17 YEARS FOLIC ACID FLOUR FORTIFICATION

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ACIDE FOLIQUE
FOLSÄURE
ACIDO FOLICO
Lebens-Vitamin
Vitamine de la vie
Vitamina della vita

Agenda:

- Folate and flour fortification
- Neural tube defects in Europe
- Impact of flour fortification
- The Flour Fortification Initiative

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Part I:
Folate and Fortification

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Image: http://gab.giggle.com/2012/01/nine-months/the-411-on-folic-acid/

Folate

- Required for: healthy cell development and division, DNA methylation, regulation of homocysteine in the blood

- Deficiency may lead to: increased risk for birth defects, one type of anemia and raised homocysteine levels

- Potentially reduces the risk of (recent studies): orofacial clefts, autism, stroke, cognitive decline

Neural Tube Defects

- An estimated **300,000 neural tube defects** (NTDs) occur every year globally.[1] Approximately 4500 pregnancies in the EU are affected.[2]
- Many of these birth defects are **preventable** if the mother has enough folic acid at the right time.[3]

Spina bifida is a malformation of the baby's spine. It causes permanent damage.

Anencephaly is a malformation of the baby's brain. It is always fatal.

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[1] Global Report on Birth Defects, March of Dimes Birth Defects Foundation, 2006
[2] Busby A et al. (2005) Preventing neural tube defects in Europe: a missed opportunity.
[3] U.S. Centers for Disease Control and Prevention: http://www.cdc.gov/ncbddd/folicacid/faqs.html
Photos from Google Images

The Remarkable Micronutrient: Folic Acid

Prevention of neural tube defects: Results of the Medical Research Council Vitamin Study

MRC VITAMIN STUDY RESEARCH GROUP*

bifida, encephalocele). A total of 1817 women at high risk of having a pregnancy with a neural tube defect, because of a previous affected pregnancy, were allocated at random to one of four groups—namely, folic acid, other vitamins, both, or neither. 1195 had a completed pregnancy in which the fetus or infant was known to have or not have a neural tube defect; 27 of these had a known neural tube defect, 6 in the folic acid groups and 21 in the two other groups, a 72% protective effect (relative risk 0·28, 95% confidence interval 0·12–0·71). The other vitamins showed no significant protective effect (relative risk 0·80, 95% CI 0·32–1·72). There was

Lancet. 1991 Jul 20;338(8760):131-7.

Multiple Options

Supplementation

Dietary Diversification

Fortification

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Images: http://www.wulongforlife.com/blog/food-groups-that-i-used-to-know/
http://www.humanbodydetectives.com/blog/supplements-to-believe-in/
http://recipeshack.com/wheat-bread-for-diabetics.html

Food Folate

Food Product	Folate (µg DFE)
Cooked chicken livers	578 per 100g portion
Cooked lentils	181 per 100g portion
Cooked spinach	146 per 100g portion
Roasted peanuts	126 per 100g portion
Raw broccoli	63 per 100g portion
Whole navel orange	48 per orange
Canned kidney beans, drained	28 per 100g portion
Large hard-boiled egg	22 per egg
Whole wheat bread (unfortified)	13 per slice

