remind participants that 400 micrograms folic acid, preferably from vitamin supplements but alternatively from folic acid fortified foods, is needed on a daily basis to decrease their risk of having a baby with a neural tube defect.
6. After all meals have been planned, tell participants to look at the amount of folic acid and folate they consumed based on the foods they have selected.
7. Review or emphasize the food choices that were made that contributed significantly to folic acid and food folate intake. Suggest ways that women can incorporate these foods into their diets.

Note: Some foods in the food flash card set are WIC eligible (see next page).

Food Flash Cards and the Women, Infants, and Children (WIC) Program¹

The WIC program provides vouchers for pregnant, postpartum, and breast feeding women to purchase foods. The following foods in the food flash card set are eligible to be purchased by women on the WIC program depending on the woman's status; pregnant, (P), postpartum (PP), or breast feeding (BF). The folic acid content of fortified foods is denoted. Food folate content is denoted using the following scale:

- No stars = poor to fair source of folate
- ★ = moderate source of folate
- ★★ = good source of folate
- ★★★ = excellent source of folate

Food	<u>Status</u>		
	P	PP	BF
Orange juice (100% juice); 1 cup = ★★	X	X	X
Apple juice (100% juice)	X	X	X
Milk	X	X	X
Ready-to-eat cereals ² and instant grits	X	X	X
Pinto beans ³ (dry only); ½ cup cooked = ★★★	X		X
Black beans ³ (dry only); ½ cup cooked = ★★★	X		X
Peas, black-eyed ³ (dry only); ½ cup cooked = ★★★	X		X
Chickpeas ³ (dry only); ½ cup cooked = ★★★	X		X
Carrots			X
Egg; 1 large = ★	X	X	X

¹ The foods and amounts listed are effective as of March 2006. Revisions may be made in the future based on proposed changes to the WIC food package. Check with your state WIC office for a current description of the food package in your state.

² Only specific ready-to-eat cereals are approved to be purchased by WIC checks. Look at the nutrition label and choose cereals that provide at least 25% of the Daily Value (DV) for folate or folic acid (i.e., at least 100 micrograms folic acid per serving).

³ Pregnant and breast feeding women will be given a check that specifies either dry beans or peanut butter (not both) may be purchased.

ACTIVITY #3: CASE STUDY

Purpose:

- To allow participants to apply knowledge gained to evaluate and recommend lifestyle and diet changes regarding intake of folic acid.

Materials required:

- Handouts: Case Studies #1 through #5
- Handout “Case Study Question Sheet”
- “Case Study Question/Answer Sheet” (for the educator)
- Pen/Pencil

Instructions:

1. Split the participants into five or fewer groups. Distribute one case study sheet to each group.
2. Tell the participants to read their case study sheet.
3. Distribute the case study question sheet to each group. Ask participants to think about each question and write their answers on the sheet.
4. Ask someone from each group to volunteer to present their case study and tell the group how they answered the questions. Use the “Case Study Question/Answer Sheet” to assist with the discussion.

ACTIVITY #4: CONTRACT
My Commitment to Inform

Purpose:

- To encourage participants to inform one woman who can become pregnant about how she can reduce her risk of having a baby with a neural tube defect.

Materials required:

- Handout (camera-ready copy) – “*My Commitment to Inform*”

Begin activity:

1. Distribute the “My Commitment to Inform” contract
2. Ask participants to make a commitment to join the campaign “Reducing Neural Tube Defect Risk with Folic Acid” by telling one woman who can become pregnant about the Institute of Medicine’s recommendation.
3. Encourage participation by reminding participants that they are an important link for spreading this message because they are looked to by their family, friends, and community for information about health and food habits

Conclusion:

Once the lesson has concluded, distribute the Lesson #4 post-test and have the participants complete the test.

Section 7:

Additional Resources

Section 7: Additional Resources

This list includes sources of materials or additional information about neural tube defects, nutrition, women's health, or children's health.

Centers for Disease Control and Prevention (CDC)

National Center on Birth Defects and Developmental Disabilities
1600 Clifton Road,
Mail Stop E-86
Atlanta, GA 30333
(404) 639-3311
Public Inquiries (800) 311-3435
Fax (404) 498-3550
<http://www.cdc.gov/ncbddd/folicacid/index.htm>

Source for free folic acid fact sheets, publications, print ads, posters, and public service announcements (including Spanish language materials). Refer to the CDC's Web site for a full list of available free materials. The on-line order form can be accessed at <http://www2.cdc.gov/ncbddd/faorder/orderform.htm>.

March of Dimes Birth Defects Foundation

1275 Mamaroneck Ave.
White Plains, NY 10605
(914) 428-7100
(914) 997-4750 (voice mail only)
marchofdimes.com

Source for folic acid flyers, fact sheets, videos, booklets, and other publications. Refer to the March of Dimes Web site for a list of available items or contact your local March of Dimes chapter.

