

**Health Promotion Brochure:  
Iron Deficiency Anemia Prevention  
Targeting Young Women**



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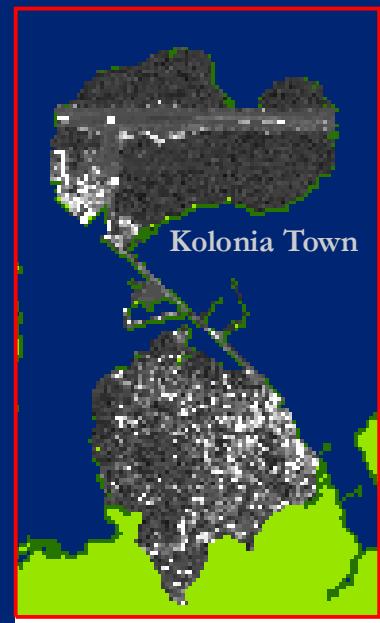
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Sara Krosch

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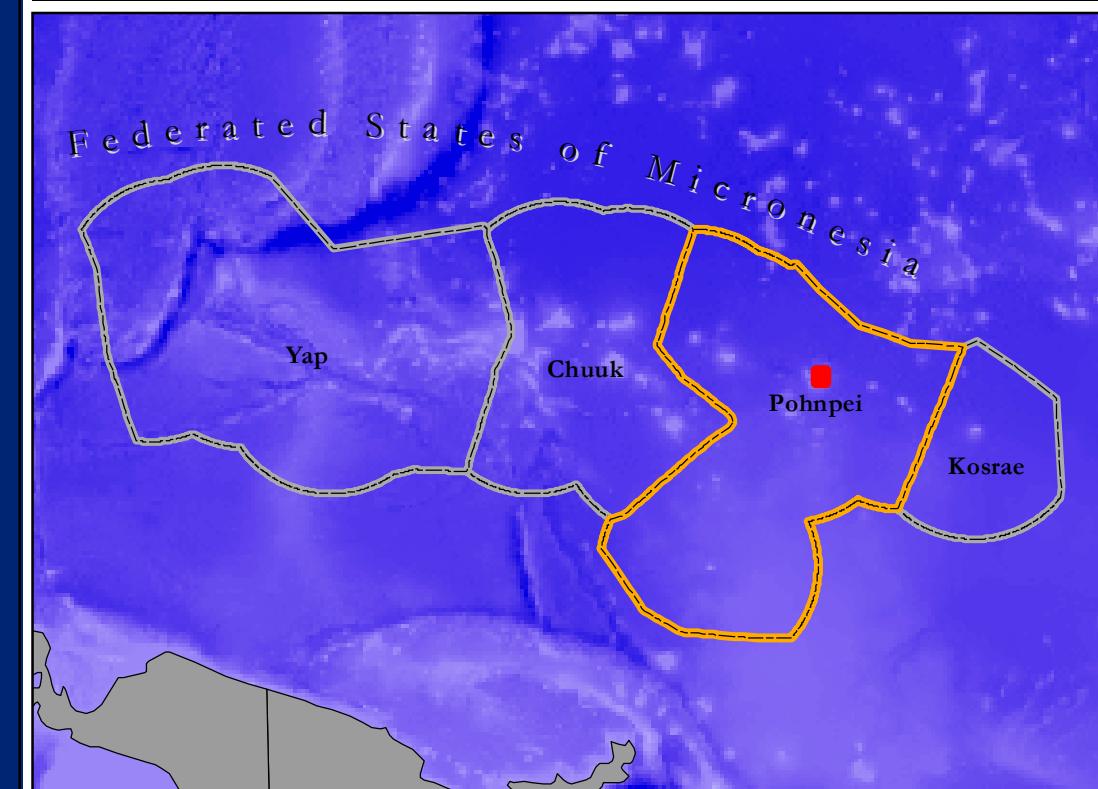
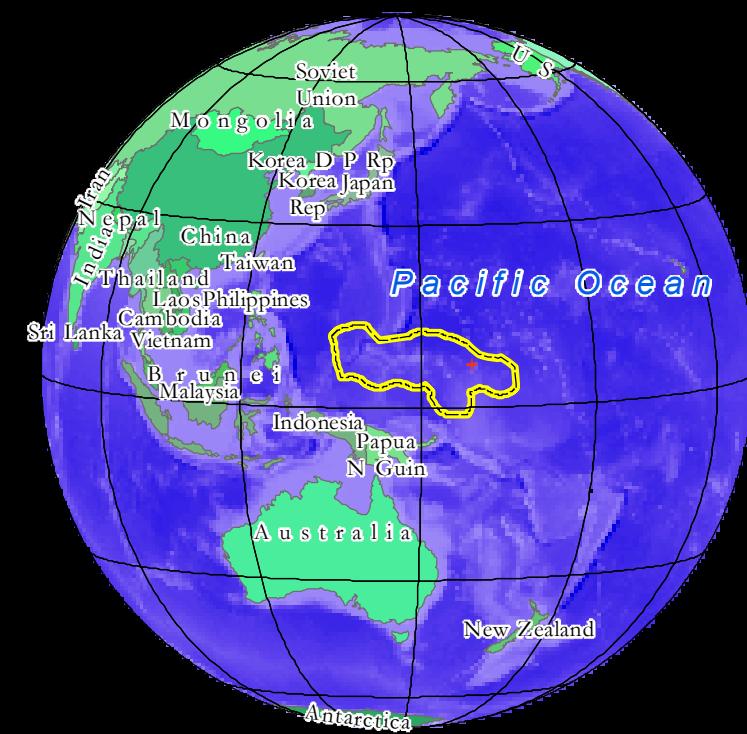
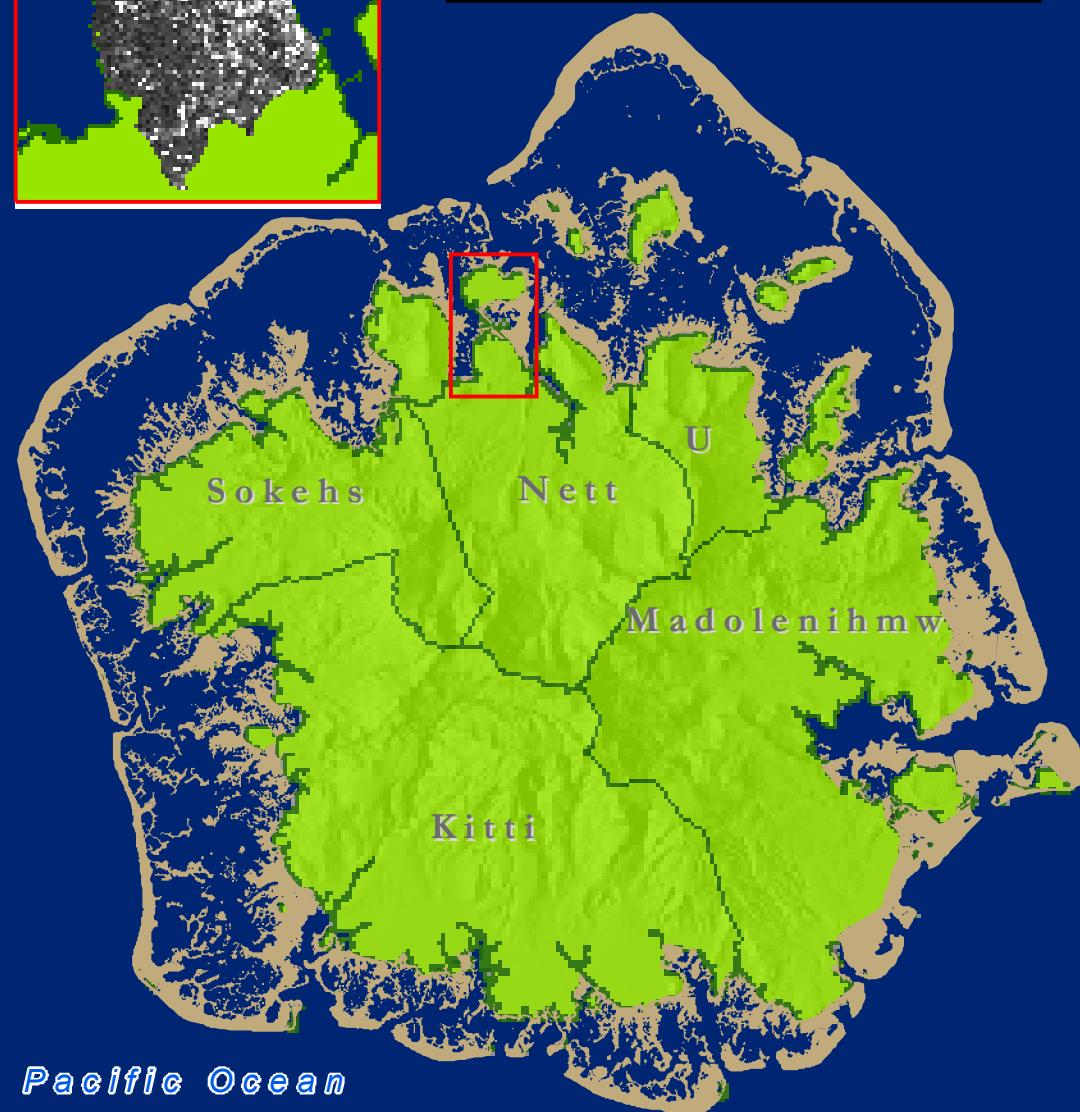


