REPORT

MEETING ON WEEKLY IRON/FOLIC ACID SUPPLEMENTATION FOR PREVENTING ANAEMIA IN WOMEN OF REPRODUCTIVE AGE IN THE WESTERN PACIFIC REGION

Manila, Philippines
29 September – 1 October 2003

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February 2004
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MEETING ON WEEKLY IRON/FOLIC ACID SUPPLEMENTATION FOR PREVENTING ANAEMIA IN WOMEN OF REPRODUCTIVE AGE IN THE WESTERN PACIFIC REGION

Convened by:

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NOTE

The views expressed in this report are those of the participants in the Meeting on Weekly Iron/Folic Acid Supplementation for Preventing Anaemia in Women of Reproductive Age in the Western Pacific Region and do not necessarily reflect the policies of the Organization.

This report has been prepared by the World Health Organization Regional Office for the Western Pacific for governments of Member States in the Region and for those who participated in the Meeting on Weekly Iron/Folic Acid Supplementation for Preventing Anaemia in Women of Reproductive Age in the Western Pacific Region, which was held in Manila, Philippines from 29 September to 1 October 2003.
# CONTENTS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMMARY .................................................................</td>
</tr>
<tr>
<td>1. INTRODUCTION .....................................................</td>
</tr>
<tr>
<td>1.1 Objectives ..........................................................</td>
</tr>
<tr>
<td>1.2 Organization (Annex 1) ...........................................</td>
</tr>
<tr>
<td>1.3 Participants and resource persons (Annex 2) ................</td>
</tr>
<tr>
<td>1.4 Opening comments ................................................</td>
</tr>
<tr>
<td>2. PROCEEDINGS ........................................................</td>
</tr>
<tr>
<td>2.1 Presentations of background papers ..........................</td>
</tr>
<tr>
<td>3. GENERAL DISCUSSION OF COUNTRY PAPERS ..................</td>
</tr>
<tr>
<td>3.1 General discussion of all country papers ..................</td>
</tr>
<tr>
<td>3.2 Preparation of country papers for publication ............</td>
</tr>
<tr>
<td>3.3 Titles for papers ..................................................</td>
</tr>
<tr>
<td>3.4 Time frame ...........................................................</td>
</tr>
<tr>
<td>3.5 Other general issues discussed ...............................</td>
</tr>
<tr>
<td>4. PUBLICATION STRATEGY ...........................................</td>
</tr>
<tr>
<td>4.1 Journal selection and process for submission ..............</td>
</tr>
<tr>
<td>4.2 Editors and reviewers ..............................................</td>
</tr>
<tr>
<td>5. COUNTRY FUTURE PLANS FOR EXPANSION ....................</td>
</tr>
<tr>
<td>5.1 Cambodia ..............................................................</td>
</tr>
<tr>
<td>5.2 China .................................................................</td>
</tr>
<tr>
<td>5.3 The Lao People's Democratic Republic .......................</td>
</tr>
<tr>
<td>5.4 Philippines ...........................................................</td>
</tr>
<tr>
<td>5.5 Viet Nam ..............................................................</td>
</tr>
<tr>
<td>6. CONCLUSIONS AND RECOMMENDATIONS AND FINAL SYNTHESIS PAPER ....</td>
</tr>
<tr>
<td>7. CLOSING ....................................................................</td>
</tr>
</tbody>
</table>
ANNEXES:

ANNEX 1 - OBJECTIVES AND AGENDA OF THE MEETING

ANNEX 2 - LIST OF TEMPORARY ADVISERS, RESOURCE PERSONS, REPRESENTATIVES AND OBSERVERS, SECRETARIAT

ANNEX 3a - THE IMPORTANCE OF IRON NUTRITION IN WOMEN (FERNANDO VITERI)

ANNEX 3b - CAUTIONS IN EXTRAPOLATING TO MULTIPLE MICRONUTRIENT SUPPLEMENTATION FOR PREGNANT WOMEN FROM SUCCESS WITH IRON SUPPLEMENTATION (BARBARA UNDERWOOD)

ANNEX 4a - WEEKLY IRON/FOLATE SUPPLEMENTATION PILOT PROGRAM FOR PREVENTION OF ANEMIA IN WOMEN OF REPRODUCTIVE AGE, CAMBODIA 2001-2002 (SAU SOKUN MEALINY)

ANNEX 4b - WEEKLY IRON/FOLATE SUPPLEMENTATION AND SOCIAL MARKETING IN CAMBODIA (BYRON CRAPE)

ANNEX 4c - WEEKLY IRON SUPPLEMENTATION – ANTHROPOMETRIC, STOOL AND HEMOGLOBIN SURVEY IN SCHOOL HEALTH PROGRAM, KAMPOT, CAMBODIA, SUPPORTED BY GTZ (CAMBODIAN-GERMAN COOPERATION) (PHILIP LONGFILS)

ANNEX 5a - INTRODUCTION OF WEEKLY IRON-FOLATE SUPPLEMENTS TO IMPROVE IRON STATUS AND PREVENT PREGNANCY ANEMIA IN WOMEN OF REPRODUCTIVE AGE IN SELECTED AREAS IN THE PHILIPPINES: THE PROCESS (LOURDES PAULINO)

ANNEX 5b - THE EFFECTS OF A COMMUNITY-BASED WEEKLY IRON-FOLATE SUPPLEMENTATION ON HEMOGLOBIN AND IRON STATUS OF PREGNANT AND NON-PREGNANT WOMEN IN THE PHILIPPINES (IMELDA ANGELES-AGDEPPA)

ANNEX 5c - FEMINA – LEARNINGS FROM PILOT PROJECT AND NATIONAL LAUNCH (EVA DATOL)

ANNEX 6a - INTRODUCTION OF A NEW APPROACH TOWARDS WEEKLY IRON FOLATE SUPPLEMENTATION FOR CONTROLLING ANEMIA AMONG REPRODUCTIVE WOMEN IN VIET NAM (H.K. THANH, S. SUTTILAK, N.C. KHAN, N.D. QUANG, J.BERGER, N.PALIAKARA, T. CAVALLI-SFORZA, P.T. HOA, ET. AL.)

ANNEX 6b - EFFECTIVENESS OF WEEKLY IRON/FOLATE SUPPLEMENTATION ON ANEMIA AND IRON STATUS IN WOMEN OF REPRODUCTIVE AGE IN RURAL VIET NAM (J.BERGER, T.K. THAN, N.C. KHAN, L.T. CAVALLI-SFORZA, ET AL)
ANNEX 7 - GUIDELINES FOR PREPARATION OF PROCESS PAPERS FOR PUBLICATION

ANNEX 8 - GUIDELINES FOR PREPARATION OF IMPACT PAPERS FOR PUBLICATION

ANNEX 9 - TITLES AGREED UPON FOR PAPERS TO BE USED IN SUPPLEMENT FOR PUBLICATION

Keywords:

SUMMARY

The WHO Regional Office for the Western Pacific sponsored unsupervised effectiveness projects in Cambodia, the Philippines and Viet Nam to reduce the prevalence of iron deficiency (ID) and iron deficiency anaemia (IDA) in women of reproductive age (WRA) through the weekly distribution of iron/folic acid supplements (WIFS) introduced to the target populations concurrent with an intensive community mobilization and social marketing programme. The linked approach—new for the Region—was proposed to enhance acceptance of the supplements and compliance in using them, thus overcoming the relatively unsuccessful programmes of supplement distribution to control anaemia that have been on-going for years through distribution of free supplements through the health system. Community workers in each country received training in counselling, and community groups were mobilized and educated about ID, IDA and local food sources rich in iron to be consumed along with WIFS for anaemia control. The advocacy campaign was focused on the four ‘Ps’—product, place, price, and promotion—to guide development of appropriate information, education and communication (IEC) materials. The target population in Cambodia was non-pregnant WRAs in factories, schools and rural villages. In the Philippines and Viet Nam both pregnant and non-pregnant village women were targeted. A uniform supplement containing 60 mg iron as ferrous sulfate + 3.5 mg folic acid for non-pregnant WRAs, or 120 mg iron as ferrous sulfate + 3.5 mg folic acid for pregnant women, was taken weekly as appropriate for each target population. Supplements were provided free of charge to pregnant women through health centre units and sold to non-pregnant WRAs for an affordable price by community collaborators, except among factory workers in Cambodia where governmental regulations required employers to provide free health care. Community committees managed funds collected from sales using some to compensate sales agents (about 20%) and some for maintenance of the programme (about 30%). The remaining funds were deposited into community banks or revolving funds which were controlled at the community level (about 50%). Outcome measures included an evaluation of changes from baseline in knowledge, attitudes and practices (KAP), and changes in the prevalence of anaemia (haemoglobin values [Hb]), at 4, 9 and 12 months during the year of intervention. In the Philippines and Viet Nam, iron status as indicated by serum ferritin values (SF) and transferrin receptors (TR) were also evaluated.

The social marketing/mobilization effort in all three countries resulted in significant positive KAP changes in awareness of iron-rich foods, knowledge of ID and IDA, and attitudes toward acceptance of weekly supplements. Anaemia prevalence declined in schoolgirls in Cambodia, but not among rural women and WRAs in factories. Pregnant and non-pregnant women in the Philippines who took the WIFS improved in iron status (SF values) but there was only an insignificant impact on anaemia, probably because of the contribution of other causes of anaemia, perhaps lack of other hematinic micronutrients, but not infections. In Viet Nam, anaemia prevalence declined very significantly, but remained relatively high, while iron status improved, indicating, as in the Philippines, that other causes of anaemia were not addressed by WIFS alone. The Viet Nam project provided evidence that pre-pregnancy consumption of WIFS for a minimum of three months, but better if six months, can reduce significantly the likelihood that a woman will become anaemic during pregnancy. Deworming did not improve the effectiveness of WIFS in reducing anaemia, but did reduce the intensity of hookworm load and should be continued. In all three countries, WIFS is an important intervention for anaemia control, but should be accompanied with additional programmes to control the other causes of
anaemia that prevail in the Region, i.e., diets deficient in bioavailable hematinic micronutrients, hookworm, malaria and shistosomiasis, and cultural practices that lead to lack of appropriate birth spacing and birthing practices.

The objectives of this meeting, which was held from 29 September to 1 October 2003 in Manila, Philippines, were:

(1) to review the outcomes of pilot projects on unsupervised weekly iron/folic acid supplementation for preventing anaemia in women of reproductive age in Western Pacific countries;

(2) to analyze the impact of this approach on haemoglobin and iron stores in free-living populations; and the impact of iron nutrition in the first trimester of pregnancy on iron and haemoglobin status throughout pregnancy (and birth weight, if possible);

(3) to discuss the process through which the supplements have been promoted, using social marketing and community mobilization, and the impact of this approach on improving the knowledge, attitude and practices of WRA;

(4) to draw conclusions and recommendations for scaling up the approach and for possible extension to other countries, including through school health programmes and within the framework of safe motherhood programmes; and

(5) to review and prepare for publication papers to be submitted to an international journal.

Participants at the meeting concluded that the new approach including social marketing and community mobilization linked to availability of WIFS for purchase in local outlets by non-pregnant WRAs, and provided free to pregnant women through prenatal care units, can significantly reduce IDA in the Region, and perhaps worldwide. Each participating country presented preliminary draft plans for expansion of the project and representatives from both China and the Lao People’s Democratic Republic expressed interest in applying this approach in their countries. Accomplishing these objectives will require further development of public/private partnerships between government at all levels, community leaders, civil populations and industry. Participants also agreed upon publication of their project results, with accompanying introductory concept papers on social marketing and community participation and on the rationale for WIFS, as a supplement to a respected journal.

Recommendations agreed upon at the meeting include:

(1) There is sufficient evidence to recommend that WHO and countries in the Western Pacific Region consider recommending the ‘packaged approach’ in introducing WIFS for WRAs where anaemia prevalence constitutes a public health problem. This should be done by encouraging public/private partnerships with pharmaceutical industries, the health and education sectors, nongovernmental organizations (NGOs) and community organizations, using social marketing and community mobilization.
For other age groups not covered in the projects, reference should be made to the WHO/INACG/UNICEF Guidelines of 1998, Table 6 (see page 15).

The final paper for the supplement should include:

- Overall conclusions and recommendations drawn from commonalities in other papers, e.g. role of other micronutrients as causes of anaemia.
- Future research needs, drawn from other papers and additional considerations.
- The safety of the supplementation approach in the context of other ongoing programmes to improve iron nutrition and prevent anaemia, e.g. fortification.
- The data are not available to project the numbers of lives saved, etc.. However, projections could be made on the reduction in ID and IDA if there is a 20% reduction in maternal deaths due to anaemia in relation to achievement of the United Nations Millennium Development Goals (MDGs).
- Extrapolations should not be made beyond what data are available to support. The analysis can still relate to achievement of the MDGs, etc., noting that other projections can be made as additional data becomes available.
- In supervised situations such as schools, enough data has accumulated to recommend WIFS for reproductive age girls for nationwide WIFS programmes.
- In unsupervised situations, countries should put in place a system that will assure regular intake of iron supplements by WRA.
- A paradigm change is needed from curative to preventive iron/folic acid supplementation for WRAs, realizing that the whole process of implementation must be improved at the national down to the village level. Success in these projects was due to collaboration so final recommendations should suggest the roles of each partner based on the experience from this project. Collaboration is needed among:
  (1) WHO/international agencies
  (2) Governments
  (3) Private sector
  (4) Community leaders
  (5) Civil society
- A key message from the three country studies for WRA is the need for WIFS supplementation from the time menstrual period begins until menopause—the high risk period for anaemia.
1. INTRODUCTION

1.1 Objectives

The objectives of the meeting were:

(1) to review the outcomes of pilot projects on unsupervised weekly iron/folic acid supplementation for preventing anaemia in women of reproductive age (WRA) in Western Pacific countries;

(2) to analyze the impact of this approach on haemoglobin and iron stores in free-living populations; and the impact of iron nutrition in the first trimester of pregnancy on iron and haemoglobin status throughout pregnancy (and birth weight, if possible);

(3) to discuss the process through which the supplements have been promoted, using social marketing and community mobilization, and the impact of this approach on improving the knowledge, attitude and practices of WRA;

(4) to draw conclusions and recommendations for scaling up the approach and for possible extension to other countries, including through school health programmes and within the framework of safe motherhood programmes; and

(5) to review and prepare for publication papers to be submitted to an international journal.

1.2 Organization (Annex 1)

The meeting was organized in plenary sessions for presentation of an introductory paper on weekly iron/folic acid implementation and of papers on the process and impact of each programme, followed by discussion of each paper. The group altered the original agenda to allow all country papers to be presented in sequence before proceeding to the next set of country papers. Background papers describing the process, including social marketing and mobilization, in implementing weekly distribution of iron/folic acid supplements (WIFS), preceded a background paper on the impact of WIFS on anaemia and iron status. Discussions that followed each presentation aimed to draw out strengths and weaknesses of the projects and lessons learned. A discussion of publication strategies occurred in plenary session. Two groups then met separately so that those participants with an interest in the ‘process’ and in the ‘impact’ of programmes could develop a format for use in preparation of country papers for publication. Participants then separated into the three country groups to suggest titles and contents for each paper, which were later approved in plenary. During the plenary session, the structure of the proposed supplement and the criteria for authorship and the responsible contact person for each paper was clarified. Country groups then met to discuss future plans for expansion of WIFS. A final plenary session discussed what might be overall conclusions and recommendations for the final synthesis paper.
It is expected that this paper will be included together with introductory and project papers and be submitted as a supplement to a scientific journal.

1.3 Participants and resource persons (Annex 2)

The meeting was attended by 12 representatives from Cambodia, China, the Lao People's Democratic Republic, the Philippines and Viet Nam, and five resource persons from the Philippines, Thailand, the United States of America and Venezuela. They came from ministries of health, research institutes, national nutrition centres, maternal and child health services, food and drug bureaus and the pharmaceutical industry. Two international agencies were represented and three nongovernmental organizations (NGOs).

1.4 Opening comments

Dr Shigeru Omi, Regional Director of the WHO Regional Office for the Western Pacific opened the meeting. He highlighted the global significant contribution of iron deficiency (ID) to death and disability-adjusted life years and to maternal mortality. In the Western Pacific Region, anaemia prevalence among pregnant women is estimated to be 40%, and in Cambodia, the Philippines and Viet Nam over 50%. Anaemia in the Region is due to multiple causes, thus requiring multiple interventions to successfully control it, e.g. control of malaria, hookworm, and shistosomiasis, as well as ID. Dr Omi noted the lack of success in previous years of controlling pregnancy anaemia by providing free iron/folic acid supplements distributed through the health services and meant to be taken daily. This was the basis for the WHO Regional Office for the Western Pacific to test a new approach in three countries with high anaemia rates: Cambodia, the Philippines and Viet Nam. In these three countries, pilot projects were introduced that provided weekly supplements for purchase together with an intensive social mobilization and marketing programme. He noted that all three projects were completed and it was therefore time to report on the process and impact of the new approach, draw conclusions from the experience, and consider whether expansion is appropriate and how to do so within the context of countries in the Region. Dr Omi then challenged the group to review the projects for answers to five questions: (1) What is needed to make weekly iron/folic acid successful in free-living populations? (2) Is iron/folic acid supplementation sufficient, or are other measures necessary to substantially reduce anaemia and improve the iron status in pregnant and non-pregnant women? (3) Should other nutrients like vitamin A be added to supplements to achieve the goal in these countries? (4) Is supplementation sufficient, or are other measures – like deworming, control of infection, improved water and sanitation - just as important to have a significant impact? (5) What are the conditions and partnerships needed to make these programmes sustainable?
2. PROCEEDINGS

2.1 Presentations of background papers

2.1.1 Importance of Pre-Pregnancy and Pregnancy Iron Status: Can Long-term Weekly Preventive Iron Supplementation Achieve Desirable and Safe Status? (Fernando Viteri, MD, ScD); and Cautions in Extrapolating to Multiple Micronutrient Supplementation for Pregnant Women from Success with Iron Supplementation (Barbara A. Underwood, PhD) (See Annex 3a and 3b for Power Point presentations.)

Dr Viteri’s paper noted that women of childbearing age are at risk of ID that over several months can result in iron deficiency anaemia (IDA), the situation for over 41% of such women who reside in South East Asia. Estimates suggest that in the developed world for every anaemic woman there are 2-2 ½ women who are iron deficient without anaemia, but confirmatory data are lacking from the developing world where other causes of anaemia are frequent. Regardless, less than desirable pre-pregnancy iron reserves to meet the needs of pregnancy occur in many women both in the industrialized and non-industrialized countries. The anaemia problem was reduced by fortification of sugar and fish sauce with iron (NaFeEDTA) in Guatemala and Viet Nam, respectively, but iron stores may remain below a desirable level (300 mg or more) for the majority of women. Dr Viteri suggested that any of the diagnostic tools currently available provide only a rough approximation of both iron status and anaemia and that new diagnostic tools are urgently needed. Nonetheless, the preponderance of evidence indicates that there are benefits to iron supplementation during pregnancy that translate into improved iron status of the infant during the first year of life, although an influence on birth weight remain inconsistent. The presentation underscored that research suggests that correction of anaemia before the end of the second trimester has greater beneficial effect than third trimester correction. Overall, the available data indicate that adequate iron status and no anaemia early in pregnancy are highly desirable. On the other hand, accumulating evidence suggests that ingesting more iron than needed, resulting in haemoglobin levels in excess of 130 g/L at any time during pregnancy, has adverse effects, e.g. risk of low birth weight. These findings raise questions about current recommended doses by international agencies and expert groups, which may be higher than needed when given on a daily basis. Dr Viteri noted that previous studies have demonstrated that iron reserves can be improved and anaemia reduced safely by ‘preventive supplementation’ with iron/folic acid achieved through weekly supplementation of women of childbearing age. Furthermore, he noted that the studies to be presented during this consultation show that supplementation for 3 to 6 months pre-pregnancy result in desirable haemoglobin and ferritin concentrations early in pregnancy when they are most important to favourable birth outcomes.

Dr Viteri concluded that the ‘preventive supplementation’ approach of weekly iron/folic acid supplements throughout a woman’s lifecycle when she is at risk of ID (reproductive years) could meet her needs, including the period of pregnancy. Other health benefits he noted include reduced risk of neural tube defects and hyperhomocystenemia, which has been associated with heart disease. The ‘preventive supplementation’ approach also lends itself to complementation
with some other nutrients, such as vitamin A and possibly iodine and zinc, and to management in community settings under supervision of health establishments.

Dr Underwood added a note of caution when considering multiple micronutrient supplementations during pregnancy. She cited studies from Mexico and Nepal that report no added benefit from multi-micronutrient supplements on birth outcomes beyond that achieved from iron or iron/folic acid supplementation alone, and potential for some combinations to negate benefit from iron supplements. She stressed the need for efficacy and effectiveness studies prior to promoting large-scale multi-micronutrient programmes for pregnant women.

Discussion. Participants observed that in the Viet Nam context, other causes of anaemia were significant and that projecting the magnitude of ID from anaemia prevalence at a ratio of 2-2 ½ ID to 1 anaemia was not accurate. They also noted that in this Region, there was need for interventions in addition to iron to achieve desired health outcomes, e.g. deworming, malaria and schistosomiasis control. The question was also raised whether low birth weight was a sufficient outcome indicator to use in evaluating weekly/daily iron supplementation among pregnant women. Perhaps the infant’s iron status post-delivery would be a better indicator since so many factors influence birth weight other than ID.

2.1.2 Knowledge and Participation in a Weekly Iron/Folic Acid Supplementation Programme in Preventing Anaemia Using Social Marketing and Community Mobilization Approaches in Cambodia. Paper presented by Dr Sau Sokun Mealiny (See Annex 4a for Power Point presentation.)

