Flour Fortification Overview
Global and Regional Update

Presented by Quentin Johnson
Event: SF, FFI, WHO/EMRO Workshop, Casablanca
Date: 12-15 May 2014
What is Grain Fortification?

- Fortification adds vitamins and minerals during the milling process so that foods made with fortified grain products are more nutritious.
Wheat and maize lose nutrients in the milling process, usually at levels indicated in the gray box.

Adapted from “Wheat in Human Nutrition” by W.R. Aykroyd and Joyce Doughty
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Fortification Overview

**Why Fortify?**
- **Health Benefits**
- Economic Benefits

Grain Fortification Status

FFI Overview

Regional Highlights

Women and children are the people most likely to benefit from nutrients used in flour fortification. Istockphoto.
Vitamin and Mineral Deficiency Contributes to:

- More than one-third of all *deaths in children* under the age of 5
- Stunting of an estimated *195 million children* under age 5 in developing countries
- Undeveloped *cognitive capacity*, productivity and earning potential
Iron Deficiency:

- Affects *more people* than any other health condition
- Reduces *work capacity*
- Impairs a child’s physical and intellectual *development*
- Contributes to 20% of all *maternal deaths*
- Is a leading cause of anemia which affects *2 billion people* – over 30% of the world’s population

Photo by Ivan Mateev at istockphoto
## Success of Fortifying with Iron

<table>
<thead>
<tr>
<th>Country</th>
<th>Population studied</th>
<th>Improvement?</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Women</td>
<td>Yes</td>
</tr>
<tr>
<td>Iran</td>
<td>Women and men</td>
<td>Yes</td>
</tr>
<tr>
<td>Venezuela</td>
<td>School-age children</td>
<td>Yes</td>
</tr>
<tr>
<td>Fiji</td>
<td>Women of child-bearing age</td>
<td>Yes</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>Preschool and school-age children</td>
<td>Yes</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>Preschool and school-age children</td>
<td>Yes</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Preschool and school-age children</td>
<td>Yes</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>Preschool and school-age children</td>
<td>Yes</td>
</tr>
<tr>
<td>South Africa</td>
<td>Women of child-bearing age</td>
<td>No</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>Preschool and school-age children</td>
<td>No</td>
</tr>
</tbody>
</table>

FFI review May 2013. See references on last slides.
Insufficient Folic Acid

• An estimated **300,000 neural tube defects** (NTDs) occur every year globally.¹
• Most of these birth defects are **preventable** if the mother has enough folic acid at the right time.²

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² U.S. Centers for Disease Control and Prevention: [http://www.cdc.gov/ncbdd/folicacid/faqs.html](http://www.cdc.gov/ncbdd/folicacid/faqs.html)
Photos from Google Images
Equivalent of 400 µg of Folic Acid

- 4 slices of beef liver or
- 44½ medium ripe tomatoes or
- 14½ cups of raw broccoli or
- 17½ cups of orange juice or
- 5½ cups of black beans or
- 200 medium red apples or
- 19½ cups of raw green beans

Overall 46% Reduction In Birth Defects

Eight studies from Argentina, Canada, Chile, South Africa, and the United States report:

• **31% to 78% reduced risk** of neural tube defects after fortifying flour with folic acid

• Overall **46% reduction** in neural tube defects after fortifying flour with folic acid
Globally an estimated **38,417** birth defects were prevented in 2012 - an average of **105 a day** – where flour was fortified with folic acid.

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  • Health Benefits
  • Economic Benefits

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Photo by Karen Codling, FFI staff
Wheat Flour Fortification Progress

<table>
<thead>
<tr>
<th></th>
<th>2004¹</th>
<th>2007¹</th>
<th>2014²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries with mandates to fortify wheat flour with at least iron or folic acid</td>
<td>33</td>
<td>57</td>
<td>78</td>
</tr>
<tr>
<td>Percent of wheat flour fortified in industrialized mills worldwide</td>
<td>18</td>
<td>27</td>
<td>31</td>
</tr>
</tbody>
</table>

The combined population of countries requiring wheat flour fortification is 2.2 billion.

