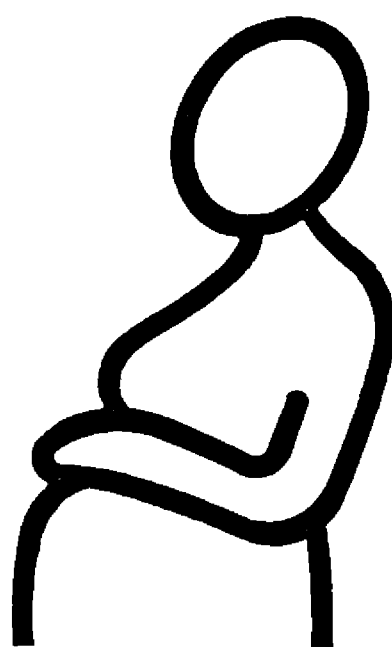


STUDY OF

IRON DEFICIENCY ANAEMIA

AMONG PREGNANT WOMEN

IN BELIZE



January 1996

This is a joint study carried out under the auspices of :

INCAP	-	Institute of Nutrition of Central America and Panama
PAHO	-	The Pan American Health Organization
UNICEF	-	The United Nations Children's Fund

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Abstract

The prevalence of anaemia among pregnant women attending public prenatal clinics in Belize stands at 52%, ranging from 63% in Cayo District to 32% in Orange Walk District. This was established by a study of 6,402 women attending public health centres, carried out across the country during the latter part of 1995. These results represent a 30% increase in the prevalence rate since a previous study was carried out in 1988.

Other findings of the study are:

- Iron supplements were not available in 67% of the country's health centres at the time of the study.
- Time for the delivery of haemoglobin (Hb) test results ranges from three days to two months, with some results never received at all.

Implications of these findings are that:

- Emergency action should be taken to address the high rate of maternal anaemia. This could include public education, revitalization of the iron supplementation programme, and steps toward iron fortification of basic foods.
- The problem of anaemia is present in populations other than pregnant women, again calling for immediate action through public education and iron fortification of basic foods.

Introduction

Anaemic pregnant women have reduced chances of surviving childbirth and delivering healthy babies. Their ability to care for a family and participate in economic and social activity is also impaired and they are more likely to die due to post partum hemorrhage than women with healthy haemoglobin levels. Further complications associated with low haemoglobin levels include increased risk of premature delivery, low birth weight, placental hypertrophy, and reduced estriol excretion¹.

The reduction of iron deficiency anaemia in women by one third of 1990 levels by the year 2000 is a stated goal of the Government of Belize.

The most common cause of anaemia is iron deficiency, although other causes do exist. Pregnant women require more iron than non-pregnant women due to natural increases in haemoglobin demand which occur during pregnancy. Intake of iron from poorly absorbed sources and low maternal iron stores contribute to high prevalence of iron deficiency anaemia during pregnancy. The UNICEF-WHO Joint Committee estimates that, in communities where 30% or more of pregnant women are anaemic, a universal iron supplementation programme should be implemented for all pregnant women². Universal supplementation is supplementation for the entire population, which can best be achieved through food fortification. The World Health Organization defines anaemia in pregnant females as less than 110 grams of haemoglobin per litre of blood. The Ministry of Health in Belize has adopted this definition as its standard .

In the early 1980's, the Ministry of Health implemented a successful program to reduce maternal anaemia through iron supplementation and public education. In 1988 measurements of anaemia in pregnant women were taken, finding the prevalence to be 40.2%³.

Background

At the 1990 World Summit for Children, governments including Belize agreed upon a series of 27 goals to achieve by the end of the decade. One of these is: *the reduction of iron deficiency in women by one-third of 1990 levels*⁴. No data on the prevalence of anaemia among pregnant women in Belize has been gathered since 1988. Observations by health professionals suggested that the health

situation among pregnant women was worsening and there was a need for information in order for further action to be taken.

Objectives of the Study

1. To estimate the prevalence of anaemia in pregnant women who attended public prenatal clinics in Belize in 1994-1995, nationally as well as by district.
2. To assess the availability and distribution of iron supplements in prenatal clinics.
3. To identify operational problems in management of maternal anaemia and possible solutions.

