TECHNICAL REPORT

FANTA · 2

FOOD AND NUTRITION TECHNICAL ASSISTANCE

USAID FROM THE AMERICAN PEOPLE

Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Ouagadougou, Burkina Faso Site

Elodie Becquey, Gilles Capon and Yves Martin-Prével

December 2009

Food and Nutrition Technical Assistance II Project (FANTA-2)
Academy for Educational Development 1825 Connecticut Ave., NW Washington, DC 20009-5721
Tel: 202-884-8000 Fax: 202-884-8432 E-mail: fanta2@aed.org Website: www.fanta-2.org

FANTA·2

FOOD AND NUTRITION TECHNICAL ASSISTANCE

USAID FROM THE AMERICAN PEOPLE

Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Ouagadougou, Burkina Faso Site

Elodie Becquey, Gilles Capon and Yves Martin-Prével

December 2009

AED

Food and Nutrition Technical Assistance II Project (FANTA-2)
Academy for Educational Development 1825 Connecticut Ave., NW Washington, DC 20009-5721
Tel: 202-884-8000 Fax: 202-884-8432 E-mail: fanta2@aed.org Website: www.fanta-2.org

This report is made possible by the generous support of the American people through the support of the Office of Health, Infectious Disease, and Nutrition, Bureau for Global Health, United States Agency for International Development (USAID), under terms of Cooperative Agreement No. GHN-A-00-08-00001-00, through the Food and Nutrition Technical Assistance II Project (FANTA-2), managed by the Academy for Educational Development (AED).

Published December 2009

Recommended Citation:

Becquey, Elodie, Gilles Capon and Yves Martin-Prével. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Ouagadougou, Burkina Faso Site*. Washington, DC: Food and Nutrition Technical Assistance II Project, Academy for Educational Development, 2009.

Contact information:

Food and Nutrition Technical Assistance II Project (FANTA-2)
Academy for Educational Development
1825 Connecticut Avenue, NW
Washington, D.C. 20009-5721
Tel: 202-884-8000
Fax: 202-884-8432
Email: fanta2@aed.org
Website: www.fanta-2.org

Table of Contents

Text Table

Foreword

This report is one in a series of technical reports produced under the Women's Dietary Diversity Project (WDDP). The WDDP is a collaborative research initiative to assess the potential of simple indicators of dietary diversity to function as proxy indicators of the micronutrient adequacy of women's diets in resource-poor areas. Work carried out under the WDDP includes the development of a standard analysis protocol and application of that protocol to five existing data sets meeting the analytic criteria established by the project. The data sets analyzed as part of the WDDP are from sites in Bangladesh, Burkina Faso, Mali, Mozambique and the Philippines.

Comparative results across the five sites are presented in a summary report, which will be published in 2010:

Mary Arimond, Doris Wiesmann, Elodie Becquey, Alicia Carriquiry, Melissa C. Daniels, Megan Deitchler, Nadia Fanou, Elaine Ferguson, Maria Joseph, Gina Kennedy, Yves Martin-Prével and Liv Elin Torheim. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets in Resource-Poor Areas: Summary of Results from Five Sites*.

Detailed results for each data set are discussed in individual site reports:

- Bangladesh: Mary Arimond, Liv Elin Torheim, Doris Wiesmann, Maria Joseph and Alicia Carriquiry. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Rural Bangladesh Site*.
- Burkina Faso: Elodie Becquey, Gilles Capon and Yves Martin-Prével. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Ouagadougou, Burkina Faso Site*.
- Mali: Gina Kennedy, Nadia Fanou, Chiara Seghieri and Inge D. Brouwer. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Bamako, Mali Site*.
- Mozambique: Doris Wiesmann, Mary Arimond and Cornelia Loechl. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Rural Mozambique Site*.
- Philippines: Melissa C. Daniels. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Results from Metropolitan Cebu, Philippines Site*.

This report presents the results for the Burkina Faso site.

The WDDP initiative began in 2006. Funding is provided by the United States Agency for International Development (USAID)'s Food and Nutrition Technical Assistance II Project (FANTA-2) and its predecessor project, FANTA, at the Academy for Educational Development (AED). The WDDP has been a collaboration among researchers from the International Food Policy Research Institute (IFPRI), FANTA, Akershus University College, Food and Agriculture Organization of the United Nations, Institute of Research for Development, Iowa State University, London School of Hygiene and Tropical Medicine, University of North Carolina at Chapel Hill and Wageningen University.

Acknowledgments

Funding for this report was provided by the United States Agency for International Development (USAID) through the Food and Nutrition Technical Assistance II Project (FANTA-2) and its predecessor project, FANTA, at the Academy for Educational Development (AED).

We are grateful to the Government of Burkina Faso for its support, particularly through the participation of technical teams at ISSP (Institut Supérieur des Sciences de la Population) and at the Direction of Nutrition of the Ministry of Health. We thank the Institute of Research for Development for its financial support for data collection and data analysis. We are grateful to Gilles Capon for his assistance with data analysis and Esmee Doets for her help in checking some values from Food Composition Tables. We gratefully acknowledge the contributions of all members of the Women's Dietary Diversity Project's group. We also thank the FANTA-2 Project's Communication team for its valuable editorial review. Finally, we are very grateful to all the women who participated in the survey.

Acronyms and Abbreviations

AED	Academy for Educational Development
AI	Adequate Intake
AUC	Area(s) under the curve
BLUP	Best linear unbiased predictor
BMI	Body mass index
BMR	Basal metabolic rate
CI	Confidence interval
DHMS	Demographic and Health Monitoring System
DHS	Demographic and Health Surveys
DRI	Dietary Reference Intakes
EAR	Estimated average requirement
FANTA	Food and Nutrition Technical Assistance Project
FANTA-2	Food and Nutrition Technical Assistance II Project
FAO	Food and Agriculture Organization of the United Nations
FCT	Food composition table
FGI	Food group diversity indicator
FGI-6	Food group diversity indicator summed from 6 groups, minimum intake 1 g per group
FGI-6R	Food group diversity indicator summed from 6 groups, minimum intake 15 g per group
FGI-9	Food group diversity indicator summed from 9 groups, minimum intake 1 g per group
FGI-9R	Food group diversity indicator summed from 9 groups, minimum intake 15 g per group
FGI-13	Food group diversity indicator summed from 13 groups, minimum intake 1 g per group
FGI-13R	Food group diversity indicator summed from 13 groups, minimum intake 15 g per group
FGI-21	Food group diversity indicator summed from 21 groups, minimum intake 1 g per group
FGI-21R	Food group diversity indicator summed from 21 groups, minimum intake 15 g per group
g	Gram(s)
h	Hour
IRD	Institute of Research for Development
ISSP	Institut Supérieur des Sciences de la Population (Higher Institute of Population Sciences)
kcal	Kilocalorie(s)
kg	Kilogram(s)
µg	Microgram(s)
mg	Milligram(s)
MPA	Mean probability of adequacy
NPNL	Non-pregnant non-lactating
OC	Oral contraceptives
ORC Macro	Opinion Research Corporation Macro International, Inc.
PA	Probability of adequacy
PhD	Doctor of Philosophy
R1	Round 1 of data collection (first observation day)
R2	Round 2 or second round of data collection (second observation day)
R3	Round 3 of data collection (third observation day)
RAE	Retinol activity equivalent
RE	Retinol equivalent
ROC	Receiver-operating characteristic
SD	Standard deviation
SEM	Standard error of the mean

TACAM	*Table de Composition d'aliments du Mali* (food composition table for Mali)
USDA	United States Department of Agriculture
USDA Release	United States Department of Agriculture National Nutrient Database for Standard Reference Release
WDDP	Women's Dietary Diversity Project
WHO	World Health Organization

Executive Summary

BACKGROUND

In resource-poor environments across the globe, low quality monotonous diets are the norm. When grain- or tuber-based staple foods dominate and diets lack vegetables, fruits and animal-source foods, risk for a range of micronutrient deficiencies is high. Women of reproductive age constitute one vulnerable group. While information on micronutrient deficiencies is scarce, it is clear that poor micronutrient status among women is a global problem and is most severe for poor women. Information about dietary patterns for women across countries is also scarce, but the Demographic and Health Surveys (DHS) have recently begun to fill this information void.

The broad objective of this study, carried out under FANTA's Women's Dietary Diversity Project (WDDP), is to use an existing data set with dietary intake data from 24-hour (24-h) recalls to analyze the relationship between simple indicators of dietary diversity – such as could be derived from the DHS – and diet quality for women. Adequate diet quality is defined here as a diet that delivers adequate amounts of selected micronutrients, to meet the needs of women of reproductive age. We recognize that definitions of diet quality often include other dimensions, such as moderation and balance. However, because low intakes remain the dominant problem in many of the poorest regions, focus in this work is on micronutrient adequacy only.

Dietary diversity – i.e., the number of foods consumed across and within food groups over a reference period – is widely recognized as a key dimension of diet quality. There is ample evidence from developed countries showing that dietary diversity is indeed strongly associated with nutrient adequacy. There is less evidence from developing countries, but the few available studies of adult women have also supported the association between diversity and nutrient adequacy.

OBJECTIVES

To assess the potential of simple indicators of dietary diversity to function as proxy indicators of diet quality, the following main objectives were identified for the WDDP:

1. Develop a set of diversity indicators, varying in complexity, but all amenable to construction from simple survey data
2. Develop an indicator of diet quality, using current best practices to assess adequacy across a range of key micronutrients
3. Explore relationships among diversity indicators, energy intake and diet quality
4. Test and compare the performance of various indicators

As a secondary objective, the WDDP also aimed to characterize micronutrient adequacy for women of reproductive age in each study site.

Indicator performance in just one site is not sufficient to address the broader objective of developing indicators for global use. Therefore, although site-specific results pertaining to objective four are presented in this report, the results for indicator performance are most useful when considered across multiple sites. This discussion is provided in the WDDP summary report.

DATA AND SAMPLING

The Institute of Research for Development (IRD) in Ouagadougou has been involved in several studies exploring the links between dietary diversity and socio-economic and anthropometric characteristics of populations (especially women) in Burkina Faso. In 2005, we undertook an exploratory survey to assess the characteristics of the diet of approximately 1,000 adults, both men and women, in two districts of Ouagadougou, Burkina Faso. In 2006, we carried out another survey, with a random sub-sample of the women included in the 2005 study, to collect quantitative data about food consumption (24-h recall on three non-consecutive days).

The sample used for this study is from the data collected in 2006, comprised of 182 women aged 17-49 years who completed at least two out of the three 24-h recalls with reliable data. Among them, 168 women had reliable data for the three 24-h recalls. Results are presented for the full sample of 178 women having completed the second round (R2) of 24-h recall and for the non-pregnant non-lactating (NPNL) sub-sample of 130 women also having data for R2. Pregnant (n=13) and lactating (n=35) women were too few in number to report disaggregated results for these specific physiologic groups.

METHODS

Data collection lasted three months, from February to May 2006. Food consumption was recorded on three non-consecutive days for each woman included in the study. On each day of survey, a quantitative 24-h recall questionnaire was administered by a trained female surveyor and a qualitative recall (yes/no for 32 food sub-groups) was administered separately by another female surveyor. In addition, a direct weighing method was used on the day preceding the first 24-h recall, to validate the quantitative 24-h recall method. Standard recipes and portion sizes for all foods consumed out of the home (e.g., street foods, in restaurants) were used.

The food composition table (FCT) for Mali, *Table de Composition d'aliments du Mali* (TACAM), was chosen as the primary source of nutrient data for foods and was supplemented as necessary by other sources, including the Worldfood FCT for Senegal (Worldfood Dietary Assessment System) and the United States Department of Agriculture (USDA) National Nutrient Database for Standard Reference Release 20 (USDA Release 20).

Analytic methods followed the WDDP analysis protocol. Intakes were calculated for energy, protein, animal-source protein, fat, carbohydrates and for eleven micronutrients: thiamin, riboflavin, niacin, vitamin B6, folate, vitamin B12, vitamin A, vitamin C, calcium, iron and zinc.

Eight dietary diversity indicators were investigated – comprised of 6, 9, 13 and 21 food groups, and each having a 1 g and a 15 g cut-off – corresponding to a progressive disaggregation of main food groups into more specific food sub-groups, and to a minimum amount of consumption required (1 g or 15 g) for each group to be taken into account in a dietary diversity score. The indicators are abbreviated as follows: FGI-6 identifies the six-food-group indicator with a 1 g cut-off; FGI-6R ("R" for "Restricted") identifies the six-food-group indicator with a 15 g cut-off. Similarly, other indicators are referred to as FGI-9 and FGI-9R, FGI-13 and FGI-13R, FGI-21 and FGI-21R.

Probability of adequacy (PA) was calculated for the 11 micronutrients listed above, taking into account both distributions of requirements and distributions of estimated usual intake. Probabilities were averaged across the 11 micronutrients to form a summary indicator of diet quality: "mean probability of adequacy" (MPA).

Correlations and linear regressions were used to describe relationships between the various diversity indicators, energy intake and MPA. Performance of the indicators for prediction of MPA was assessed using receiver-operating characteristic (ROC) analysis, and through examination of indicator characteristics such as sensitivity, specificity and total misclassification.

Data entry was performed with EpiData software, version 3.1. Data quality was ensured by quality checks at data entry, double entry and data cleaning. SAS System version 9.1 was used for all initial data management and to generate the output for **Tables 9a-d** and **N9a-d**. Computation of MPA, the eight dietary diversity indicators and all other statistical analyses were performed with Stata version 10, with the syntax provided to the WDDP working group.

RESULTS

Diets in our study sample consisted mainly of starchy staples and vegetables. Although consumed in small quantities, flesh foods were also frequently consumed. Starchy staples were the largest contributors of energy and carbohydrate intake, but also provided about half of the total protein intake.
Although starchy staples are not nutrient dense, they were the principal source of most micronutrient intakes (thiamin, riboflavin, niacin, vitamin B6, iron and zinc). Vitamin A-rich fruits and vegetables, particularly dark green leafy vegetables, were also important sources of micronutrients intakes (calcium and vitamin A particularly). Dairy was not frequently consumed and soy, eggs, poultry, organ meat and small animals like insects or rodents were never or almost never consumed.

Intakes of vitamins A, C and B6, and zinc were quite good among our study sample. On the other hand, intakes of niacin and iron were low and intakes of riboflavin, folate and vitamin B12 were very low.

The dietary diversity indicators were moderately correlated with intakes of most individual micronutrients. Exceptions were poor correlations demonstrated between the diversity indicators and iron and zinc intakes, as well as between the restricted indicators and folate. Stronger correlations were generally shown for the restricted indicators. The strength of all correlations decreased when controlling for energy intake.

The restricted dietary diversity indicators were more powerful predictors of MPA than the non-restricted indicators. In this sample, the indicators with 6 and 9 food groups were not detailed enough to be able to differentiate between the diversity of diets of varying qualities. The indicator with 13 groups performed quite well, but the best predictor of MPA was the indicator with 21 groups.

GENERALIZABILITY

Our study sample consisted of women of reproductive age from two districts in Ouaguodou. Although the results from our study sample cannot be generalized to the whole population of Ouagadougou, there is no reason to think the findings would be different for women of reproductive age in a similar setting (an urban area in a poor African country) with similar dietary patterns.

CONCLUSIONS

In our Burkina Faso sample, dietary diversity indicators were correlated with the probability of micronutrient adequacy. The overall performance of the dietary diversity indicators for prediction of MPA was moderate to good, with the restricted dietary diversity indicators performing better than the non-restricted indicators. Two candidate indicators presented acceptable results to predict MPA: FGI-21R and FGI-13R. Dietary diversity as assessed by these indicators is an interesting alternative for purposes of rapid assessments and/or when resources are limited. At the population level, these indicators could be interpreted as good proxies of the micronutrient adequacy of women's diet.

1. Background

In resource-poor environments across the globe, low quality monotonous diets are the norm. When grain- or tuber-based staple foods dominate and diets lack vegetables, fruits, and animal-source foods, risk for a variety of micronutrient deficiencies is high. Those most likely to suffer from deficiencies include infants and young children, and adolescent girls and women of reproductive age. Unfortunately, outside of developed countries, very little information is available on women's micronutrient status, but even with limited data, it is clear that poor micronutrient status among women is a global problem, and is most severe for poor women.[1]

Similarly, comparable information about dietary patterns for women across countries is also scarce. The Demographic and Health Surveys (DHS) have recently added questions on mothers' diets in order to begin to fill this information void. The current survey questionnaire includes a set of questions about food groups eaten in the last 24 hours by mothers of young children under three years of age (see **Appendix 5**).[2]

The broad objective of this study, carried out under FANTA's Women's Dietary Diversity Project (WDDP), is to use an existing data set with dietary intake data from 24-hour (24-h) recall to analyze the relationship between simple indicators of dietary diversity – such as could be derived from the DHS and other surveys – and diet quality for women.

Simple indicators are urgently needed in developing countries to characterize diet quality, to assess key diet problems, such as lack of animal source foods, fruits and vegetables, and to identify sub-groups particularly at risk of nutrient inadequacy. Simple indicators are also needed to monitor and evaluate intervention programs. The present study contributes to development of such simple indicators. At the same time, the study also provides descriptive information on dietary patterns and levels of micronutrient adequacy for women in one resource-poor setting.

For the purposes of this study, adequate diet quality is defined as a diet that has a high probability of delivering adequate amounts of selected micronutrients, to meet the needs of women of reproductive age. We recognize that definitions of diet quality often include other dimensions, such as moderation (e.g., in intakes of energy, saturated/trans fat, cholesterol, sodium, refined sugars) and balance. But because low intakes remain the dominant problem in many of the poorest regions, our focus in this work is on micronutrient adequacy only.

[1] Kennedy and Meyers 2005.
[2] Appendix 5 excerpts the relevant questions from the model questionnaire; the entire questionnaire is available on the Opinion Research Corporation Macro International, Inc., (ORC Macro) DHS website at: http://www.measuredhs.com/aboutsurveys/dhs/questionnaires.cfm (accessed September 7, 2007).

2. Dietary Diversity

Dietary diversity – i.e., the number of foods consumed across and within food groups over a reference time period – is widely recognized as being a key dimension of diet quality. It reflects the concept that increasing the variety of foods and food groups in the diet helps to ensure adequate intake of essential nutrients, and promotes good health. There is ample evidence from developed countries showing that dietary diversity is indeed strongly associated with nutrient adequacy, and thus is an essential element of diet quality.[3]

There is less evidence from developing countries where monotonous diets, relying mostly on a few plant-based staple foods, are typical. Even fewer studies from developing countries have aimed to confirm this association specifically among adult women. The available studies have generally supported the association between diversity and nutrient adequacy.[4] One exception to this was reported in a study from urban Guatemala, but in this study diversity was defined as the number of unique foods consumed over 14 24 hour periods; this meant that even very infrequently consumed items counted in the score.[5]

Previous studies have generally been context-specific, and diversity has been operationalized differently in each study.[6] While this has made comparisons difficult, it has also suggested that the relationship is robust. This report, along with the companion reports from additional sites, extends knowledge of the relationship between simple diversity indicators and nutrient adequacy for women.

[3] Randall, Nichaman and Contant, Jr. 1985; Krebs-Smith et al. 1987; Kant 1996; Drewnowski et al. 1997; Cox et al. 1997; Lowik, Hulshof and Brussaard 1999; Bernstein et al. 2002; Foote et al. 2004.
[4] Ogle, Hung and Tuyet 2001; Torheim et al. 2003, 2004; Roche et al. 2007.
[5] Fitzgerald et al. 1992.
[6] Ruel 2003.

3. Objectives

To assess the potential of simple indicators of dietary diversity to function as proxy indicators of diet quality, the following main objectives were identified for the WDDP:

1. Develop a set of diversity indicators, varying in complexity, but all amenable to construction from simple survey data
2. Develop an indicator of diet quality, using current best practices to assess adequacy across a range of key micronutrients
3. Explore relationships among diversity indicators, energy intake, and the indicator of diet quality
4. Test the performance of various indicators using cut-points along the range of diversity scores; assess performance (sensitivity, specificity and total misclassification) relative to various cutoffs for diet quality, as data allow

As a secondary objective, the WDDP also aimed to characterize micronutrient adequacy for women of reproductive age in each study site.

Indicator performance in just one site is not sufficient to address the broader objective of developing indicators for global use. Therefore, although site-specific results pertaining to objective four are presented in this report, the results for indicator performance are most useful when considered across multiple sites. This discussion is provided in the WDDP summary report.[7]

[7] Arimond et al 2009.

4. Burkina Faso Study: Original Research Objectives and Context

The Institute of Research for Development (IRD) in Ouagadougou has been involved in several studies exploring the links between dietary diversity and socio-economic and anthropometric characteristics of populations (especially women) in Burkina Faso.[8] Our work has involved an exploratory survey in 2005 to assess the characteristics of the diet of approximately 1,000 adults, both men and women, in an urban area of Burkina Faso. The 2005 survey gathered qualitative information about food habits and food consumption over a one-week period, including food groups consumed (measured as dietary diversity scores) and the frequency of consumption of various meals, snacks and beverages.

The objective of the 2005 survey was exploratory because little information was available about the diet of people living in Ouagadougou. Its intention was to roughly describe the diets among men and women, and to investigate how simple dietary diversity indicators relate to the socio-demographic and economic characteristics of the population and individual nutritional status, assessed through anthropometric indices.

In 2006, we carried out another survey in the same area, and collected quantitative data about food consumption (24-h recall on three non-consecutive days) among a sub-sample of approximately 250 adult women who were involved in the previous study.[9]

The main objective of the 2006 survey was to validate simple dietary diversity indicators as a measure of the micronutrient adequacy of the diet of a sub-sample of women in the 2005 survey. Secondary objectives were to explore links between nutrition knowledge, food habits and the nutritional status of women, and also to examine changes in scores on simple dietary diversity indicators over time among these women (2005 vs. 2006), according to various characteristics. It is data from the 2006 survey that are reported in this study.

4.1. SETTING

The 2005 and 2006 surveys were conducted in two districts of Ouagadougou. According to the most recent census in 2006, Ouagadougou has a population of about 1,181,000. The city is divided into districts with amenities in the town centre (known as "parceled districts"), and peripheral districts without amenities (known as "non-parceled districts"). Beginning in 2002, the Institut Supérieur des Sciences de la Population (ISSP; Higher Institute of Population Sciences) launched a Demographic and Health Monitoring System (DHMS) covering two districts. One parceled district (Wemtenga with about 2,500 inhabitants) and one non-parceled district (Taabtenga with about 3,500 inhabitants) were purposively selected for monitoring. These districts were in-turn chosen for this study because basic socio-demographic and economic information about people living in them was already available, and also for practical and financial reasons.

4.2. SAMPLING AND SURVEY DESIGN

The 2005 and 2006 survey samples were not intended to be representative of the whole population of Ouagadougou. However, prior to data collection in 2005, some socio-demographic and economic data from the two districts were compared (as taken from the DHMS already in place) to the same data taken from the whole Ouagadougou sample of the most recent DHS.[10] It turned out that by equaling the weights of the two districts in the analysis of the DHMS data, the values obtained correctly reflected the mean

[8] This was the topic of a PhD dissertation by M. Savy.
[9] This was the topic of a Masters thesis by E. Becquey. Becquey is an investigator of this report, who is currently working on her PhD dissertation on food vulnerability in Ouagadougou. Another investigator, Y. Martin-Prével, supervised the initial work by Savy and is also the current supervisor of Becquey. Gilles Capon assisted with statistical analyses.
[10] 2003.

social and economic situations observed in the DHS sample of Ouagadougou.[11] We therefore decided that an equal number of subjects from each district would be selected for the 2005 survey.

For the 2005 study, the targeted number of subjects for the analysis (i.e., observations with complete data) was 250 women and 250 men in each district. To account for refusal and other issues leading to incomplete data, 300 women and 300 men, aged 20-59 years, were randomly selected from the ISSP database in each district, giving a total sample of 1,200 subjects. The final sample was 1,072 subjects and among them 1,060 (551 women and 509 men) had sufficient data to be included in the dietary analysis.

For the 2006 study, one in two women were randomly selected among those who were selected for the first study. A total of 255 women were included, aged 17-65 years.[12] For the purpose of the current study, women older than 49 years were excluded to limit the investigation to women of reproductive age. The final sample was comprised of 182 women aged 17-49 years who had completed at least two out of the three 24-h recalls with reliable data.[13] Among them, 168 women had reliable data for the three 24-h recalls. There were 13 pregnant women (for whom the trimester of pregnancy was recorded) and 35 lactating women (for whom children's ages were unfortunately not recorded). Results are presented for the full sample of 178 women having completed the second round (R2) and for the non-pregnant non-lactating (NPNL) sub-sample of 130 women also having data for R2. Pregnant and lactating women were too few in number to report disaggregated results for these specific physiologic groups.

To correct for unequal probabilities of being included between the two districts, sample weights were calculated and are available for each observation. Sample weights were used for descriptive statistics, particularly for **Tables 1-9**, **12-15** and **17**, and **N1-N9**, **N12-N15** and **N17**, since those results reflect population-level characteristics. For the remaining tables and figures, sample weights were not necessary, as those results reflect relationships investigated at the individual level.

[11] This was only true, however, when the mean value of the indicators were compared, but not for their whole distribution.
[12] A few women < 20 years of age were included by mistake in the first study (they were included by surveyors in replacement of women that were absent but without checking the age). Since these women (n=16) were of reproductive age (17 to 19 years), they were retained in the sample for the purpose of the current analysis.
[13] In addition to women more than 49 years of age, outliers were excluded according to the Goldberg equations (Black 2000).

5. Methods

5.1. DIETARY METHODOLOGY

Food consumption was recorded on three non-consecutive days for each woman included in the study. Only weekdays[14] were considered. On each day of survey, a quantitative 24-h recall questionnaire was administered by a trained female surveyor and a qualitative recall (yes/no for 32 food sub-groups)[15] was administered separately by another female surveyor. In addition, a direct weighing method was used on the day preceding the first 24-h recall. We used standard recipes and portion sizes for all foods consumed out of the home (e.g., street foods, in restaurants).

Validation

The direct weighing performed on the first day was used to validate the quantitative 24-h recall method.

Data collected by the **weighing method** involved a trained female surveyor spending the whole day with the surveyed woman, from the first meal of the day to the last. Every food consumed was weighed to the nearest gram (g) on a domestic scale. All ingredients of home-cooked dishes were weighed separately before cooking (raw); waste was also weighed. The final dish was weighed before and after cooking, and the portion eaten was also weighed (women were asked to eat from an individual plate). For mixed dishes, staple foods, sauces, and meat or fish pieces were weighed separately. In some cases, the surveyed woman may have eaten a snack outside the home or at night when the surveyor was absent. In these cases, the corresponding consumed quantities were estimated by recall using standard recipes and portion sizes or calibrated household measures (see **Section 5.2**).

The same principles were followed for the quantitative **24-h recall questionnaire** that was administered on subsequent days by another female surveyor. The interview technique was adapted from the Multiple-Pass method:[16]

1. A list of meals, dishes and all food items consumed was first recorded.
2. An exact description of ingredients was asked for all mixed dishes.
3. The method of preparation was noted (e.g., time of cooking, cooking receptacle covered or not, number of portions).
4. Amounts were assessed separately for each ingredient and for the portions eaten (e.g., weighing of a replica, measure of the volume, use of calibrated household measures, portion sizes or prices).
5. Waste and non-consumed parts were estimated.
6. Interviewees were systematically prompted for specific foods such as snacks and drinks.

Food intakes obtained by direct weighing and from the corresponding quantitative 24-h recall were compared for energy (in kilocalories [kcal]), carbohydrates, protein and lipids (g), and also for micronutrients.[17] This was performed on a sub-sample of data from 133 women for whom all meals were directly weighed by the surveyor. Matched comparisons using paired t-tests revealed no significant

---

[14] This includes Saturdays because in Ouagadougou, only Sundays are susceptible to diet modifications as compared to other days. Weekdays were also excluded in case of ceremony, fest or any event that may significantly influence food consumption.
[15] See list in Appendix 3.
[16] Raper et al. 2004: 545-55.
[17] Estimations using data collected by the quantitative 24-h recall method are not totally independent of weighing records because some household measures and purchase prices used to estimate the amount eaten by recall were derived from the weighing records (e.g., mean measures among all women, mean prices by district among all women). Consequently, this validation does not mean that the household measures are valid for the whole city of Ouagadougou, but at least are valid for the three rounds of quantitative 24-h recall among our sample.

difference between both methods for energy and for macronutrient intakes.[18] The quantitative 24-h recall method slightly over-estimated quantities of energy and macronutrients recorded by direct weighing, but the mean individual over-estimation in this study remained fairly negligible (2.4 percent for energy, 6.0 percent for lipids, 4.1 percent for proteins and 1.1 percent for carbohydrates); detailed results are given in **Appendix 8**. As for micronutrients, the comparison revealed negligible differences for some (0.6-7.4 percent for thiamin, riboflavin, niacin and vitamin B6), slight differences for others (10.2-15.8 percent for folate, vitamin B12, calcium and iron), but rather large differences for vitamin C (25.9 percent) and vitamin A (44.3 percent). It is highly probable that the over-estimation for vitamins A and C is due to difficulties in estimating the size of mangoes for the quantitative 24-h recall. Nevertheless, as good estimations of micronutrient intakes are very difficult to obtain from a single-day record,[19] we concluded that the quantitative 24-h recall method provided a reasonable assessment of actual food intakes.

It is worth noting that the survey itself may have affected the consumption of the women, though whether and to what degree this occurred cannot be easily confirmed. First, women were asked to eat with separate plates, even when this was not the usual practice, in order to help the recall of quantities. Second, the presence of the surveyor in the house during the first day may have led some women to prepare better meals than usually eaten. In addition, data collection itself was complicated by the fact that some women were uncomfortable with the presence of the surveyors and asked them to leave the house before the evening meal (these women were excluded from the above comparison, n=67). Finally, the recall for day 1 was probably easier than for the other days because of the weighing.

Data Collection

All surveyors were female because this was likely to create a greater level of comfort for both surveyed women and their husbands, and because female surveyors were found to be more skilled at collecting information about cooking methods, eating habits, market prices, etc. All surveyors followed a six-day training course with theoretical and practical learning, which included a pre-test under real field conditions. According to their demonstrated skills, surveyors were then assigned to one of the following tasks: supervision (2 supervisors), direct weighing (5 surveyors), quantitative 24-h recall (4 surveyors), qualitative dietary diversity questionnaire and anthropometrics (1 surveyor), coding and data entry (3 office agents). Therefore, all qualitative dietary diversity questionnaires and anthropometric data were collected by the same surveyor. To the extent possible, the three 24-h recalls for each surveyed woman were performed by three different surveyors.

Each woman selected for inclusion in the study was fully informed about each step of data collection (e.g., direct weighing, quantitative 24-h recalls, qualitative dietary diversity questionnaire) by the weighing surveyor. A schedule of the days for data collection was established with the respondent. This was done with the help of a supervisor when necessary.

Throughout data collection, which lasted three months, from February to May 2006, supervisors checked the accuracy and completeness of all questionnaires and directly observed a sub-sample of each surveyor's work. We[20] also supervised the field work, directly observed a sub-sample of data collected and checked the overall quality of data.

Food was weighed using domestic scales with a precision of 1 g and a maximum weighing capacity of 3 kilograms (kg; Tanita or Philips domestic scales). Anthropometric measurements were taken according to standard techniques.[21] Weight and body fat, by foot-to-foot bio-impedance measurement, were recorded using a TEFAL Bodymaster scale. Height was measured to the nearest millimeter (mm) with locally-made

[18] However, normality assumption for the t-test was violated in some cases, particularly for micronutrients. The normality assumption was less of a problem for energy and macronutrients.
[19] Ferro-Luzzi 2003: 101-125.
[20] Becquey and Martin-Prével.
[21] WHO 1995.

portable devices equipped with height gauges (SECA 206 Bodymeter). Domestic and Bodymaster scales were calibrated every day with standard weights.

Usual household measures were recorded and calibrated during weighings and quantitative 24-h recalls. For each food or ingredient, the household measure used by the woman was specified and the volume was noted (using water when necessary). The purchase price and weight of the corresponding ingredient was also noted, with all useful precisions (e.g., raw or cooked, dried or fresh, if spoons were flat or domed). For each type of household measure, the values obtained across the whole sample during the weighing were averaged and the mean value was used thereafter for the recall. When only a few values for a household measure has been obtained from interviewees, additional data were obtained by weighing the corresponding ingredients on markets or in some voluntary households. In markets, all prices, selling units and the corresponding weights were also recorded at least once a month for foods which vary in price seasonally. There was only one main market in each district, which most of the women usually went to. Prices were recorded from several vendors at the same market for each ingredient/food. Mean matching values between prices and quantities calculated by district were then used for further calculations.

Two catalogs of recipes were constructed: for dishes prepared and consumed at home and for dishes consumed outside the home. Recipes for dishes cooked at home were recorded from the direct weighing observations. To establish standard recipes for dishes consumed or purchased outside the home, a parallel survey was carried out among restaurants and all types of street-food vendors in the two districts. When recording information about a recipe the following steps were followed:

1. Empty cooking receptacles were weighed.
2. All ingredients including water were weighed.
3. Absorbed oil for fried foods were weighed.
4. Waste was weighed.
5. Length of time of cooking was recorded and whether cooking receptacles were covered or not.
6. Final cooked dish was weighed.
7. Empty cooking receptacles were weighed after serving.
8. Sample of preparations were observed and weighed; and standard portions for restaurant and street-food recipes were weighed.

Dietary Supplements

Unfortunately, no information is available about the consumption of dietary supplements in our dataset. However, we can assume that such consumption is rare in this setting. During the 2005 survey, only 2.8 percent of women declared that they consumed dietary supplements "from time to time" and only 0.2 percent declared that they consumed dietary supplements regularly.[22]

5.2. FOOD COMPOSITION DATA SOURCES

Food Composition Table (FCT)

The FCT for Mali, *Table de Composition d'aliments du Mali* (TACAM),[23] was selected as the primary source of nutrient data for foods because:

1. Many foods eaten in our sample were country-specific.
2. No complete and consistent FCT exists for Burkina Faso.
3. TACAM was the most complete and consistent FCT available for countries in the same region, and most country-specific foods eaten in Ouagadougou were included in it.

[22] Data unpublished.
[23] Barikmo et al. 2004.

The second source of nutrient data for foods was another country-specific FCT: the Worldfood FCT for Senegal (Worldfood Dietary Assessment System). A third source was the United States Department of Agriculture (USDA) National Nutrient Database for Standard Reference Release 20 (USDA Release 20). For some rare foods, other sources were used, including local data, data from the food industry or data on a similar food in the FCT with or without taking yield and retention factors into account.

For certain foods information on the content of specific nutrients was not available or not consistent. For these foods we replaced the missing nutrient content with that found in the same FCTs cited above, in the given order of preference. Each nutrient value was adjusted to reflect content per 100 g of dry matter of the original food.

The final FCT used for this study contains 219 foods and is presented in **Appendix 9**. For each food, references are given about the FCT of origin and possible additions or changes in specific nutrient data are specified in **Appendix 10**.[24]

Retention Factors

Most foods in our FCT were raw foods. In order to take into account losses due to cooking, we applied retention factors (USDA Release 5) to the nutrient content of cooked foods.

Yield Factors

For computation of nutrient consumption, we calculated yield factors from observed data. For each type of dish, we measured the amount of water lost during cooking by weighing each type of dish before and after cooking. One "type of dish" was identified by the name given by the women themselves, not by a common combination of ingredients, though there were generally few, if any, differences between the lists of ingredients and the main ingredient(s) that the recipe name referred to was/were always in the list. Mean yield factors by type of dish were then generalized to the whole sample. This allowed us to calculate the amount of raw ingredients (many ingredients by dish) corresponding to a given amount of each cooked dish.

To calculate the weights of each ingredient eaten when computing the food groups diversity indicators, it was not possible to use observed data from the weighing record as these corresponded to whole dishes and not to specific ingredients. For example, when it was known that a dish of "*riz gras*" lost 15 percent of its water during cooking, it was not possible to differentiate the water lost by tomatoes and water gained by rice. Consequently, to calculate such specific weights, ingredient by ingredient, we used USDA Yield Factors.[25]

Vitamin A Values

For the purpose of this study, it was decided to express the vitamin A content of food in retinol equivalent (RE). Although the current standard is to use retinol activity equivalent (RAE), recommendations of intake are expressed in RE and have not been converted to reflect the new standard of units. For vegetable foods found in the TACAM and USDA FCT (Release 20), it was therefore necessary to recalculate vitamin A content using the following formula: *vitamin A (RE) = retinol + (beta-carotene / 6)*.[26]

---

[24] For example, a Master's Thesis made some recommendations for updating very specific nutrient contents of the TACAM, and most of these were taken into account for this analysis (Doets 2007).
[25] Matthews and Garrison 1975.
[26] WHO/FAO 2004.

5.3. IMPLEMENTATION OF THE PROTOCOL

A research protocol was specifically developed for the purposes of the WDDP.[27] The protocol provides the background of the project and describes the analysis methods used in this study. Certain aspects of the protocol were flexible, to allow researchers participating in the WDDP to make analysis choices most appropriate to their data set and study setting. Methodology choices specific to our Burkina Faso dataset are described below.

Bioavailability of Zinc and Iron

For the results described in this report, we estimated the bioavailability of iron as 5 percent (only 7.7 percent of iron intake was provided by animal source foods in our sample) and the bioavailability of zinc as 25 percent (56.3 percent of energy intake was provided by starchy staples, most of them with a high extraction rate, such as maize and rice). However, the individual probabilities of adequacy (PA) and the mean probability of adequacy (MPA) obtained with intermediate levels of bioavailability for both iron and zinc were also calculated (**Appendix 7**).

Choice of Food Groups

Some foods could be categorized either as vitamin A-rich or as vitamin C-rich. In these cases, the foods were categorized as vitamin A-rich.

A few items in the FCT were "composite dishes" that could belong to different food groups (a typical example was the hamburger). The mean proportion of each food group in such dishes (proportion of weight) was estimated from local recipes. The total weight of each "composite dish" was then distributed across the different food groups according to the previously determined mean proportions.

Data Entry and Data Management

Data entry was performed with EpiData software, version 3.1. Data quality was ensured by quality checks at data entry, double entry and data cleaning. SAS System version 9.1 was used for all initial data management and to generate the output for **Tables 9a-d** and **Tables N9a-d**. Computation of MPA, the dietary diversity indicators and all other statistical analyses were performed with Stata version 10, with the syntax provided to the WDDP collaborators.[28]

In our dataset, one intake of vitamin B12 was extremely high (> 200 micrograms [µg]) as compared to the following highest intake (27 µg). This was due to a very large amount of liver consumed (> 200 g). We have confidence in the intake; however, the software could not perform the box-cox transformation because of this outlier. Consequently, the vitamin B12 intake of more than 200 µg was replaced by the next highest intake of 27 µg.

[27] Arimond et al. March 2008; Arimond et al. revised October 2008.
[28] Ibid.

6. Results [29]

6.1. CHARACTERISTICS OF WOMEN, AND ENERGY AND MACRONUTRIENT INTAKE

The total sample size available for analysis was 178 women aged 17-49 years, having completed at least two rounds with reliable data. More than a quarter of the women in the sample were either pregnant (7.6 percent) or lactating (20.5 percent).The mean age was 31.1 ± 7.4 years (**Table 1**). The literacy rate was quite low for an urban area (only 46.7 percent of the women had ever attended school). Mean height was 163.1 centimeters (cm) and mean weight 61.7 kg, giving a mean body mass index (BMI) of 23.2 ± 4.0 kg/m². More than 60 percent of women had a normal BMI. Only a small percentage of women (9.2 percent) presented a low BMI (< 18.5 kg/m²); however more than 29 percent were overweight (25-29.9 kg/m²; 24.5 percent) or obese (> 30 kg/m²; 4.6 percent) (**Table 1**).

Mean energy intake was 2,316 kcal (**Table 2**). The range was quite wide (714-5,242 kcal) and the distribution negatively skewed (the mean was about 120 kcal higher than the median).

The mean intake of protein (61.5 g; **Table 2**) was fairly low and roughly one quarter (14.9 g) came from animal sources. Two thirds of the energy intake came from carbohydrates. The contribution of proteins and fats to the energy intake was 11 percent and 22 percent, respectively, which is in line with the World Health Organization (WHO) recommendations at the population-level (10-15 percent for proteins and 15-30 percent for fats).[30]

NPNL women in the sample had a slightly lower energy intake (2,235 kcal), and thus a lower macronutrients intake, but proportions of energy brought by macronutrients were similar to those of the whole sample (**Table N2**). In other words, pregnant and lactating women consumed, on average, a higher caloric diet than NPNL women, but with a similar balance across macronutrients.

6.2. DESCRIPTION OF DIETARY PATTERNS

Eight dietary diversity indicators were investigated – comprised of 6, 9, 13 and 21 food groups, and each having a 1 g and a 15 g cut-off – corresponding to a progressive disaggregation of main food groups into more specific food sub-groups, and to a minimum amount of consumption required (1 g or 15 g) for each group to be taken into account in a dietary diversity score. The food groupings are shown in **Table A**.

The indicators are abbreviated as follows: FGI-6 identifies the six-food-group indicator with a 1 g cut-off; FGI-6R ("R" for "Restricted") identifies the six-food-group indicator with a 15 g cut-off. Similarly, other indicators are referred to as FGI-9 and FGI-9R, FGI-13 and FGI-13R, FGI-21 and FGI-21R.

At the highest level of aggregation (6 food groups) and with the lowest consumption cut-off (1 g), all women reported consuming starchy staples, and almost all reported consuming fruits and vegetables not rich in vitamin A (95.7 percent), non-dairy animal-source foods (93.9 percent), and vitamin A-rich fruits and vegetables (92.4 percent) (**Table 3a**). The next most frequently consumed food group was legumes and nuts (84.5 percent). However, only one woman out of six (17.6 percent) reported consuming dairy.

The use of the 15 g cut-off did not reduce the proportion of women consuming starchy staples, fruit and vegetables (not rich in vitamin A), and dairy. However, using the 15 g cut-off reduced the proportion of women consuming the other food groups (i.e., non-dairy animal-source foods, legumes and nuts, vitamin A-rich fruits and vegetables) by an average of 20 percentage points as compared to the 1 g cut-off.

[29] Results for the entire sample will be identified as Table 1, 2, 3, etc. and correspond to tables found in Appendix 1. Results for the sample of NPNL women only will be identified as Table N1, N2, N3 etc. and correspond to tables found in Appendix 2.
[30] WHO 2003.