Dr Mealiny noted that in Cambodia, anaemia is very prevalent and although there was interest in weekly iron supplementation, the question was how to deliver supplements and sustain such a programme in the Cambodia setting. Social marketing and community mobilization had been successful in promoting bednets for malaria control, making this the impetus behind the pilot programme in Cambodia conducted among WRA in three settings, i.e. seven garment factories near Phnom Penh, girls in five secondary schools, and women in 139 rural villages in Kampong Speu province. The three primary objectives of the study conducted among women in the three target areas were:

(1) to introduce under programme conditions and through the application of social marketing and participatory communication approaches, a preventive once-weekly iron/folic acid (60 mg ferrous sulphate + 3.5 mg folic acid) supplementation programme for non-pregnant WRA;

(2) to assess the effectiveness of the weekly iron/folic acid supplementation programme in improving knowledge, attitudes and practices (KAP) as well as haemoglobin levels of non-pregnant WRA in three target areas; and

(3) to assess the effects of de-worming combined with the supplementation on haemoglobin levels in subgroups of selected women in three target areas.
Dr Mealiny reported that all three sites featured participatory planning, peer education and social marketing. Peers were responsible for counselling and in organizing educational activities to promote the ‘Red Rose’ supplement (name selected by Cambodian women during pre-testing) and good nutrition (nutrition messages on iron-rich foods were included on the supplement packet). In factories, the supplement was provided free of charge due to government regulations that required employers to provide for health needs of workers. In the schools and rural villages, however, the supplement was sold for 10 cents per "flex-foil" package of four, a one-month supply. In all three sites, the project was launched by appropriately designed campaign-type publicity. Funds received in schools and villages were managed by a school committee and a village revolving fund committee, respectively. Especially impoverished village families received supplements without cost. Implementation in the village settings was considerably less structured than in the factories and schools. Implementation problems were encountered more frequently in the rural setting. Results were evaluated through questionnaires administered at baseline and six-month post intervention and by baseline and six-month haemoglobin levels.

The three study populations differed in several aspects, particularly in age where the students were youngest (median 16 years) and community women oldest (median age 32 years) and morbidity history, where diarrhoea and fever in the past two weeks were most frequent (33% and 60%, respectively) among rural community women. At baseline, rural villages had the highest proportions of women with moderate/severe anaemia and mild anaemia, factory workers the least and schoolgirls falling between. Educational level was highest among factory women compared with villagers. KAP surveys showed that all three populations were very responsive to learning and understanding about anaemia. The minimal knowledge of anaemia at baseline responded after six months to the social marketing/mobilization programme with nearly 100% in all sites showing significant improvement in their knowledge of iron-rich foods. Behaviours related to supplement use also responded to the intervention among all three groups, e.g. they reported the need for iron supplementation, their intent to continue taking supplements if they were already taking them, and most who were taking the supplement were doing so on a weekly basis. Dropouts were high in all three sites and may skew results. However, Dr Mealiny felt that it was due to factors that should not bias the results. Compliance was not directly evaluated, but indications of interest in continuing supplementation and expression of personal need for iron indirectly suggests compliance. There was no placebo control. The important conclusion from the project was a demonstration that the multi-sectoral collaborative approach is feasible and effective in changing KAP to control anaemia in Cambodia.

Discussion. Participants pointed to some limitations of the study. They noted the need to have more information about side effects and compliance, which could not be directly evaluated as this study design did not include a placebo group for comparison. Compliance issues are very difficult to interpret without a placebo group for comparison. Nonetheless, the group suggested there was opportunity to get some information on compliance in schools and villages from records on supplement sales and the revolving funds.

This paper presents the biological impact results from the study described in the previous paper. Haemoglobin values could be evaluated only in school girls and rural village women where baseline values showed the percent with levels below 90 g/L was 3% and 11.0%, respectively. The school environments were much less complex and presented fewer implementation challenges than the rural villages.

Dr Crape summarized the available data from the schoolgirl population, which indicated an improvement after six months in haemoglobin status among those students taking the iron/folic acid supplement. Concurrent deworming did not improve the response. Students were informed of their anaemia status at baseline. Girl students with lower Hb at baseline were more likely to take WIFS than those with higher baseline Hb levels. Bias could not be ruled out in interpreting the results. No directly obtained data were available on compliance. Nonetheless, the data suggested that the successful social mobilization and social marketing programme described in the previous paper were effective in improving iron status among schoolgirls. This implies compliance, particularly since the tablets were purchased and less likely to be discarded.

Among rural village women, however, Dr Crape reported no improvement in haemoglobin levels from those taking the supplement nor from deworming, suggesting the need for a more intensive support structure. However, other causes of anaemia and poverty may also have impacted programme effectiveness.

Among factory workers, the greatest haemoglobin response occurred among those who had attained a high level of education (11th or 12th grade). Again, the lack of a placebo group and compliance information in taking the weekly iron-folic acid supplements for six months, confound interpretation and direct causal linkage of the results to the weekly supplementation programme.

Discussion. Participants speculated that low hookworm intensity might explain the lack of demonstrable benefit beyond iron/folic acid alone of deworming on Hb levels among schoolgirls and rural women. Additional information is needed on other potential causes of anaemia including genetic markers for abnormal Hb, malaria and diarrhoea prevalence and the availability of clean water as a risk factor for infections. The programme support group was urged to look at the effectiveness of the whole process of project implementation, particularly in rural villages, to be able to better assess the quality of information for interpretation of effectiveness of the packaged programme and why anaemia rates were unresponsive.

2.1.4 Weekly Iron and Folic Acid Supplementation: Anthropometrics, Stool and Haemoglobin Survey in School Health Programme in Kampot Province, Cambodia. Paper presented by Dr Philippe Longfils. (See Annex 4c for Power Point presentation.)

This study was not a part of the WHO sponsored project. Rather it was sponsored by GTZ. It was included in the consultation because of its relevance to the effectiveness of WIFS in addition to other health-related interventions, i.e. deworming, vitamin A, sanitation, etc., in improving nutrition and iron status among school age children. The meeting report was restricted to school girls of reproductive age.
Dr Longfils described an intervention in which 60 mg iron (ferrous sulphate) and 0.25 mg folic acid were given weekly to school children in two cluster schools in Cambodia. At six-month intervals children also received 200 000 IU vitamin A and 500 mg mebendazole. Grade 1 school children (451, ages 11-15 years) were selected for follow-up to assess changes from baseline in haemoglobin, anthropometrics, and worm infestation. Anaemia prevalence was estimated using the Lovibond Method for Hb values since other methods for Hb analysis were not available. About two-thirds of pupils in both schools were anaemic and worm infestation occurred at a similar prevalence, more than 40% due to hookworm. Teachers administered the iron/folic acid supplement weekly at school. At the end of one year of WIFS, anaemia prevalence had dropped from 64% to 20% in the school with an average compliance of 90%, and from 64% to 36% in the school with an average compliance of 70%. Although no significant drop in the prevalence of hookworm infestation occurred, the intensity of the infection was shifted downward. It was assumed that the decline in anaemia was due primarily to the weekly administration of the iron supplement, perhaps augmented by the semi-annual distribution of vitamin A and lower hookworm load.

Among lessons learned during the intervention, Dr Longfils noted the value of multiple interventions to control anaemia, heavy worm infestations and malnutrition. Although side-effects from the iron supplement, in the form of nausea and aversion to taste and smell, were a problem influencing compliance, which occurred mainly among children taking the supplement in the morning without first having breakfast. He advised that in the school environment the supplement should be given together with food to improve long-term compliance with the regime and provide other nutrients needed to combat the chronic malnutrition. Alternately, a lower dose of iron might reduce side effects and be efficacious among school children. He felt that semi-annual deworming was valuable to maintain a lower worm load burden, but needed to be combined with improved hygienic measures and wearing of shoes to reduce the rate of re-infestation. Despite the fact that this study was not a planned intervention and used only a semi-quantitative method for haemoglobin estimation, quite clearly the weekly iron/folic acid supplementation had a very positive impact on anaemia prevalence and could be recommended as a cost-effective programme for expansion into the Cambodian school health programme, particularly the first three grades of primary schools. (Later in the meeting, Dr Longfils presented data on prevalence of anaemia in under-five year old Cambodian children. Prevalence rates of over 90% were reported. A high prevalence of abnormal haemoglobin has been reported and may be contributing to the problem, as well as other micronutrient deficiencies. A study is beginning in which iron will be given alone and compared with iron given with other micronutrients).

Discussion. Participants suggested that the Ministry of Education in Cambodia needed to be aware of the educational as well as health benefits of a weekly iron supplementation programme, and through the Ministry, teacher awareness should be promoted. Other participants questioned whether the programme could be sustained at no cost to students since the government budget for schools is limited. It was suggested that more education and communication activities might be needed if the programme is expanded to other schools.
2.1.5 Introduction of Weekly Iron Folic Acid Supplements to Improve Iron Status and Prevent Pregnancy Anaemia in Women of Reproductive Age in Selected Areas in the Philippines: The Process. Paper presented by Dr Lourdes S. Paulino. (See Annex 5a for Power Point presentation.)

Recent surveys in the Philippines found anaemia prevalence among pregnant and lactating women of about 51% and 46%, respectively. The causes are multiple but primarily due to an inadequate bioavailable dietary iron. This is exacerbated by a low intake of absorption enhancers (vitamin C) and a high intake of phytates (in rice). Dr Paulino noted that although the Department of Health had an iron supplementation programme in effect for two decades, updated in 2003, success in reducing anaemia rates has been limited for a variety of reasons. She noted that the WIFS approach offers an alternative in a preventive mode that could be more effective and sustainable in the Philippines.

In addition to the two general objectives of the WHO-sponsored projects, the Philippines' project specifically aimed:

(1) to increase awareness in the community of the importance of iron and folic acid for WRA;

(2) to promote the adoption of weekly iron supplements among WRA;

(3) to determine the effectiveness of the programme in improving the knowledge, attitudes and practices of women using weekly iron/folic acid supplements;

(4) to measure the improvement in the iron status of WRA using weekly supplementation;

(5) to estimate the compliance and the prevalence of side effects in women taking the iron supplements; and

(6) to assess the feasibility of weekly iron/folic acid supplementation in the Philippines and its sustainability.

Dr Paulino’s presentation covered objectives 1-3 and 6, objectives 4 and 5 are to be covered in the next presentation by Dr Angeles-Agdeppa.

The project was carried out in three selected municipalities in the province of Pangasinan for one year among all WRA, including both those pregnant and non-pregnant. Two iron preparations (produced by United Laboratories [UNILAB]) to be taken weekly were used: (1) for non-pregnant women, Femina 60 contained 60 mg elemental iron and 3.5 mg folic acid, and (2) for pregnant women, Femina OB containing 120 mg elemental iron and 3.5 mg folic acid. The Femina OB supplement was delivered free of charge when pregnant women came for prenatal visits to rural health units. Femina 60 was sold at main drug stores, secondary schools and by barangay health workers. To help women remember, Tuesday was promoted as the day to take the supplement.
The standard protocol developed for taking Femina was as follows:

- Non-pregnant women aged 15 years or who have started menstruating should take Femina 60 once a week on Tuesday night before going to bed;

- Pregnant women should take Femina OB once a week if seen for pre-natal check up at the health centre during their 20th weeks of gestation or less. They should continue taking the tablets until delivery and for three months thereafter. They were also to take Femina OB on Tuesday night before going to bed. After delivery, they should take Femina 60 purchased from local outlets;

- Pregnant women seen at the health centre for pre-natal check-up at more than 20 weeks gestation were to take the daily dose of iron given for free by the Department of Health. This iron tablet contains 60 mg elemental iron with 400 ug folic acid.

Social mobilization and social marketing activities were done in all three sites, IEC materials were produced and health workers trained to support and build capacity for the project. Local officials, health personnel and barangay health workers, drug store owners, and people in the community were all involved in educational and promotional activities conducted by the Department of Health and UNILAB. The communication campaign was centred on four elements, i.e. product, price, place and promotion.

1. **Product** - the target audience was made aware about the importance of iron and its benefits to the body.

2. **Price** – the target audience was informed of the cost of the iron tablet (for which an affordable price was set) and was encouraged to buy the product.

3. **Place** – the target audience was informed of the availability of the iron tablets at all times in certain places like drugstores for Femina 60, and at the rural health unit or at the barangay health station for Femina OB.

4. **Promotion** – Efforts were made to tell the target audience about the product, price and place, including advertising, packaging, point-of-sale displays and special events.

Evaluation of the process was based on four KAP surveys that included 744, 528, 466 and 420 women, respectively. Awareness of importance of taking iron tablets daily increased with each survey. About 50% of women involved with survey 1 were aware of the role of weekly iron/folic acid supplementation through pre-project promotional activities and this increased by 30% during the year of the project implementation. The greatest improvement was in awareness on the need to take the supplement throughout the reproductive period, which increased by over 71% during the project, with the increased awareness being generally higher among pregnant compared to the non-pregnant women. Knowledge about iron and anaemia and about iron-rich foods also increased with each KAP survey. In addition, attitudes about iron/folic acid supplementation were positive. Perhaps the most important finding was the markedly increased reported compliance in taking the supplement noted with each successive survey, culminating in
over 95% among both pregnant and non-pregnant women. Dr Paulino interpreted these results as demonstrating the effectiveness of the social mobilization and social marketing efforts concurrent with making the supplements locally available. Furthermore, although side effects were reported, they occurred in fewer than 11% among those taking either the daily or weekly dose for less than six weeks, and about 14% for those taking daily or weekly supplements for longer than six weeks. Importantly, the project showed that women are willing to buy the supplements if adequate knowledge about ID and IDA is made available to the health workers and the target population.

Dr Paulino’s presentation ended with a series of recommendations based on results from the project:

- to the government for adoption of the programme for WRA and in secondary schools;
- to research institutions to independently assess effectiveness in improving Hb and iron status annually in a target population;
- to the Philippine Medical Association, Drugstores Association and local pharmaceutical companies to promote the weekly iron supplementation as a new approach for prevention of nutritional anaemia; and
- for implementing pilot projects using the approach among infants and children for anaemia prevention since they are among the most affected.

Discussion. Participants observed that the lack of a placebo group could limit interpretation of some of the data, particularly on side effects and compliance. Several potential groups to enlist for motivating participation in the future after the intensive social marketing campaign subsidies were suggested, including expanding the FEMINA clubs for young girls and providing a newsletter distributed through the clubs, and having periodic ‘Iron Days’ throughout the Philippines.

2.1.6 The Effects of a Community-Based Weekly Iron-Folic Acid Supplementation on Haemoglobin and Iron Status of Pregnant and Non-Pregnant Women in the Philippines. Paper presented by Dr Imelda Angeles-Agdeppa. (See Annex 5b for Power Point presentation.)

Dr Angeles-Agdeppa continued the presentation on the Philippines project by providing information on the impact on anaemia prevalence and iron status. She noted that the primary cause of anaemia in the Philippines is ID, with hookworm infection playing a lesser role and malaria contributing in some parts of the country, but not in the project area. There were 744 women who formed the subset selected because of the high probability that they would become pregnant within the following year (recently married and intending to become pregnant). Blood samples obtained at each of the four surveys noted in the previous paper were analyzed for haemoglobin, serum ferritin and transferring receptors to evaluate the effects of WIFS (other routine blood cell counts were also done).

Results from taking the WIFS demonstrated that iron status, as reflected by serum ferritin was significantly improved both in pregnant and non-pregnant women, but had little effect on anaemia prevalence, i.e. haemoglobin values, although a significant increase in haematocrit
occurred in those who took iron/folic acid supplements. Taking the supplement for more than six weeks was more effective in improving iron status than shorter intervals of intake. Dr Angeles-Agdeppa suggested that the lack of effect on haemoglobin might be because other factors contributed to the anaemia, such as other micronutrients that affect iron absorption, utilization and mobilization. She noted that vitamin A deficiency was a likely contributing micronutrient factor because previous nutrition surveys indicated deficiency among pregnant and lactating women in the project area. Infection appeared to play a minor role.

Evidence for rising compliance to supplementation intake increased with each survey, resulting in over 95% of both pregnant and non-pregnant women reporting to adhere to the regime at the end of the study period. Adverse side effects, as self-reported, did occur ranging from 3.4% among those who were not taking any supplements to 14.5% among those who took the weekly supplements for more than six weeks. Side effects were reported the longer the supplement was taken but there was no difference in occurrence between daily and weekly supplementation. Based on the project, it was concluded that WIFS was a feasible preventive approach for the Philippines and a series of recommendations for further actions were made as noted in the Power Point presentation in Annex 5b.

Discussion. The group suggested the need for more information on causes of anaemia, specifically about ID and IDA in the project area. It was suggested that the ferritin data should also be analyzed using a cut-off of < 12ug/L, which is the accepted cut-off for deficiency. Additional information on vitamin A status in the women who took part in the project would strengthen the argument for a causative relationship to the unresponsiveness of haemoglobin levels. Note was made that the large loss to follow up was problematic in eliminating bias from interpretation of results.

2.1.7  FEMINA Nationwide Launch 2002, Paper presented by Ms Eva Datol. (See Annex 5c for Power Point presentation.)

The iron/folic acid supplements used in all three country projects were produced by UNILAB in the Philippines and provided free of charge to WHO. Success of the social mobilization and public/private partnership in advocacy for WIFS in the WHO/Department of Health-sponsored pilot project in Pangasinan convinced the company to launch a nationwide effort to promote FEMINA in the preventive iron supplementation category of the market. Although other brands of iron/hematinics were available on the commercial market, none featured a once-a-week dosage and preventive action; hence there was no direct competition. Nonetheless, the concept of preventive supplementation for anaemia control, rather than treatment, was new and needed to be promoted.

The company launched a major education programme via advertising to create awareness about IDA and use of iron supplements for prevention. The advertisements focused on the attributes of FEMINA, including the weekly dosing, which was brand building. Professional marketing to hospitals, offices with women’s health educational programmes and school programmes, in addition to television advertising, were key methods to provide education on IDA and the preventive attributes of FEMINA. Although a heightened awareness to IDA occurred as a result of the FEMINA advertising, it did not translate into an increased use. Lessons learned
from the experience (see Power Point presentation Annex 5c) include: (1) rethinking of the advertising material to focus on the reasons enumerated by respondents that reflected misconceptions and lack of understanding of the causes and consequences of IDA; (2) greater effort is needed to more fully implement the successful social marketing concept of the Pangasinan project on a national scale; need to segment wide range of target audiences and tailor messages to their needs, i.e. younger segment of girls versus women in mid 20s to 30s; (3) more education of consumers on the reasons for weekly supplementation; and (4) doctor’s prescription is perceived as needed to promote use of the product.

Discussion. Participants noted that market-based communication is a good strategy for the Philippines, but may be less effective in Cambodia and Viet Nam where the pharmaceutical system is less developed. In the latter countries, social marketing activities should go together with education and promotion. Also noted was the importance of public/private partnership because control of anaemia requires a multi-sectoral effort and government policy supportive of supplementation use. Participants noted the need to prevent conflicting messages about anaemia control when referring to fortification and dietary diversification. Discussants noted the need to introduce a comprehensive package of messages about control of IDA

2.1.8 Introduction of a New Approach Towards Weekly Iron/Folic Acid Supplementation for the Control of Anaemia among Reproductive Age Women in Viet Nam. Paper presented by Dr Nguyen Cong Khan. (See Annex 6a for the Power Point presentation.)

The Viet Nam project, like the one in the Philippines, included both pregnant and non-pregnant WRA who received the weekly iron/folic acid supplement of 60 mg iron as ferrous sulfate + 3.5 mg folic acid if not pregnant, or 120 mg iron + 3.5 mg folic acid if pregnant. The project was conducted in a rural province where 34 000 WRAs resided and anaemia prevalence among pregnant women was over 50%. An intensive social marketing effort occurred guided by the 4 P’s (product, place, price and promotion). The product (iron/folic acid supplement) image was cast by giving the supplement a new name, which meant ‘a beautiful flower’ so that taking of the supplement carried the message of beauty and health. The place for supplement distribution was through women collaborators who sold the product to non-pregnant women and received 20% of the sale, and through health staff free of charge at pre-natal visits for pregnant women. Price for a "flex-foil" of four tablets (a one-month supply) was maintained within the economic conditions of the rural women. The project was extensively promoted through district committees and women's organizations. Health personnel and women's union leaders were trained in counselling and about ID and IDA. Extensive IEC material were produced and distributed. The rate of purchase was used to monitor motivation and additional training workshops held when sales declined. Other aspects of the project were also monitored monthly to detect and solve problems as they occurred. The women selling the supplements would keep 20% of the money gained as an incentive to sell more supplements.

Evaluation occurred by KAP, Hb and iron status surveys conducted at baseline and after 4, 9 and 12 months of intervention. Anaemia awareness was high from the beginning and remained high throughout the intervention. A significant improvement in knowledge about factors causing anaemia occurred and attitudes about the seriousness of anaemia and taking WIFS for anaemia prevention significantly improved as demonstrated by an increased rate of buying and consuming
the tablet by non-pregnant women. A comparison was made between the pregnant women who took the United Nations Children’s Fund (UNICEF) iron/folic acid tablet (60 mg iron and 0.25 mg folic acid) daily (because they were already pregnant at baseline) and those who took WIFS when they became pregnant during the intervention. Compliance was high in both groups, but side effects were significantly higher in the daily than weekly group and higher in the weekly group after 4.5 months than the weekly group after 12 months. Dr Khan reported some difficulty occurred mid-way in the project in buying and using the supplement due to rumours that the tablet would stop delivery and due to busy workloads of women during the harvest season that caused forgetfulness in regularly taking the supplement.

Following completion of the first phase of the project, a domestic iron/folic acid tablet was produced in order to expand the intervention into other populations. This product had 60 mg elemental iron and 0.25 mg folic acid and was packaged with 30 tablets per blister pack. Dr Khan noted that the product was less attractive than that provided by UNILAB for the project and that there was need for further product development. However, it demonstrated that public/private collaboration could result in development of a product in Viet Nam for public health use.

Discussion. Participants noted that the concept of a community-managed revolving fund was new in the Vietnamese culture and there was need to create the mechanism for this to work smoothly. Also, Mr Valentine noted that although social marketing was a common component of all three projects, two different models were followed. In the Philippines the ‘manufacturers’ model was followed, which included a public-private partnership with government where industry contributed to start-up costs with the expectation that later the product would become self-supporting on the commercial market. In contrast, both Cambodia and Viet Nam followed a more classical social marketing pattern in which the product is not expected to become viable on the commercial market because the target recipients will never be able to afford it, i.e. the product will have to be subsidized for the poor. Dr Solon also questioned what was to happen to the UNICEF iron supplement that is so widely used and remains a good product, but one that has never had the advantage of social marketing/social mobilization applied in these projects. Could it be better used just by adding the social marketing/mobilization component? Participants expressed interest in the locally produced iron-folic acid supplement and urged that the necessary acceptability testing be done prior to broad use of the product.

