



INSTITUTO DE NUTRICIÓN DE CENTROAMÉRICA Y PANAMÁ  
-INCAP-

# Using HCES to Assess Diet Quality in Guatemala Focusing on Maternal & Infant Groups

Mazariegos M, Méndez H, Menchú MT, Dary O



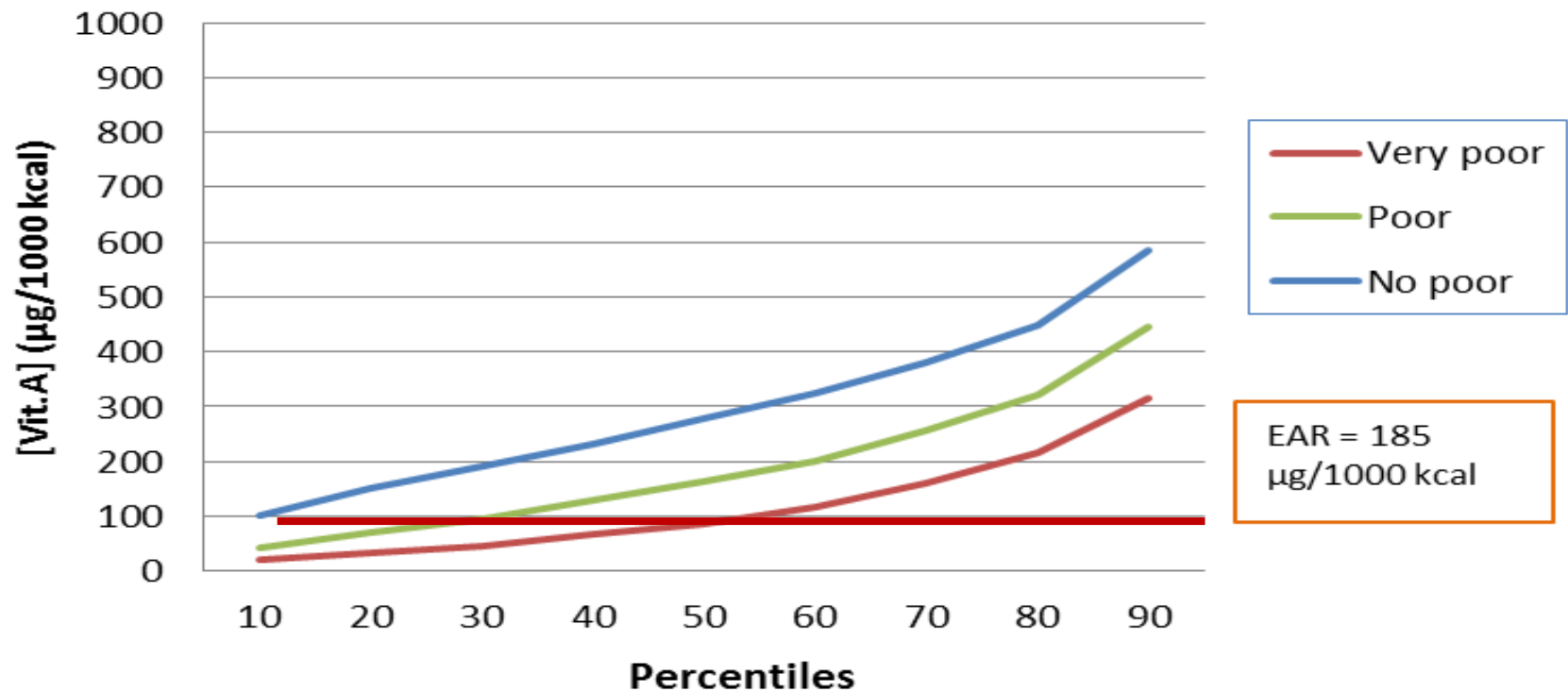
Micronutrient Forum  
June 2nd, 2014  
Addis Ababa, Ethiopia

# Objectives

- Assess HCES potential in determining nutrient inadequacies by assessing the quality of diet, based on nutrient densities.
- Compare results of HCES (family) with diet from children (6-23 months) and women (pregnant and lactating) using 24HR results in Western Highlands of Guatemala
- Determine if HCES predicts profile of micronutrient inadequacy against estimations through 24HR.
- Compare HCES- and 24HR-based estimates of nutrient inadequacies.