Methodology

A list of all public health centres in the country was compiled. A specialist from INCAP/PAHO assisted with construction of the survey form (see Appendix 4) which included woman's age, number of pregnancies, last menstrual period, estimated date of delivery, haemoglobin level at first clinic visit, and sickle cell anaemia test. Of the 35 public health centres, 33 were in regular operation at the time of the survey.

Each of the 33 health centres were visited and public health nurses interviewed on availability of iron supplements, length of time taken to receive lab results and other comments. Next, data for the one year period from September 1994 through August 1995 was copied from the prenatal register. Data collection took place during October and November of 1995. Upon completion, the data was entered into the computer software package Epi-Info version 6.0 for analysis⁵. Specialists from INCAP/PAHO provided technical supervision and assisted with data analysis. The clinics included in the survey are listed in appendix one.

The prenatal registers and public health nurses in each community provided all information for the study, carried out in a joint effort involving the Ministry of Health, UNICEF, PAHO/WHO, and INCAP/PAHO. A UNICEF intern from University of California

All 33 regularly operating public health centres in the country were visited for data collection. Information was taken from the nurses and the prenatal records.

Los Angeles and an intern from State University of New York College at Cortland collected the data from the clinics for the survey. INCAP/PAHO provided transportation to the health centres. UNICEF covered other costs. This report was prepared by the Cortland intern assigned to UNICEF, with technical assistance from INCAP/PAHO.

Limitations

The survey sample includes 6,402 women who attended public health clinics during the given year. Official data on the number of births for 1994 was not available at the time the report was prepared. However, in 1993, 6,462 births were recorded, suggesting the survey sample is more than adequate to be representative. Neither women who sought care only from private medical doctors nor those who sought no prenatal care were included in the survey (some women seek care from both public clinics and private doctors). It was initially believed that information on sickle cell anaemia would be useful in the data analysis. However, this information was not readily available so it was not considered in the findings. In circumstances where data was missing, as much information as was available was recorded on the survey form.

Results

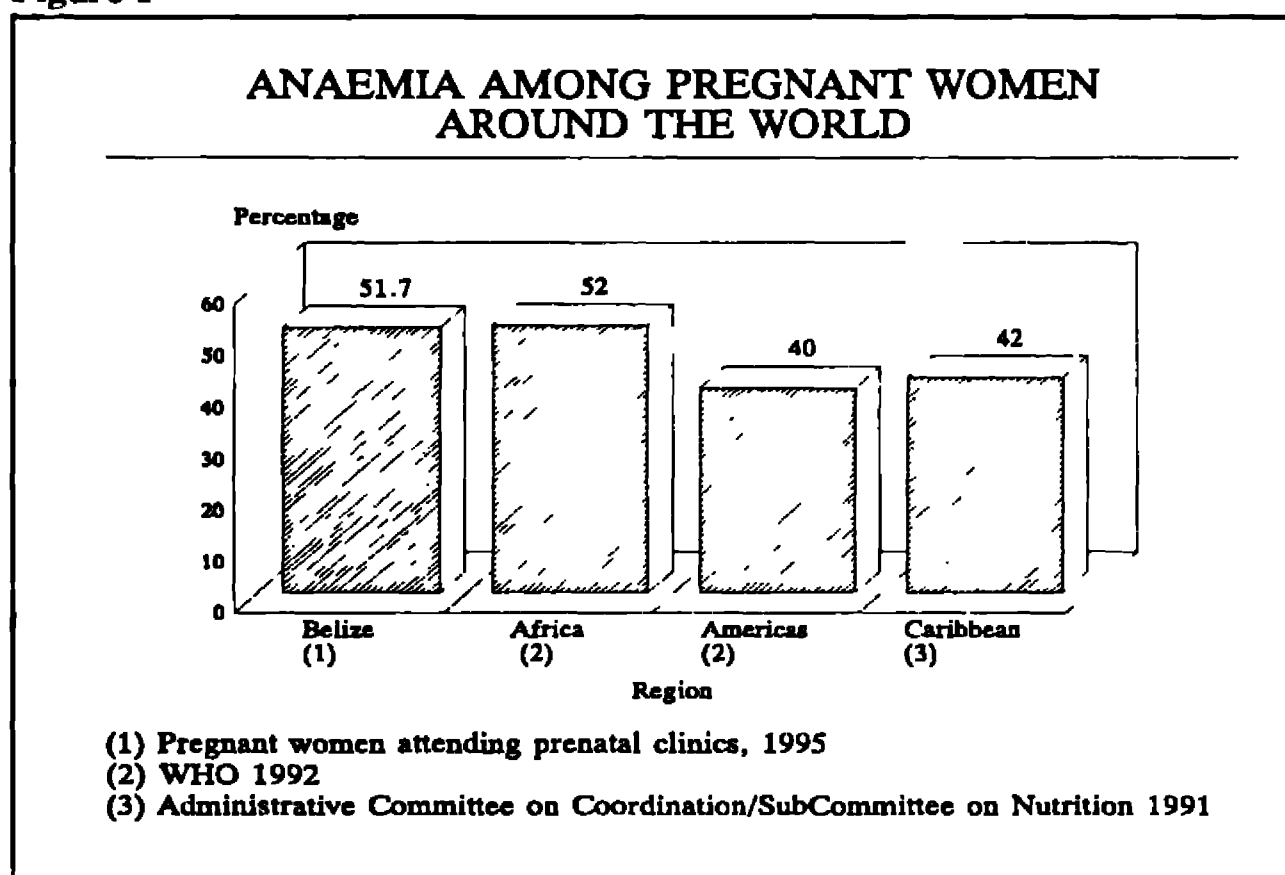
Magnitude of Maternal Iron Deficiency Anaemia