Florida Department of Health

Division of Environmental Health
4052 Bald Cypress Way, Bin # A08
Tallahassee, FL 32399-1709
(850) 245-4250
<http://www.doh.state.fl.us>

Source for brochures, posters, and magnets (English and Spanish). Online ordering of materials can be accomplished at the following Web address:
<http://www.doh.state.fl.us/environment/newsroom/brochures/index.html>

Governmental Health Agencies

National Institute of Child Health and Human Development

Bldg 31, Room 2A32, MSC 2425

31 Center Drive

Bethesda, MD 20892-2425

(800) 370-2943

Fax (301) 984-1473

<http://www.nichd.nih.gov>

National Institutes of Health (NIH)

9000 Rockville Pike

Bethesda, Maryland 20892

(301) 496-4000

<http://www.nih.gov>

Specific information on folic acid can be found at the following Web address:

http://cerhr.niehs.nih.gov/genpub/topics/folic_acid-ccae.html

U.S. Department of Agriculture (USDA)

1400 Independence Ave. SW

Washington, D.C. 20250

(202) 720-6858

<http://www.usda.gov>

Food Composition Database: www.nal.usda.gov/fnic/foodcomp

USDA Center for Nutrition Policy and Promotion

<http://www.usda.gov/cnpp>

Contact: John Webster, Director of Public Information and Governmental Affairs

E-mail john.webster@cnpp.usda.gov

USDA Food and Nutrition Service

3101 Park Center Drive

Alexandria, VA 22302

<http://www.fns.usda.gov/fns>

Email webmaster@fns.usda.gov

U.S. Department of Health and Human Services (DHHS)

Region IV Contact Information (AL, FL, GA, KY, MS, NC, SC, TN)

Atlanta Federal Center

61 Forsyth Street, Room 5B95

Atlanta, GA 30303-8909

(404) 562-7888

Fax (404) 562-7899

<http://www.hhs.gov>

U. S. Food and Drug Administration (FDA)
(888) INFO-FDA (463-6332)
<http://www.fda.gov>

State of Florida

Florida Agency for Health Care Administration

2727 Mahan Drive
Tallahassee, FL 32308
(888) 419-3456
<http://www.fdhc.state.fl.us>
For information on health conditions refer to: <http://www.floridahealthstat.com>

Florida Birth Defects Registry

Bureau of Community Environmental Health
4052 Bald Cypress Way, Bin A-08
Tallahassee, FL 32399-1712
(850) 245-4299
Fax (850) 922-8473
<http://www.fbdr.org>

Florida Department of Agriculture and Consumer Services

The Capitol
Tallahassee, Florida 32399-0800
(850) 488-3022
<http://doacs.state.fl.us>

Florida Folic Acid Coalition

Ron Lutz, MSN, ARNP, Coordinator
University of Florida/IFAS
Food Science and Human Nutrition Department
PO Box 110720
Gainesville, FL 32611-0720
(352) 392-1978 Ext. 406
Fax (352) 392-1988
Email rlutz@ufl.edu
<http://www.FolicAcidNow.net>

Family Health Line

(800) 451-2229
<http://www.doh.state.fl.us/family/mch/pdf/fhl.pdf>

Florida Healthy Start

Healthy Start Program office
(386) 758-1135
Florida Association of Healthy Start Coalitions Web site: <http://www.healthystartflorida.com>

University of South Florida

Department of Pediatrics
Birth Defects Center
17 Davis Blvd., Suite 200
Tampa, FL 33606
(813) 259-8850
Fax (813) 259-8848

Organizations**American Academy of Pediatrics**

141 Northwest Point Boulevard
P.O. Box 927
Elk Grove Village, IL 60007-1098
(847) 434-4000
Fax (847) 434-8000
<http://www.aap.org>

American Academy of Family Physicians

11400 Tomahawk Creek Parkway
Leawood, KS 66211-2672
P. O. Box 11210
Shawnee Mission, KS 66207-1210
(800) 274-2237
(913) 906-6000
<http://www.aafp.org>

American College of Obstetricians and Gynecologists

409 12th Street SW
P. O. Box 96920
Washington, DC 20090-6920
(202) 638-5577
<http://www.acog.org>

American College of Physicians

190 N. Independence Mall West
Philadelphia, PA 19106-1572
(800) 523-1546 Ext. 2600
<http://www.acponline.org>

American Dietetic Association

120 South Riverside Plaza, Suite 2000
Chicago, IL 60606-6995
(800) 877-1600
<http://www.eatright.org>

American Nurses Association

8515 Georgia Avenue
Suite 400
Silver Spring, MD 20910
(301) 628-5000
(800) 274-4ANA (4262)
Fax (301) 628-5001
<http://www.nursingworld.org>

American Pharmaceutical Association

2215 Constitution Avenue, NW
Washington, DC 20037-2985
(800) 237-APHA (2742)
Fax (202) 783-2351
<http://www.aphanet.org>

American Society for Nutritional Sciences

9650 Rockville Pike, Suite 4500
Bethesda, Maryland 20814
(301) 634-7050
Fax (301) 634-7892
Email sec@asns.org
<http://www.asns.org>