Table A. Food Groups Summed in Diversity Indicators [a]

6-group indicators	9-group indicators	13-group indicators	21-group indicators
All starchy staples	All starchy staples	All starchy staples	Grains and grain products All other starchy staples
All legumes and nuts	All legumes and nuts	All legumes and nuts	Cooked dry beans and peas Soybeans and soy products Nuts and seeds
All dairy	All dairy	All dairy	Milk/yogurt Cheese
Other animal source foods	Organ meat	Organ meat	Organ meat
	Eggs Flesh foods and other miscellaneous small animal protein	Eggs Small fish eaten whole with bones	Eggs Small fish eaten whole with bones
		All other flesh foods and miscellaneous small animal protein	Large whole fish/dried fish/shellfish and other seafood Beef, pork, veal, lamb, goat, game meat Chicken, duck, turkey, pigeon, guinea hen, game birds Insects, grubs, snakes, rodents and other small animals
Vitamin A-rich fruits and vegetables	Vitamin A-rich dark green leafy vegetables Other vitamin A-rich vegetables and fruits	Vitamin A-rich dark green leafy vegetables Vitamin A-rich deep yellow/orange/red vegetables Vitamin A-rich fruits	Vitamin A-rich dark green leafy vegetables Vitamin A-rich deep yellow/orange/red vegetables Vitamin A-rich fruits
Other fruits and vegetables	Other fruits and vegetables	Vitamin C-rich vegetables	Vitamin C-rich vegetables
		Vitamin C-rich fruits All other fruits and vegetables	Vitamin C-rich fruits All other vegetables
			All other fruits

[a] For each set of food groups (6, 9, 13, and 21 groups), two indicators were constructed. The first counted a food group as eaten if at least 1 g was consumed; the second counted the food group if at least 15 g was consumed; thus, a total of eight FGIs were constructed. Grams of intake were assessed based on foods as eaten (e.g., raw, cooked).
[b] "Vitamin A-rich" is defined as > 60 RAE/100g; "vitamin C-rich" is defined as > 9 mg/100g; these represent 15 percent of the NRV.

The highest level of disaggregation (21 food sub-groups) and a 1 g consumption cut-off allowed for distinguishing between the following food sub-groups in our sample:

- Foods included in the composition of traditional dishes: grain products with a sauce made of vegetables (i.e., dark green leafy vegetables; vitamin A-rich orange fleshed vegetables and/or vitamin C-rich vegetables, most frequently tomatoes; other vegetables), with fermented seeds often included as condiments; the corresponding food sub-groups were consumed by between two-thirds and 100 percent of the women in the sample (**Table 3d**)

- Foods often added to the sauce of traditional dishes: mainly fish and/or meat products, which were roughly consumed by one out of two women

- Foods included in the composition of some main dishes that were less frequently consumed: beans and peas (29 percent), non-grain starchy staples (16 percent)

- Foods generally consumed as snacks: groundnuts (but not distinguishable from the fermented seeds), fruits (particularly vitamin A-rich fruits that were consumed by 28.9 percent of the women as the survey took place during the mango season), milk and yogurt (17.2 percent).

- Foods seldom or never consumed: eggs (1.4 percent), poultry (1.3 percent), cheese (0.5 percent), organ meat, insects and soy products (0 percent).

The use of the 15 g cut-off led to a marked decrease in the proportion of women consuming foods often used as condiments, particularly small fish (i.e., fish powder), which dropped from 52.0 percent to 5.4 percent, and nuts and seeds (a large part of which was constituted by soumbala, a fermented seed used as condiment), which dropped from 76.5 percent to 40.5 percent. It also led to a significant decrease in the consumption of foods used in rather small quantities in sauces (i.e., meat, large fish, vitamin A-rich orange fleshed vegetables, dark green leafy vegetables, other vegetables) or eaten in small quantities (vitamin C-rich fruit, constituted in large part by cola-nut). Otherwise, the proportion of women consuming the food group remained the same or the decrease was minimal. For NPNL women, the dietary patterns were roughly the same.

The above observations were confirmed by reviewing the quantities consumed for each food group (**Tables 4a-d**). Diets in this study's sample were dominated by starchy staples, which provided the main source of energy. On average, women ate more than 1,300 g of starchy staples per day, contributing more than 1,300 kcal to the diet per day (**Table 4a**). Legumes and nuts were the second major contributor to energy, providing 235 kcal per day on average and 278 kcal among those who consumed them.

On average, consumption of vitamin C-rich fruit and milk/yogurt was slightly higher among NPNL women than for all women taken together (+7.1 g and +2.1 percentage points among vitamin C-rich fruit consumers; +26.9 g and +1.0 percentage point among milk/yogurt consumers). On the other hand, consumption of grains and beans and peas was slightly lower (-84.5 g and -0.4 percentage points, and -15.8 g and -1.5 percentage points respectively). But on the whole, consumption patterns were similar (**Table N4d**).

When food groups were disaggregated, it was clear that for some groups the median quantity eaten among those who consumed them was far less than 15 g (e.g., small fish group: 5.0 g, vitamin A-rich orange vegetables: 4.1 g; **Table 4d**), thus explaining the differences in the frequency of consumption when shifting the cut-off from 1 g to 15 g. It is also worth noting that for many sub-groups the median quantity consumed was around the value of 15 g (e.g., nuts and seeds, poultry) or only slightly above (e.g., meat, large fish). This latter fact at least partly explains why the mean diversity scores ranged from 4.8 food groups (for FGI-6) to 7.3 food groups (for FGI-21) when using a 1 g minimum consumption cut-off, while the mean scores ranged from 4.2 food groups (FGI-6R) to 4.9 food groups (FGI-21R) when using a 15 g minimum consumption cut-off (**Table 5**). The difference in mean score was also minimal between FGI-6 and FGI-9, whether the consumption minimum was restricted or not, while the difference was more substantial when shifting from 9 to 13 food sub-groups. The distribution for all dietary diversity indicators was skewed, though this was most pronounced when using the 1 g minimum consumption cut-off as opposed to the 15 g cut-off (**Table 6** and **Figures 35-42**).

Cross-tabulation of diversity scores against the proportion consuming each food group provides a picture of how diets are diversified (**Tables 7a-h**). This picture varies slightly according to the number of food groups in the score and whether the consumption cut-off was restricted (15 g) or not (1 g). However, low and very low scores (two or three) generally reflected the traditional dishes, namely a staple (most often a grain) accompanied by a sauce made of vegetables (green leafy vegetables or vitamin C-rich vegetables), legumes and nuts (mainly fermented seeds as condiments and/or groundnut in the sauce), and with some flesh foods, when scores reached three or four (depending on the total number of groups). When scores increased further, vitamin C-rich vegetables and flesh foods were included in the diet quite systematically; thereafter the consumption of legumes and nuts and other fruits and vegetables also increased, reflecting additional ingredients in the dishes and/or a higher number of meals in the day. Dairy and vitamin A-rich fruits were the last food groups to appear in the diet, while other groups were never or almost never consumed.

6.3. MICRONUTRIENT INTAKES AND PROBABILITY OF ADEQUACY

As is usual in resource-poor settings, the distributions for micronutrient intakes were skewed (**Figures 1-11**).

For some micronutrients (i.e., riboflavin, niacin, folate, vitamin B12), median intakes were below (far below for vitamin B12) the estimated average requirement (EAR), and the median intake of calcium was less than half of the adequate intake (AI) (i.e., 1,000 milligrams [mg]). Vitamin C, vitamin A and zinc were the only nutrients with median intake values largely above the EAR.

The probability of adequacy (PA) for each nutrient incorporated information from three rounds (or two rounds when one round was missing) so that intra-individual variability was taken into account. Even if the distribution of intake was similar across rounds (not shown), intra-individual variations could be very high. Most of the nutrients presented a non-normal PA distribution; some distributions were highly skewed while other distributions were bimodal with most values either close to zero (null probability of covering the needs) or to one (needs adequately covered) (see **Figures 23-33**). The most notable exception was for calcium, which had a positively skewed distribution, likely due in part to the method used to estimate PA.

Due to the shape of the PA distributions, the mean and median PA values were often quite different. The mean PA was very low for vitamin B12 (0.04), folate (0.12) and riboflavin (0.13), and the median PA was estimated as 0.00 for these three nutrients. The mean and median PA were also low for niacin (mean=0.20, median=0.06), iron (mean=0.26, median=0.15) and calcium (mean=0.31, median=0.25). On the other hand, the mean and median PA were quite high for vitamin C (mean=0.68, median estimated as 0.99), vitamin A (mean=0.67, median=0.97), zinc (mean=0.71, median=0.94) and, to a lesser extent, for vitamin B6 (mean=0.60, median=0.65). For thiamin, the mean and median PA was intermediate (mean=0.44, median=0.38).

The mean probability of adequacy (MPA) across these 11 micronutrients – a summary measure describing the extent to which women's diets meet their full micronutrient needs – was low in our sample (0.38).

Mean and median intakes of micronutrients among NPNL women were similar to those of the whole sample. Not withstanding the exception of iron whose PA was much lower, and niacin, calcium and zinc whose PA were similar, the MPA for other nutrients was higher, and sometimes far higher (mean +4 percentage points). This is due to the more substantial needs of pregnant and lactating women, who are included along with NPNL women in the whole sample. For iron, mean intake was slightly lower among NPNL women and, despite lower nutrient requirements, the PA of iron was also clearly lower than for all women taken together (0.15 vs. 0.26), due to higher iron bioavailability assumed for pregnant and lactating women.

When considering higher bioavailability levels for iron and zinc (moderate levels are 10 percent for iron and 34 percent for zinc), the mean probability of adequate intake for iron rose from 0.26 to 0.77 and for zinc rose from 0.71 to 0.93. This led to an increase of 6 percentage points in the mean probability of micronutrient adequacy (**Appendix 7**). However, this sample included some pregnant women for whom the bioavailability of iron depended on their physiological status and was not affected by the hypothesis of higher bioavailability levels. In the NPNL sample, the mean probability of adequate intake for iron rose from 0.15 to 0.68 (and for zinc rose from 0.70 to 0.95). This led to a mean increase of 7 percentage points in the mean probability of micronutrient adequacy.

6.4. CONTRIBUTION OF FOOD GROUPS TO NUTRIENT INTAKES

Tables 9a-d show how the different food groups contributed to nutrient intake. Starchy staples notably contributed significantly to energy and protein intake (56.3 percent and 47.9 percent respectively), and also to the intake of most micronutrients (27.8-61.6 percent) (**Table 9a**). Vitamins B12, C and A were the only nutrients to which starchy staples did not contribute substantially (< 10.0 percent), and calcium the nutrient to which it contributed moderately (14.9 percent). Legumes and nuts also contributed moderately to the intake of most micronutrients (11.4-29.1 percent), with the exceptions of vitamins B12, A, C and B6. Vitamin B12 – the micronutrient whose needs were the least covered – was mainly provided by animal-source foods (74.0 percent). However, for all other micronutrients except niacin and calcium, animal-source foods were poor contributors to nutrient intakes because they were eaten in small quantities. Dark green leafy vegetables, on the other hand, contributed significantly to the intake of several micronutrients, particularly vitamin A (43.6 percent) and calcium (30.2 percent). On the whole, two thirds of vitamin A intake and one third of calcium intake came from vitamin A-rich fruits and vegetables. Vitamin C intake was provided largely by vitamin C-rich fruits and vegetables (46.3 percent) and vitamin A-rich fruits and vegetables – including mango, rich in both vitamins C and A (36.1 percent). Only 1.4 percent of vitamin C intake was provided by other fruits and vegetables.

6.5. RELATIONSHIP BETWEEN DIVERSITY INDICATORS AND ESTIMATED INTAKES OF INDIVIDUAL MICRONUTRIENTS

Except for folate (not correlated with non-restricted scores), iron and zinc, most individual micronutrient intakes were positively correlated with the eight dietary diversity indicators (**Table 10**). When controlling for energy intake (because energy intake was also positively and significantly correlated with all indicators except FGI-6), the strength of the correlations became weaker but remained significant for all nutrients, except thiamine, riboflavin, calcium and folate. Vitamins C and A were most strongly correlated with the dietary diversity indicators, with or without controlling for energy intake (0.252-0.499, $p < 0.001$). Niacin also showed strong correlations, as did vitamin B12, though to a lesser extent. Iron and zinc, on the other hand, showed poor correlations with the indicators (-0.111-0.256), and the correlations were mostly not significant.

Dietary diversity indicators with a 15 g minimum consumption cut-off (restricted indicators; FGI-6R, FGI-9R, FGI-13R and FGI-21R) generally showed better correlations with individual micronutrient intakes than indicators requiring a 1 g minimum consumption (non-restricted indicators; FGI-6, FGI-9, FGI-13 and FGI-21), except for calcium, vitamin B12, iron and zinc. This pattern persisted whether or not energy was controlled for. There was no dietary diversity indicator in terms of the number of food groups, which clearly demonstrated a stronger correlation across all individual micronutrient intakes (**Table 10**).

Results were similar for NPNL women and correlations of micronutrient intakes with the dietary diversity indicators were slightly stronger than those of the whole sample, except for vitamin B12 and thiamin intakes which showed a slightly weaker correlation.

6.6. RELATIONSHIP BETWEEN ENERGY FROM SPECIFIC FOOD GROUPS AND MEAN PROBABILITY OF ADEQUACY

The correlations between the energy contributed by each food group and MPA were fairly weak (**Tables 11a-d**). In the most disaggregated dietary diversity indicator (21 food groups; see **Table 11d**), only four food groups were significantly correlated with MPA and only three of them (vitamin A-rich fruits, dark green leafy vegetables and the beef, pork, veal, etc. food group) remained significant when controlling for total energy intake. The correlation between the nuts and seeds food group and MPA was no longer significant when controlling for total energy intake. On the other hand, the correlation between grains and MPA became negative and significant when controlling for total energy intake, meaning that caloric intake due to grains rose faster than nutrient intakes due to that group.

With aggregation of food groups in the dietary diversity indicators, a correlation between energy from starchy staples and MPA appeared without control for total energy. Flesh foods, vitamin A-rich fruits, dark green leafy vegetables and starchy staples were the only food groups showing a positive correlation between energy and MPA at all levels of aggregation with or without controlling for total energy (**Tables 11a-d**).

For NPNL women, the distribution of MPA was shifted to the right as compared to the distribution for the whole sample (**Figures 34** and **N34**). However, there was roughly the same energy intake for the whole sample and for NPNL women. Therefore, the relationship between energy from specific food groups and MPA gave quite different results for the two samples. Correlations were mostly stronger among the sample of NPNL women. Energy from starchy staples (if no control for total energy) and flesh foods (when controlling for energy with 6 or 9 food groups) were not significantly correlated with MPA. One food group (nuts and seeds) remained significantly correlated with MPA after controlling for energy intake at all levels of disaggregation.

6.7. RELATIONSHIP BETWEEN DIVERSITY INDICATORS AND TOTAL ENERGY INTAKE

For all dietary diversity indicators, mean total energy intake increased consistently with the number of food groups eaten, except for FGI-9R, FGI-13 and FGI-21 where energy intake did not increase or increased irregularly (**Table 12**). In other words, the general pattern illustrated that, on average, the more diverse the diet was, the more caloric it was. This was confirmed by the correlation coefficients measuring the relationships between dietary diversity scores and energy intake (**Table 13**). All linear correlations were significant, except for FGI-6. Moreover, the strength or the coefficient increased with the number of food groups and with restriction.

Results for the NPNL sample were quite different. Two restricted indicators – FGI-6R and FGI-9R – showed decreased correlations with total energy intake. The same indicators, when not restricted – FGI-6 and FGI-9 – showed higher correlations than other non-restricted indicators.

6.8. RELATIONSHIP BETWEEN DIVERSITY INDICATORS AND MEAN PROBABILITY OF ADEQUACY

Despite the wide range of MPA across score levels, MPA increased fairly consistently with diversity score for each dietary diversity indicator except FGI-6 (**Table 14**). The more diverse the diet was, the better the overall micronutrient needs were met by the diet. All dietary diversity indicators were significantly correlated with MPA (correlation coefficients r=0.236 to 0.438) (**Table 15**).

Although adjustment for energy intake attenuated the correlation between the dietary diversity indicators and MPA (r=0.162 to 0.356), the correlation remained statistically significant for all indicators (**Table 15**). This shows that a part of the increase in MPA was due to increase of diversity score, but another part was due to an increase in caloric intake (i.e., quantities). The strongest correlation, when controlling for energy, was demonstrated for FGI-21R (r=0.356).

Results were similar for NPNL women, though stronger correlations were consistently demonstrated, with or without controlling for total energy intake (r=0.272 to 0.468 with control and r=0.201 to 0.394 without).

Analysis of the determinants of MPA by multiple linear regression (**Table 16**) confirmed that dietary diversity was a significant determinant of MPA along with total energy intake. Models taking energy into account made better models (adjusted R^2 were far higher, between 0.460 and 0.515 when controlling for energy as compared to 0.076 to 0.194 without controlling for energy). After adjusting for energy intake, the contribution of the dietary diversity indicators to explaining the variability in MPA decreased but still remained significant. Restricted dietary diversity indicators were better predictors than non-restricted indicators (beta=0.049 to 0.064 for restricted; beta=0.020 to 0.055 for non-restricted). The highest adjusted R^2 was found for both models using FGI-9R and FGI-21R as the dietary diversity indicator to predict MPA. Pregnancy status could not be taken into account in the model since, for unexplained reasons, the software dropped the corresponding variable. Age and height had no influence on MPA, but lactation status was a strong negative determinant of MPA.

Results were similar for NPNL women, where the model including FGI-21R was slightly better than the one including FGI-9R (adjusted R^2=0.548 and 0.540, respectively).

6.9. PERFORMANCE OF DIVERSITY INDICATORS USING SELECTED CUT-OFFS FOR MEAN PROBABILITY OF ADEQUACY

To study the predictive power of diversity indicators, it was necessary to determine a cut-off for MPA, to define what would be an acceptable MPA. Ideally, an acceptable MPA would be 100 percent. No woman in our sample reached that value. Three women (1.6 percent) reached 80 percent MPA, thirteen women (7.4 percent) reached 70 percent and 28 women (15.1 percent) reached 60 percent (**Table 17**). We concluded 70 to be the highest MPA cut-off with enough women above the cut-off. The following discussion focuses on this cut-off and on a cut-off of 60 percent.

At the cut-off of 70 percent, all of the eight dietary diversity indicators led to receiver-operating characteristics (ROCs) with areas under the curve (AUC) superior to 0.500, which is the limit of "no information" (**Table 18**). The best predictor was FGI-21R (AUC = 0.802). FGI-13R and FGI-21 also had AUCs ≥ 0.700, which corresponds to a good quality of prediction. While all the ROCs were different from the "non-informative" curve, there were not many significant differences among them ($p \geq 0.05$), except that AUC for FGI-21R was different from AUC for FGI-6, FGI-6R, FGI-9R, FGI-13 and FGI-21, and that AUC for FGI-13R was different from those for FGI-6R and FGI-9R (**Table 19**). The 60 percent MPA cut-off gave the same results as above with weaker AUC, though the AUC for FGI21-R was significantly better than all other AUC ($p \leq 0.052$).

At an MPA cut-off of > 70 percent, the AUC for NPNL women tended to be similar to the whole sample (-0.008 to +0.029), and increased using a 60 percent cut-off (+0.001 to +0.038). The precision of the measure remained roughly stable despite the significant decrease in the number of subjects (**Table N18**). FGI-21R remained the best predictor of MPA at the 70 percent cut-off (AUC=0.798), though four out of the six dietary diversity indicators with 9 or more food groups also reached AUCs ≥ 0.700. At the 60 percent cut-off, AUC for FGI-21R was significantly better than the others at the limit α=0.05, except for FGI-9 and FGI-13R; however, its AUC (0.790) was far higher than those of FGI-9 (0.692) and FGI-13R (0.740), even if not significantly different (p=0.129 and p=0.135, respectively).

The dietary diversity indicator that performed well in both samples and had a significantly better AUC than the other indicators was FGI-21R (AUC=0.768 to 0.802, whatever the cut-off for MPA or the sample). The next-best performing indicator was FGI-13R, even if its AUC was not significantly different from most of other indicators' AUC.

Dietary diversity score cut-offs were investigated to explore whether or not a dichotomous dietary diversity indicator could be used to predict subjects meeting a MPA > 60 percent or MPA > 70 percent (**Tables 20a-h** and **N20a-h**). For non-restricted indicators, no dietary diversity score cut-off led to both a sensitivity and a specificity of at least 50 percent (< 50 percent is not acceptable) for prediction of MPA > 60 percent and MPA > 70 percent in the whole sample. On the other hand, a cut-off could be identified for each restricted indicator. The dietary diversity score cut-off by indicator was always the same no matter the MPA cut-off was used (60 percent or 70 percent). For both FGI-6R and FGI-9R, a dietary diversity score cut-off of ≥ 5 was identified (for all women and NPNL women), but neither sensitivity nor specificity exceeded 65 percent. For FGI-13R, a dietary diversity score cut-off of ≥ 5 was also identified as the best, and though sensitivity and specificity were moderately good, this cut-off slightly favored sensitivity over specificity (i.e., better identified women meeting the MPA than women failing to meet the MPA). To predict an MPA > 60 percent with a cut-off ≥ 5, sensitivity was 71.4 percent (80.0 percent for NPNL women) and specificity was 51.3 percent (53.6 percent for NPNL women). For FGI-21R, the best cut-off that predicted the meeting of a 60 percent MPA was at the level of ≥ 6. This cut-off also favored sensitivity (80.0 percent) over specificity (70.9 percent) in the NPNL sample, but sensitivity and specificity were balanced (71.4 percent and 72.0 percent) in the whole sample. The total proportion of misclassification was quite high with both indicators (from 27.7 percent for FGI-21R and 28.1 percent for FGI-13R in the NPNL sample to 42.3 percent for FGI-21R and 45.5 percent for FGI-13R in the whole sample).

7. Summary and Discussion

7.1. DIETARY PATTERNS

Diets in our urban Burkina Faso sample consisted mainly of starchy staples (100 percent of sample consumed) and vegetables (95.7 percent). Fats intake was quite high (22 percent of energy intake). Although consumed in small quantities, flesh foods were also frequently consumed (93.9 percent of sample consumed).

Starchy staples were the largest contributors of energy and carbohydrate intake, but also provided about half of the total protein intake. Although starchy staples are not nutrient dense, they were the principal source of most micronutrient intakes (thiamin, riboflavin, niacin, vitamin B6, iron and zinc). Vitamin A-rich fruits and vegetables, particularly dark green leafy vegetables, were also important sources of micronutrients intakes (calcium and vitamin A particularly). Dairy was not frequently consumed and soy, eggs, poultry, organ meat and small animals like insects or rodents were never or almost never consumed.

Using FGI-6R, diets appeared quite diverse (mean=4.2). However, when using a more disaggregated indicator, the diets did not appear very diverse in terms of specific food groups (mean=4.9 for FGI-21R).

7.2. MICRONUTRIENT INTAKES AND ADEQUACY

Intakes of vitamin A, vitamin C, zinc and vitamin B6 were quite good in the sample setting. On the other hand, intakes of niacin and iron were low and intakes of riboflavin, folate and especially vitamin B12 were extremely low given the diversity of the diet. Therefore, animal-source foods, including dairy, should be consumed either in larger quantities or more frequently to improve intake of vitamin B12.[31]

Given women's physiologic status, nutrient needs are different. Thus probability of adequacy can be different for the same nutrient intake. In our sample, women's physiologic status did not modify average micronutrient intakes. Not surprisingly, however, NPNL women had better probability of adequacy for all micronutrients (except iron) than the whole sample. For iron, it was assumed that pregnant women had a better absorption (23 percent) than NPNL and lactating women (5 percent), which explains the better probability of adequacy for iron found with the whole sample.

7.3. RELATIONSHIP BETWEEN FOOD GROUP DIVERSITY, DIET QUALITY AND ENERGY INTAKE

The dietary diversity indicators were significantly correlated with energy intake (0.138-0.276). The more the food groups were disaggregated, the more strongly correlated the diversity indicators were to energy intake - indicating larger quantities of food intake with high diversity scores in the most disaggregated indicators. The dietary diversity indicators were also moderately correlated with intakes of most individual micronutrients (0.099-0.499). Exceptions were poor correlations demonstrated between the diversity indicators and iron and zinc intakes, as well as between the restricted indicators and folate. Stronger correlations were generally shown for the restricted indicators. The strength of all correlations decreased when controlling for energy intake.

Only a few food groups had energy intakes that were significantly correlated with MPA: vitamin A-rich fruits (also rich in vitamin C), dark green leafy vegetables, flesh foods, legumes and nuts, and starchy staples. Other groups – some of which are known to be nutrient dense – were not significantly correlated

[31] Vitamin B12 values in this study's FCT are quite low as compared to other FCTs. It is worth noting that these values have been reexamined by Doets as a follow-up study of her Master's thesis (see footnote 24) and it was concluded that these lower Vitamin B12 values can reflect particularities for some local foods (e.g., beef). Also, quantities of vitamin B12-rich foods consumed were often low.

with MPA (e.g., dairy). Starchy staples, which provided the majority of most micronutrient intakes, were negatively correlated with MPA when controlling for total energy intake. This indicates that a larger increase in quantity was required to obtain a substantial increase in micronutrients as compared to other food groups.

In our sample setting, where diets were moderately diverse, the increase in the overall micronutrient adequacy of the diet was due to both an increase in variety and an increase in quantity. Limiting the analysis to NPNL women substantially improved the correlations. This is understandable from a theoretical point of view. Due to higher needs on the one hand but similar dietary patterns to NPNL women on the other, pregnant and lactating women had lower MPA than the NPNL women in the sample. This introduced some noise into the results when considering the whole sample. While dietary diversity indicators can be useful to predict MPA for both NPNL women and pregnant and lactating women, an acceptable dietary diversity indicator (and cut-off score) for NPNL women would not be automatically acceptable for pregnant and lactating women because the latter group has different nutrient intake requirements.

7.4. INDICATOR PERFORMANCE

As seen through previous results, the restricted dietary diversity indicators were more powerful predictors of MPA than the non-restricted indicators. In this sample, the indicators with 6 and 9 food groups were not detailed enough to be able to differentiate between the diversity of diets of varying qualities. The indicator with 13 groups performed quite well, but the best predictor was definitely the indicator with 21 groups. From an operational point of view, however, an indicator with less food groups would have been preferable for its simplicity.

FGI-21R and FGI-13R both showed good AUC for cut-offs of 60 percent and 70 percent MPA (AUC ≥ 0.700), particularly when considering NPNL women separately. However, the results of sensitivity and specificity analyses were only moderately good. Both sensitivity and specificity were better for FGI-21R (71.4 percent and 72.0 percent at the cut-off of ≥ 6).

7.5. PRELIMINARY IMPLICATIONS FOR OPERATIONALIZING FOOD GROUP DIVERSITY

As with other WDDP sites, in our urban Burkina Faso sample, the restricted dietary diversity indicators were shown to perform better than the non-restricted indicators. This is a challenge for operationalization, however, because the principle of dietary diversity indicators such as those tested in this sample (and one of their major strengths for simple surveys) is to focus only on types of foods eaten and not on the quantities consumed.

The restrictions in our sample were mainly influenced by foods consumed as condiments (e.g., tomato paste, soumbala, dried fish) or by very specific foods (e.g., cola-nut). The challenge for operationalization could therefore be overcome. These foods, consumed in small quantities, could easily be identified and recorded separately in the questionnaire. Certain foods such as fresh fish and flesh foods can be consumed in small quantities. Analyses could be re-run to identify if, for these specific food groups, not considering any cut-off point would have an impact on the performance of the indicators. If yes, when designing the questionnaire, attention should be paid to defining household measures as clearly as possible in order to identify the minimum quantity that should be eaten.

7.6. GENERALIZABILITY

Our sample consisted of women from two districts that represented the two clear types of settings existing in Ouagadougou: one district was parceled (with amenities) while the other was non-parceled (no amenities). We initially planned to run separate analyses in order to explore the performance of the indicators in the two contrasting settings within the same city, however were limited by sample sizes.

Results cannot be generalized to the whole population of Ouagadougou. However, in a similar setting (an urban area in a poor African country) with similar dietary patterns, there is no reason to think results would not be similar.

8. Conclusion

In our Burkina Faso sample, dietary diversity indicators were correlated with the probability of micronutrient adequacy. Two candidate indicators presented acceptable results to predict MPA: FGI-21R and FGI-13R. However, with cut-offs of ≥ 6 and ≥ 5 respectively, they identified only 72 and 51 percent of women with an MPA below 60 percent, respectively (specificity), and each identified 71 percent of women with an MPA above 60 percent (sensitivity; all women).

Our sample setting was urban and characterized by quite a wide range of dietary diversity and energy intake. It would be interesting to compare the results of our study to results from samples in other urban settings with equally diverse diets in order to assess whether the moderate performances of the indicators can be explained by the overall diversity of diets or if they are due to some specific dietary patterns in our sample.

The overall performances of the indicators were moderate to good. A precise assessment of the micronutrient adequacy of the diet requires data collection on several days as well as surveyors with specific skills, and is therefore very expensive to obtain. Dietary diversity as assessed by the eight indicators explored here provides an interesting alternative for purposes of rapid assessments and/or when resources are limited. In addition, such indicators could be of use for monitoring and targeting of interventions in similar urban contexts. At the population level, these indicators could be interpreted as good proxies of the micronutrient adequacy of women's diet.

References

Arimond, M., D. Wiesmann, E. Becquey, A. Carriquiry, M. Daniels, M. Deitchler, N. Fanou, E. Ferguson, M. Joseph, G. Kennedy, Y. Martin-Prével, and L. E. Torheim. 2009. *Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets in Resource-Poor Areas: Summary of Results from Five Sites*. Washington, DC: FANTA at AED.

Arimond, M., D. Wiesmann, L. E. Torheim, M. Joseph, and A. Carriquiry. Revised October 2008. *Validation of Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Background and Research Protocol.* Washington, DC: FANTA at AED.

---. March 2008. *Validation of Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets: Addendum to Research Protocol.* Washington, DC: FANTA at AED.

Barikmo, I., F. Ouattara, and A. Oshaug. 2004. *Table de composition d'aliments du Mali*. Oslo: Akershus University College.

Becquey, E. July 2006. *[Validation of a Food Dietary Diversity Indicator as a Measure of Nutritional Adequacy of the Diet in Ouagadougou (Burkina Faso)]*. Masters Thesis. University of Paris 6 (France).

Becquey, E., and Y. Martin-Prével. November 2007. *Validation of Dietary Diversity as a Measure of the Micronutrient Adequacy of Women's Diets – Basic Descriptive Information on the IRD Data Set*. Ouagadougou, Burkina Faso: IRD.

Bernstein, M. A., K. L. Tucker, N. D. Ryan, E. F. O'Neil, K. M. Clements, M. E. Nelson, W. J. Evans, and M. A. Fiatarone Singh. 2002. "Higher Dietary Variety Is Associated with Better Nutritional Status in Frail Elderly People." *Journal of the American Dietetic Association* 102: 1096-1104.

Black, A. E. 2000. "Critical evaluation of energy intake using the Goldberg cut-off for energy intake: basal metabolic rate [BMR]. A practical guide to its calculation, use and limitations." *International Journal of Obesity* 54: 395-404.

Cox, D., J. Skinner, B. Carruth, J. Moran III, and K. Houck. 1997. "A Food Variety Index for Toddlers (VIT): Development and Application." *Journal of American Dietetic Association* 97: 1382-86.

Doets, E. L. 2007. Quality Evaluation and Update of the Food Composition Table of Mali (TACAM 2004). Master Thesis. Wageningen University (The Netherlands).

Drewnowski, A., S. A. Henderson, A. Driscoll, and B. J. Rolls. 1997. "The Dietary Variety Score: Assessing Diet Quality in Healthy Young and Older Adults." *Journal of the American Dietetic Association* 97: 266-71.

Ferro-Luzzi A. 2002. "Individual food intake survey methods in proceedings: Measurement and assessment of food deprivation and undernutrition". International Scientific Symposium in Rome, Italy, 26-28 June.

Foote, J. A., S. P. Murphy, L. R. Wilkens, P. P. Basiotis, and A. Carlson. 2004. "Dietary Variety Increases the Probability of Nutrient Adequacy Among Adults." *Journal of Nutritio*n 134: 1779-85.

Kant, A. 1996. "Indexes of Overall Diet Quality: A Review." *Journal of the American Dietetic Association* 96: 785-91.

Kennedy, E., and L. Meyers. 2005. "Dietary Reference Intakes: Development and Uses for Assessment of Micronutrient Status of Women—A Global Perspective." *American Journal of Clinical Nutrition* 81: 1194S-97S.

Krebs-Smith, S., H. Smiciklas-Wright, H. Guthrie, and J. Krebs-Smith. 1987. "The Effects of Variety in Food Choices on Dietary Quality." *Journal of the American Dietetic Association* 87: 897-903.

Lowik, M. R., K. F. Hulshof, and J. H. Brussaard. 1999. "Food-Based Dietary Guidelines: Some Assumptions Tested for the Netherlands." *British Journal of Nutrition* 81: S143-S149.

Matthews, R. H., and Y. J. Garrison. 1975. *Food yields summarized by different stages on preparation*. Agriculture handbook n. 102. Washington, DC: USDA.

Ogle, B. M., P. H. Hung, and H. T. Tuyet. 2001. "Significance of Wild Vegetables in Micronutrient Intakes of Women in Vietnam: An Analysis of Food Variety." *Asia Pacific Journal of Clinical Nutrition* 10: 21-30.

ORC Macro. DHS. http://www.measuredhs.com/aboutsurveys/dhs/questionnaires.cfm (accessed September 7, 2007).

---. 2003. DHS Burkina Faso. http://www.measuredhs.com/aboutsurveys/search/metadata.cfm?surv_id=230&ctry_id=50&SrvyTp=custom (Accessed November 1, 2004).

Randall, E., M. Z. Nichaman, and C. F. Contant, Jr. (1985). "Diet diversity and Nutrient Intake." *Journal of the American Dietetic Association* 85: 830-36.

Raper, N., B. Perloff, L. Ingwersen, L. Steinfeldt, and J. Anand. 2004. "An overview of USDA's Dietary Intake Data System." *Journal of Food Composition and Analysis* 17(3-4): 545-55.

Ruel, M. T. 2003. "Operationalizing Dietary Diversity: A Review of Measurement Issues and Research Priorities." *Journal of Nutrition* 133: 3911S-26S.

Savy, M. *Dietary Diversity Indices: Measure and Use among Women of Reproductive age in Burkina Faso*. PhD Dissertation. University of Paris 6 (France).

Torheim, L. E., I. Barikmo, C. L. Parr, A. Hatloy, F. Ouattara, and A. Oshaug. 2004. "Validation of Food Variety as an Indicator of Diet Quality Assessed with a Food Frequency Questionnaire for Western Mali." *European Journal of Clinical Nutrition* 57: 1283-91.

Torheim, L. E., F. Ouattara, M. M. Diarra, F. D. Thiam, I. Barikmo, A. Hatloy, and A. Oshaug. 2004. "Nutrient Adequacy and Dietary Diversity in Rural Mali: Association and Determinants." *European Journal of Clinical Nutrition* 58: 594-604.

WHO. 2003. "Nutrition and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation." Technical Report Series n°916. Geneva: WHO.

---. 1995. "Physical status: the use and interpretation of anthropometry: Report of a WHO Expert Committee". Tech Rep Ser n°854. Geneva: WHO.

WHO/FAO. 2004. "Vitamin and mineral requirements in human nutrition (second edition)". Geneva: WHO and Rome: FAO.

Appendix 1. Tables and Figures, All Women

Table 1. Description of Sample, All Women, R2

	n	Mean	SD	Median	Range
Age (year)	177	31.1	7.4	29.0	17.0-49.0
Height (cm)	161	163.1	6.2	163.0	150.0-182.0
Weight (kg)	160	61.7	11.5	60.4	38.2-102.1
BMI	160	23.2	4.0	22.7	16.1-37.1
Ever attended school	178	46.7			
% Lactating	178	20.5			
% Pregnant	178	7.6			
	n	**Percent**			
BMI < 16	0	0.0			
BMI 16-16.9	6	3.9			
BMI 17-18.49	8	5.3			
BMI 18.5-24.9	100	61.7			
BMI 25-29.9	39	24.5			
BMI ≥ 30	7	4.6			

Table 2. Energy and Macronutrient Intakes, All Women, R2

	Mean	SD	Median	Range	Percent of kcal
Energy (kcal)	2,316.0	876.4	2,188.8	714.2-5,242.1	
Protein (g)	61.5	31.4	54.0	15.8-257.1	10.8
Animal source (g)	14.9	25.6	8.6	0.0-242.7	2.7
Plant source (g)	46.6	22.3	43.6	7.7-123.7	8.1
Total carbohydrate (g)	386.5	165.8	356.6	90.5-904.4	66.2
Sugars (g)	74.1	68.5	58.2	5.0-394.8	12.9
Total fat (g)	55.8	34.3	49.7	5.1-234.0	22.0
Saturated fat (g)	–	–	–	–	–

Table 3a. Percent of Women who Consumed 6 Major Food Groups, All Women, R2

	≥ 1 g	≥ 15 g
All starchy staples	100.0	100.0
All legumes and nuts	84.5	61.2
All dairy	17.6	17.6
Other animal-source foods	93.9	71.8
Vitamin A-rich fruits and vegetables [a]	92.4	72.5
Other fruits and vegetables	95.7	93.2

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 3b. Percent of Women who Consumed 9 Sub-Food Groups, All Women, R2

	≥ 1 g	≥ 15 g
All starchy staples	100.0	100.0
All legumes and nuts	84.5	61.2
All dairy	17.6	17.6
Organ meat	0.0	0.0
Eggs	1.4	0.5
Flesh foods and other miscellaneous small animal protein	93.4	70.9
Vitamin A-rich dark green leafy vegetables [a]	77.8	54.6
Other vitamin A-rich vegetables and fruits [a]	72.0	32.2
Other fruits and vegetables	95.7	93.2

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 3c. Percent of Women who Consumed 13 Sub-Food Groups, All Women, R2

	≥ 1 g	≥ 15 g
All starchy staples	100.0	100.0
All legumes and nuts	84.5	61.2
All dairy	17.6	17.6
Organ meat	0.0	0.0
Eggs	1.4	0.5
Small fish eaten whole with bones	52.0	5.4
All other flesh foods and miscellaneous small animal protein	78.6	65.1
Vitamin A-rich dark green leafy vegetables [a]	77.8	54.6
Vitamin A-rich deep yellow/orange/red vegetables [a]	61.8	6.2
Vitamin C-rich vegetables [b]	94.2	90.0
Vitamin A-rich fruits [a]	28.9	27.6
Vitamin C-rich fruits [b]	12.1	6.6
All other fruits and vegetables	54.5	20.6

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 3d. Percent of Women who Consumed 21 Sub-Food Groups, All Women, R2

	≥ 1 g	≥ 15 g
Grains and grain products	98.9	98.9
All other starchy staples	16.0	16.0
Cooked dry beans and peas	28.9	28.3
Soybeans and soy products	0.0	0.0
Nuts and seeds	76.5	40.5
Milk/yogurt	17.2	17.2
Cheese	0.5	0.5
Beef, pork, veal, lamb, goat, game meat	48.4	35.9
Organ meat	0.0	0.0
Chicken, duck, turkey, pigeon, guinea hen, game birds	1.3	1.3
Large whole fish/dried fish/shellfish and other seafood	56.2	36.2
Small fish eaten whole with bones	52.0	5.4
Insects, grubs, snakes, rodents and other small animal	0.0	0.0
Eggs	1.4	0.5
Vitamin A-rich dark green leafy vegetables [a]	77.8	54.6
Vitamin A-rich deep yellow/orange/red vegetables [a]	61.8	6.2
Vitamin C-rich vegetables [b]	94.2	90.0
All other vegetables	53.4	19.5
Vitamin A-rich fruits [a]	28.9	27.6
Vitamin C-rich fruits [b]	12.1	6.6
All other fruits	1.7	1.1

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 4a. Summary of Food Group Intake (FGI-6), All Women, for All R2 Observation Days and for Days When the Food Was Consumed

	All (n = 178)					Among those who consume			
Food group	**Mean amount (g)**	**Mean energy (kcal)**	**Median amount (g)**	**Median energy (kcal)**	**Percent consuming**	**Mean amount (g)**	**Mean energy (kcal)**	**Median amount (g)**	**Median energy (kcal)**
All starchy staples	1,318.5	1,322.4	1,234.3	1,207.5	100.0	1,318.5	1,322.4	1,234.3	1,207.5
All legumes and nuts	98.7	234.7	36.8	162.4	84.5	116.8	277.7	50.8	233.3
All dairy	39.7	30.3	0.0	0.0	17.6	225.5	172.0	176.0	166.6
Other animal source foods	57.7	129.9	28.0	66.2	93.9	61.5	138.4	31.0	71.7
Vitamin A-rich fruits and vegetables [a]	145.5	93.2	59.4	30.3	92.4	157.4	100.8	67.5	34.4
Other fruits and vegetables	113.0	50.4	88.6	36.2	95.7	118.0	52.6	89.4	38.2

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 4b. Summary of Food Group Intake (FGI-9), All Women, for All R2 Observation Days and For Days When the Food Was Consumed

	All (n = 178)					Among those who consume			
Food group	**Mean amount (g)**	**Mean energy (kcal)**	**Median amount (g)**	**Median energy (kcal)**	**Percent consuming**	**Mean amount (g)**	**Mean energy (kcal)**	**Median amount (g)**	**Median energy (kcal)**
All starchy staples	1,318.5	1,322.4	1,234.3	1,207.5	100.0	1,318.5	1,322.4	1,234.3	1,207.5
All legumes and nuts	98.7	234.7	36.8	162.4	84.5	116.8	277.7	50.8	233.3
All dairy	39.7	30.3	0.0	0.0	17.6	225.5	172.0	176.0	166.6
Organ meat	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Eggs	0.6	0.9	0.0	0.0	1.4	43.6	62.9	9.2	14.5
Flesh foods and other miscellaneous small animal protein	57.1	129.1	28.0	64.8	93.4	61.1	138.1	31.0	68.2
Vitamin A-rich dark green leafy vegetables [a]	48.9	23.2	18.6	6.6	77.8	62.9	29.9	33.0	14.4
Other vitamin A-rich vegetables and fruits [a]	96.6	70.0	4.1	4.9	72.0	134.1	97.1	10.9	13.6
Other fruits and vegetables	113.0	50.4	88.6	36.2	95.7	118.0	52.6	89.4	38.2

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 4c. Summary of Food Group Intake (FGI-13), All Women, for All R2 Observation Days and for Days When the Food Was Consumed

	All (n = 178)					Among those who consume			
Food group	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)	Percent consuming	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)
All starchy staples	1,318.5	1,322.4	1,234.3	1,207.5	100.0	1,318.5	1,322.4	1,234.3	1,207.5
All legumes and nuts	98.7	234.7	36.8	162.4	84.5	116.8	277.7	50.8	233.3
All dairy	39.7	30.3	0.0	0.0	17.6	225.5	172.0	176.0	166.6
Organ meat	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Eggs	0.6	0.9	0.0	0.0	1.4	43.6	62.9	9.2	14.5
Small fish eaten whole with bones	3.7	9.6	1.4	3.5	52.0	7.0	18.3	5.0	13.0
All other flesh foods and miscellaneous small animal protein	53.4	119.5	24.6	55.9	78.6	67.9	151.9	36.0	73.2
Vitamin A-rich dark green leafy vegetables [a]	48.9	23.2	18.6	6.6	77.8	62.9	29.9	33.0	14.4
Vitamin A-rich deep yellow/orange/red vegetables [a]	4.5	4.5	2.1	2.6	61.8	7.1	7.1	4.1	4.8
Vitamin C-rich vegetables [b]	94.4	35.4	76.2	24.2	94.2	100.3	37.6	80.2	26.4
Vitamin A-rich fruits [a]	92.1	65.5	0.0	0.0	28.9	318.5	226.3	236.7	172.8
Vitamin C-rich fruits [b]	6.5	5.2	0.0	0.0	12.1	53.8	42.7	18.0	21.1
All other fruits and vegetables	12.0	9.8	4.1	1.9	54.5	22.1	17.9	9.9	9.7

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 4d. Summary of Food Group Intake (FGI-21), All Women, for All R2 Observation Days and for Days When the Food Was Consumed

Food group	All (n = 178)					Among those who consume			
	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)	Percent consuming	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)
Grains and grain products	1,242.8	1,245.6	1,143.9	1,150.1	98.9	1,256.6	1,259.4	1,154.2	1,156.9
All other starchy staples	75.6	76.8	0.0	0.0	16.0	473.6	480.9	211.2	425.9
Cooked dry beans and peas	76.0	107.3	0.0	0.0	28.9	262.7	371.1	223.6	315.9
Soybeans and soy products	0.0	0.0	0.0	0.0	0.0	--	--	--	--
Nuts and seeds	22.7	127.3	7.8	37.5	76.5	29.7	166.5	17.5	99.6
Milk/yogurt	39.6	30.0	0.0	0.0	17.2	231.1	175.1	213.1	166.6
Cheese	0.1	0.2	0.0	0.0	0.5	15.7	54.7	15.7	54.7
Beef, pork, veal, lamb, goat, game meat	23.7	67.0	0.0	0.0	48.4	48.9	138.6	24.5	64.8
Organ meat	0.0	0.0	0.0	0.0	0.0	--	--	--	--
Chicken, duck, turkey, pigeon, guinea hen, game birds	5.5	10.7	0.0	0.0	1.3	428.6	839.5	15.9	21.9
Large whole fish/dried fish/shellfish and other seafood	24.3	41.7	5.7	7.1	56.2	43.2	74.3	21.6	34.8
Small fish eaten whole with bones	3.7	9.6	1.4	3.5	52.0	7.0	18.3	5.0	13.0
Insects, grubs, snakes, rodents and other small animal	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Eggs	0.6	0.9	0.0	0.0	1.4	43.6	62.9	9.2	14.5
Vitamin A-rich dark green leafy vegetables [a]	48.9	23.2	18.6	6.6	77.8	62.9	29.9	33.0	14.4
Vitamin A-rich deep yellow/orange/red vegetables [a]	4.5	4.5	2.1	2.6	61.8	7.1	7.1	4.1	4.8
Vitamin C-rich vegetables [b]	94.4	35.4	76.2	24.2	94.2	100.3	37.6	80.2	26.4
All other vegetables	11.0	8.1	3.3	1.9	53.4	20.6	15.2	9.9	9.0
Vitamin A-rich fruits [a]	92.1	65.5	0.0	0.0	28.9	318.5	226.3	236.7	172.8
Vitamin C-rich fruits [b]	6.5	5.2	0.0	0.0	12.1	53.8	42.7	18.0	21.1
All other fruits	1.0	1.7	0.0	0.0	1.7	59.8	96.0	51.0	62.2

[a] Vitamin A-rich fruits and vegetables are defined as those with >120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with >9 mg/100g *raw, taking into account retention factors*.