Pohnpei Island  
With Municipalities  
and Kolonia Town,  
Federated States of Micronesia



NORTH

0 2 4 8 12 16  
Kilometers



## **Introduction**

Iron deficiency anemia (IDA) affects one in five non-pregnant young women in Pohnpei State in the Federated States of Micronesia (FSM). As part of a multifaceted health awareness, education and behavior change program, a series of brochures will be developed targeting different sub-groups of females. The brochure developed for high school and college age females will attempt to introduce IDA, promote consumption of locally available food sources of iron and vitamin A, enable self-monitoring of food intake and monthly menstrual blood flow, and encourage the target audience to consult with health providers to ensure they have the proper nutrition for a ‘Strong Mind and Strong Body.’ The attached draft brochure was developed based on data from literature reviews and target group profiles completed by health providers working closely with females ages 15-22. It will be tested in target focus groups before being mass produced and disseminated at school-based clinics and health fairs and at local hospitals, clinics and municipal health dispensaries.

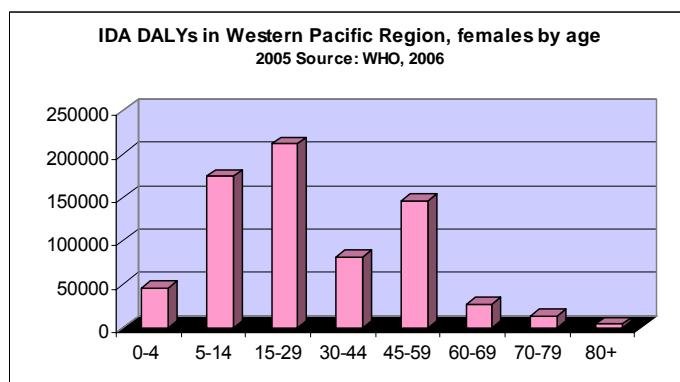
## **Literature Review**

IDA is the most prevalent nutritional disorder in the world today, especially amongst women in developing countries (Brabin and Brabin, 1992; Creed-Kanashiro, 2000; Kurz and Galloway, 2000; WHO, 2001; Berger and Dillon, 2002; Massawe et al, 2002; Horton and Ross, 2003; Foo, et al, 2004; de Almeida, et al. 2005; Grosbois, et al., 2005). IDA is highly prevalent in women in the Western Pacific region. Surveys from a decade ago report 40% of pregnant women (a severe level) and 20% of non-pregnant women (a moderate level) are anemic due to iron deficiency in the FSM, with prevalence being highest in Pohnpei State (WHO, 2000; Yamamura, 2001). Despite this, no health interventions have been undertaken to reduce the rates of this chronic condition.

