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Strengthening Partnerships, Results,  
and Innovations in Nutrition Globally

## SPRING NUTRITION TECHNICAL BRIEF

# A SIMPLE METHOD FOR MAKING A RAPID, INITIAL ASSESSMENT OF THE CONSUMPTION AND DISTRIBUTION OF IRON-FOLIC ACID SUPPLEMENTS AMONG PREGNANT WOMEN IN DEVELOPING COUNTRIES



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## **ABOUT SPRING**

The Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project is a five-year USAID-funded Cooperative Agreement to strengthen global and country efforts to scale up high-impact nutrition practices and policies and improve maternal and child nutrition outcomes. The project is managed by JSI Research & Training Institute, Inc., with partners Helen Keller International, The Manoff Group, Save the Children, and the International Food Policy Research Institute. SPRING provides state-of-the-art technical support and focuses on the prevention of stunting and maternal and child anemia in the first 1,000 days.

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## **DISCLAIMER**

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## **SPRING**

JSI Research & Training Institute, Inc.  
1616 Fort Myer Drive, 16th Floor  
Arlington, VA 22209 USA  
Phone: 703-528-7474  
Fax: 703-528-7480  
Email: [info@spring-nutrition.org](mailto:info@spring-nutrition.org)  
Internet: [www.spring-nutrition.org](http://www.spring-nutrition.org)

## THE GLOBAL BURDEN OF MATERNAL AND CHILD ANEMIA

Twenty-five percent of the world's population (over 1.6 billion people) suffers from anemia (Figure 1) (de Benoist et al. 2008). Anemia is a condition in which there is a deficiency in the number of healthy red blood cells, or less than the normal quantity of hemoglobin in the blood. Iron deficiency anemia (IDA) is associated with 22 percent (115,000) of all maternal deaths (Stoltzfus et al 2004). It is the 15th most important risk factor for total global mortality, and the 13th most important risk factor contributing to the global burden of disease (Ezatti et al. 2006). IDA's effects include increased risk of premature delivery, maternal and child mortality, and negative impacts on the cognitive and physical development of children, and on the physical stamina and productivity of people of all ages (Horton and Ross 2003).

About half of all anemia is due to iron deficiency, a condition caused by inadequate intake or low absorption of iron. Anemia is also caused by inadequate intake of other nutrients, such as vitamins A, B12, zinc and folic acid (Galloway 2003). IDA is more common during pregnancy and in infancy, when physiological iron requirements are the highest

**Table 1. Global Number and Percent of Anemic Persons (millions of persons)**

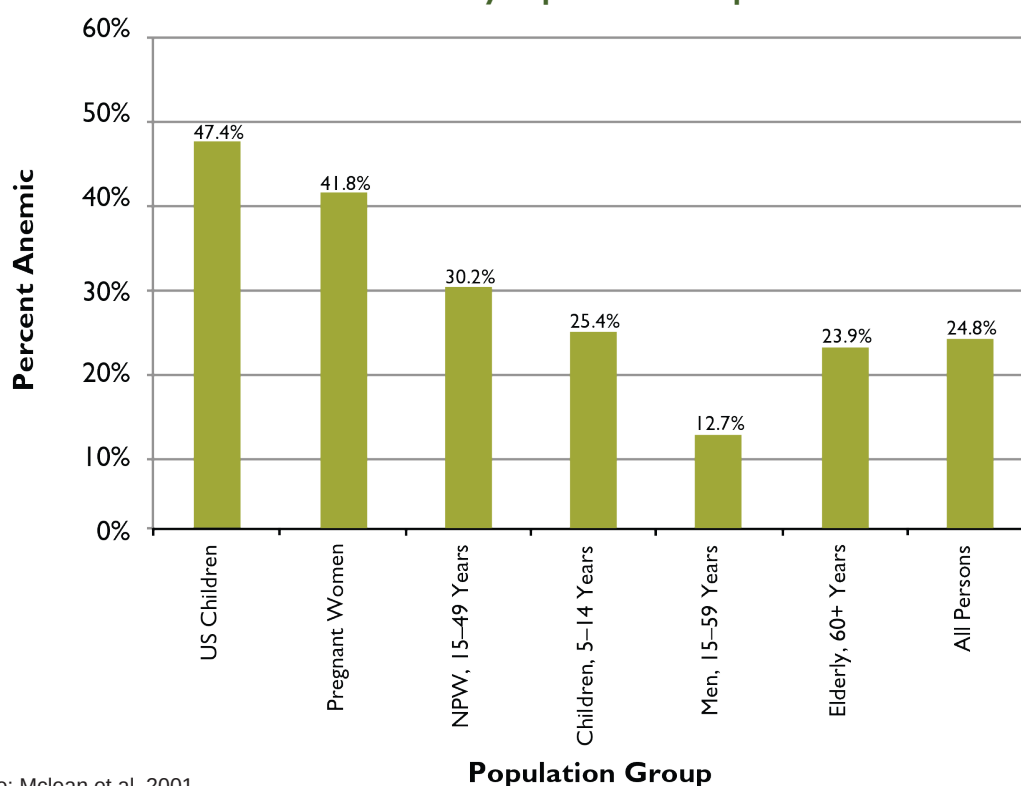
POPULATION GROUP	PERSONS	PERCENT
US Children	293.1	18%
Children 5–14 years	304.6	19%
Pregnant Women	56.5	3%
NPW, 15–49 years	468.5	29%
Women 50–59 years	75.3	5%
Men 15–59 years	259.6	16%
Elderly, 60+ years	163.8	10%
<b>GLOBAL</b>	<b>1621.4</b>	<b>100%</b>