Table 5. Diversity Scores for Various Diversity Indicators, All Women, R2

Indicator	Number of food groups and level	Mean	SD	Median	Range
FGI-6	6 major food groups	4.8	0.7	5.0	2-6
FGI-6R [a]	6 major food groups	4.2	0.9	4.0	2-6
FGI-9	9 food sub-groups	5.4	1.0	6.0	2-7
FGI-9R [a]	9 food sub-groups	4.3	1.1	4.0	2-7
FGI-13	13 food sub-groups	6.6	1.6	7.0	2-10
FGI-13R [a]	13 food sub-groups	4.6	1.2	5.0	2-8
FGI-21	21 food sub-groups	7.3	1.8	8.0	2-11
FGI-21R [a]	21 food sub-groups	4.9	1.4	5.0	2-9

[a] "R" indicates that at least 15 g must be consumed in order for the food group/sub-group to "count" in the score.

Table 6. Percent of Observation Days at Each Food Group Diversity Score, All Women, R2

Number of food groups eaten	Diversity indicators							
	FGI-6	FGI-6R	FGI-9	FGI-9R	FGI-13	FGI-13R	FGI-21	FGI-21R
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.6	4.6	0.6	3.9	0.6	3.5	0.6	3.6
3	3.3	19.1	2.6	18.6	2.2	18.2	0.9	12.6
4	18.6	35.9	14.8	35.0	8.7	26.1	8.2	26.6
5	66.2	36.2	26.6	29.1	10.4	30.5	7.3	23.1
6	11.2	4.2	46.2	12.4	19.1	16.1	12.2	23.6
7			9.1	0.9	27.3	5.3	18.2	6.8
8			0.0	0.0	23.2	0.5	28.8	3.2
9			0.0	0.0	7.7	0.0	15.1	0.5
10					0.9	0.0	8.1	0.0
11					0.0	0.0	0.5	0.0
12					0.0	0.0	0.0	0.0
13					0.0	0.0	0.0	0.0
14							0.0	0.0
15							0.0	0.0
16							0.0	0.0
17							0.0	0.0
18							0.0	0.0
19							0.0	0.0
20							0.0	0.0
21							0.0	0.0

Table 7a. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-6 - 1 g Minimum)

	Number of food groups eaten					
	1	**2**	**3**	**4**	**5**	**6**
Percent (number) [a] of observation days at each diversity score	0.0 (0)	0.6 (1)	3.3 (6)	18.6 (34)	66.2 (116)	11.2 (21)
Food groups	**Percent of observation days on which each food group was consumed**					
All starchy staples	–	100.0	100.0	100.0	100.0	100.0
All legumes and nuts	–	100.0	72.2	46.6	93.0	100.0
All dairy	–	0.0	0.0	5.9	8.0	100.0
Other animal source foods	–	0.0	0.0	88.2	100.0	100.0
Vitamin A-rich fruits and vegetables [b]	–	0.0	66.7	72.1	99.0	100.0
Other fruits and vegetables	–	0.0	61.1	87.3	100.0	100.0

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 7b. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-6R - 15 g Minimum)

	Number of food groups eaten					
	1	**2**	**3**	**4**	**5**	**6**
Percent (number) [a] of observation days at each diversity score	0.0 (0)	4.6 (8)	19.1 (33)	35.9 (64)	36.2 (65)	4.2 (8)
Food groups	**Percent of observation days on which each food group was consumed**					
All starchy staples	–	100.0	100.0	100.0	100.0	100.0
All legumes and nuts	–	24.0	45.0	45.7	85.4	100.0
All dairy	–	0.0	0.0	14.7	22.4	100.0
Other animal source foods	–	0.0	30.1	74.9	96.5	100.0
Vitamin A-rich fruits and vegetables [b]	–	28.0	43.1	66.0	97.0	100.0
Other fruits and vegetables	–	48.0	81.8	98.7	98.7	100.0

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 7c. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-9 - 1 g Minimum)

	Number of food groups eaten								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Percent (number)[a] of observation days at each diversity score	0.0 (0)	0.6 (1)	2.6 (5)	14.8 (26)	26.6 (46)	46.2 (82)	9.1 (18)	0.0 (0)	0.0 (0)
Food groups	**Percent of observation days on which each food group was consumed**								
All starchy staples	–	100.0	100.0	100.0	100.0	100.0	100.0	–	–
All legumes and nuts	–	100.0	65.5	61.7	76.4	94.3	100.0	–	–
All dairy	–	0.0	0.0	7.4	9.9	12.3	90.0	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	–	–
Eggs	–	0.0	0.0	0.0	1.7	0.0	10.0	–	–
Flesh foods and other miscellaneous small animal protein	–	0.0	0.0	80.9	98.3	100.0	100.0	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	0.0	41.4	35.2	65.1	97.6	100.0	–	–
Other vitamin A-rich vegetables and fruits [b]	–	0.0	17.2	30.9	51.0	95.8	100.0	–	–
Other fruits and vegetables	–	0.0	75.9	84.0	97.6	100.0	100.0	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 7d. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-9R - 15 g Minimum)

	Number of food groups eaten								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Percent (number)[a] of observation days at each diversity score	0.0 (0)	3.9 (7)	18.6 (32)	35.0 (62)	29.1 (53)	12.4 (22)	0.9 (2)	0.0 (0)	0.0 (0)
Food groups	**Percent of observation days on which each food group was consumed**								
All starchy staples	–	100.0	100.0	100.0	100.0	100.0	100.0	–	–
All legumes and nuts	–	27.9	40.2	51.8	78.1	87.5	100.0	–	–
All dairy	–	0.0	0.0	15.1	18.8	47.8	100.0	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	–	–
Eggs	–	0.0	0.0	0.0	1.6	0.0	0.0	–	–
Flesh foods and other miscellaneous small animal protein	–	0.0	34.3	72.9	90.3	94.9	100.0	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	16.3	26.5	43.2	74.3	91.2	100.0	–	–
Other vitamin A-rich vegetables and fruits [b]	–	0.0	15.2	20.1	38.6	82.4	100.0	–	–
Other fruits and vegetables	–	55.8	83.8	96.9	98.4	96.3	100.0	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 7e. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-13 - 1 g Minimum)

	Number of food groups eaten												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Percent (number) of observation days at each diversity score	0.0 (0)	0.6 (1)	2.2 (4)	8.7 (15)	10.4 (20)	19.1 (33)	27.3 (49)	23.2 (40)	7.7 (14)	0.9 (2)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**												
All starchy staples	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–	–	–
All legumes and nuts	–	100.0	79.2	77.9	43.9	75.6	95.0	94.5	100.0	100.0	–	–	–
All dairy	–	0.0	0.0	7.4	13.2	17.2	19.4	17.7	32.1	50.0	–	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–
Eggs	–	0.0	0.0	0.0	4.4	0.0	1.7	0.0	0.0	50.0	–	–	–
Small fish eaten whole with bones	–	0.0	0.0	36.8	43.0	28.2	56.9	68.9	85.7	100.0	–	–	–
All other flesh foods and miscellaneous small animal protein	–	0.0	0.0	30.5	54.4	83.3	84.9	100.0	100.0	50.0	–	–	–
Vitamin A-rich dark green leafy vegetables [a]	–	0.0	50.0	47.4	44.7	68.4	89.6	94.5	100.0	100.0	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [a]	–	0.0	0.0	14.7	45.6	52.6	58.2	91.7	100.0	100.0	–	–	–
Vitamin C-rich vegetables [b]	–	0.0	70.8	65.3	93.9	100.0	96.7	100.0	100.0	100.0	–	–	–
Vitamin A-rich fruits [a]	–	0.0	0.0	12.6	25.4	26.3	21.1	40.2	54.8	100.0	–	–	–
Vitamin C-rich fruits [b]	–	0.0	0.0	0.0	0.0	13.4	14.4	9.4	39.3	50.0	–	–	–
All other fruits and vegetables	–	0.0	0.0	7.4	31.6	34.9	62.2	83.1	88.1	100.0	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 7f. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-13R - 15 g Minimum)

	Number of food groups eaten												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Percent (number) of observation days at each diversity score	0.0 (0)	3.5 (6)	18.2 (31)	26.1 (48)	30.5 (54)	16.1 (28)	5.3 (10)	0.5 (1)	0.0 (0)	0.0 (0)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**												
All starchy staples	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–	–	–	–	–
All legumes and nuts	–	31.6	41.2	53.5	64.7	85.2	91.4	100.0	–	–	–	–	–
All dairy	–	0.0	3.5	11.2	18.0	39.2	34.5	100.0	–	–	–	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–
Eggs	–	0.0	0.0	0.0	1.5	0.0	0.0	0.0	–	–	–	–	–
Small fish eaten whole with bones	–	0.0	0.0	9.1	2.1	14.8	0.0	0.0	–	–	–	–	–
All other flesh foods and miscellaneous small animal protein	–	0.0	29.1	54.2	81.7	96.0	91.4	100.0	–	–	–	–	–
Vitamin A-rich dark green leafy vegetables [a]	–	18.4	30.7	49.3	62.9	68.8	91.4	100.0	–	–	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [a]	–	0.0	0.0	1.7	9.6	10.8	20.7	0.0	–	–	–	–	–
Vitamin C-rich vegetables [b]	–	31.6	76.4	94.1	97.0	97.2	91.4	100.0	–	–	–	–	–
Vitamin A-rich fruits [a]	–	0.0	13.1	16.8	25.7	47.7	91.4	100.0	–	–	–	–	–
Vitamin C-rich fruits [b]	–	0.0	3.5	2.4	7.2	6.8	37.9	0.0	–	–	–	–	–
All other fruits and vegetables	–	18.4	2.5	7.7	29.6	33.5	50.0	100.0	–	–	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 7g. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-21 - 1 g Minimum)

	Number of food groups eaten																				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
Percent (number) of observation days at each diversity score	0.0 (0)	0.6 (1)	0.9 (2)	8.2 (14)	7.3 (14)	12.2 (22)	18.2 (31)	28.8 (50)	15.1 (28)	8.1 (15)	0.5 (1)	0.0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**																				
Grains and grain products	–	100.0	100.0	100.0	91.3	100.0	97.5	100.0	100.0	100.0	100.0	–	–	–	–	–	–	–	–	–	–
All other starchy staples	–	0.0	0.0	0.0	15.0	7.5	17.1	13.6	34.3	21.3	0.0	–	–	–	–	–	–	–	–	–	–
Cooked dry beans and peas	–	100.0	50.0	47.8	8.8	24.6	28.1	24.7	22.9	56.2	0.0	–	–	–	–	–	–	–	–	–	–
Soybeans and soy products	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–
Nuts and seeds	–	0.0	0.0	52.2	51.3	47.8	82.9	82.6	100.0	100.0	100.0	–	–	–	–	–	–	–	–	–	–
Milk/yogurt	–	0.0	0.0	7.8	6.3	20.1	12.1	25.6	16.3	13.5	100.0	–	–	–	–	–	–	–	–	–	–
Cheese	–	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–
Beef, pork, veal, lamb, goat, game meat	–	0.0	0.0	0.0	27.5	34.3	47.7	57.9	65.7	78.7	100.0	–	–	–	–	–	–	–	–	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–
Chicken, duck, turkey, pigeon, guinea hen, game birds	–	0.0	0.0	0.0	8.8	0.0	0.0	2.2	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–
Large whole fish/dried fish/shellfish and other seafood	–	0.0	0.0	18.9	25.0	52.2	46.7	65.2	81.3	78.7	100.0	–	–	–	–	–	–	–	–	–	–
Small fish eaten whole with bones	–	0.0	0.0	31.1	35.0	44.0	44.7	56.6	66.3	80.9	100.0	–	–	–	–	–	–	–	–	–	–
Insects, grubs, snakes, rodents and other small animal	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–
Eggs	–	0.0	0.0	0.0	6.3	0.0	2.5	0.0	0.0	5.6	0.0	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich dark green leafy vegetables [a]	–	0.0	50.0	57.8	51.3	43.3	82.4	88.0	97.0	100.0	100.0	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [a]	–	0.0	0.0	7.8	46.3	64.2	38.7	75.3	91.6	84.3	100.0	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich vegetables [b]	–	0.0	100.0	61.1	85.0	100.0	100.0	96.8	100.0	100.0	100.0	–	–	–	–	–	–	–	–	–	–
All other vegetables	–	0.0	0.0	7.8	21.3	35.1	49.7	64.2	71.1	100.0	100.0	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich fruits [a]	–	0.0	0.0	7.8	21.3	21.6	28.6	32.6	31.9	51.7	100.0	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich fruits [b]	–	0.0	0.0	0.0	0.0	5.2	17.6	11.4	21.7	21.3	0.0	–	–	–	–	–	–	–	–	–	–
All other fruits	–	0.0	0.0	0.0	0.0	0.0	3.5	1.6	0.0	7.9	0.0	–	–	–	–	–	–	–	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 7h. Percent of Observation Days on Which Different Food Groups were Consumed, by Food Group Diversity Score, All Women, R2 (FGI-21R - 15 g Minimum)

	Number of food groups eaten																				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
Percent (number) of observation days at each diversity score	0.0 (0)	3.6 (6)	12.6 (22)	26.6 (47)	23.1 (41)	23.6 (43)	6.8 (13)	3.2 (5)	0.5 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**																				
Grains and grain products	–	100.0	100.0	97.6	98.0	100.0	100.0	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
All other starchy staples	–	0.0	3.6	15.5	12.6	19.7	28.0	60.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Cooked dry beans and peas	–	30.0	34.1	26.1	20.6	29.3	34.7	60.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Soybeans and soy products	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Nuts and seeds	–	0.0	8.7	22.7	60.5	49.8	58.7	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Milk/yogurt	–	17.5	0.0	9.3	10.3	31.7	54.7	0.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Cheese	–	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Beef, pork, veal, lamb, goat, game meat	–	0.0	12.3	17.2	50.2	52.1	52.0	60.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Chicken, duck, turkey, pigeon, guinea hen, game birds	–	0.0	0.0	2.4	0.0	2.7	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Large whole fish/dried fish/shellfish and other seafood	–	0.0	3.6	32.3	30.4	54.1	64.0	80.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Small fish eaten whole with bones	–	0.0	0.0	6.5	2.8	10.0	0.0	20.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Insects, grubs, snakes, rodents and other small animal	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Eggs	–	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich dark green leafy vegetables [a]	–	17.5	39.1	45.7	59.7	64.5	70.7	80.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [a]	–	0.0	0.0	1.7	4.7	13.1	13.3	20.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich vegetables [b]	–	17.5	79.7	93.5	96.0	94.2	93.3	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
All other vegetables	–	17.5	3.6	8.2	26.9	22.0	45.3	40.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich fruits [a]	–	0.0	10.1	17.2	19.8	46.3	56.0	60.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich fruits [b]	–	0.0	5.1	4.1	5.5	6.6	20.0	20.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
All other fruits	–	0.0	0.0	0.0	0.0	1.9	9.3	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 8. Mean and Median Nutrient Intake and PA: Lowest Bioavailability Level for Iron and Zinc, All Women [a]

Nutrient	Mean	SD	Median	EAR [b]	SD [b]	PA (Mean)	PA (Median)	Lambda (Box-Cox transformation) [c]
Energy	2,315.99	876.45	2,188.79					
Protein (All Sources) (% of kcal)	10.81	3.78	10.30					
Protein from animal sources (% of kcal)	2.68	3.89	1.62					
Total carbohydrate (% of kcal)	66.23	11.23	67.68					
Sugars (% of kcal)	12.90	10.37	11.08					
Total fat (% of kcal)	22.03	10.47	21.09					
Saturated fat (% of kcal)	–	–	–					
Thiamin (mg/d)	1.06	0.49	0.98	0.9	0.09	0.44	0.38	0.236
Riboflavin (mg/d)	0.78	0.46	0.67	0.9	0.09	0.13	0.00	0.033
Niacin (mg/d)	9.84	5.72	8.38	11	1.65	0.20	0.06	0.110
Vitamin B6 (mg/d)	1.57	0.86	1.35	1.1	0.11	0.60	0.65	0.106
Folate (µg/d)	255.79	185.31	201.55	320	32	0.12	0.00	0.170
Vitamin B12 (µg/d)	1.00	1.78	0.41	2.0	0.2	0.04	0.00	0.146
Vitamin C (mg/d)	85.65	98.92	53.24	30	3.0	0.68	0.99	0.182
Vitamin A (RE/d)	795.17	978.59	424.64	270	54	0.67	0.97	0.101
Calcium (mg/d)	544.21	432.93	410.61	[d]	[d]	0.31	0.25	0.062
Iron (mg/d)	24.72	15.03	21.40	See tables A6-2 & A6-3		0.26	0.15	0.106
Zinc (mg/d)	9.83	4.61	9.05	15% bioavail: 6.67	1.67	0.71	0.94	0.291
MPA across 11 micronutrients	0.38	0.19	0.34					

[a] Mean and median nutrient intakes are for second observation day; PA are based on estimated usual intake, calculated using repeat observations for a subset of the sample.
[b] EAR and SD are presented for the predominant physiological group, i.e., NPNL women (19-65 years); however, the sample also include pregnant women (7.6 percent), lactating women (20.5 percent) and adolescent girls (2.3 percent). See table A6-1 for sources of data.
[c] This documents the transformation parameters selected for each nutrient. The power transformations result in approximately normal distributions.
[d] There is no EAR and no SD for calcium; 1000 mg is the Adequate Intake (AI).

Table 9a. Percent Contribution of Food Groups (FGI-6) to Intake of Energy, Protein and Nutrients, All Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
All starchy staples	56.3	47.9	73.6	12.0	53.8	30.5	32.3	45.3	27.8	0.0	9.2	3.3	14.9	37.9	61.6
All legumes and nuts	10.3	19.6	6.0	21.5	22.0	14.2	25.8	7.6	29.1	0.0	3.2	1.8	11.4	18.2	17.3
All dairy	1.5	2.4	1.2	2.5	1.7	5.8	1.8	1.6	1.5	9.2	1.6	2.5	7.0	1.2	2.2
Other animal source foods	5.8	19.4	0.0	15.0	5.1	8.4	12.5	7.5	2.2	74.0	0.3	2.0	13.3	6.5	8.9
Vitamin A-rich fruits/vegetables [b]	4.2	5.5	5.1	1.9	7.8	24.8	12.5	24.3	21.0	0.0	36.1	70.3	33.5	21.3	4.6
Other fruits and vegetables	2.4	3.3	2.6	1.6	6.8	10.3	10.4	10.3	13.1	0.0	47.8	18.6	16.9	12.7	4.4

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol)
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 9b. Percent Contribution of Food Groups (FGI-9) to Intake of Energy, Protein and Nutrients, All Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
All starchy staples	56.3	47.9	73.6	12.0	53.8	30.5	32.3	45.3	27.8	0.0	9.2	3.3	14.9	37.9	61.6
All legumes and nuts	10.3	19.6	6.0	21.5	22.0	14.2	25.8	7.6	29.1	0.0	3.2	1.8	11.4	18.2	17.3
All dairy	1.5	2.4	1.2	2.5	1.7	5.8	1.8	1.6	1.5	9.2	1.6	2.5	7.0	1.2	2.2
Organ meat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eggs	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.1
Flesh foods and other miscellaneous small animal protein	5.7	19.3	0.0	14.9	5.1	8.3	12.5	7.5	2.1	73.4	0.3	1.9	13.3	6.4	8.8
Vitamin A-rich dark green leafy vegetables	1.1	4.1	1.1	0.8	3.9	18.0	6.5	16.0	16.6	0.0	15.7	43.6	30.2	15.3	3.1
Other vitamin A-rich vegetables and fruits [b]	3.0	1.4	4.0	1.1	3.9	6.8	6.0	8.3	4.3	0.0	20.5	26.7	3.3	6.0	1.5
Other fruits and vegetables	2.4	3.3	2.6	1.6	6.8	10.3	10.4	10.3	13.1	0.0	47.8	18.6	16.9	12.7	4.4

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol)
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 9c. Percent Contribution of Food Groups (FGI-13) to Intake of Energy, Protein and Nutrients, All Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
All starchy staples	56.3	47.9	73.6	12.0	53.8	30.5	32.3	45.3	27.8	0.0	9.2	3.3	14.9	37.9	61.6
All legumes and nuts	10.3	19.6	6.0	21.5	22.0	14.2	25.8	7.6	29.1	0.0	3.2	1.8	11.4	18.2	17.3
All dairy	1.5	2.4	1.2	2.5	1.7	5.8	1.8	1.6	1.5	9.2	1.6	2.5	7.0	1.2	2.2
Organ meat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eggs	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.1
Small fish eaten whole w/bones	0.4	3.1	0.0	0.6	0.2	0.3	1.4	1.1	0.3	20.5	0.0	0.0	7.6	0.4	0.3
All other flesh foods misc. small animal protein	5.3	16.2	0.0	14.2	4.9	8.1	11.1	6.4	1.9	52.9	0.3	1.9	5.7	6.0	8.5
Vitamin A-rich dark green leafy vegetables [b]	1.1	4.1	1.1	0.8	3.9	18.0	6.5	16.0	16.6	0.0	15.7	43.6	30.2	15.3	3.1
Vitamin A-rich deep yellow/orange/red vegetables [b]	0.4	0.4	0.3	0.7	1.0	0.9	1.7	1.5	1.1	0.0	0.8	6.3	0.5	0.9	0.4
Vitamin C-rich vegetables [c]	1.7	2.3	1.8	1.2	5.0	6.5	6.6	7.1	9.3	0.0	43.8	16.6	11.0	4.3	2.6
Vitamin A-rich fruits [b]	2.6	1.1	3.7	0.4	2.9	5.9	4.3	6.8	3.2	0.0	19.7	20.4	2.7	5.0	1.1
Vitamin C-rich fruits [c]	0.3	0.1	0.4	0.1	0.5	0.4	0.3	1.2	0.8	0.0	2.5	0.1	0.5	0.2	0.2
All other fruits and vegetables	0.4	0.9	0.4	0.3	1.4	3.4	3.5	2.0	3.0	0.0	1.4	1.8	5.4	8.2	1.6

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol)
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 9d. Percent Contribution of Food Groups (FGI-21) to Intake of Energy, Protein and Nutrients, All Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
Grains and grain products	53.2	46.1	68.9	11.5	48.6	28.1	29.6	38.9	22.9	0.0	1.1	1.9	9.2	35.0	58.5
All other starchy staples	3.1	1.8	4.7	0.4	5.2	2.4	2.7	6.3	4.9	0.0	8.1	1.4	5.6	3.0	3.1
Cooked dry beans and peas	4.6	10.7	5.0	1.0	13.4	6.1	6.5	3.9	17.8	0.0	2.8	1.3	6.1	7.0	9.4
Soybeans and soy products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuts and seeds	5.7	9.0	1.0	20.4	8.5	8.1	19.3	3.7	11.4	0.0	0.4	0.5	5.3	11.2	7.9
Milk/yogurt	1.5	2.4	1.2	2.4	1.7	5.8	1.8	1.6	1.5	9.2	1.6	2.3	6.9	1.2	2.2
Cheese	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0
Beef, pork, veal, lamb, goat, game meat	3.0	7.5	0.0	8.5	3.1	6.1	7.4	3.3	1.0	35.3	0.1	0.5	1.1	3.8	6.4
Organ meat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chicken, duck, turkey, pigeon, guinea hen, game birds	0.4	0.6	0.0	0.6	0.3	0.6	0.6	0.4	0.0	0.9	0.0	0.6	0.1	0.4	0.5
Large whole fish/dried fish/shellfish, other seafood	1.8	8.1	0.0	5.1	1.4	1.4	3.1	2.7	0.9	16.8	0.2	0.8	4.4	1.8	1.6
Small fish eaten whole w/bones	0.4	3.1	0.0	0.6	0.2	0.3	1.4	1.1	0.3	20.5	0.0	0.0	7.6	0.4	0.3
Insects, grubs, snakes, rodents and other small animal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eggs	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.1
Vitamin A-rich dark green leafy vegetables [b]	1.1	4.1	1.1	0.8	3.9	18.0	6.5	16.0	16.6	0.0	15.7	43.6	30.2	15.3	3.1
Vitamin A-rich deep yellow/orange/red vegetables [b]	0.4	0.4	0.3	0.7	1.0	0.9	1.7	1.5	1.1	0.0	0.8	6.3	0.5	0.9	0.4
Vitamin C-rich vegetables [c]	1.7	2.3	1.8	1.2	5.0	6.5	6.6	7.1	9.3	0.0	43.8	16.6	11.0	4.3	2.6
All other vegetables	0.3	0.9	0.3	0.2	1.3	3.3	3.4	1.9	2.9	0.0	1.4	1.8	5.3	8.2	1.5
Vitamin A-rich fruits [b]	2.6	1.1	3.7	0.4	2.9	5.9	4.3	6.8	3.2	0.0	19.7	20.4	2.7	5.0	1.1
Vitamin C-rich fruits [c]	0.3	0.1	0.4	0.1	0.5	0.4	0.3	1.2	0.8	0.0	2.5	0.1	0.5	0.2	0.2
All other fruits	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol)
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table 10. Correlations between Food Group Diversity Scores and Estimated Usual Intakes of Individual Nutrients, All Women [a, b]

	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
Nutrients	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy
Total energy	0.138		0.185 *		0.197 **		0.215 **		0.222 **		0.243 **		0.251 ***		0.276 ***	
Thiamin	0.113	0.012	0.253 ***	0.176 *	0.150 *	0.001	0.262 ***	0.155 *	0.149 *	-0.031	0.281 ***	0.152 *	0.216 **	0.040	0.316 ***	0.170 *
Riboflavin	0.251 ***	0.212 **	0.365 ***	0.321 ***	0.249 ***	0.172 *	0.379 ***	0.320 ***	0.139	0.021	0.343 ***	0.258 ***	0.165 *	0.032	0.348 ***	0.245 **
Niacin	0.246 ***	0.206 **	0.431 ***	0.409 ***	0.289 ***	0.217 **	0.409 ***	0.359 ***	0.308 ***	0.224 **	0.409 ***	0.339 ***	0.334 ***	0.236 **	0.444 ***	0.363 ***
Vitamin B6	0.207 **	0.156 *	0.288 ***	0.224 **	0.221 **	0.128	0.322 ***	0.247 ***	0.253 ***	0.150 *	0.342 ***	0.251 ***	0.312 ***	0.204 **	0.386 ***	0.284 ***
Folate	0.116	0.052	0.231 **	0.161 *	0.099	-0.004	0.244 **	0.158 *	0.124	0.009	0.216 **	0.107	0.187 *	0.067	0.228 **	0.102
Vitamin B12	0.288 ***	0.276 ***	0.286 ***	0.271 ***	0.292 ***	0.276 ***	0.253 ***	0.235 **	0.208 **	0.188 *	0.244 **	0.224 **	0.236 **	0.215 **	0.292 ***	0.273 ***
Vitamin C	0.279 ***	0.252 ***	0.379 ***	0.345 ***	0.338 ***	0.298 ***	0.485 ***	0.452 ***	0.314 ***	0.267 ***	0.460 ***	0.419 ***	0.354 ***	0.302 ***	0.499 ***	0.455 ***
Vitamin A	0.285 ***	0.257 ***	0.334 ***	0.297 ***	0.318 ***	0.276 ***	0.458 ***	0.422 ***	0.288 ***	0.236 **	0.411 ***	0.364 ***	0.319 ***	0.262 ***	0.444 ***	0.392 ***
Calcium	0.241 **	0.204 **	0.193 *	0.131	0.209 **	0.144	0.222 **	0.152 *	0.214 **	0.140	0.204 **	0.119	0.238 **	0.155 *	0.182 *	0.080
Iron	0.173 *	0.114	0.106	-0.002	0.168 *	0.067	0.119	-0.008	0.225 **	0.120	0.156 *	0.017	0.256 ***	0.139	0.147	-0.018
Zinc	0.098	-0.015	0.115	-0.045	0.108	-0.072	0.111	-0.088	0.176 *	0.008	0.159 *	-0.048	0.195 **	0.002	0.146	-0.111

[a] Usual intake of energy and individual nutrients are estimated by the best linear unbiased predictor (BLUP) following the method described in section 11 of the WDDP protocol (Arimond et al. 2008). Diversity scores are from round 2 data; BLUP calculation incorporates information from one to three rounds.
[b] A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.

Table 11a. Correlation between Energy from 6 Major Food Groups and MPA, With and Without Controlling for Total Energy Intake, All Women [a, b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
All starchy staples	0.152 *	**-0.287** ***
All legumes and nuts	0.232 **	0.116
All dairy	0.022	0.020
Other animal source foods	0.226 **	0.180 *
Vitamin A-rich fruits and vegetables [c]	0.421 ***	0.388 ***
Other fruits and vegetables	0.158 *	0.113

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample. Transformed MPA (box-cox) was used in these correlations
[c] Vitamin A-rich fruits and vegetables are defined as those with >120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 11b. Correlation between Energy from 9 Sub-Food Groups and MPA, With and Without Controlling for Total Energy Intake, All Women [a. b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
All starchy staples	0.152 *	**-0.287** ***
All legumes and nuts	0.232 **	0.116
All dairy	0.022	0.020
Organ meat	–	–
Eggs	0.049	0.094
Flesh foods and other miscellaneous small animal protein	0.223 **	0.174 *
Vitamin A-rich dark green leafy vegetables [c]	0.348 ***	0.360 ***
Other vitamin A-rich vegetables and fruits [c]	0.344 ***	0.304 ***
Other fruits and vegetables	0.158 *	0.113

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample. Transformed MPA (box-cox) was used in these correlations
[c] Vitamin A-rich fruits and vegetables are defined as those with >120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table 11c. Correlation between Energy from 13 Sub-Food Groups and MPA, With and Without Controlling for Total Energy Intake, All Women [a, b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
All starchy staples	0.152 *	**-0.287** ***
All legumes and nuts	0.232 **	0.116
All dairy	0.022	0.020
Organ meat	–	–
Eggs	0.049	0.094
Small fish eaten whole with bones	0.099	0.048
All other flesh foods and miscellaneous small animal protein	0.214 **	0.169 *
Vitamin A-rich dark green leafy vegetables [c]	0.348 ***	0.360 ***
Vitamin A-rich deep yellow/orange/red vegetables [c]	0.054	-0.024
Vitamin C-rich vegetables [d]	0.089	0.051
Vitamin A-rich fruits [c]	0.341 ***	0.304 ***
Vitamin C-rich fruits [d]	0.100	0.134
All other fruits and vegetables	0.082	-0.005

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample. Transformed MPA (box-cox) was used in these correlations
[c] Vitamin A-rich fruits and vegetables are defined as those with >120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[d] Vitamin C-rich fruits and vegetables are defined as those with >9 mg/100g *raw, taking into account retention factors*.

Table 11d. Correlation between energy from 21 Sub-Food Groups and MPA, With and Without Controlling for Total Energy Intake, All Women [a, b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
Grains and grain products	0.112	**-0.243** **
All other starchy staples	0.090	0.014
Cooked dry beans and peas	0.125	0.056
Soybeans and soy products	–	–
Nuts and seeds	0.193 **	0.102
Milk/yogurt	0.021	0.019
Cheese	0.019	0.024
Beef, pork, veal, lamb, goat, game meat	0.231 **	0.216 **
Organ meat	–	–
Chicken, duck, turkey, pigeon, guinea hen, game birds	0.010	-0.009
Large whole fish/dried fish/shellfish and other seafood	0.098	0.037
Small fish eaten whole with bones	0.099	0.048
Insects, grubs, snakes, rodents and other small animal	–	–
Eggs	0.049	0.094
Vitamin A-rich dark green leafy vegetables [c]	0.348 ***	0.360 ***
Vitamin A-rich deep yellow/orange/red vegetables [c]	0.054	-0.024
Vitamin C-rich vegetables [d]	0.089	0.051
All other vegetables	0.013	-0.064
Vitamin A-rich fruits [c]	0.341 ***	0.304 ***
Vitamin C-rich fruits [d]	0.100	0.134
All other fruits	0.101	0.055

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at p < 0.05; ** indicates p < 0.01, and *** indicates p < 0.001.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample. Transformed MPA (box-cox) was used in these correlations
[c] Vitamin A-rich fruits and vegetables are defined as those with >120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[d] Vitamin C-rich fruits and vegetables are defined as those with >9 mg/100g *raw, taking into account retention factors*.

Table 12. Total Energy Intake (kcal) by Food Group Diversity Scores, All Women, R2 [a, b]

Number of food groups eaten	Diversity indicators: Median total energy intake (range)															
	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	–	–	2867	(1389-4279)	–	–	2855	(1389-3431)	–	–	1998	(1389-3431)	–	–	1998	(1068-3431)
3	1281	(988-3103)	1912	(946-3393)	1423	(988-3103)	1917	(946-4279)	–	–	1917	(988-4279)	–	–	1912	(988-4279)
4	2074	(981-4279)	2213	(903-4565)	1998	(981-4061)	2177	(903-4565)	1918	(1038-4061)	2077	(903-4565)	1798	(988-3083)	1899	(903-4061)
5	2197	(768-5242)	2317	(714-5242)	2078	(946-4836)	2303	(714-5242)	2244	(981-4279)	2237	(714-5242)	2244	(1173-4279)	2249	(768-5242)
6	2334	(714-4491)	3001	(1864-3504)	2202	(714-5242)	2024	(1293-3779)	2000	(1131-4836)	2851	(1245-4493)	2044	(981-4836)	2537	(714-4493)
7					2791	(903-4491)	–	–	2202	(714-4565)	2808	(1789-3779)	1917	(768-4192)	2808	(1245-3779)
8					–	–	–	–	2496	(1456-5242)	–	–	2266	(714-5242)	2317	(1789-2841)
9					–	–	–	–	2107	(903-4491)	–	–	2213	(903-4565)	–	–
10									–	–	–	–	3089	(1789-4491)	–	–
11									–	–	–	–	–	–	–	–
12									–	–	–	–	–	–	–	–
13									–	–	–	–	–	–	–	–
14													–	–	–	–
15													–	–	–	–
16													–	–	–	–
17													–	–	–	–
18													–	–	–	–
19													–	–	–	–
20													–	–	–	–
21													–	–	–	–

[a] Energy intake and food group diversity scores for second observation day.
[b] Light shading indicates impossible values (beyond range of possible scores). A "--" indicates that a cell has fewer than 5 observations. Cells with fewer than 10 observations have dark shading.

Table 13. Relationship between Food Group Diversity Scores and Total Energy Intake, All Women [a]

	Food group diversity score (mean)	Food group diversity score (median)	Total energy intake (mean)	Total energy intake (median)	Correlation Coefficient [b]
FGI-6	4.8	5.0	2316	2189	0.138
FGI-6R [c]	4.2	4.0	2316	2189	0.185 *
FGI-9	5.4	6.0	2316	2189	0.197 **
FGI-9R [c]	4.3	4.0	2316	2189	0.215 **
FGI-13	6.6	7.0	2316	2189	0.222 **
FGI-13R [c]	4.6	5.0	2316	2189	0.243 **
FGI-21	7.3	8.0	2316	2189	0.251 ***
FGI-21R [c]	4.9	5.0	2316	2189	0.276 ***

[a] Food group diversity scores and mean and median energy intakes are from second observation day; BLUP for energy intake based on 1 to 3 observation days is used for correlation analysis.
[b] A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[c] Refers to minimum intake of 15g for each of the food groups/sub food groups

Table 14. MPA by Food Group Diversity Scores, All Women [a, b]

Number of food groups eaten	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
	Median MPA (range)															
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	–	–	0.21	(0.07-0.50)	–	–	0.21	(0.07-0.45)	–	–	0.20	(0.07-0.45)	–	–	0.19	(0.07-0.45)
3	0.24	(0.05-0.60)	0.25	(0.00-0.60)	0.45	(0.05-0.60)	0.26	(0.00-0.60)	–	–	0.26	(0.00-0.60)	–	–	0.33	(0.01-0.60)
4	0.30	(0.00-0.61)	0.37	(0.08-0.84)	0.30	(0.05-0.61)	0.33	(0.04-0.84)	0.33	(0.07-0.43)	0.33	(0.04-0.84)	0.24	(0.05-0.55)	0.30	(0.04-0.69)
5	0.40	(0.04-0.84)	0.36	(0.04-0.88)	0.34	(0.00-0.78)	0.36	(0.11-0.88)	0.27	(0.00-0.57)	0.34	(0.11-0.88)	0.33	(0.01-0.50)	0.34	(0.00-0.84)
6	0.36	(0.11-0.88)	0.62	(0.34-0.75)	0.40	(0.04-0.84)	0.51	(0.25-0.77)	0.25	(0.04-0.84)	0.51	(0.16-0.81)	0.26	(0.04-0.69)	0.46	(0.11-0.88)
7					0.52	(0.21-0.88)	–	–	0.35	(0.09-0.88)	0.55	(0.34-0.75)	0.34	(0.00-0.84)	0.60	(0.34-0.75)
8					–	–	–	–	0.42	(0.08-0.81)	–	–	0.35	(0.11-0.88)	0.55	(0.36-0.81)
9					–	–	–	–	0.52	(0.18-0.77)	–	–	0.40	(0.08-0.75)	–	–
10									–	–	–	–	0.53	(0.33-0.81)	–	–
11									–	–	–	–	–	–	–	–
12									–	–	–	–	–	–	–	–
13									–	–	–	–	–	–	–	–
14													–	–	–	–
15													–	–	–	–
16													–	–	–	–
17													–	–	–	–
18													–	–	–	–
19													–	–	–	–
20													–	–	–	–
21													–	–	–	–

[a] Food group diversity scores are from second observation day; MPA is is based on estimated usual intake, calculated using repeat observations for a subset of the sample.

[b] Light shading indicates impossible values (beyond range of possible scores). A "--" indicates that a cell has fewer than 5 observations. Cells with fewer than 10 observations have dark shading.

Table 15. Relationship between MPA and Food Group Diversity Scores, All Women [a]

	Food group diversity score		MPA		Correlation Coefficient [b]	Partial correlation controlling for total energy intake [b]
	(mean)	(median)	(mean)	(median)		
FGI-6	4.8	5.0	0.38	0.34	0.236 **	0.193 **
FGI-6R [c]	4.2	4.0	0.38	0.34	0.333 ***	0.281 ***
FGI-9	5.4	6.0	0.38	0.34	0.263 ***	0.188 *
FGI-9R [c]	4.3	4.0	0.38	0.34	0.387 ***	0.330 ***
FGI-13	6.6	7.0	0.38	0.34	0.255 ***	0.162 *
FGI-13R [c]	4.6	5.0	0.38	0.34	0.394 ***	0.321 ***
FGI-21	7.3	8.0	0.38	0.34	0.321 ***	0.225 **
FGI-21R [c]	4.9	5.0	0.38	0.34	0.438 ***	0.356 ***

[a] Food group diversity scores are from second observation day, MPA is based on one to three observations days; Transformed MPA (box-cox) and BLUP for total energy intake were used for correlation analysis.
[b] A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[c] Refers to minimum intake of 15g for each of the food groups/sub food groups.