2.1.9 Effectiveness of Weekly Iron/Folic Acid Supplementation on Anaemia and Iron Status in Women of Reproductive Age in Rural Viet Nam. Paper presented by Dr Jacques Berger. (See Annex 6b for the Power Point presentation.)

The project in Viet Nam described by Dr Khan in the previous paper had the objectives of reducing the prevalence of anaemia and improving iron status similar to those in the other two countries. Dr Berger noted, however, that the Viet Nam project aimed also to define the duration of preventive WIFS needed to have impact on Hb and iron stores throughout pregnancy under non-supervised programme conditions. Women pregnant at baseline received free of charge from the health centre the UNICEF tablets (60 mg iron + 0.25 mg folic acid). Non-pregnant women at baseline were urged, through intensive social marketing efforts described in the previous paper, to purchase the WIFS from collaborators from the Women’s Union in each village. When pregnancy was detected, these women received the weekly supplement containing 120 mg iron +
3.5 mg folic acid free of charge from the same collaborators. This arrangement continued for three months post-delivery, after which they would again purchase the lower dose weekly supplement. At the end of the intervention, those women taking WIFS were divided into three groups: those who remained non-pregnant during the study; those who became pregnant within the first three months after baseline; and women who became pregnant between the first day of the fourth month and the last day of the sixth month after baseline. This allowed outcomes of each of these three WIFS-consuming groups to be compared to those consuming the daily UNICEF supplement.

Among women who did not become pregnant during the study, anaemia prevalence occurred in 50% of the women, similar to the prevalence reported in the national survey of 1995 among WRAs, whereas serum ferritin values, an indicator of iron status, at baseline were low in only 8% of non-pregnant women using cut off for deficiency as < 12 ug/L, (or 18.4% using a cut off <20 ug folic acid/L). These results suggest that the cause of anaemia among WRAs in Viet Nam was only partially due to ID, with other causes being significant contributors. Nonetheless, under the unsupervised conditions of this project, anaemia prevalence was reduced and iron status improved in non-pregnant women taking about 26 WIFS over a period of about nine months. Longer supplementation would be expected to insure higher iron stores and should be recommended for all WRAs.

During the first and second trimesters of pregnancy under non-supervised programme conditions, WIFS significantly reduced anaemia and improved iron status when the 60 mg iron + 3.5 mg folic acid supplement was taken for a minimum of three months (and better if for six months) before beginning pregnancy and when the intake of a supplement containing 120 mg iron + 3.5 mg folic acid was continued during pregnancy. The project could not evaluate the effect of WIFS on the third trimester of pregnancy. However, if WIFS (60 mg iron + 3.5 mg folic acid) were begun only a few weeks before pregnancy and continued throughout pregnancy at 120 mg iron + 3.5 mg folic acid, anaemia prevalence remained elevated and iron stores low. Dr Berger concluded that the study indicated that women should have taken preventive iron-folic acid supplementation for a minimum of three months, and preferably six months, to assure adequate iron status during the first and second trimester of pregnancy. The absence of preventive iron-folate supplementation before the start of pregnancy was related under programme conditions to inadequate iron status in the third trimester of pregnancy. In contrast, under non-supervised programme conditions, daily iron-folic acid supplementation with the UNICEF tablet (60 mg iron + 0.25 mg folic acid) during pregnancy was not efficient in maintaining haemoglobin levels, anaemia prevalence being higher in all trimesters of pregnancy compared to the weekly group.

Discussion. Participants discussed the issue of duration of WIFS among WRAs since the issue of taking the supplement for a lifetime could be discouraging for individual women as well as governments. The group felt that the duration of WIFS should cover the entire reproductive age period, i.e. menarche to menopause, when WRAs remain at risk of ID and IDA, until other better ways of preventing anaemia such as food fortification and dietary improvement are operating effectively.
3. GENERAL DISCUSSION OF COUNTRY PAPERS

3.1 General discussion of all country papers

A general discussion of all papers occurred to guide the authors preparing their papers for publication. Key points included:

- A relatively uniform format should be used for all process papers and impact papers.

- Information on coverage rate and compliance of taking tablets should be included where such information is available, even if only indirectly assessed.

- The point of pre-pregnancy supplementation as preventive of IDA anaemia during pregnancy should be stressed. Such supplementation is not meant as a cure if anaemia exists when pregnancy occurs.

- That success in these projects was due to the package approach, i.e., social mobilization and social marketing concurrent with WIFS which led to effectiveness in changed KAP, compliance and favourable iron status with supplementation should be stressed.

- Somewhere in the publication there should be reference to the reduced risk of iron excess with weekly supplementation compared with daily. This reference should probably be best placed in the introductory WIFS paper.

- For government planners and policy-makers, the issue of how long WIFS should be advocated and relative programme costs should be addressed.

- Papers should highlight the strengths and limitations of each project.

- Uniformity in cut-off points used to define iron status is needed. All papers should include a cut-off of ferritin < 12 ug/L. Other cut-offs can be used in addition to this minimum.

- The possibility of too high Hb levels with adverse effects should be discussed. Expressing Hb values as a distribution should help make this point in the papers.

- The point was made that although social marketing was a prominent feature of all country projects, two distinct models were used: the manufacturers’ model that assumes market viability and the more typical social marketing model whereby the product is expected to be subsidized if it is to reach the poor. Reference to these two distinct social marketing approaches should appear somewhere in the supplement, perhaps the introductory paper dealing with process.
3.2 Preparation of country papers for publication

Participants were separated into two groups to develop a suggested standardized outline of content to be included for all authors to follow in preparation of final papers on process and on impact. The outline drafts given in Annex 7 and 8 were agreed upon during the plenary session.

3.3 Titles for papers

An overall title for the publication was discussed and consensus was reached on:

‘Preventive Weekly Iron/Folic Acid Supplementation Can Improve Iron Status of Reproductive Age Women: Experiences from Cambodia, the Philippines and Viet Nam’.

Participants separated into country groups with resource people to suggest titles for the country papers. It was decided that each country would have the same title with a subtitle indicating the process (social marketing/mobilization) or impact (on iron status and/or Hb) to distinguish two different papers. Following modifications made during the plenary session, the agreed upon titles for the country papers are provided in Annex 9.

The issue of authors was also discussed and it was agreed that each country would decide on authors with the primary criteria being that authors must have made a significant contribution to the project. Others can be acknowledged at the end of the paper.

3.4 Time frame

The group agreed that final versions of all country papers would be sent to the editors by the end of October 2003 and that all final papers would be complete by 31 December 2003.

3.5 Other general issues discussed

The possibility of including other invited papers from researchers using WIFS in different age groups was discussed. The group agreed that this could dilute the main message from these studies and that the publications should be restricted to data on WRAs, with the exception of the paper on Cambodian primary school children. The case for inclusion of the Cambodian primary school children is that it shows the impact of using multiple approaches for reducing anaemia, not WIFS alone. It was also agreed that the results of these studies should not be extrapolated to age groups not covered in the projects. For these groups, reference should be made to the WHO/INACG/UNICEF monograph of 1998, Guidelines for the Use of Iron Supplements to Prevent and Treat Iron Deficiency Anaemia.

Some comments on cost estimates for a national programme should be mentioned somewhere in the supplement. This will be difficult since the projects were very expensive for social marketing start-up costs that would not occur at the country level. The UNILAB data may be the best possibility for obtaining estimates for a manufacturers’ model of social marketing costs. Sustainability may also be mentioned, realizing that sustainability may refer to
programme and/or impact. It was agreed to not make projections beyond what the data of these projects support.

4. PUBLICATION STRATEGY

4.1 Journal selection and process for submission

The group discussed how to proceed to identify a publication outlet. It was agreed that a widely circulated, scientifically respected journal that publishes supplements should be identified. Among those suggested were Nutrition Reviews as the first choice, followed by the Food and Nutrition Bulletin. The Secretariat will make the appropriate contacts with editors and keep the participants informed. An early decision on the publication outlet will be needed to know the appropriate format for paper presentation of the journal selected.

4.2 Editors and reviewers

The group considered who should be editors for the supplement. It was decided that Dr Suttilak will edit the process papers and Dr Berger will edit impact papers received from countries. Dr Underwood was proposed as the overall editor receiving the process and impact papers after initial editing from Dr Smitasiri and Dr Berger.

The draft supplement, after received by the overall editor, will be sent to selected reviewers for comment. Reviewers suggested included Dr Viteri, Dr Stoltzfus, resource persons at this meeting, and perhaps a biostatistician and a social marketing expert. Reviewers will be acknowledged in the supplement.

5. COUNTRY FUTURE PLANS FOR EXPANSION

Countries met individually to discuss plans for expansion of the project then presented their plans during the plenary session.

5.1 Cambodia

(1) Non-pregnant women: Over the next six months:

(a) Integrate WIFS into the ongoing safe motherhood programme, initially in two provinces: Kampong Speu and Kampot.

(b) Provide training for health centre staff.
(c) The strategy is based on health centre staff doing technical training at the household level.

(d) Supervision and monitoring is to be done by health centre staff with assistance by village health workers.

(2) **School programme**

(a) The Ministry of Health is to provide WIFS through the health centre staff in collaboration with the Ministry Education.

(3) **Explore the most cost efficient source of WIFS supply**

(a) Assess the availability in the near future within Cambodia.

(b) Assess the availability in the near future through import.

(c) Assess the potential for local production in the long term.

5.2 **China**

Dr Ren Ai-guo briefly described the situation relevant to ID and IDA in China. He expressed interest and shared the draft of a protocol to conduct a similar intervention with WIFS in China, starting supplements from the time when women get married and go for pre-marital counselling.

5.3 **The Lao People’s Democratic Republic**

Dr (Mrs) Somchit Akkhavong, Deputy Director, Department of Hygiene and Prevention, Ministry of Health, the Lao People’s Democratic Republic described the context of ongoing programmes in her country and expressed the hope that similar interventions for anaemia control could be conducted in the near future.

5.4 **Philippines**

(1) Each author will complete his/her respective paper according to the comments made during the workshop by 31 October 2003 and papers will be sent to the assigned reviewers.

(2) Presentation of project results will be made to the National Centre of Disease Prevention and Control and Cluster Meeting of the Office of Health Operations of the Department of Health in November 2003.

(3) A presentation of project results will be made to micronutrient expert groups and other stakeholders in November 2003.

(4) A presentation of project results will be made to the Executive Committee of the Department of Health in December 2003.
(5) A presentation of project results will be made to the regional, provincial, and municipal stakeholders in Pangasinan in December 2003.

(6) From January 2003 onwards:

(a) Draft a Position Paper on WIFS (programme and policy implications).

(b) Draft an Administrative Order on WIFS upon recommendation of the Expert Group.

(c) The Pangasinan experience will be operationalized in key provinces in the region.

(d) The WIFS will be adopted for implementation nationwide.

5.5 Viet Nam

(1) During the period 2004-2005 to support expansion of WIFS at the provincial level:

(a) Target WRA and schoolgirls of Hai Duong province and one other province.

(b) Increase work with product development in order to fit conditions in Viet Nam.

(c) Conduct pilot projects on high school girls.

(d) Organize workshops on advocacy.

(2) During the period 2006-2010:

(a) Consider making it government policy to expand the project throughout the country.

6. CONCLUSIONS AND RECOMMENDATIONS AND FINAL SYNTHESIS PAPER

The conclusions and recommendations which will be included in the final synthesis paper will be drawn from the country papers, focusing on the commonalities.

Recommendation agreed upon at the meeting include:

(1) There is sufficient evidence to recommend that WHO and countries in the Western Pacific Region consider recommending the ‘packaged approach’ in introducing WIFS for WRAs where anaemia prevalence constitutes a public health problem. This should be done by encouraging public/private partnerships with pharmaceutical industries, the health and education sectors, and NGOs and community organizations, using social marketing and community mobilization.
For other age groups not covered in the projects, reference should be made to the WHO/INACG/UNICEF Guidelines of 1998, Table 6 (see page 15).

The final paper for the supplement should include:

- Overall conclusions and recommendations drawn from commonalities in other papers, e.g. the role of other micronutrients as causes of anaemia.
- Future research needs, drawn from other papers and additional considerations.
- The safety of a supplementation approach in the context of other ongoing programmes to improve iron nutrition and prevent anaemia, e.g. fortification.
- The data are not available to project the numbers of lives saved, etc.. However, projections could be made on the reduction in ID and IDA if there is a 20% reduction in maternal deaths due to anaemia in relation to achievement of the United Nations Millennium Development Goals (MDGs).
- Extrapolations should not be made beyond what data are available to support. The analysis can still relate to achievement of the MDGs, etc., noting that other projections can be made as additional data becomes available.
- In supervised situations such as schools, enough data has accumulated to recommend WIFS for reproductive age girls for nationwide WIFS programmes.
- In unsupervised situations, countries should put in place a system that will assure regular intake of iron supplements by WRA.
- A paradigm change is needed from curative to preventive iron/folic acid supplementation for WRAs, realizing that the whole process of implementation must be improved at the national down to the village level. Success in these projects was due to collaboration so final recommendations should suggest the roles of each partner based on the experience from this project. Collaboration is needed among:
  
  (1) WHO/international agencies
  (2) Governments
  (3) Private sector
  (4) Community leaders
  (5) Civil society

- A key message from the three country studies for WRA is the need for WIFS supplementation from the time menstrual period begins until menopause—the high risk period for anaemia.
7. CLOSING

Dr Hisashi Ogawa, as Acting Director, Division of Healthy Communities and Populations, closed the meeting on behalf of Dr Omi by reading his closing remarks. Dr Omi emphasized the importance of the country reports brought to this meeting, which will assist in improving anaemia prevention programmes in the Region and contribute to meeting the Millenium Development Goal which calls for a reduction of maternal mortality by three quarters between 1990 and 2015. He noted the multiple partnerships between public and private sectors identified by the country projects and other key interventions that are necessary for achieving successful weekly iron/folic acid supplementation programmes. Of special significance to Dr Omi is that the projects have shown that pre-pregnancy supplementation for three to six months decreases the risk of anaemia during pregnancy and that other interventions, including fortification and dietary modification should be promoted, in addition to the WIFS programme. He looked forward to publication of the results of these studies to guide others on how to organize successful WIFS programmes and to the expansion of this ‘packaged’ programme within participating countries.

Finally, Dr Omi expressed his appreciation for the hard work of all the participants and wished them a safe trip home.
OBJECTIVES OF THE MEETING

The objectives of the meeting were:

(1) to review the outcomes of pilot projects on unsupervised weekly iron/folate supplementation for preventing anaemia in women of reproductive age (WRA) in Western Pacific countries;

(2) to analyze the impact of this approach on haemoglobin and iron stores in free-living populations; and the impact of iron nutrition in the first trimester of pregnancy on iron and haemoglobin status throughout pregnancy (and birthweight, if possible);

(3) to discuss the process through which the supplements have been promoted, using social marketing and community mobilization, and the impact of this approach on improving the knowledge, attitude and practices of WRA;

(4) to draw conclusions and recommendations for scaling up the approach and for possible extension to other countries, including through school health programmes and within the framework of safe motherhood programmes; and

(5) to review and prepare for publication papers to be submitted to an international journal.

AGENDA

(1) Opening ceremony

(2) Introductory paper on weekly iron/folate supplementation

(3) Papers on the programme process in three countries (Cambodia, the Philippines, Viet Nam)

(4) Discussion on changes needed to the papers on process

(5) Papers on programme impact in three countries (Cambodia, the Philippines, Viet Nam)

(6) Discussion of changes needed to the papers on impact

(7) Final discussion on additional changes needed in the papers

(8) Outline of paper with conclusions on pilot projects and discussion on write-up

(9) Discussion on publication strategy

(10) Strategic planning for future programmes (steps for expansion)

(11) Closing ceremony
ANNEX 2

LIST OF TEMPORARY ADVISERS, RESOURCE PERSONS, REPRESENTATIVES AND OBSERVERS, SECRETARIAT

1. TEMPORARY ADVISERS

Dr (Mrs) Somchit AKKHAVONG
Deputy Director, Department of Hygiene and Prevention
Ministry of Health, Vientiane, Lao People's Democratic Republic
Tel.: (856-21) 252911. Fax: (856-21) 214010. E-mail: S.vilayrack@yahoo.com

Dr Imelda ANGELES AGDEPPA
Assistant Scientist, Food and Nutrition Research Institute (FNRI), DOST Compound,
General Santos Avenue, Bicutan, Taguig, Metro Manila, Philippines
Tel.: (632) 837-2071; (632) 837-2934 loc. 2297 or 2301
Fax: (632) 837-2934; (632) 837-3164
E-mail: imeldaagdeppa@yahoo.com; iaa@fnri.dost.gov.ph

Dr Jacques BERGER
Senior Researcher; IRD Representative in Viet Nam
Institut de Recherche pour le Développement (IRD), French Embassy
57 Tran Hung Dao, Ha Noi, Viet Nam
Tel: (84-4) 972 06 29 / 971-4826. Fax: (84-4) 972 06 30
E-mail: j.berger@fpt.vn (in case of problem, send to repird@fpt.vn)

Ms Eva DATOL
Product Manager, Women's Health, United Laboratories, Inc. (UNILAB)
4th floor, Bonaventure Plaza, Ortigas Avenue, Greenhills, San Juan
Mandaluyong City, Philippines
Tel.: (632) 723-0511. Fax: (632) 722-4852. E-mail: edatol@unilab.com.ph

Dr HOANG THI Kim Thanh
Vice Director of Nutrition Information Education Center
National Institute of Nutrition, 48B Tang Bat Ho, Ha Noi, Viet Nam
Tel.: (84-4) 971-3090. Fax: (84-4) 971 7885
E-mail: c/o Dr Khan: khoa-mt@hn.vnn.vn

Dr Philippe LONGFILS
Kampot Advisor, GTZ (German Technical Cooperation), Food Security and Nutrition, Policy
Support Project, Food and Nutrition Policy Support Project
PO Box 172, Kampot, Cambodia
Tel.: (+855) 12 838 739; 023-22 07 40. Fax: (+855) 023-22 07 41
E-mail: 012838739@mobitel.com.kh; for mail >250 kb, cc: to FSNPSP@gtz.org.kh

Dr NGUYEN Cong Khan
Director, National Institute of Nutrition
48B Tang Bat Ho Street, Ha Noi, Viet Nam
Tel.: (84-4) 971 6058 / 971 3784. Fax: (84 4) 971 7885. E-mail: nekhan@hn.vnn.vn
2. RESOURCE PERSONS

Mr Byron CRAPE (under APW)
615 N. Wolfe St. Box 25, Johns Hopkins School of Public Health
Baltimore, MD 21205, USA
Tel: (433) 768-6501. E-mail: bcrepe@jhsph.edu

Dr Maria Nieves GARCIA-CASAL
Instituto Venezolano de Investigaciones Científicas
Centro de Medicina Experimental. Laboratorio de Fisiopatología
Carretera Panamericana Km 11, Altos de Pipe, 21827 Caracas 1020-A, Venezuela
Tel: (58212) 540-1232; (58212) 504-1426. Fax: (58212) 504-1086
E-mail: mngarcia@medicina.ivic.ve
3. REPRESENTATIVES

Dr Moises SERDONCILLO
Programme Officer, Reproductive Health, United Nations Population Fund
c/o United Nations Development Programme in the Philippines
P.O. Box 7285 (DAPO), 1300 Domestic Road, Pasay City, Metro Manila, Philippines
Tel: (632) 892-0611 ext 313. Fax: (632) 817 8616
E-mail: mserdoncillo@unfpa.com.ph

Dr Romanus MKERENGA
Health and Nutrition Officer, UNICEF Philippine Country Office
106 Amorsolo Str., Legaspi Village, Makati City
P.O. Box 1076, Makati Central Post Office, Makati City, 1250 Philippines
Tel.: Phone; 00-63-2-840 0731. Fax: 00-63-2-840 0279
Mobile/Cell phone: 00-63-917-811 0430

4. OBSERVERS

Ms Ellen VILLATE
Country Director, Helen Keller Inc.
704 Pablo Ocampo Sr. St., Malate, Manila, Philippines
Tel.: (632) 525-9457; (632) 525-9474 to 75
Fax: (632) 525-9476
E-mail: evillate@hki.com.ph

Mr David VALENTINE
Population Services, PSI Nepal International
Laxmi Niwas, Naya Chowk Buddhakantha, Kathmandu, Nepal
E-mail: david@psi.org.np
5. SECRETARIAT

Dr Linda MILAN
Director, Building Healthy Communities and Populations
WHO Regional Office for the Western Pacific
P.O. Box 2932, 1000 Manila, Philippines
Tel.: (632) 528 9981 (direct); 528-8001 (general). Fax: (632) 521 1036; 526 0279
E-mail: milanl@wpro.who.int

Dr Tommaso CAVALLI-SFORZA (Responsible Officer)
Regional Adviser in Nutrition and Food Safety
WHO Regional Office for the Western Pacific
P.O. Box 2932, 1000 Manila, Philippines
Tel.: (632) 528 9864 (direct); 528-8001 (general). Fax: (632) 521 1036; 526 0279
E-mail: cavalli-sforzat@wpro.who.int

Dr PANG Ru-yan
Regional Adviser in Maternal and Child Health
WHO Regional Office for the Western Pacific
P.O. Box 2932, 1000 Manila, Philippines
Tel.: (632) 528 9876 (direct); 528-8001 (general). Fax: (632) 521 1036; 526 0279
E-mail: pangr@wpro.who.int

Dr Eva-Maria CHRISTOPHEL
Medical Officer
Malaria, Vectorborne and other Parasitic Diseases
WHO Regional Office for the Western Pacific
P.O. Box 2932, 1000 Manila, Philippines
Tel.: (632) 528 9723 (direct); 528-8001 (general). Fax: (632) 521 1036; 526 0279
E-mail: christophele@wpro.who.int