Source: Adapted from de Benoist et al. 2008

and the amount of iron absorbed from the diet is not sufficient to meet many individuals' requirements (Stoltzfus et. al 1998). Other causes of anemia include infections—especially helminthiasis infections and red blood cell destruction due to malaria—making anemia a complex and multifaceted health problem.

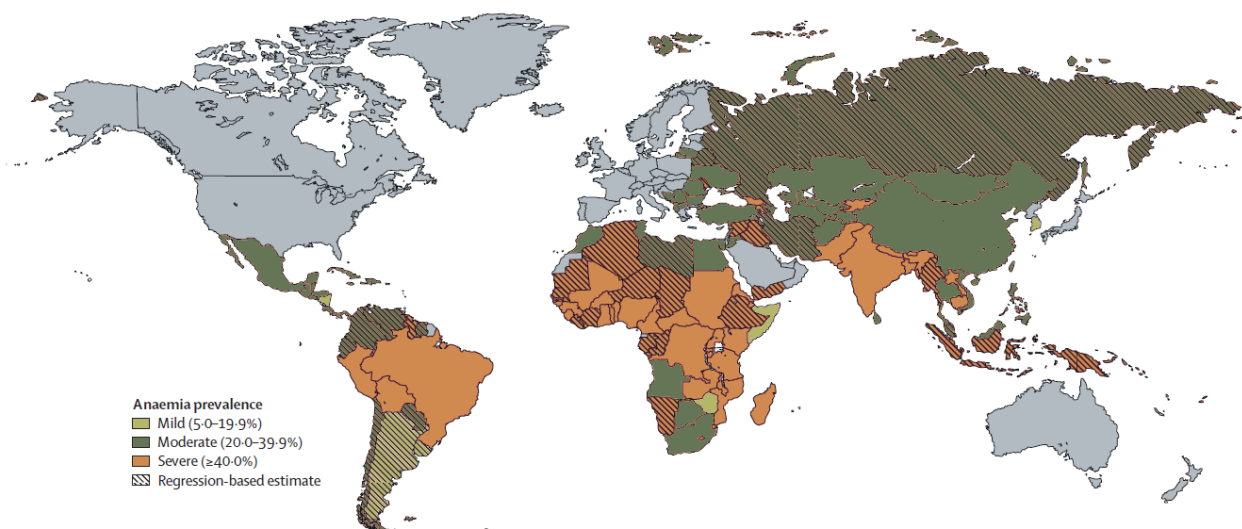
Globally, more than 600 million (pregnant and non-pregnant) women 15–59 years of age are anemic, accounting for 37 percent of all persons with anemia (Table 1).

**Figure 1. Global Prevalence of Anemia by Population Group**



Source: Mclean et al. 2001

**Figure 2. Prevalence of Anemia in Developing Countries**



Source: Balarajan et al. 2011

People living in Africa, Asia and parts of South America are the most at-risk, as shown in Figure 2.

Fifty-five percent of all anemic women 15–49 years of age live in Africa or Asia. Africa has the highest prevalence of anemia among both pregnant and non-pregnant women (Table 2). However, the largest absolute number of women with anemia (38 percent of the global total) live in South and Southeast Asia, more than twice the number of women with anemia in Africa (Table 3).

The highest prevalence and severity of anemia is among children under five and women, due in part to the high iron demands of growth and pregnancy, and exacerbated by frequent pregnancies and short birth intervals (Figure 3).

The prevalence of anemia is high among women of all socioeconomic classes, but its relative risk is greatest among the socially disadvantaged and is directly related to household wealth quintile. Women in the lowest (poorest) quintile are 25 percent more likely to have anemia than those in the highest quintile because they are less likely to be able to afford foods rich in iron and other micronutrients, and are likely to have less access to services that can help prevent or control anemia (Balarajan et al. 2011).

