



NEW YORK STATE **PRAMS** *Delivery*

Pregnancy Risk Assessment Monitoring System

New York State Department of Health

Neural Tube Defects and Knowledge of Folic Acid

Kathleen Shea, MPH, Larry Steele, Ph.D. and Anne Radigan

Infant Mortality and Birth Defects

In the United States, birth defects are the leading cause of infant mortality. (1) From 1980 -1995, infant mortality declined 39.8 percent. (2) Infant mortality due to birth defects during these years did not decrease as fast as the overall infant mortality.

Birth defect information that is collected in the United States usually contains data on live born infants or fetuses beyond a certain gestational age. This would exclude pregnancies that have been terminated as a result of detection of a neural tube defect (NTD). A study conducted by the Centers for Disease Control and Prevention (CDC) found that 40 percent of NTD cases that are found prenatally are terminated. (3)

Neural Tube Defects (NTD)

The neural tube forms the baby's brain and spinal cord. The formation takes place during the first four weeks of pregnancy, this is the time when most pregnancies are uncertain. By the time most women confirm their pregnancy, the neural tube is completely formed.

Neural tube defects are among the most common birth defects contributing to infant disability and mortality. Each year approximately 2,500 infants are born in the United States with NTD. (4) A surveillance project in the lower Hudson Valley found the rate of neural tube defects in that area to be 8.5 per 10,000 live births. (5)

Neural tube defects include, anencephaly (infant being born without a brain), spina bifida (infants born with an opening of the spine), and encephalocele (defects in the baby's skull). These defects can lead to paralysis of the legs, hydrocephalus, learning disabilities and death.

Folic Acid

Studies have demonstrated that consumption of folic acid reduces the risk of NTD. (6) The U.S. Public Health Service (USPHS) recommends all women capable of becoming pregnant consume 400ug of folic acid daily to prevent neural tube defects. (2)

The B vitamin, folic acid can be obtained from vitamins and foods. Not only has it been proven to reduce NTD, but intake of folic acid may also reduce the risk of heart disease. (7)

Few foods are high in folate. Cooking and food processing destroys some of the folate in foods. In 1998, the Food and Drug Administration began requiring manufactures to add folic acid to many foods such as flour and cereals. Examples of foods that naturally contain folic acid are:

- Liver
- Beans (Pinto, Red Kidney, Lima)
- Spinach
- Chick-peas
- Broccoli
- Orange Juice

New York State's Response

In September of 1996, the New York State Department of Health launched its first four-phase folic acid awareness campaign. This included, making valuable partnerships, distribution of educational materials and mailings, an annual folic awareness week and speaking engagements.





The New York State Folic Acid Campaign

The campaign attempted to inform all women of childbearing age (14-44) in New York State of the risk-reducing benefits of folic acid (FA), especially in preventing neural tube defects when taken prior to conception.

Evaluation

Although a direct evaluation of the effectiveness of the campaign was never done, two population-based data sets have afforded indirect assessment of the degree of awareness of FA benefits among women of childbearing age.

Data

One source of data is the Pregnancy Risk Assessment Monitoring System (PRAMS), which surveys women who recently had a child. The PRAMS survey may be the only indicator of the possible effectiveness of the campaign since the PRAMS FA question was asked pre- and post-campaign. The 1996 and 1997 upstate New York PRAMS questionnaire included an item addressing FA knowledge. Each respondent was asked to respond “yes” or “no” to the question:

“Have you ever heard or read that taking the vitamin folic acid can prevent some birth defects?”

The second source of information on FA knowledge among the state’s population is the Behavioral Risk Factor Surveillance System (BRFSS), a telephone survey of a sample of the state’s non-institutionalized adult population. A four item FA module was included in the 1997 questionnaire administration. One of these items addressed FA awareness among those under 45 years of age. Respondents were asked to select the best response to the following:

“Some health experts recommend that women take 400 micrograms of the B vitamin folic acid, for which of the following reasons?”

- a) To make strong bones*
- b) To prevent birth defects*
- c) To prevent high blood pressure*
- d) Some other reason”*

The selection of the “b” response was considered an indicator of the respondent’s knowledge of FA benefits. In addition, another item in the questionnaire asked whether the respondent was currently pregnant, thus permitting the breakdown of folic acid awareness by pregnancy status during analyses. When generating percentages, weights were applied to adjust for the selection probabilities and the estimates of age-sex-race distribution of adults in the state.

Results

Results show that 67.9 percent of women in the 1996 PRAMS sample indicated an awareness of the risk-reducing benefits of folic acid. In the 1997 sample, this proportion increased to 78.2 percent. In comparison, the 1997 BRFSS measure of FA awareness showed that only 36.7 percent of women in New York State aged 18-44 responded as knowing that taking 400 micrograms could prevent birth defects. When pregnancy status was accounted for, the results showed that 62.2 percent of women currently pregnant were aware of FA benefits. Although this total is more comparable to that from the PRAMS sample, the differences in item construction and in target population in the two surveys imply that the two measurements can not be taken as fully equivalent.