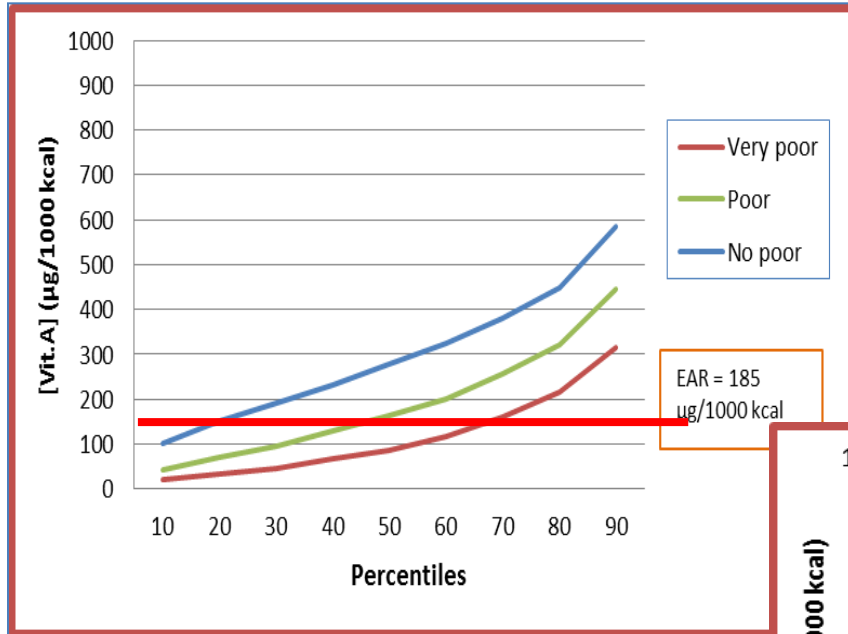


# Dietary availability (density) of Vit A in absence of fortification children 2-4 y, Guatemala-2006



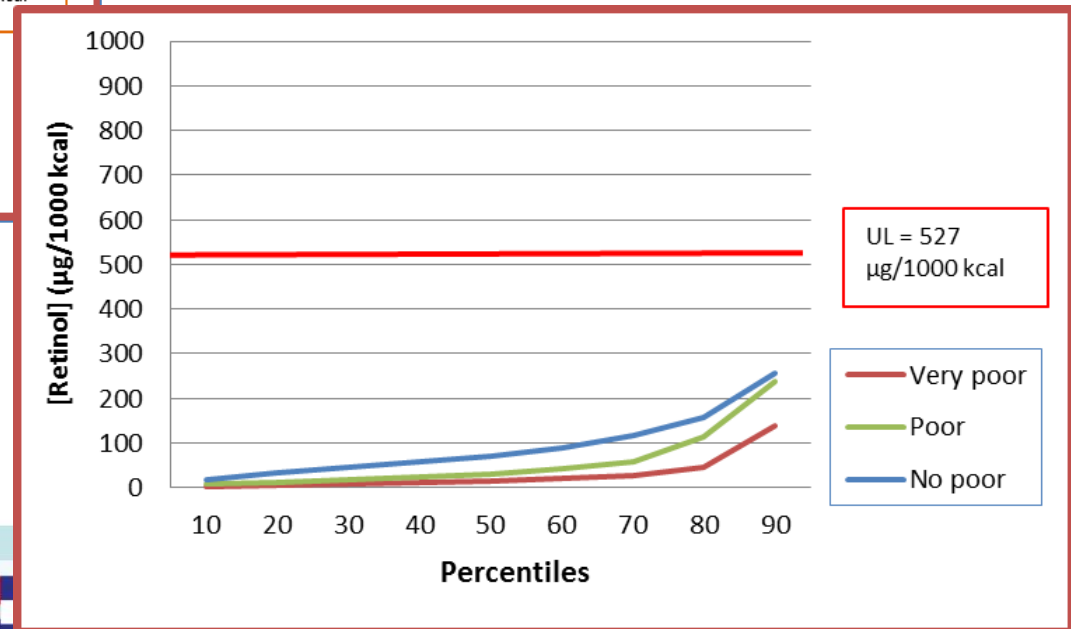
Source : Menchú *et al.* (INCAP). Estudio complementario la ENCOVI-2006 de Guatemala; 2013.

# “Adequacy” and “safety” of Vit A in the absence of fortification for children 2-4 y, Guatemala-2006



Diet “adequacy” (density)

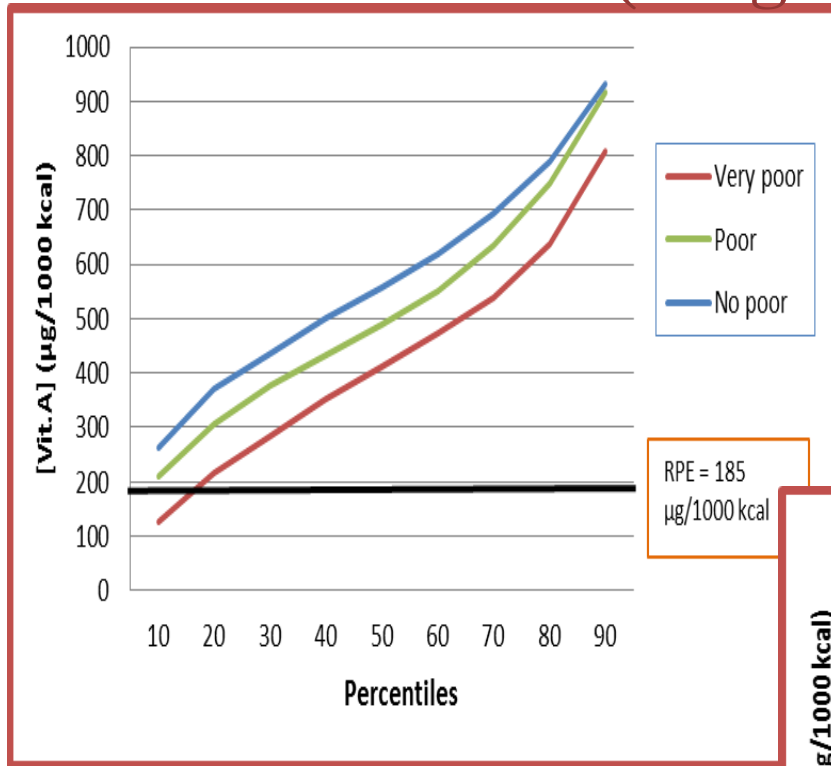
“Safety” of retinol (density)



Source : Menchú *et al.* (INCAP). Estudio complementario la ENCOVI-2006 de Guatemala; 2013.