The average person does not consume 300µg/day folate through food alone

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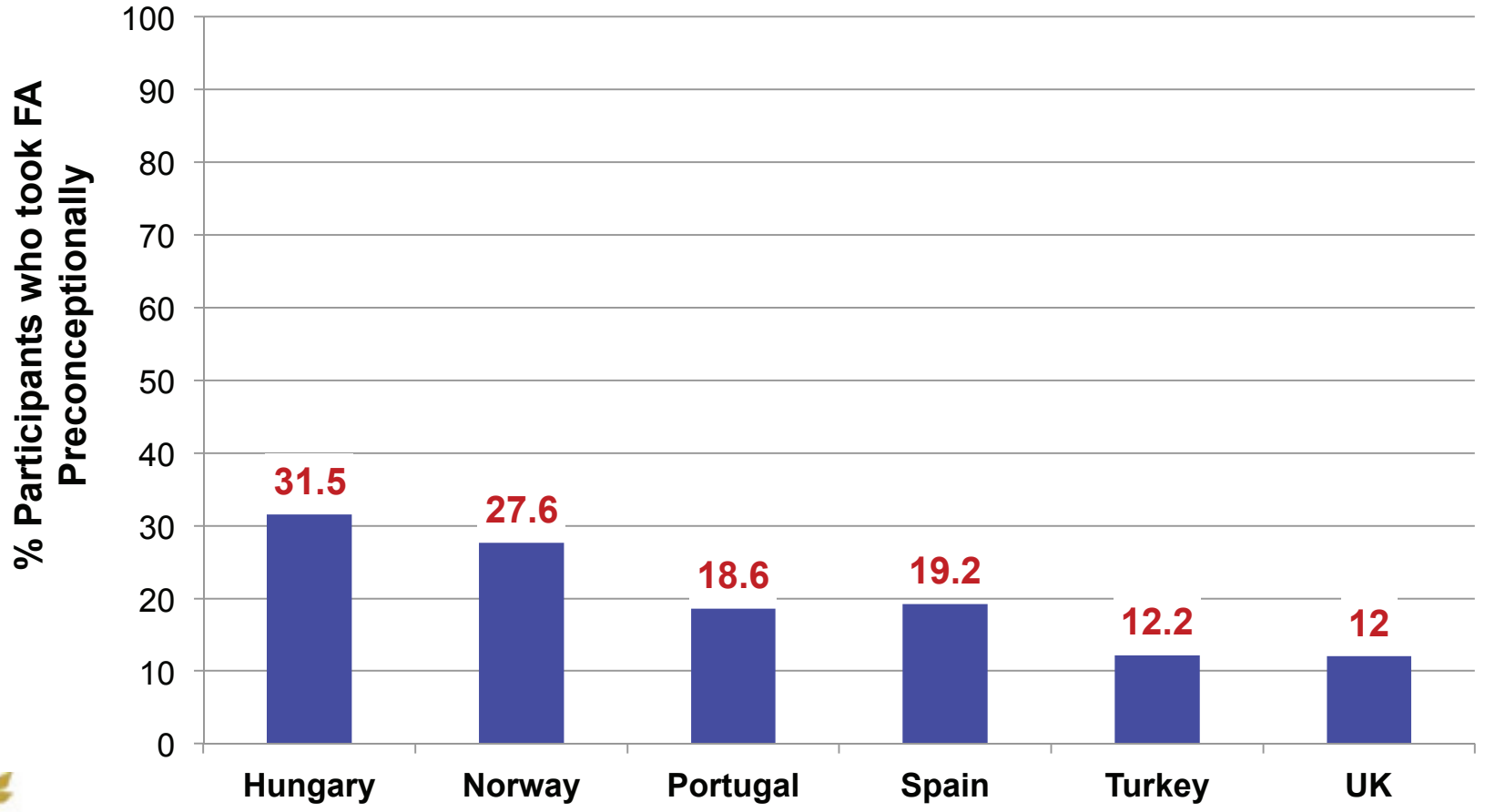
Data obtained from: http://ndb.nal.usda.gov/ (accessed 29 Aug 2013)

Preconceptional Folic Acid Intake



1. Paulik E et al. Eur J Obstet Gynecol Reprod Biol. 2009 Jul; 145(1) 49-52.
2. Nilson R et al. Am J Clin Nutr 2006; 84 : 1134-1141.
3. Pinto, E et al. Public Health Nutr. 2009 Jul; 12(7):922-931.
4. Navarrete-Muñoz EM. Med Clin (Barc). 2010 Nov 13;135(14):637-43.
5. Baykan Z et al. Arch Gynecol Obstet (2011) 283:1249-1253.
6. Brough L. J Hum Nutr Diet. 2009 Apr; 22(2): 100-107.

What is Flour Fortification?

Fortification adds vitamins and minerals to flour during the milling process so that foods made with fortified flour are more nutritious.

FFI photo

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History of Fortifying Flour with Folic Acid

1990s: Studies show folic acid reduces the risk of NTDs

1996: Oman becomes first country to fortify flour with folic acid on a national level

1998: US millers expected to fully comply with regulation to fortify enriched flour with folic acid

2004 & 2008: Technical meetings for flour fortification involving multiple respected, influential entities and experts

2009: WHO issues Recommen-dations for Wheat and Maize Flour Fortification with 5 micronutrients