The prevalence of anaemia among pregnant women in Belize who attended prenatal clinics in 1994-1995 was 51.7%. The prevalence increased from 40.2% in 1988. Levels of anaemia among pregnant women in Belize are currently higher than those in the Americas and the Caribbean⁶ and similar to those for Africa, with four of the districts having rates higher than an African regional average. See Figure 1.

The sample excludes women receiving care exclusively from private medical doctors and those receiving no prenatal care.

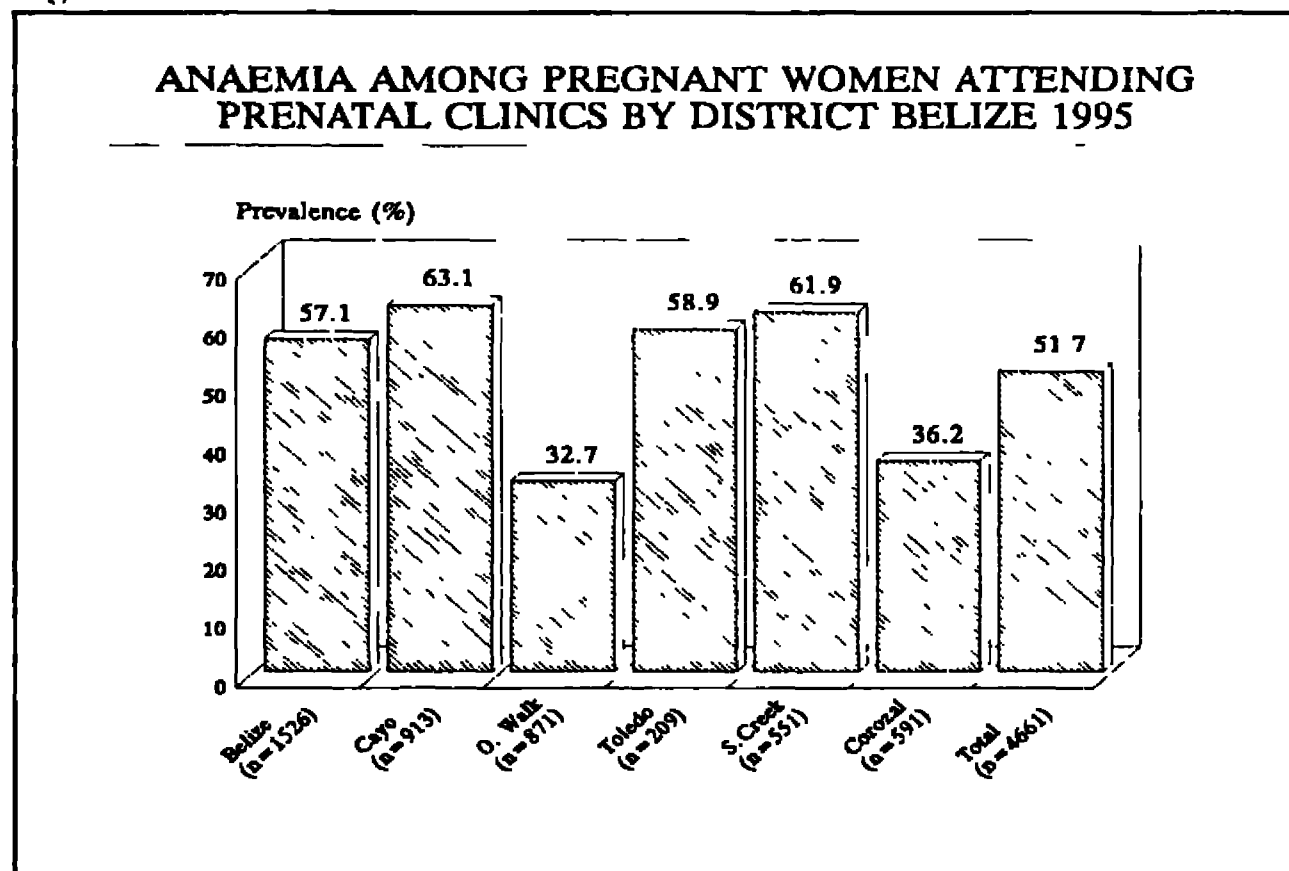
Cayo, Stann Creek, Belize, and Toledo are the districts with the most severe maternal anaemia problem.