The demographic breakdowns of the results from both surveys reveal several areas of public health implications. Given the relative lack of knowledge about FA benefits among non-pregnant women (35.4%) in the BRFSS sample, it would seem to indicate a failure to reach women who are not currently sensitized to the risks of pregnancy. Other subgroups who should perhaps be targeted for more focused intervention are African-American women, teenagers, women with less than a high school education, and women who are not married.



PRAMS and BRFSS Survey Results on Folic Acid Knowledge

Demographic Status	1996		1997	
	Freq.	%	Freq.	%
Race				
White	802	69.9	937	81.1
Black	80	53.5	85	49.8
Other	21	61.1	26	83.4
Age				
<20	45	36.4	54	50.0
20-24	134	60.3	161	71.3
25-35	551	71.3	626	83.2
>34	179	75.9	213	80.7
Education				
<High School	95	48.5	115	53.8
High School	237	54.2	269	71.6
>High School	577	81.2	670	89.3
Marital Status				
Married	727	73.8	828	84.8
Not Married	182	52.2	226	61.2
TOTAL	1,354	67.9	1,048	78.2

The Pregnancy Risk Assessment Monitoring System (PRAMS) survey is designed to collect data on live births from a representative sample of women in New York State. PRAMS was developed to assess the impact of maternal behaviors, both before and during pregnancy on the outcomes of the pregnancy and the health of the newborn infant. Funding for the program is provided in part by the Centers for Disease Control and Prevention.

Demographic Status	Pregnant		Not Pregnant		Total	
	Freq.	%	Freq.	%	Freq.	%
Race						
White	32	69.3	734	38.9	766	40.5
Black	9	41.0	174	25.8	183	26.7
Other	1	0.0	107	26.2	108	26.0
Age						
<20	3	76.7	50	35.6	53	38.3
20-29	18	47.3	341	33.2	359	34.1
30-44	21	74.8	633	36.8	654	38.2
Education						
<High School	4	72.1	65	17.7	69	22.2
High School	14	51.0	265	26.3	279	27.8
>High School	24	68.3	693	40.8	717	41.8
Marital Status						
Married	28	76.1	446	43.4	474	45.3
Not Married	14	42.2	576	27.9	590	28.4
Refused			2	34.3	2	34.3
Total	42	62.6	1,024	35.4	1,066	36.7

The Behavioral Risk Factor Surveillance System (BRFSS) is a continuous telephone survey system supported in part by the Centers for Disease Control and Prevention and administered by the NYSDOH. The system is designed to provide information on behaviors and risk factors for chronic disease, preventive infectious disease and other health conditions among the adult population.

References

1. Anderson RN, Kochanek KD, Murphy SL. Report on the final mortality statistics, 1995. Hayattsville, Maryland: US Department of Health and Human Services, CDC, National Center for Health Statistics, 1997. (Monthly vital statistics report; 45(11): suppl 2).
2. Centers for Disease Control and Prevention: Trends in Infant Mortality Attributable to Birth Defects - United States, 1980-1995. *Morbidity and Mortality Weekly Report* 1998;47(37): 773-8.
3. Cragan JD, Roberts HE, Edmonds LD, et al: Surveillance for anencephaly and spina bifida and the impact of prenatal diagnosis - United States, 1985-1994. *Morbidity and Mortality Weekly Report* 1995;44(SS-4): 1-13.
4. Centers for Disease Control and Prevention: Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. *Morbidity and Mortality Weekly Report* 1992;41(RR-14): 1-7.
5. New York State Department of Health: Statistical summary of children born in 1995 and diagnosed through 1997. Congenital Malformations Registry Annual Report 1999;47-52.
6. MCR Vitamin Research Study Group: Prevention of neural tube defects: results of the Medical Research Council Vitamin Study. *The Lancet* 1991;338: 131-7.
7. B vitamins may cut heart disease risk. *Havard Health Letter*. 1998; 23(6): 8.



A Survey of the Health of **Mothers & Babies** in New York State

For additional information on
the PRAMS Project
1-800-772-6788

New York State Department of Health

Center for Community Health
Public Health Information Group
Corning Tower, Room 750, Empire State Plaza
Albany, NY 12237-0602

George E. Pataki,

Governor, State of New York

Antonia C. Novello, MD, MPH,

Commissioner, New York State Department of Health

Dennis P. Whalen,

Excutive Deputy Commissioner

PRAMS Program

Michael Medvesky, MPH, Principal Investigator, Director, Public Health Information Group
Barbara Brustman, EdD, Co-Principal Investigator, Director, Perinatal Health Unit, Bureau of Women's Health

Anne Radigan, PRAMS Project Coordinator

Nancy Davidson, PRAMS Data Manager

Susan Bubb, MSW, PRAMS Data Analyst

Kathleen Shea, MPH

Larry Steele, PhD

Funding for the PRAMS Program is provided in part by the Centers for Disease
Control and Prevention, Atlanta, GA (Grant Number U50/CCU20709507)