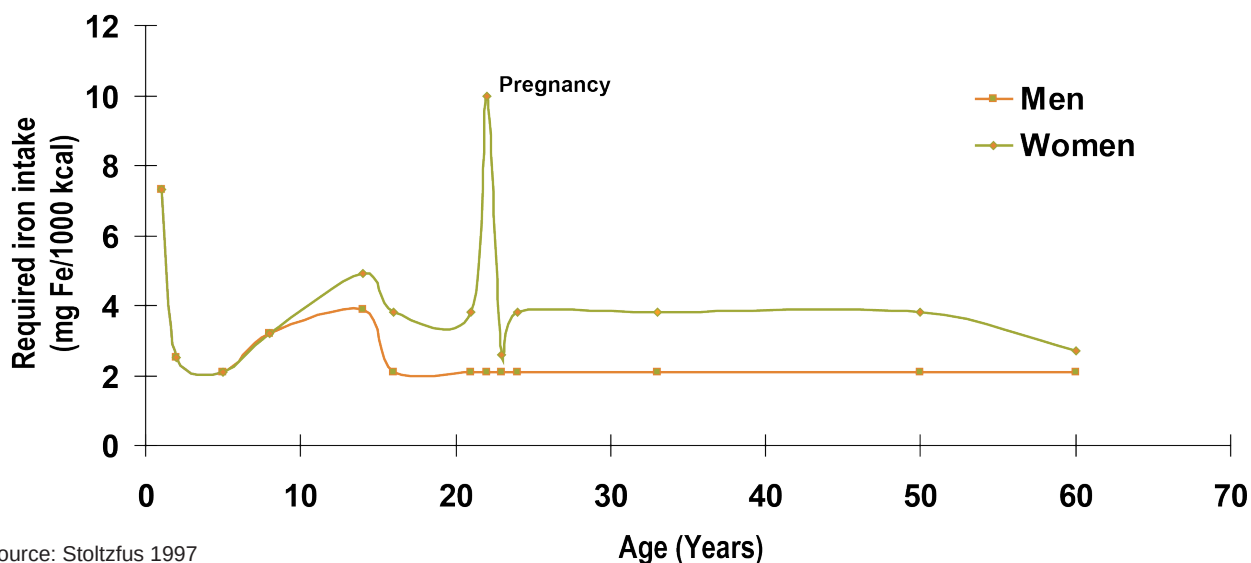
As is the case with many diseases, economic growth has been found to contribute to lowering the prevalence of anemia. The impact, however, is limited; even doubling a country's Gross Domestic Product (GDP) has been found to reduce anemia by only about 25 percent (Alderman & Linnemayr 2009). Thus, in most countries, economic growth alone will require an unacceptably long period of time—many

**Table 2. Anemia Prevalence by Sub-population and WHO Region**

WHO REGION	PREGNANT WOMEN	NON-PREGNANT WOMEN
Africa	57.1%	47.5%
Americas	24.1%	17.8%
SE Asia	48.2%	45.7%
Europe	21.0%	19.0%
Eastern Mediterranean	44.2%	32.4%
Western Pacific	30.7%	21.5%
<b>GLOBAL</b>	<b>41.8%</b>	<b>30.2%</b>

Source: Adapted from de Benoist et al. 2008

**Figure 3. Dietary Requirements throughout the Life Cycle**



Source: Stoltzfus 1997

decades—before anemia is no longer a major public health issue. At the same time, anemia also undermines economic growth: a study of 10 developing countries estimated median annual losses in productivity due to iron deficiency to be four percent of GDP (Horton and Ross 2003).

Given anemia’s multifaceted nature, an effective program to address it requires identifying its specific causes in a given setting and population, and using a cross-sectoral and integrated approach. Programs to control and prevent anemia involve multiple public and private sectors—such as agriculture to make iron-rich foods available, the commercial sector to make iron-fortified foods available, and the health sector to ensure that women and children receive appropriate services like bednets, deworming, and iron supplementation.

The supplementation of iron-folic acid (IFA) tablets during contact with antenatal care (ANC) providers is one of the oldest and most common anemia control programs. The World Health Organization (WHO) recommends that all pregnant women receive a standard dose of 30–60 mg iron and 400 µg folic acid beginning as soon as possible during gestation (WHO 2012). Ideally, women should receive iron-containing supplements no later than the first trimester of pregnancy, which means ideally taking 180 tablets before delivery.