Dr Y.C. CHONG
Regional Adviser in Health Information
WHO Regional Office for the Western Pacific
P.O. Box 2932, 1000 Manila, Philippines
Tel.: (632) 528 9812 (direct); 528-8001 (general). Fax: (632) 521 1036; 526 0279
E-mail: chongyc@wpro.who.int

Dr Sophie LEONARD
Associate Professional Officer in Nutrition
WHO Regional Office for the Western Pacific
P.O. Box 2932, 1000 Manila, Philippines
Tel.: (632) 528 9865 (direct); 528-8001 (general). Fax: (632) 521 1036; 526 0279
E-mail: leonards@wpro.who.int
THE IMPORTANCE OF IRON NUTRITION IN WOMEN
(especially during childbearing years and early in gestation)

Fernando E. Viteri, MD, ScD
Professor, Department of Nutritional Sciences and Toxicology, University of California at Berkeley
and
Senior Scientist, Children’s Hospital Oakland Research Institute (CHORI)
## Prevalence of Anaemia among Different Populations, Based on National Data

<table>
<thead>
<tr>
<th>Regions</th>
<th>Children</th>
<th>Women (15-59y)</th>
<th>Men (15-59y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-4y Pop</td>
<td>Pregnant</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>% (mil)</td>
<td>% (mil)</td>
<td>% (mil)</td>
</tr>
<tr>
<td>Africa</td>
<td>33.1 35.5</td>
<td>46.9 9.6</td>
<td>28.0 41.9</td>
</tr>
<tr>
<td>Non-Industrialized Americas</td>
<td>22.9 13.0</td>
<td>39.0 3.8</td>
<td>11.0 15.8</td>
</tr>
<tr>
<td>South East Asia</td>
<td>52.7 93.8</td>
<td>79.6 22.2</td>
<td>42.4 184.8</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>38.3 28.1</td>
<td>63.9 8.8</td>
<td>32.7 41.5</td>
</tr>
<tr>
<td>Non-Industrialized West Pacific</td>
<td>14.7 19.7</td>
<td>38.5 9.4</td>
<td>36 172.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34 190 53</td>
<td>56 54 43</td>
<td>34 456.5</td>
</tr>
</tbody>
</table>
DISTRIBUTION OF HEMOGLOBIN LEVELS IN A POPULATION WITH BOTH IRON-NORMAL AND IRON-DEFICIENT MEMBERS.
(Risk assessment for defining iron deficiency anemia)
### Sequential Changes in the Development of Iron Deficiency

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Iron Depletion</th>
<th>Iron Deficient Erythropoiesis</th>
<th>Iron Deficient Anemia</th>
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<td><strong>Erythron Iron</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RE Marrow Fe (0–6)</strong></td>
<td>2–3+</td>
<td>0–1+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Transferrin IBC (µg/dL)</strong></td>
<td>330±30</td>
<td>360</td>
<td>390</td>
<td>410</td>
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<td><strong>Plasma Ferritin (µg/L)</strong></td>
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<td>10</td>
<td>&lt;10</td>
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<tr>
<td><strong>Iron Absorption</strong></td>
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<td>↑</td>
<td>↑</td>
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<td>&lt;40</td>
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<tr>
<td><strong>Transferrin Saturation (%)</strong></td>
<td>35±15</td>
<td>30</td>
<td>&lt;15</td>
<td>&lt;10</td>
</tr>
<tr>
<td><strong>Sideroblasts (%)</strong></td>
<td>40–60</td>
<td>40–60</td>
<td>&lt;10</td>
<td>&lt;10</td>
</tr>
<tr>
<td><strong>RBC Protoporphyrin (µg/dL RBC)</strong></td>
<td>30</td>
<td>30</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td><strong>Erythrocytes</strong></td>
<td>normal</td>
<td>normal</td>
<td>normal</td>
<td>microcytic and hypochromic</td>
</tr>
</tbody>
</table>
Projected Prevalence of Iron Deficiency Based on Prevalence of Iron Deficiency Anemia
The vertical bars represent + 2 SE.

From Skikne et al, 1990
Cumulative frequency distribution of body iron calculated from the ratio of the serum transferrin receptor to serum ferritin

From Cook, JD et al., 2003
EFFECT OF PREGNANCY ON Fe REQUIREMENTS OF WOMEN

Fe requirement (mg/day)

fetus

red cells

body Fe loss
## Two Estimates of Iron Demands for Pregnancy, Delivery and Postpartum

<table>
<thead>
<tr>
<th>PREGNANCY</th>
<th>mg</th>
<th>mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal body Fe loss</td>
<td>216</td>
<td>216</td>
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<tr>
<td>Fetal</td>
<td>270</td>
<td>270</td>
</tr>
<tr>
<td>Placenta</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Maternal Hb and other tissues</td>
<td>400</td>
<td>240</td>
</tr>
<tr>
<td><strong>PREGNANCY TOTAL</strong></td>
<td>940</td>
<td>780</td>
</tr>
</tbody>
</table>

### Dietary Contribution:
- 0.8 mg/d throughout: 216<sup>b</sup> 216<sup>b</sup>
- 0.8 mg/d in 1st trimester and 1.5 mg/d after: 342<sup>b</sup> 342<sup>b</sup>

### Mg of iron that supplements should provide if started by the 6th week of pregnancy:
- Without utilizing any iron reserves: 4.0-3.3<sup>a,b</sup> 3.1-2.4<sup>a,b</sup>
- Utilizing 300 mg of iron reserves: 2.4-1.6<sup>a,b</sup> 1.5-0.8<sup>a,b</sup>

---

<sup>a</sup> High values are observed among iron supplemented well-nourished, “non-anemic” women; Low values are among non-iron-supplemented well-nourished, “non-anemic” women.

<sup>b</sup> Estimated as if dietary iron absorption was 0.8 mg/d throughout or during the 1st trimester and 1.5 mg/d during the last two trimesters.
Iron Deficiency: A worldwide curse to control safely

Our concern is to provide the scientific basis for policies and population programs aimed at preventing and correcting iron deficiency and preventing iron excess in their early, silent phases.
Persistence of low non-heme iron in the brains of rats made iron deficient at an early age.
(INACG, after Dallman et al., 1975)
Estimates of mean and mean-maximal % absorption with time of different supplementation schemes obtained by moving averages

From: Viteri et al. In preparation 2003
POSSIBLE MAXIMAL IRON ABSORPTION (mg/day) BY DIFFERENT IRON SUPPLEMENTATION SCHEMES AMONG NON-ANEMIC WOMEN WITH OR WITHOUT IRON RESERVES

Fe required (mg/day) late in pregnancy

- no Fe reserves,
- 300 mg Fe reserves,

MAXIMAL mg Fe ABSORBED/DAY

D60  W60  W120
CHANGE IN Hb AMONG ANEMIC PREGNANT WOMEN RECEIVING EITHER DAILY (60 mg) OR WEEKLY (120 mg) OF IRON

From Ekstrom AJCN 2002
Evolution of hemoglobin categories in school-age children supplemented weekly with 60 mg of iron +0.5 mg folic acid in the province of Chiriquí, Panama during three consecutive school years

Sinisterra et al, 2000
Mean Hb Concentrations over the 22-wk Study by Treatment Group

Tee et al. (1999)
EVOLUTION OF MEAN HEMOGLOBIN IN DAILY AND WEEKLY SUPPLEMENTED WOMEN IN RELATION TO SUGGESTED “NORMAL” EVOLUTION IN WELL NOURISHED IRON SUPPLEMENTED WOMEN.

From Casanueva et al. 2003
INCIDENCE OF HIGH Hb CONCENTRATIONS (HEMOCONCENTRATION) IN NON-ANEMIC PREGNANT MEXICAN WOMEN SUPPLEMENTED WITH 60 mg OF IRON, 500µg FOLIC ACID AND 1µg B12 DAILY OR DOUBLE DOSES ONCE WEEKLY

NOTE: THERE WERE NO WOMEN WITH Hb LEVELS BELOW 93 g/L AMONG EITHER DAILY OR WEEKLY SUPPLEMENTED GROUPS

From: Casanueva et al. Submitted 2003
Relative risk of low birth weight in woman with hemoglobin >145 g/L at different gestational ages in Mexico City

From: Casanueva et al. Submitted 2003
Relative risk of prematurity in woman with hemoglobin >145 g/L at different gestational ages

N = 167 women

From: Casanueva et al. Submitted 2003
Serum Ferritin Levels in Anemic and Non-Anemic Children

Distribution of children who were anemic at the start of the study by serum ferritin levels—

- after three months of iron supplementation
- twice a week
- weekly

—compared with the distribution of non-anemic children before supplementation ( ).

FROM LIU ET AL, 1995
RELATION OF HEMOGLOBIN LEVELS IN FIRST AND SECOND TRIMESTERS TO OUTCOME OF PREGNANCY
(44,316 births in Cardiff, Wales)

From Murphy et al., Lancet May 13, 1986
ANALYSIS OF NONLINEAR REGRESSION MODELS: COMPARISON OF AN OVERALL MODEL AND INDIVIDUAL MODELS OF Z-TRANSFORMED VALUES VS. LN- NONHEME LIVER IRON

**Graph Description:**
- Z score on the y-axis.
- In nonheme iron (µmol/g wet liver) on the x-axis.
- Lines represent different models:
  - Overall
  - DCF PMNs
  - DCF lymphocytes
  - Rh123 PMNs
  - Rh123 lymphocytes
  - mtDNA damage
  - 1/RCR

**Normal Range:**
- Highlighted on the graph.
## Effects of Iron Supplementation on Mean Hemoglobin Concentration Late in Pregnancy

<table>
<thead>
<tr>
<th>Dose of Elemental Iron&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Number of Subjects</th>
<th>Hemoglobin, g/dl, at 35-40 wk of Gestation&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Difference&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supplemented</td>
<td>Controls</td>
<td>Supplemented</td>
</tr>
<tr>
<td>30 mg/day as ferrous fumarate&lt;sup&gt;c&lt;/sup&gt;</td>
<td>49</td>
<td>46</td>
<td>12.4</td>
</tr>
<tr>
<td>100 mg, twice daily, with meals, sustained release</td>
<td>24</td>
<td>26</td>
<td>12.4</td>
</tr>
<tr>
<td>100 mg, twice daily, sustained release</td>
<td>16</td>
<td>16</td>
<td>12.7</td>
</tr>
<tr>
<td>65 mg (+ 350 µg of folate)</td>
<td>21</td>
<td>24</td>
<td>12.7</td>
</tr>
<tr>
<td>200 mg/day</td>
<td>22</td>
<td>23</td>
<td>12.6</td>
</tr>
<tr>
<td>105 mg, sustained release, at breakfast</td>
<td>21</td>
<td>23</td>
<td>12.6</td>
</tr>
<tr>
<td>65 mg as part of multivitamin mineral supplement after meals</td>
<td>16</td>
<td>13</td>
<td>12.4</td>
</tr>
</tbody>
</table>

<sup>a</sup> Ferrous sulfate, unless otherwise stated.

<sup>b</sup> All differences were statistically significant except for Wallenberg and van Eijk (1984).

<sup>c</sup> Doses of 60 mg and 120 mg did not result in higher hemoglobin values.
# USE OF MULTIVITAMIN/MINERAL PRENATAL SUPPLEMENTS: INFLUENCE ON THE OUTCOME OF PREGNANCY

(Camden N. J. 1,848 births)

From Scholl et al., Am. J. Epidem., v. 146, 1997

<table>
<thead>
<tr>
<th>Prenatal supplement use</th>
<th>Preterm delivery†</th>
<th>Very preterm delivery†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>AOR*</td>
</tr>
<tr>
<td>Yes</td>
<td>15.2</td>
<td>0.66</td>
</tr>
<tr>
<td>No</td>
<td>22.6</td>
<td>1.00</td>
</tr>
<tr>
<td>1st trimester</td>
<td>12.3</td>
<td>0.53</td>
</tr>
<tr>
<td>2nd trimester</td>
<td>16.9</td>
<td>0.71</td>
</tr>
<tr>
<td>No use</td>
<td>22.6</td>
<td>1.00</td>
</tr>
<tr>
<td>Preconceptual use plus prenatal use in first trimester **</td>
<td>0.14</td>
<td>0.05-0.40</td>
</tr>
</tbody>
</table>

† 60% of low birth weight babies were delivered preterm, and 95.4% of very low birth weight were delivered very preterm

* Adjusted Odds Ratio

** Preconceptional and prenatal use effects were additive

From Scholl et al., Am. J. Epidem., v. 146, 1997
EFFECT ON BIRTH WEIGHT OF IRON SUPPLEMENTATION (30 mg/day) FROM GESTATIONAL WEEK ≤20 TO WEEK 28, COMPARED TO PLACEBO IN IRON-SUFFICIENT PREGNANT WOMEN

From Cogswell et al. 2003
Cautions in Extrapolating to Multiple Micronutrient Supplementation for Pregnant Women from Success with Iron Supplementation

Dr Barbara Underwood
<table>
<thead>
<tr>
<th>Regions</th>
<th>Children</th>
<th></th>
<th>Women (15-59y)</th>
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<th>Men (15-59y)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-4y</td>
<td>%</td>
<td>5-14y</td>
<td>%</td>
<td>Pop (mil)</td>
</tr>
<tr>
<td>Africa</td>
<td>33.1</td>
<td>35.5</td>
<td>52.8</td>
<td>85.2</td>
<td>46.9</td>
</tr>
<tr>
<td>Non-Industrialized Americas</td>
<td>22.9</td>
<td>13.0</td>
<td>36.9</td>
<td>39.5</td>
<td>39.0</td>
</tr>
<tr>
<td>South East Asia</td>
<td>52.7</td>
<td>93.8</td>
<td>63.9</td>
<td>207.8</td>
<td>79.6</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>38.3</td>
<td>28.1</td>
<td>30.8</td>
<td>37.9</td>
<td>63.9</td>
</tr>
<tr>
<td>Non-Industrialized West Pacific</td>
<td>14.7</td>
<td>19.7</td>
<td>56.9</td>
<td>156</td>
<td>38.5</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>190</td>
<td>53</td>
<td>526</td>
<td>56</td>
</tr>
</tbody>
</table>
### Sequential Changes in the Development of Iron Deficiency

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<td>Erythron Iron</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RE Marrow Fe (0–6)</td>
<td>2–3+</td>
<td>0–1+</td>
<td>0</td>
<td>0</td>
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<td>330±30</td>
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<tr>
<td>Sideroblasts(%)</td>
<td>40–60</td>
<td>40–60</td>
<td>&lt;10</td>
<td>&lt;10</td>
</tr>
<tr>
<td>RBC Protoporphyrin (µg/dL RBC)</td>
<td>30</td>
<td>30</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Erythrocytes</td>
<td>normal</td>
<td>normal</td>
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Projected Prevalence of Iron Deficiency Based on Prevalence of Iron Deficiency Anemia
EFFECT OF PREGNANCY ON Fe REQUIREMENTS OF WOMEN

Fe requirement (mg / day)

fetus
red cells
body Fe loss
## TWO ESTIMATES OF IRON DEMANDS FOR PREGNANCY, DELIVERY AND POSTPARTUM

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</tr>
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<td>PREGNANCY TOTAL</td>
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<td>780</td>
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Dietary contribution: 0.8 mg/d throughout   216\(^b\) 216\(^b\)
0.8 mg/d in 1st trimester and 1.5 mg/d after 342\(^b\) 342\(^b\)

Mg of iron that supplements should provide if started by the 6th week of pregnancy:

- without utilizing any iron reserves 4.0-3.3\(^a, b\) 3.1-2.4\(^a, b\)
- utilizing 300 mg of iron reserves 2.4-1.6\(^a, b\) 1.5-0.8\(^a, b\)

\(^a\) High values are observed among iron supplemented well-nourished, “non-anemic” women; Low values are among non-iron-supplemented well-nourished, “non-anemic” women.

\(^b\) Estimated as if dietary iron absorption was 0.8 mg/d throughout or during the 1st trimester and 1.5 mg/d during the last two trimesters.
Iron Deficiency: A worldwide curse to control safely

Our concern is to provide the scientific basis for policies and population programs aimed at preventing and correcting iron deficiency and preventing iron excess in their early, silent phases.
POSSIBLE MAXIMAL IRON ABSORPTION (mg/day) BY DIFFERENT IRON SUPPLEMENTATION SCHEMES AMONG NON-ANEMIC WOMEN WITH OR WITHOUT IRON RESERVES

Fe required (mg/day) late in pregnancy

no Fe reserves,
300 mg Fe reserves,

MAXIMAL mg Fe ABSORBED/DAY
CHANGE IN Hb AMONG ANEMIC PREGNANT WOMEN RECEIVING EITHER DAILY (60 mg) OR WEEKLY (120 mg) OF IRON

From Ekstrom AJCN 2002
INCIDENCE OF HIGH Hb CONCENTRATIONS (HEMOCONCENTRATION) IN NON-ANEMIC PREGNANT MEXICAN WOMEN SUPPLEMENTED WITH 60 mg OF IRON, 500µg FOLIC ACID AND 1µg B12 DAILY OR DOUBLE DOSES ONCE WEEKLY.

NOTE: THERE WERE NO WOMEN WITH Hb LEVELS BELOW 93 g/L AMONG EITHER DAILY OR WEEKLY SUPPLEMENTED GROUPS.

From: Casanueva et al. Submitted 2003
Relative risk of low birth weight in woman with hemoglobin >145 g/L at different gestational ages in Mexico city

From: Casanueva et al. Submitted 2003
Relative risk of prematurity in woman with hemoglobin >145 g/L at different gestational ages

N=167 women

From: Casanueva et al. Submitted 2003
RELATION OF HEMOGLOBIN LEVELS IN FIRST AND SECOND TRIMESTERS TO OUTCOME OF PREGNANCY
(44,316 births in Cardiff, Wales)

From Murphy et al., Lancet May 13, 1986
Multiple micronutrient supplements for pregnant women

<table>
<thead>
<tr>
<th></th>
<th>UNICEF\UNU\WHO</th>
<th>US RDA</th>
<th>NEPAL STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vit. A</td>
<td>800 ug</td>
<td>(770)</td>
<td>1000 ug*, **, ***, ****, *****, *****</td>
</tr>
<tr>
<td>Vit. D</td>
<td>200 IU</td>
<td>(200)</td>
<td>400 IU</td>
</tr>
<tr>
<td>Vit. E</td>
<td>10 mg</td>
<td>(12)</td>
<td>10 mg</td>
</tr>
<tr>
<td>Vit. C</td>
<td>70 mg</td>
<td>(85)</td>
<td>65 mg</td>
</tr>
<tr>
<td>Vit. B&lt;sub&gt;1&lt;/sub&gt;</td>
<td>1.4 mg</td>
<td>(1.4)</td>
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</tr>
<tr>
<td>Vit. B&lt;sub&gt;2&lt;/sub&gt;</td>
<td>1.4 mg</td>
<td>(1.4)</td>
<td>1.8 mg</td>
</tr>
<tr>
<td>Niacin</td>
<td>18 mg</td>
<td>(18)</td>
<td>20 mg</td>
</tr>
<tr>
<td>Vit. B&lt;sub&gt;6&lt;/sub&gt;</td>
<td>1.9 mg</td>
<td>(1.9)</td>
<td>2.2 mg</td>
</tr>
<tr>
<td>Folate</td>
<td>400 ug</td>
<td>(600)</td>
<td>400 ug **, ***, ****</td>
</tr>
<tr>
<td>Iron</td>
<td>30 mg</td>
<td>(27)</td>
<td>60 mg ***, ****</td>
</tr>
<tr>
<td>Zinc</td>
<td>15 mg</td>
<td>(11)</td>
<td>30 mg ****</td>
</tr>
<tr>
<td>Copper</td>
<td>2 mg</td>
<td>(0.9)</td>
<td>2 mg</td>
</tr>
<tr>
<td>Selenium</td>
<td>65 ug</td>
<td>(49)</td>
<td>-------</td>
</tr>
<tr>
<td>Iodine</td>
<td>150 ug</td>
<td>(220)</td>
<td>-------</td>
</tr>
<tr>
<td>Vit. K</td>
<td>-----</td>
<td>(90)</td>
<td>30 ug</td>
</tr>
<tr>
<td>Mg</td>
<td>-----</td>
<td>(350)</td>
<td>100 mg</td>
</tr>
<tr>
<td>Vit B&lt;sub&gt;12&lt;/sub&gt;</td>
<td>-----</td>
<td>(2.6)</td>
<td>2.6 ug</td>
</tr>
</tbody>
</table>
Efficacy trials in pregnant Nepalese women

Nepal (N=5000)

Multi-micronutrients (******) increased BW but not different from that of iron or iron + FA (**); FA alone had no effect; No effect on infant mortality, whereas FA (**), iron + FA (***) , & iron + FA + zinc (****) reduced infant deaths; Zinc mitigated benefits of iron on BW
Multiple micronutrient supplements for pregnant women

<table>
<thead>
<tr>
<th>UNICEF\UNU\WHO</th>
<th>NEPAL STUDY</th>
<th>MEXICO STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vit. A</td>
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</tr>
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<td>20 mg</td>
</tr>
<tr>
<td>Vit. B₆</td>
<td>1.9 mg (1.9)</td>
<td>2.2 mg</td>
</tr>
<tr>
<td>Folate</td>
<td>400 ug (600)</td>
<td>400 ug***,*<strong>,</strong>**</td>
</tr>
<tr>
<td>Iron</td>
<td>30 mg (27)</td>
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<td>65 ug (49)</td>
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<td>------</td>
</tr>
<tr>
<td>Vit. K</td>
<td>------ (90)</td>
<td>30 ug</td>
</tr>
<tr>
<td>Mg</td>
<td>---- (350)</td>
<td>100 mg</td>
</tr>
<tr>
<td>Vit B₁₂</td>
<td>---- (2.6)</td>
<td>2.6 ug</td>
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</table>
## Multi-micronutrient supplement
Efficacy trials -- pregnant women

<table>
<thead>
<tr>
<th>WHO/UNICEF/UNU</th>
<th>5 Trials in progress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BW main outcome</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nepal (N=5000)</th>
<th>Multi-micronutrients increased BW but not different from that of iron or iron + FA; No effect on infant mortality; Zinc mitigated iron effects</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mexico (N=873)</th>
<th>Multi-micronutrients increased BW but no different from iron-only</th>
</tr>
</thead>
</table>
Short cuts vs. longer routes home???