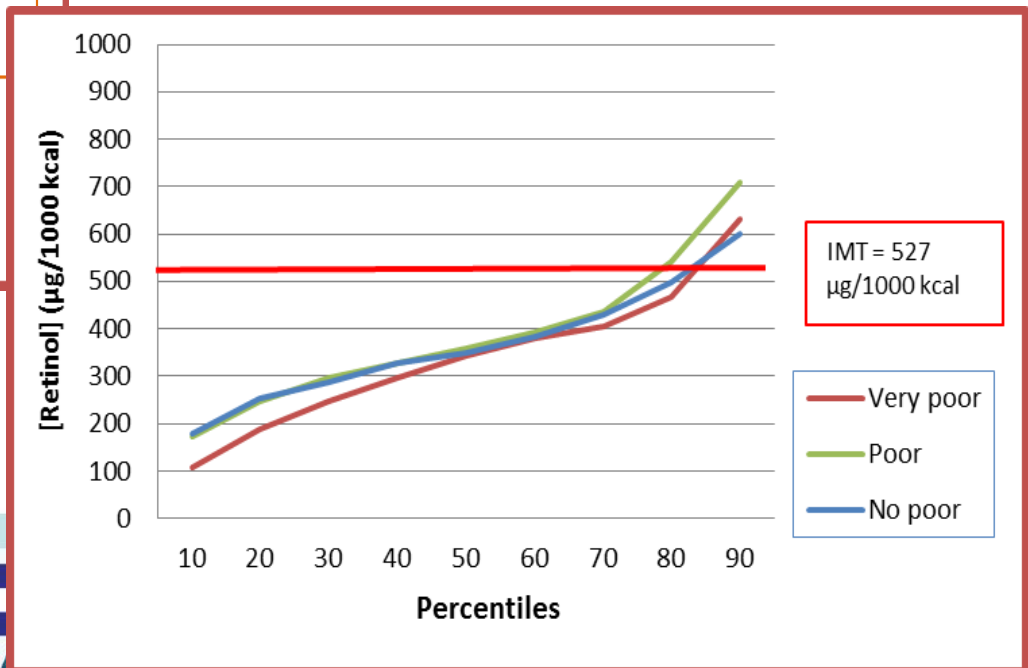


# “Adequacy” and “safety” of Vit A in the presence of sugar fortified with Vit A (9 mg/kg) for children 2-4 y



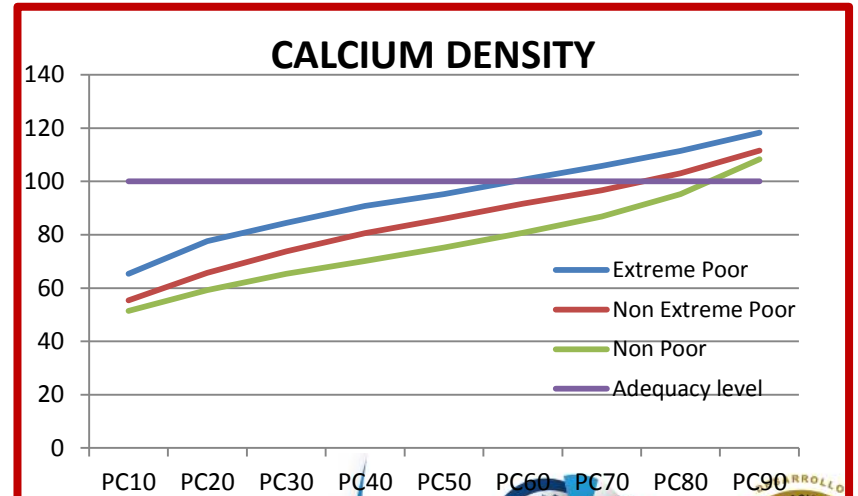
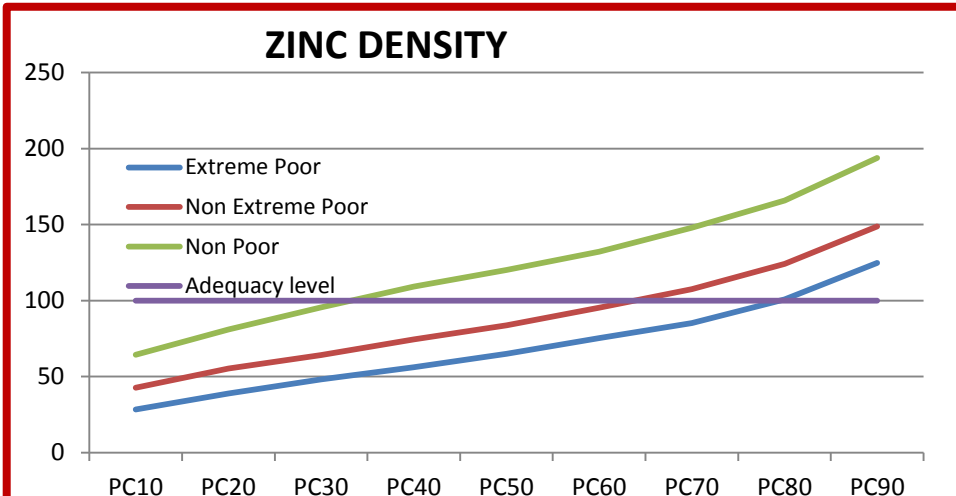
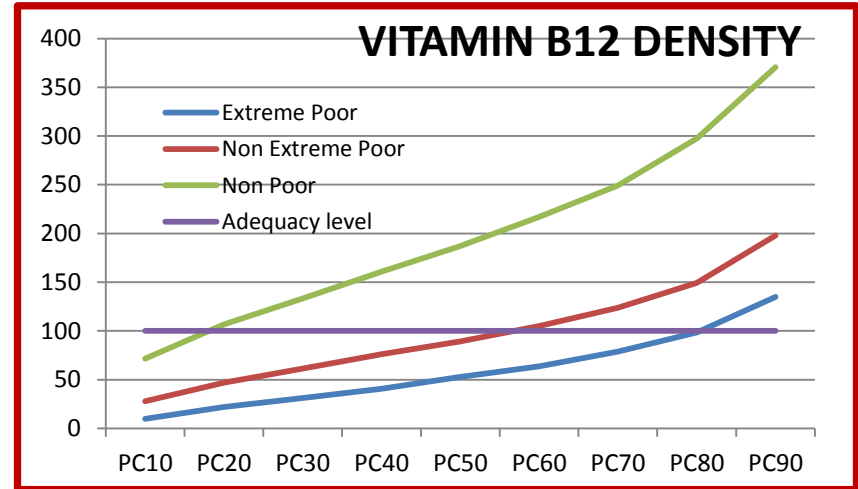
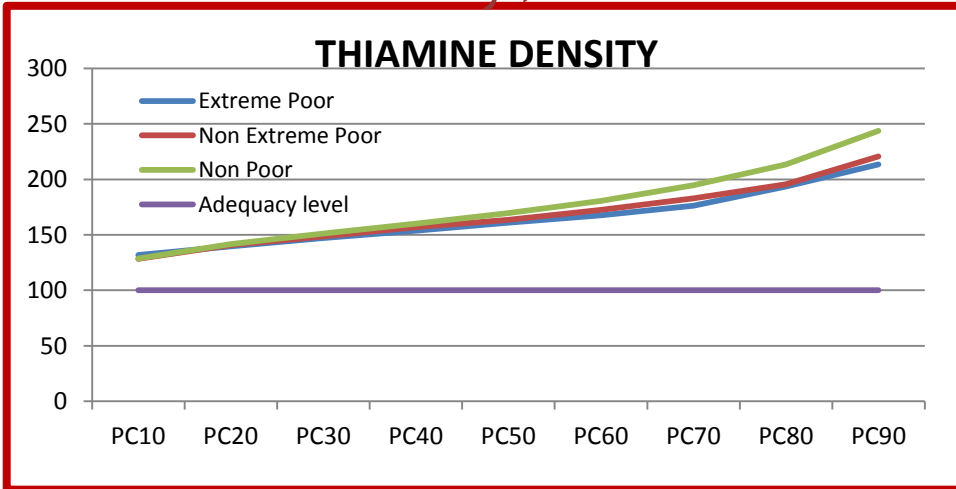
Diet “adequacy” (density)