While many countries have had ANC-based IFA distribution programs for decades, their coverage rates are often low and their potential impact on anemia is not realized. The growing rates of antenatal care coverage provide an opportunity for improving the coverage of IFA supplementation and achieving

**Table 3. Number of Women (in millions) with Anemia by Status and WHO Region**

WHO REGION	PREGNANT WOMEN	NON-PREGNANT WOMEN	ALL WOMEN 15–49 YEARS	
			NUMBER	PERCENT
Africa	17.2	69.9	87.1	17%
Americas	3.9	39	42.9	8%
SE Asia	18.1	182	200.1	38%
Europe	2.6	40.8	43.4	8%
Eastern Mediterranean	7.1	39.8	46.9	9%
Western Pacific	7.6	97	104.6	20%
<b>GLOBAL</b>	<b>56.5</b>	<b>468.5</b>	<b>525.0</b>	<b>100%</b>

Source: Adapted from de Benoist et al. 2008

greater progress on MDG 4 (Reduce Child Mortality) and MDG 5 (Improve Maternal Health), making this an opportune time for reviewing the causes of the disappointing performance of anemia programs, while keeping in mind that IFA supplementation (and this particular distribution mechanism) should constitute only a part of the strategy to prevent and control anemia.

## **A RAPID, INITIAL ASSESSMENT METHOD**

SPRING has developed a method for making a rapid, initial assessment of the strengths and weaknesses of the distribution and consumption of IFA supplements in ANC programs, based on secondary analysis of Demographic and Health Survey (DHS) data. The method makes use of population-based surveys from a nationally representative sample of all women in the country to identify country-specific quantitative measures to assess the relative significance of four sequential points at which IFA supplementation programs for pregnant women commonly falter:

1. ANC attendance / coverage
2. Receipt of at least one IFA tablet from an ANC provider
3. Consumption of one or more IFA tablets
4. Consumption of the ideal minimum of 180 IFA tablets

The method constitutes a decision tree analysis of four interactions of pregnant women and the ANC delivery system. It shows the likelihood of not fulfilling the requirements of each of the sequential, necessary, but not sufficient conditions required to ultimately achieve consumption of the ideal minimum number of IFA tablets. By tracking women's entry into and movement through the ANC system and comparing the number of IFA tablets they received and consumed to the ideal minimum number of IFA tablets, it provides a simple, initial assessment of the system. Although this initial assessment cannot identify the specific cause(s) of a system's faltering performance, it identifies the point(s) at

which the system is weak, which constitutes an essential, evidence-based, first step in improving the functioning of the system. The findings help to prioritize follow-up activities and research to better understand the causes of the identified shortcomings, such as the need to: improve the IFA supply chain, make the IFA tablets more appealing, improve provider prescribing behavior or provider counseling, increase women's compliance or identify additional distribution channels to provide greater access to IFA supplements.

SPRING is currently carrying out initial assessments in select high burden countries, and country-specific research briefs describing the analysis are available at <http://www.spring-nutrition.org>.

