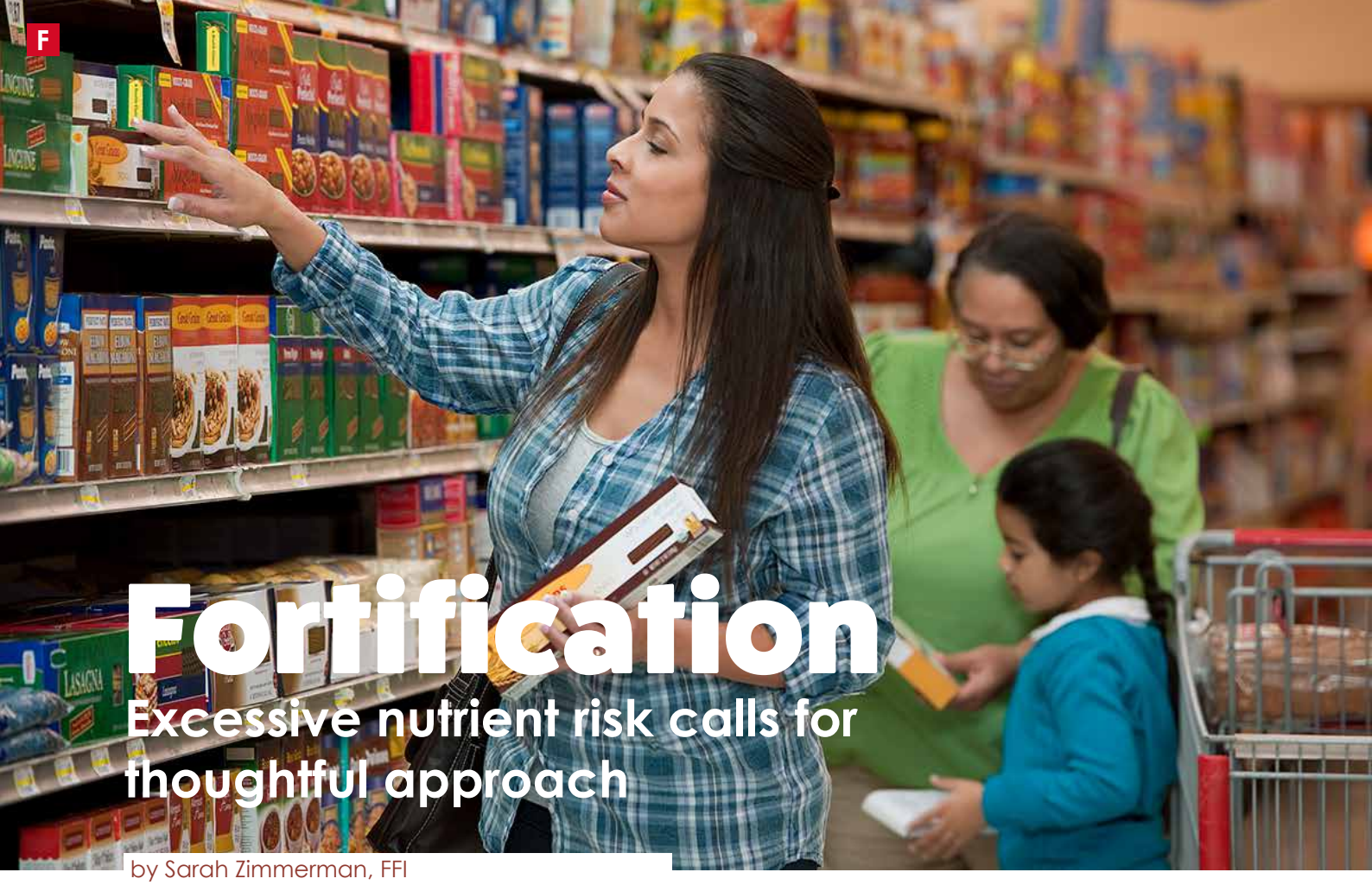

Fortification

Excessive nutrient risk calls for thoughtful approach

by Sarah Zimmerman, FFI

From folate-enriched eggs to iron fortified chocolate, the list of foods with added nutrients seems to be growing faster than bread rises. Though a single serving of one fortified food rarely provides excessive nutrients, some people worry that consuming multiple fortified foods, in combination with other vitamin and mineral intake, might be too much of a good thing.

This concern can be addressed by coordinating the planning, implementation, monitoring, and evaluation of simultaneous nutrition programmes, according to reports from a 2017 technical consultation convened by the World Health Organisation (WHO). Reports from the meeting were published in June 2019.