Symptoms of IDA include fatigue, weakness, shortness of breath, and the inability to concentrate (Callen, 2000; Mayo, 2007; CDC, 1998). Haas and Brownlie’s (2001) review of 29 reports found a strong causal relationship between IDA and impaired aerobic capacity, endurance, energy efficiency and work productivity. IDA has especially adverse effects on the cognitive abilities and productivity of teen girls (Creed-Kanashiro, 2000; Kurz, 2000). Research shows that iron-sufficient females perform better on cognitive tasks and complete them faster than females with IDA, but these results are reversible when healthy iron levels return (Murray-Kolb and Beard, 2007).

The chronic nature of IDA can be translated into disability adjusted life years (DALYs). According to the World Health Organization (WHO), Western Pacific females between the ages of 15-22 carry the heaviest burden of IDA<sup>1</sup>.

Figure 1



IDA starts mild and symptoms often go unnoticed but increase as the condition worsens (Callen, 2000; Mayo, 2007; CDC, 1998) so it is important to target at risk groups.

The main risk factors for young women developing IDA are:

- Diets poor in iron and vitamin A
- No iron supplementation
- Growth spurts
- Menarche
- Teen pregnancy

(Berger and Dillon, 1992; Brabin and Brabin, 1992; CDC, 1998; Ilich, 1998; WHO, 2000; WHO 2001; Yamamura, 2001, Engleberger, et al. 2002, Massewe, et al., 2002; WHO, 2003, USAID, 2006).

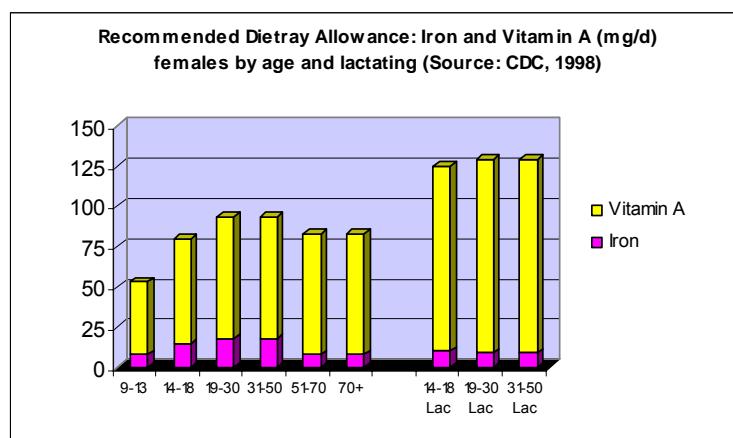
In the FSM, as in most developing countries, young women have a heavy work load, low social status, low priority in food distribution, and are not targeted for most nutrition related health promotion programs. Adolescent girls are particularly prone to developing IDA because of increased demands for iron on growth, loss of iron with menstruation and poor dietary habits (Ilich, 1998; Berger and Dillon, 1992) As a result, a peak in the prevalence of IDA frequently occurs among females during adolescence (WHO, 2001). Pregnant women are most in need of adequate iron stores (CDC, 1998), and they are the only population receiving regular iron supplements in Pohnpei. Birthrate statistics show that 19% of births in Pohnpei between 1996 and 2000 were to teenage mothers (Johnson, 2002). In the developing world, one quarter to one half of females are already iron deficient by the time

<sup>1</sup> Women ages 30-44 are most likely to receive iron supplements during pregnancy but females are at risk of IDA until menopause (WHO, 2006).

they become pregnant. It is often not known when pregnancy will occur and therefore when to promote extra iron intake. So, strengthening the dietary intake of young women will improve both birth outcomes and general well being (Kurz and Galloway, 2000).

Iron treatment has little impact without adequate levels of vitamin A as it enables the absorption of iron (Engelberger, 2001; Brabin and Brabin, 1992). Pohnpei nutrition surveys in the 1990's documented vitamin A deficiency prevalence among the highest in the world (Engelberger, 2001). The figure below shows non-lactating females ages 15-22 require about 80mg of vitamin A per day in order to be able to fully absorb 18mg of iron needed daily. Therefore, any attempts to alleviate IDA must promote iron and vitamin A concurrently.