“Safety” of retinol (density)



**Source :** Menchú *et al.* (INCAP). Estudio complementario la ENCOVI-2006 de Guatemala; 2013.

# Examples of “adequacy” of other micronutrients for children 2-4 y, Guatemala-2006



Source : Menchú *et al.* (INCAP). Estudio complementario la ENCOVI-2006 de Guatemala; 2013.

# Methods

**ENCOVI (HCES) 2006:** Nationally representative survey stratified by region & socioeconomic strata. North-Western region data selected for this study.

**24HR:** Secondary data analysis of a sample of about 550 households in the Western Highlands of Guatemala, who participated in the Optifood Project (FANTA, 2012) to determine food-based recommendations for PLW and children (6-24 mo)<sup>1</sup>.

**1. Source:** FANTA, LSHTM, INCAP. Development of Evidence-Based Dietary Recommendations for Children, Pregnant, Women, and Lactating Women Living in Western Highlands of Guatemala. 2014.



# Methods (continued)

- **Comparisons of results:** HCES and 24HR surveys, 2 independent sample populations, carried out in different seasons.
- **Estimation of nutrient intake inadequacy:** percent of the sample below the EAR for a specific group.



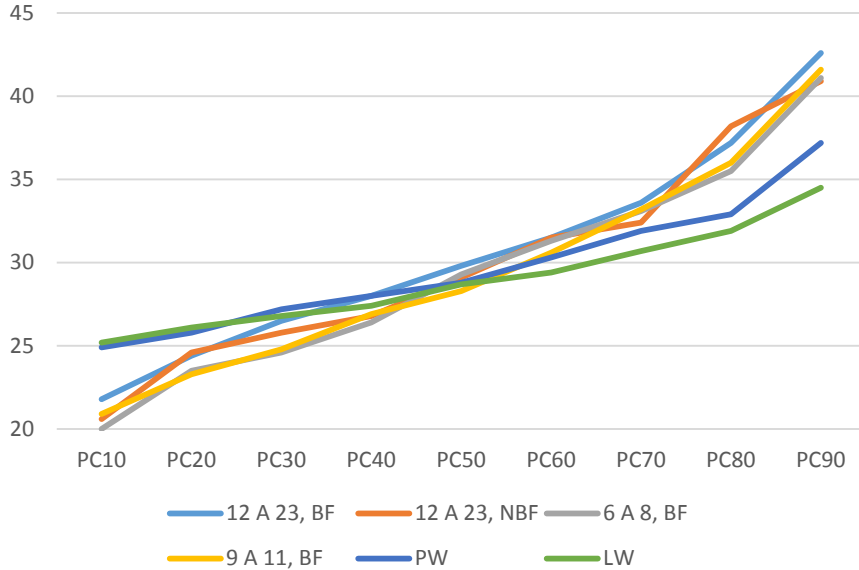


# Methods (continued)

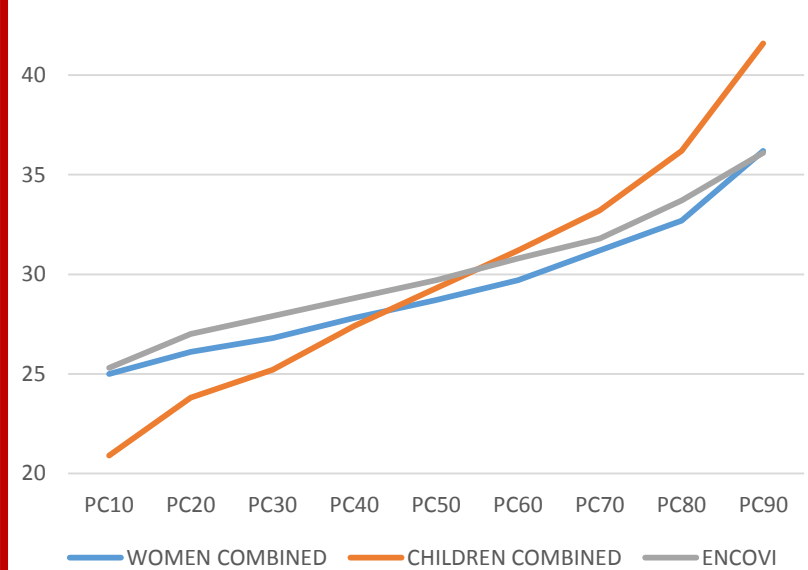
- **HCES (ENCOVI):** EAR adjusted for energy requirements for each target group, assuming all individuals in a family consume only the amount of food needed to meet the specific requirements.
- Assessed how the results of these two surveys compared in terms of the quality of the diet and the probability of nutrient inadequacies in a specific region of the country.