Table 16. Results of Ordinary Least Squares Regression Analysis of the Determinants of MPA, All Women [a, b]

	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
	Not controlling for energy															
	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error
Constant	-0.904	0.545	-0.864	0.525	-0.684	0.536	-0.742	0.509	-0.598	0.538	-0.737	0.513	-0.644	0.526	-0.765	0.504
Woman's height	-0.001	0.003	-0.001	0.003	-0.001	0.003	-0.002	0.003	-0.001	0.003	-0.001	0.003	-0.001	0.003	-0.001	0.003
Age	-0.006 *	0.003	-0.004	0.002	-0.005	0.003	-0.004	0.002	-0.005 *	0.003	-0.004	0.002	-0.005 *	0.002	-0.003	0.002
Lactating (0/1)	-0.059	0.047	-0.069	0.046	-0.066	0.047	-0.063	0.045	-0.072	0.048	-0.065	0.045	-0.082	0.047	-0.066	0.045
Pregnant [d] (0/1)	– –	–	– –	–	– –	–	– –	–	– –	–	– –	–	– –	–	– –	–
Dietary diversity score	0.099 ***	0.028	0.095 ***	0.020	0.072 ***	0.020	0.097 ***	0.017	0.041 **	0.013	0.080 ***	0.015	0.046 ***	0.011	0.078 ***	0.013
Adjusted R^2	0.085 **		0.136 ***		0.089 ***		0.175 ***		0.076 **		0.163 ***		0.117 ***		0.194 ***	
	Controlling for energy															
	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error	B	Standard error
Constant	-3.626 ***	0.488	-3.567 ***	0.472	-3.491 ***	0.488	-3.411 ***	0.466	-3.464 ***	0.493	-3.411 ***	0.472	-3.421 ***	0.484	-3.368 ***	0.467
Woman's height	-0.003	0.002	-0.003	0.002	-0.004	0.002	-0.004	0.002	-0.004	0.002	-0.004	0.002	-0.004	0.002	-0.004	0.002
Age	-0.002	0.002	-0.001	0.002	-0.002	0.002	-0.001	0.002	-0.002	0.002	-0.001	0.002	-0.002	0.002	-0.001	0.002
Lactating (0/1)	-0.275 ***	0.041	-0.276 ***	0.040	-0.278 ***	0.041	-0.266 ***	0.040	-0.282 ***	0.042	-0.269 ***	0.040	-0.283 ***	0.041	-0.264 ***	0.040
Pregnant [d] (0/1)	– –	–	– –	–	– –	–	– –	–	– –	–	– –	–	– –	–	– –	–
Dietary diversity score	0.055 *	0.022	0.064 ***	0.016	0.039 *	0.015	0.064 ***	0.014	0.020 *	0.010	0.050 ***	0.012	0.026 **	0.008	0.049 ***	0.010
Total energy intake [c]	156.440 ***	14.689	152.460 ***	14.237	155.951 ***	14.736	148.475 ***	14.136	157.289 ***	14.871	149.046 ***	14.358	153.182 ***	14.671	145.746 ***	14.286
Adjusted R^2	0.468 ***		0.500 ***		0.468 ***		0.515 ***		0.460 ***		0.503 ***		0.478 ***		0.515 ***	

[a] A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$. For the adjusted R^2, the stars indicate the significance level of the F statistic of the regression.
[b] Transformed MPA (box-cox), and BLUP for total energy intake were used in the regressions. MPA and BLUP calculation for total energy intake incorporates information from one to three rounds.
[c] BLUP for total energy intake was divided by 1000 before running the regressions due to the large scale of the energy variable and the small scale of MPA.
[d] The dummy variable for pregnancy was first introduced in the regression, but was automatically dropped by the software

Based on the results shown in **Table 17**, three MPA cut-offs are considered - 50%, 60% and 70% - for **Tables 18-19**.

Table 17. Percent of Observation Days above Selected Cut-Off(s) for MPA, All Women

	Percent (number)	
Women with MPA >50%	26.2	(47)
Women with MPA >60%	15.1	(28)
Women with MPA >70%	7.4	(13)
Women with MPA >80%	1.6	(3)
Women with MPA >90%	0.0	(0)

Table 18. MPA: Performance of Diversity Scores, All Women [a]

	Range	AUC	p-value [b]	SEM [c]	95% CI [d]
			MPA >50% (first cut-off)		
FGI-6	2.0-6.0	0.645	<0.001	0.037	0.572-0.717
FGI-6R [e]	2.0-6.0	0.652	0.001	0.044	0.566-0.738
FGI-9	2.0-7.0	0.673	<0.001	0.042	0.590-0.756
FGI-9R [e]	2.0-7.0	0.684	<0.001	0.044	0.599-0.770
FGI-13	2.0-10.0	0.659	<0.001	0.044	0.572-0.746
FGI-13R [e]	2.0-8.0	0.701	<0.001	0.044	0.616-0.787
FGI-21	2.0-11.0	0.691	<0.001	0.044	0.605-0.777
FGI-21R [e]	2.0-9.0	0.731	<0.001	0.043	0.647-0.815
			MPA > 60% (second cut-off)		
FGI-6	2.0-6.0	0.640	0.003	0.046	0.549-0.731
FGI-6R [e]	2.0-6.0	0.680	<0.001	0.051	0.580-0.779
FGI-9	2.0-7.0	0.671	0.001	0.052	0.568-0.774
FGI-9R [e]	2.0-7.0	0.669	0.001	0.050	0.570-0.768
FGI-13	2.0-10.0	0.607	0.033	0.050	0.509-0.705
FGI-13R [e]	2.0-8.0	0.702	<0.001	0.052	0.600-0.804
FGI-21	2.0-11.0	0.665	0.002	0.053	0.561-0.769
FGI-21R [e]	2.0-9.0	0.768	<0.001	0.046	0.677-0.859
			MPA > 70% (third cut-off)		
FGI-6	2.0-6.0	0.624	0.005	0.044	0.538-0.711
FGI-6R [e]	2.0-6.0	0.631	0.348	0.062	0.509-0.752
FGI-9	2.0-7.0	0.692	0.001	0.059	0.576-0.808
FGI-9R [e]	2.0-7.0	0.634	0.027	0.061	0.516-0.753
FGI-13	2.0-10.0	0.687	0.003	0.063	0.563-0.812
FGI-13R [e]	2.0-8.0	0.739	<0.001	0.051	0.639-0.839
FGI-21	2.0-11.0	0.714	0.001	0.065	0.586-0.842
FGI-21R [e]	2.0-9.0	0.802	<0.001	0.041	0.722-0.883

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.
[b] P-value for test of null hypothesis that area=0.5 ("neutral" diagonal line on ROC graph).
[c] Standard error of the mean.
[d] Confidence interval.
[e] Refers to minimum intake of 15g for each food groups/sub food groups.

Table 19. MPA: Tests Comparing AUC for Various Diversity Scores, All Women [a, b]

MPA > 50% (first cut-off)									
		FGI-6	**FGI-6R**	**FGI-9**	**FGI-9R**	**FGI-13**	**FGI-13R**	**FGI-21**	**FGI-21R**
	AUC[c]	0.645	0.652	0.673	0.684	0.659	0.701	0.691	0.731
		P-values							
FGI-6	0.645								
FGI-6R [d]	0.652	0.824							
FGI-9	0.673	0.260	0.603						
FGI-9R [d]	0.684	0.264	0.083	0.772					
FGI-13	0.659	0.732	0.887	0.681	0.536				
FGI-13R [d]	0.701	0.135	0.078	0.476	0.456	0.222			
FGI-21	0.691	0.290	0.404	0.655	0.877	0.164	0.803		
FGI-21R [d]	0.731	0.035	0.015	0.189	0.096	0.086	0.193	0.312	
MPA > 60% (second cut-off)									
		FGI-6	**FGI-6R**	**FGI-9**	**FGI-9R**	**FGI-13**	**FGI-13R**	**FGI-21**	**FGI-21R**
	AUC[c]	0.640	0.680	0.671	0.669	0.607	0.702	0.665	0.768
		P-values							
FGI-6	0.640								
FGI-6R [d]	0.680	0.274							
FGI-9	0.671	0.326	0.837						
FGI-9R [d]	0.669	0.451	0.564	0.964					
FGI-13	0.607	0.535	0.144	0.174	0.208				
FGI-13R [d]	0.702	0.172	0.530	0.482	0.311	0.015			
FGI-21	0.665	0.687	0.785	0.913	0.936	0.065	0.469		
FGI-21R [d]	0.768	0.006	0.026	0.052	0.008	0.000	0.019	0.011	
MPA > 70% (third cut-off)									
		FGI-6	**FGI-6R**	**FGI-9**	**FGI-9R**	**FGI-13**	**FGI-13R**	**FGI-21**	**FGI-21R**
	AUC[c]	0.624	0.631	0.692	0.634	0.687	0.739	0.714	0.802
		P-values							
FGI-6	0.624								
FGI-6R [d]	0.631	0.909							
FGI-9	0.692	0.151	0.342						
FGI-9R [d]	0.634	0.862	0.904	0.374					
FGI-13	0.687	0.394	0.356	0.946	0.433				
FGI-13R [d]	0.739	0.063	0.033	0.445	0.038	0.160			
FGI-21	0.714	0.270	0.236	0.804	0.289	0.550	0.637		
FGI-21R [d]	0.802	0.002	0.004	0.123	0.004	0.047	0.111	0.050	

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.
[b] P-value for test of null hypothesis that area under the curve is equal for the 2 indicators. P-values <0.05 are in bold type.
[c] Area under the curve.
[d] Refers to minimum intake of 15 g for each food groups/sub food groups.

Table 20a. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-6) and MPA, By Diversity Cut-Offs, All Women [a]

N	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
177	≥ 3	100.0	0.8	73.0	0.0	73.0
171	≥ 4	95.7	3.8	70.8	1.1	71.9
137	≥ 5	93.6	29.0	52.2	1.7	53.9
21	6	21.3	91.6	6.2	20.8	27.0
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
177	≥ 3	100.0	0.7	83.7	0.0	83.7
171	≥ 4	96.4	4.0	80.9	0.6	81.5
137	≥ 5	92.9	26.0	62.4	1.1	63.5
21	6	25.0	90.7	7.9	11.8	19.7
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
177	≥ 3	100.0	0.6	92.1	0.0	92.1
171	≥ 4	100.0	4.2	88.8	0.0	88.8
137	≥ 5	100.0	24.8	69.7	0.0	69.7
21	6	15.4	88.5	10.7	6.2	16.9

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

Table 20b. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-6R) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
170	≥ 3	100.0	6.1	69.1	0.0	69.1
137	≥ 4	89.4	27.5	53.4	2.8	56.2
73	≥ 5	55.3	64.1	26.4	11.8	38.2
8	6	14.9	99.2	0.6	22.5	23.0
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
170	≥ 3	100.0	5.3	79.8	0.0	79.8
137	≥ 4	96.4	26.7	61.8	0.6	62.4
73	≥ 5	57.1	62.0	32.0	6.7	38.8
8	6	21.4	98.7	1.1	12.4	13.5
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
170	≥ 3	100.0	4.8	88.2	0.0	88.2
137	≥ 4	100.0	24.8	69.7	0.0	69.7
73	≥ 5	53.8	60.0	37.1	3.4	40.4
8	6	7.7	95.8	3.9	6.7	10.7

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

Table 20c. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-9) and MPA, By Diversity Cut-Offs, All Women [a]

N	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
177	≥ 3	100.0	0.8	73.0	0.0	73.0
172	≥ 4	95.7	3.1	71.3	1.1	72.5
146	≥ 5	93.6	22.1	57.3	1.7	59.0
100	≥ 6	76.6	51.1	36.0	6.2	42.1
18	≥ 7	21.3	93.9	4.5	20.8	25.3
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
177	≥ 3	100.0	0.7	83.7	0.0	83.7
172	≥ 4	96.4	3.3	81.5	0.6	82.0
146	≥ 5	92.9	20.0	67.4	1.1	68.5
100	≥ 6	78.6	48.0	43.8	3.4	47.2
18	≥ 7	25.0	92.7	6.2	11.8	18.0
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
177	≥ 3	100.0	0.6	92.1	0.0	92.1
172	≥ 4	100.0	3.6	89.3	0.0	89.3
146	≥ 5	100.0	19.4	74.7	0.0	74.7
100	≥ 6	84.6	46.1	50.0	1.1	51.1
18	≥ 7	23.1	90.9	8.4	5.6	14.0
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

Table 20d. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-9R) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
171	≥ 3	100.0	5.3	69.7	0.0	69.7
139	≥ 4	91.5	26.7	53.9	2.2	56.2
77	≥ 5	61.7	63.4	27.0	10.1	37.1
24	≥ 6	29.8	92.4	5.6	18.5	24.2
2	≥ 7	4.3	100.0	0.0	25.3	25.3
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
171	≥ 3	100.0	4.7	80.3	0.0	80.3
139	≥ 4	96.4	25.3	62.9	0.6	63.5
77	≥ 5	60.7	60.0	33.7	6.2	39.9
24	≥ 6	28.6	89.3	9.0	11.2	20.2
2	≥ 7	3.6	99.3	0.6	15.2	15.7
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
171	≥ 3	100.0	4.2	88.8	0.0	88.8
139	≥ 4	100.0	23.6	70.8	0.0	70.8
77	≥ 5	61.5	58.2	38.8	2.8	41.6
24	≥ 6	15.4	86.7	12.4	6.2	18.5
2	≥ 7	0.0	98.8	1.1	7.3	8.4
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

Table 20e. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-13) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
177	≥ 3	100.0	0.8	73.0	0.0	73.0
173	≥ 4	95.7	2.3	71.9	1.1	73.0
158	≥ 5	95.7	13.7	63.5	1.1	64.6
138	≥ 6	93.6	28.2	52.8	1.7	54.5
105	≥ 7	74.5	46.6	39.3	6.7	46.1
56	≥ 8	46.8	74.0	19.1	14.0	33.1
16	≥ 9	17.0	93.9	4.5	21.9	26.4
2	≥10	2.1	99.2	0.6	25.8	26.4
0	≥11	–	–	–	–	–
0	≥12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
177	≥ 3	100.0	0.7	83.7	0.0	83.7
173	≥ 4	96.4	2.7	82.0	0.6	82.6
158	≥ 5	96.4	12.7	73.6	0.6	74.2
138	≥ 6	96.4	26.0	62.4	0.6	62.9
105	≥ 7	75.0	44.0	47.2	3.9	51.1
56	≥ 8	39.3	70.0	25.3	9.6	34.8
16	≥ 9	7.1	90.7	7.9	14.6	22.5
2	≥10	3.6	99.3	0.6	15.2	15.7
0	≥11	–	–	–	–	–
0	≥12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
177	≥ 3	100.0	0.6	92.1	0.0	92.1
173	≥ 4	100.0	3.0	89.9	0.0	89.9
158	≥ 5	100.0	12.1	81.5	0.0	81.5
138	≥ 6	100.0	24.2	70.2	0.0	70.2
105	≥ 7	84.6	43.0	52.8	1.1	53.9
56	≥ 8	53.8	70.3	27.5	3.4	30.9
16	≥ 9	15.4	91.5	7.9	6.2	14.0
2	≥10	7.7	99.4	0.6	6.7	7.3
0	≥11	–	–	–	–	–
0	≥12	–	–	–	–	–
0	13	–	–	–	–	–

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

Table 20f. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-13R) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
172	≥ 3	100.0	4.6	70.2	0.0	70.2
141	≥ 4	91.5	25.2	55.1	2.2	57.3
93	≥ 5	72.3	55.0	33.1	7.3	40.4
39	≥ 6	44.7	86.3	10.1	14.6	24.7
11	≥ 7	12.8	96.2	2.8	23.0	25.8
1	≥ 8	2.1	100.0	0.0	25.8	25.8
0	≥ 9	–	–	–	–	–
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
172	≥ 3	100.0	4.0	80.9	0.0	80.9
141	≥ 4	96.4	24.0	64.0	0.6	64.6
93	≥ 5	71.4	51.3	41.0	4.5	45.5
39	≥ 6	50.0	83.3	14.0	7.9	21.9
11	≥ 7	14.3	95.3	3.9	13.5	17.4
1	≥ 8	0.0	99.3	0.6	15.7	16.3
0	≥ 9	–	–	–	–	–
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
172	≥ 3	100.0	3.6	89.3	0.0	89.3
141	≥ 4	100.0	22.4	71.9	0.0	71.9
93	≥ 5	92.3	50.9	45.5	0.6	46.1
39	≥ 6	46.2	80.0	18.5	3.9	22.5
11	≥ 7	7.7	93.9	5.6	6.7	12.4
1	≥ 8	0.0	99.4	0.6	7.3	7.9
0	≥ 9	–	–	–	–	–
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

Table 20g. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
177	≥ 3	100.0	0.8	73.0	0.0	73.0
175	≥ 4	97.9	1.5	72.5	0.6	73.0
161	≥ 5	95.7	11.5	65.2	1.1	66.3
147	≥ 6	95.7	22.1	57.3	1.1	58.4
125	≥ 7	87.2	35.9	47.2	3.4	50.6
94	≥ 8	72.3	54.2	33.7	7.3	41.0
44	≥ 9	42.6	81.7	13.5	15.2	28.7
16	≥ 10	21.3	95.4	3.4	20.8	24.2
1	≥ 11	0.0	99.2	0.6	26.4	27.0
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
177	≥ 3	100.0	0.7	83.7	0.0	83.7
175	≥ 4	96.4	1.3	83.1	0.6	83.7
161	≥ 5	96.4	10.7	75.3	0.6	75.8
147	≥ 6	96.4	20.0	67.4	0.6	68.0
125	≥ 7	89.3	33.3	56.2	1.7	57.9
94	≥ 8	71.4	50.7	41.6	4.5	46.1
44	≥ 9	42.9	78.7	18.0	9.0	27.0
16	≥ 10	17.9	92.7	6.2	12.9	19.1
1	≥ 11	0.0	99.3	0.6	15.7	16.3
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

(continued)

Table 20g (continued). Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
177	≥ 3	100.0	0.6	92.1	0.0	92.1
175	≥ 4	100.0	1.8	91.0	0.0	91.0
161	≥ 5	100.0	10.3	83.1	0.0	83.1
147	≥ 6	100.0	18.8	75.3	0.0	75.3
125	≥ 7	100.0	32.1	62.9	0.0	62.9
94	≥ 8	76.9	49.1	47.2	1.7	48.9
44	≥ 9	46.2	77.0	21.3	3.9	25.3
16	≥ 10	30.8	92.7	6.7	5.1	11.8
1	≥ 11	0.0	99.4	0.6	7.3	7.9
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

Table 20h. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21R) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
178	≥ 1	100.0	0.0	73.6	0.0	73.6
178	≥ 2	100.0	0.0	73.6	0.0	73.6
172	≥ 3	100.0	4.6	70.2	0.0	70.2
150	≥ 4	91.5	18.3	60.1	2.2	62.4
103	≥ 5	83.0	51.1	36.0	4.5	40.4
62	≥ 6	63.8	75.6	18.0	9.6	27.5
19	≥ 7	23.4	93.9	4.5	20.2	24.7
6	≥ 8	8.5	98.5	1.1	24.2	25.3
1	≥ 9	2.1	100.0	0.0	25.8	25.8
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

(continued)

Table 20h (continued). Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21R) and MPA, By Diversity Cut-Offs, All Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 60%		
178	≥ 1	100.0	0.0	84.3	0.0	84.3
178	≥ 2	100.0	0.0	84.3	0.0	84.3
172	≥ 3	100.0	4.0	80.9	0.0	80.9
150	≥ 4	96.4	18.0	69.1	0.6	69.7
103	≥ 5	89.3	48.0	43.8	1.7	45.5
62	≥ 6	71.4	72.0	23.6	4.5	28.1
19	≥ 7	32.1	93.3	5.6	10.7	16.3
6	≥ 8	7.1	97.3	2.2	14.6	16.9
1	≥ 9	0.0	99.3	0.6	15.7	16.3
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–
				MPA > 70%		
178	≥ 1	100.0	0.0	92.7	0.0	92.7
178	≥ 2	100.0	0.0	92.7	0.0	92.7
172	≥ 3	100.0	3.6	89.3	0.0	89.3
150	≥ 4	100.0	17.0	77.0	0.0	77.0
103	≥ 5	100.0	45.5	50.6	0.0	50.6
62	≥ 6	84.6	69.1	28.7	1.1	29.8
19	≥ 7	23.1	90.3	9.0	5.6	14.6
6	≥ 8	15.4	97.6	2.2	6.2	8.4
1	≥ 9	0.0	99.4	0.6	7.3	7.9
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.

FIGURES

Histograms of intakes for 11 micronutrients (R2 data): Figures 1-11

Histograms for intra-individual SDs of intake, based on data from one to three rounds: Figures 12-22

Histograms for FGIs (R2 data): Figures 23-30

Histograms of PA for 11 micronutrients, based on data from one to three rounds: Figures 31-41

