

THE TERATOLOGY SOCIETY

Birth Defects Insights

Folic Acid Fortification: How a Tortilla Could Be the Perfect Plug for a Hole in the Dike

*By Mary Alice Smith, PhD, Teratology Society President &
Godfrey P. Oakley Jr., MD, Teratology Society Past President*

Folic acid. Two words mentioned in a commercial for Raisin Bran or during a visit to the OB shortly after a woman finds out she's pregnant. Maybe you've even noticed them on a bottle in the vitamin aisle at the pharmacy. The point is, they're familiar words and they should be. Why? Chances are if you're a healthy adult reading this blog, you may have folic acid to partially thank for your good health.

Folic acid deficiency is known to be the primary cause of neural tube defects unless it has been prevented by folic acid fortification. Thus, fortifying foods supplies women of reproductive age enough folic acid to prevent two of the most serious birth defects: spina bifida and anencephaly. These two birth defects are major causes of neonatal, infant and childhood mortality, and disabilities around the world. It's why we decided to highlight them during our participation in the first World Birth Defects Day this month. These birth defects are present and, for now, aren't going away any time soon.

The Good News

Approximately 70 countries have folic acid fortification programs and prevent cases of spina bifida and anencephaly in an estimated 60,000 children a year. This is very good news.

When women of childbearing age take folic acid supplements before they get pregnant and during their pregnancies, the number of babies born with spina bifida or other neural tube defects decreases significantly—anywhere from 25-40%.

In 1996, the FDA required folic acid fortification of all "enriched" cereal grain products like flour and corn meal by Jan 1, 1998. In fact, the US was the first country to require folic acid fortification. It has been a public health triumph. Let's look at how the research supports this sentiment:

- It has saved about \$10 billion in health care costs.
- It has saved 1,300 babies each year in the US from developing spina bifida and anencephaly.

The Bad News

There are approximately 180,000 children around the world affected by preventable spina bifida and anencephaly because their governments have not required folic acid fortification. These are sad failures of public health policy that contribute to unnecessary neonatal, infant, and childhood mortality and morbidity. Think these public policy failures only happen outside of the US? Think again.

There is a hole in the dike in US fortification: corn masa flour. Despite \$8 billion in sales with Hispanic Americans as the primary consumer of the product, it failed to be included in the 1996 FDA regulations. The lack of fortification of this key staple among the diets of so many Hispanic Americans is likely responsible for the continuing excess cases of spina bifida and anencephaly among this population.

In an article published earlier this year in the Centers for Disease Control and Prevention's (CDC) *Morbidity and Mortality Weekly Report (MMWR)*, there was a summary of CDC data showing that serum folate levels among Hispanic Americans is lower than other ethnic groups, just providing additional evidence of a problem. There is even an ongoing epidemic of spina bifida and anencephaly in Eastern Washington, where a large population of Hispanic Americans resides. The lack of folic acid fortification of corn masa flour is likely to be a major contributor to this epidemic.

The Thalidomide Epidemic Taught Us How to Plug the Dike

The excess cases of spina bifida and anencephaly among Hispanic births have the potential to be dramatically curbed. One way could be by working with the US Food and Drug Administration (FDA) to have folic acid determined a food additive. As it stands right now, there is no standard of identity for corn masa. According to current regulations, a study to show that folic acid placed in corn masa flour is stable must happen first. An alternative route could be to permit folic acid as an additive to corn masa flour. If the study shows that there is some loss of folic acid in the processing or storage, then a little more could be added to compensate.

You may recall the thalidomide epidemic of the 1950s and 1960s, during which 10,000 children were affected by the drug. Babies exposed prenatally to the medication were born with major malformations of the limbs, among other birth defects. The thalidomide epidemic led to major changes in drug regulations globally. Folic acid fortification has the potential to prevent neural tube defects in 18 times as many babies each year compared to the total number of babies deformed by thalidomide over the course of the entire epidemic. This makes one thing quite clear - the global impact of national folic acid fortification will have an even greater impact—by saving lives and preventing birth defects. It makes sense to encourage global health policy change when it comes to folic acid fortification.

On a side note, it is also worth pointing out that folic acid fortification eliminates folate deficiency anemia—another worldwide problem and yet another reason to fix this public health policy gap without delay. Having that said, preventing spina bifida and anencephaly should be reason enough to stop the stream of birth defects from continuing to flow right beneath us...

The Teratology Society adopted a [resolution](#) recommending that all countries fortify a commonly consumed food with folic acid to reduce the global burden of spina bifida. Scientists interested in learning more about the Teratology Society's efforts as well as becoming a member are encouraged to visit www.Teratology.org. Members include those specializing in cell and molecular biology, developmental biology and toxicology, reproduction and endocrinology, nutritional biochemistry, genetics, and epidemiology, as well as the clinical disciplines of prenatal medicine, pediatrics, obstetrics, neonatology, medical genetics, and teratogen risk counseling. In addition, it publishes the scientific journal, [Birth Defects Research, Parts A, B, and C](#).

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About The Authors

Mary Alice Smith, PhD, is the Teratology Society President and Professor of Developmental and Reproductive Toxicology at the University of Georgia.

Godfrey P. Oakley Jr., MD, is a Professor of Epidemiology at the Rollins School of Public Health at Emory University. He is often referred to as “the folic acid ambassador” for his work to highlight the effects of folic acid deficiency around the world.

References:

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