Express train

Integrated into community/households lifestyles

Effectiveness trials—community setting (+ impact)

RCTs—efficacy

Market/program distribution multi-fortified product

Epidemiological studies

Bench science
Short cuts vs. longer routes home???

Bench science

Epidemiological studies

RCTs—efficacy

Effectiveness trials—community setting (+ impact)

Integrated into community/households lifestyles

Market/program distribution fortified product

Express train

Integrated into community/households lifestyles

Effectiveness trials—community setting (+ impact)

Market/program distribution fortified product
Balanced approach to effective programs

Integrated into community/households lifestyles

Effectiveness trials

RCTs--efficacy

Epidemiological studies

Bench science
Weekly Iron/Folate Supplementation Pilot Program
for Prevention of Anemia in Women of Reproductive Age, Cambodia 2001-2002

Sau Sokun Mealiny . MD. MPH
National Maternal and Child Health Center
Ministry of Health, Cambodia

29 September 2003
Cambodia Situation

Anemia is a very serious public health problem in Cambodia. The Cambodia Health and Demographic Survey (CDHS) 2000 revealed very high anemia prevalence:

- Children 6-59 months: 63%
- Pregnant women: 66%
- Non-pregnant women: 58%

Main cause of anemia in Cambodia is inadequate dietary intake of absorbable iron.
Cambodia Situation

Policy for controlling and preventing anemia:

• No policy for supplementation for children

• No policy for supplementation for non-pregnant women

• Safe Motherhood Policy: To provide supplementation for pregnant women (daily supplement at least 90 tablets during pregnancy) and postpartum mothers (daily supplement at least 45 tablets postpartum supplement).

Only 38% of women receive ante-natal care and there is only 4% of women take iron/folate supplements for at least 2 months during pregnancy.
Objectives of the Pilot Program

1. To introduce, through the application of social marketing and participatory communication approaches, a preventive once-a-week iron/folate supplementation program for non-pregnant women of reproductive age (15-49 years) in selected garment factories, secondary school, and rural communities.

2. To assess the effectiveness of the weekly iron/folate supplementation program in improving the knowledge, attitudes, and practices of the participants to maintain or improve hemoglobin levels.

3. To assess the effects of de-worming combined with iron-folate supplementation on hemoglobin levels in subgroups of selected women in each of the three target areas.
Target Groups

In 2001-2002, the Ministry of Health in collaboration with other ministries and other agencies and with funding and technical support from WHO and Japanese government implemented the pilot program with:

- Seven garment factories
- Five secondary schools
- One hundred and thirty nine rural villages

A total of approximately 24,000 women were involved in the pilot program
Steps in Implementing the Pilot Program in Garment Factories

1. Selection of garment factories around Phnom Penh
2. Participatory planning and human resource development: Participatory planning, capacity building, and training were conducted at every level.
3. Social marketing strategies and IEC materials
   - Peer education training
   - Strategies used to promote the supplement
   - Program lottery
   - Utilization of local media
   - Mobile team activities
   - IEC materials developments include logo, poster, t-shirts, cap, shoulder bag, pen, billboard, and leaflet contain key messages about the supplement and iron rich foods
4. Launching of the pilot program at program sites
5. Packaging and distribution of the supplement
6. Monitoring and reporting system
7. External monitoring.
Big launching at factory

Dr. Pigott during launching

Factory team leader training

Preparation with Dr. Suttilak
The Count of Factory Workers that listed correctly of iron-rich food

Count of Women

Baseline
Follow-Up

Number of Iron-Rich Foods
The Count of Factory Workers that listed correctly the following number of consequences of Anemia

<table>
<thead>
<tr>
<th>Number of Consequences of Anemia</th>
<th>Count of Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100 (Baseline)</td>
</tr>
<tr>
<td>1</td>
<td>150 (Follow-Up)</td>
</tr>
<tr>
<td>2</td>
<td>200 (Baseline)</td>
</tr>
<tr>
<td>3</td>
<td>250 (Follow-Up)</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- **Baseline**
- **Follow-Up**
The Count of Factory Workers that listed correctly the following number of Preventive Measures of Anemia

Baseline
Follow-Up

Number of Preventive Measures of Anemia
Constraints of the Pilot Program in Garment Factories

• Limited access to the factories due to the busy work schedule

• Some negative rumors about the supplement, but disappeared after the first two month of the program.
Steps in Implementing the Pilot Program in Schools and Rural Communities

1. Participatory planning and human resource development: The pilot program was be integrated into UNICEF’s Child Right Program. Trainings of involved personnel were conducted.

2. Peer educators at school and community level

3. Social marketing strategies and IEC materials: Supplement was sold for 10 cents per package (4 tablets)
   - New poster and the rest of IEC materials are the same as the ones used in garment factories

4. Launching of the pilot program at program sites

5. ‘Big Lunch’ in the community

6. Distribution System

7. Monitoring and follow up support

8. Reporting system

9. External monitoring
Launching at community

Interview of school girl during final evaluation

Training village peer counselors

Launch of the WIF program at secondary school
The Count of School Students that listed correctly the following number of iron-rich Food

![Bar graph showing the count of women listed the number of iron-rich foods. The x-axis represents the number of iron-rich foods (0, 1, 2, 3, 4, 5), and the y-axis represents the count of women. The graph compares Baseline and Follow-Up data.](image-url)
The Count of School Students that listed correctly the following number of consequences of Anemia

Count of Women

Number of Consequences of Anemia

Count of Women

- 200
- 150
- 100
- 50
- 0

0 1 2 3 4

Baseline
Follow-Up
The Count of School Students that listed correctly the following number of Preventive Measures of Anemia:

- Baseline
- Follow-Up

<table>
<thead>
<tr>
<th>Number of Preventive Measures of Anemia</th>
<th>Counts of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>300</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>
The Count of Community Women that listed correctly the following number of iron-rich foods

- **Baseline**
- **Follow-Up**

<table>
<thead>
<tr>
<th>Number of Iron-Rich Foods</th>
<th>Baseline Count</th>
<th>Follow-Up Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>447</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>44</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>38</td>
<td>90</td>
</tr>
</tbody>
</table>
The Count of Community Women that listed correctly the following number of consequences of Anemia

- Baseline
- Follow-Up

Count of Women

Number of Consequences of Anemia

0 1 2 3 4
The Count of Community Women that listed correctly the following number of Preventive Measures of Anemia
Constraints of the Pilot Program in Schools and Rural Communities

- Time available for planning and implementation was too short
- Not enough time for teaching and practicing counseling skills
- Some IEC materials were not completed until the fifth month of the implementation
- The pilot program is new to the Child Right Program, so it took time to build trust and confidence
- The revolving fund concept at school was new, also took time to be well understood.

Child Right (Seth Kuma) Program is a community based program. Consists of many components, including capacity building, community education and child care, water sanitation and Environment, health, nutrition, hygiene, caring practices, protection and care of vulnerable women and children, Credit, employment, and income generation.
Conclusions

1. The pilot program showed that a multi-sectoral collaborative approach to prevent iron deficiency anemia in women of reproductive age is feasible and essential.

2. Participatory planning and social marketing strategies proved effective in promoting the preventive supplement in Cambodia.

3. Cambodian women have demonstrated that they have an interest in improving their health and preventing anemia.

4. Introducing preventive public health program into factories has shown to be difficult.

5. Schools are a highly supportive environment to improve knowledge and behavior practices to control and prevent anemia.

6. The community showed no substantial or statistical different between the non-iron/folate supplementation group and the iron/folate supplementation group.
Recommendations

1. The weekly iron/folate supplementation program for school girls should be extended nation wide.

2. The supplementation in the rural communities needs more study to find out key program factors:
   - Distribution and availability of the supplement at the community level
   - Training and support of the village peer counselors to promote the supplement
   - Price regulation and monitoring
   - Child Right (Seth Kuma) coordination and integration

3. Further study should also be conducted for the factory setting.

4. The use of daily multi-micronutrient supplements should be tested to see if they are more effective in reducing the prevalence of anemia than the weekly iron/folate supplements in the Cambodia context.
Thank for your attention!
Weekly Iron Folate Supplementation and Social Marketing in Cambodia

Byron Crape,  
Johns Hopkins School of Public Health
Weekly Iron-Folate Supplementation and Social Marketing in Cambodia: Improved Hemoglobin for Secondary School Girls, but Not for Women in Rural Villages
*Descriptives: Baseline Characteristics and Anemia Status

*Anemia Status Compared At Baseline and Follow-up

*Mean Hemoglobin Change by Deworming and Iron-Folate Supplementation Status in Schools

*Mean Hemoglobin Change by Iron-Folate Supplementation in Schools

*Education and Change in Hemoglobin Levels in Factories
<table>
<thead>
<tr>
<th>Baseline Characteristic</th>
<th>Secondary Students</th>
<th>Rural Village Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Age (range)</td>
<td>16 (11, 20)</td>
<td>32 (15, 49)</td>
</tr>
<tr>
<td>Median Height in cm (range)</td>
<td>149 (130, 164)</td>
<td>--------------------</td>
</tr>
<tr>
<td>Median Body Mass in kg (range)</td>
<td>40.2 (24.1, 59.2)</td>
<td>--------------------</td>
</tr>
<tr>
<td>Median Hemoglobin in gm/dl (range)</td>
<td>12.0 (6.5, 15.3)</td>
<td>11.6 (4.4, 16.9)</td>
</tr>
<tr>
<td>% Suffered Diarrhea past two weeks (fraction)</td>
<td>19.1% (81/423)</td>
<td>32.9% (210/639)</td>
</tr>
<tr>
<td>% Suffered Fever past two weeks (fraction)</td>
<td>36.4% (154/423)</td>
<td>59.5% (380/639)</td>
</tr>
<tr>
<td>% Under Hemoglobin of 9 g/dl (fraction)</td>
<td>3.3% (14/423)</td>
<td>11.0% (70/638)</td>
</tr>
</tbody>
</table>
Percent of Women Not Anemic (hg≥12 g/dl), Mildly Anemic (hg<12 & hg ≥9 g/dl) or Moderately/Severely Anemic (hg<9 g/dl) at Baseline
OBSERVATIONS

1. Rural Community Women Appeared to Suffer More from Diarrhea and Fever than Secondary School Students at Baseline

2. Rural Community Women Appeared to Suffer More from Anemia than Secondary School Students at Baseline
Students Not Taking Iron-Folate Supplements (N=191)

- Not Anemic: 58%
- Mildly Anemic: 40%
- Moderately and Severely Anemic: 2%

Students Taking Iron-Folate Supplements (N=232)

- Not Anemic: 45%
- Mildly Anemic: 51%
- Moderately and Severely Anemic: 4%
Rural Village Women Not Taking Iron-Folate Supplements (N=323)

- Not Anemic: 41%
- Mildly Anemic: 47%
- Moderately and Severely Anemic: 12%

Rural Village Women Taking Iron-Folate Supplements (N=315)

- Not Anemic: 39%
- Mildly Anemic: 51%
- Moderately and Severely Anemic: 10%
OBSERVATIONS

1. Students were More Likely to Take Supplements if They Found if Their Anemia/Hemoglobin Status was Poor (chisq p=.02)

2. Rural Community Women Chose to Take the Supplements Regardless of Anemia/Hemoglobin Status (chisq p=.68 at baseline, chisq p=.74 at follow-up)

3. By Follow-up, the Anemia Status of Those Students Taking Supplements (Initially Worse than Those Not Taking Supplements) was Equal that of Those Students Not taking Supplements (chisq p=.96)
Mean Change in Hemoglobin (gm/dl) from Baseline to Follow-up Among Secondary School Girls By Deworming/Iron-Folate Status

- Neither: N=57
- Dewormed Only: N=51
- Iron-Folate Only: N=134
- Iron-Folate & Deworming: N=181
OBSERVATIONS

1. Iron-Folate Supplementation Appeared to Contribute More to Hemoglobin Levels than Deworming Among Students

2. Those with Neither Supplementation or Deworming Appeared to do Poorest
Mean Change in Hemoglobin over Six-months for Secondary School Girls by Iron-Folate Supplementation Status (Wilcoxon p-value=.05)

- All School Girls Who Reported Not Taking Iron-Folate Supplementation at Follow-up: N=191
- All School Girls Who Reported Taking Iron-Folate Supplementation at Follow-up: N=232
OBSERVATIONS

1. Weekly Iron-Folate Supplementation was Associated with Greater Improvement in Change in Hemoglobin Level Among Students

2. Weekly Iron-Folate Supplementation was Not Associated With Improvement in Change in Hemoglobin over that of No Supplementation
<table>
<thead>
<tr>
<th>Variable*</th>
<th>Parameter Estimate</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Hemoglobin Levels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(gm/dl) in Quartiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 13.6</td>
<td>-1.53</td>
<td>.0004</td>
</tr>
<tr>
<td>&lt; 13.6 and ≥ 12.8</td>
<td>-0.89</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>&lt; 12.8 and ≥ 12.0</td>
<td>-0.45</td>
<td>&lt; .0001</td>
</tr>
<tr>
<td>&lt; 12.0</td>
<td>0 (reference)</td>
<td></td>
</tr>
<tr>
<td><strong>Highest School Grade Attained</strong></td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>11(^{th}) - 12(^{th})</td>
<td>0.15</td>
<td>.002</td>
</tr>
<tr>
<td>9(^{th}) - 10(^{th})</td>
<td>0.15</td>
<td>.38</td>
</tr>
<tr>
<td>7(^{th}) - 8(^{th})</td>
<td>0.14</td>
<td>.21</td>
</tr>
<tr>
<td>5(^{th}) - 6(^{th})</td>
<td>0 (reference)</td>
<td>.20</td>
</tr>
<tr>
<td>1(^{st}) - 5(^{th})</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Height (cm) in Quartiles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 156.5</td>
<td>-0.28</td>
<td>.02</td>
</tr>
<tr>
<td>≤ 156.5 and &gt; 153.0</td>
<td>-0.14</td>
<td>.24</td>
</tr>
<tr>
<td>≤ 153.0 and &gt; 150.0</td>
<td>-0.002</td>
<td>.98</td>
</tr>
<tr>
<td>≤ 150.0</td>
<td>0 (reference)</td>
<td></td>
</tr>
</tbody>
</table>
OBSERVATIONS

1. Higher Education was Associated With Improved Hemoglobin Levels after Adjusting for Baseline Hemoglobin and Height

2. Age and Income had No Impact on the Model and were Dropped Out.
Conclusions

* Students Responded to Poor Hemoglobin Levels at Baseline by More Likely Choosing to Take Iron-Folate Supplement.

* Iron/Folate Supplementation Worked for Students But Not For Rural Community Women...

  Differences in Compliance?
  Ability to Utilize Iron?
  Illness Rates?

* Higher Education (11th and 12th Grade) was Associated with Improved Changes in Hemoglobin
Weekly Iron Supplementation
Anthropometric, Stool and Hemoglobin
survey in School Health Program,
Kampot, Cambodia supported by GTZ
(Cambodian-German cooperation)

Philip Longfils
Weekly Iron Supplementation
Anthropometric, Stool and Hemoglobin survey in School Health Program, Kampot, Cambodia supported by GTZ (Cambodian – German cooperation)

- Study design: prospective study carried out in June 1999 & June 2000
- Selected groups: all first grade primary pupils in two cluster schools: Dang Tung (217) and Chum Kiri (234). Total: 234 males, 217 females.
- Measurements: age assessment, weight, height, hemoglobin level (Lovibond method) and stool analysis (in Dang Tung).
- Definition of anemia:
  - < 115 gr. Hb /1 L. of blood for pupils from 5 to 11 y. old.
  - < 120 gr. Hb /1 L. of blood for pupils 12 y. old and over
- Definition of Malnutrition:
  - acute or wasting: weight - to - height < -2 Z-score
  - chronic or stunting: height - to - age < -2 Z-score
  - **under nutrition or underweight:** weight - to - age < -2 Z score
- Intervention: iron 60 mg /folic acid 0.25 mg once a week for 20 weeks. Vitamin A, Mebendazole twice a year: day 1 and day 180.
Comparison between school register age and survey age in grade 1 at Chum Kiri school - July 1999 school survey

July 1999 survey

Mean of school age: 7.4 year

Mean of survey age: 3.4 year

Number of kids in age survey: 228
Baseline survey: prevalence of anemia in Dang Tung & Trapiang Reang schools by age group (June 1999).

- Sample size: 234 in TR & 217 in DT.
- 64% of pupils in both schools have anemia.
- 5-11 y. old: 62% in TR & 57% in DT.
- 12-14 y. old: 83% in TR & 91% in DT.

Anemia per age groups in grade 1
in Trapiang Reang and Dang Tung schools in July 1999

- Dang Tung age: 5-11
  Hb cut-off point: 5-11 y: < 11.5 g. Hb/100 ml; 12-14 y: < 12 g. Hb/100 ml
Degree of anemia: severe, moderate, “healthy”.

- 11% of pupils suffer from severe anemia with Hb. < 98 gr/1 L.
- Only 12% have a “healthy level” of Hb. of 127 gr./ 1 L. or more.
Distribution of anemia in Dang Tung & Trapiang Reang schools in July 1999 - GTZ - IFSP survey in Kampot province

Dang Tung 1999: 218 kids

Trapiang Reang 1999: 234 kids

Acute anemia: Hb 7.3 to 9.7 gr; moderate anemia: Hb >9.7 to 11.7 gr.; "healthy": Hb >11.7 gr.
Prevalence of anemia by age group among grade 1 in Trapiang Reang and Dang Tung schools

In DT for age 6: only 3 samples; age 13: 2, age 14: 5
In TR for age 6: only 5 samples; age 13: 4; age 14: 2; age 15: 3
Prevalence of malnutrition by age groups in grade 1 of Trapiang Reang school - Kampot (July 1999)

- Stunting = chronic malnutrition = height/age (< -2.0 SD, haz)
- Wasting = acute malnutrition = weight/height (< -2.0 SD whz)
- Underweight = general malnutrition = weight/age (< -2.0 SD waz)
Prevalence of stool parasites among school children
grade 1 in Dang Tung school in June 1999

- Parasite + 62%
- Parasite - 38%

Type of parasite
- Hookworm/ankylostome: 69%
- Trichuris: 20%
- Ascaris: 11%
- Entero: 6%
- Gardia lam.nana: 4%
- Amibe: 3%
Follow-up of 1999 grade 1 pupils in Trapiang Reang and Dang Tung schools in 2000

Trapiang Reang 2000
- Grade 1: 129
- Grade 2: 98
- At home: 19
- Lost: 21

Dang Tung 2000
- Grade 1: 98
- Grade 2: 96
- At home: 2
- Lost: 2

grade 1 = repeat = doublant
Anemia per age group - follow-up survey
in grade 1-2 in Trapiang Reang and Dang Tung schools - July 2000

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Chum Kiri</th>
<th>Dang Tung</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1999</td>
<td>2000</td>
</tr>
<tr>
<td>5-11 years old</td>
<td>130/211</td>
<td>19/160</td>
</tr>
<tr>
<td></td>
<td>61.6%</td>
<td>11.9%</td>
</tr>
<tr>
<td>12-14 years old</td>
<td>19/23</td>
<td>23/52</td>
</tr>
<tr>
<td></td>
<td>82.6%</td>
<td>44.2%</td>
</tr>
</tbody>
</table>

Hb cut-off point: 5-11 y: < 11.5 g Hb/100 ml; 12-14 y: < 12 g Hb/100 ml

Number of pupils

Hemoglobin level

- Normal hemoglobin level
- Severe anemia
- Moderate anemia
- Normal

Graph showing the distribution of hemoglobin levels with the number of pupils and the level of hemoglobin.

1999:
- Hemoglobin mean: 11.11
- Number of pupils: 234

2000:
- Hemoglobin mean: 12.58
- Number of pupils: 263
Prevalence of stool parasites among school children
grade 1 in Dang Tung school, follow-up survey June 2000

Parasite + 49%

- Hookworm/ankylostome: 72%
- No: 74%

% infection

Type of parasite

- Ascaris: 59%
- Entero: 10%
- Amibe: 8%
- Strongy/anguilule: 8
Constraints:

Iron compliance survey: (310 pupils)

- Pupils nutrition habits:
  - 60% pupils eat 2 times per day
  - 30% pupils going to school with empty stomach
- Side effects from Iron supplementation: 227 answers:
  - stomachache (9%), nausea (55%), don’t like taste - smell (12%), parents advice not to take iron (7%).
- Compliance: Self: 99% take iron !!; Other: 25% don’t take!!
- 85% pupils provided with iron weekly, 11% every 2 weeks
- 63% teacher supervise iron medication
- 69% teacher explain food must be taken before iron
- Water to take iron pill: 24% from school, 35% from pupils, 41% from nearby wells or pond!
Recommendations regarding implementation of Weekly Iron Supplementation in School Program

- Tablet with appropriate iron dosage adapted to average primary school children bodyweight is needed.
- Coated iron pill to decrease gastric side effects is a must
- Association of MMN to iron must be considered
- Teacher training on WIS is part of the program
- Community and parents information on WIS is needed
- Appropriate supervision system of iron distribution by teacher is essential
- Teacher monitoring of pupil’s compliance is essential
- Appropriate water supply to take the drug must exist
- School feeding program is the best way to ensure appropriate pupil’s compliance with iron tablet.
RECOMMENDATIONS REGARDING SCHOOL HEALTH PROGRAMME

- **Low cost school health programme** should become the norm in Cambodia.