"This is a call for country leaders to evaluate all the sources of nutrients and be thoughtful about what is being provided to consumers," said Dr Helena Pachón, Senior Nutrition Scientist for the Food Fortification Initiative (FFI) who attended the 2017 consultation.

Defining what an excess of vitamins and minerals means is challenging because at least nine organisations have published "upper levels" for individuals to safely consume on a daily basis (See Table 1). The WHO meeting report stresses that upper levels are not toxic if they are surpassed occasionally. Instead healthy people should avoid consistently exceeding the upper levels.

Pachón said the consequences of excessive intakes of some nutrients, such as vitamin B12, are negligible. She said country leaders should pay more attention to limiting intake of nutrients that can pose a danger at high levels.

One example is preformed vitamin A, which is used in fortification, supplements, and some medicines. Excessive intakes can be harmful and even deadly; pregnant women who consume too much can have babies with serious birth defects such as heart defects and malformations of the face.

On the other hand, vitamin and mineral deficiencies can also be dangerous and life-threatening. Women who consume too little folic acid (vitamin B9) risk having babies with serious or fatal birth defects of the brain and spine.

Anemia in pregnancy contributes to maternal deaths, in childhood it limits cognitive development, and in adults it lowers productivity. Anemia can be caused by deficiencies of iron, riboflavin, folic acid, zinc, vitamin A, and vitamin B12.

The WHO consultation participants were charged with weighing the risk of excessive intake with the risk of deficiencies. They found that in low- and middle-income countries, exceeding the upper level is uncommon. In some cases, however, fortification combined with supplementation might lead to high intake. They recommended that countries assess the population's total dietary intake and nutritional status as well as incorporate rapid screening tools for routine monitoring and surveillance.

As an example, consider the United States' analysis of folic acid (vitamin B9) consumption. Flour and rice labeled "enriched" in the US must include folic acid, breakfast cereals can be

Table 1: Upper levels of seven nutrients based on published upper levels of nine organizations

Nutrient	Daily upper level for adults
Iron	~ 45 milligrams
Folic acid	1 milligram
Vitamin A and provitamin A carotenoids	~ 3000 micrograms retinol equivalents
Vitamin D	~ 100 micrograms
Iodine	~ 1100 micrograms
Zinc	~ 40 milligrams
Calcium	~ 2500 milligrams

Source: Pike, V. and Zlotkin, S. (2019), Excess micronutrient intake: defining toxic effects and upper limits in vulnerable populations. Annals of the New York Academy of Sciences, 1446: 21-43.

voluntarily fortified with folic acid, and supplements with folic acid are readily available.

Researchers analysed national health and nutrition survey data from 2003 to 2006. They found that 60 percent of adults consumed folic acid only from fortified foods, and none of these adults exceeded the upper level of one milligram a day.

Only 2.7 percent of adults consumed more than the upper level. Nearly half of the adults who consumed supplements with more than 400 micrograms of folic acid exceeded the upper level. The scientists' conclusion was that, at current fortification levels, US adults who do not consume supplements or take supplements with 400 micrograms or less of folic acid are unlikely to exceed the upper level for folic acid intake.

Another example is in Sri Lanka; here, children ages 6-to-23 months receive a "megadose" of vitamin A every six months. In addition, several brands of margarine, powdered milk, cereals, and biscuits are voluntarily fortified with vitamin A.

This combination may lead to an excess of vitamin A intake among these young children. Researchers recommended scaling back the national supplementation programme and monitoring fortification initiatives.

The FFI recommends that countries establish standards for types of nutrients and the levels of each to include in flour and rice. The FFI also recommends mandatory fortification programmes, in part because they can be more easily monitored than voluntary programs to ensure compliance with the national standard.

Several tools are available to help countries plan, implement, monitor, and evaluate food fortification as part of simultaneous national nutrition programmes:

The Fortification Assessment Coverage Toolkit provides standardised methods for the collection, analysis, and synthesis of data on quality, coverage, and consumption of fortified foods

Fortification Monitoring is online training solution for flour and rice fortification. It teaches the basic concepts of internal, external, import, and commercial monitoring

Fortify MIS (Management Information System) is an online data collection and aggregation approach for fortification monitoring

Fortification Monitoring and Surveillance (FORTIMAS) is an approach for tracking the population coverage and impact of a food fortification programme, available in English, French and Portuguese

Global recommendations for nutrients to include in wheat and maize and flour fortification. Adjust these levels downwards if other foods are fortified effectively.

44 items are available in the forms of fortification documentation, available in English, French, Spanish, and Russian

For more information on fortification of wheat flour, maize flour, or rice, contact FFI at info@ffinetwork.org.