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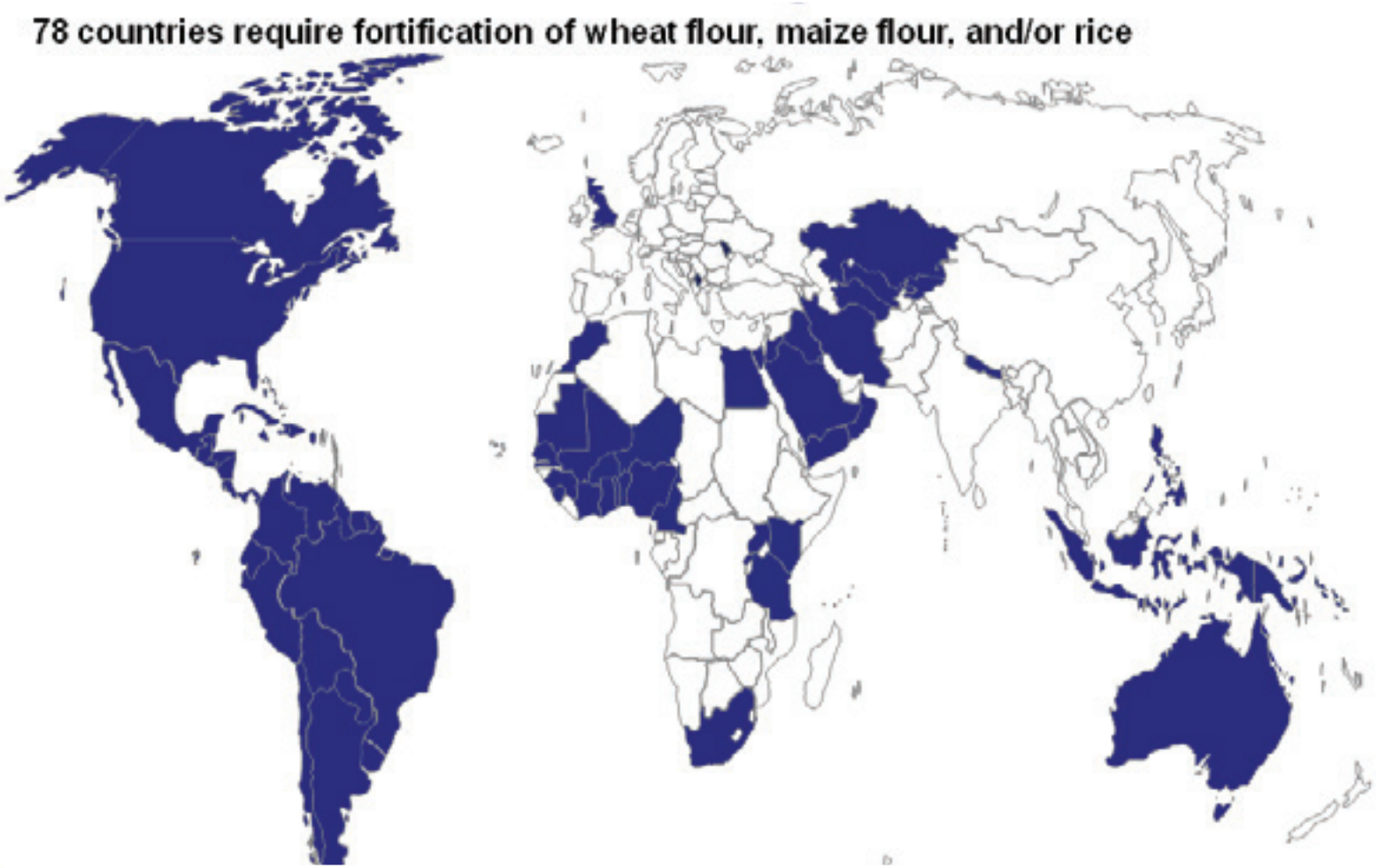
Flour Fortification Worldwide



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Global Consensus

IFSBH INTERNATIONAL FEDERATION for SPINA BIFIDA and HYDROCEPHALUS

gain Global Alliance for Improved Nutrition

Helen Keller INTERNATIONAL

unicef

Micronutrient Initiative

World Health Organization

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

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 Recommenda-*

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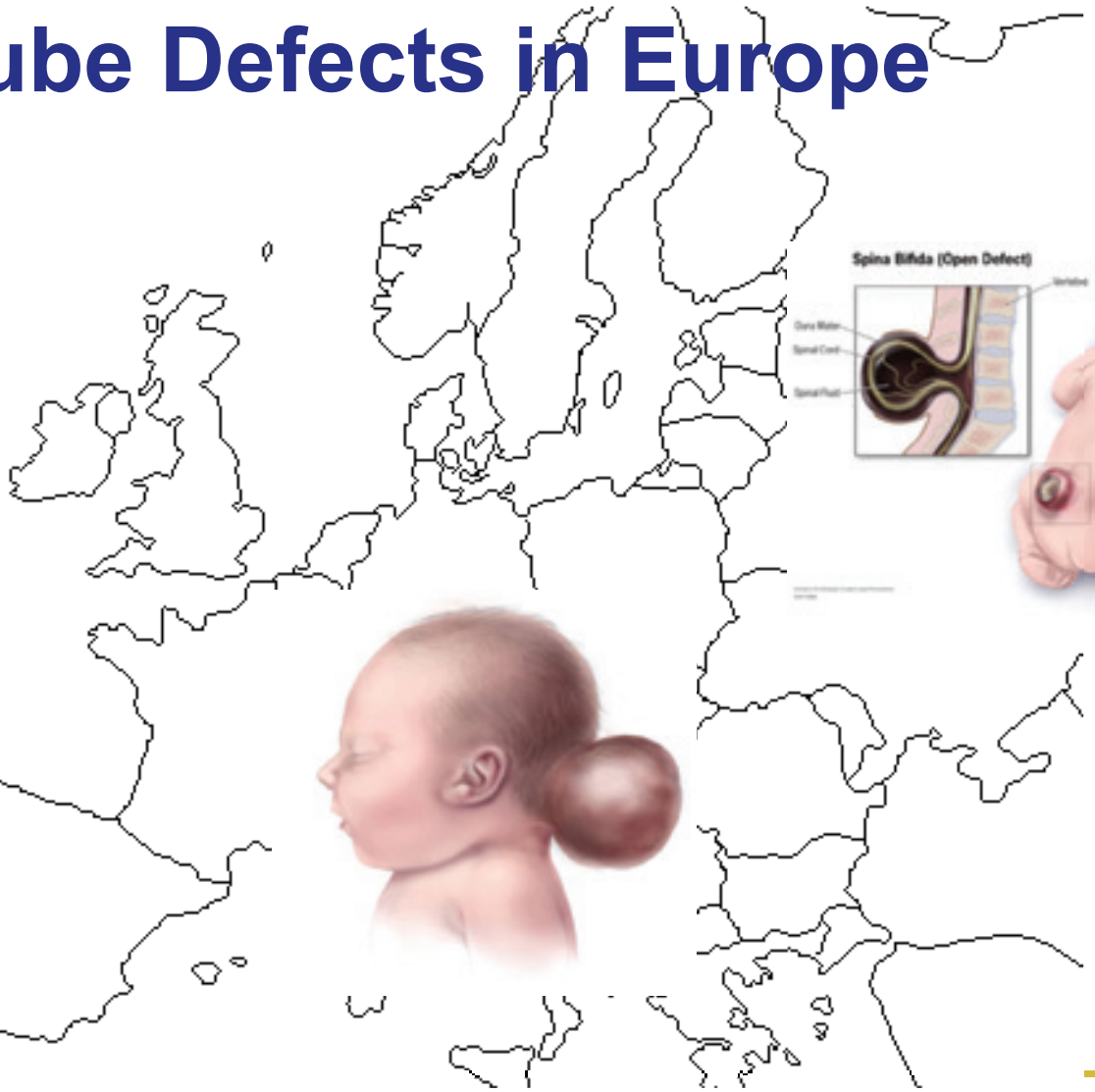
Part II:
Neural Tube Defects in Europe