  Just to remind that primary school children are affected by high prevalence of:

  - Chronic malnutrition  60 % in our Trapiang Reang study
  - Acute malnutrition  10% in our Trapiang Reang study
  - Anemia         57% up to 91% in our study
  - Parasites infestation   62% in our Dang Tung study
  - Vitamin A deficiency         present (not assessed in this study)
  - Vitamin B deficiency up to 16% in school health screening
  - Iodine deficiency               present (not assessed in this study)
  - Diarrhea prevalence 37% on survey day
- Priority should be given to the **first three grades of primary school**, which are more affected.
- Vitamin A, Vitamin B complex supplement and mass deworming twice a year should be part of School Health programme.
- Regular **weekly mass iron supplementation** should be part of School Health Programme in Cambodia. Its efficiency has been demonstrated in this study.
- Latrine development programme should be supported for school and household to prevent hookworm infection.
- "To wear shoes during defecation" should become an important topic during health education.
- **School feeding programme** is strongly recommended, considering malnutrition prevalence and nutrient deficiencies found among primary school children.
Recommendations to Ministry of Education:

- **School age registration**: Real age should become the standard.
- **Delayed school registration**: Community education is needed to encourage parents to send their kids to school at 6b years of age according to the rule of the law.
- The traditional test "Hand catching the opposite ear" should be banned, as it just contribute to delay even more the already late registration of stunted Khmer children.
Iron cost in mass WIS

One tablet of Iron-Folic acid costs 6.8 Riels (CMS price)

- So, a treatment with 20 tablets will cost 0.033 US$ per child.
- With one US $, we can rebuild healthy blood level for 30 kids!
- With 100,000 US$/year, iron tablet may be available for 3,000,000 Khmer primary school pupils.

By: Lourdes S. Paulino M.D., M.P.H.
Chief Health Program Officer
Department of Health
Outline of Presentation

1. Introduction
2. Project Objectives
3. Project description & design
4. Project Results
5. Conclusions and recommendations
Introduction

- Anemia is a public health problem in the Philippines:
  - 3 out of 10 Filipinos (30.3%)
  - 51 out of 100 pregnant (50.7%)
  - 46 out of 100 lactating (45.6%)
- (Source: 1998 NNS-FNRI-DOST)
Causes of Anemia

1. Intake of iron-rich foods only 64.7% of the RDA. (FNRI-DOST, 1993)
2. Intake of enhancers (vit. C) only 73.2% of RDA (FNRI-DOST, 1993)
3. Presence of phytates in the diet (rice)
4. Parasitism
5. Malaria & schistosomiasis
6. Vitamin A deficiency
Iron Supplementation Program

- Memorandum Circular, 1977
- Start of intake: 4th month of pregnancy until delivery;
- Postpartum: 2 months
- Iron preparation: 1 tablet containing 60 mg. elemental iron & 250 ug. folate
- Dose: 2 tablets per day
● Administrative order no.3 – A s. 2000
● Pregnant women: start ASAP for a period of at least 6 months during the pregnancy period
● Postpartum: 3 months
● Preparation: 60 mg. elemental iron with 400 ug. folate.
Problems

- Late ante-natal check-ups
- Low compliance
- Inadequate knowledge of health workers on ID and IDA
- Erratic supply of the iron supplements
Project Objectives

- General:
- A. To introduce weekly iron/folate supplements to WRA (15-49 years old) starting with the weekly dose of 60 mg. EI & 3.5 mg folate before pregnancy & to continue with a weekly dose when pregnancy is detected & for 3 months after delivery using community based social mobilization & communication
B. To assess the effectiveness of combined strategies of social mobilization & weekly iron supplementation in improving knowledge, attitudes & practices & the iron status of WRA.
Specific objectives

- Increase awareness on importance of iron
- Promote the adoption of weekly iron to WRA
- Program effectiveness: KAP improved
- Measure improvement of iron status
- Estimate compliance/prevalence of side effects
- Feasibility of the Philippines adopting the weekly iron/folate supplementation
Project Description & design

- Study areas: 3 municipalities in Pangasinan
- Duration of study: 1 year
- Subjects of study: WRA
- Iron prep: (1) Femina 60 for non-pregnant women. Contains 60 mg. EI & 3.5 mg. folate. (2) Femina OB for pregnant women. Contains 120 mg. EI & 3.5 mg. folate. (Produced by United Laboratories, Phil.)
Method of distribution

- Femina OB was given free to pregnant women seen at health centers.
- Femina 60 was sold in main drugstores of the municipalities, secondary schools & by the BHWs
- DOSE: ONCE A WEEK (a protocol for the project was developed)
Project implementation

- Training of health workers
- KAP survey: 4 times
- Biochemical assessment: 4 times
- Intervention: iron supplementation; social mobilization & social marketing
Social mobilization & social marketing

- Advocacy to local officials
- Development, production, distribution & dissemination of IEC materials
- Project & product launching with UL
- Orientation-training of project implementors.
- Improvement of service delivery through the existing health systems.
- Introducing the availability of the iron weekly supplements.
- General community education/promotion programs.
Behavioral objectives of the social marketing strategies

- Accessibility to the iron supplements
- Taking the supplements
- Taking regularly the supplements
Distribution of women according to pregnancy status at each survey period

<table>
<thead>
<tr>
<th>Status of women</th>
<th>Survey 1</th>
<th>Survey 2</th>
<th>Survey 3</th>
<th>Survey 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not pregnant</td>
<td>409</td>
<td>419</td>
<td>383</td>
<td>357</td>
</tr>
<tr>
<td>Pregnant</td>
<td>335</td>
<td>109</td>
<td>83</td>
<td>63</td>
</tr>
<tr>
<td>Total</td>
<td>744</td>
<td>528</td>
<td>466</td>
<td>420</td>
</tr>
</tbody>
</table>
Percentage of pregnant women who agreed to different statements on the importance of iron at each survey period.
Percentage of non-pregnant women who agreed to different statements on the importance of iron at each survey period
## Percentage of Respondents at each Survey period Who Agree to Different Statements Reflecting Women’s Knowledge and Attitudes on Iron and Anemia

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>PREGNANT</th>
<th>NOT PREGNANT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S1</td>
<td>S2</td>
</tr>
<tr>
<td>I know something about iron/folate tablets</td>
<td>40.3</td>
<td>80.7</td>
</tr>
<tr>
<td>The benefits of taking iron/folate tablets are:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It improves one’s nutritional status</td>
<td>5.7</td>
<td>13.8</td>
</tr>
<tr>
<td>It prevents anemia</td>
<td>9.9</td>
<td>39.4</td>
</tr>
<tr>
<td>It treats anemia</td>
<td>3.6</td>
<td>5.5</td>
</tr>
<tr>
<td>It makes me more beautiful</td>
<td>14.6</td>
<td>39.4</td>
</tr>
<tr>
<td>It makes me have a healthy child</td>
<td>0.9</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td>43.1</td>
</tr>
<tr>
<td>The following need to take iron/folate tablets:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnant women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married women</td>
<td>81.6</td>
<td>96.3</td>
</tr>
<tr>
<td>Mothers</td>
<td>11.2</td>
<td>28.8</td>
</tr>
<tr>
<td>Lactating women</td>
<td>2.4</td>
<td>7.5</td>
</tr>
<tr>
<td>Female students</td>
<td>5.6</td>
<td>20.0</td>
</tr>
<tr>
<td>Women in the reproductive age-groups</td>
<td>2.4</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>4.8</td>
<td>41.3</td>
</tr>
</tbody>
</table>
The following are iron-rich foods:

<table>
<thead>
<tr>
<th>Food</th>
<th>11.9</th>
<th>43.1</th>
<th>65.1</th>
<th>71.4</th>
<th>12.5</th>
<th>38.7</th>
<th>66.8</th>
<th>73.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eggs</td>
<td>14.6</td>
<td>40.4</td>
<td>54.2</td>
<td>74.6</td>
<td>17.4</td>
<td>46.8</td>
<td>67.4</td>
<td>75.4</td>
</tr>
<tr>
<td>Meat</td>
<td>14.0</td>
<td>62.4</td>
<td>79.5</td>
<td>88.9</td>
<td>18.3</td>
<td>58.7</td>
<td>79.1</td>
<td>83.5</td>
</tr>
<tr>
<td>Liver</td>
<td>10.1</td>
<td>26.6</td>
<td>62.7</td>
<td>76.2</td>
<td>11.2</td>
<td>24.8</td>
<td>55.9</td>
<td>67.5</td>
</tr>
<tr>
<td>Fish</td>
<td>31.0</td>
<td>56.9</td>
<td>78.3</td>
<td>81.0</td>
<td>36.4</td>
<td>43.9</td>
<td>77.0</td>
<td>78.7</td>
</tr>
<tr>
<td>Malunggay (Horse Raddish)</td>
<td>14.9</td>
<td>47.7</td>
<td>54.2</td>
<td>58.7</td>
<td>17.6</td>
<td>43.9</td>
<td>56.9</td>
<td>57.4</td>
</tr>
<tr>
<td>Saluyot</td>
<td>13.7</td>
<td>45.0</td>
<td>49.4</td>
<td>25.4</td>
<td>15.2</td>
<td>33.7</td>
<td>43.6</td>
<td>23.5</td>
</tr>
</tbody>
</table>

Wishes to know more about iron/folate tablets:

| Feeds                      | 80.6 | 99.1 | 100 | 100 | 88.0 | 98.8 | 98.4 | 99.7 |

Feels that she needs to take iron/folate tablets:

| Feeds                      | 94.7 | 98.8 | 100 | 100 | 89.3 | 99.5 | 100 | 100 |
Percentage of women taking weekly iron/folate supplementation by pregnancy status and survey period.

<table>
<thead>
<tr>
<th>PREGNANCY STATUS</th>
<th>SURVEY PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SURVEY1</td>
</tr>
<tr>
<td>Pregnant</td>
<td>5.7</td>
</tr>
<tr>
<td>Not pregnant</td>
<td>6.1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5.9</td>
</tr>
</tbody>
</table>
### Occurrence of side effects according to type & duration of iron/folate supplementation

<table>
<thead>
<tr>
<th>Type of Duration of Iron/Folate Supplementation</th>
<th>% With Adverse Side Effects</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower Limit</td>
</tr>
<tr>
<td>No Treatment</td>
<td>3.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Daily, ≤6 Weeks</td>
<td>11.1</td>
<td>4.6</td>
</tr>
<tr>
<td>Daily, &gt;6 Weeks</td>
<td>13.9</td>
<td>7.2</td>
</tr>
<tr>
<td>Weekly, ≤6 Weeks</td>
<td>10.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Weekly, &gt;6 Weeks</td>
<td>14.5</td>
<td>12.2</td>
</tr>
</tbody>
</table>
Conclusions & Recommendations

1. DOH to issue a policy statement on the adoption of the weekly iron supplementation.
2. Dept. of Education as the agency that collaborative efforts can be conducted.
3. Assessing the effectiveness of the weekly iron supplementation (FNRI)
Recommendations/conclusions

- Support from the PMA, Drugstores Association of the Phil., local pharmaceutical companies.
- Weekly Iron supplementation among infants and children
- Develop a communication plan
The project team

- Ms. Imelda A. Agdeppa, RND, PhD.
- Ms. Unita Mari Etorma, RND, MPH
- Ms. Socorro Ignacio, RND, Dr. PH.
- Ms. Lourdes S. Paulino, M.D., M.P.H.
- Director Ms. Adelisa C. Ramos and
- the medical technologists
Acknowledgement

- The LGEs of the 3 municipalities
- The MHOs and all the RHU staff
- The BHWs
- The Provincial Health Officer
- The Provl. NDs
- The local organizations
- The community
Acknowledgement

- Nutrition Foundation of the Philippines
- And to Diane Bosch (WHO)
- And to Dr. Tommaso Cavalli-Sforza (WHO)
- And to UNITED Laboratories
- And to Dr. Suttillak; Dr. Ophelia Mendoza
Salamat po
The effects of a community-based weekly iron-folate supplementation on hemoglobin and iron status of pregnant and non-pregnant women in the Philippines

Imelda Angeles-Agdeppa
During the WHO Meeting, WPRO, Manila, Philippines
September 29 – October 1, 2003
DOH iron supplementation program: 2 decades

Limited effectiveness

10% pregnant women going for prenatal consultation

Lack of time for health workers to motivate women

Lack of budget

Presence of side-effects

Operation effectiveness: 7%
Prevalence of Anemia (Phil.)

Periods (yr)

IDA a cause for concern...

Source: FNRI-DOST, 1998
## Prevalence of Anemia by Age/Physiological State

<table>
<thead>
<tr>
<th>AGE/PHYSIOLOGICAL STATE</th>
<th>PERCENT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Philippines</strong></td>
<td></td>
</tr>
<tr>
<td>6 mos to &lt; 1y</td>
<td>30.6</td>
</tr>
<tr>
<td>1-5 y</td>
<td>56.6</td>
</tr>
<tr>
<td>6 mo - 5 y</td>
<td>29.6</td>
</tr>
<tr>
<td>6 -12 y M</td>
<td>31.8</td>
</tr>
<tr>
<td>F</td>
<td>34.8</td>
</tr>
<tr>
<td>13-19 y M</td>
<td>36.5</td>
</tr>
<tr>
<td>F</td>
<td>36.2</td>
</tr>
<tr>
<td>20-39 y M</td>
<td>36.2</td>
</tr>
<tr>
<td>F</td>
<td>33.2</td>
</tr>
<tr>
<td>40-59 y M</td>
<td>14.5</td>
</tr>
<tr>
<td>F</td>
<td>31.7</td>
</tr>
<tr>
<td>60 + M</td>
<td>27.7</td>
</tr>
<tr>
<td>F</td>
<td>33.3</td>
</tr>
<tr>
<td>Pregnant Women</td>
<td>49.1</td>
</tr>
<tr>
<td>Lactating Women</td>
<td>50.3</td>
</tr>
</tbody>
</table>

Source: FNRI-DOST, 1998
Prevalence of Anemia Among 6 mos - 5 y Children: Philippines, 1998
Mean One-Day per Capita energy and Nutrient Intake and Percent Adequacy

<table>
<thead>
<tr>
<th>Energy and nutrient</th>
<th>Intake</th>
<th>% Adequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td>1684</td>
<td>87.8</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>49.9</td>
<td>106.2</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>10.1</td>
<td>64.7</td>
</tr>
<tr>
<td>Calcium (g)</td>
<td>0.39</td>
<td>67.2</td>
</tr>
<tr>
<td>Vitamin A (µg RE)</td>
<td>391.9</td>
<td>88.1</td>
</tr>
<tr>
<td>Thiamin (mg)</td>
<td>0.67</td>
<td>68.4</td>
</tr>
<tr>
<td>Riboflavin (mg)</td>
<td>0.56</td>
<td>57.1</td>
</tr>
<tr>
<td>Niacin (mg)</td>
<td>16.1</td>
<td>88.0</td>
</tr>
<tr>
<td>Ascorbic Acid (mg)</td>
<td>46.7</td>
<td>73.2</td>
</tr>
</tbody>
</table>

Source: FNRI – DOST, 1993
Objective of the study:

✓ Introduce and assess effectiveness
✓ Weekly iron – folate supplementation
✓ WRA : (pregnant and non-pregnant)
✓ Community –based
✓ Social mobilization and social marketing
Specific Objectives of the study:

- Increase awareness – importance of iron-folate
- Promote the adoption of the supplements
- Effectiveness of social marketing & mobilization on KAP of WRAs using the weekly dosing
- Estimate compliance
- Assess feasibility of the weekly iron-folate dosing
Study design:
- Survey
- Community-based intervention study

Subjects:
- Pregnant and Non-Pregnant aged 15 – 49 y.o.

Inclusion Criteria:
- Women who were considered to become pregnant within 12 – month
- Women who were pregnant
- Willing - blood collection and responds to questionnaires
Exclusion Criteria:

- Taking daily IF supplements at start of the study
- Suffering from any sort of infections
- Suffering from chronic diseases

Study areas:

- 3 municipalities in Pangasinan
- Agriculture, fishing and trade
All WRAs

Selected women
✓ Non-pregnant or pregnant pregnant for the first time
✓ Planning to have a child or to be pregnant for the first time
✓ Willing to participate in the study

Baseline, 2nd, 3rd, 4th surveys
✓ Hb, serun ferritin
✓ Serumtransferrin receptor
✓ MCV, MCH, Hematocrit
✓ RBC, WBC

Schematic Diagram for Blood Collection Schedules
Supplements:

- Produced by UNILAB
- Capsule shaped packed in flex foil
- Packed by 4’s– 1 month supply
- Attached to a catch cover: information on
  - About the product
  - Food sources of iron
  - Product dosage and indication
Treatment Protocol:

✓ Pregnant women < 20 wks: 120 mg + 3.5 mg folate/wk
  Continued supplementation till 3 mos after delivery

✓ Pregnant women > 20 wks: 120 mg + 400 μg folate/d

✓ Non- Pregnant : 60 mg iron + 3.5 mg folate/ wk

Non- Pregnant : has to buy from local drugstores/HP

Pregnant women < 20 wks: given free at HC

Tuesday is the supplementation day
Delivery of the supplements

Unilab - Manila

Regional Depot

RHUs

BHS

BHWs

Pharmacies

Non-pregnant Women

Pregnant Women

Given free

to be bought
Social mobilization component:
- Training of HP and BHW
- Orientation briefing – LCE, priests and NGOs

Social marketing component:
- Availability of the product
- Accessibility of the product
- Affordability – low cost
- Promotion – events to create noise; posters and billboards, IEC materials
Micros Machine (ABX Hematologie, 34184 Montpellier Cedex):

- Hb, hematocrit
- MCV, MCH
- RBC, WBC
- Differential count

EIA method: Spectro Ferritin (Ramco Laboratories)
- Serum Ferritin

TFR IEA: (TFX – 94 Ramco Laboratories)
- Transferrin receptor
Hemoglobin levels (g/dl) classification:

Non-pregnant women
- Normal: Hb > 12.0
- Anemic: Hb < 12.0

Pregnant women
- Normal: Hb > 11.0
- Anemic: Hb < 11.0
Serum ferritin level (ng/ml) classification:

❖ Non-pregnant women
  ✅ Normal: SF ≥ 20.0
  ✅ Iron deficient: SF < 20.0

❖ Pregnant women
  ✅ Normal: SF ≥ 20.0
  ✅ Anemic: SF < 20.0
Statistical analysis

- Program: SAS
- Pearson’s and Spearman’s coefficients
  - Correlate SF and HB with WBC
- Linear regression
  - Effect of iron - folate supplementation
  - Frequency of supplementation
Results
<table>
<thead>
<tr>
<th>Physiological status</th>
<th>Survey 1</th>
<th>Survey 2</th>
<th>Survey 3</th>
<th>Survey 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not pregnant</td>
<td>409</td>
<td>419</td>
<td>383</td>
<td>357</td>
</tr>
<tr>
<td>Pregnant</td>
<td>335</td>
<td>109</td>
<td>83</td>
<td>63</td>
</tr>
<tr>
<td>Total</td>
<td>744</td>
<td>528</td>
<td>466</td>
<td>420</td>
</tr>
<tr>
<td>Physiological status/Blood parameters</td>
<td>No. of samples</td>
<td>Mean (SD)</td>
<td>Range</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Not pregnant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red blood cells</td>
<td>397</td>
<td>4.49 ± 0.45</td>
<td>2.80 – 5.99</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>402</td>
<td>12.37 ± 1.23</td>
<td>7.50 – 15.50</td>
<td></td>
</tr>
<tr>
<td>Hematocrit</td>
<td>403</td>
<td>37.24 ± 3.36</td>
<td>22.60 – 48.20</td>
<td></td>
</tr>
<tr>
<td>Serum Ferritin</td>
<td>401</td>
<td>34.34 ± 17.07</td>
<td>11.00 – 92.00</td>
<td></td>
</tr>
<tr>
<td>Transferrin receptor</td>
<td>401</td>
<td>5.11 ± 1.67</td>
<td>2.20 – 11.20</td>
<td></td>
</tr>
<tr>
<td>Pregnant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red blood cells</td>
<td>330</td>
<td>3.87 ± 0.45</td>
<td>2.66 – 5.46</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>330</td>
<td>10.89 ± 1.27</td>
<td>7.00 – 15.10</td>
<td></td>
</tr>
<tr>
<td>Hematocrit</td>
<td>329</td>
<td>32.28 ± 3.34</td>
<td>23.30 – 42.10</td>
<td></td>
</tr>
<tr>
<td>Serum Ferritin</td>
<td>328</td>
<td>31.20 ± 15.76</td>
<td>8.00 – 88.00</td>
<td></td>
</tr>
<tr>
<td>Transferrin receptor</td>
<td>328</td>
<td>4.85 ± 1.64</td>
<td>2.10 – 11.00</td>
<td></td>
</tr>
<tr>
<td>Measurements</td>
<td>Non – Pregnant</td>
<td></td>
<td>Pregnant</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------</td>
<td>------------</td>
<td>----------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>268</td>
<td>66.7</td>
<td>151</td>
<td>45.8</td>
</tr>
<tr>
<td>Anemic</td>
<td>134</td>
<td>33.3</td>
<td>179</td>
<td>54.3</td>
</tr>
<tr>
<td>Total</td>
<td>402</td>
<td>100.0</td>
<td>330</td>
<td>100.0</td>
</tr>
<tr>
<td>Serum Ferritin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>324</td>
<td>80.8</td>
<td>240</td>
<td>73.2</td>
</tr>
<tr>
<td>Iron deficient</td>
<td>77</td>
<td>19.2</td>
<td>88</td>
<td>26.8</td>
</tr>
<tr>
<td>Total</td>
<td>401</td>
<td>100.0</td>
<td>328</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 2. Physiological status of women and frequency of intake of iron supplementation

<table>
<thead>
<tr>
<th>Physiological status</th>
<th>Previous Iron/Folate Supplement Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nothing No. (%)</td>
</tr>
<tr>
<td>Not pregnant</td>
<td>555 (35.4)</td>
</tr>
<tr>
<td>1st trimester</td>
<td>73 (61.3)</td>
</tr>
<tr>
<td>2nd trimester</td>
<td>145 (58.2)</td>
</tr>
<tr>
<td>3rd trimester</td>
<td>113 (50.9)</td>
</tr>
</tbody>
</table>
Table 3 & 4. Effects of tablet intake and duration of supplementation and physiological status of women on ferritin and Hb levels