Histogram of MPA, based on data from one to three rounds: Figure 42

Figure 1. Distribution of Thiamin Intakes, All Women

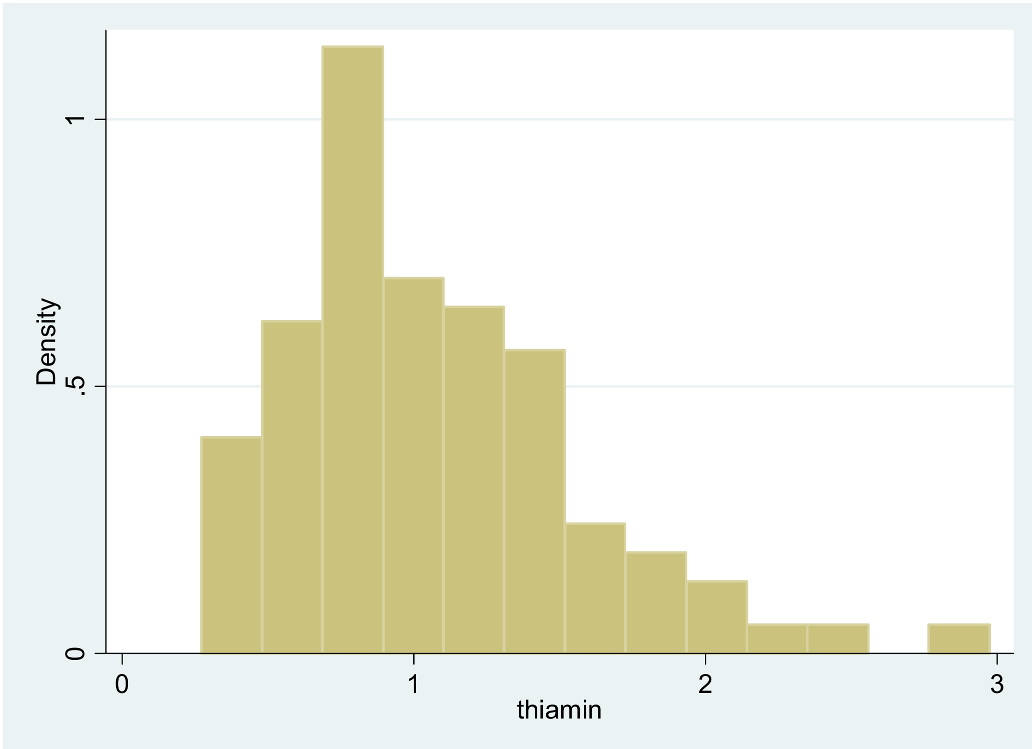


Figure 2. Distribution of Riboflavin Intakes, All Women

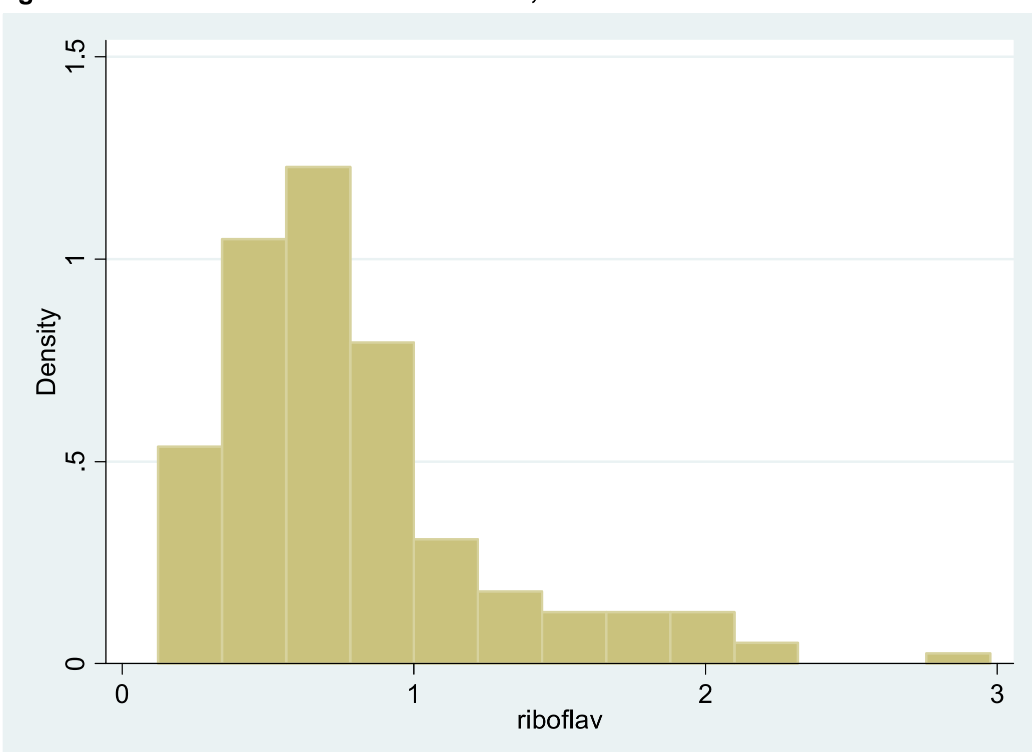


Figure 3. Distribution of Niacin Intakes, All Women

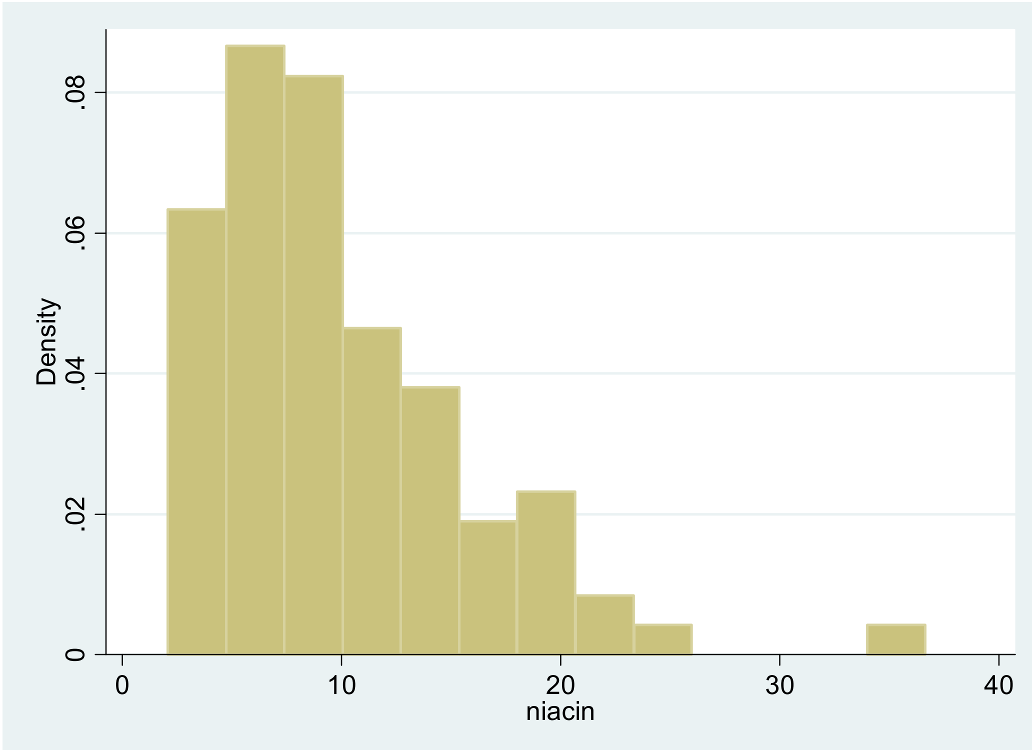


Figure 4. Distribution of Vitamin B6 Intakes, All Women

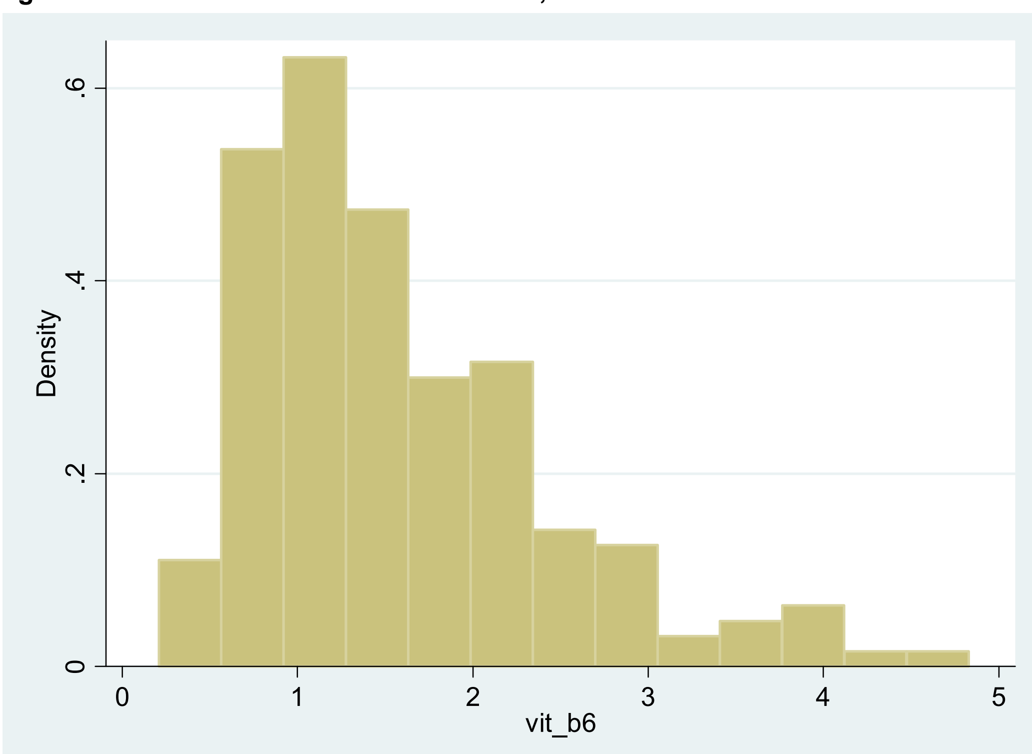


Figure 5. Distribution of Folate Intakes, All Women

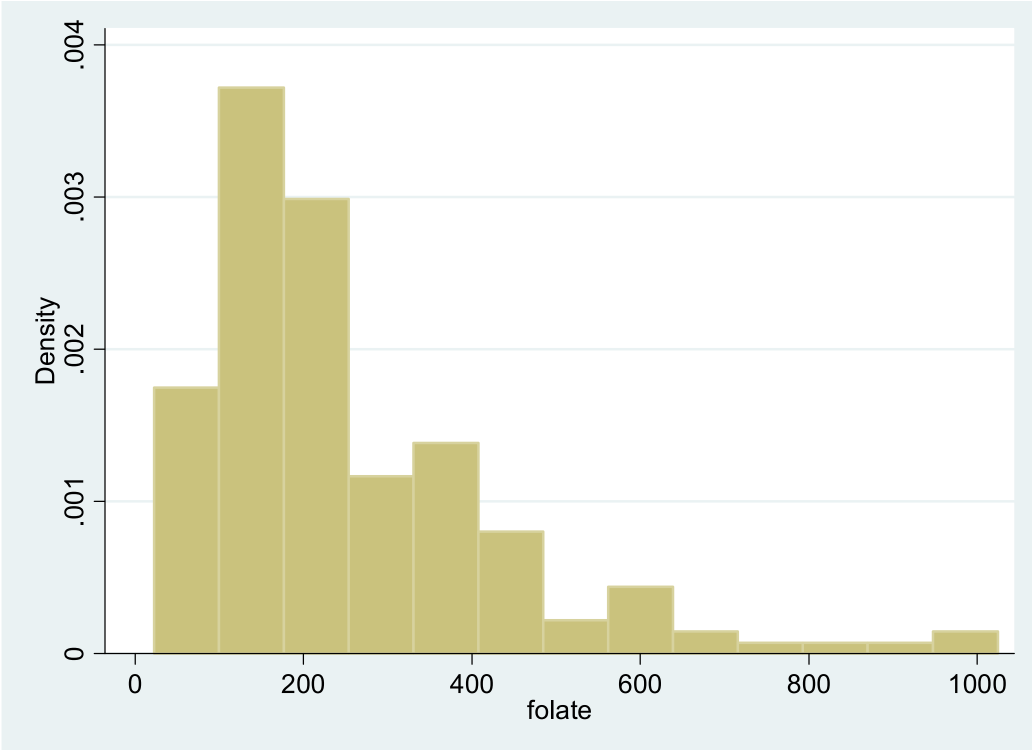


Figure 6. Distribution of Vitamin B12 Intakes, All Women

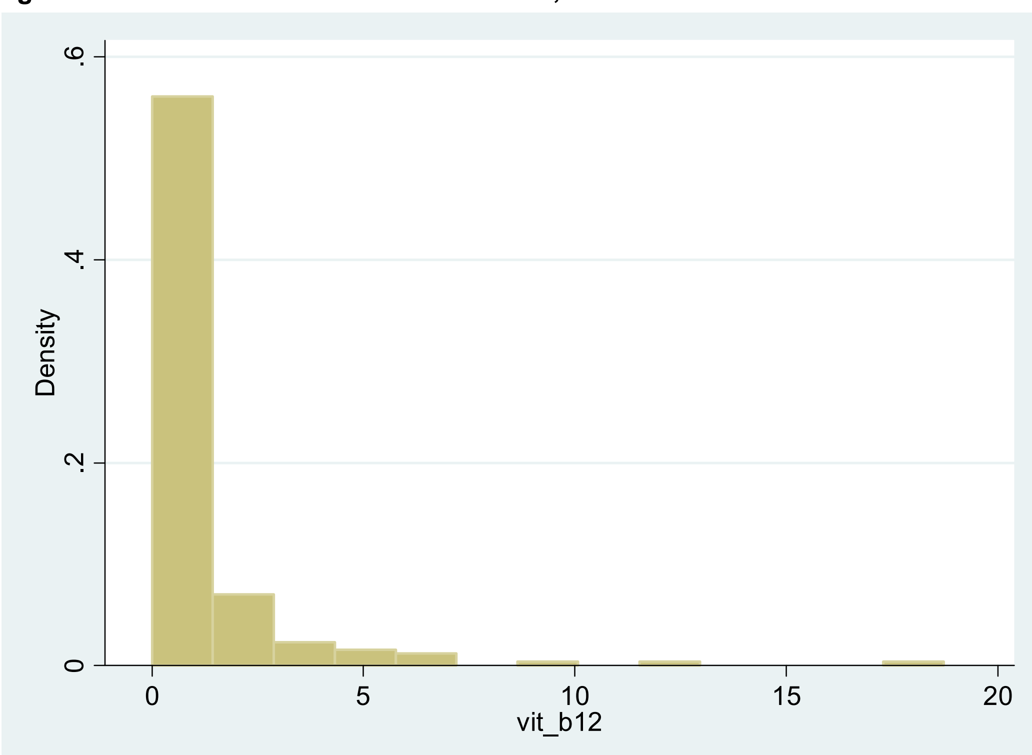


Figure 7. Distribution of Vitamin C Intakes, All Women

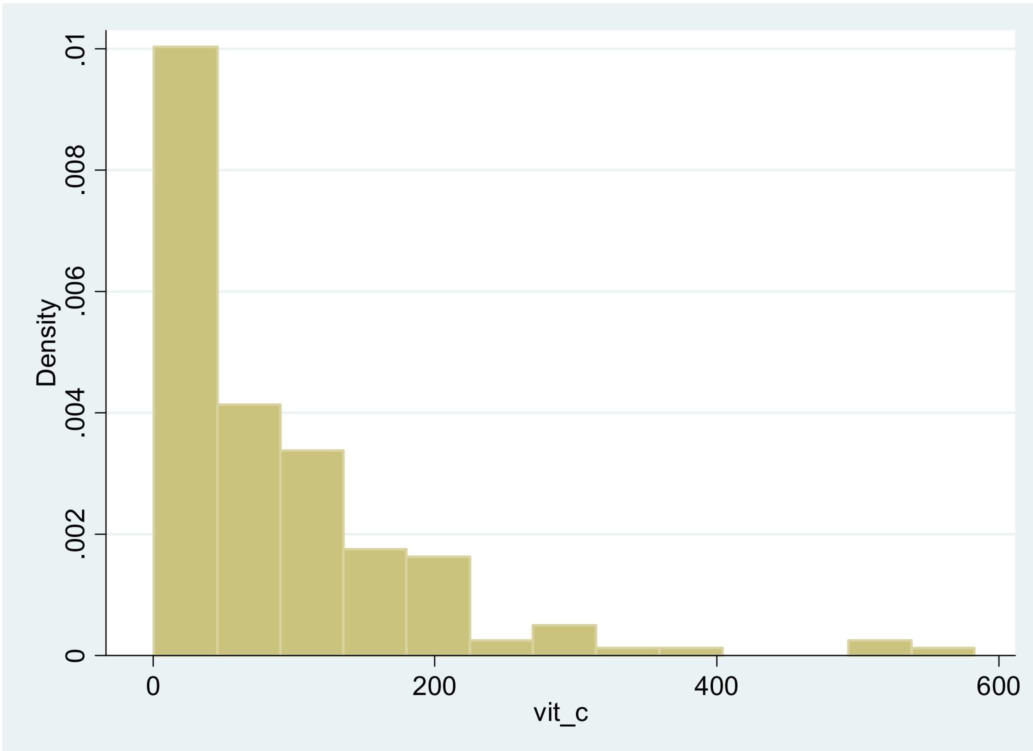


Figure 8. Distribution of Vitamin A Intakes, All Women

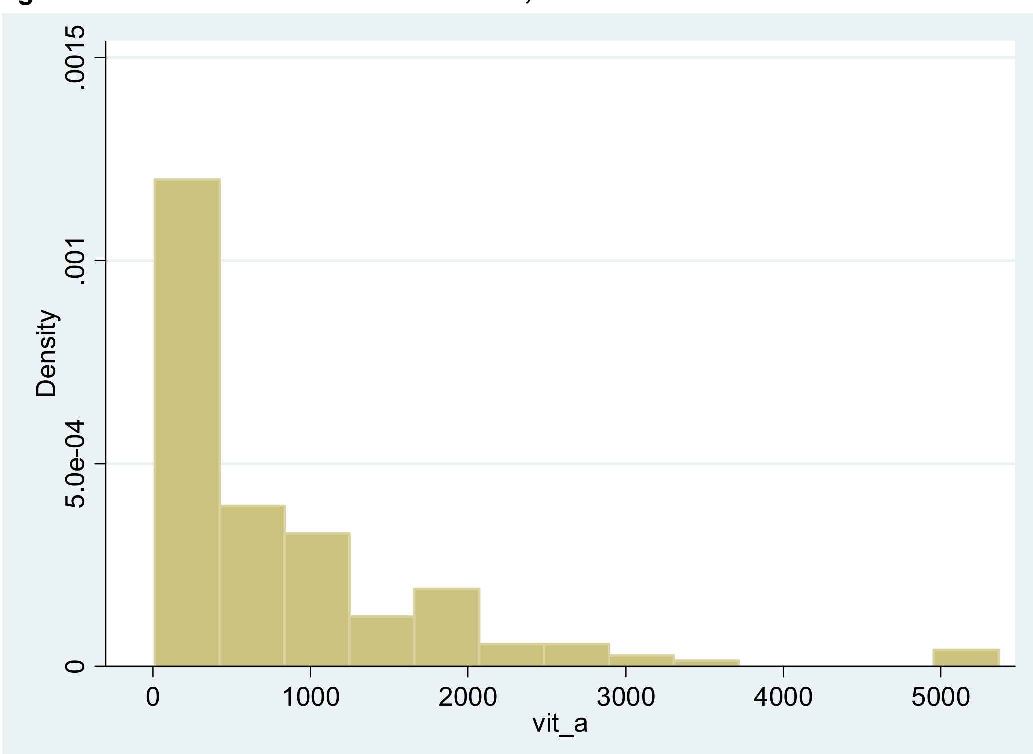


Figure 9. Distribution of Calcium Intakes, All Women

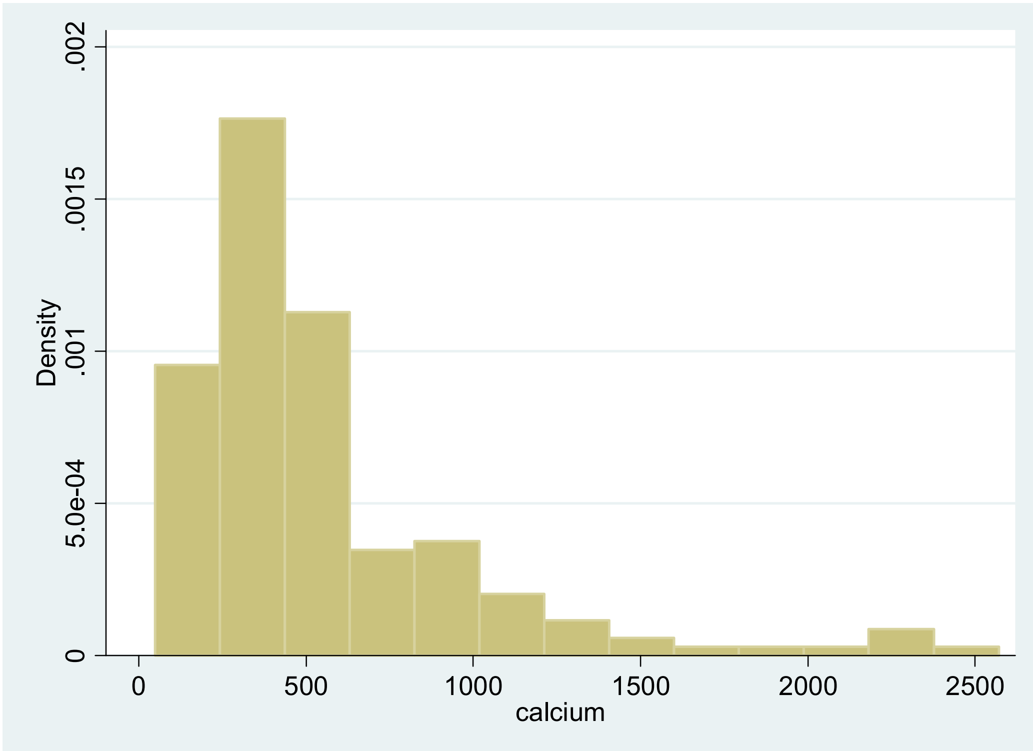


Figure 10. Distribution of Iron Intakes, All Women

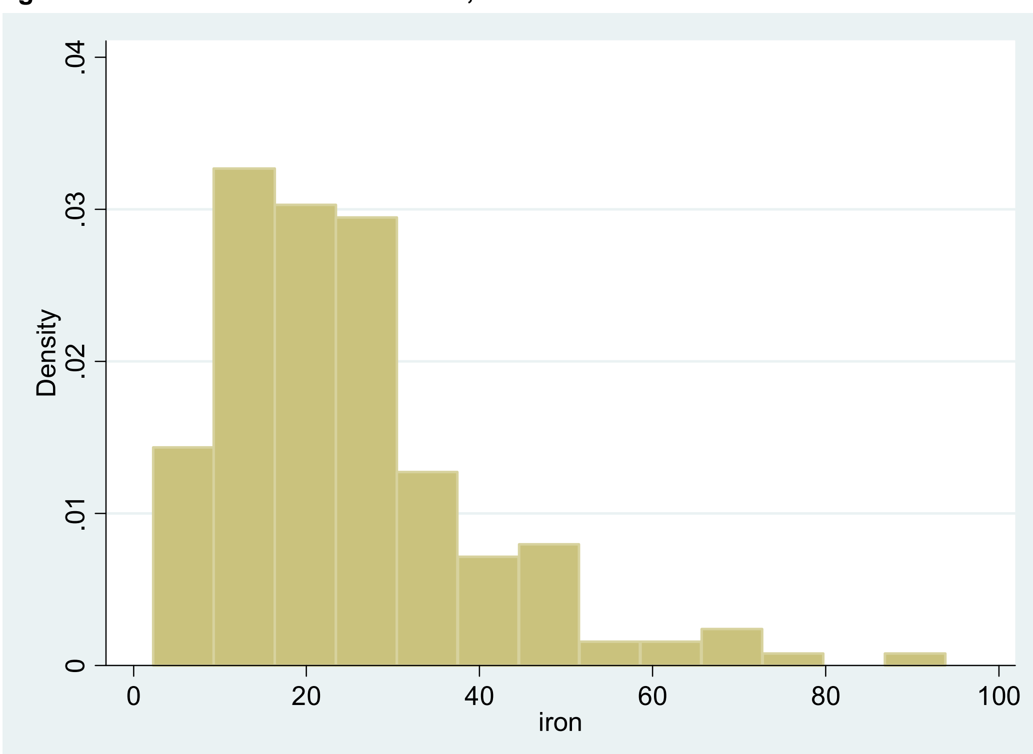


Figure 11. Distribution of Zinc Intakes, All Women

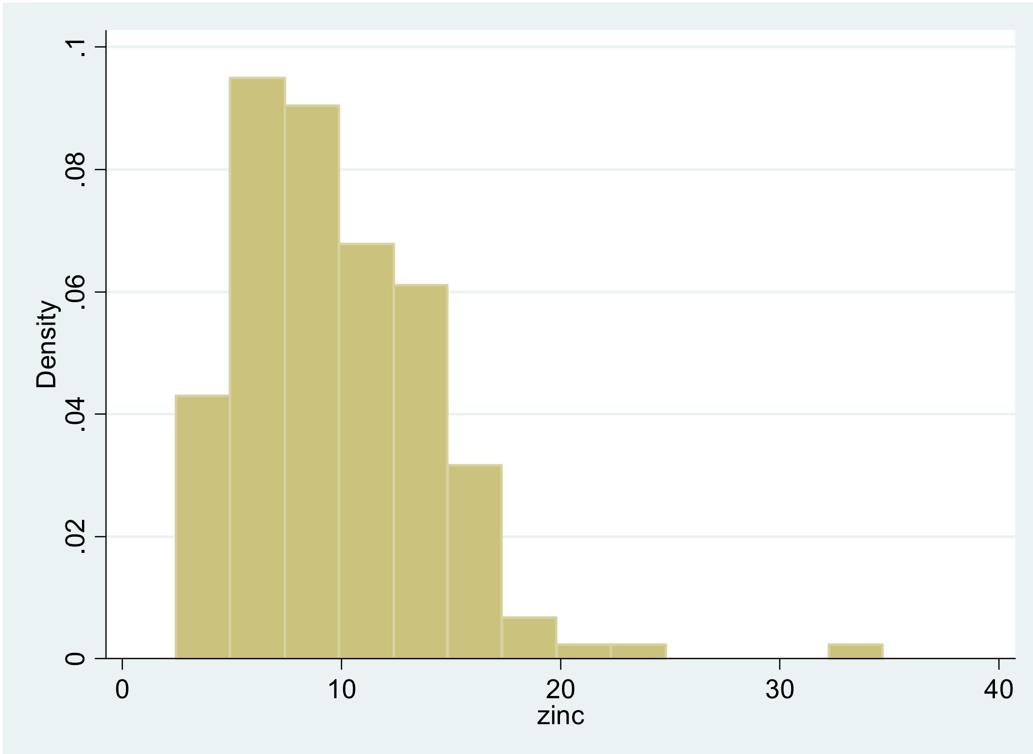


Figure 12. Intra-Individual SD of Thiamin Intakes, All Women

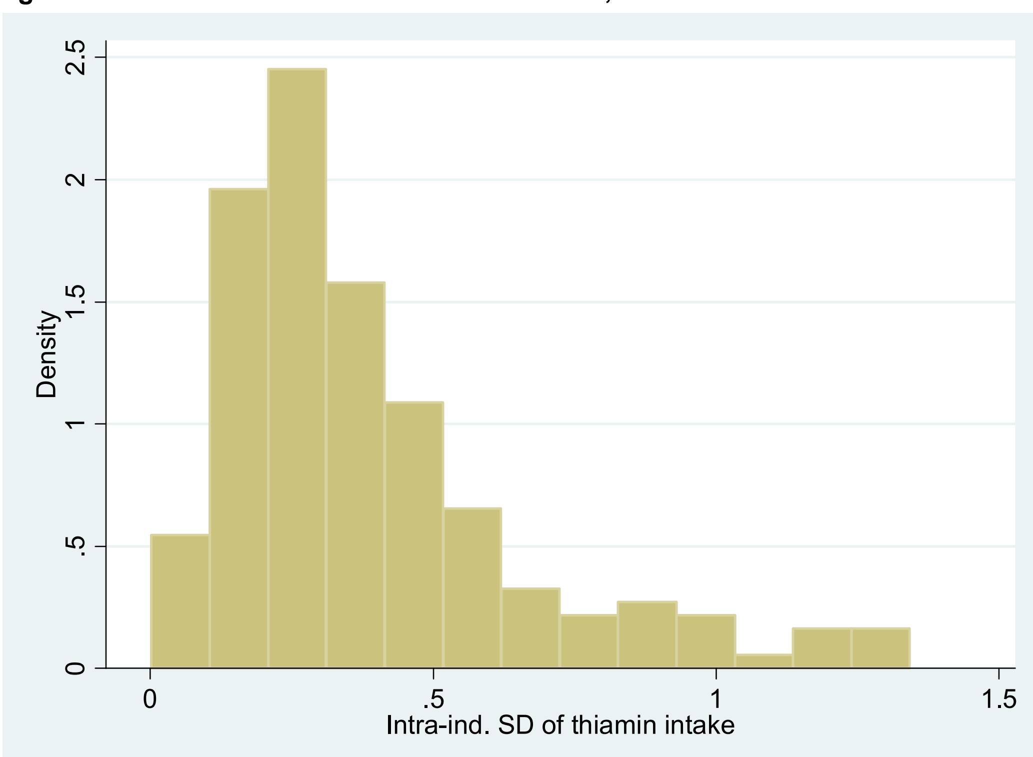


Figure 13. Intra-Individual SD of Riboflavin Intakes, All Women

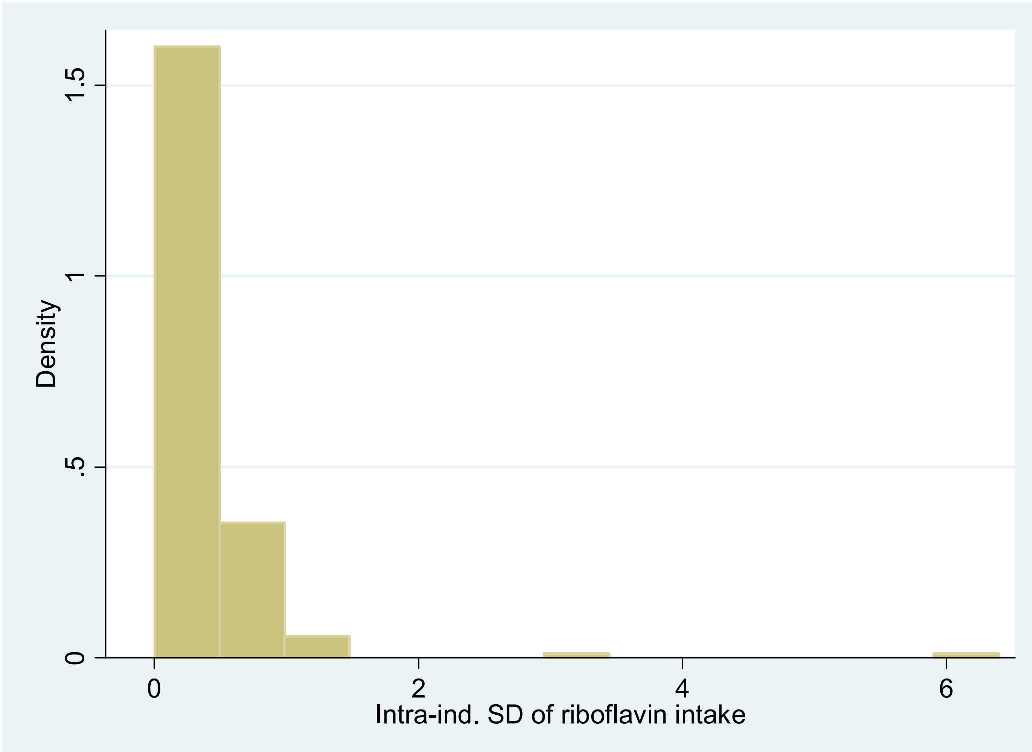


Figure 14. Intra-Individual SD of Niacin Intakes, All Women

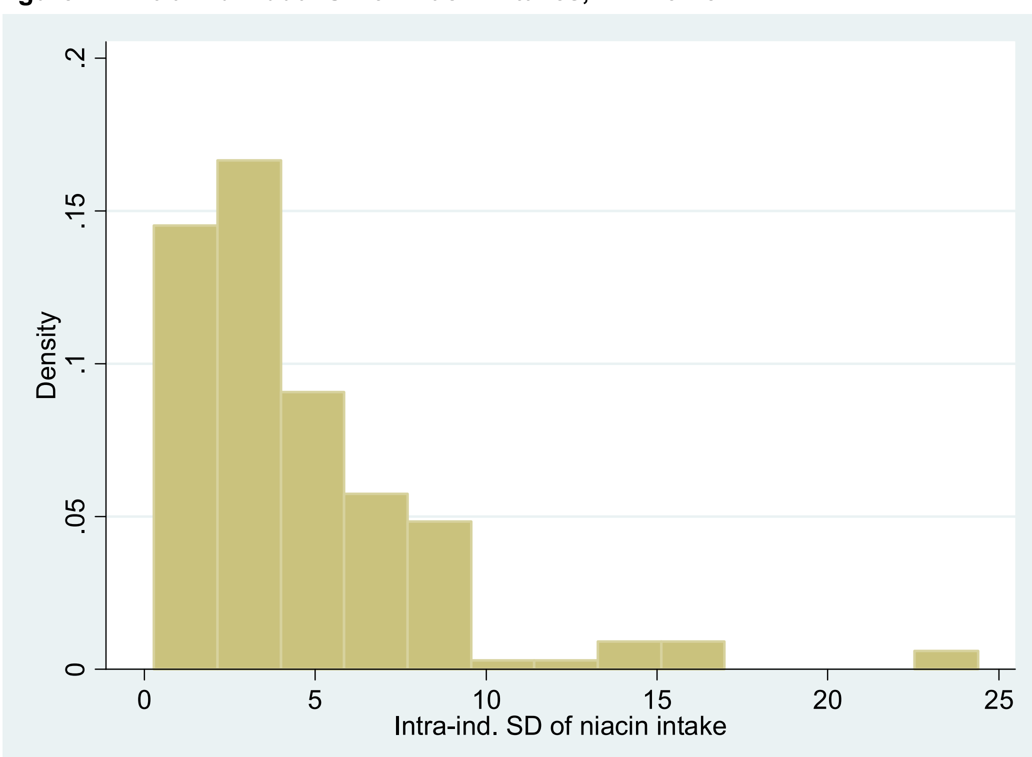


Figure 15. Intra-Individual SD of Vitamin B6 Intakes, All Women

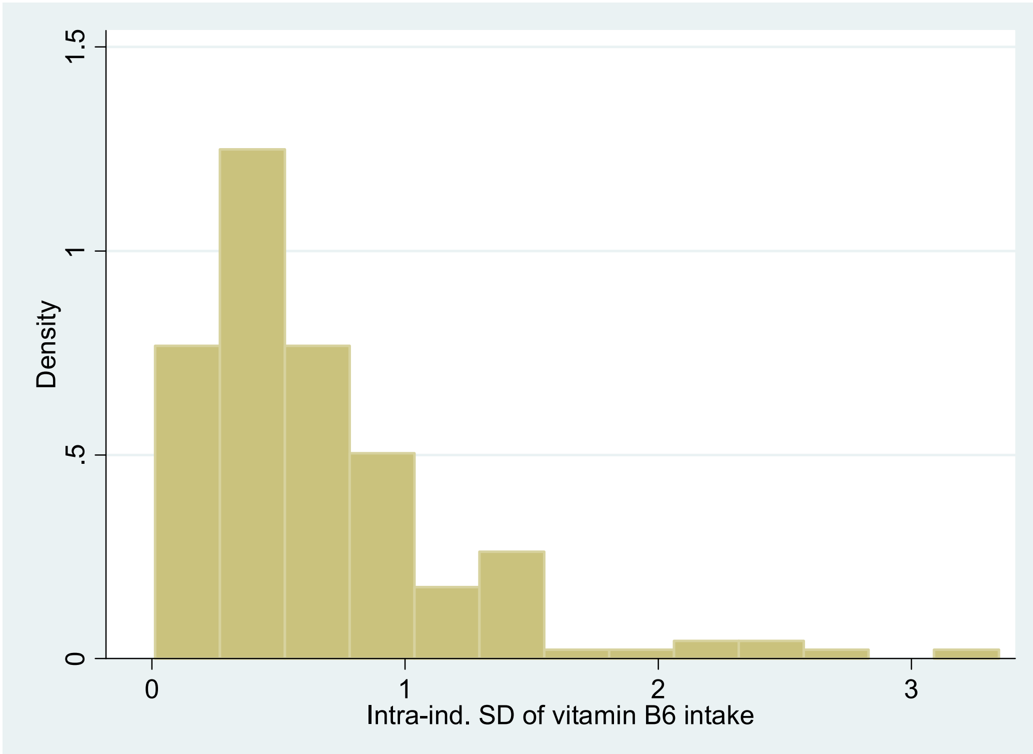


Figure 16. Intra-Individual SD of Folate Intakes, All Women

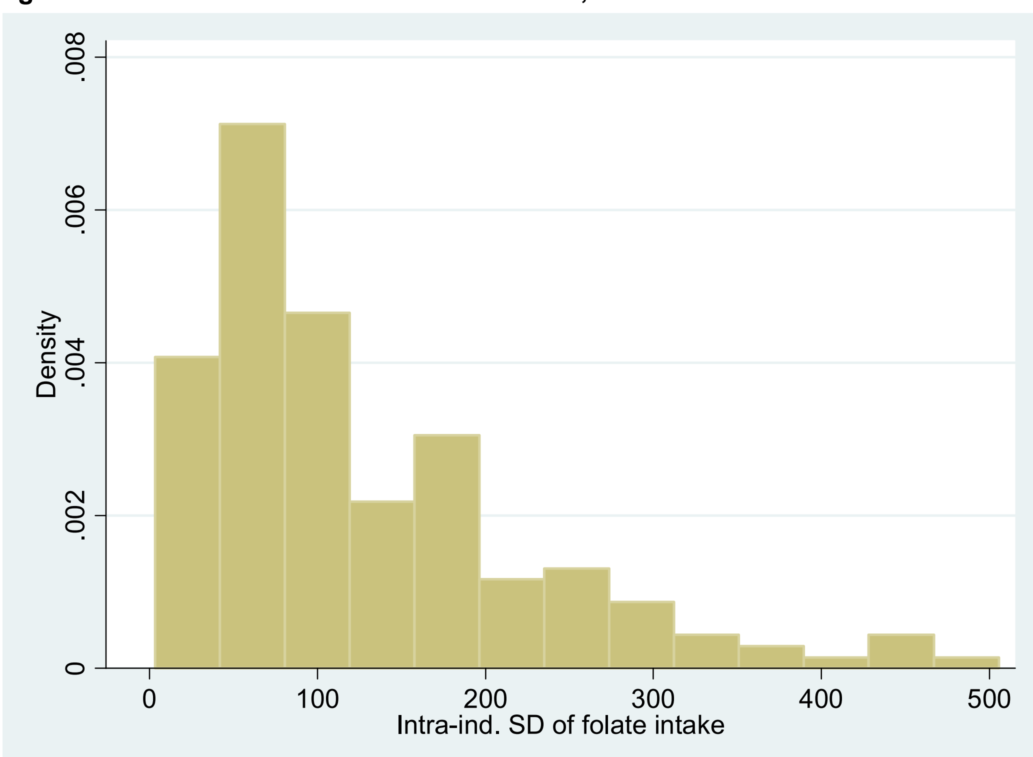


Figure 17. Intra-Individual SD of Vitamin B12 Intakes, All Women

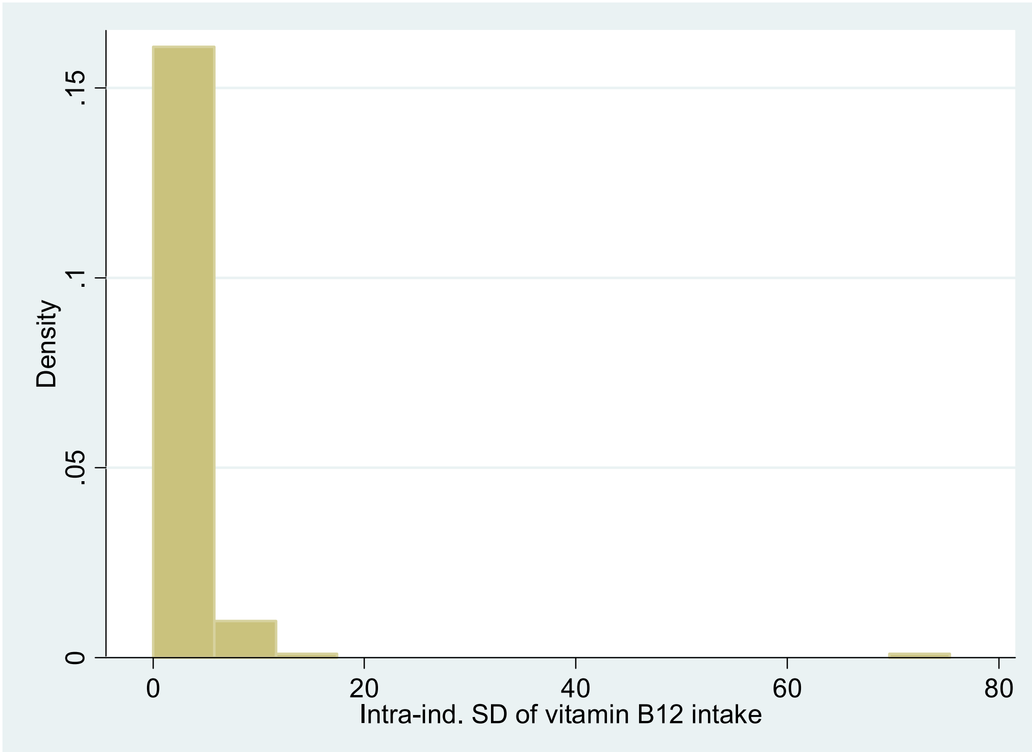


Figure 18. Intra-Individual SD of Vitamin C Intakes, All Women

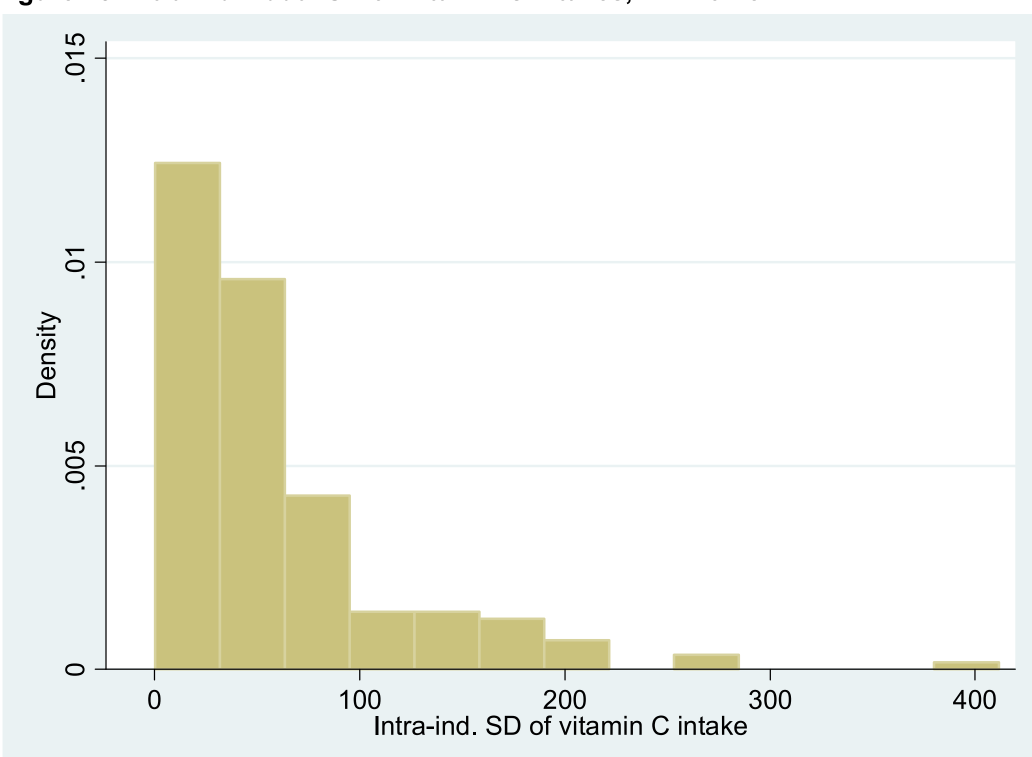


Figure 19. Intra-Individual SD of Vitamin A Intakes, All Women

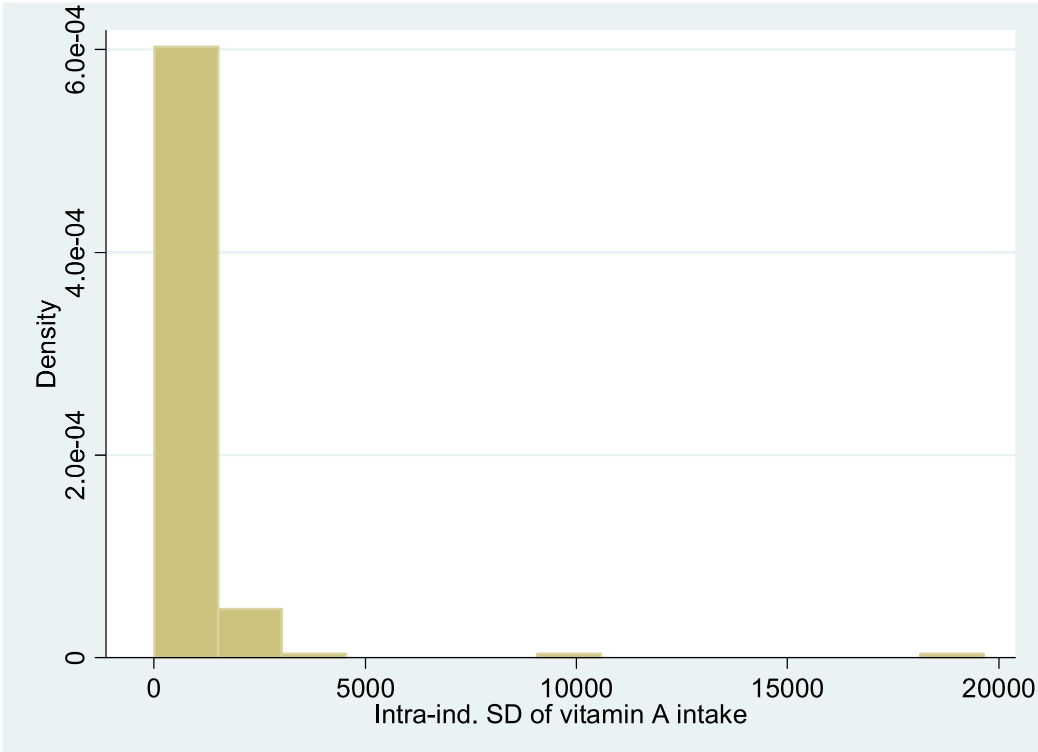


Figure 20. Intra-Individual SD of Calcium Intakes, All Women

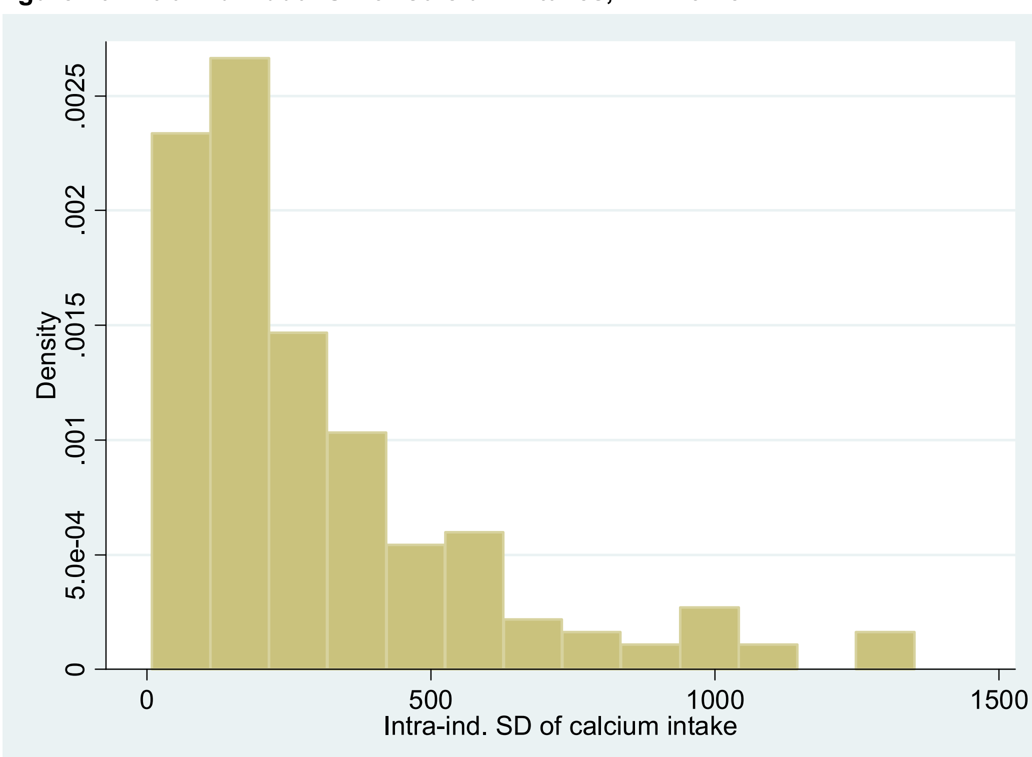


Figure 21. Intra-Individual SD of Iron Intakes, All Women

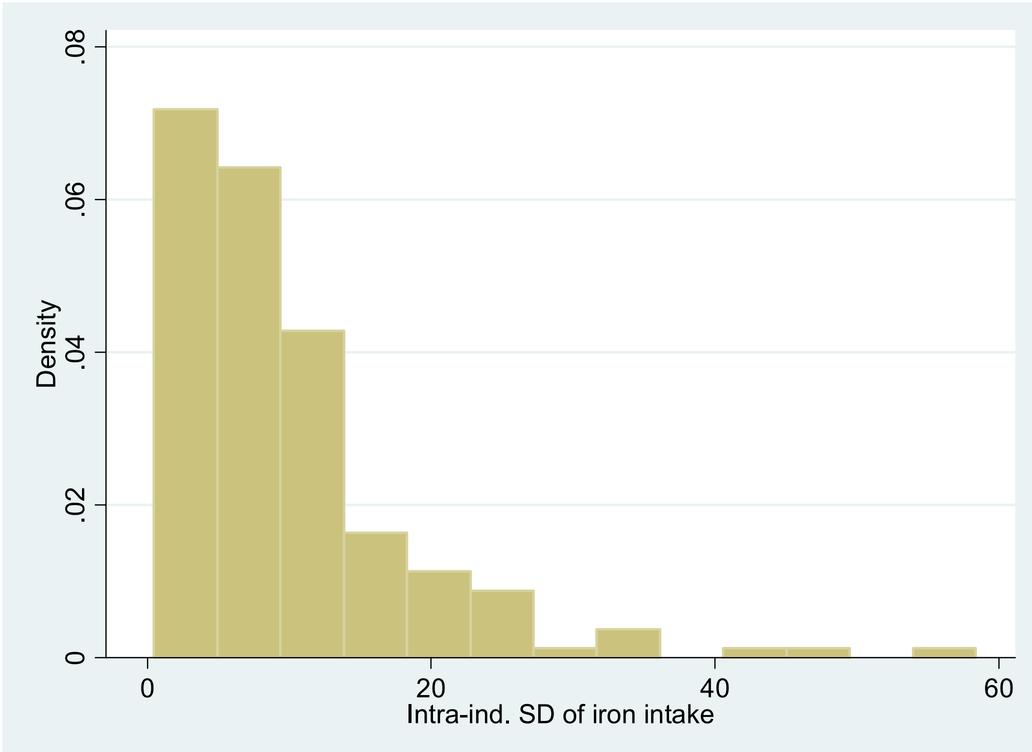


Figure 22. Intra-Individual SD of Zinc Intakes, All Women

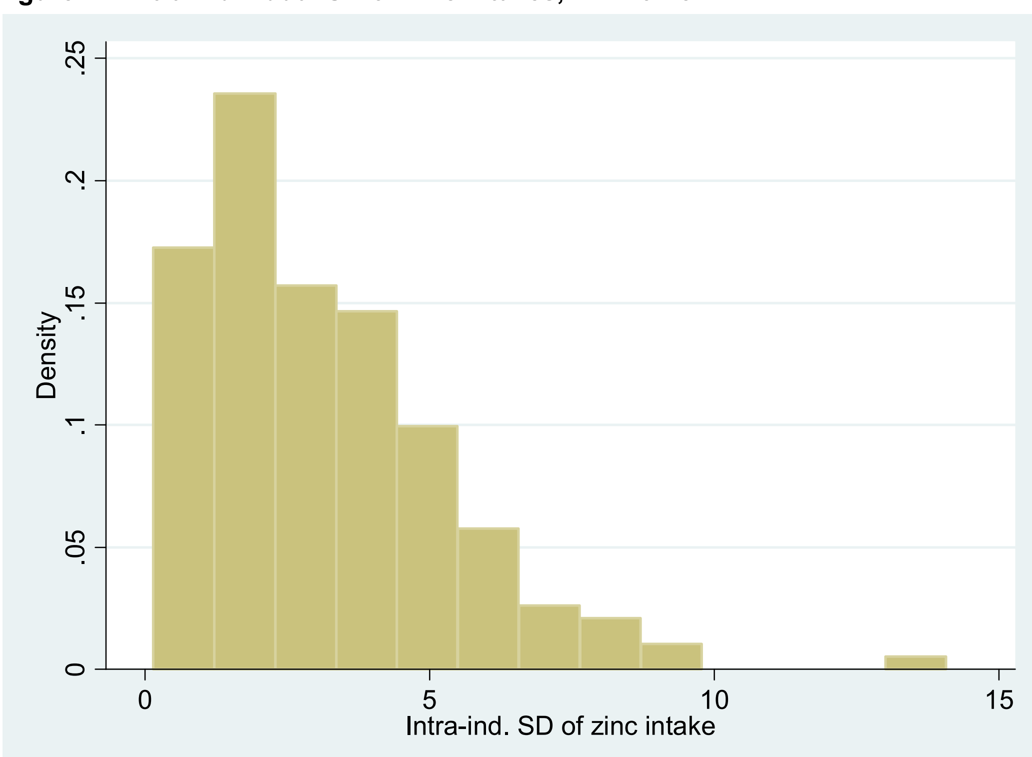


Figure 23. Distribution of Scores for FGI-6, All Women

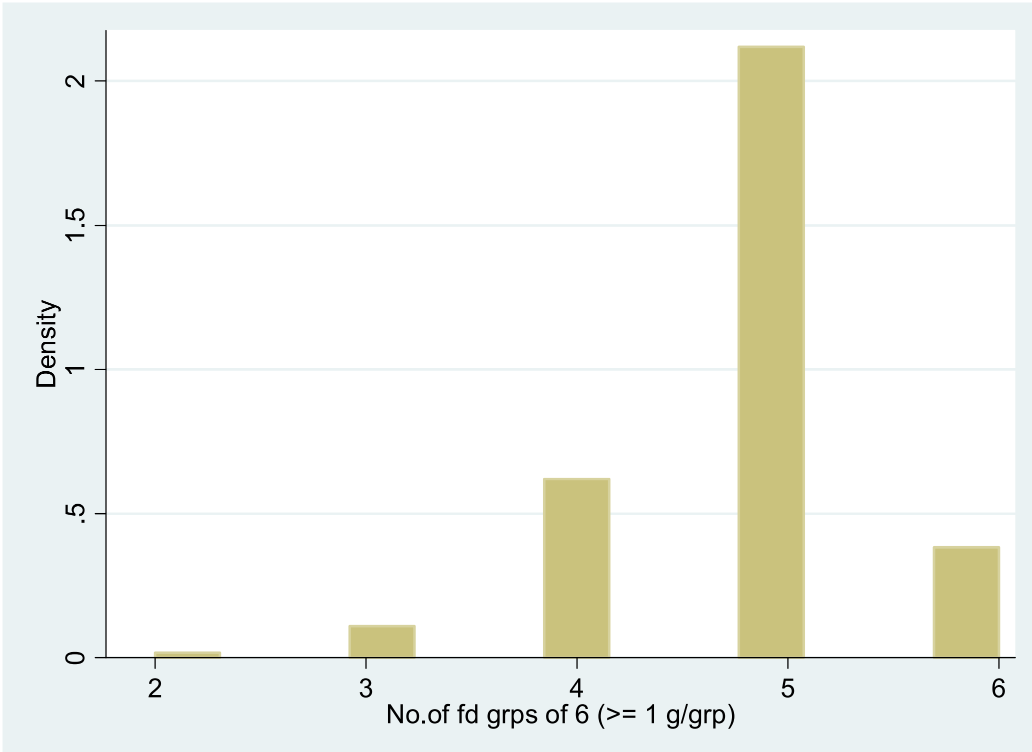


Figure 24. Distribution of Scores for FGI-6R, All Women

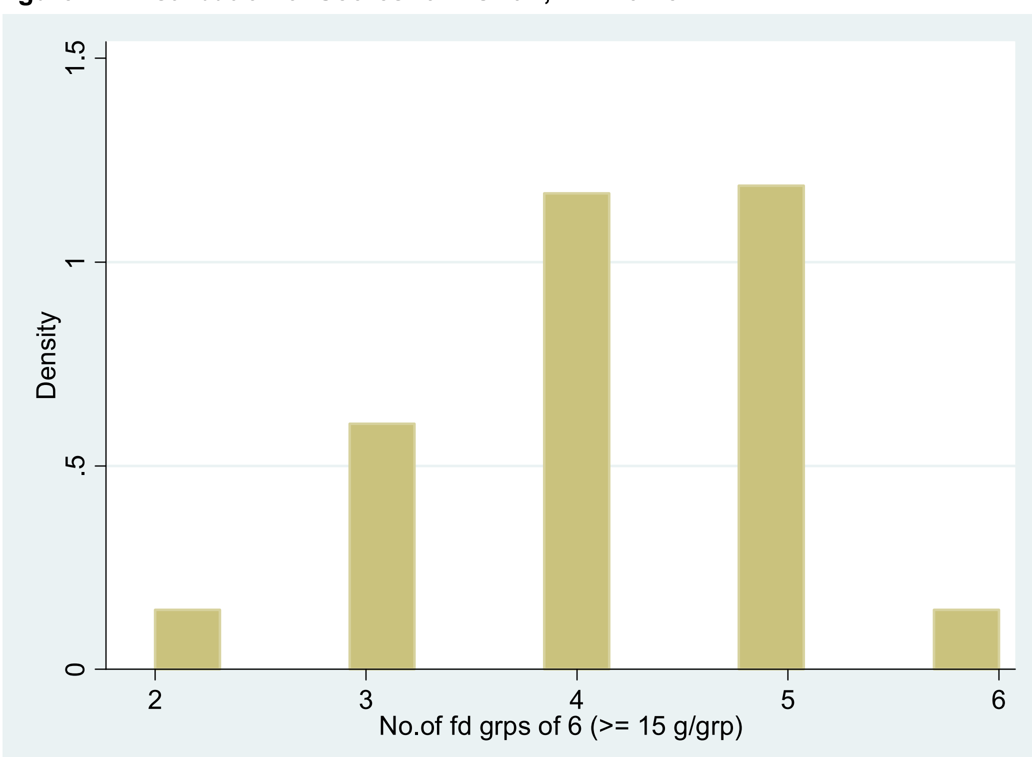


Figure 25. Distribution of Scores for FGI-9, All Women

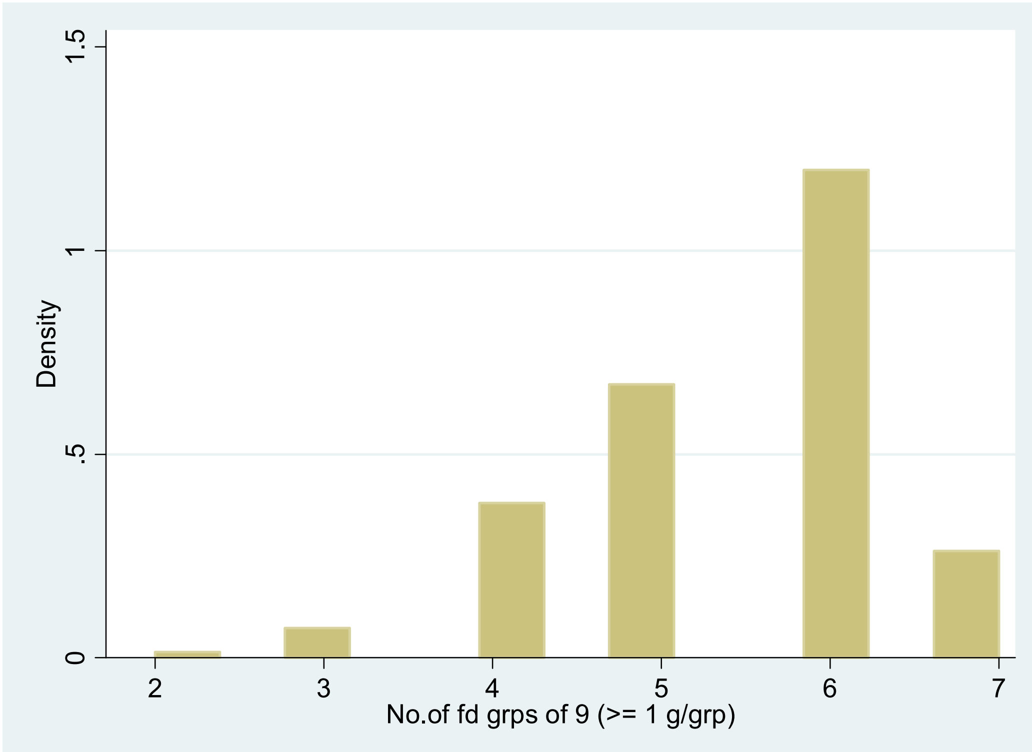


Figure 26. Distribution of Scores for FGI-9R, All Women

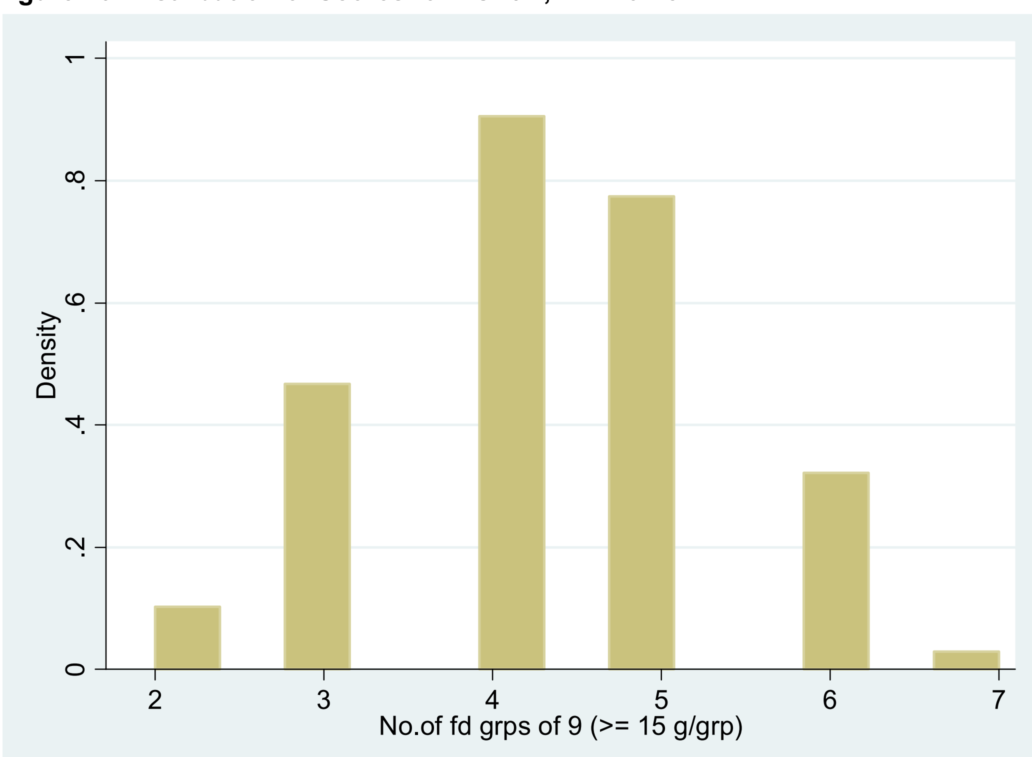


Figure 27. Distribution of Scores for FGI-13, All Women

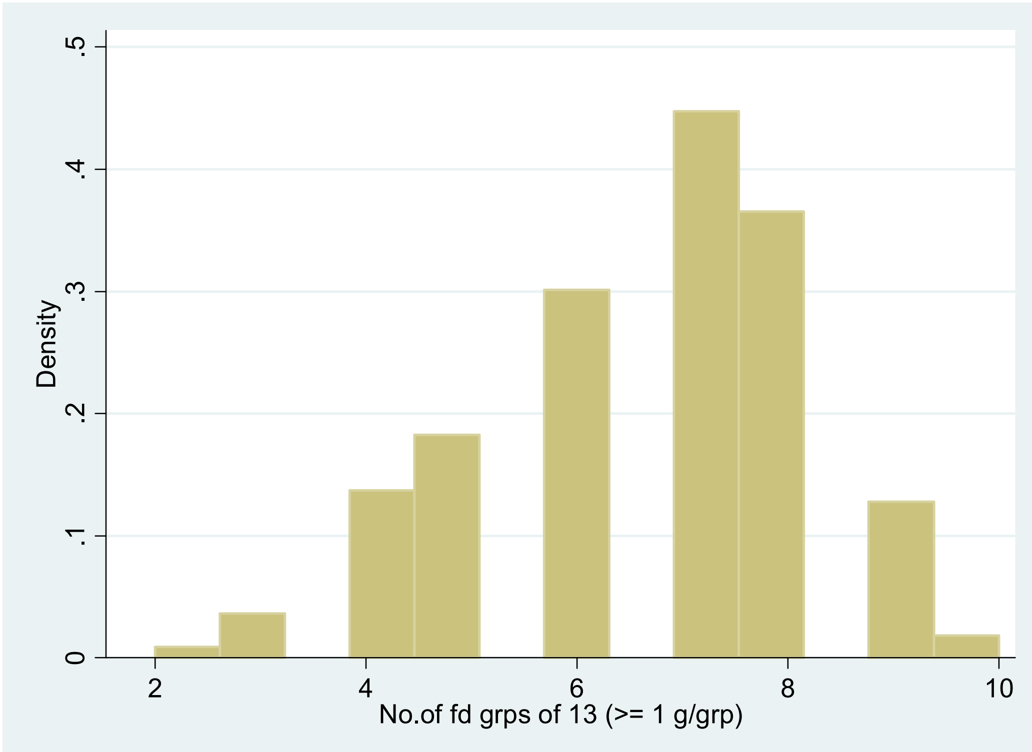


Figure 28. Distribution of Scores for FGI-13R, All Women

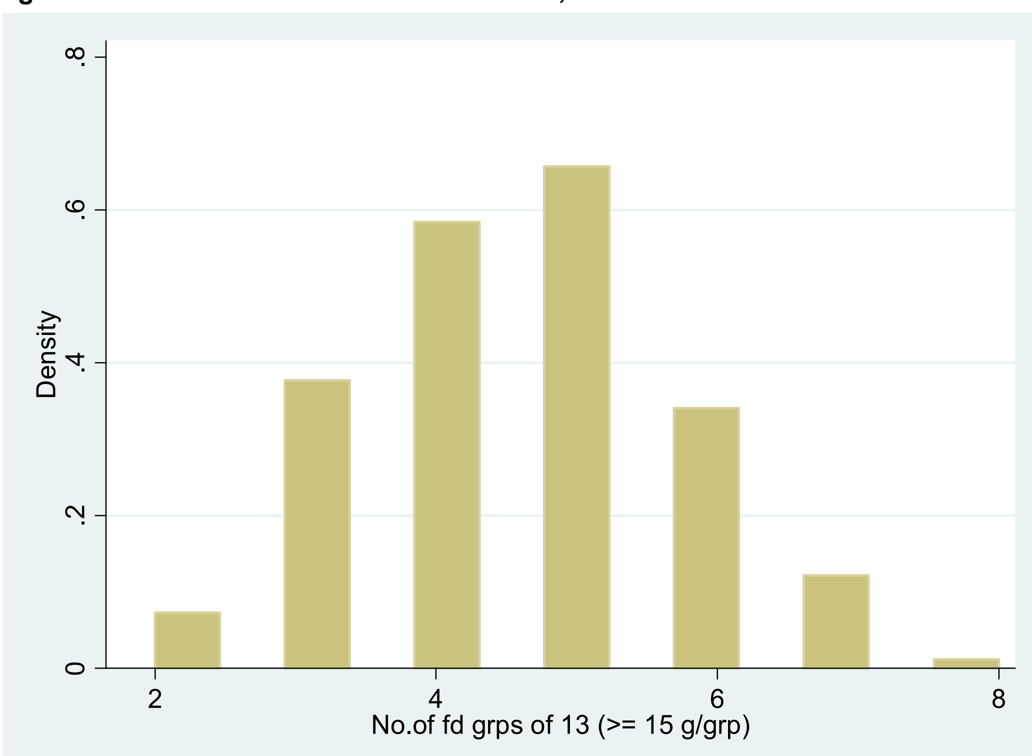


Figure 29. Distribution of Scores for FGI-21, All Women

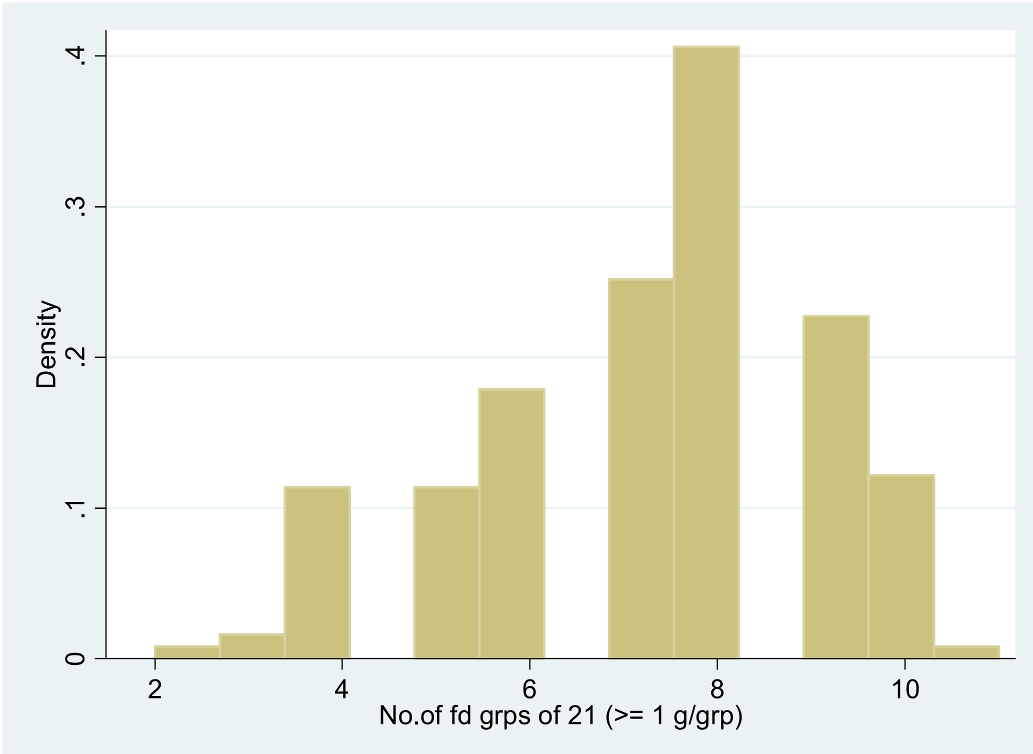


Figure 30. Distribution of Scores for FGI-21R, All Women

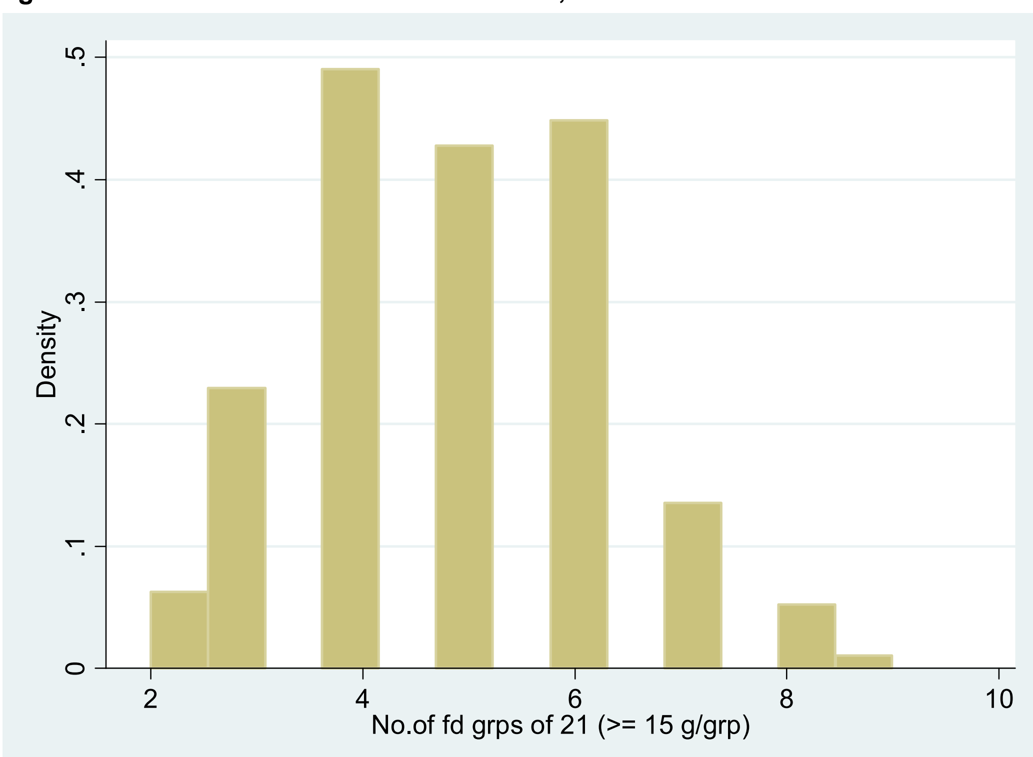


Table 6. Percent of Observation Days at Each Food Group Diversity Score, All Women, R

Number of food groups eaten	Diversity indicators							
	FGI-6	FGI-6R	FGI-9	FGI-9R	FGI-13	FGI-13R	FGI-21	FGI-21R
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.6	4.6	0.6	3.9	0.6	3.5	0.6	3.6