Figure 1



Cayo, Stann Creek, Belize, and Toledo Districts had the highest prevalence of maternal anaemia with 63.1%, 61.9%, 57.1% and 58.9% respectively. Orange Walk and Corozal Districts showed comparably lower levels of maternal anaemia, with 32.7% and 36.2% respectively. See Table 1 and Figure 2.

Figure 2



UNICEF/WHO recommend that prevalence of maternal anaemia above 30% demands universal iron supplementation for all pregnant women

UNICEF-WHO recommend that prevalence of maternal anaemia above 30% demands universal iron supplementation for all pregnant women. This is a low cost intervention, with purchase of sufficient supplement for an entire pregnancy estimated at only US\$0.15⁷. Every district in Belize exceeds this 30% guideline, with two of the six districts showing prevalence more than double the guideline, and two more districts almost double.

Table 1

Prevalence of Anaemia Among Pregnant Women by District

District	# Women With Hb Lab Results Available	# Anaemic Women*	% Anaemic Women*
Corozal	591	214	36.2%
Toledo	209	123	58.9%
Stann Creek	551	341	61.9%
Cayo	913	576	63.1%
Orange Walk	871	285	32.7%
Belize	1526	872	57.1%
TOTAL	4661	2411	51.7%

Anaemia rates among pregnant women are 52% nationally.

* Anaemia is defined as haemoglobin levels less than 110 grams per litre of blood.

Operational Problems of the Iron Supplementation Programme

In assessing the availability and distribution of iron supplements in prenatal clinics, most health centres did not have supplements to distribute to pregnant women at the time of the study. Only 11 of

the 33 health centres had iron supplements available at the time of the survey. Of the clinics which had iron tablets available, four reported problems such as having insufficient supplies, or having tablets only for women with haemoglobin levels below 100 grams per litre of blood. In Corozal District, privately raised funds were used to buy iron tablets for very poor women. The remaining health centres reported having no iron supplements, some for as long as two years. See Table 2 for a listing of supplement availability. For comments from each health centre see Appendix 2.

Table 2

Availability of Iron Supplements in Public Health Centres by District

District	# of Health Centres	Centres with Iron Supplements Available* **	Centres with Iron Supplements Not Available**
Belize	10	2	8
Cayo	4	3	1
Corozal	5	2	3
Orange Walk	4	1	3
Stann Creek	6	3	3
Toledo	4	0	4
Total	33	11	22

Most health centres do not have iron supplements available, and face operational problems with regard to haemoglobin

* For listing of supplement availability by health centre see Appendix 2

** At the time of the survey

Standard procedure is to draw two blood samples from each pregnant woman attending clinic. The first is taken at the woman's first visit and the second in the third trimester of pregnancy. These results were not available for every pregnant woman attending clinic in the health centre records. The estimation of maternal anaemia prevalence does not include the missing figures.

Toledo District had the highest number of unavailable haemoglobin results at 66%. Corozal and Stann Creek Districts were next with 30% and 28% of the lab tests unavailable. Orange Walk, Belize, and Cayo Districts had lower levels of missing lab results with 16%, 20%, and 26% respectively. These findings are listed in Table 3. Information other than Hb levels, such as age, number of pregnancies, last menstrual period, and estimated delivery date was missing from most health centres as well. Therefore, this data was not analyzed. See Figure 3.