Figure 2



Although both WHO and UNICEF assert that successful iron supplementation results in the disappearance of anemia as a public health problem, research also reveals that supplements alone are inadequate (Stoltzfus, 2001; Yip, 2001). Iron supplements are appropriate only when individuals need more iron than a balanced diet can provide (Yip, 2001), but the FSM is rich in free native foods high in iron and vitamin A. Iron supplement treatment can take several weeks to months and IDA can easily return if preventative behaviors are not maintained (Mayo, 2007). And Patterson et al (2001) found that high iron diets produce more sustainable results than use of supplements.

Simple, home-based food fortification methods provide an alternative to supplements and encourage local food consumption. Research has shown when iron bioavailability is low, foods can be fortified when boiled in cast iron or steel instead of aluminium pots. The fortification process is enhanced when foods high in vitamin C (readily available Chinese cabbage, tomatoes, lime or lemon juice) are added to the pot (Burns et al, 1997; Borigato and Martinez, 1998; Adish et al, 1999; Brabin, 1999; Pickrell, 2002; Berti et al, 2004).

## **Target Group**

The brochure targets females who attend high school (ages 15-18 years), the State or National College, and vocational school (18-22 years) on Pohnpei Island. All are proficient in English at a grade 7 level as it is a requirement for admission level and it is the mode of instruction from grade 4 onwards. The majority of this group lives in an extended family household with an average of 6 people. Those from neighboring islands or States live in on-campus dormitories. About one forth earns some sort of income mostly from working in the service industry. All have access to a school nurse during school hours and have access to a State hospital, two clinics or 6 local dispensaries within a one hour drive from anywhere on the island. This group has been socialized to be the primary food buyers (64%) and food preparers (99%). And 59% of adult females in Pohnpei, (including members of this target group or their family members) have received some information on healthy foods for disease prevention via community workshops (22.2%), radio (18.3%) or public clinics (13.7) (FSM Statistics, 2002; Corsi, 2004).

## **Program Overview and Brochure Objectives**

The PRECEDE-PROCEED Model (Green and Kreuter, 1999) was used in developing the program by defining the overall goal, risk factors and contributing factors, objectives, sub-objectives and strategies. The table below provides a brief summary of relevant portions of the program. The draft brochure contains messages that contribute to the highlighted sub-objectives and objectives.

Specifically the brochure aims to:

- Increase awareness of IDA
- Increase knowledge of the causes, symptoms, means of diagnosis and means of preventing IDA
- Build self-efficacy to make informed eating decisions and monitor intake of foods rich in iron and vitamin A.
- Provide motivation to visit health providers for more information and testing for IDA
- Increase awareness of the “Iron + Vitamin A Everyday!” and the “Strong Mind-Strong Body” campaigns and other program activities
- Increase recognition of program branding and of the implementing agency itself