² Flour Fortification Initiative database, April 2014
Wheat Availability and Fortification Legislation

75 or more grams available per person per day

Mandatory fortification legislation *
78 countries

Less than 75 grams available per person per day

No availability or legislation data

* Legislation has effect of mandating grain fortification with at least iron or folic acid; does not reflect how much grain is available.

Grain availability data from the Food and Agriculture Organization (2009).
Legislation status from the Flour Fortification Initiative (www.FFlnetwork.org) April 2014
Maize Availability and Fortification Legislation

| 75 or more grams available per person per day | Mandatory fortification legislation *
| Less than 75 grams available per person per day | 12 countries |
| No availability or legislation data |

* Legislation has effect of mandating grain fortification with at least iron or folic acid; does not reflect how much grain is available.
Grain availability data from the Food and Agriculture Organization (2009).
Legislation status from the Flour Fortification Initiative (www.FFInetwork.org) April 2014
Reasons for Mandatory Legislation

• Equalizes costs for millers
• Sets appropriate standards including:
  • Best iron compound
  • Levels of other vitamins and minerals
• Can be more easily monitored
• Provides more equitable access to foods made with fortified flour

Osmonbek Artykbaev, left, former Parliamentarian in the Kyrgyz Republic, helped the country pass legislation to require flour fortification.
Grain Fortification Challenges

Grains produced globally for human consumption in 2009:¹

<table>
<thead>
<tr>
<th>Million tons of wheat</th>
<th>Million tons of rice</th>
<th>Million tons of maize</th>
</tr>
</thead>
<tbody>
<tr>
<td>439</td>
<td>354</td>
<td>113</td>
</tr>
</tbody>
</table>

Our Challenges:

- Fortifying more wheat flour
- Developing best practices for rice fortification
- Fortifying maize flour

FFI Team
Facilitating collaboration among partners to advance grain fortification worldwide

Canada
Training and Technical Support Coordinator

Europe
Senior Advisor in The Netherlands
Europe Associate in Brussels

US
• Director
• Nutrition Scientist
• Communications Coordinator
• Senior Advisor
• Micronutrient Specialist
• Administrative Coordinator

Africa
Network Coordinator

India
India Network Coordinator and Senior Advisor

Asia
Coordinators in Bangkok and Jakarta
Global Best Practices

To plan a flour fortification program, consider:

- Local culture and cereal consumption
- Nutritional needs
- Industry analysis
- Creation of a multi-sector national fortification alliance
- Legislation
- Monitoring

Brazil photo by David Snyder / CDC Foundation
Middle East

http://www.ffinetwork.org/regional_activity/middle_east.php
Boy with balidi bread photo from the World Food Programme.
Africa

http://www.ffinetwork.org/regional_activity/africa.php
Photo from by Anna Verster, FFI staff.
In Summary

The Problem:
One-third of the world’s population suffers from vitamin and mineral deficiencies. In many countries, both lower and higher income populations are affected.

– World Bank 2006

Part of the Solution:
Within countries, FFI stimulates interaction among partners so that together we can achieve results that none of us could achieve independently.

www.FFInetwork.org
Global Consensus

Recommendations on Wheat and Maize Flour Fortification Meeting Report: Interim Consensus Statement

**Purpose**

This statement is based on scientific reviews prepared for a Flour Fortification Initiative (FFI) technical workshop held in Stone Mountain, GA, USA in 2008 where various organizations actively engaged in the prevention and control of vitamin and mineral deficiencies and various other relevant stakeholders met and discussed specific practical recommendations to guide flour fortification efforts being implemented in various countries by the public, private and civic sectors.

**The FFI Second Technical Workshop on Wheat Flour Fortification**

Nearly 100 leading nutrition, pharmaceutical and cereal scientists and milling experts from the public and private sectors from around the world met on March 30 to April 3, 2008 in Stone Mountain, GA, USA to provide advice for countries considering national wheat and/or maize flour fortification. This Second Technical Workshop on Wheat Flour Fortification—Practical Recommendations for the National Implementation of Wheat Flour Fortification®—was convened by FFI, Inc., Center for Diseases.
For More Information

www.FFInetwork.org
www.Facebook.com/FFInetwork
https://twitter.com/FFINetwork

Join the Food Fortification Initiative group on LinkedIn

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