Toledo District had the highest number of unavailable haemoglobin results at 66%.

Figure 3

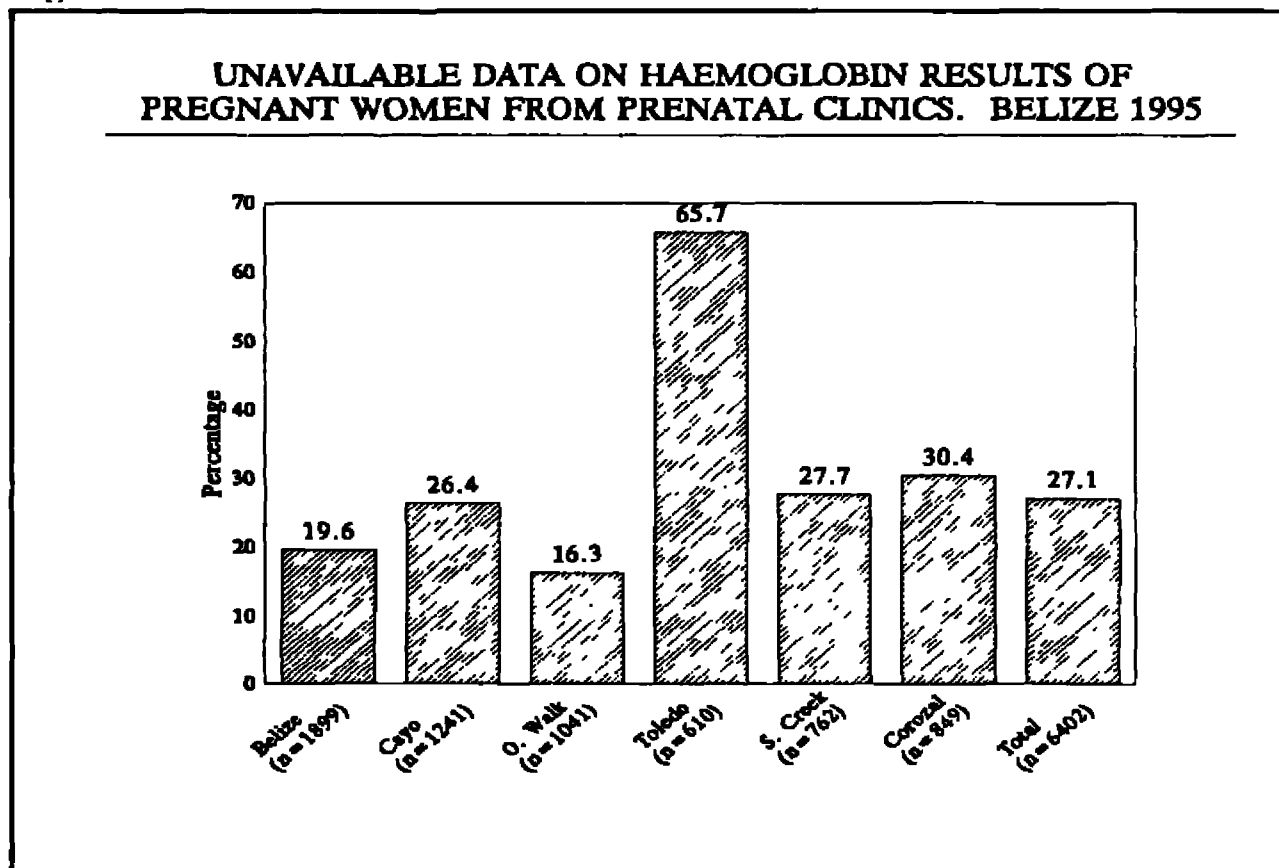


Table 3

Availability Of Haemoglobin Lab Results to Patients at Public Health Clinics By District

District	Prenatal Clinic Attendance*	No. of Available Hb Lab Results	No. of Un-available Hb Lab Results	% Unavailable Hb Lab Results
Corozal	849	591	258	30.4 %
Toledo**	610	209	401	65.7 %
Stann Creek	762	551	211	27.7 %
Cayo	1241	913	328	26.4 %
Orange Walk	1041	871	170	16.3 %
Belize	1899	1526	373	19.6 %
Total**	6402	4661	1741	27.1 %

* Pregnant Women Attending Clinic From September 1994 through August 1995

** Does not include Crique Sarco Health Centre due to problems with prenatal records

In each health centre the public health nurse reported the average length of time taken to receive haemoglobin lab results. As shown in Appendix 3, Hb results can take as little as one day, as long as two months or are not received at all.