3	3.3	19.1	2.6	18.6	2.2	18.2	0.9	12.6
4	18.6	35.9	14.8	35.0	8.7	26.1	8.2	26.6
5	66.2	36.2	26.6	29.1	10.4	30.5	7.3	23.1
6	11.2	4.2	46.2	12.4	19.1	16.1	12.2	23.6
7			9.1	0.9	27.3	5.3	18.2	6.8
8			0.0	0.0	23.2	0.5	28.8	3.2
9			0.0	0.0	7.7	0.0	15.1	0.5
10					0.9	0.0	8.1	0.0
11					0.0	0.0	0.5	0.0
12					0.0	0.0	0.0	0.0
13					0.0	0.0	0.0	0.0
14							0.0	0.0
15							0.0	0.0
16							0.0	0.0
17							0.0	0.0
18							0.0	0.0
19							0.0	0.0
20							0.0	0.0
21							0.0	0.0

Figure 31. Distribution of PA for Thiamin, All Women

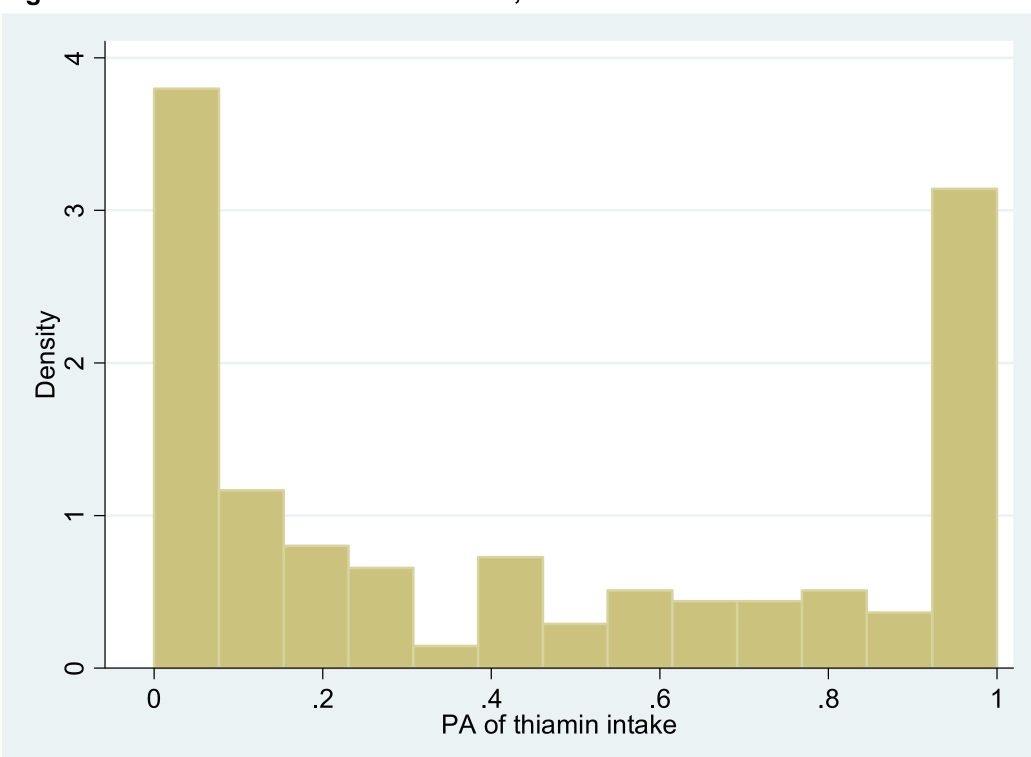


Figure 32. Distribution of PA for Riboflavin, All Women

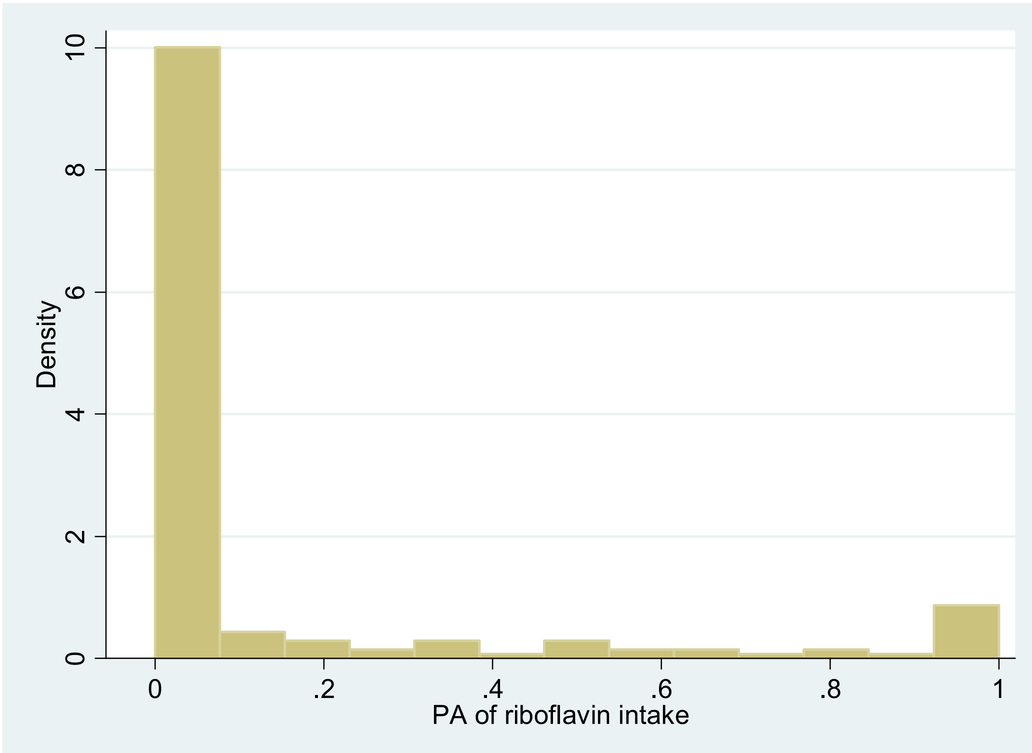


Figure 33. Distribution of PA for Niacin, All Women

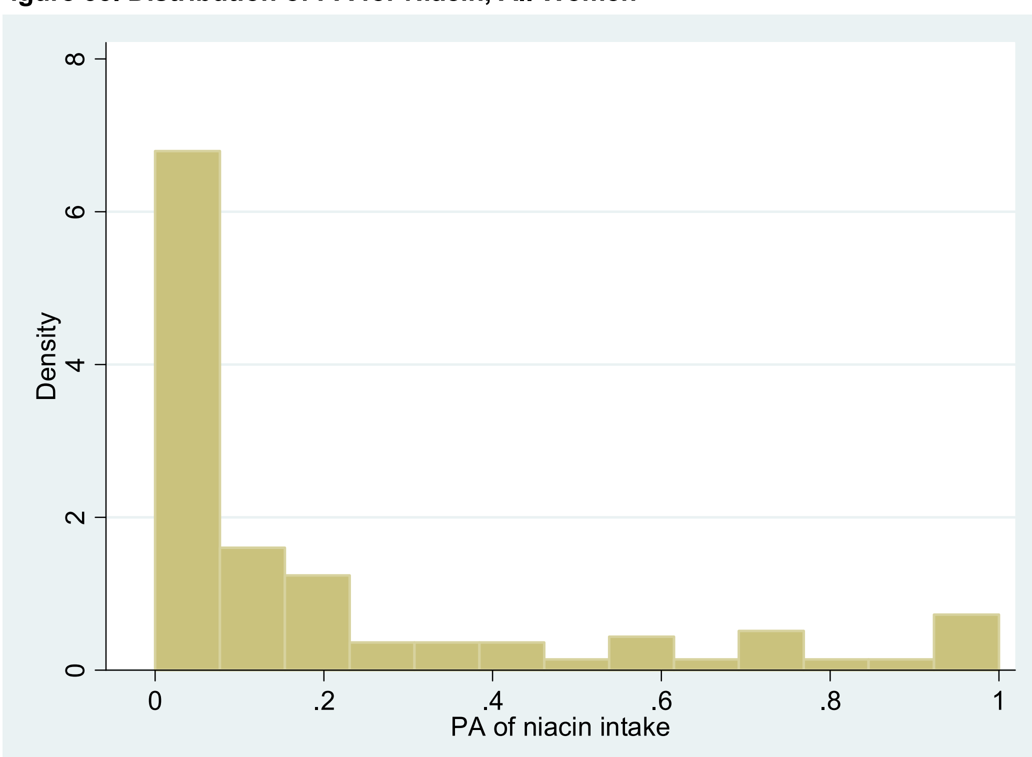


Figure 34. Distribution of PA for Vitamin B6, All Women

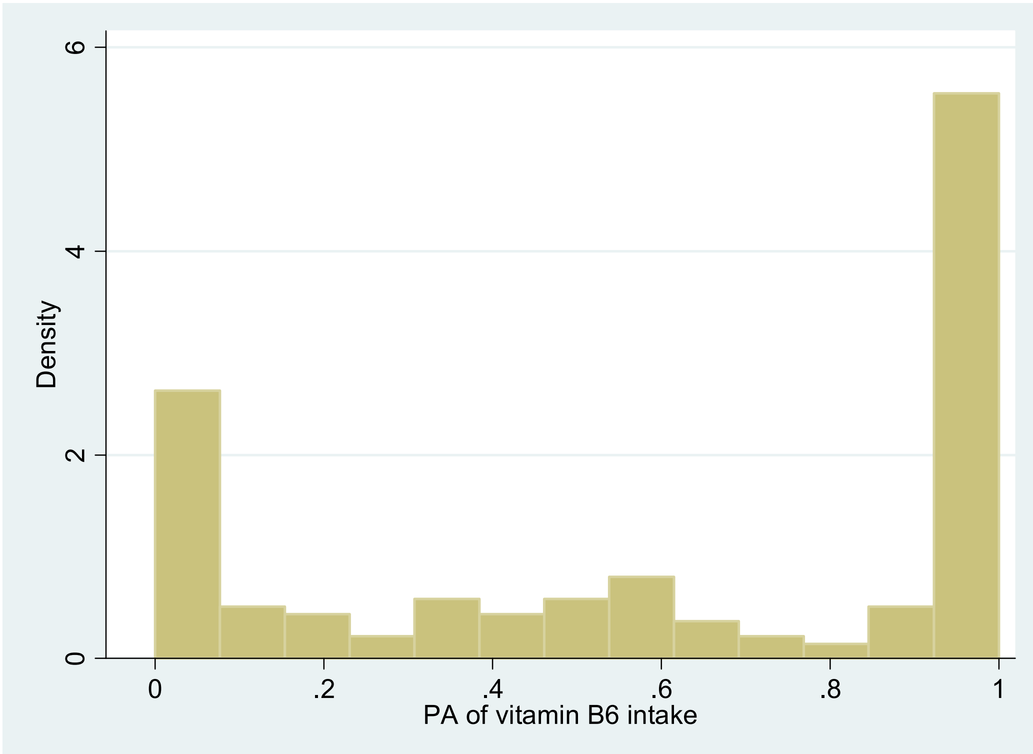


Figure 35. Distribution of PA for Folate, All Women

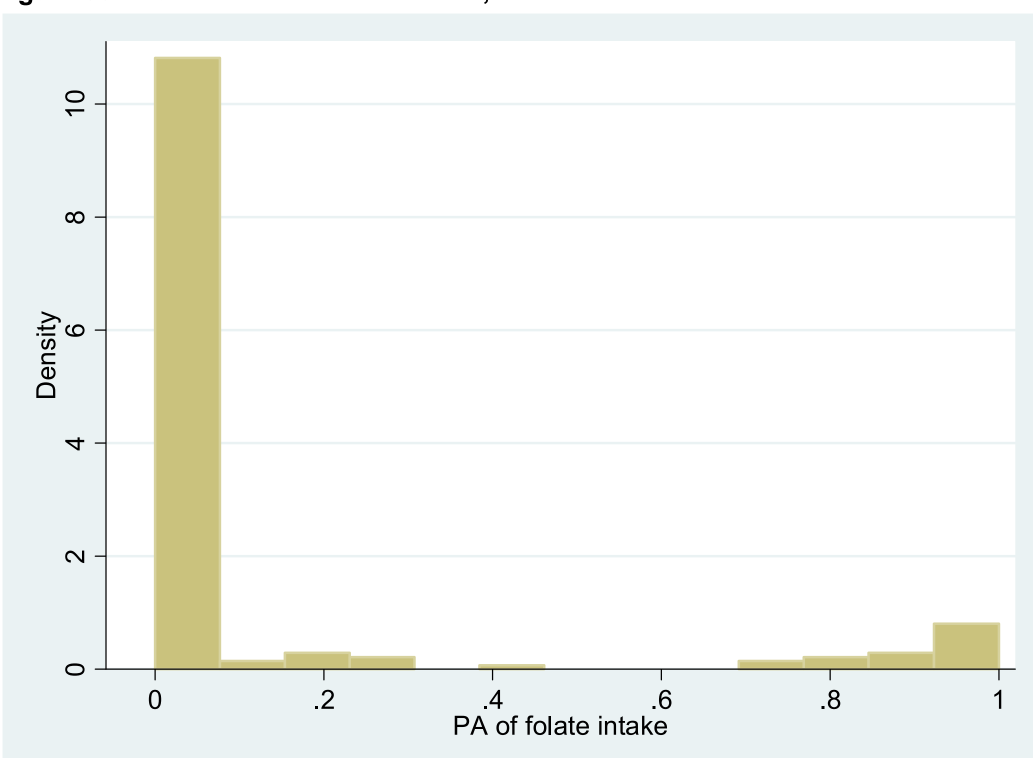


Figure 36. Distribution of PA for Vitamin B12, All Women

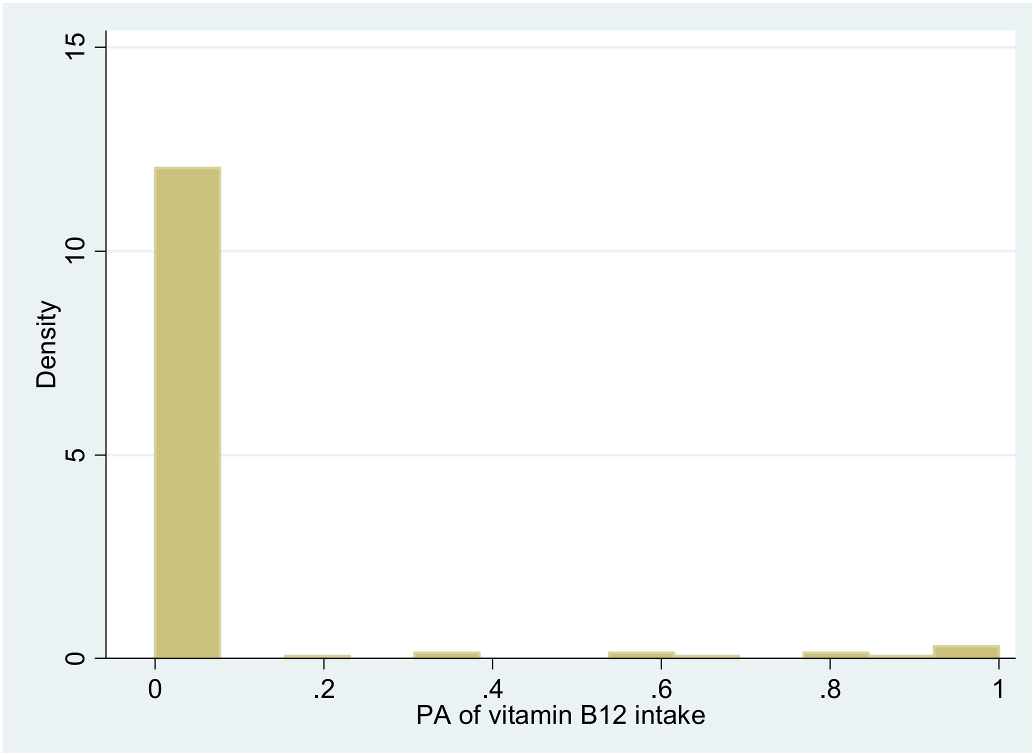


Figure 37. Distribution of PA for Vitamin C, All Women

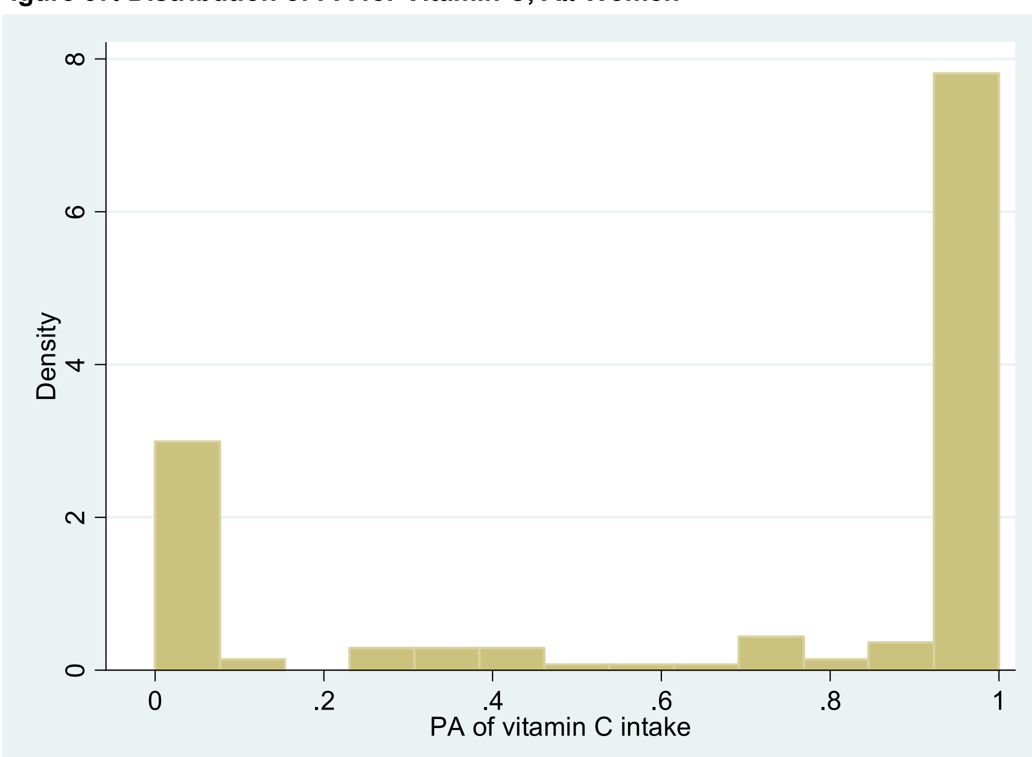


Figure 38. Distribution of PA for Vitamin A, All Women

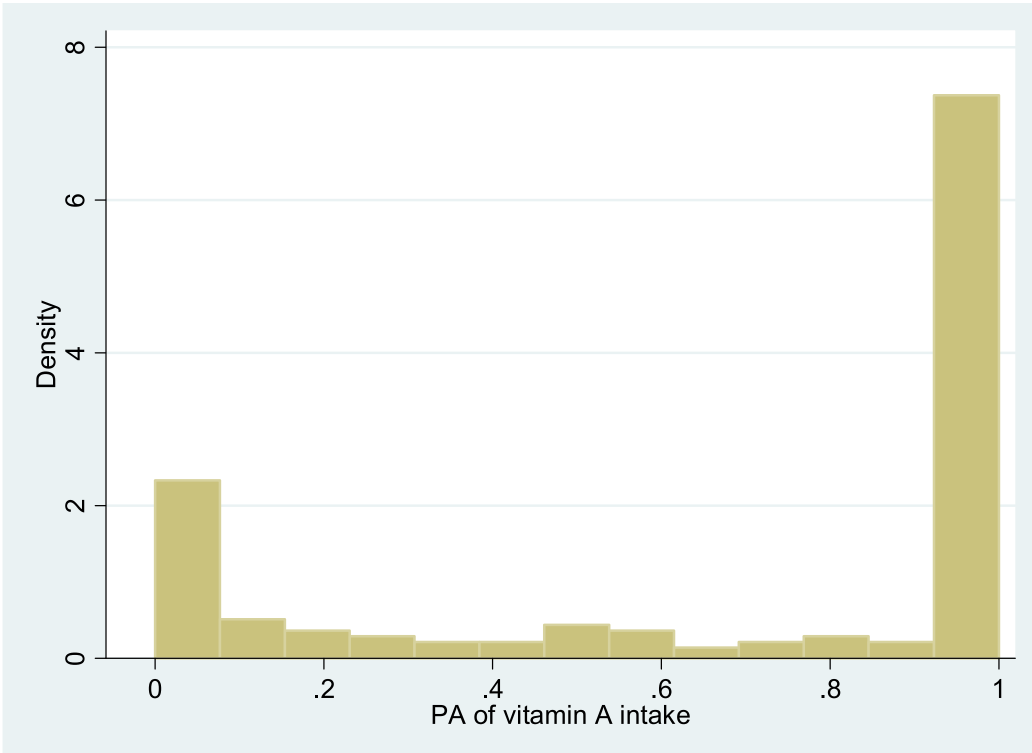


Figure 39. Distribution of PA for Calcium, All Women

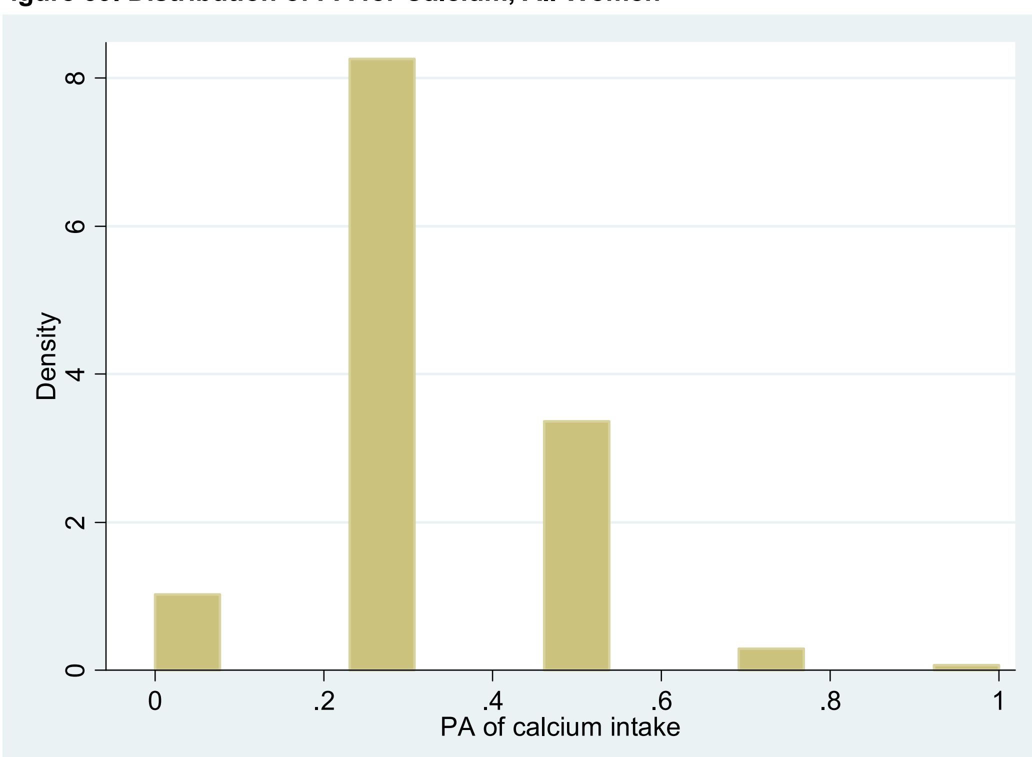


Figure 40. Distribution of PA for Iron, All Women

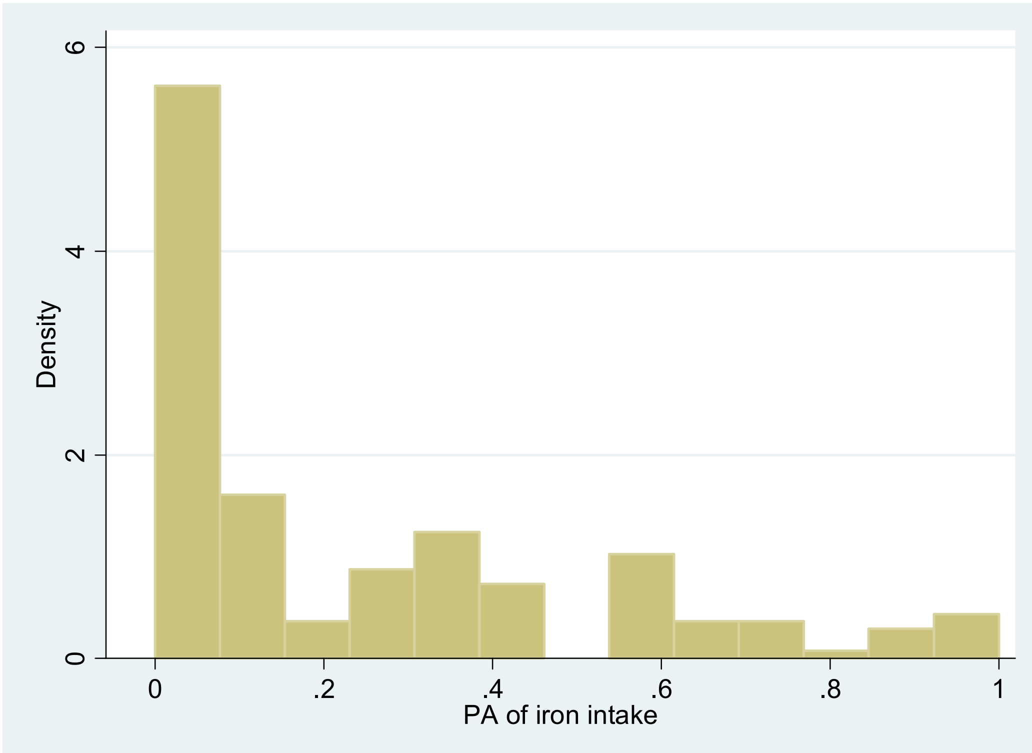


Figure 41. Distribution of PA for Zinc, All Women

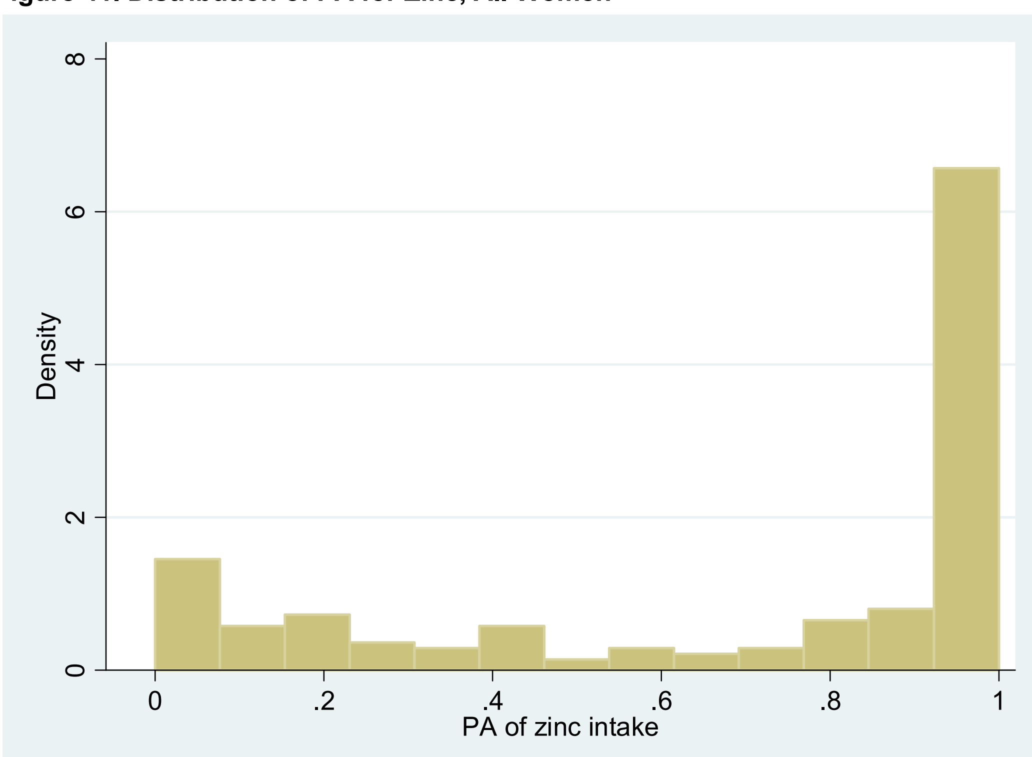
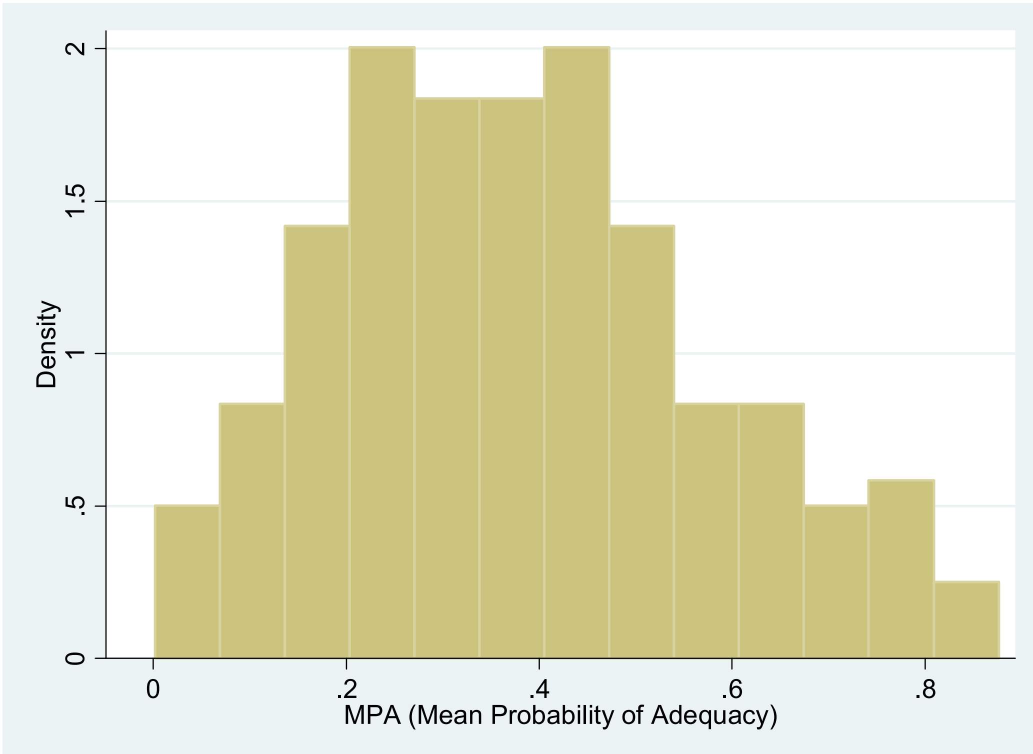


Figure 42. Distribution of MPA, All Women



Appendix 2. Tables and Figures, Non-Pregnant Non-Lactating Women

Table N1. Description of Sample, NPNL Women, R2

	n	Mean	SD	Median	Range
Age (year)	129	31.7	7.9	30.0	17.0-49.0
Height (cm)	126	163.3	6.2	163.0	150.0-182.0
Weight (kg)	125	63.1	12.0	61.7	38.2-102.1
BMI	125	23.7	4.2	23.2	16.1-37.1
Ever attended school	130	51.6			
% Lactating	130	0.0			
% Pregnant	130	0.0			
	n	**Percent**			
BMI <16	0	0.0			
BMI 16-16.9	4	3.4			
BMI 17-18.49	6	5.3			
BMI 18.5-24.9	74	58.1			
BMI 25-29.9	34	27.2			
BMI ≥ 30	7	5.9			

Table N2. Energy and Macronutrient Intakes, NPNL Women, R2

	Mean	SD	Median	Range	Percent of kcal
Energy (kcal)	2,234.7	837.1	2,077.6	903.4-5,242.1	
Protein (g)	59.4	31.2	52.8	15.8-257.1	10.8
Animal source (g)	15.3	27.7	8.9	0.0-242.7	2.8
Plant source (g)	44.1	20.8	41.4	9.8-123.7	8.0
Total carbohydrate (g)	371.3	154.2	337.5	90.5-904.4	66.4
Sugars (g)	75.7	69.5	58.1	5.0-334.4	13.6
Total fat (g)	54.3	36.1	43.9	5.1-234.0	21.7
Saturated fat (g)	–	–	–	–	–

Table N3a. Percent of Women Who Consumed 6 Major Food Groups, NPNL Women, R2

	≥ 1 g	≥ 15 g
All starchy staples	100.0	100.0
All legumes and nuts	80.6	58.1
All dairy	18.8	18.8
Other animal source foods	93.9	72.1
Vitamin A-rich fruits and vegetables [a]	92.1	69.3
Other fruits and vegetables	97.6	95.1

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N3b. Percent of Women Who Consumed 9 Sub-Food Groups, NPNL Women, R2

	≥ 1 g	≥ 15 g
All starchy staples	100.0	100.0
All legumes and nuts	80.6	58.1
All dairy	18.8	18.8
Organ meat	0.0	0.0
Eggs	1.9	0.6
Flesh foods and other miscellaneous small animal protein	93.3	70.8
Vitamin A-rich dark green leafy vegetables [a]	76.6	50.6
Other vitamin A-rich vegetables and fruits [a]	71.4	35.7
Other fruits and vegetables	97.6	95.1