Association of State and Territorial Public Health Nutrition Directors

PO Box 1001
Johnstown, PA 15907-1001
(814) 255-2829
<http://www.astphnd.org>

Association of Women's Health, Obstetric, and Neonatal Nurses

2000 L Street NW
Suite 740
Washington, DC 20036
(800) 673-8499
Fax (202) 728-0575
<http://www.awhonn.org>

National Alliance for Hispanic Health [formerly National Coalition of Hispanic Health and Human Services (COSSMHO)]

1501 16th Street, NW
Washington, DC 20036-1401
(202) 387-5000
Fax (202) 797-4353
<http://www.hispanichealth.org>

National Birth Defects Prevention Network

<http://www.nbdpn.org>

National Healthy Mothers, Healthy Babies Coalition

2001 N. Beauregard Street
12th Floor
Alexandria, VA 22311-1732
(703) 837-4792
Fax (703) 684-3247
<http://www.hmhb.org>

National Rehabilitation Information Center (NARIC)

4200 Forbes Blvc., Suite 202
Lanham, MD 20706-4829
(301) 562-2400
(800) 346-2742
Fax (301) 459-4263
<http://www.naric.com>

National Organization for Rare Disorders, Inc., (NORD)

55 Kenosia Avenue
P.O. Box 1968
Danbury, CT 06813-1968
(203) 744-0100
(800) 999-6673
Fax (203) 798-2291
<http://www.rarediseases.org>

Spina Bifida Association of America

4590 MacArthur Boulevard, NW
Suite 250
Washington, DC 20007-4226
(202) 944-3285
(800) 621-3141
Fax (202) 944-3295
<http://www.sbaa.org>

Latex Information Page: http://www.sbaa.org/site/PageServer?pagename=sbaa_latex

Teratology Society

1821 Michael Faraday Drive, Suite 300
Reston, VA 20190
(703) 438-3104
Fax (703) 438-3113
Email tshq@teratology.org
<http://www.teratology.org>

**US Department of Health and Human Services
HRSA Information Center**

PO Box 2910
Merrifield, VA 22116
(888) ASK-HRSA
Fax (703) 821-2098
<http://www.ask.hrsa.gov>

Other Online Resources

International Clearinghouse for Birth Defects Surveillance and Research

<http://www.icbd.org>

Organization for Teratology Information Services (OTIS)

(866) 626-6847
<http://www.otispregnancy.org>

Hospitals and Clinics

All Children's Hospital

Spina Bifida Team
801 6th Street South
St. Petersburg, FL 33701
(727) 898-7451
<http://www.allkids.org>

Arnold Palmer Hospital for Women and Children

92 West Miller
Orlando, FL 32806-2036
(407) 841-5111
Fax (407) 841-5136
<http://www.arnoldpalmerhospital.org>

Medical College of Georgia

Children's Medical Center
Clinic for Children with Spina Bifida
1446 Harper Street
Augusta, Georgia 30912
(706) 721-4262
<http://www.mcg.edu>

Miami Children's Hospital

3100 SW 62nd Avenue
Miami, FL 33155
(800) 432-6837
<http://www.mch.com>

Nemours Children's Clinic

Offers a program for children with spina bifida
807 Children's Way
Jacksonville, FL 32207
(904) 390-3600
Fax (904) 390-3699
<http://www.nemours.org>
Nemours health education Web site: <http://www.kidshealth.org>

Shands Children's Hospital at the University of Florida

1600 SW Archer Road
Gainesville, FL 32612
(800) 749-7424 or (352) 265-8000
Spina Bifida Clinic (352) 265-8250
<http://www.shands.org/children>

Shriner's Hospitals for Children

12502 North Pine Dr.
Tampa, FL 33612-9499
(813) 972-2250
(800) 237-5055
Fax (813) 978-9442
<http://www.shrinershq.org>

Genetics and Genetic Counseling**Regional Genetics Program**

University of Florida
College of Medicine
Division of Genetics
Box 100296, Health Sciences Center
Gainesville, FL 32610-0296
(352) 392-4104

GeneClinics

University of Washington School of Medicine
GeneTests Contact Information:
9725 Third Avenue NE, Suite 602
Seattle, WA 98115
(206) 221-4674
Fax (206) 221-4679
<http://www.geneclinics.org>

Genzyme

<http://www.genzyme.com/default.asp>

Florida Locations:

1031 Ives Dairy Road

Suite 228

N. Miami Beach, FL 33179

(800) 245-4363

Diagnostic Testing

10421 University Center Drive

Suite 100

Tampa, FL 33612

(813) 979-9442

(800) 966-4440

Fax (813) 972-4632

National Human Genome Research Institute

Communications and Public Liaison Branch

National Human Genome Research Institute

National Institutes of Health

Building 31, Room 4B09

31 Center Drive, MSC 2152

9000 Rockville Pike

Bethesda, MD 20892-2152

(301) 402-0911

Fax (301) 402-2218

Email webmaster@nhgi.nih.gov

<http://www.nhgri.nih.gov>

National Society of Genetic Counselors

<http://www.nsgc.org>

Office of Genomics and Disease Prevention (CDC)

4770 Buford Highway, Mailstop K89

Atlanta, GA 30341-3724

(770) 448-8510

Fax (770) 488-8336

Email genetics@cdc.gov

<http://www.cdc.gov/genomics>