Map: http://www.enchantedlearning.com/geography/europe/outlinemap/
Images: Courtesy of the Centers for Disease Control and Prevention

EUROCAT

- Started 1979
- Network of population-based registries which track congenital anomalies
- 21 countries
- 1.7 million births (29% of European births)

eurocat
european surveillance of congenital anomalies

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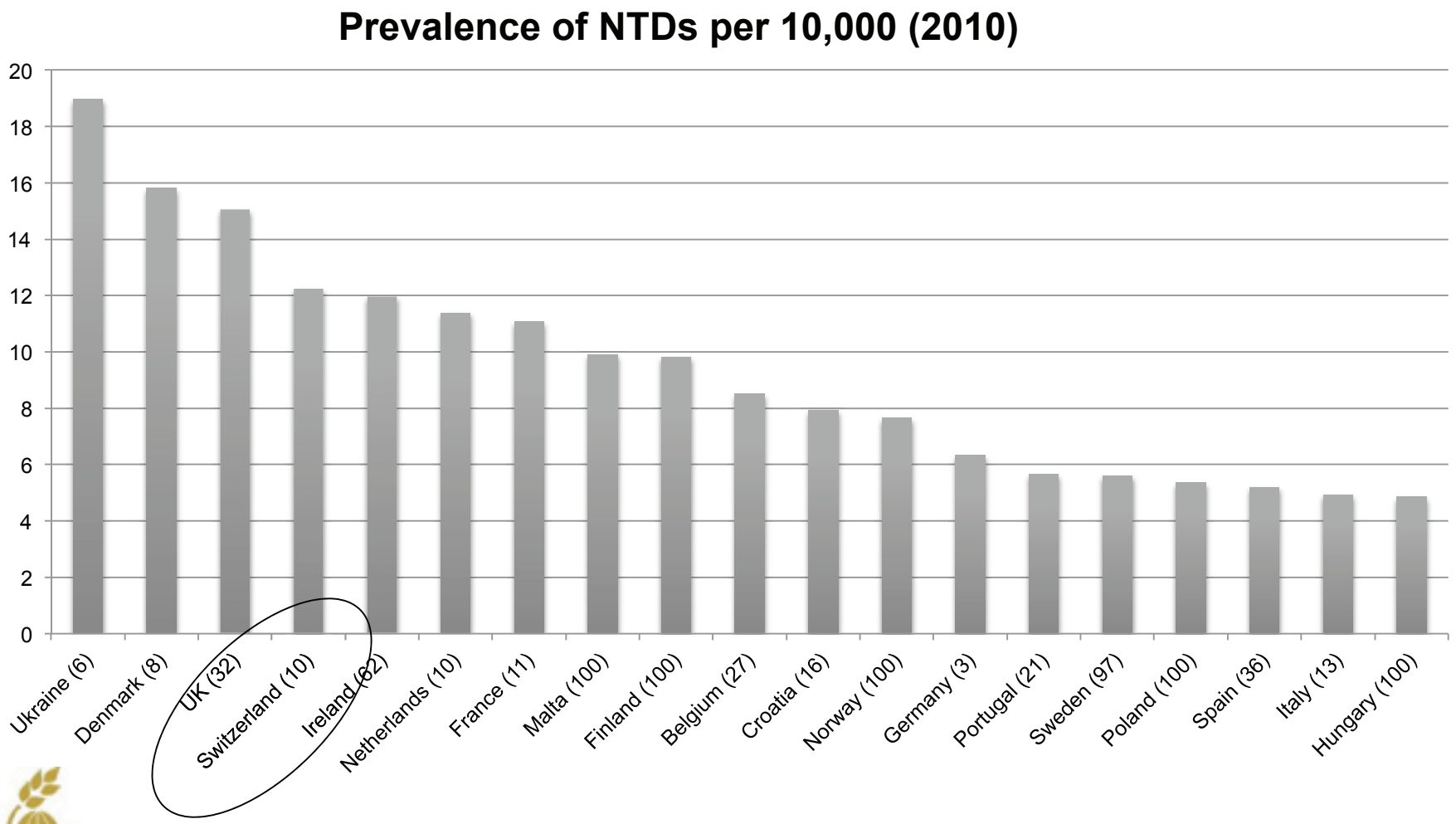
Source: http://www.eurocat-network.eu/