## PROTEIN DENSITY



## PROTEIN DENSITY



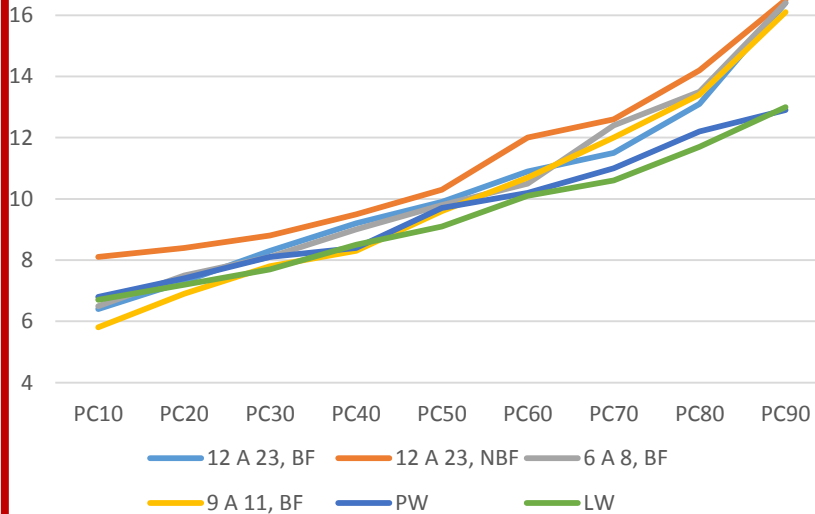
### 24HR: Women vs children

- Children groups: similar pattern
- Women groups: similar pattern

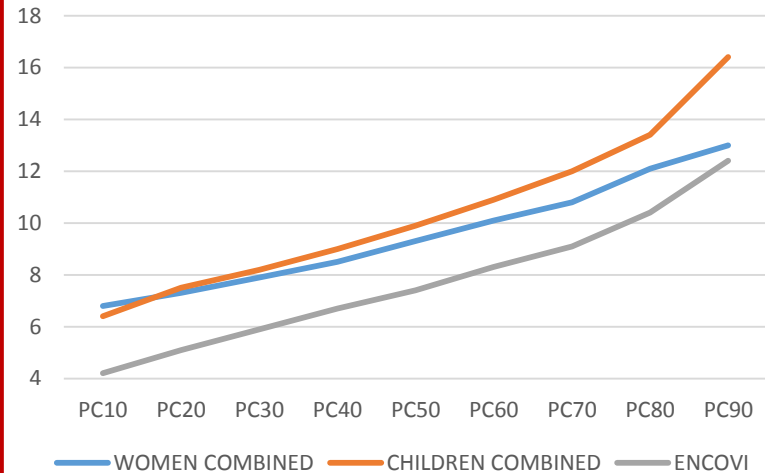
### 24HR vs ENCOVI comparisons: density distributions

24HR Women & children combined  
 ENCOVI densities comparable to 24HR,  
 especially close for women

## IRON DENSITY



## IRON DENSITY Combined groups



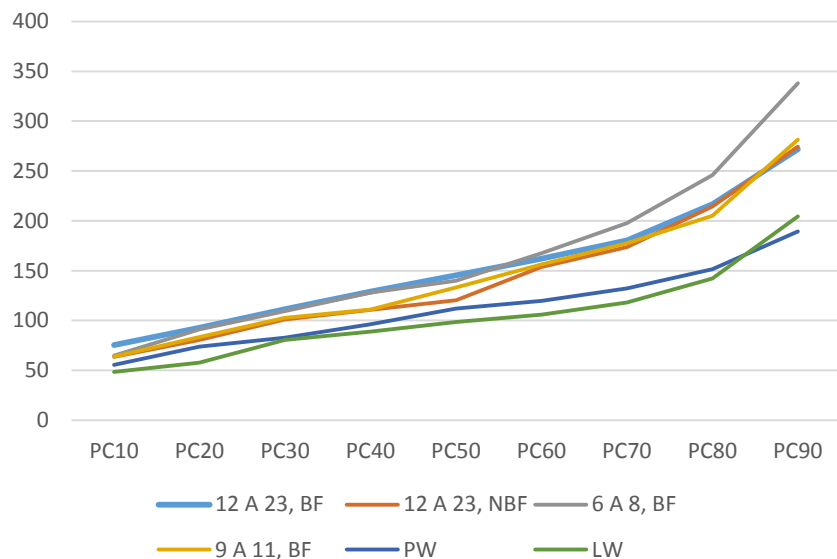
### 24HR: Women vs children

- Children groups: similar pattern
- Women: similar pattern
- Trend toward higher nutrient densities in children groups

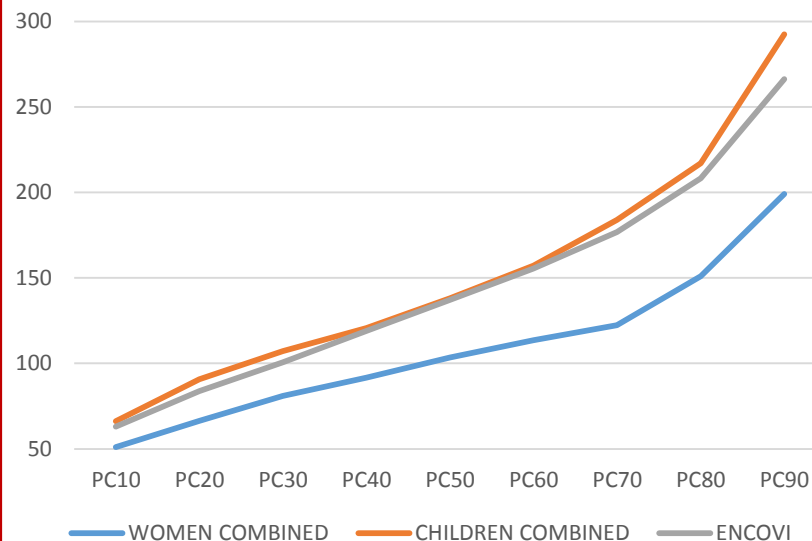
### 24HR Women & children combined compared with ENCOVI

ENCOVI: lower densities respect to 24HR, for children & women

## FOLATE DENSITY



## FOLATE DENSITY



### 24HR: Children vs PLW

- Childrens' groups are similar
- Women's groups are similar
- But child groups with higher densities

### 24HR: Children compared with women & ENCOVI.

Children's diet is different from women's & from family diet (ENCOVI).