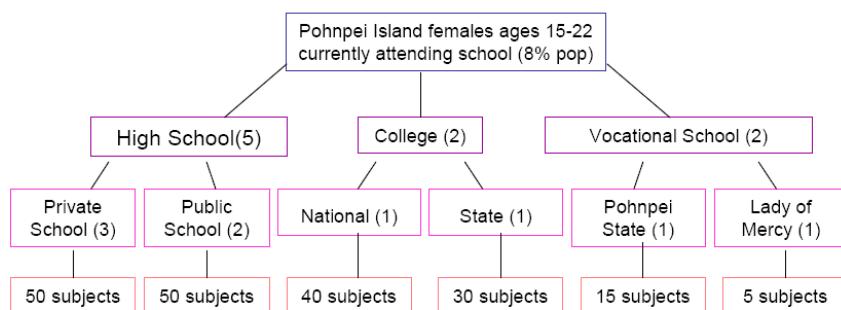
Table 1

<p><b>Program Goal:</b> Reduce the level of IDA amongst non-pregnant females ages 15-39 from current moderate/severe levels to mild levels<sup>2</sup> on Pohnpei Island in the Federated States of Micronesia within 18 months.</p>		
Risk Factor: Diet poor in iron & vitamin A	Objective: <b>Increase the daily dietary intake of iron and vitamin A to achieve normal body iron stores.<sup>3</sup></b>	
Contributing Factors: <ul style="list-style-type: none"> <li>• low incomes &amp; high unemployment lead to dependence on cheap nonfortified, low-heme imported foods</li> <li>• shift to cash economy and less local farming</li> <li>• no national yes, you dofortification program</li> </ul>	Sub-objectives: <ul style="list-style-type: none"> <li>• Increase food fortification knowledge, skills</li> <li>• Increase awareness of local iron, vitamin A foods to prevent &amp; treat IDA</li> <li>• increase purchase, consumption of iron, vitamin A foods</li> </ul>	Strategies: <ul style="list-style-type: none"> <li>• Workshops</li> <li>• Posters &amp; brochures</li> <li>• Video &amp; radio spots</li> <li>• Logo/sticker to label foods</li> <li>• Farmer's market stall</li> </ul>
Risk Factor: Menorrhagia (heavy menstrual flow)	Objective: <b>Increase knowledge of menorrhagia as a risk factor for IDA.</b>	
Contributing Factor: <ul style="list-style-type: none"> <li>• Poor monitoring for IDA amongst target group experiencing menorrhagia</li> </ul>	Sub-objectives: <ul style="list-style-type: none"> <li>• Improve personal monitoring</li> <li>• Improve health provider screening, monitoring &amp; counselling procedures</li> </ul>	Strategies: <ul style="list-style-type: none"> <li>• Collect baseline data on target group experiencing menorrhagia</li> <li>• Partner with health providers to develop screening, monitoring &amp; <b>counselling materials</b> (provide training if necessary)</li> <li>• Monitor target group iron status via <b>food diaries</b> &amp; body iron store blood testing</li> </ul>

### Brochure Development Methods

The draft brochure is the product of a series of formative activities. Initially, stratified cluster samples of the target group were identified and surveyed for baseline information about awareness of IDA, and beliefs of the impact nutrition and menses have on overall health.

Figure 3: Population Sample



<sup>2</sup> mild levels: <20% of population; moderate levels: 20-39.9% of population; severe levels: ≥40% population (WHO, 2001)

<sup>3</sup> 15 mg and vitamin A to 65mg for females ages 15-18, & increase daily dietary intake of iron to 18mg and vitamin A to 75mg for females ages 19-39

Baseline data was compiled along with target group profiles created by health providers and others working closely with females ages 15-22 in school settings. and a review of the literature was shared at a Design Workshop, as described by de Fossard (1998), where key implementers and target group representatives from each school group developed the messages, tone, and color/image themes for media products. The Workshop yielded a Design Plan for all media products and a specific creative brief for the brochure.

### **Brochure Pre-testing Methods**

A SMOG test was conducted on the draft brochure to determine readability. The average polysyllabic word count was 24 which was an approximate grade level of 8. However, when the word ‘vitamin’ was omitted from the test the average dropped to 17, making it at a grade 7 reading level. An informal follow-up survey with members of the target group and their teachers found that 70% knew the word ‘vitamin’ and could use it in a sentence. The next step is to pre-test the brochure in English classes at each designated school shown in the diagram above. Numbers of subjects were determined by overall population base of each school. The brochure will be distributed to randomly selected girls in each location and subjects will be asked to first read it independently. Then, as a large group, subjects will be asked the following questions:

- Does this brochure look like something someone like you would read? Why/why not?
- What do you think of the colors and pictures?
- Is the layout interesting and does it hold your attention?
- What do you feel are the main messages in this brochure?
- Do you believe this information? Why/why not?
- Is there anything about the writing, colors or pictures you would like to change?
- Is it easy to read? Are there any words or sentences that are confusing?
- Did you learn anything new from this brochure? If so, what?
- Would you share this brochure with friends? Family?
- What actions does this brochure encourage you to take? Do you feel you will take these actions? Why/why not?

### **Brochure Dissemination**

After pre-testing has been completed and any necessary changes have been made, the brochure will be printed locally and distributed to all local health providers, all secondary and tertiary schools and at health events on campuses and around the island throughout the

year. In addition, the brochures will be made available wherever other program activities are taking place, such as in local stores where logo stickers are on iron and vitamin A foods and in local restaurants and cafeterias.