Neural Tube Defects in Europe



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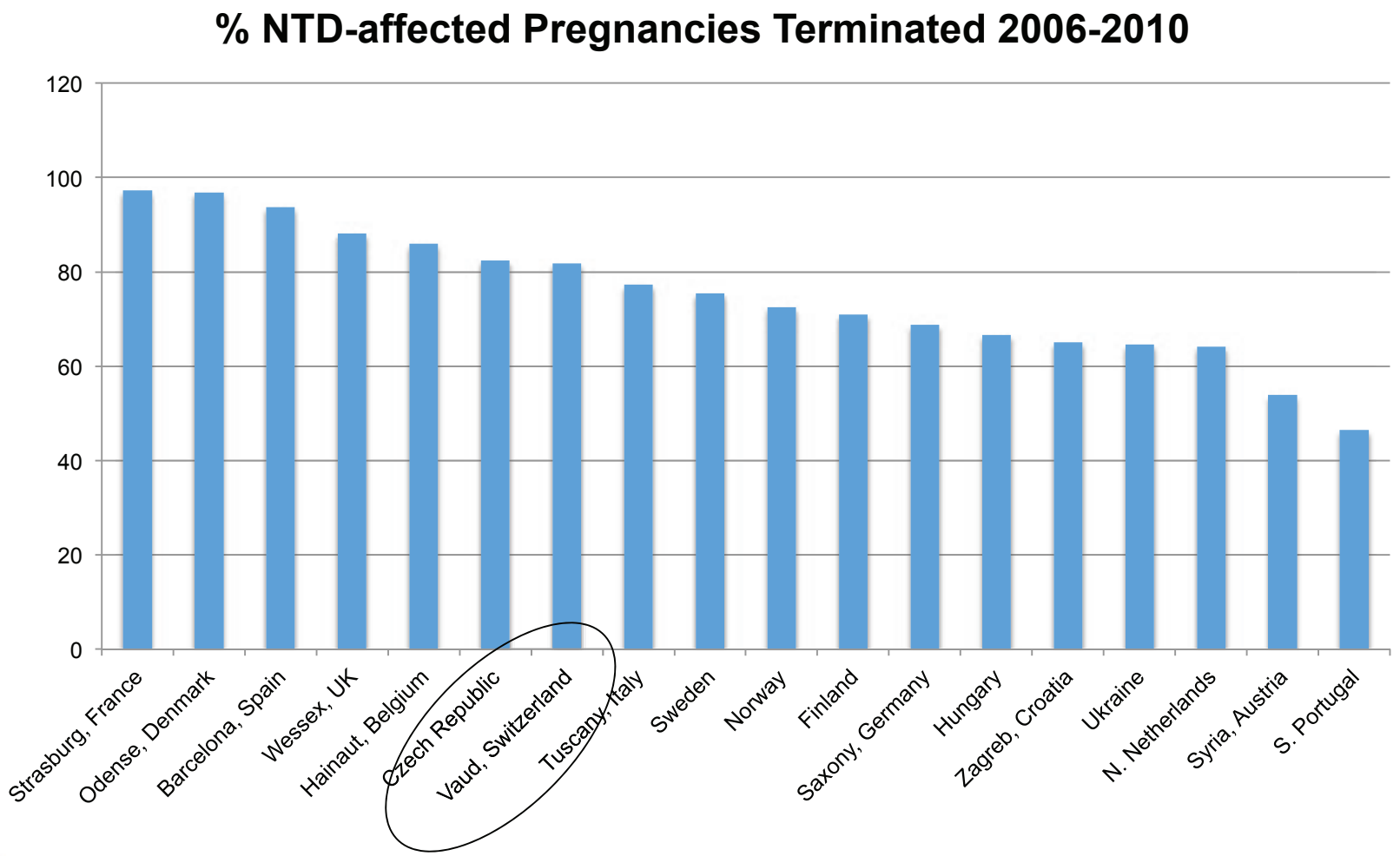
* Numbers in parenthesis indicate the % of births in the country covered by the registries

Source: EUROCAT 2010 (downloaded July 2013).