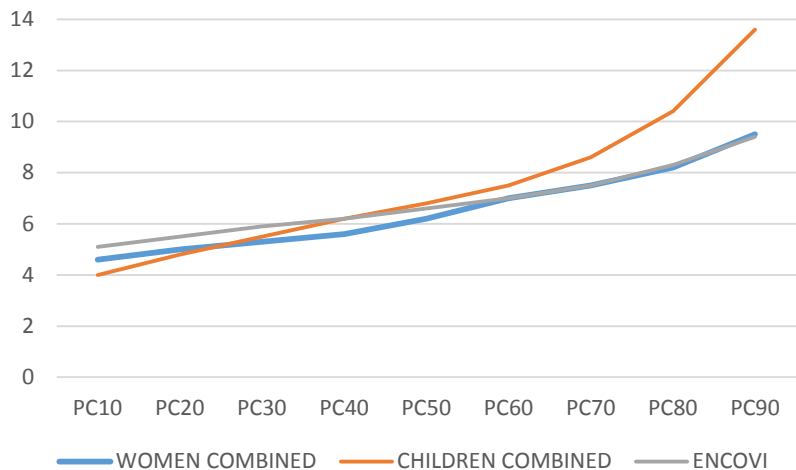
INSTITUTO DE NUTRICIÓN DE CENTROAMÉRICA Y PANAMÁ  
-INCAP-



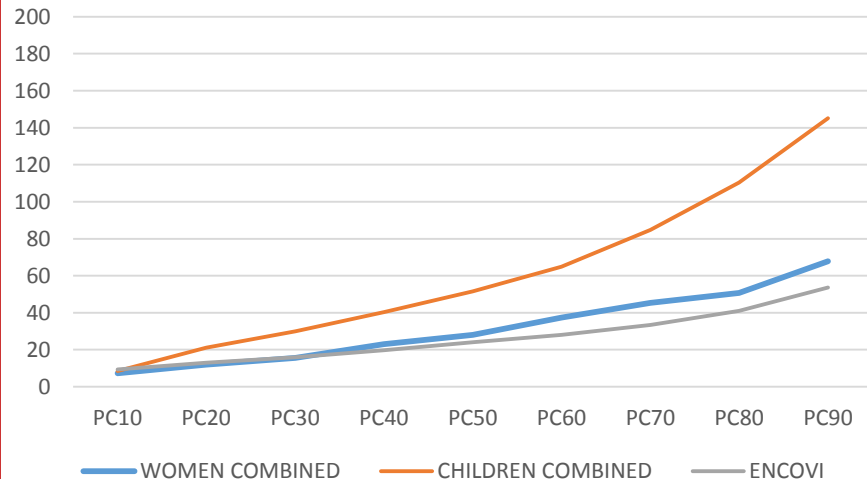
# Nutrient density: 24HR vs ENCOVI

## Women combined / children combined vs ENCOVI (examples)

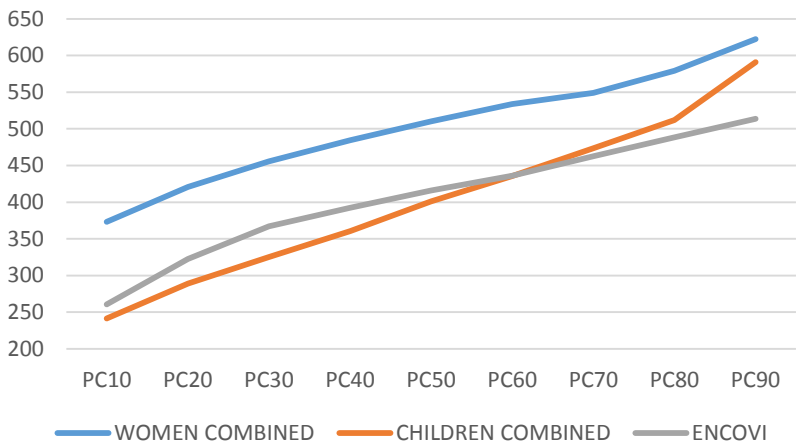
### NIACIN DENSITY



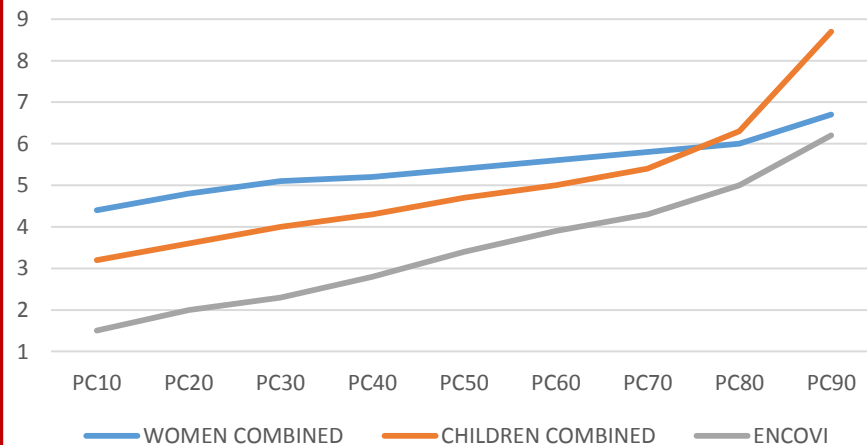
### VITAMIN C DENSITY



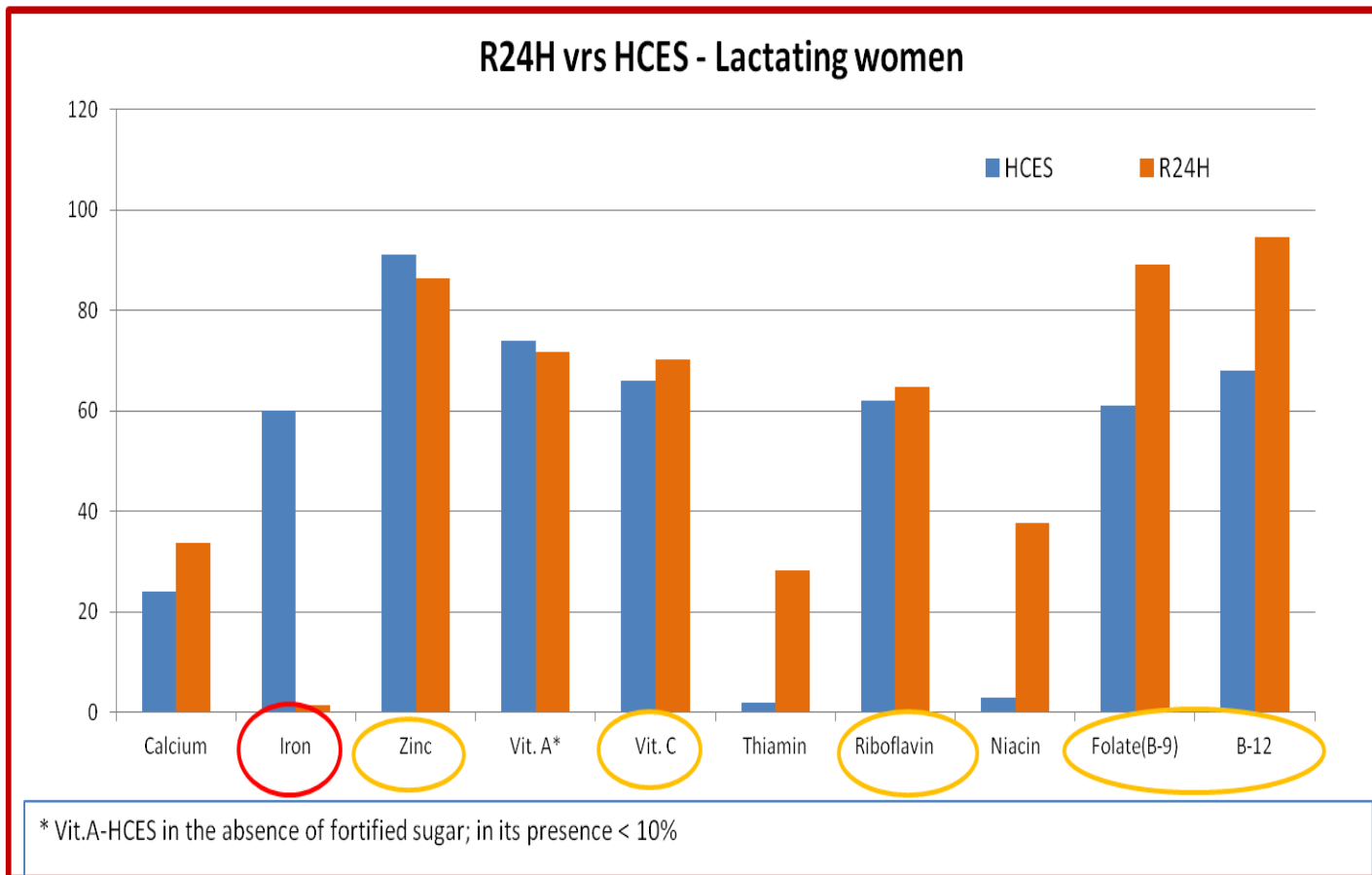
### CALCIUM DENSITY




### ZINC DENSITY

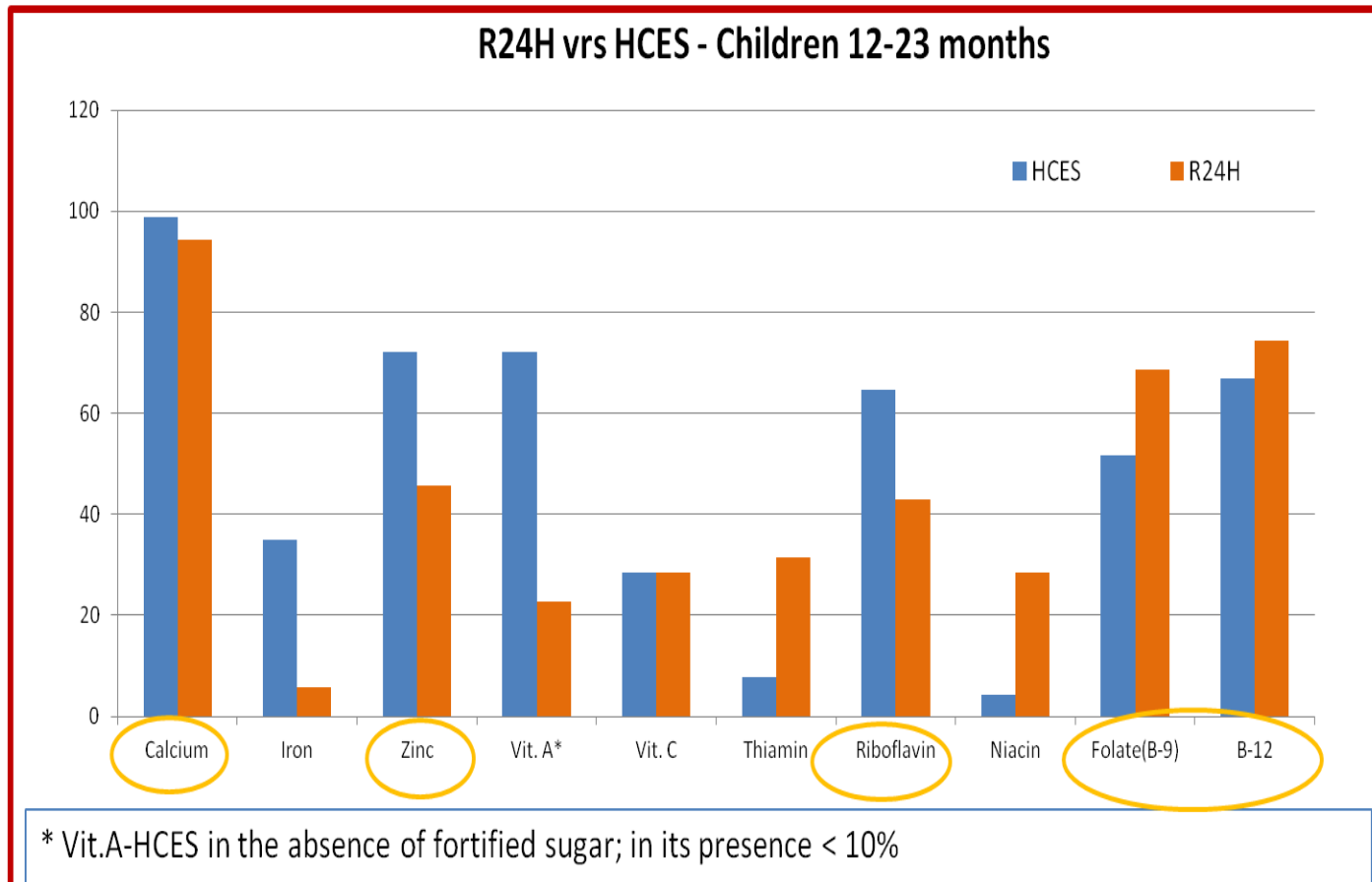


# Nutrient inadequacies in lactating women



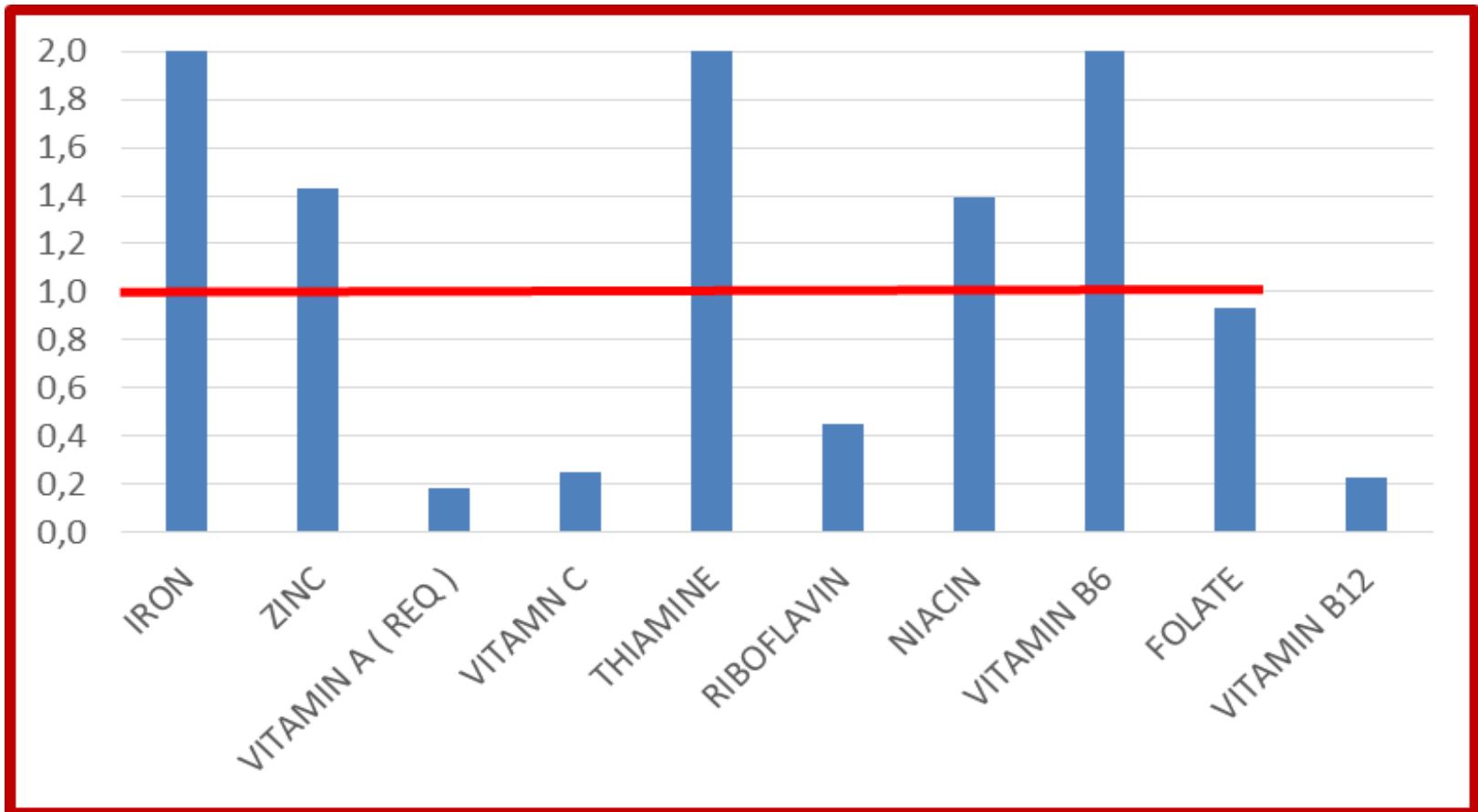
Both approaches predict fairly well the pattern of nutrient inadequacies (> 60%): zinc, Vit. C, riboflavin, folate, B-12. Fe Results of HCES are fertile age women,  with greater inadequacy when compared to 24HfR.

# Nutrient inadequacies in children 12-23 months (Non Breastfed)



Both approaches predicted fairly well pattern of nutrient inadequacies (> 60%): calcium, zinc, riboflavin, folate and B-12. There is also inadequacy for Vit A in HCES, this is due to calculation without taking into account contribution of Vit A in fortified sugar. With fortified sugar, the inadequacy disappears.