## REFERENCES AND RESOURCES

- Alderman, Harold and Sebastian Linnemayr. 2009. "Anemia in low income countries is unlikely to be addressed by economic development without additional programs." *Food and Nutrition Bulletin* 30(3):265-269.
- Balarajan, Yarlina, Usha Ramakrishnan, Emre Özaltin, Anuraj H. Shankar, and SV Subramanian. 2011. "Anaemia in low-income and middle-income countries." *The Lancet* 378(9809):2123-35.
- De Benoist, Bruno, Erin McLean E, Ines Egli, and Mary Cogswell (Eds.) 2008. *Worldwide prevalence of anaemia 1993-2005. WHO Global database on anaemia*. Geneva: World Health Organization and Center for Disease Control and Prevention.
- Ezzati, Majid, Stephen Vander Hoorn, Alan D. Lopez, Goodarz Danaei, Anthony Rodgers, Colin D. Mathers, and Christopher J. L. Murray. 2006. "Comparative quantification of mortality and burden of disease attributable to selected risk factors." In *Global burden of disease and risk factors*, edited by Alan D. Lopez, Colin D. Mathers, Majid Ezzati, Dean T. Jamison, and Christopher J. L. Murray, 241-268. Washington DC: World Bank and Oxford University Press.
- Galloway, Rae and Judith McGuire. 1994. "Determinants of compliance with iron supplementation: Supplies, side effects, or psychology?" *Social Science Medicine* 39(3):381-390.
- Galloway, Rae, Erin Dusch, Leslie Elder, Endang Achadi, Ruben Grajeda, Elena Hurtado, Mike Favin, Shubhada Kanani, Julie Marsaban, Nicolas Meda, K. Mona Moore, Linda Morison, Neena Raina, Jolly Rajaratnam, Javier Rodriguez, and Chitra Stephen. 2002. "Women's perceptions of iron deficiency and anaemia prevention and control in eight developing countries." *Social Science Medicine* 55(4):529-44
- Galloway, Rae. 2003. *Anemia Prevention and Control: What Works*. Washington, DC: USAID.
- Griffiths, Marcia. "Improving the chances that nutrient supplements will make a difference." Presentation at the Asia Regional Meeting, Interventions for Impact in Essential Obstetric and Newborn Care, Dhaka, Bangladesh, May 3, 2012.
- Harvey, Philip W. J. 2004. *A Strategic Approach to Anemia Control Programs*. Arlington, Virginia: MOST, USAID Micronutrient Program.
- Horton, Sue, and Jay Ross. 2003. "The Economics of Iron Deficiency." *Food Policy* 28(1):51-75.
- Kahn, Khalid S., Daniel Wojdyla, Lale Say, A. Metin Gülmezolu, and Paul F. A. Van Look. 2006. "WHO Analysis of causes of maternal death: A systematic review." *The Lancet* 367(9516):1066-1074.
- McLean, Erin, Mary Cogswell, Ines Egli, Daniel Wojdyla, and Bruno de Benoist. 2009. "Worldwide prevalence of anaemia, WHO Vitamin and Mineral Nutrition Information System, 1993–2005." *Public Health Nutrition* 12(4): 444–454.
- Moore, Mona. 1991. *A qualitative investigation of factors influencing use of iron folate tablets by pregnant women in West Java: A summary of findings*. Arlington, Virginia: MotherCare Project.
- Mwadime, Robert K. N., Philip W. J. Harvey, Sarah Naikoba, Louise Sserjongi, Hanifa Bachou, Loyce Arinaitwe, and Wamuyu G. Maina. 2004. *Overcoming Barriers to Effective Maternal Anemia Interventions during Antenatal Services in Uganda*. Arlington, Virginia: MOST, USAID Micronutrient Program.
- Rolf D. W. Klemm, A. Elisabeth Sommerfelt, Alfred Boyo, Corazon Barba, Prakash Kotecha, Mona Steffen, and Nadra Franklin. 2011. *Are we making progress on reducing anemia in women? Cross-country comparison of anemia prevalence, reach and use of antenatal care and anemia reduction interventions*. Washington, DC: Academy for Educational Development.
- Ross J, Horton S. The economic consequences of iron deficiency. Ottawa: 1998: Micronutrient Initiative.
- Sanghvi, Tina G., Philip W. J. Harvey, and Emily Wainwright. 2010. "Maternal iron-folic acid supplementation programs: Evidence of impact and implementation." *Food Nutrition Bulletin* 31(2 Supplement): S100-S107.
- Stoltzfus, Rebecca J. 1997. "Rethinking anaemia surveillance." *The Lancet* 349(9067):1764– 1766.
- Stoltzfus, Rebecca J., and Michele L. Dreyfuss. 1998. *Guidelines for the use of Iron Supplements to Prevent and Treat Iron Deficiency Anemia*. Washington DC: ILSI Press.
- Stoltzfus, Rebecca J., Luke Mullany, and Robert E. Black. 2004. "Iron Deficiency Anemia." In *Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*, edited by Majid Ezzati, Alan D. Lopez, Anthony Rodgers, and Christopher J. L. Murray, 163-209. Geneva, Switzerland: World Health Organization.
- USAID, A2Z Project, ACCESS Program, Food and Nutrition Technical Assistance (FANTA) Project. 2006. *Maternal anemia: A preventable killer*. Washington DC: Academy for Educational Development.
- Winichagoon, Pattanee. 2002. "Prevention and control of anemia: Thailand experiences." *Journal of Nutrition* 132(4 Supplement):862S-866S.
- World Health Organization (WHO). 2006. "Iron and Folate Supplementation." In *Standards for Maternal and Neonatal Care, Integrated Management of Pregnancy and Childbirth (IMPAC) Vol. 1.8*, 1-6. Geneva: World Health Organization.
- WHO. 2009. *Weekly iron-folic acid supplementation (WIFS) in women in reproductive age: its role in promoting optimal maternal and child health. Position Statement*. Geneva: World Health Organization.
- WHO. 2012. "Guideline: Daily Iron and Folic Acid Supplementation in Pregnant Women." Geneva: WHO.
- WHO, United Nations University, UNICEF. 2001. *Iron deficiency anaemia: assessment, prevention and control. A guide for programme managers*. Geneva: World Health Organization, 2001.



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