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N3c. Percent of Women Who Consumed 13 Sub-Food Groups, NPNL Women, R2

	≥ 1 g	≥ 15 g
All starchy staples	100.0	100.0
All legumes and nuts	80.6	58.1
All dairy	18.8	18.8
Organ meat	0.0	0.0
Eggs	1.9	0.6
Small fish eaten whole with bones	47.2	5.7
All other flesh foods and miscellaneous small animal protein	80.7	66.0
Vitamin A-rich dark green leafy vegetables [a]	76.6	50.6
Vitamin A-rich deep yellow/orange/red vegetables [a]	59.0	4.9
Vitamin C-rich vegetables [b]	95.4	90.5
Vitamin A-rich fruits [a]	33.2	31.3
Vitamin C-rich fruits [b]	14.2	8.2
All other fruits and vegetables	53.4	20.3

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N3d. Percent of Women Who Consumed 21 Sub-Food Groups, NPNL Women, R2

	≥ 1 g	≥ 15 g
Grains and grain products	98.5	98.5
All other starchy staples	14.1	14.1
Cooked dry beans and peas	27.4	26.5
Soybeans and soy products	0.0	0.0
Nuts and seeds	75.4	39.7
Milk/yogurt	18.1	18.1
Cheese	0.6	0.6
Beef, pork, veal, lamb, goat, game meat	50.5	38.5
Organ meat	0.0	0.0
Chicken, duck, turkey, pigeon, guinea hen, game birds	1.8	1.8
Large whole fish/dried fish/shellfish and other seafood	54.8	36.8
Small fish eaten whole with bones	47.2	5.7
Insects, grubs, snakes, rodents and other small animal	0.0	0.0
Eggs	1.9	0.6
Vitamin A-rich dark green leafy vegetables [a]	76.6	50.6
Vitamin A-rich deep yellow/orange/red vegetables [a]	59.0	4.9
Vitamin C-rich vegetables [b]	95.4	90.5
All other vegetables	51.9	18.8
Vitamin A-rich fruits [a]	33.2	31.3
Vitamin C-rich fruits [b]	14.2	8.2
All other fruits	2.4	1.5

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N4a. Summary of Food Group Intake (FGI-6), for all R2 Observation Days and for Days When the Food Was Consumed, NPNL Women

	All (n = 130)					Among those who consume			
Food group	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)	Percent consuming	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)
All starchy staples	1,221.2	1,249.8	1,113.1	1,146.0	100.0	1,221.2	1,249.8	1,113.1	1,146.0
All legumes and nuts	87.9	208.7	25.9	135.0	80.6	109.1	259.0	41.4	212.2
All dairy	46.9	35.7	0.0	0.0	18.8	249.8	190.3	244.9	187.6
Other animal source foods	57.9	135.1	28.0	71.8	93.9	61.7	143.8	31.1	76.4
Vitamin A-rich fruits and vegetables [a]	155.3	102.0	60.9	30.9	92.1	168.6	110.7	72.2	36.0
Other fruits and vegetables	113.4	52.6	87.7	36.2	97.6	116.2	53.9	88.6	38.2

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N4b. Summary of Food Group Intake (FGI-9), for All R2 Observation Days and for Days When the Food Was Consumed, NPNL Women

	All (n = 130)					Among those who consume			
Food group	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)	Percent consuming	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)
All starchy staples	1,221.2	1,249.8	1,113.1	1,146.0	100.0	1,221.2	1,249.8	1,113.1	1,146.0
All legumes and nuts	87.9	208.7	25.9	135.0	80.6	109.1	259.0	41.4	212.2
All dairy	46.9	35.7	0.0	0.0	18.8	249.8	190.3	244.9	187.6
Organ meat	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Eggs	0.8	1.2	0.0	0.0	1.9	43.6	62.9	9.2	14.5
Flesh foods and other miscellaneous small animal protein	57.1	133.9	28.0	71.8	93.3	61.2	143.5	31.0	74.8
Vitamin A-rich dark green leafy vegetables [a]	48.3	23.8	15.0	5.2	76.6	63.0	31.1	29.1	12.6
Other vitamin A-rich vegetables and fruits [a]	107.0	78.1	3.8	4.9	71.4	149.6	109.2	13.5	14.6
Other fruits and vegetables	113.4	52.6	87.7	36.2	97.6	116.2	53.9	88.6	38.2

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N4c. Summary of Food Group Intake (FGI-13), for All R2 Observation Days and for Days When the Food Was Consumed, NPNL Women

	All (n = 130)					Among those who consume			
Food group	**Mean amount (g)**	**Mean energy (kcal)**	**Median amount (g)**	**Median energy (kcal)**	**Percent consuming**	**Mean amount (g)**	**Mean energy (kcal)**	**Median amount (g)**	**Median energy (kcal)**
All starchy staples	1,221.2	1,249.8	1,113.1	1,146.0	100.0	1,221.2	1,249.8	1,113.1	1,146.0
All legumes and nuts	87.9	208.7	25.9	135.0	80.6	109.1	259.0	41.4	212.2
All dairy	46.9	35.7	0.0	0.0	18.8	249.8	190.3	244.9	187.6
Organ meat	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Eggs	0.8	1.2	0.0	0.0	1.9	43.6	62.9	9.2	14.5
Small fish eaten whole with bones	3.4	9.0	0.5	1.4	47.2	7.2	18.8	4.7	12.2
All other flesh foods and miscellaneous small animal protein	53.7	124.9	24.8	57.2	80.7	66.5	154.8	34.6	75.1
Vitamin A-rich dark green leafy vegetables [a]	48.3	23.8	15.0	5.2	76.6	63.0	31.1	29.1	12.6
Vitamin A-rich deep yellow/orange/red vegetables [a]	3.6	3.9	1.8	2.2	59.0	6.0	6.4	3.8	4.3
Vitamin C-rich vegetables [b]	92.2	36.0	72.2	23.6	95.4	96.6	37.7	77.5	24.2
Vitamin A-rich fruits [a]	103.4	74.3	0.0	0.0	33.2	310.8	223.3	266.2	175.8
Vitamin C-rich fruits [b]	8.7	6.7	0.0	0.0	14.2	60.9	46.7	18.0	20.0
All other fruits and vegetables	12.5	10.0	4.4	1.9	53.4	23.5	18.7	9.9	9.4

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N4d. Summary of Food Group Intake (FGI-21), for All R2 Observation Days and for Days When the Food Was Consumed, NPNL Women

Food group	All (n = 130)					Among those who consume			
	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)	Percent consuming	Mean amount (g)	Mean energy (kcal)	Median amount (g)	Median energy (kcal)
Grains and grain products	1,154.2	1,177.9	1,027.7	1,106.5	98.5	1,172.1	1,196.1	1,037.3	1,116.5
All other starchy staples	66.9	71.9	0.0	0.0	14.1	475.1	510.2	187.0	425.9
Cooked dry beans and peas	67.7	95.6	0.0	0.0	27.4	246.9	348.8	223.6	315.9
Soybeans and soy products	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Nuts and seeds	20.2	113.1	6.9	35.4	75.4	26.8	150.0	17.5	99.6
Milk/yogurt	46.8	35.4	0.0	0.0	18.1	258.0	195.0	244.9	187.6
Cheese	0.1	0.3	0.0	0.0	0.6	15.7	54.7	15.7	54.7
Beef, pork, veal, lamb, goat, game meat	23.6	67.1	1.0	3.1	50.5	46.7	132.9	23.4	60.8
Organ meat	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Chicken, duck, turkey, pigeon, guinea hen, game birds	7.6	14.9	0.0	0.0	1.8	428.6	839.5	15.9	21.9
Large whole fish/dried fish/shellfish and other seafood	22.4	42.9	5.1	6.7	54.8	40.9	78.2	25.9	39.9
Small fish eaten whole with bones	3.4	9.0	0.5	1.4	47.2	7.2	18.8	4.7	12.2
Insects, grubs, snakes, rodents and other small animal	0.0	0.0	0.0	0.0	0.0	–	–	–	–
Eggs	0.8	1.2	0.0	0.0	1.9	43.6	62.9	9.2	14.5
Vitamin A-rich dark green leafy vegetables [a]	48.3	23.8	15.0	5.2	76.6	63.0	31.1	29.1	12.6
Vitamin A-rich deep yellow/orange/red vegetables [a]	3.6	3.9	1.8	2.2	59.0	6.0	6.4	3.8	4.3
Vitamin C-rich vegetables [b]	92.2	36.0	72.2	23.6	95.4	96.6	37.7	77.5	24.2
All other vegetables	11.1	7.7	3.2	1.6	51.9	21.4	14.8	9.9	9.0
Vitamin A-rich fruits [a]	103.4	74.3	0.0	0.0	33.2	310.8	223.3	266.2	175.8
Vitamin C-rich fruits [b]	8.7	6.7	0.0	0.0	14.2	60.9	46.7	18.0	20.0
All other fruits	1.4	2.3	0.0	0.0	2.4	59.8	96.0	51.0	62.2

[a] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[b] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N5. Diversity Scores for Various Diversity Indicators, NPNL Women, R2

Indicator	Number of food groups and level	Mean	SD	Median	Range
FGI-6	6 major food groups	4.8	0.6	5.0	3-6
FGI-6R [a]	6 major food groups	4.1	1.0	4.0	2-6
FGI-9	9 food sub-groups	5.4	1.0	6.0	3-7
FGI-9R [a]	9 food sub-groups	4.3	1.1	4.0	2-7
FGI-13	13 food sub-groups	6.6	1.5	7.0	3-10
FGI-13R [a]	13 food sub-groups	4.6	1.3	5.0	2-8
FGI-21	21 food sub-groups	7.2	1.7	7.0	3-10
FGI-21R [a]	21 food sub-groups	4.9	1.5	5.0	2-9

[a] "R" indicates that at least 15 g must be consumed in order for the food group/sub-group to "count" in the score.

Table N6. Percent of Observation Days at Each Food Group Diversity Score, NPNL Women, R2

Number of food groups eaten	Diversity indicators							
	FGI-6	FGI-6R	FGI-9	FGI-9R	FGI-13	FGI-13R	FGI-21	FGI-21R
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	4.6	0.0	3.7	0.0	3.0	0.0	3.3
3	3.7	22.1	3.7	21.4	3.0	19.9	1.3	14.8
4	20.2	33.8	14.6	32.0	7.9	25.1	8.1	26.4
5	65.6	34.6	28.9	28.6	11.2	29.7	6.9	18.9
6	10.5	4.9	43.4	13.1	20.6	15.7	14.6	25.0
7			9.4	1.3	27.7	5.8	19.9	7.4
8			0.0	0.0	20.2	0.6	25.8	3.6
9			0.0	0.0	8.9	0.0	15.2	0.6
10					0.6	0.0	8.2	0.0
11					0.0	0.0	0.0	0.0
12					0.0	0.0	0.0	0.0
13					0.0	0.0	0.0	0.0
14							0.0	0.0
15							0.0	0.0
16							0.0	0.0
17							0.0	0.0
18							0.0	0.0
19							0.0	0.0
20							0.0	0.0
21							0.0	0.0

Table N7a. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-6 - 1 g Minimum)

	Number of food groups eaten					
	1	2	3	4	5	6
Percent (number)[a] of observation days at each diversity score	0.0 (0)	0.0 (0)	3.7 (5)	20.2 (27)	65.6 (83)	10.5 (15)
Food groups	**Percent of observation days on which each food group was consumed**					
All starchy staples	–	–	100.0	100.0	100.0	100.0
All legumes and nuts	–	–	65.5	39.0	91.1	100.0
All dairy	–	–	0.0	7.5	10.3	100.0
Other animal source foods	–	–	0.0	88.1	100.0	100.0
Vitamin A-rich fruits and vegetables [b]	–	–	58.6	73.0	98.6	100.0
Other fruits and vegetables	–	–	75.9	92.5	100.0	100.0

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N7b. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-6R - 15 g Minimum)

	Number of food groups eaten					
	1	2	3	4	5	6
Percent (number)[a] of observation days at each diversity score	0.0 (0)	4.6 (6)	22.1 (28)	33.8 (44)	34.6 (45)	4.9 (7)
Food groups	**Percent of observation days on which each food group was consumed**					
All starchy staples	–	100.0	100.0	100.0	100.0	100.0
All legumes and nuts	–	13.9	42.0	42.9	83.2	100.0
All dairy	–	0.0	0.0	17.3	23.1	100.0
Other animal source foods	–	0.0	36.2	72.6	100.0	100.0
Vitamin A-rich fruits and vegetables [b]	–	19.4	31.6	69.2	95.6	100.0
Other fruits and vegetables	–	66.7	90.2	98.1	98.2	100.0

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N7c. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-9 - 1 g Minimum)

	Number of food groups eaten								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Percent (number)[a] of observation days at each diversity score	0.0 (0)	0.0 (0)	3.7 (5)	14.6 (19)	28.9 (36)	43.4 (56)	9.4 (14)	0.0 (0)	0.0 (0)
Food groups	**Percent of observation days on which each food group was consumed**								
All starchy staples	–	–	100.0	100.0	100.0	100.0	100.0	–	–
All legumes and nuts	–	–	65.5	52.2	74.1	91.5	100.0	–	–
All dairy	–	–	0.0	10.4	10.5	14.0	86.5	–	–
Organ meat	–	–	0.0	0.0	0.0	0.0	0.0	–	–
Eggs	–	–	0.0	0.0	2.2	0.0	13.5	–	–
Flesh foods and other miscellaneous small animal protein	–	–	0.0	83.5	97.8	100.0	100.0	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	–	41.4	20.9	68.9	98.5	100.0	–	–
Other vitamin A-rich vegetables and fruits [b]	–	–	17.2	37.4	49.6	95.9	100.0	–	–
Other fruits and vegetables	–	–	75.9	95.7	96.9	100.0	100.0	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N7d. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-9R - 15 g Minimum)

	Number of food groups eaten								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Percent (number)[a] of observation days at each diversity score	0.0 (0)	3.7 (5)	21.4 (27)	32.0 (42)	28.6 (37)	13.1 (17)	1.3 (2)	0.0 (0)	0.0 (0)
Food groups	**Percent of observation days on which each food group was consumed**								
All starchy staples	–	100.0	100.0	100.0	100.0	100.0	100.0	–	–
All legumes and nuts	–	17.2	40.2	44.4	76.4	88.3	100.0	–	–
All dairy	–	0.0	0.0	18.3	20.4	44.7	100.0	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	–	–
Eggs	–	0.0	0.0	0.0	2.2	0.0	0.0	–	–
Flesh foods and other miscellaneous small animal protein	–	0.0	37.3	71.8	89.3	100.0	100.0	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	0.0	19.5	44.4	68.0	88.3	100.0	–	–
Other vitamin A-rich vegetables and fruits [b]	–	0.0	14.2	23.0	45.8	83.5	100.0	–	–
Other fruits and vegetables	–	82.8	88.8	98.0	97.8	95.1	100.0	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N7e. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-13 - 1 g Minimum)

	Number of food groups eaten												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Percent (number)[a] of observation days at each diversity score	0.0 (0)	0.0 (0)	3.0 (4)	7.9 (10)	11.2 (16)	20.6 (26)	27.7 (36)	20.2 (25)	8.9 (12)	0.6 (1)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**												
All starchy staples	–	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–	–	–
All legumes and nuts	–	–	79.2	66.1	35.2	71.6	95.4	91.2	100.0	100.0	–	–	–
All dairy	–	–	0.0	11.3	17.0	19.1	17.0	23.9	28.6	0.0	–	–	–
Organ meat	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–
Eggs	–	–	0.0	0.0	5.7	0.0	2.3	0.0	0.0	100.0	–	–	–
Small fish eaten whole with bones	–	–	0.0	22.6	31.8	24.7	59.6	61.0	82.9	100.0	–	–	–
All other flesh foods and miscellaneous small animal protein	–	–	0.0	46.8	64.8	82.7	85.8	100.0	100.0	0.0	–	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	–	50.0	30.6	42.0	71.0	89.0	95.6	100.0	100.0	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [b]	–	–	0.0	22.6	53.4	51.9	49.1	86.8	100.0	100.0	–	–	–
Vitamin C-rich vegetables [c]	–	–	70.8	80.6	92.0	100.0	95.4	100.0	100.0	100.0	–	–	–
Vitamin A-rich fruits [b]	–	–	0.0	8.1	33.0	25.3	26.6	49.1	65.7	100.0	–	–	–
Vitamin C-rich fruits [c]	–	–	0.0	0.0	0.0	13.0	19.7	10.7	37.1	100.0	–	–	–
All other fruits and vegetables	–	–	0.0	11.3	25.0	40.7	60.1	81.8	85.7	100.0	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N7f. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-13R - 15 g Minimum)

	Number of food groups eaten												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Percent (number)[a] of observation days at each diversity score	0.0 (0)	3.0 (4)	19.9 (25)	25.1 (34)	29.7 (38)	15.7 (20)	5.8 (8)	0.6 (1)	0.0 (0)	0.0 (0)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**												
All starchy staples	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–	–	–	–	–
All legumes and nuts	–	20.8	43.3	44.9	62.8	79.0	100.0	100.0	–	–	–	–	–
All dairy	–	0.0	4.5	13.6	16.7	44.4	32.6	100.0	–	–	–	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–
Eggs	–	0.0	0.0	0.0	2.1	0.0	0.0	0.0	–	–	–	–	–
Small fish eaten whole with bones	–	0.0	0.0	6.1	3.0	21.0	0.0	0.0	–	–	–	–	–
All other flesh foods and miscellaneous small animal protein	–	0.0	32.5	56.6	79.9	100.0	89.1	100.0	–	–	–	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	0.0	21.0	52.0	61.1	59.7	89.1	100.0	–	–	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [b]	–	0.0	0.0	0.0	11.5	9.7	0.0	0.0	–	–	–	–	–
Vitamin C-rich vegetables [c]	–	50.0	79.0	94.9	95.7	96.0	89.1	100.0	–	–	–	–	–
Vitamin A-rich fruits [b]	–	0.0	12.1	17.2	32.5	58.1	89.1	100.0	–	–	–	–	–
Vitamin C-rich fruits [c]	–	0.0	4.5	3.5	7.3	9.7	47.8	0.0	–	–	–	–	–
All other fruits and vegetables	–	29.2	3.2	11.1	27.4	22.6	63.0	100.0	–	–	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N7g. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-21 - 1 g Minimum)

	Number of food groups eaten																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Percent (number)[a] of observation days at each diversity score	0.0 (0)	0.0 (0)	1.3 (2)	8.1 (10)	6.9 (10)	14.6 (19)	19.9 (25)	25.8 (33)	15.2 (20)	8.2 (11)	0.0 (0)	0.0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**																				
Grains and grain products	–	–	100.0	100.0	87.0	100.0	96.8	100.0	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–
All other starchy staples	–	–	0.0	0.0	22.2	8.7	17.2	10.8	21.7	21.5	–	–	–	–	–	–	–	–	–	–	–
Cooked dry beans and peas	–	–	50.0	37.5	0.0	22.6	17.8	31.5	25.8	58.5	–	–	–	–	–	–	–	–	–	–	–
Soybeans and soy products	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–
Nuts and seeds	–	–	0.0	62.5	40.7	43.5	87.3	78.8	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–
Milk/yogurt	–	–	0.0	10.9	9.3	19.1	10.8	33.0	16.7	7.7	–	–	–	–	–	–	–	–	–	–	–
Cheese	–	–	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–
Beef, pork, veal, lamb, goat, game meat	–	–	0.0	0.0	40.7	33.9	51.6	58.6	70.0	81.5	–	–	–	–	–	–	–	–	–	–	–
Organ meat	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–
Chicken, duck, turkey, pigeon, guinea hen, game birds	–	–	0.0	0.0	13.0	0.0	0.0	3.4	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–
Large whole fish/dried fish/shellfish and other seafood	–	–	0.0	26.6	27.8	56.5	45.9	63.1	74.2	70.8	–	–	–	–	–	–	–	–	–	–	–
Small fish eaten whole with bones	–	–	0.0	21.9	13.0	40.9	43.3	47.8	75.8	73.8	–	–	–	–	–	–	–	–	–	–	–
Insects, grubs, snakes, rodents and other small animal	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–
Eggs	–	–	0.0	0.0	9.3	0.0	3.2	0.0	0.0	7.7	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	–	50.0	40.6	50.0	44.3	91.1	84.7	95.8	100.0	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [b]	–	–	0.0	10.9	59.3	64.3	35.7	68.5	88.3	78.5	–	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich vegetables [c]	–	–	100.0	78.1	77.8	100.0	100.0	95.1	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–
All other vegetables	–	–	0.0	10.9	18.5	34.8	49.7	60.6	71.7	100.0	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich fruits [b]	–	–	0.0	0.0	31.5	25.2	27.4	44.8	30.0	70.8	–	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich fruits [c]	–	–	0.0	0.0	0.0	6.1	17.8	14.3	30.0	18.5	–	–	–	–	–	–	–	–	–	–	–
All other fruits	–	–	0.0	0.0	0.0	0.0	4.5	2.5	0.0	10.8	–	–	–	–	–	–	–	–	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N7h. Percent of Observation Days on Which Different Food Groups Were Consumed, By Food Group Diversity Score, NPNL Women, R2 (FGI-21R - 15 g Minimum)

	Number of food groups eaten																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Percent (number)[a] of observation days at each diversity score	0.0 (0)	3.3 (4)	14.8 (19)	26.4 (34)	18.9 (25)	25.0 (33)	7.4 (10)	3.6 (4)	0.6 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Food groups	**Percent of observation days on which each food group was consumed**																				
Grains and grain products	–	100.0	100.0	96.6	96.6	100.0	100.0	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
All other starchy staples	–	0.0	4.3	11.5	10.1	19.8	24.1	50.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Cooked dry beans and peas	–	19.2	34.2	17.3	11.4	36.0	32.8	75.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Soybeans and soy products	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Nuts and seeds	–	0.0	10.3	29.3	59.7	40.1	67.2	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Milk/yogurt	–	26.9	0.0	10.6	8.1	34.5	50.0	0.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Cheese	–	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Beef, pork, veal, lamb, goat, game meat	–	0.0	14.5	24.0	50.3	53.8	50.0	75.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Organ meat	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Chicken, duck, turkey, pigeon, guinea hen, game birds	–	0.0	0.0	3.4	0.0	3.6	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Large whole fish/dried fish/shellfish and other seafood	–	0.0	4.3	30.3	38.9	51.8	62.1	75.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Small fish eaten whole with bones	–	0.0	0.0	5.8	0.0	13.2	0.0	25.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Insects, grubs, snakes, rodents and other small animal	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Eggs	–	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich dark green leafy vegetables [b]	–	0.0	28.2	45.7	58.4	59.4	70.7	75.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich deep yellow/orange/red vegetables [b]	–	0.0	0.0	0.0	8.1	11.2	8.6	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich vegetables [c]	–	26.9	82.1	97.6	93.3	92.4	91.4	100.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
All other vegetables	–	26.9	4.3	8.2	26.8	15.7	50.0	50.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin A-rich fruits [b]	–	0.0	12.0	13.9	30.2	54.8	55.2	50.0	100.0	–	–	–	–	–	–	–	–	–	–	–	–
Vitamin C-rich fruits [c]	–	0.0	6.0	5.8	4.7	8.6	25.9	25.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–
All other fruits	–	0.0	0.0	0.0	0.0	2.5	12.1	0.0	0.0	–	–	–	–	–	–	–	–	–	–	–	–

[a] Percents are weighted according to the sample design; however, the number of observations is unweighted.
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N8. Mean and Median Nutrient Intake and PA, NPNL Women [a]

Nutrient	Mean	SD	Median	EAR [b]	SD [b]	PA (Mean)	PA (Median)	Lambda (Box-Cox transformation) [c]
Energy	2,234.75	837.05	2,077.59					
Protein (All Sources) (% of kcal)	10.82	4.05	10.31					
Protein from animal sources (% of kcal)	2.83	4.24	1.62					
Total carbohydrate (% of kcal)	66.37	11.32	67.25					
Sugars (% of kcal)	13.59	11.18	11.08					
Total fat (% of kcal)	21.74	10.32	21.28					
Saturated fat (% of kcal)								
Thiamin (mg/d)	1.03	0.45	0.92	0.9	0.09	0.49	0.44	0.268
Riboflavin (mg/d)	0.79	0.48	0.67	0.9	0.09	0.16	0.00	0.035
Niacin (mg/d)	9.70	5.76	8.39	11	1.65	0.19	0.05	0.062
Vitamin B6 (mg/d)	1.57	0.88	1.33	1.1	0.11	0.70	0.95	0.152
Folate (µg/d)	247.32	185.93	194.40	320	32	0.15	0.00	0.171
Vitamin B12 (µg/d)	1.05	1.96	0.41	2.0	0.2	0.06	0.00	0.128
Vitamin C (mg/d)	90.47	100.41	55.15	30	3.0	0.70	1.00	0.172
Vitamin A (RE/d)	853.47	1,015.55	515.14	270	54	0.73	1.00	0.099
Calcium (mg/d)	539.75	461.47	394.09	[d]	[d]	0.30	0.25	0.068
Iron (mg/d)	23.17	13.62	20.39	See tables A6-2 & A6-3		0.15	0.07	0.085
Zinc (mg/d)	9.27	3.76	8.49	15% bioavail: 6.67	1.67	0.70	0.89	0.308
MPA across 11 micronutrients	0.39	0.20	0.38					

[a] Mean and median nutrient intakes are for second observation day; PA are based on estimated usual intake, calculated using repeat observations for a subset of the sample.
[b] EAR and SD are presented for the predominant physiological group i.e., NPNL women (19-65 years); However, the sample also include adolescent girls (2.3 percent). See table A6-1 for sources of data.
[c] This documents the transformation parameters selected for each nutrient. The power transformations result in approximately normal distributions.
[d] There is no EAR and no SD for calcium; 1,000 mg is the Adequate Intake (AI).

Table N9a. Percent Contribution of Food Groups (FGI-6) to Intake of Energy, Protein and Nutrients, NPNL Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
All starchy staples	55.7	48.0	72.8	12.1	54.4	30.8	32.3	44.0	29.3	0.0	8.3	2.5	15.2	37.5	61.1
All legumes and nuts	9.6	18.1	5.5	20.3	20.5	12.9	23.9	7.0	26.6	0.0	2.3	1.4	11.1	17.3	16.3
All dairy	1.7	2.5	1.4	2.6	1.8	6.3	2.2	1.6	1.6	9.1	1.8	2.4	7.8	1.5	2.3
Other animal source foods	6.3	20.4	0.0	16.1	5.2	8.7	12.9	8.0	2.4	73.4	0.3	2.3	13.1	7.3	9.9
Vitamin A-rich fruits /vegetables[b]	4.6	5.5	5.6	2.2	7.9	24.1	12.2	24.6	20.8	0.0	38.2	70.3	31.8	20.9	4.8
Other fruits and vegetables	2.6	3.4	2.8	1.9	7.1	10.4	10.9	10.7	13.8	0.0	47.1	19.4	17.6	13.2	4.7

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol).

[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N9b. Percent Contribution of Food Groups (FGI-6) to Intake of Energy, Protein and Nutrients, NPNL Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
All starchy staples	55.7	48.0	72.8	12.1	54.4	30.8	32.3	44.0	29.3	0.0	8.3	2.5	15.2	37.5	61.1
All legumes and nuts	9.6	18.1	5.5	20.3	20.5	12.9	23.9	7.0	26.6	0.0	2.3	1.4	11.1	17.3	16.3
All dairy	1.7	2.5	1.4	2.6	1.8	6.3	2.2	1.6	1.6	9.1	1.8	2.4	7.8	1.5	2.3
Organ meat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eggs	0.1	0.2	0.0	0.2	0.1	0.2	0.0	0.0	0.1	0.9	0.0	0.1	0.0	0.1	0.2
Flesh foods and other miscellaneous small animal protein	6.2	20.2	0.0	15.9	5.1	8.6	12.9	7.9	2.3	72.5	0.3	2.2	13.1	7.2	9.7
Vitamin A-rich dark green leafy vegetables	1.1	4.0	1.1	0.7	3.9	16.9	6.3	15.3	16.0	0.0	15.2	40.4	28.2	14.5	3.2
Other vitamin A-rich vegetables and fruits [b]	3.5	1.5	4.5	1.5	4.0	7.3	5.9	9.3	4.8	0.0	23.0	29.9	3.6	6.4	1.6
Other fruits and vegetables	2.6	3.4	2.8	1.9	7.1	10.4	10.9	10.7	13.8	0.0	47.1	19.4	17.6	13.2	4.7

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol).
[b] Vitamin A-rich fruits and vegetables are defined as those with >120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N9c. Percent Contribution of Food Groups (FGI-13) to Intake of Energy, Protein and Nutrients, NPNL Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
All starchy staples	55.7	48.0	72.8	12.1	54.4	30.8	32.3	44.0	29.3	0.0	8.3	2.5	15.2	37.5	61.1
All legumes and nuts	9.6	18.1	5.5	20.3	20.5	12.9	23.9	7.0	26.6	0.0	2.3	1.4	11.1	17.3	16.3
All dairy	1.7	2.5	1.4	2.6	1.8	6.3	2.2	1.6	1.6	9.1	1.8	2.4	7.8	1.5	2.3
Organ meat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eggs	0.1	0.2	0.0	0.2	0.1	0.2	0.0	0.0	0.1	0.9	0.0	0.1	0.0	0.1	0.2
Small fish eaten whole w/bones	0.4	3.0	0.0	0.6	0.2	0.3	1.3	1.0	0.2	18.9	0.0	0.0	7.2	0.4	0.3
All other flesh foods misc. small animal protein	5.7	17.2	0.0	15.3	4.9	8.3	11.6	7.0	2.1	53.6	0.3	2.2	5.9	6.8	9.4
Vitamin A-rich dark green leafy vegetables [b]	1.1	4.0	1.1	0.7	3.9	16.9	6.3	15.3	16.0	0.0	15.2	40.4	28.2	14.5	3.2
Vitamin A-rich deep yellow/orange/red vegetables [b]	0.5	0.3	0.3	1.0	0.9	0.8	1.5	1.4	1.1	0.0	0.8	6.8	0.6	0.9	0.4
Vitamin C-rich vegetables [c]	1.8	2.3	1.8	1.5	5.1	6.5	6.8	7.2	9.7	0.0	42.1	17.1	11.4	4.5	2.7
Vitamin A-rich fruits [b]	2.9	1.1	4.2	0.5	3.1	6.5	4.4	7.9	3.7	0.0	22.1	23.2	3.0	5.5	1.2
Vitamin C-rich fruits [c]	0.4	0.2	0.6	0.1	0.6	0.5	0.4	1.6	1.0	0.0	3.4	0.2	0.7	0.3	0.3
All other fruits and vegetables	0.4	0.9	0.4	0.4	1.4	3.4	3.7	2.0	3.0	0.0	1.6	2.1	5.5	8.4	1.6

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol).
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N9d. Percent Contribution of Food Groups (FGI-21) to Intake of Energy, Protein and Nutrients, NPNL Women, R2 [a]

Food groups (%)	Energy	Protein	CHO	Total fat	Thiamin	Riboflavin	Niacin	Vitamin B6	Folate	Vitamin B12	Vitamin C	Vitamin A	Calcium	Iron	Zinc
Grains and grain products	52.6	46.3	67.8	11.6	49.4	28.4	29.7	37.7	24.0	0.0	1.0	1.5	9.6	34.3	58.0
All other starchy staples	3.1	1.7	5.0	0.5	5.1	2.5	2.7	6.3	5.3	0.0	7.3	1.0	5.5	3.1	3.1
Cooked dry beans and peas	4.3	9.7	4.6	1.1	12.4	5.5	5.6	3.5	16.4	0.0	1.8	0.9	5.8	6.3	8.7
Soybeans and soy products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuts and seeds	5.3	8.4	0.9	19.2	8.0	7.4	18.3	3.5	10.2	0.0	0.4	0.5	5.3	11.0	7.5
Milk/yogurt	1.6	2.5	1.4	2.5	1.8	6.2	2.2	1.6	1.5	9.1	1.8	2.1	7.7	1.5	2.3
Cheese	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0
Beef, pork, veal, lamb, goat, game meat	3.2	7.8	0.0	9.0	3.3	6.3	7.8	3.6	1.1	35.6	0.1	0.4	1.2	4.3	7.0
Organ meat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chicken, duck, turkey, pigeon, guinea hen, game birds	0.5	0.9	0.0	0.9	0.5	0.8	0.9	0.5	0.0	1.2	0.0	0.9	0.2	0.6	0.7
Large whole fish/dried fish/shellfish, other seafood	2.0	8.5	0.0	5.5	1.2	1.2	2.9	2.9	1.0	16.8	0.2	0.9	4.5	2.0	1.7
Small fish eaten whole w/bones	0.4	3.0	0.0	0.6	0.2	0.3	1.3	1.0	0.2	18.9	0.0	0.0	7.2	0.4	0.3
Insects, grubs, snakes, rodents and other small animal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eggs	0.1	0.2	0.0	0.2	0.1	0.2	0.0	0.0	0.1	0.9	0.0	0.1	0.0	0.1	0.2
Vitamin A-rich dark green leafy vegetables [b]	1.1	4.0	1.1	0.7	3.9	16.9	6.3	15.3	16.0	0.0	15.2	40.4	28.2	14.5	3.2
Vitamin A-rich deep yellow/orange/red vegetables [b]	0.5	0.3	0.3	1.0	0.9	0.8	1.5	1.4	1.1	0.0	0.8	6.8	0.6	0.9	0.4
Vitamin C-rich vegetables [c]	1.8	2.3	1.8	1.5	5.1	6.5	6.8	7.2	9.7	0.0	42.1	17.1	11.4	4.5	2.7
All other vegetables	0.4	0.9	0.3	0.3	1.3	3.3	3.6	1.9	2.9	0.0	1.5	2.1	5.5	8.4	1.6
Vitamin A-rich fruits [b]	2.9	1.1	4.2	0.5	3.1	6.5	4.4	7.9	3.7	0.0	22.1	23.2	3.0	5.5	1.2
Vitamin C-rich fruits [c]	0.4	0.2	0.6	0.1	0.6	0.5	0.4	1.6	1.0	0.0	3.4	0.2	0.7	0.3	0.3
All other fruits	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0

[a] Percents may not sum to 100 due to nutrient contributions from foods not included in any of the groups comprising the diversity indicators (e.g., fats, sweets, alcohol)
[b] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[c] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N10. Correlations between Food Group Diversity Scores and Estimated Usual Intakes of Individual Nutrients, NPNL Women [a, b]

Nutrients	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy	Not controlling for energy	Controlling for energy
Total energy	0.206*		0.189*		0.232**		0.223*		0.186*		0.252**		0.191*		0.280**	
Thiamin	0.136	-0.018	0.234**	0.144	0.145	-0.033	0.242**	0.120	0.120	-0.021	0.277**	0.142	0.168	0.045	0.304***	0.153
Riboflavin	0.310***	0.241**	0.405***	0.368***	0.295***	0.206*	0.421***	0.367***	0.142	0.048	0.374***	0.291***	0.156	0.062	0.371***	0.270**
Niacin	0.267**	0.188*	0.446***	0.418***	0.305***	0.217*	0.443***	0.394***	0.305***	0.247**	0.429***	0.360***	0.306***	0.245**	0.459***	0.380***
Vitamin B6	0.295***	0.222*	0.344***	0.293***	0.284**	0.190*	0.386***	0.323***	0.277**	0.212*	0.409***	0.334***	0.326***	0.270**	0.447***	0.365***
Folate	0.197*	0.112	0.264**	0.199*	0.164	0.057	0.282**	0.202*	0.195*	0.120	0.264**	0.165	0.258**	0.192*	0.267**	0.154
Vitamin B12	0.281**	0.261**	0.289***	0.271**	0.292***	0.270**	0.244**	0.221*	0.178*	0.157	0.231**	0.206*	0.187*	0.166	0.274**	0.248**
Vitamin C	0.259**	0.211*	0.399***	0.366***	0.342***	0.293***	0.524***	0.491***	0.324***	0.286**	0.509***	0.469***	0.356***	0.318***	0.535***	0.492***
Vitamin A	0.346***	0.300***	0.407***	0.371***	0.399***	0.349***	0.529***	0.494***	0.354***	0.314***	0.485***	0.438***	0.392***	0.354***	0.512***	0.462***
Calcium	0.324***	0.269**	0.242**	0.185*	0.282**	0.212*	0.276**	0.209*	0.284**	0.232**	0.273**	0.194*	0.292***	0.240**	0.243**	0.149
Iron	0.255**	0.173	0.103	-0.002	0.213*	0.103	0.152	0.035	0.246**	0.175*	0.174*	0.043	0.267**	0.197*	0.154	-0.001
Zinc	0.173*	0.036	0.120	-0.024	0.142	-0.038	0.129	-0.047	0.174*	0.058	0.164	-0.026	0.181*	0.064	0.149	-0.078

[a] Usual intake of energy and individual nutrients are estimated by the BLUP following the method described in section 11 of the WDDP protocol (Arimond et al. 2008). Diversity scores are from R2 data; BLUP calculation incorporates information from one to three rounds of data.
\b A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.

Table N11a. Correlation between Energy from 6 Major Food Groups and MPA, With and Without Controlling for Total Energy Intake, NPNL Women [a, b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
All starchy staples	0.077	-0.336 ***
All legumes and nuts	0.289 ***	0.218 *
All dairy	0.026	-0.014
Other animal source foods	0.213 *	0.179 *
Vitamin A-rich fruits and vegetables [c]	0.487 ***	0.440 ***
Other fruits and vegetables	0.130	0.103

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at p < 0.05; ** indicates p < 0.01, and *** indicates p < 0.001.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample.
[c] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect

Table N11b. Correlation between Energy from 9 Sub-Food Groups and MPA, With and Without Controlling for Total Energy Intake, NPNL Women [a. b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
All starchy staples	0.077	-0.336 ***
All legumes and nuts	0.289 ***	0.218 *
All dairy	0.026	-0.014
Organ meat	–	–
Eggs	0.043	0.087
Flesh foods and other miscellaneous small animal protein	0.209 *	0.172
Vitamin A-rich dark green leafy vegetables [c]	0.405 ***	0.400 ***
Other vitamin A-rich vegetables and fruits [c]	0.395 ***	0.342 ***
Other fruits and vegetables	0.130	0.103

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at p < 0.05; ** indicates p < 0.01, and *** indicates p < 0.001.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample.
[c] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.

Table N11c. Correlation between Energy from 13 Sub-Food Groups and MPA, With and Without Controlling for Total Energy Intake, NPNL Women [a, b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
All starchy staples	0.077	-0.336 ***
All legumes and nuts	0.289 ***	0.218 *
All dairy	0.026	-0.014
Organ meat	–	–
Eggs	0.043	0.087
Small fish eaten whole with bones	0.153	0.122
All other flesh foods and miscellaneous small animal protein	0.198 *	0.163
Vitamin A-rich dark green leafy vegetables [c]	0.405 ***	0.400 ***
Vitamin A-rich deep yellow/orange/red vegetables [c]	0.057	0.026
Vitamin C-rich vegetables [d]	0.052	0.035
Vitamin A-rich fruits [c]	0.393 ***	0.341 ***
Vitamin C-rich fruits [d]	0.109	0.139
All other fruits and vegetables	0.059	-0.015

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample.
[c] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[d] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N11d. Correlation between energy from 21 Sub-Food Groups and MPA, With and Without Controlling for Total Energy Intake, NPNL Women [a, b]

Major food groups	Correlation between MPA and energy from each food group:	Partial correlation coefficients for energy from each food group (controlling for total energy)
Grains and grain products	0.067	-0.241**
All other starchy staples	0.013	-0.056
Cooked dry beans and peas	0.168	0.128
Soybeans and soy products	–	–
Nuts and seeds	0.243**	0.176*
Milk/yogurt	0.025	-0.015
Cheese	0.008	0.009
Beef, pork, veal, lamb, goat, game meat	0.250**	0.263**
Organ meat	–	–
Chicken, duck, turkey, pigeon, guinea hen, game birds	-0.008	-0.034
Large whole fish/dried fish/shellfish and other seafood	0.074	0.000
Small fish eaten whole with bones	0.153	0.122
Insects, grubs, snakes, rodents and other small animal	–	–
Eggs	0.043	0.087
Vitamin A-rich dark green leafy vegetables [c]	0.405***	0.400***
Vitamin A-rich deep yellow/orange/red vegetables [c]	0.057	0.026
Vitamin C-rich vegetables [d]	0.052	0.035
All other vegetables	-0.032	-0.075
Vitamin A-rich fruits [c]	0.393***	0.341***
Vitamin C-rich fruits [d]	0.109	0.139
All other fruits	0.104	0.046

[a] Numbers in bold indicate coefficients that changed direction when total energy was controlled for, with both coefficients being significant. A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[b] Energy from food groups is from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample.
[c] Vitamin A-rich fruits and vegetables are defined as those with > 120 RE/100g *raw, taking into account retention factors*. As nutrient data is expressed as RE, RE values should be divided by 2 to reflect newer thinking about the bioefficacy of carotenoids. We note that this correction is imperfect.
[d] Vitamin C-rich fruits and vegetables are defined as those with > 9 mg/100g *raw, taking into account retention factors*.

Table N12. Total Energy Intake (kcal) by Food Group Diversity Scores, NPNL Women, R2 [a, b]

Number of food groups eaten	Diversity indicators															
	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
	Median total energy intake (range)															
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	–	–	2867	(1389-4279)	–	–	2855	(1389-3103)	–	–	–	–	–	–	–	–
3	1423	(988-3103)	1741	(946-2900)	1423	(988-3103)	1912	(946-4279)	–	–	1912	(988-4279)	–	–	1892	(988-4279)
4	1918	(981-4279)	2085	(903-4192)	2074	(981-3083)	2078	(903-4192)	2074	(1389-3083)	1899	(903-4192)	1798	(988-3083)	1874	(903-3083)
5	2079	(946-5242)	2266	(1088-5242)	1959	(946-4836)	2317	(1088-5242)	1892	(981-4279)	2237	(1088-5242)	2074	(1173-4279)	2107	(981-5242)
6	2334	(903-3591)	2024	(1864-3504)	2085	(1068-5242)	1938	(1293-3779)	1959	(1131-4836)	2791	(1245-3591)	2044	(981-4836)	2505	(1218-3591)
7					2775	(903-3591)	–	–	2197	(946-3341)	1955	(1789-3779)	1917	(946-4192)	2513	(1245-3779)
8					–	–	–	–	2188	(1456-5242)	–	–	2024	(1068-5242)	–	–
9					–	–	–	–	2107	(903-3504)	–	–	2079	(903-3570)	–	–
10									–	–	–	–	2635	(1789-3779)	–	–
11									–	–	–	–	–	–	–	–
12									–	–	–	–	–	–	–	–
13									–	–	–	–	–	–	–	–
14													–	–	–	–
15													–	–	–	–
16													–	–	–	–
17													–	–	–	–
18													–	–	–	–
19													–	–	–	–
20													–	–	–	–
21													–	–	–	–

[a] Energy intake and food group diversity scores for second observation day.
[b] Light shading indicates impossible values (beyond range of possible scores). A "–" indicates that a cell has fewer than 5 observations. Cells with fewer than 10 observations have dark shading.