# Nutrient ratios of diet by 24HR respect to human breast milk composition (according to FCT)





# Conclusions

- HCES - usually the only and main source of information of population consumption at country level. Analysis showed its potential in estimating the **profile of nutrient inadequacies** by assessing the quality of the diet-based on nutrient densities.
- There was an **acceptable concordance** in the pattern of nutrient inadequacies in women based on comparisons between 24HR and HCES. Comparison was much better than expected, and generalization of this conclusion to other countries should be confirmed through similar studies.
- By using 24HR, nutrient densities in children populations showed to **be higher in select nutrients** compared with lactating (and in general all) women, except for calcium consumption by-NBF children.



# Conclusions (continued)

- Inadequate nutrients in women's (or family) diet are also expected to be inadequate in breast milk; in Guatemala highlands: vitamin C, riboflavin, and vitamin B12.
- The milk content of iron, zinc, and folate is always low in milk, regardless of the content of these nutrients in the diet. However, the transference of these micronutrients from mothers to children during fetal period may be impaired if their diet is inadequate, as in the case for Guatemala Western highlands.

# Opportunities

- Need to assess diet consumption at population level, esp. for maternal and infant /young child groups.
- Given the potential of HCES in assessing quality of diet at population level, it is important to continue revising or improving these types of surveys to allow key information on the quality of the diet of target groups. This will help not just determining inadequacies, but also programmers to refine programs and assess impact of target interventions.
- More research is needed to confirm these findings and also to improve the use of HCES.