Termination of NTD-affected Pregnancies



Source: EUROCAT (2006-2010 Data). Termination information not provided for Ireland, Malta and Poland

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Part III:
Impact of Flour Fortification

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Success of Fortifying with Folic Acid: Mandatory Fortification

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

- **31% to 78% reduced risk** of neural tube defects after fortifying wheat flour with folic acid
- Overall **46% reduction** in neural tube defects after fortifying flour with folic acid

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Blencowe et al.(2010) Folic acid to reduce neonatal mortality form neural tube disorders *International Journal of Epidemiology.*
Istockphoto

Impact of Voluntary Fortification- Ireland

- 662 healthy adults (convenience sample)
- No supplement users included
- 4 day food diary and food frequency questionnaire
- > 75% consumed fortified foods at least one time per week on average (‘users’)
- Most commonly fortified foods were cereals and fat spreads
- Participants in the top tier of consumption had median intake of 208 µg/day, similar to the US at 190 µg/day

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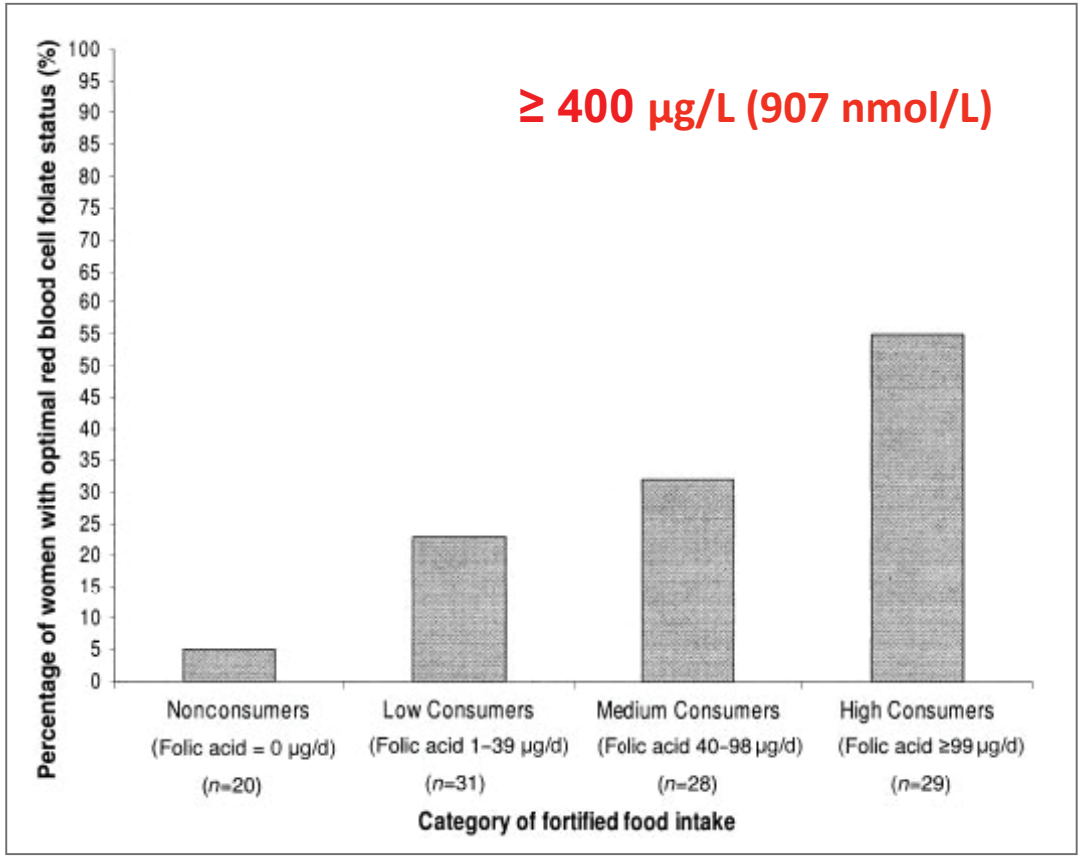
Hoey et al. (2007) Effect of a voluntary food fortification policy on folate, related B vitamin status, and homocysteine in healthy adults

Optimal RBC Folate for NTD Prevention



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Hoey et al. Am J Clin Nutr. 2007 Nov;86(5):1405-13.
Image reproduced with permission from Dr. Hoey

Part IV:
The Flour Fortification Initiative (FFI)

FFI advocates for and supports fortification of industrially milled cereal grains worldwide by collaborating with multi-sector partners so that people are smarter, stronger and healthier.