In Sittee River and Seine Bight there were problems with recording the dates of visit to the clinic. In order for the data to be complete, information was taken from January through December 1994.

A major problem in the data collection process was encountered in the village of Crique Sarco in Toledo District. The public health nurse did not have a prenatal register that could be used to collect information for the survey. The nurse did have records of 28 pregnant women attending clinic for the specified period,

Hb results can take as little as one day, as long as two months or are not received at all.

however haemoglobin results were not available for any of these women.

The village of San Antonio in Toledo District recorded visits of 185 pregnant women however, the nurse did not have tubes to take blood samples from the women so no data on haemoglobin was available for the given year.

The initial objective of the survey was to estimate the prevalence of anaemia among pregnant women in Belize and to assess the status of the iron folate supplementation programme. In conducting this study, other factors which affect health care delivery to pregnant women were discovered. Additional findings such as length of time taken to receive lab results or the absence thereof are important to consider in the overall assessment of prenatal care. Many of the public health nurses voiced concerns specific to their health centre, supporting the major operational problems identified (See Appendix 2).

Conclusions

Based on the data gathered on the prevalence of anaemia among pregnant women in Belize, it is apparent that a serious problem exists. As a nation, 52% of all pregnant women are anaemic with levels of maternal anaemia being 60% or greater in Stann Creek and Cayo Districts. Each district was missing a significant proportion of haemoglobin laboratory results. Toledo District was missing 66% of all their haemoglobin results, with Corozal and Stann Creek missing 30% and 28% respectively.

Twenty-two of the 33 health centres did not have supplies of iron supplements for distribution at the time of the survey. However, there is no direct correlation between lack of iron supplement availability and high prevalence of maternal anaemia; those districts with greatest shortages of supplement do not have the highest prevalence rates. This suggests that measures in addition to iron supplementation are required to successfully address such high levels of maternal anaemia.

The data indicates that an emergency plan of action should be formulated and implemented by the Ministry of Health.

As a nation, 52% of all pregnant women are anaemic, with levels of maternal anaemia being 60% or greater in Stann Creek and Cayo Districts.

Health centres included in the survey:

**Matron Roberts Health Centre
Port Loyola Health Post
Cleopatra White Health Centre
Caye Caulker Health Centre
Crooked Tree Health Centre
Ladyville Health Centre
Double Head Cabbage Health Centre
Maskall Health Centre
Hattieville Health Centre
Valley of Peace Health Centre
Georgeville Health Centre
San Ignacio Health Centre
Belmopan Health Centre
Benque Mopan Clinic
Guinea Grass Health Centre
San Felipe Health Centre
San Jose/San Pablo Health Centre
San Narciso Health Centre
Sarteneja Health Centre
Libertad Health Centre
Progreso Health Centre
Dangriga Health Centre
Independence Health Centre
Stann Creek Valley Health Centre
Sittee River Health Centre
Hopkins Health Centre
Seine Bight Health Centre
San Pedro Columbia Health Centre
San Antonio Health Centre
Crique Sarco Health Centre
Punta Gorda Town Health Centre
August Pine Ridge Health Centre*
Burrell Boom Health Centre***

***Not open at time of survey**

AVAILABILITY OF IRON SUPPLEMENTS
In Public Health Centres
(Oct. 1995)

Health Centre	Iron Supplements Available	Iron Supplements Not Available	Comments
Cayo District			
Belmopan	X		
Benque Mopan Clinic	X		
Georgeville	X		Small amount of iron tablets for very poor women in remote areas
San Ignacio		X	No iron supplements since January 1995
Belize District			
Caye Caulker		X	No iron supplements since July 1995
Crooked Tree	X		Very few pregnant women; sometimes iron tablets expire before being used
Cleopatra White		X	No iron supplements for one year
Double Head Cabbage		X	No iron supplements since August 1995; when iron is available, the nurse usually runs out
Hattieville		X	No iron supplements since February 1995
Ladyville	X		Iron tablets are given to women with Hb levels below 10.0 g/dl
Maskall		X	No iron supplements since August 1995
Matron Roberts		X	No iron supplements since February 1995
Port Loyola		X	No iron supplements available