<table>
<thead>
<tr>
<th>Variables</th>
<th>Serum ferritin</th>
<th></th>
<th>Hemoglobin</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>Std. Error</td>
<td>Estimate</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Pregnant Vs. Non-pregnant</td>
<td>-7.007</td>
<td>2.201</td>
<td>-0.8717</td>
<td>0.1016</td>
</tr>
<tr>
<td>Trimester (lin trnd)</td>
<td>-3.809</td>
<td>2.275</td>
<td>-0.3951</td>
<td>0.1054</td>
</tr>
<tr>
<td>Trimester (lack of fit)</td>
<td>1.952</td>
<td>3.723</td>
<td>0.2997</td>
<td>0.1719</td>
</tr>
<tr>
<td>Iron Vs. Nothing</td>
<td>20.407</td>
<td>2.161</td>
<td>-0.0938</td>
<td>0.0994</td>
</tr>
<tr>
<td>&gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>11.848</td>
<td>3.468</td>
<td>-0.0662</td>
<td>0.1604</td>
</tr>
<tr>
<td>Weekly Vs. Daily</td>
<td>17.623</td>
<td>3.533</td>
<td>0.0781</td>
<td>0.1635</td>
</tr>
<tr>
<td>Weekly: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>14.056</td>
<td>3.469</td>
<td>-0.1346</td>
<td>0.1589</td>
</tr>
<tr>
<td>Daily: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>9.640</td>
<td>5.981</td>
<td>0.0023</td>
<td>0.2773</td>
</tr>
<tr>
<td>NPR: Iron Vs. Nothing</td>
<td>21.704</td>
<td>1.989</td>
<td>0.1421</td>
<td>0.0920</td>
</tr>
<tr>
<td>PRG: Iron Vs. Nothing</td>
<td>19.975</td>
<td>2.801</td>
<td>-0.1725</td>
<td>0.1288</td>
</tr>
<tr>
<td>NPR: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>10.180</td>
<td>3.076</td>
<td>-0.1119</td>
<td>0.1427</td>
</tr>
<tr>
<td>PRG: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>12.404</td>
<td>4.456</td>
<td>-0.0510</td>
<td>0.2061</td>
</tr>
<tr>
<td>NPR: Weekly Vs. Daily</td>
<td>15.938</td>
<td>3.135</td>
<td>-0.1067</td>
<td>0.1455</td>
</tr>
<tr>
<td>PRG: Weekly Vs. Daily</td>
<td>18.185</td>
<td>4.539</td>
<td>0.1397</td>
<td>0.2100</td>
</tr>
<tr>
<td>NPR: WKS: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>15.322</td>
<td>2.386</td>
<td>-0.0558</td>
<td>0.1095</td>
</tr>
<tr>
<td>PRG: WKS: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>13.633</td>
<td>4.529</td>
<td>-0.1609</td>
<td>0.2076</td>
</tr>
<tr>
<td>NPR: DAY: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>5.037</td>
<td>5.669</td>
<td>-0.1680</td>
<td>0.2634</td>
</tr>
<tr>
<td>PRG: DAY: &gt; 6 weeks Vs. &lt; 6 weeks</td>
<td>11.175</td>
<td>7.654</td>
<td>0.0590</td>
<td>0.3548</td>
</tr>
</tbody>
</table>
Table 5. Percentage of women taking weekly iron-folate supplements by physiological status and survey periods

<table>
<thead>
<tr>
<th>Physiological status</th>
<th>Survey Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survey 1</td>
</tr>
<tr>
<td>Pregnant</td>
<td>5.7</td>
</tr>
<tr>
<td>Non-Pregnant</td>
<td>6.1</td>
</tr>
<tr>
<td>Total</td>
<td>5.9</td>
</tr>
<tr>
<td>Tablet intake/ Duration of supplementation</td>
<td>% with adverse side-effects</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>No tablet intake</td>
<td>3.4</td>
</tr>
<tr>
<td>Daily, ≤ 6 weeks</td>
<td>11.1</td>
</tr>
<tr>
<td>Daily, ≥ 6 weeks</td>
<td>13.9</td>
</tr>
<tr>
<td>Weekly, ≤ 6 weeks</td>
<td>10.0</td>
</tr>
<tr>
<td>Weekly, ≥ 6 weeks</td>
<td>14.5</td>
</tr>
</tbody>
</table>

Table 6. Occurrence of adverse side-effects according to duration of supplementation.
Summary of findings

♦ Pregnancy worsens iron status

♦ Iron-Folate supplementation improves serum ferritin levels but mild effects on Hb levels
  - pregnant women
  - non-pregnant women

♦ Longer supplementation period - more effective than shorter period

♦ Weekly supplementation - more effective than daily
Summary of findings

- Occurrence of adverse side-effects – influenced by:
  - tablet intake
  - duration - longer duration = higher number of women experiencing side-effects

- Weekly Vs. Daily supplementation – no significant difference in the occurrence of side-effects
Conclusions

Iron – folate supplements effective in improving iron stores of both pregnant and non-pregnant women.

Iron – folate supplements mild effects on Hb could be due to deficiencies in other heme-forming nutrients.

Weekly iron-folate supplements could effectively improve iron status when taken regularly for several months.

Weekly iron-folate supplements is feasible for implementation.
Recommendations and future works

- Further research on the duration of supplementation to assess the minimal period of weekly supplementation before pregnancy that would allow to continue taking weekly supplements during pregnancy.

- DOH to recommend weekly preventive supplementation for all WRA starting during adolescence.

- Pharmaceutical companies to produce a standard weekly dose preparation and be made available at the village level.
Recommendations and future works

- Assessment of the presence of infection to determine to what extent it contributes to anemia

- Weekly supplements should be introduced in the schools

- Impact of supplementation should be assessed independently by a research institute (FNRI)

- Vitamin A, C and other micronutrients be added to iron and folate preparation
Recommendations and future works

- Meeting of key partners: DOH, DepED, Unilab - signing of MOA
- Meeting of key partners: Medical practitioners, LGUs, pharmaceutical companies
- Infants and children are the most affected – pilot projects on weekly regimen should be implemented
Thank you!!!
Have A Nice Day!!!
FEMINA

Learnings from Pilot Project and National Launch

Ms Eva Datol
Product Manager, Women's Health
United Laboratories, Inc. (UNILAB)
OUTLINE:

   - Objectives
   - Social Marketing Program
   - Key Results
   - Learnings

2. NATIONAL LAUNCH (2002)
   - Marketing Strategies
   - Key Learnings
PILOT PROJECT:

• WHO would like to test if during “unsupervised” intake the result of daily and weekly intake will be the same.

• Another WHO objective was to test the effectiveness of social marketing in improving the knowledge, attitude, behavior and practice of women.

• Organizations involved:
  • World Health Organization
  • Nutrition Service -Department of Health
  • United Laboratories, Inc
BACKGROUND:

- There were two products: Femina 60 mg for women before and after pregnancy, and Femina OB for pregnant women.
- Apart from producing Femina, Unilab’s role was to formulate a social marketing program to convince women to take the weekly iron supplement.
- The study was done from Dec 1998 to March 2000.
WEEKLY IRON/FOLATE SUPPLEMENTATION STUDY

OBJECTIVES:

• To introduce the weekly iron-folate supplements to WRA’s
• To assess the effectiveness of social marketing in promoting the new approach
• To improve the KABP and iron status of WRA’s in the test area
AREAS COVERED:

- Calasiao
- Sta. Barbara
- Binmaley
- Mangaldan- control area
ACTIVITIES:

- Advocacy Meeting with Town Mayor and Rural Health Unit Heads
- Orientation and Training of Barangay Health Workers
- Advocacy Meeting with School Officials at the Provincial and Municipal levels
- Orientation of School Principals
- Training of T.H.E. Teachers
- Teaching Aid Production and Dissemination
ACTIVITIES:

- Integration of IDA in the nutrition curriculum
- Orientation of School Coop Supervisors on making the product available
- Orientation of Drugstore owners and Distributors
- Series of Product Symposium done in Town Plazas for community orientation
ACTIVITIES:

- Conduct of school-based social marketing and promotional activities
  - Essay Writing Contest
  - Poster Making Contest
  - Comic Handbill Writing Contest
  - Activation of Femina Club as Iron Advocates
- Trade and Consumer Promos
ACTIVITIES:

- Mobilization of PTA as support group
- Conduct of Special Activities:
  - Fun run and Fitness Tournament
  - Ms. Femina Contest
**SUCCESS MEASURE:**

<table>
<thead>
<tr>
<th></th>
<th>FERSULFATE</th>
<th>FEMINA</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWARENESS</td>
<td>46%</td>
<td>40%</td>
</tr>
<tr>
<td>CONVERSION</td>
<td>62%</td>
<td>44%</td>
</tr>
<tr>
<td>RETENTION</td>
<td>43%</td>
<td>59%</td>
</tr>
</tbody>
</table>
SUCCESS FACTORS:

- Public-Private sector partnership
- Very supportive Municipal government
- Aggressive Principals who issued memo circular to all T.H.E. Teachers
  - Integration of subject matter (IDA) in nutrition curriculum
  - Making Femina available in School Coop
SUCCESS FACTORS:

- Very cooperative T.H.E. Supervisors and Teachers
- Supportive school health personnel, parents and community (drug store owners)
- Wide distribution (drugstores, schools, barangay health centers)
- Receptive students
KEY LEARNINGS:

• Social mobilization (involving key actors of the community) effectively improved knowledge on IDA, and promoted iron supplementation.

• Educational program was effective in promoting the practice of taking Femina among female adolescents.

• The teachers emerged as important and credible sources of health advice. It has been demonstrated that if only they are provided with ready-to-use teaching aids they will not hesitate to integrate health and nutrition concepts in their curriculum.

• DOH-UL collaboration was effective in the promotion of health concepts and healthy practices.

• Barangay Health workers also were instrumental in effecting behavior change as women turn to them for counselling.
NATIONAL LAUNCH
(2002)
BRAND VISION:

FEMINA is the indispensable enabler of every woman that allows her to maximize her potentials and fulfill all the dimensions of her womanhood.
BUSINESS VISION:

Build the preventive iron supplementation category.
BRAND POSITIONING:

FEMINA allows women to constantly perform at their physical and mental best through IDA prevention. That is because its breakthrough formulation of iron and folic acid works synergistically to constantly replenish bodily iron stores through once-a-week iron banking.
### MARKETING PROGRAM

<table>
<thead>
<tr>
<th>ADVERTISING</th>
<th>PROFESSIONAL MARKETING</th>
<th>TRADE SUPPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV</td>
<td>Hospital Detailing</td>
<td>Salesclerk Incentive Program</td>
</tr>
<tr>
<td>Radio</td>
<td>GPs</td>
<td>Distributor Incentive Program</td>
</tr>
<tr>
<td>Print</td>
<td>Pedias</td>
<td></td>
</tr>
<tr>
<td>Advertorials</td>
<td>Health Centers</td>
<td></td>
</tr>
<tr>
<td>Merchandising</td>
<td>Consumer Education/Sampling</td>
<td></td>
</tr>
<tr>
<td>Publicity/PR</td>
<td>Offices</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Schools</td>
<td></td>
</tr>
<tr>
<td>Message Focus</td>
<td>Campaign</td>
<td>Timing</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>-------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Women of menstruating age are at risk of IDA since their iron stores are regularly depleted during menstruation. IDA can be prevented through constant iron supplementation.</td>
<td>Infomercials TVCs “Serial Killer”</td>
<td>Mar-April ‘02</td>
</tr>
<tr>
<td>FEMINA is a breakthrough once-a-week product that helps women bank on iron once-a-week to prevent IDA.</td>
<td>Launch Product TVC “Breakthrough”</td>
<td>April-Sept ‘02</td>
</tr>
<tr>
<td>Iron depletion can happen rapidly every time you menstruate. Take on the FEMINA habit once a week to prevent IDA.</td>
<td>Habit Building/ Tactical “Icon”</td>
<td>Oct-Nov ‘02</td>
</tr>
</tbody>
</table>
KEY RESULTS
# LAUNCH RESULTS

## PROFESSIONAL MKTG COVERAGE

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>TARGET</th>
<th>ACTUAL (as of Dec)</th>
<th>% TO TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital Program</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPs</td>
<td>1,000</td>
<td>1,000</td>
<td>100%</td>
</tr>
<tr>
<td>Pedias</td>
<td>500</td>
<td>977</td>
<td>195%</td>
</tr>
<tr>
<td>Health Center</td>
<td>3,500</td>
<td>3,500</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Consumer Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75,000 female employees</td>
<td></td>
<td>50,000</td>
<td>67%</td>
</tr>
<tr>
<td>by Mar 2003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Schools</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GMA Schools</td>
<td>100,000 female HS students</td>
<td>40,000</td>
<td>40%</td>
</tr>
<tr>
<td>by Mar 2003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Government</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DECS, DOH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical groups</td>
<td>PMWA, FAAP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Following were some qualitative feedback:

**Doctors’ Feedback**
- GPs showed interest and support for Femina.
- The once a week dosage caught most of their attention.
- Viewed Femina as a product committed to uplifting the health and well-being of women.

**Consumer Feedback**
- Most of the office employees are already aware of Femina due to advertising.
- Brand recall for IDA, Femina, and Biktima ka ba was enormous.
- Seminar established need for iron-folate supplementation.
- Male employees would like to share information with their wives, daughters, mothers.
## LAUNCH RESULTS

### BRAND HEALTH MEASURES

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>NATIONAL</th>
<th>PILOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWARENESS</td>
<td>58%</td>
<td>40%</td>
</tr>
<tr>
<td>CONVERSION</td>
<td>11%</td>
<td>44%</td>
</tr>
<tr>
<td>RETENTION</td>
<td>39%</td>
<td>59%</td>
</tr>
</tbody>
</table>

Source: Brand Tracking Study as of Dec 2002  
Source: Pangasinan UAI July 1999
KEY LEARNINGS
KEY LEARNING 1:

Combined Strategies of Advertising and Professional Marketing led to high awareness but did not translate to high usage.
ADVERTISING STRENGTHS:

- It is acknowledged to be the only iron supplement uniquely being advertised in television.

- The ad is informative as it explains how all menstruating women may be susceptible to IDA.

- Successfully instilled concern among some respondents about IDA. Some even started to suspect that they may already have it.

- Was able to convince some discussants to consider Femina and iron banking as a preventive habit, and not as an action for treatment.
REASONS FOR NOT TRYING FEMINA DESPITE AWARENESS OF ITS AD?

“HOW DO I KNOW?”: No distinct symptom = no identification = denial
Respondents would like to find clear symptoms that would signal that they might have IDA. In the absence of signs, they would rather believe that they don’t have it.

“SO WHAT?”: No distinct consequences
There are no facts on what will happen to them if they get IDA.
REASONS FOR NOT TRYING FEMINA DESPITE AWARENESS OF ITS AD?

THE MENSTRUAL EXPERIENCE

The menstruation story also elicited some questions on how one could have possibly survived losing so much iron for many years of menstruating without the benefit of iron supplements.

In response to this, some respondents believe that iron may have been adequately received from other sources such as food and multivitamins.
FEMINA PERCEIVED AS A MEDICINE THAN A SUPPLEMENT

Despite the mention of taking Femina once a week every week to signal its being a supplement, the belief that iron is medicine to treat anemia and low blood remains. As a result, respondents feel that in the absence of said conditions there is no urgency to take Femina.
**NO SYMPTOMS** = no identification = denial

Respondents would like to find clear symptoms that would signal IDA. In the absence of signs, they would rather believe that they don’t have it or even susceptible to it.

**NO CONSEQUENCES** = need to justify the ‘scare’

Respondents would like to know what would specifically happen to them if they get IDA. They would like to determine what it is that they would want to avoid by taking Femina.
**KEY LEARNING 2:**
We have not fully implemented Pangasinan social marketing efforts on a national scale.

<table>
<thead>
<tr>
<th>TEST MARKET</th>
<th>NATIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Advocacy Campaign with Town Mayor and RHUs</td>
<td>• Orientation and training of BHWs</td>
</tr>
<tr>
<td>• Use of BHW’s as sales channels</td>
<td>• Advocacy Campaign with School Officials</td>
</tr>
<tr>
<td>• Training of Health Education Teachers</td>
<td>• Teaching Aid Production and Dissemination</td>
</tr>
<tr>
<td>• Use of Teachers as sales channels</td>
<td>• Integration of IDA in school curriculum</td>
</tr>
<tr>
<td>• Availability of Femina in school canteens</td>
<td>• Orientation of drugstore owners and distributors</td>
</tr>
<tr>
<td>• Product symposium in Town Plazas</td>
<td>• Merchandising at point of sale</td>
</tr>
<tr>
<td>• School-based promos (e.g. Essay writing, sportsfest, Search for Ms. Femina)</td>
<td>• Trade and Consumer Promos</td>
</tr>
<tr>
<td>• Involvement of PTA groups</td>
<td></td>
</tr>
<tr>
<td>• Establishment of Club Femina in Schools</td>
<td></td>
</tr>
<tr>
<td>• Orientation and training of BHWs</td>
<td></td>
</tr>
<tr>
<td>• Advocacy Campaign with School officials</td>
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<td></td>
</tr>
<tr>
<td>• Merchandising at point of sale</td>
<td></td>
</tr>
<tr>
<td>• Trade and Consumer Promos</td>
<td></td>
</tr>
</tbody>
</table>
KEY LEARNING 3:
It is important to segment wide target market and determine the best communications approach to each group.

- The younger segment are distant to the concept of iron and IDA. Pangasinan results have shown that the key to their compliance was their teachers, hence school program will address this market.

- Women in their mid 20’s-30’s (pre-conception stage) are the more receptive and sensitive segment to Femina’s initiatives, hence should be the focus of communications.
KEY LEARNING 4:  
The once a week dosage has to be further explained to consumers.

• There is still low awareness on the advantages of once a week dose.
• The once a week formula connotes very high dosage/potency ultimately leading them to believe it is drug.
• Consumers needed an explanation on why it should be taken once a week every week when iron is lost only once a month during menstruation. Given this, they feel that Femina should logical be taken once a month and not weekly.
KEY LEARNING 5:  
A doctor’s prescription is needed to compel trial.

- Consumers hesitate to take Femina without doctor’s advice because of the belief it is drug.
- Iron is traditionally prescribed to pregnant or anemic women.
- Concerns on possible side effects
OVERALL CONCLUSIONS

- Advertising framework must be revisited. Need to shift current consumer perceptions on Femina:
  - Medicine vs supplement
  - Therapeutic vs Preventive
- Professional Marketing emerged to be a better venue for communicating Femina product story since we can only say so much on TV.
- Massive sampling is needed to build trial.
- Habit-building campaign is important to maintain high retention.
OPPORTUNITIES

- Market is still not saturated. Iron usage among women is only 20%.
- Potential market is huge, about 19 M menstruating women.
- While direct sales declined, offtake was quite healthy.
- Awareness and retention levels are high.
- Femina is a breakthrough formula and the first preventive supplement; the rest are therapeutic.
- Feedback from medical community is very good. Prescriptions are starting to build up.
- Office and School Program likewise successful as indicated by qualitative feedback from consumers.
- IDA remains to be widely prevalent and is one of the government’s top health priorities.
THANK YOU!
ANNEX 6a

Introduction of a new approach towards WEEKLY IRON/FOLATE SUPPLEMENTATION for controlling anaemia among reproductive women in Viet Nam


NIN - IRD - WHO
Introduction (1)

• Anaemia has been affecting to health status seriously.
• In WPR: 40% Pregnancy women are anaemic.
• In Vietnam: 1995 Over 50% pregnant & 40% non-pregnant women are anaemic (NIN/UNICEF/CDC).
• Current program: iron supplementation as daily for pregnant women in the 3 last months of gestation (in 110 pilot districts, supported by UNICEF)
• Daily iron supplement: some side effect and women often forgot taking regularly,

• Iron/folat supplementation during pregnancy is ineffective to correct pre-pregnancy iron deficiency during gestation

• Introduction to a new approach « Weekly iron supplementation for WRA » which is preventive supplement based on social mobilization and communication.
1. To introduce preventive supplement weekly doses of iron/folat to WRA by using community-based social mobilization and communication to promote this new approach.
Aim of the project (2)

2. To assess the effectiveness of the combined strategies of social mobilization for weekly iron/folat supplement in improving both the KAP and the iron status of WRA.
Place of implemented project (1)

- Thanh Mien is a rural district, Hai Duong province which is situated about 70 km North West of Hanoi, Vietnam (Red River Delta) with 19 communes and 34,000 reproductive women.
- District has strong women union network from district to village levels.
The prevalence of anaemia among pregnant women was over 50% (1994).

The prevalence of underweight children was 40% (1994).
Subjects and methods

1. Subject: All WRA including pregnant women and non-pregnant in all communes/villages of the district.

2. Method: To apply a new public approach “social marketing”. The strategy included 4P (Product, Place, Price, and Promotion)
Product

- Pink Blister BHHH: 4 tablets/blister each tablet contains 60mg of element iron and 3.5 mg of folic acid.
- Red Blister BHHH: 4 tablets/blister each tablet contains 120 mg of element iron and 3.5 mg of folic acid.
Product (1)

- The name of iron supplement was chosen as "BO HUYET HOA HONG (BHHH): a beautiful flower that nutritious for blood.

- a new product was produced with attractive package and colors such as light pink of blister and box for non-pregnant women and red blister and box for pregnant women.
Message was selected, "Take one BHHH only once a week - You will assured of beauty and health".

For pregnant and lactating mothers.

"Take BHHH once a week during pregnancy and three mos after delivery will ensure you and your baby beauty and strength."
Place

Must be suitable for women: Distributed following 2 systems:

• women collaborators distributed pink-BHHH,
• women - health staffs allocated red-BHHH for pregnant women
Price

- Price of iron/folat product must be suitable for economy conditions and acceptable of subjects. BHHH was sold with 1,000 VND/blister for use in one month (one tablet/week).
- That suitable price is acceptable for the capability of rural women or their family.
Benefit of selling products

- Money from selling Pink BHHH:
  - 20% paid for woman collaborators
  - 30% paid for management and regular communication activities in the communes;
  - 50% was kept in the bank by district steering committee to revolve fund for maintenance of the project.

- For Red BHHH: pregnant women got without payment
Promotion

- Establish District and commune steering committee
  - Strengthening district and commune organizational support for nutrition and health
District and commune management committee

- The role of these committees is to implement, control all project activities and to produce monthly reports.

