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THE IMPORTANCE OF FORTIFYING CORN MASA WITH FOLIC ACID TO REDUCE HEALTH DISPARITIES IN BIRTH OUTCOMES AMONG HISPANIC WOMEN

by Vickie Ybarra, PhD, MPH, RN, RWJF Center for Health Policy at the University of New Mexico and Nora Coronado, MSW Commissioner for the Commission on Hispanic Affairs; University of Washington Latino Center for Health

While the incidence of neural tube defect has decreased substantially in the U.S. since the Food and Drug Administration (FDA) instituted fortification of grains and cereals with folic acid in 1998, racial/ethnic disparities persist. Hispanic women continue to experience the highest rates of neural tube defects, with rates highest among less-aculturated Mexican-origin women. The two most common neural tube defects are spina bifida, a spinal defect affecting lower extremely functioning, and anencephaly, in which the brain does not fully develop. Anencephaly is incompatible with life, and affected babies die shortly after birth. An investigation of 2010-2014 birth records by the Washington State Department of Health confirms that three counties in central Washington State experienced a very high rate of anencephaly, with 60% of the cases being births to Hispanic women. Extending folic acid fortification to corn masa flour could begin to address the racial/ethnic disparities in neural tube defects that persist nationwide.

Fortifying Grains with Folic Acid - A Public Health Policy Success Story

In 1996, the FDA added folate to the list of nutrients required for addition to enriched breads, flours and grains based on a 1992 CDC recommendation that all women of childbearing age consume folic acid prior to pregnancy to reduce the incidence of neural tube defects¹. There is widespread agreement that this policy has been successful in contributing to reductions in the overall incidence of neural tube defects in the U.S.², with the incidence decreasing approximately 37% from 1995-96 to 2005-06³. While not all cases may be prevented with folic acid fortification, fortification remains an impactful public health policy tool in the prevention of neural tube defects in the U.S.⁴.

Disparities Remain among Hispanic Women Nationwide and in Washington State

Despite the overall success of folic acid fortification, racial/ethnic disparities remain. Births to Hispanic women continue to experience the highest prevalence of neural tube defects in the U.S.⁵. Pregnancies to less acculturated Hispanic women, particularly Mexican-born women, appear to have the highest risk. One study found Mexican-born women in California to have a significant 2.4 times greater risk of a pregnancy with neural tube defect than white women⁶.

In September 2013 the Washington State Department of Health first reported on an apparent cluster of cases of anencephaly in a three-county region of central Washington (Yakima, Benton and Franklin Counties)⁷. Active case finding revealed 63 cases of neural tube defect occurring from 2010 through 2015. Forty-one of the cases were anencephaly, for an effective anencephaly rate of 9.5/10,000 births in the three-county cluster area, compared with a rate of 2.7 in all of Washington. Over half the cases in the three-county cluster area have been pregnancies to Hispanic women. The majority of births in

Franklin County have been to Hispanic women since 1990 and in Yakima County since 1993⁸. A case-control study failed to find any apparent proximal exposure factors that would explain the high rates of anencephaly, and the Department of Health is currently recommending that women of childbearing age in this region attend to their pre-pregnancy folic acid consumption, seek early prenatal care, and have their water tested if they are on a private well⁹

Extending Folic Acid Fortification to Corn Masa to Saves Lives and Improves Health

Research suggests that extending current folic acid fortification to corn masa flour, as is done in some Latin American countries, could address part or all of the persistent disparity in neural tube defects among Hispanic women in the U.S. Corn masa flour is the primary ingredient in corn tortillas, tamales, and other corn-based Latin American foods, and is currently not fortified with folic acid in the U.S.⁵. Using nutrition data from dietary studies public health researchers estimate that fortification of corn masa flour with folic acid would increase the proportion of Mexican-American women achieving the recommended intake of folic acid by 6.0 to 8.2 percentage points, with the greater increase occurring among less-aculturated women¹⁰.

In 2012 the March of Dimes, along with a coalition - including the American Academy of Pediatrics, the Spina Bifida Association, National Council of La Raza, and Gruma Foods – petitioned the FDA to fortify corn masa flour with folic acid^{xi}. There have been a series of delays in the FDA process due to lack of funds and the need for scientific stabilization studies. Most recently, the FDA announced they are again delaying a decision to allow folic acid to be added to corn masa flour.^{xii} Of note, the current rule under consideration would allow folic acid to be added to corn masa flour, not require it to be added as is the case with other grains. Although Gruma foods, the largest producer of corn masa in the U.S., appears interested in implementing the fortification, there is no assurance that other manufacturers will follow suit and no assurance that women in Washington state will benefit from the rule change once implemented.

¹ Backstrand, Jeffrey R. 2002. "The History and Future of Food Fortification in the United States: A Public Health Perspective." *Nutrition Reviews* 60(1):15-26.

² Osterhues, Anja, Nyima S. Ali and Karin B. Michels. 2013. "The Role of Folic Acid Fortification in Neural Tube Defects: A Review." *Critical Reviews in Food Science and Nutrition* 53(11):1180-1190.

³ CDC Public Health Grand Rounds, Feb 18 2010.

⁴ Hesecker, Helmut B., Joel B. Mason, Jacob Selhub, Irwin H. Rosenberg and Paul F. Jacques. 2009. "Not all Cases of Neural-Tube Defect can be Prevented by Increasing the Intake of Folic Acid." *Br J of Nutrition* 102:173-180.

⁵ Fleischman, Alan R. and Motoko Oinumu. 2011. "Fortification of Corn Masa Flour with Folic Acid in the United States." *AJPH* 101(8):1360-1364.

⁶ Shaw, Gary M., Ellen M. Velie and Cathy R. Wasserman. 1997. "Risk for Neural Tube Defect-Affected Pregnancies among Women of Mexican Descent and White Women in California." *AJPH* 87(9): 1467-1471.

⁷ Person, A., C. Spitters, G. Patrick, C. Wasserman, P. Vander Kelen, J. VanEenwyk, S. Gilboa, J. Kucik, R. Sorenson, E. Ailes and M. Stahre. 2013. "Investigation of a Cluster of Neural Tube Defects-Central Washington, 2010-2013." *MMWR* 62(35):728.

⁸ Wash. State Dept. of Health Vital Statistics, Natality Table A13-Mother's Race/Ethnicity by County of Residence.

⁹ <http://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/BirthDefects/AnencephalyInvestigation.aspx>

¹⁰ Hamner, H.C., S.C. Tinker, A.L. Flores, J. Mulinare, A.P. Weakland and N.F. Dowling. 2013. "Modelling Fortification of Corn Masa Flour with Folic Acid and the Potential Impact on Mexican-American Women with Lower Acculturation." *Public Health Nutrition* 16(5):912-921.

^{xi} <http://www.marchofdimes.com/news/coalition-petitions-fda-to-fortify-corn-masa-flour-with-folic-acid.aspx>

^{xii} http://www.yakimaherald.com/news/local/fda-delays-decision-on-adding-folic-acid-to-corn-masa/article_557bb0f0-c0cc-11e5-8158-4f09f0d6a025.html