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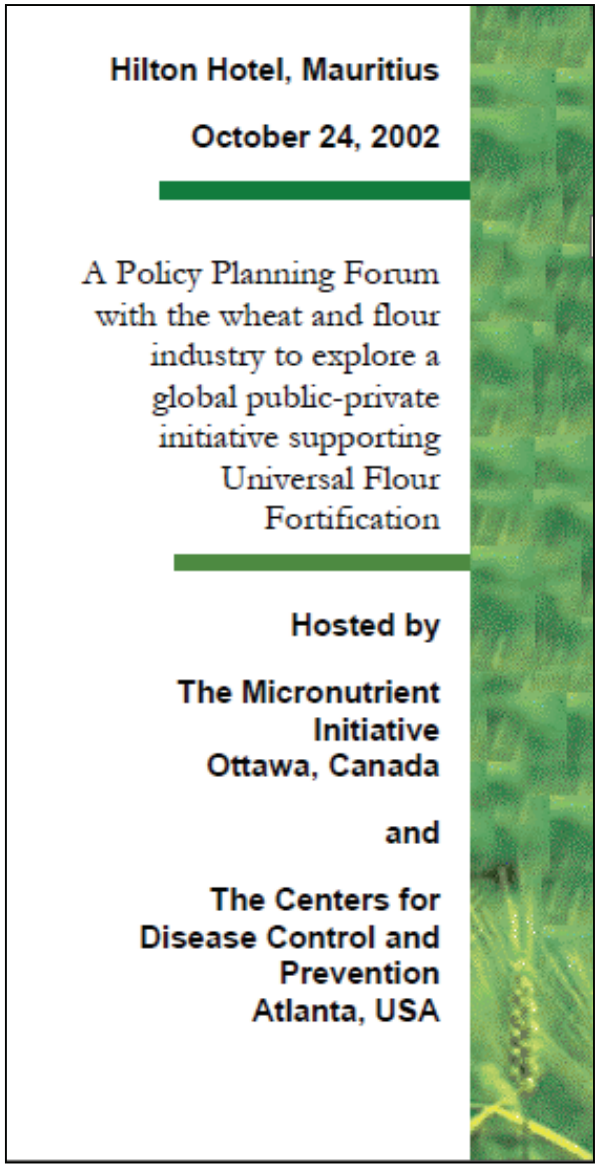
Flour Fortification Initiative (FFI)

- Based on experience with salt iodization in 1990s
- First global "Policy Planning Forum" was in 2002
- By 2003 was named the Flour Fortification Initiative



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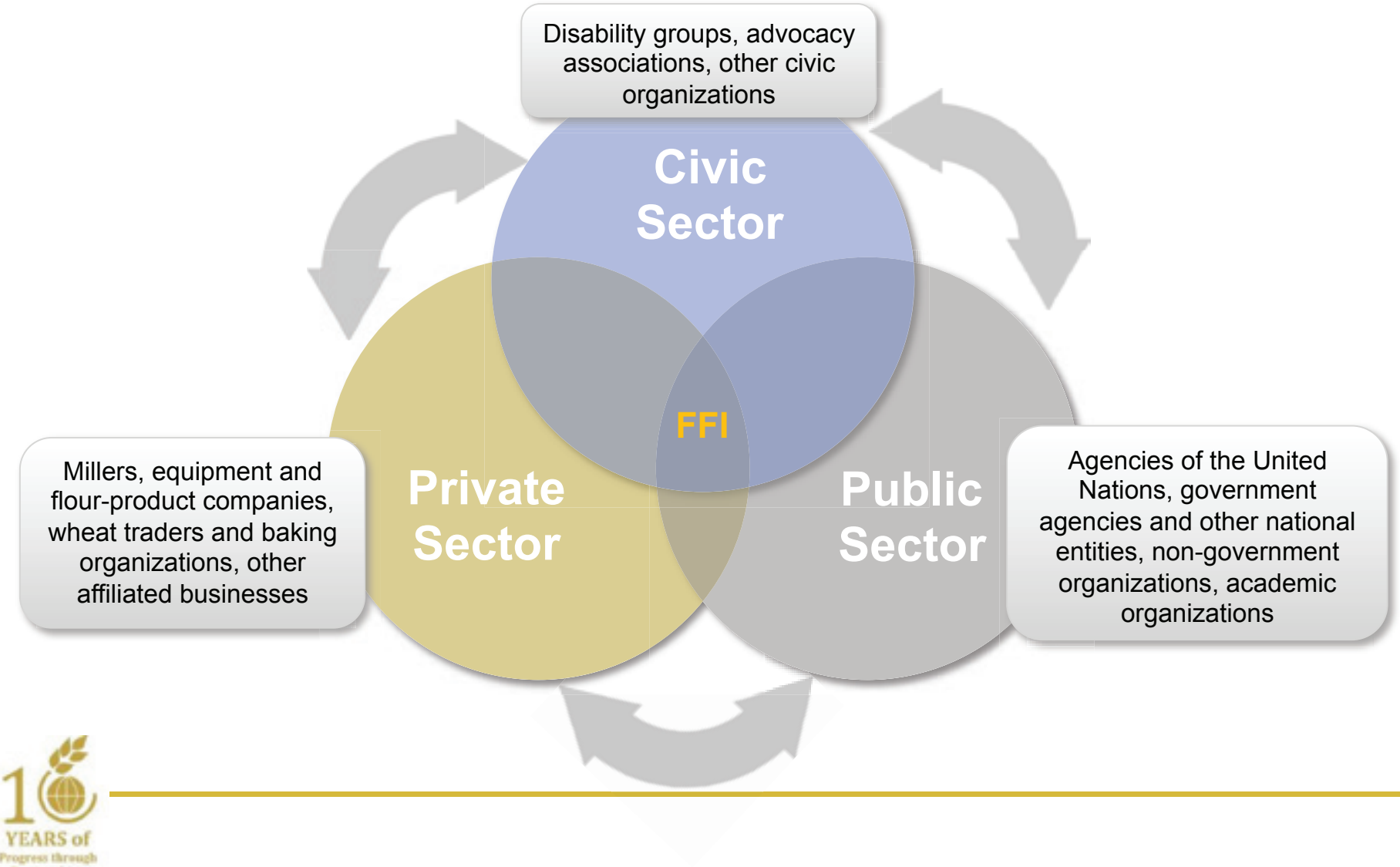
FFI Stimulates Network Interaction