- Monthly meeting (district and commune levels)
  to exchange information, to discuss issues and to find out appropriate solutions.

- Consultative meetings
Improving pre-post natal service of the existing health system

Training for health personnel

- Two trainings on pregnancy care, anemia control and dietary diversification for health personnel: 104 participants (from commune health stations, obstetric department of district health center)
- record-book keeping and usage and introduction of the Weekly iron/folate project.
- The participants would become trainers for women reproductive of age when coming to health stations.
Training course for health personnel at Thanh Mien district
IEC materials for mothers

+ 25,000 Leaflets
+ Two billboards were developed for each of the 19 communes.
+ The logo of the product was stamped on the handbags and bicycles of the collaborators.
+ Banners were developed and hung on the village and commune streets during the 3 communication campaigns.
+ Handbook on preventive anaemia supply to informant of the communes.
+ Local loudspeaker has transferred the contents of the handbook to the community.
Billboard is hung at health station, handbag and bicycle of the collaborator
Introducing weekly iron supplementation project through women's union networks

Training workshop for women's union leaders

- Six training workshops on preventive anaemia were carried out for women's union leaders from districts, communes and villages (570 subjects).

- After attending training courses, The women's union leaders would become trainer for reproductive women in their communes and villages.
Training course for women’s union leader of communes and villages
Advertisement campaigns at district/commune level

- Billboards, banners, promotional cars and loud speakers were used to motivate project in the campaigns. There were 3 campaigns throughout the project.
- The first campaign was carried out in May 1999 (soon after the baseline),
- The second campaign was carried out in November 1999
- The third campaign was carried out in February 2000.
- The main objectives of the campaign were to inform population the activities of the project and motivate the participation and the support of the community.
Project communication at the women’s club activities

- All communes have women’s club.
- The contents of the project were communicated through women’s club activities every month.
- WRA come to their club to discuss and share experiences in preventive anaemia together.
- They composed poems, dzamas, folk songs on using BHHH to prevent anaemia and demonstrated those compositions at the club for subject (WRA’s) looking.
- 85 poems, 15 dzamas, 11 folk song on contents of the project were composed.
- The women’s club have made impression deeply to subject.
Women’s club activities at the village
High school activities

- Organize 1 training workshop for teacher of high school of 19 communes with contents: “Preventive anaemia for adolescent, using BHHH, the skill of preventive anaemia communication for girl pupils (girl pupils will receive BHHH through their mother or sister).

- After training course, the teachers communicated above knowledge to their pupils.
Communication through other organizations

- The contents of project were also communicate through meeting of Elder club (who have prestige in the commune), veteran organization and youth organization in each commune.
To maintain and motivate project

- Monitor the rate of buying and using BHHH

- Organized 6 refresher training workshop to address issue of rate of buying go down (participants: leader of the villages, women union collaborators): The skills of communication and contact with subjects.

- The communication campaign of the project was carried out in the all 19 communes to promote project
Project monitoring

Monitoring of the project was carried out monthly with the contents:

- Are activities of the project carried out following plan of proposal?
- Number of WRA taking and using BHHH
- Controlling money from selling BHHH
- What problem happen when carried out activities
- To find out good solutions to solve problems in time.
The project team carry out monitoring at the commune
Women’s club activities at the village
Three aspects to this evaluation:

- The first, will look at changes in KAP of the studied women.
- The second, will measure compliance and the prevalence of side effects.
- The third, laboratory test based assessment of the iron status of the women.
Main tool for the evaluation:

- Questionnaire for the collection of information on KAP
- Self-evaluation from for the collection of information on side effect
- Record book from collaborator to monitor the rate of using BHHH of WRA
- Laboratory tests for measuring the iron status
Evaluation (3)

Evaluation would be conducted in 4 times:

- The base line survey
- After 4,5 months intervention,
- After 9 months intervention
- After 12 months of intervention.
Results

1. The change of knowledge and attitude
### Table 1: The change of knowledge of nutritional anemia among WRA

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>At the fist survey (n=856)</th>
<th>At the last survey (n=863)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Knowing about anemia</td>
<td>745</td>
<td>90,8</td>
<td>814</td>
</tr>
<tr>
<td>Knowing lack of nutrition makes anemia</td>
<td>195</td>
<td>22,6</td>
<td>794</td>
</tr>
<tr>
<td>Knowing high requirement of body when being pregnant makes anemia</td>
<td>82</td>
<td>9,5</td>
<td>738</td>
</tr>
<tr>
<td>Knowing women reproductive age are menstruation monthly makes anemia</td>
<td>75</td>
<td>8,7</td>
<td>724</td>
</tr>
<tr>
<td>Knowing hookworm infection makes anemia</td>
<td>36</td>
<td>4,2</td>
<td>654</td>
</tr>
<tr>
<td>Knowing using Iron/ folate to prevent anemia</td>
<td>248</td>
<td>28,7</td>
<td>704</td>
</tr>
</tbody>
</table>

The rate of WRA know about anaemia was very high in the baseline and last survey (90, 8% and 95,5%); the change knowledge of WRA about nutritional anemia was also clearly acknowledged.
Women Knowledge about Benefit of taking BHHH

Prevent anaemia: 38.8, 58.5, 82.1, 78.7
Treat anaemia: 18.3, 29.9, 37.6, 35
More healthy: 11.2, 19.2, 26.8, 28.3
More beautiful: 10.3, 17.3, 25.8, 17.8
Healthy baby: 12.9, 18.2, 29.3, 4.1
Good for blood: 3.6, 18.3, 25.8, 17.8

T0, T1, T2, T3
### Table 2: The changes of attitude of nutritional anemia of Women reproductive age

<table>
<thead>
<tr>
<th></th>
<th>Baseline survey (n = 863)</th>
<th>Last survey (n = 856)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Thinking anemia affects health seriously</td>
<td>133</td>
<td>15.4</td>
<td>550</td>
</tr>
<tr>
<td>Thinking weekly iron supplementation can prevent anemia</td>
<td>176</td>
<td>20.4</td>
<td>623</td>
</tr>
</tbody>
</table>

- From the first survey, we can see that there were only 15.4% WRA thinking that anemia seriously affects to health. In the last survey, we can see 64.3% WRA thinking anemia seriously affects to health.
- The rate of women think that it’s possible to prevent anaemia by taking iron-tablets was only at 20.4% in the first survey but increased at 72.8% in the last survey.
2. The rate of buying and using BHHH of non-pregnant women

The rate of using BHHH of non-pregnant women

Month

%
<table>
<thead>
<tr>
<th>Feeling</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>P</td>
<td>NP</td>
</tr>
<tr>
<td>No problem</td>
<td>22.7</td>
<td>25.6</td>
<td>24.3</td>
</tr>
<tr>
<td>Stronger</td>
<td>53.5</td>
<td>49.6</td>
<td>77.7</td>
</tr>
<tr>
<td>Less tired</td>
<td>33.1</td>
<td>26.4</td>
<td>39.7</td>
</tr>
<tr>
<td>Sleep better</td>
<td>40.8</td>
<td>27.9</td>
<td>50.0</td>
</tr>
<tr>
<td>More appetite</td>
<td>38.1</td>
<td>31.0</td>
<td>32.0</td>
</tr>
</tbody>
</table>
### Side effect of taking BHHH

<table>
<thead>
<tr>
<th>Feeling</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NP</td>
<td>P</td>
<td>NP</td>
</tr>
<tr>
<td>Diarrihoea</td>
<td>1.7</td>
<td>1.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Headache</td>
<td>1.3</td>
<td>0.8</td>
<td>1.3</td>
</tr>
<tr>
<td>Allergy</td>
<td>4.7</td>
<td>1.6</td>
<td>2.7</td>
</tr>
<tr>
<td>nause</td>
<td>5.4</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Constipation</td>
<td>13.7</td>
<td>20.2</td>
<td>9.7</td>
</tr>
</tbody>
</table>
3. The rate of taking BHHH of pregnant women

- **Daily group**: women who were pregnant already at baseline survey. They received free of charge UNICEF iron/folat tablets, one tablet/day (60/0.25)

- **Weekly group**: non-pregnant women at baseline who would use ink BHHH (60/3.5) sold by women collaborator. When pregnancy was detected, (during the project carry out) pregnant women received weekly BHHH (120/3.5 mg folat) free of charge from health worker.

- Pregnant women in 2 groups (daily and weekly) were received and taken iron/folat regularly from 96% to 99%
4. Comparison of side effect between daily Group and weekly group

Table 3: Side effect between daily group and weekly group

<table>
<thead>
<tr>
<th>Side effect after taking iron/folate</th>
<th>Daily group at baseline survey</th>
<th>Weekly group at visit 2</th>
<th>Weekly group at visit 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 117</td>
<td>n = 350</td>
<td>n = 350</td>
</tr>
<tr>
<td>Women felt to want vomiting</td>
<td>14 12.0</td>
<td>16 7.4</td>
<td>16 4.6</td>
</tr>
<tr>
<td>Women vomited</td>
<td>12 10.3</td>
<td>24 6.8</td>
<td>16 4.6</td>
</tr>
<tr>
<td>Women had constipation</td>
<td>20 17.1</td>
<td>32 9.1</td>
<td>26 7.4</td>
</tr>
<tr>
<td>Women felt hot inside</td>
<td>24 20.5</td>
<td>27 7.7</td>
<td>22 6.3</td>
</tr>
<tr>
<td>Women felt itchy</td>
<td>6 5.1</td>
<td>8 2.2</td>
<td>4 1.1</td>
</tr>
<tr>
<td>Women felt indigestion</td>
<td>4 3.4</td>
<td>4 1.1</td>
<td>0 0</td>
</tr>
</tbody>
</table>
CONCLUSION

- The project had a significant impact in changing the Knowledge, Attitude and Practice of WRA towards nutritional anemia control in general and iron supplementation in particular.

- The systematic activities in the Social Marketing Approach Design had fit well in Viet Nam condition in rural communities.
CONCLUSION

- Weekly iron/folat taking had significantly less side-effect than daily approach
- Weekly iron/folat supplementation program with appropriate social mobilization is feasible and sustainable way to implement in Viet nam.
Effectiveness of weekly iron/folate supplementation on anemia and iron status in women of reproductive age in rural Viet Nam

J Berger, TK Than, NC Khan, T Cavalli-Sforza, et al

* Institute of Research for Development (IRD)
RU "Nutrition, Food, Societies", Montpellier, France
§ National Institute of Nutrition, Ha Noi, Viet Nam
** WHO, Western Pacific Regional Office, Manila, Philippines
Objectives

➢ To evaluate the effectiveness of weekly iron-folate supplementation (60 mg iron + 3.5 mg folate) before pregnancy followed by a weekly iron-folate supplementation during pregnancy (120 mg iron + 3.5 mg folate) in preventing and controlling anemia and iron deficiency in women before and during pregnancy.

This approach was compared to the usual practice in many countries, including Viet Nam, of giving daily iron-folate pills from the first antenatal visit.

➢ To understand what duration of preventive iron-folate supplementation would be needed to have an impact on Hb and iron stores under non-supervised program conditions.
Subjects

Married women willing to participate in the evaluation, nulliparous and planning to have a child as soon as possible or pregnant for the first time.

All women included in the study were informed by the social marketing campaign about the benefits of taking preventive iron-folate supplementation before pregnancy and during pregnancy, combined with improved diets.
Place

Thanh Mien district, Hai Duong province, Red river delta, 70 km South East of Ha Noi.

39 communes (population of 135,000 living in 32,865 households and about 33,000 women)

- Lack of interventions to control iron deficiency anemia in non-pregnant women
- Approval of the study by local health authorities

Time

April 1999 to December 2000
**Design**

Allocation of women to 2 treatments according to their pregnancy status:

- **DAILY group: women pregnant at baseline**, directed to health center to receive free of charge *UNICEF tablets* (60 mg iron + 0.25 mg folate) with instruction to take one tablet per day.

- **WEEKLY group: women non-pregnant at baseline** who could buy the "pink" *BHHH tablets* (60 mg iron + 3.5 mg folate) sold in each village by collaborators from the Women Union. When pregnancy was detected, pregnant women received weekly "red" *BHHH tablets* (120 mg iron + 3.5 mg folate) free of charge.

After delivery both groups of women were given weekly iron-folate supplements for 3 months free of charge.

At the end of this period, women should purchase the iron tablets
Design

At the end of intervention, the cohort of non-pregnant women of the Weekly group would be divided into 3 groups:

- **Women who remained non-pregnant during the study period**
- **Women who became pregnant within the first three months after baseline**
- **Women who became pregnant between the first day of the 4th mo and the last day of 6th mo after baseline.**
Sample size

Estimated to be of at least 116 subjects per group based on a difference in hemoglobin concentration between any two groups or between any two times of blood sampling with a confidence interval of 95% (one sided) and a power of 90%.

Assuming a drop rate of about 20%, the initial sample size required was estimated to 150 subjects per group

Enrolment: 1000 non-pregnant women to get 600 pregnancies per year in the district (150 per trimester)
Iron-Folate tablets

BHHH tablets were available immediately after baseline at the time when the social marketing campaign started.
Methods

Hemoglobin (Hb) and serum ferritin (SF) concentrations were measured 4 times (TfR on a sub-sample):

✓ **At baseline (visit 1),** before BHHH iron-folate pills were available, April 19 - May 8, 1999

✓ **4.5 month after baseline (visit 2),** Sept. 12 - Oct. 2, 1999
  (delay for some women Oct. 20-21)

✓ **9 months after baseline (visit 3),** January 18-27, 2000

✓ **12 months after baseline (visit 4),** May 5-14, 2000
Methods

4 ml venous blood into EDTA tubes

*Hb (within 12h): cyanomethemoglobin method*

Serum stored at −20°C until analysis of SF and TfR at the end of the study.

*SF, TfR: ELISA, Ramco kits*

Anemia in non-pregnant women: Hb<120 g/L

Anemia in Pregnant women: Hb<110 g/L during the first or third trimester of pregnancy and Hb<105 g/L during the second trimester of pregnancy

Iron deficiency: SF<12 µg/L
RESULTS
Enrolment, N = 912

Baseline, N = 864

Refusal, N = 48

Miscarriage, N = 31

2 delivery dates, N = 24

UNICEF and BHHH tablets, N = 18

No pregnancy status, N = 18

Data analysis, N = 777 (at baseline)

Daily group, N = 117

Weekly group, N = 660

Pregnant at T0, N = 45

Weekly group, N = 615
Women not pregnant during the study period
Hemoglobin (g/L) and SF changes in non-pregnant women of weekly group present at the four evaluations

Different letters indicate significant differences (p<0.05)
Prevalence of anemia and low ferritin values at each visit in non-pregnant women

Different letters indicate significant differences (p<0.05)
Number of BHHH tablets bought per month in non-pregnant and pregnant women

Visit 1 Visit 2 Visit 3 Visit 4
1999 2000

Iron status during pregnancy
Comparison of women in same trimesters of pregnancy at the different visits allowed to compare women who received in average the same number of red tablets according to their trimester of pregnancy, but different numbers of pink BHHH tablets before pregnancy.
Hemoglobin concentration (g/L) in weekly and daily groups according to pregnancy status (in trimester)

Different letters indicate significant differences (p<0.05)
Prevalence of anemia in non-pregnant and pregnant women of daily and weekly groups

Different letters indicate significant differences (p<0.05)
Ferritin concentration (µg/L) in weekly and daily groups according to pregnancy status

Different letters indicate significant differences (p<0.05)
Prevalence of low ferritin values (<12 µg/L) in daily and weekly groups according to pregnancy status

Different letters indicate significant differences (p<0.05)
Hemoglobin concentration (g/L) during pregnancy according to duration of intervention
Ferritin (µg/L) changes during pregnancy according to duration of intervention
CONCLUSIONS
Non-pregnant women (I)

- Anemia was a public health problem in non-pregnant women of reproductive age included in the study (45.6%).

- Iron deficiency (SF values < 12 µg/L or TfR > 8.5 mg/L) was detected in approximately 8% of women (18.4% with SF < 20 µg/L).

Iron deficiency was probably not the main reason of anemia. Other micronutrients deficiencies, such as folate, vitamin B12, vitamin A deficiencies or other non-identified causes?

A study conducted in WRA in another district of the same province indicates a similar low prevalence of iron deficiency measured by ferritin and transferrin receptors (Thuy PV, Berger J et al, AJCN 2003).
Non-pregnant women (II)

- Hb and SF concentrations increased significantly from baseline to visit 3. Prevalence of anemia and of ID (SF <12 µg/L) decreased significantly to be respectively 19.2% and 3.0 % at the end of the study period.

- Under the non-supervised conditions of the program, weekly iron-folate supplementation improved iron status of non-pregnant women of reproductive age when about 26 weekly supplements were taken (over a period of nine months).

- However, improvement was fragile and subject to compliance that would demonstrate that regular intake of supplements is one of the key factors of the success of this approach. Longer supplementation would insure higher iron stores and should be recommended.
Pregnant women (I)

- Weekly iron-supplementation, under non-supervised program conditions, had a significant and positive effect on anemia during the first and second trimesters of pregnancy when supplements (60 mg iron + 3.5 mg folate) were taken for about 6 months before the beginning of pregnancy and when supplementation (120 mg iron + 3.5 mg folate) continued during pregnancy.

- The question of effect of long duration of weekly iron-folate supplementation before and during pregnancy, on iron status and anemia in third trimester of pregnancy and in term women has not been answered by this study.
Pregnant women (II)

- However, under non-supervised program conditions, weekly iron-folate supplementation started only few weeks before pregnancy or with pregnancy (60 mg iron + 3.5 mg folate) and continued during all pregnancy (120 mg iron + 3.5 mg folate) was associated with elevated anemia and low iron stores in the third trimester of pregnancy.

- Under non-supervised program conditions, daily iron-folate supplementation (60 mg iron + 0.25 mg folate) during pregnancy was not efficient and hemoglobin concentration was lower and prevalence of anemia higher in all trimesters of pregnancy compared to the weekly group.
These findings demonstrate that the preventive approach of weekly iron-folate supplementation, including a social mobilization component, implemented in a rural district in Vietnam can be an effective approach to prevent and control iron deficiency and anemia in women of reproductive age before and during pregnancy.
GUIDELINES FOR PREPARATION OF PROCESS PAPERS FOR PUBLICATION

GROUP 1  Presented by Lourdes S. Paulino: Process papers

Name of the paper  Identify the country and distinguish PROCESS from IMPACT papers in the TITLE. Each country should identify the strongest point and make it part of the title.

Abstract

Authorships  Author(s) should have made a SIGNIFICANT contribution to the project. ACKNOWLEDGE others at the end of the paper who have made smaller contributions. SOME AUTHORS will be the same for both country papers--some will not be the same. Each country will decide on the authors.

Key words

- **Background/Introduction**: information about country, problem of IDA, some definitions

- **Objectives** (general and specific)

- **Project description and project design** (orientation and how to execute the project, two models of social marketing: public-private partnership model in the Philippines and social marketing and social mobilization in Cambodia and Viet Nam. There is information available about social marketing in industry.

  USE FLOW CHART to SHOW what happens to subjects who took part in the project.

- **Project methodology** (introduce the strategy of 4 Ps: Product, Price, Place, Promotion)

- **Results** (based on objectives of the project; should highlight the specific activities of each country, for example, social marketing worked well with "public-private partnerships", the role of industry, and the costs. Note that information on compliance and side effects should appear in both process and impact papers of each country.

- **Discussion** (including strengths and limitations of each programme)

- **Conclusions and recommendations** (Note: include sustainability, expansion and future direction)

- **References** (these are missing in the first draft)

Do not use just "PROCESS" or "IMPACT" in the title, but use these words to help understand, e.g. "impact on iron nutrition and anaemia".
GUIDELINES FOR PREPARATION OF IMPACT PAPERS FOR PUBLICATION

**GROUP 2**  Presented by Dr Jacques Berger: Impact papers

**Title of the paper**  
Same title as the process paper for each country with a mention of "impact on anaemia and iron status".

**Introduction**  
Information about the country situation, problem of IDA, why weekly supplementation, general framework of social marketing and main outcomes of the social marketing intervention.

**Objectives**  
Objective of the evaluation (not objective of the project).

**Methods**  
Time, place, subjects, treatment groups, iron compound and administration, methods of analysis of ferritin, Hb, other parameters, quality control, cut-off for ferritin and HB, statistical methods, ethical issues.

**Results**  
Baseline descriptive data of subjects included in the study, trial profile, prevalence and distribution of anaemia, ID and IDA, units for Hb (g/L), SF (geometric mean, CI); changes of haematological parameters during intervention. Note that information on compliance and side effects should appear in both process and impact papers.

*(Use flow chart if possible to track subjects on whom data for evaluation was obtained versus total population in project.)*

**Discussion**  
Would focus first on results of WIF supplementation. Note strengths and limitations in interpretation of data

**Conclusion and recommendation**

**References**
TITLES AGREED UPON
FOR PAPERS TO BE USED IN SUPPLEMENT FOR PUBLICATION

Overall Title: Preventive Weekly Iron/Folate Supplementation Can Improve Iron Status of Reproductive Age Women: Experiences from Cambodia, the Philippines and Viet Nam

Preface: Short global overview of current status of micronutrient deficiency prevention programmes

(1) Introductory paper on rationale for WIFS

(2) Introductory paper on social marketing and mobilization

Three Country Papers: Reviewed by editors

Weekly Iron Folate Supplementation: Multi-Sectoral Collaboration to Prevent Anaemia Among Cambodian Women in Three Settings

(3) Process of Social Marketing and Community Mobilization and Social Marketing Outcomes

(4) Impact on Haemoglobin Level


(5) Process

(6) Impact on Iron Status

Community Mobilization and Social Marketing to Promote Weekly Iron-Folate Supplementation in Women of Reproductive Age in Viet Nam

(7) Strategies and Process

(8) Impact on Anaemia and Iron Status

Added contributions:

(9) Weekly Iron Supplementation as a Tool to Reduce Anaemia among Primary Schoolchildren in Cambodia

(10) Industry Experience in Promoting Weekly Iron-Folate Supplements in the Philippines

(11) Final Synthesis Paper