## Conclusion

To prevent IDA, teenage girls and young women in Pohnpei need to be aware of the condition and build knowledge and skills to prevent and treat it. Females attending high school, college and vocational schools are already role models to their communities and families. By educating them and motivating their behavior change it is hoped that other females will also be more inclined to eat iron-rich foods and foods that are vitamin A sources, practice home-based methods of food fortification and monitor monthly bleeding. Very few health promotion brochures have been created locally in Pohnpei so this strategy has the potential for more personal relevance and acceptability.

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## 4 Ways You Can Help Prevent Anemia

Eat foods rich in iron, vitamin A and vitamin C every day.



Look for this sticker on foods at markets and stores.

Buy these foods and get a free cloth bag!

Make an appointment with a local health provider to have a blood test to see if you have a healthy amount of iron.

Pohnpei Public Hospital  
320-8660  
Genesis Clinic  
320-3381  
Island Family Clinic - Dr. Isaacs  
320-3381

Keep a Food Diary and pay attention to your monthly blood flow.

Share this information with friends and family members.

Get a list of 999 foods high in iron, Vitamin A and vitamin C.



Get more information about healthy foods at [www.nutritiondata.com](http://www.nutritiondata.com)  
Find your personal daily iron needs.

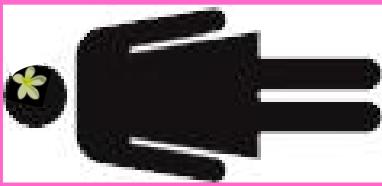
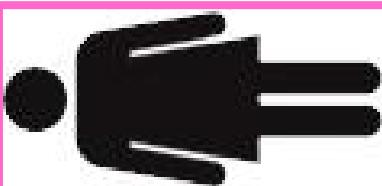


## Strong Mind • Strong Body



How strong are you?

1 in 5 females in Pohnpei does not have enough iron to be healthy.



EVERYDAY!

**Secretariat of the Pacific Community- Regional Office**  
Botanical Gardens  
Kolonia, Pohnpei  
Federated States of Micronesia  
691-320-7532

## Why does my body need iron?

When someone does not have enough iron they are said to have 'weak blood.' Iron helps move oxygen in the blood to muscles and tissues in the body. Without oxygen the body and mind cannot stay strong.

## What happens if I do not have enough iron?

If your blood has too little iron you can become **anemic**. You may feel tired and weak. You may be out of breath easily. You may also have a hard time concentrating and staying active. Women especially need iron before and during pregnancy.

## How can I make sure I get enough iron to be healthy?

The best way to get iron is to eat iron rich foods. Many local foods are high in iron. It is also important to eat foods high in vitamin A and vitamin C. Eating foods high in iron together with foods high in vitamins A and C will help the body absorb iron.

### How can learn if I am anemic?

A simple blood test can tell you how much iron is in your body. Visit a hospital or clinic for a blood test. The doctor or nurse can give you more information on ways to prevent or recover from anemia. They will give you an iron supplement if you are pregnant.



Another way to get more iron is to cook foods in cast iron or steel pots. Cooking foods in iron or steel pots will add iron to the foods.

Add some lemon, lime or tomato juice to foods cooked in iron or steel pots and this will increase the iron even more.

## What local foods contain iron, vitamin A and vitamin C?



### Iron and Vitamin C

- tuna
- clam
- octopus
- pork
- yam
- sweet potato
- plantain
- banana
- pumpkin
- tangerine
- mango
- papaya
- tapioca leaves
- pumpkin leaves
- taro leaves
- Chinese cabbage

### Iron and Vitamin A

- grouper fish
- boiled egg

Canned mackerel, corned beef and SPAM are high in iron, but they are also high in fat. Local seafood and plants are the best sources of iron, vitamin A and vitamin C.

### I already eat many iron rich foods.

### Why do I still feel weak and tired?

Sometimes women become anemic if they have heavy periods. When you lose blood each month you are also losing iron. If you have heavy monthly bleeding you should see a doctor to be tested for anemia.



Avoid drinking coffee, tea and sakau. These drinks make it difficult for the body to absorb iron from foods.

## Keep a Food Diary

Write down all the foods and drinks you have each day for one week below. Are you eating foods high in iron, vitamin A and vitamin C everyday? Bring this food diary to the school nurse to learn if you have a **strong Mind • Strong Body** diet.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

Notes on Nurse's advice: \_\_\_\_\_