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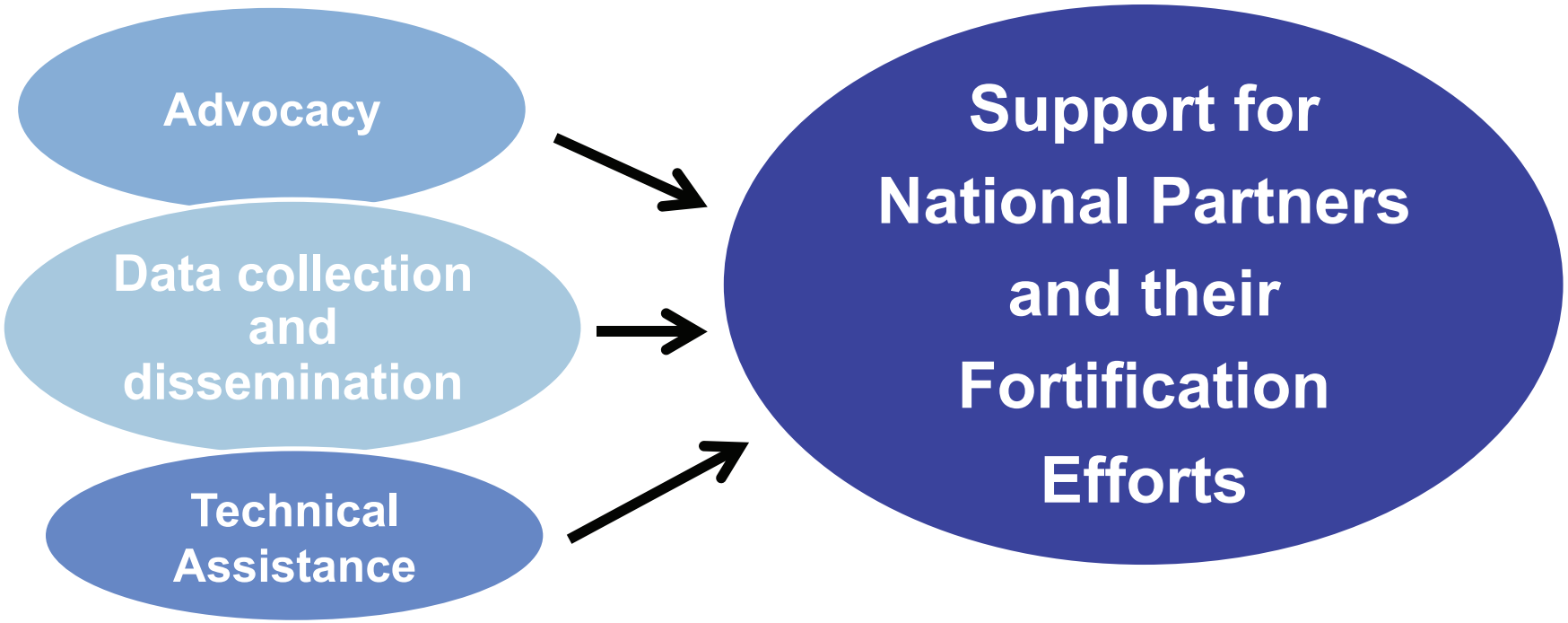
FFI's Primary Roles



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Focus on Mandatory Legislation

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

- 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

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FFI Team

Strategic direction provided by Executive Management Team of 14 members representing public, private, civic sectors

Canada
Training and Technical Support Coordinator

Europe
Senior Advisor in the Netherlands
Europe Associate in Belgium

US
- *Director*
- *Nutrition Scientist*
- *Communications Coordinator*
- *Senior Advisor*
- *Micronutrient Specialist*
- *Administrative Coordinator*

Uganda
Africa Network Coordinator

India
India Network Coordinator

Asia
Coordinators in Indonesia and Thailand

Australia
Rice Fortification Coordinator

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www.FFInetwork.org

Thank You!

My email: bhandforth@gmail.com

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