Health Centre	Iron Supplements Available	Iron Supplements Not Available	Comments
Valley of Peace		X	No iron supplements available, Nurse had a small amount in July 1995
Corozal District			
Corozal	X		Small amount of iron supplements bought with privately raised funds; given to poor women
Libertad		X	No iron supplements in 1995, Primary health Care bought some for very poor women
Progreso		X	No iron supplements since May 1994, Nurse had 240 tablets; when available women are given one month supply
San Narciso	X		Received iron supplements October 1995
Sarteneja		X	No iron since August 1995
Orange Walk District			
Guinea Grass		X	No iron supplements since May 1994
Orange Walk		X	Had small amounts of iron supplements sporadically throughout the year; when available given on a need basis
San Felipe	X		
San Jose / San Pablo		X	No iron supplements available for two years
Stann Creek District			
Dangriga	X		
Hopkins		X	No iron supplements since 1994
Independence		X	No iron supplements since receiving small amount in March 1995
Seine Bight		X	No iron supplements since August 1995
Sittee River	X		

Health Centre	Iron Supplements Available	Iron Supplements Not Available	Comments
Stann Creek Valley	X		Iron supplements run out occasionally; tablets are given to women on their first visit then they must buy their own
Toledo District			
Crique Sarco		X	No iron supplements available, no lab results available, no prenatal register
Punta Gorda		X	No iron supplements available for two years
San Antonio		X	No iron supplements available all year
San Pedro Columbia		X	No iron supplements available for one year

LABORATORY REPORTING RESULTS OF HB TESTING

Health Centre	Time to get Lab Results	Comments
Corozal District		
Corozal	1-1.5 months	Nurse reported having problems with the lab
Libertad	1 month	
Progreso	3-4 weeks	Very few results available for mobile clinic
San Narciso	Varies	
Sarteneja	2 weeks	No lab results for the mobile clinic
Orange Walk District		
Guinea Grass	1-2 weeks	Difficult to get lab results from mobile clinic; women do not go to have blood work done.
Orange Walk	2 weeks	
San Felipe	1 week	Women have to go to town for blood work, they either do not go or go and cannot afford to return to pick up results.
San Jose/San Pablo	2-3 weeks	
Toledo District		
Crique Sarco	No lab results	The nurse is very concerned with the situation and needs assistance in obtaining haemoglobin results.
Punta Gorda	3 days- many weeks	Problems with the lab; only 50% of results available
San Antonio	No lab results	Nurse did not have tubes to take blood samples for the entire year.

Health Centre	Time to get Lab Results	Comments
San Pedro Columbia	Depends	Women have to go to town to pick up their results which causes problems; nearly 70% of results were missing.
Cayo District		
Belmopan	2 weeks	
Benque Mopan Clinic	3-4 weeks	
Georgeville	2 months	
San Ignacio	2 weeks	
Belize District		
Caye Caulker	1 day	Women go to Belize City and nurse suggests using the pathology lab rather than the government lab.
Cleopatra White Health Center	3 days	
Crooked Tree	1-2 months	Nurse has problems getting lab results; only 50% available.
Hattieville	2 weeks	
Maskall	1 month	
Matron Roberts	1 week	
Port Loyola	4-6 weeks	The clinic is within Belize City and results take 4-6 weeks
Valley of Peace	1-2 weeks	
Stann Creek District		
Dangriga	1 week	

Health Centre	Time to get Lab Results	Comments
Hopkins	?	Nurse reported problems with the lab. in Dangriga, blood work was sent to Belize City but not returned, women cannot afford to go to town to have blood work done.
Independence	4 weeks; often never	80% of lab. results were unavailable.
Seine Bight	1.5 months	
Sittee River	1-4 weeks	4 of 11 recorded pregnancies did not have lab. results available.
Stann Creek Valley	1 week	Nurse reported that the lab. was not working in July and August.

**ANAEMIA PREVALENCE IN PREGNANT WOMEN OF BELIZE
SEPTEMBER 1994- AUGUST 1995**

Date: _____
Village: _____

Health Centre: _____
District: _____

[illegible]

Observations: _____

Are supplements available? Yes _____ No _____ Since when? _____

Average period of time it takes to get test results

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