Table N13. Relationship between Food Group Diversity Scores and Total Energy Intake, NPNL Women [a]

	Food group diversity score		Total energy intake		Correlation Coefficient [b]
	(mean)	(median)	(mean)	(median)	
FGI-6	4.8	5.0	2235	2078	0.206 *
FGI-6R [c]	4.1	4.0	2235	2078	0.189 *
FGI-9	5.4	6.0	2235	2078	0.232 **
FGI-9R [c]	4.3	4.0	2235	2078	0.223 *
FGI-13	6.6	7.0	2235	2078	0.186 *
FGI-13R [c]	4.6	5.0	2235	2078	0.252 **
FGI-21	7.2	7.0	2235	2078	0.191 *
FGI-21R [c]	4.9	5.0	2235	2078	0.280 **

[a] Food group diversity scores and mean and median energy intakes are from second observation day; BLUP for energy intake based on 1 to 3 observation days is used for correlation analysis.
[b] A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[c] Refers to minimum intake of 15g for each of the food groups/sub food groups

Table N14. MPA by Food Group Diversity Scores, NPNL Women [a, b]

Number of food groups eaten	Diversity indicators															
	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
	Median MPA (range)															
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	–	–	0.21	(0.07-0.49)	–	–	0.21	(0.07-0.45)	–	–	–	–	–	–	–	–
3	0.45	(0.05-0.59)	0.32	(0.00-0.59)	0.45	(0.05-0.59)	0.32	(0.00-0.59)	–	–	0.33	(0.00-0.59)	–	–	0.33	(0.01-0.59)
4	0.32	(0.00-0.60)	0.40	(0.12-0.84)	0.32	(0.05-0.60)	0.37	(0.04-0.84)	0.32	(0.07-0.42)	0.33	(0.04-0.84)	0.32	(0.05-0.54)	0.32	(0.04-0.68)
5	0.42	(0.04-0.84)	0.45	(0.04-0.87)	0.33	(0.00-0.77)	0.43	(0.19-0.87)	0.33	(0.00-0.57)	0.41	(0.13-0.87)	0.36	(0.01-0.49)	0.41	(0.00-0.84)
6	0.52	(0.15-0.87)	0.62	(0.32-0.75)	0.46	(0.04-0.84)	0.53	(0.28-0.76)	0.32	(0.04-0.84)	0.52	(0.21-0.81)	0.25	(0.04-0.68)	0.52	(0.19-0.87)
7					0.57	(0.21-0.87)	–	–	0.39	(0.09-0.87)	0.53	(0.32-0.74)	0.34	(0.00-0.84)	0.59	(0.32-0.74)
8					–	–	–	–	0.47	(0.12-0.81)	–	–	0.44	(0.12-0.87)	–	–
9					–	–	–	–	0.52	(0.17-0.76)	–	–	0.39	(0.17-0.75)	–	–
10									–	–	–	–	0.55	(0.35-0.81)	–	–
11									–	–	–	–	–	–	–	–
12									–	–	–	–	–	–	–	–
13									–	–	–	–	–	–	–	–
14													–	–	–	–
15													–	–	–	–
16													–	–	–	–
17													–	–	–	–
18													–	–	–	–
19													–	–	–	–
20													–	–	–	–
21													–	–	–	–

[a] Food group diversity scores are from second observation day; MPA is based on estimated usual intake, calculated using repeat observations for a subset of the sample

[b] Light shading indicates impossible values (beyond range of possible scores). A "–" indicates that a cell has fewer than 5 observations. Cells with fewer than 10 observations have dark shading.

Table N15. Relationship between MPA and Food Group Diversity Scores, NPNL Women [a]

	Food group diversity score		MPA		Correlation Coefficient[b]	Partial correlation controlling for total energy intake[b]
	(mean)	(median)	(mean)	(median)		
FGI-6	4.8	5.0	0.39	0.38	0.304 ***	0.229 **
FGI-6R [c]	4.1	4.0	0.39	0.38	0.380 ***	0.347 ***
FGI-9	5.4	6.0	0.39	0.38	0.329 ***	0.241 **
FGI-9R [c]	4.3	4.0	0.39	0.38	0.424 ***	0.378 ***
FGI-13	6.6	7.0	0.39	0.38	0.272 **	0.201 *
FGI-13R [c]	4.6	5.0	0.39	0.38	0.434 ***	0.368 ***
FGI-21	7.2	7.0	0.39	0.38	0.330 ***	0.277 **
FGI-21R [c]	4.9	5.0	0.39	0.38	0.468 ***	0.394 ***

[a] Food group diversity scores are from second observation day, MPA is based on one to three observations days ; BLUP for total energy intake were used for correlation analysis.
[b] A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$.
[c] Refers to minimum intake of 15g for each of the food groups/sub food groups

Table N16. Results of Ordinary Least Squares Regression Analysis of the Determinants of MPA, NPNL Women [a, b]

	FGI-6		FGI-6R		FGI-9		FGI-9R		FGI-13		FGI-13R		FGI-21		FGI-21R	
	Not controlling for energy															
	B	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**
Constant	0.301	0.466	0.342	0.452	0.480	0.457	0.417	0.440	0.541	0.464	0.447	0.439	0.539	0.454	0.437	0.430
Woman's height	-0.001	0.003	-0.001	0.003	-0.002	0.003	-0.002	0.003	-0.001	0.003	-0.002	0.003	-0.002	0.003	-0.002	0.003
Age	-0.004	0.002	-0.003	0.002	-0.004	0.002	-0.002	0.002	-0.004	0.002	-0.002	0.002	-0.004 *	0.002	-0.002	0.002
Dietary diversity score	0.087 ***	0.025	0.073 ***	0.017	0.064 ***	0.017	0.073 ***	0.015	0.034 **	0.011	0.065 ***	0.013	0.037 ***	0.009	0.062 ***	0.011
Adjusted R^2	0.097 **		0.137 ***		0.111 ***		0.175 ***		0.078 **		0.180 ***		0.119 ***		0.213 ***	
	Controlling for energy															
	B	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**	**B**	**Standard error**
Constant	-1.990 ***	0.422	-1.960 ***	0.408	-1.874 ***	0.422	-1.859 ***	0.401	-1.890 ***	0.425	-1.811 ***	0.406	-1.842 ***	0.416	-1.774 ***	0.399
Woman's height	-0.003	0.002	-0.002	0.002	-0.003	0.002	-0.003	0.002	-0.003	0.002	-0.003	0.002	-0.003	0.002	-0.003	0.002
Age	-0.002	0.002	-0.001	0.002	-0.002	0.002	-0.001	0.001	-0.002	0.002	-0.001	0.002	-0.002	0.002	-0.001	0.001
Dietary diversity score	0.047 *	0.019	0.049 ***	0.013	0.035 **	0.013	0.050 ***	0.011	0.018 *	0.008	0.041 ***	0.010	0.023 **	0.007	0.040 ***	0.009
Total energy intake [c]	126.141 ***	12.924	124.070 ***	12.440	125.056 ***	12.925	121.391 ***	12.275	127.634 ***	12.926	120.234 ***	12.480	124.904 ***	12.660	117.812 ***	12.318
Adjusted R^2	0.491 ***		0.523 ***		0.495 ***		0.540 ***		0.485 ***		0.532 ***		0.508 ***		0.548 ***	

[a] A "*" indicates a coefficient that is statistically significant at $p < 0.05$; ** indicates $p < 0.01$, and *** indicates $p < 0.001$. For the adjusted R^2, the stars indicate the significance level of the F statistic of the regression.
[b] BLUP for total energy intake was used in the regressions. MPA and BLUP calculation for total energy intake incorporates information from one to three rounds.
[c] BLUP for total energy intake was divided by 1000 before running the regressions due to the large scale of the energy variable and the small scale of MPA.

Based on the results shown in **Table N17**, three MPA cut-offs are considered - 50%, 60% and 70% - for **Tables N18-N19**.

Table N17. Percent of Observation Days Above Selected Cut-Off(s) for MPA, NPNL Women

	Percent (number)
Women with MPA >50%	27.7 (36)
Women with MPA >60%	15.2 (20)
Women with MPA >70%	9.4 (12)
Women with MPA >80%	2.2 (3)
Women with MPA >90%	0.0 (0)

Table N18. MPA: Performance of Diversity Scores, NPNL Women [a]

	Range	AUC	p-value [b]	SEM [c]	95% CI [d]
			MPA >50% (first cut-off)		
FGI-6	3.0-6.0	0.663	<0.001	0.045	0.574-0.751
FGI-6R [e]	2.0-6.0	0.684	<0.001	0.049	0.587-0.781
FGI-9	3.0-7.0	0.698	<0.001	0.050	0.599-0.796
FGI-9R [e]	2.0-7.0	0.721	<0.001	0.050	0.623-0.819
FGI-13	3.0-10.0	0.658	0.003	0.054	0.553-0.763
FGI-13R [e]	2.0-8.0	0.741	<0.001	0.050	0.643-0.839
FGI-21	3.0-10.0	0.687	0.001	0.053	0.582-0.791
FGI-21R [e]	2.0-9.0	0.762	<0.001	0.050	0.664-0.860
			MPA > 60% (second cut-off)		
FGI-6	3.0-6.0	0.664	0.001	0.050	0.566-0.761
FGI-6R [e]	2.0-6.0	0.688	0.001	0.055	0.580-0.795
FGI-9	3.0-7.0	0.692	0.001	0.057	0.581-0.804
FGI-9R [e]	2.0-7.0	0.684	0.001	0.056	0.575-0.793
FGI-13	3.0-10.0	0.628	0.025	0.057	0.516-0.740
FGI-13R [e]	2.0-8.0	0.740	<0.001	0.052	0.637-0.843
FGI-21	3.0-10.0	0.666	0.006	0.060	0.548-0.784
FGI-21R [e]	2.0-9.0	0.790	<0.001	0.047	0.697-0.883
			MPA > 70% (third cut-off)		
FGI-6	3.0-6.0	0.641	0.003	0.048	0.548-0.735
FGI-6R [e]	2.0-6.0	0.631	0.041	0.064	0.505-0.756
FGI-9	3.0-7.0	0.704	0.001	0.063	0.581-0.828
FGI-9R [e]	2.0-7.0	0.632	0.384	0.064	0.507-0.756
FGI-13	3.0-10.0	0.692	0.004	0.067	0.561-0.823
FGI-13R [e]	2.0-8.0	0.731	<0.001	0.054	0.625-0.837
FGI-21	3.0-10.0	0.743	0.000	0.068	0.610-0.876
FGI-21R [e]	2.0-9.0	0.798	<0.001	0.045	0.710-0.887

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.
[b] P-value for test of null hypothesis that area=0.5 ("neutral" diagonal line on ROC graph).
[c] Standard error of the mean.
[d] Confidence interval.
[e] Refer to minimum intake of 15g for each food groups/sub food groups.

Table N19. MPA: Tests Comparing AUC for Various Diversity Scores, NPNL Women [a, b]

MPA > 50% (first cut-off)

		FGI-6	FGI-6R	FGI-9	FGI-9R	FGI-13	FGI-13R	FGI-21	FGI-21R
	AUC[c]	0.663	0.684	0.698	0.721	0.658	0.741	0.687	0.762
						P-values			
FGI-6	0.663								
FGI-6R [d]	0.684	0.581							
FGI-9	0.698	0.219	0.774						
FGI-9R [d]	0.721	0.153	0.069	0.611					
FGI-13	0.658	0.923	0.601	0.322	0.172				
FGI-13R [d]	0.741	0.066	0.052	0.337	0.393	0.034			
FGI-21	0.687	0.647	0.958	0.823	0.495	0.249	0.223		
FGI-21R [d]	0.762	0.039	0.030	0.222	0.208	0.029	0.363	0.085	

MPA > 60% (second cut-off)

		FGI-6	FGI-6R	FGI-9	FGI-9R	FGI-13	FGI-13R	FGI-21	FGI-21R
	AUC[c]	0.664	0.688	0.692	0.684	0.628	0.740	0.666	0.790
						P-values			
FGI-6	0.664								
FGI-6R [d]	0.688	0.565							
FGI-9	0.692	0.456	0.932						
FGI-9R [d]	0.684	0.656	0.871	0.878					
FGI-13	0.628	0.597	0.324	0.267	0.357				
FGI-13R [d]	0.740	0.138	0.179	0.346	0.121	0.009			
FGI-21	0.666	0.972	0.752	0.730	0.791	0.276	0.166		
FGI-21R [d]	0.790	0.033	0.036	0.129	0.024	0.002	0.135	0.007	

MPA > 70% (third cut-off)

		FGI-6	FGI-6R	FGI-9	FGI-9R	FGI-13	FGI-13R	FGI-21	FGI-21R
	AUC[c]	0.641	0.631	0.704	0.632	0.692	0.731	0.743	0.798
						P-values			
FGI-6	0.641								
FGI-6R [d]	0.631	0.840							
FGI-9	0.704	0.210	0.276						
FGI-9R [d]	0.632	0.869	0.973	0.290					
FGI-13	0.692	0.503	0.342	0.871	0.394				
FGI-13R [d]	0.731	0.158	0.059	0.678	0.058	0.342			
FGI-21	0.743	0.230	0.113	0.671	0.147	0.233	0.823		
FGI-21R [d]	0.798	0.011	0.006	0.220	0.007	0.084	0.095	0.238	

[a] Diversity scores are from second observation day. MPA is calculated based on one to three observation days.
[b] P-value for test of null hypothesis that area under the curve is equal for the 2 indicators. P-values <0.05 are in bold type..
[c] Area under the curve.
[d] Refer to minimum intake of 15g for each food groups/sub food groups.

Table N20a. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-6) and MPA, By Diversity Cut-Offs, NPNL Women [a]

N	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
130	≥ 3	100.0	0.0	72.3	0.0	72.3
125	≥ 4	94.4	3.2	70.0	1.5	71.5
98	≥ 5	91.7	30.9	50.0	2.3	52.3
15	6	25.0	93.6	4.6	20.8	25.4
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
130	≥ 3	100.0	0.0	84.6	0.0	84.6
125	≥ 4	100.0	4.5	80.8	0.0	80.8
98	≥ 5	95.0	28.2	60.8	0.8	61.5
15	6	25.0	90.9	7.7	11.5	19.2
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
130	≥ 3	100.0	0.0	90.8	0.0	90.8
125	≥ 4	100.0	4.2	86.9	0.0	86.9
98	≥ 5	100.0	27.1	66.2	0.0	66.2
15	6	16.7	89.0	10.0	7.7	17.7

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

Table N20b. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-6R) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
124	≥ 3	100.0	6.4	67.7	0.0	67.7
96	≥ 4	88.9	31.9	49.2	3.1	52.3
52	≥ 5	58.3	67.0	23.8	11.5	35.4
7	6	16.7	98.9	0.8	23.1	23.8
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
124	≥ 3	100.0	5.5	80.0	0.0	80.0
96	≥ 4	100.0	30.9	58.5	0.0	58.5
52	≥ 5	55.0	62.7	31.5	6.9	38.5
7	6	20.0	97.3	2.3	12.3	14.6
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
124	≥ 3	100.0	5.1	86.2	0.0	86.2
96	≥ 4	100.0	28.8	64.6	0.0	64.6
52	≥ 5	50.0	61.0	35.4	4.6	40.0
7	6	8.3	94.9	4.6	8.5	13.1

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

Table N20c. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-9) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
130	≥ 3	100.0	0.0	72.3	0.0	72.3
125	≥ 4	94.4	3.2	70.0	1.5	71.5
106	≥ 5	91.7	22.3	56.2	2.3	58.5
70	≥ 6	77.8	55.3	32.3	6.2	38.5
14	≥ 7	25.0	94.7	3.8	20.8	24.6
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
130	≥ 3	100.0	0.0	84.6	0.0	84.6
125	≥ 4	100.0	4.5	80.8	0.0	80.8
106	≥ 5	95.0	20.9	66.9	0.8	67.7
70	≥ 6	80.0	50.9	41.5	3.1	44.6
14	≥ 7	25.0	91.8	6.9	11.5	18.5
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
130	≥ 3	100.0	0.0	90.8	0.0	90.8
125	≥ 4	100.0	4.2	86.9	0.0	86.9
106	≥ 5	100.0	20.3	72.3	0.0	72.3
70	≥ 6	83.3	49.2	46.2	1.5	47.7
14	≥ 7	25.0	90.7	8.5	6.9	15.4
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

Table N20d. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-9R) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
125	≥ 3	100.0	5.3	68.5	0.0	68.5
98	≥ 4	88.9	29.8	50.8	3.1	53.8
56	≥ 5	66.7	66.0	24.6	9.2	33.8
19	≥ 6	36.1	93.6	4.6	17.7	22.3
2	≥ 7	5.6	100.0	0.0	26.2	26.2
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
125	≥ 3	100.0	4.5	80.8	0.0	80.8
98	≥ 4	100.0	29.1	60.0	0.0	60.0
56	≥ 5	60.0	60.0	33.8	6.2	40.0
19	≥ 6	30.0	88.2	10.0	10.8	20.8
2	≥ 7	5.0	99.1	0.8	14.6	15.4
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
125	≥ 3	100.0	4.2	86.9	0.0	86.9
98	≥ 4	100.0	27.1	66.2	0.0	66.2
56	≥ 5	58.3	58.5	37.7	3.8	41.5
19	≥ 6	16.7	85.6	13.1	7.7	20.8
2	≥ 7	0.0	98.3	1.5	9.2	10.8
0	≥ 8	–	–	–	–	–
0	9	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

Table N20e. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-13) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
130	≥ 3	100.0	0.0	72.3	0.0	72.3
126	≥ 4	94.4	2.1	70.8	1.5	72.3
116	≥ 5	94.4	12.8	63.1	1.5	64.6
100	≥ 6	91.7	28.7	51.5	2.3	53.8
74	≥ 7	69.4	47.9	37.7	8.5	46.2
38	≥ 8	47.2	77.7	16.2	14.6	30.8
13	≥ 9	19.4	93.6	4.6	22.3	26.9
1	≥ 10	2.8	100.0	0.0	26.9	26.9
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
130	≥ 3	100.0	0.0	84.6	0.0	84.6
126	≥ 4	100.0	3.6	81.5	0.0	81.5
116	≥ 5	100.0	12.7	73.8	0.0	73.8
100	≥ 6	100.0	27.3	61.5	0.0	61.5
74	≥ 7	70.0	45.5	46.2	4.6	50.8
38	≥ 8	40.0	72.7	23.1	9.2	32.3
13	≥ 9	10.0	90.0	8.5	13.8	22.3
1	≥ 10	5.0	100.0	0.0	14.6	14.6
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
130	≥ 3	100.0	0.0	90.8	0.0	90.8
126	≥ 4	100.0	3.4	87.7	0.0	87.7
116	≥ 5	100.0	11.9	80.0	0.0	80.0
100	≥ 6	100.0	25.4	67.7	0.0	67.7
74	≥ 7	83.3	45.8	49.2	1.5	50.8
38	≥ 8	50.0	72.9	24.6	4.6	29.2
13	≥ 9	16.7	90.7	8.5	7.7	16.2
1	≥ 10	8.3	100.0	0.0	8.5	8.5
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

Table N20f. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-13R) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
126	≥ 3	100.0	4.3	69.2	0.0	69.2
101	≥ 4	88.9	26.6	53.1	3.1	56.2
67	≥ 5	77.8	58.5	30.0	6.2	36.2
29	≥ 6	50.0	88.3	8.5	13.8	22.3
9	≥ 7	16.7	96.8	2.3	23.1	25.4
1	≥ 8	2.8	100.0	0.0	26.9	26.9
0	≥ 9	–	–	–	–	–
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
126	≥ 3	100.0	3.6	81.5	0.0	81.5
101	≥ 4	100.0	26.4	62.3	0.0	62.3
67	≥ 5	80.0	53.6	39.2	3.1	42.3
29	≥ 6	50.0	82.7	14.6	7.7	22.3
9	≥ 7	15.0	94.5	4.6	13.1	17.7
1	≥ 8	0.0	99.1	0.8	15.4	16.2
0	≥ 9	–	–	–	–	–
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
126	≥ 3	100.0	3.4	87.7	0.0	87.7
101	≥ 4	100.0	24.6	68.5	0.0	68.5
67	≥ 5	91.7	52.5	43.1	0.8	43.8
29	≥ 6	41.7	79.7	18.5	5.4	23.8
9	≥ 7	8.3	93.2	6.2	8.5	14.6
1	≥ 8	0.0	99.2	0.8	9.2	10.0
0	≥ 9	–	–	–	–	–
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	13	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

Table N20g. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
130	≥ 3	100.0	0.0	72.3	0.0	72.3
128	≥ 4	97.2	1.1	71.5	0.8	72.3
118	≥ 5	94.4	10.6	64.6	1.5	66.2
108	≥ 6	94.4	21.3	56.9	1.5	58.5
89	≥ 7	83.3	37.2	45.4	4.6	50.0
64	≥ 8	66.7	57.4	30.8	9.2	40.0
31	≥ 9	41.7	83.0	12.3	16.2	28.5
11	≥ 10	25.0	97.9	1.5	20.8	22.3
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
130	≥ 3	100.0	0.0	84.6	0.0	84.6
128	≥ 4	100.0	1.8	83.1	0.0	83.1
118	≥ 5	100.0	10.9	75.4	0.0	75.4
108	≥ 6	100.0	20.0	67.7	0.0	67.7
89	≥ 7	90.0	35.5	54.6	1.5	56.2
64	≥ 8	65.0	53.6	39.2	5.4	44.6
31	≥ 9	35.0	78.2	18.5	10.0	28.5
11	≥ 10	25.0	94.5	4.6	11.5	16.2
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

(continued)

Table N20g (continued). Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
130	≥ 3	100.0	0.0	90.8	0.0	90.8
128	≥ 4	100.0	1.7	89.2	0.0	89.2
118	≥ 5	100.0	10.2	81.5	0.0	81.5
108	≥ 6	100.0	18.6	73.8	0.0	73.8
89	≥ 7	100.0	34.7	59.2	0.0	59.2
64	≥ 8	75.0	53.4	42.3	2.3	44.6
31	≥ 9	50.0	78.8	19.2	4.6	23.8
11	≥ 10	33.3	94.1	5.4	6.2	11.5
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

Table N20h. Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21R) and MPA, by Diversity Cut-Offs, NPNL Women[a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 50%		
130	≥ 1	100.0	0.0	72.3	0.0	72.3
130	≥ 2	100.0	0.0	72.3	0.0	72.3
126	≥ 3	100.0	4.3	69.2	0.0	69.2
107	≥ 4	88.9	20.2	57.7	3.1	60.8
73	≥ 5	83.3	54.3	33.1	4.6	37.7
48	≥ 6	75.0	77.7	16.2	6.9	23.1
15	≥ 7	25.0	93.6	4.6	20.8	25.4
5	≥ 8	11.1	98.9	0.8	24.6	25.4
1	≥ 9	2.8	100.0	0.0	26.9	26.9
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

(continued)

Table N20h (continued). Sensitivity/Specificity Analysis of the Relationship between Food Group Diversity (FGI-21R) and MPA, by Diversity Cut-Offs, NPNL Women [a]

n	Cutoff	Sensitivity	Specificity	Proportion of false positives	Proportion of false negatives	Total proportion misclassified
				MPA > 60%		
130	≥ 1	100.0	0.0	84.6	0.0	84.6
130	≥ 2	100.0	0.0	84.6	0.0	84.6
126	≥ 3	100.0	3.6	81.5	0.0	81.5
107	≥ 4	100.0	20.9	66.9	0.0	66.9
73	≥ 5	90.0	50.0	42.3	1.5	43.8
48	≥ 6	80.0	70.9	24.6	3.1	27.7
15	≥ 7	30.0	91.8	6.9	10.8	17.7
5	≥ 8	10.0	97.3	2.3	13.8	16.2
1	≥ 9	0.0	99.1	0.8	15.4	16.2
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–
				MPA > 70%		
130	≥ 1	100.0	0.0	90.8	0.0	90.8
130	≥ 2	100.0	0.0	90.8	0.0	90.8
126	≥ 3	100.0	3.4	87.7	0.0	87.7
107	≥ 4	100.0	19.5	73.1	0.0	73.1
73	≥ 5	100.0	48.3	46.9	0.0	46.9
48	≥ 6	83.3	67.8	29.2	1.5	30.8
15	≥ 7	25.0	89.8	9.2	6.9	16.2
5	≥ 8	16.7	97.5	2.3	7.7	10.0
1	≥ 9	0.0	99.2	0.8	9.2	10.0
0	≥ 10	–	–	–	–	–
0	≥ 11	–	–	–	–	–
0	≥ 12	–	–	–	–	–
0	≥ 13	–	–	–	–	–
0	≥ 14	–	–	–	–	–
0	≥ 15	–	–	–	–	–
0	≥ 16	–	–	–	–	–
0	≥ 17	–	–	–	–	–
0	≥ 18	–	–	–	–	–
0	≥ 19	–	–	–	–	–
0	≥ 20	–	–	–	–	–
0	21	–	–	–	–	–

[a] Diversity scores are from a single (R2) observation day. MPA is calculated based on one to three observation days.

FIGURES

Histograms of intakes for 11 micronutrients (R2 data): Figures N1-N11

Histograms for intra-individual SDs of intake, based on data from one to three rounds: Figures N12-N22

Histograms for FGIs (R2 data): Figures N23-N30

Histograms of PA for 11 micronutrients, based on data from one to three rounds: Figures N31-N41

Histogram of MPA, based on data from one to three rounds: Figure N42

Figure N1. Distribution of Thiamin Intakes, NPNL Women

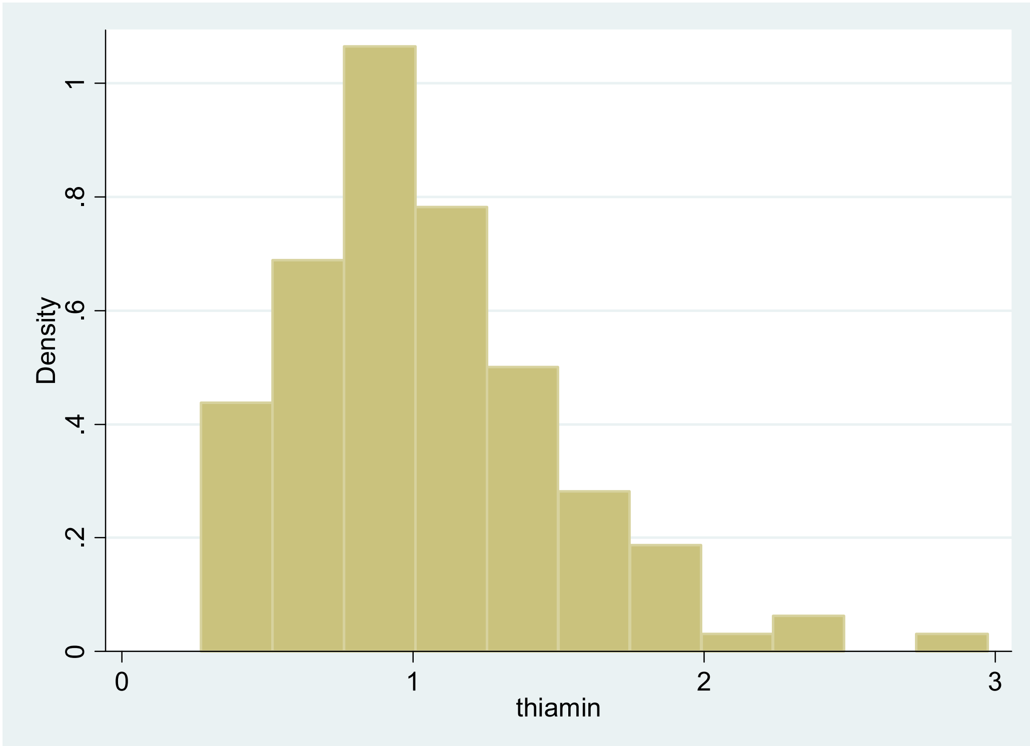


Figure N2. Distribution of Riboflavin Intakes, NPNL Women

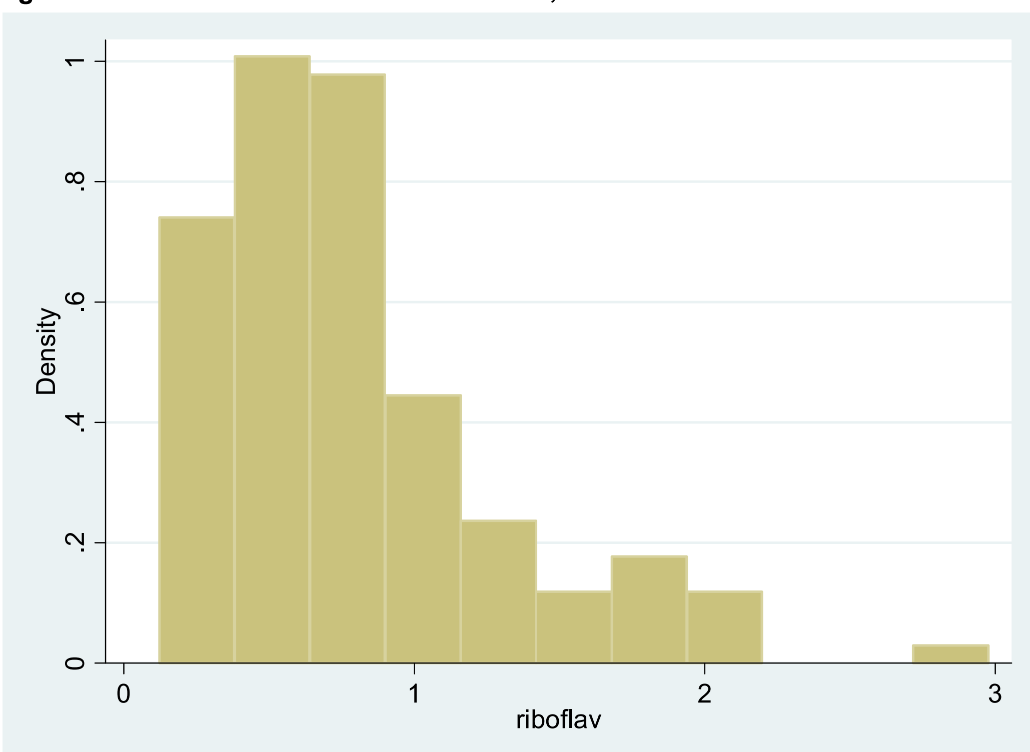


Figure N3. Distribution of Niacin Intakes, NPNL Women

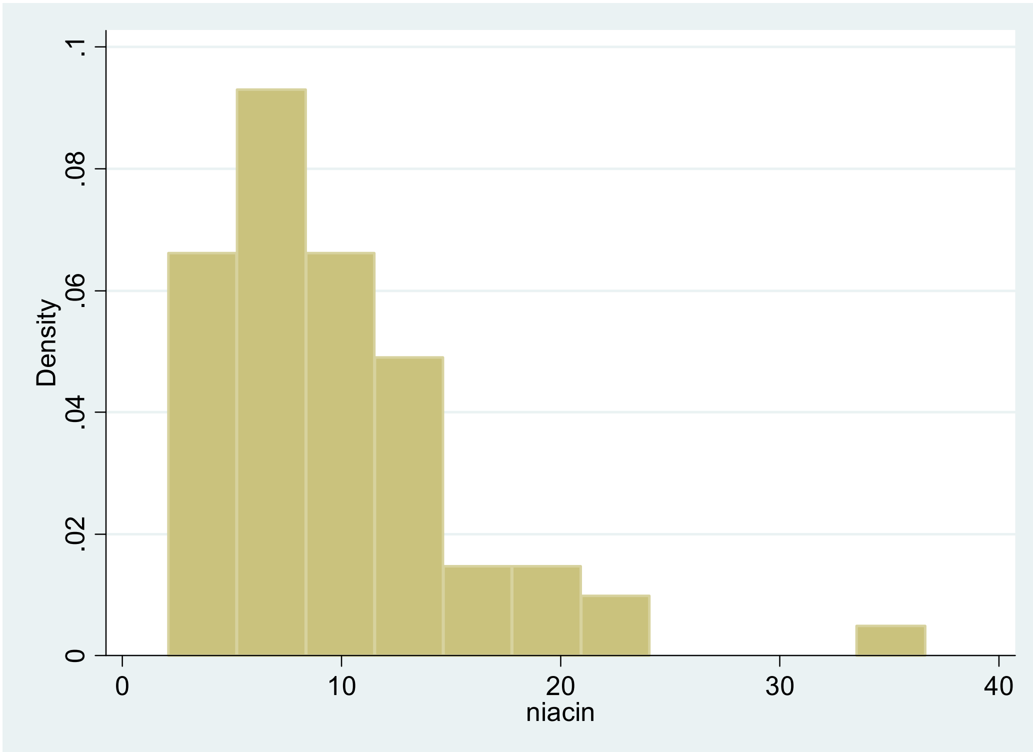


Figure N4. Distribution of Vitamin B6 Intakes, NPNL Women

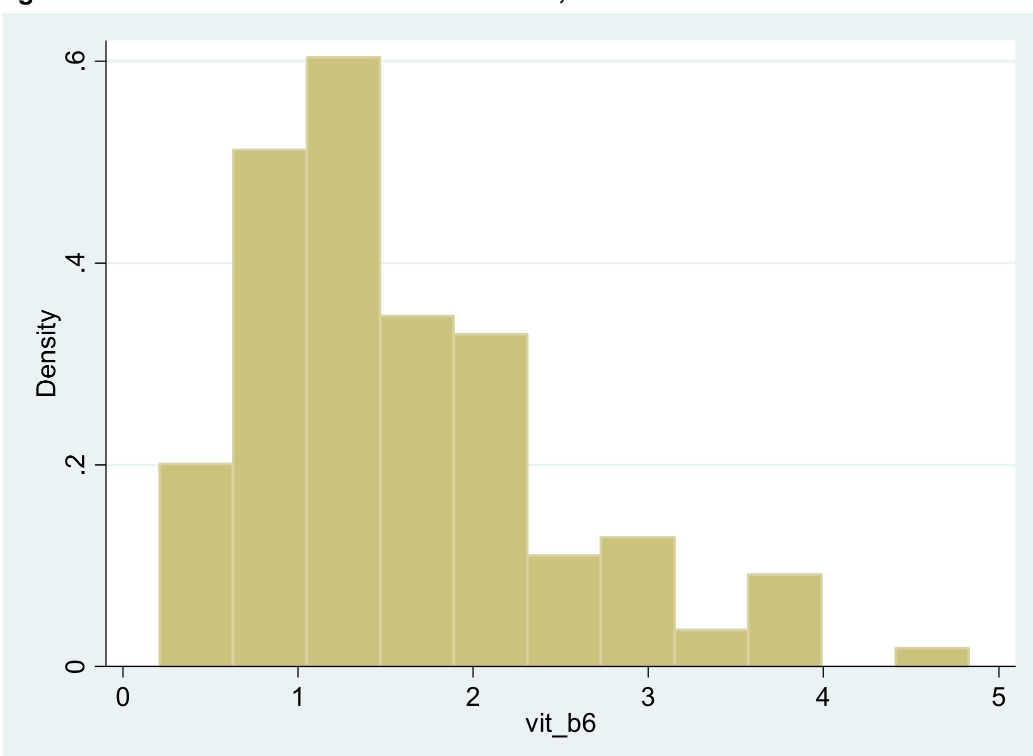


Figure N5. Distribution of Folate Intakes, NPNL Women

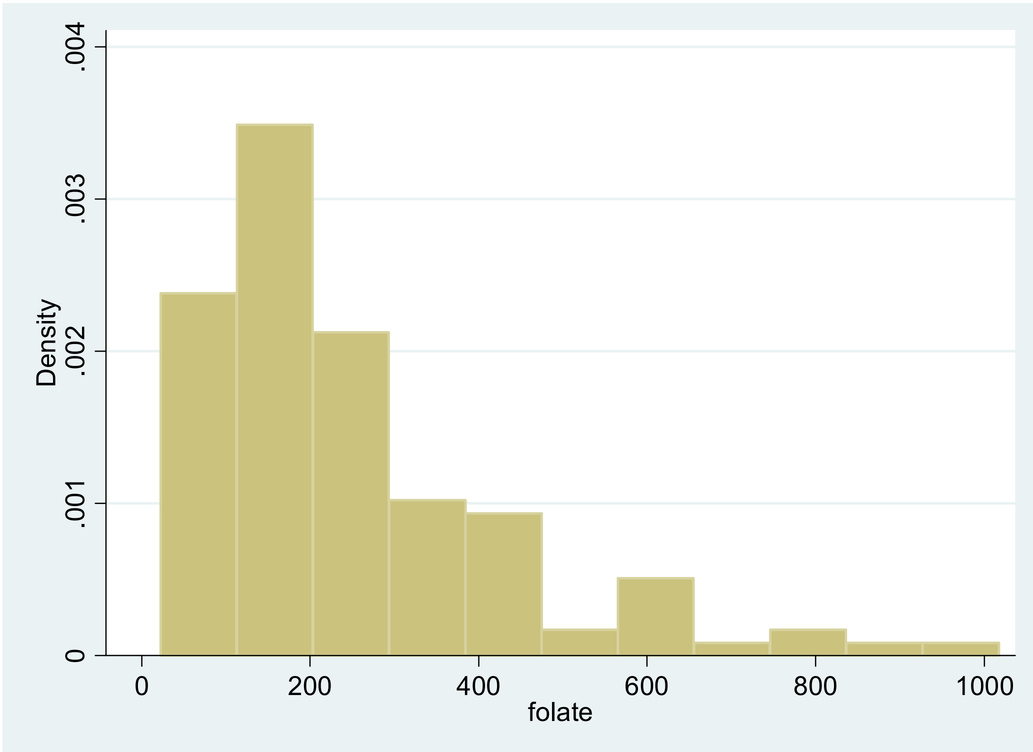


Figure N6. Distribution of Vitamin B12 Intakes, NPNL Women

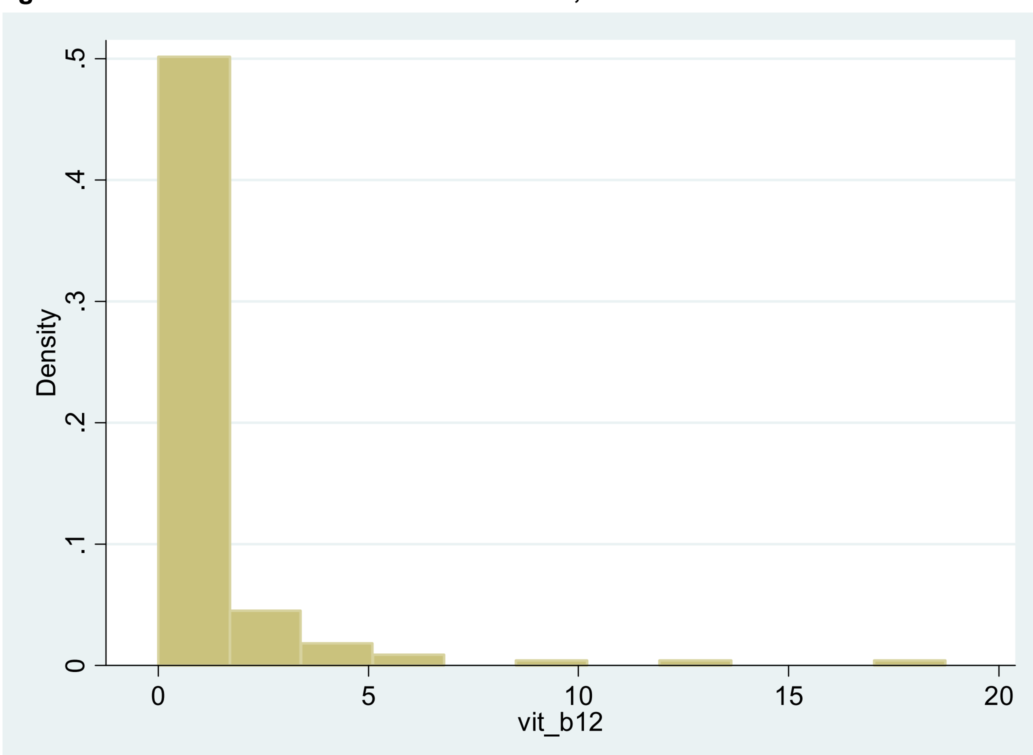


Figure N7. Distribution of Vitamin C Intakes, NPNL Women

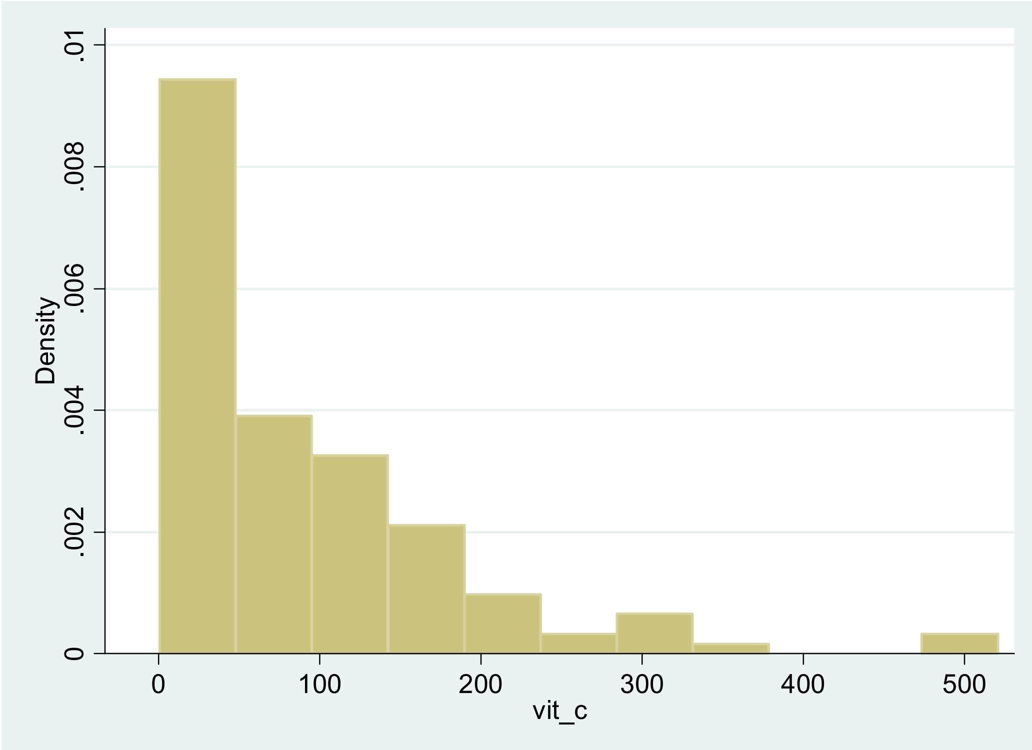


Figure N8. Distribution of Vitamin A Intakes, NPNL Women

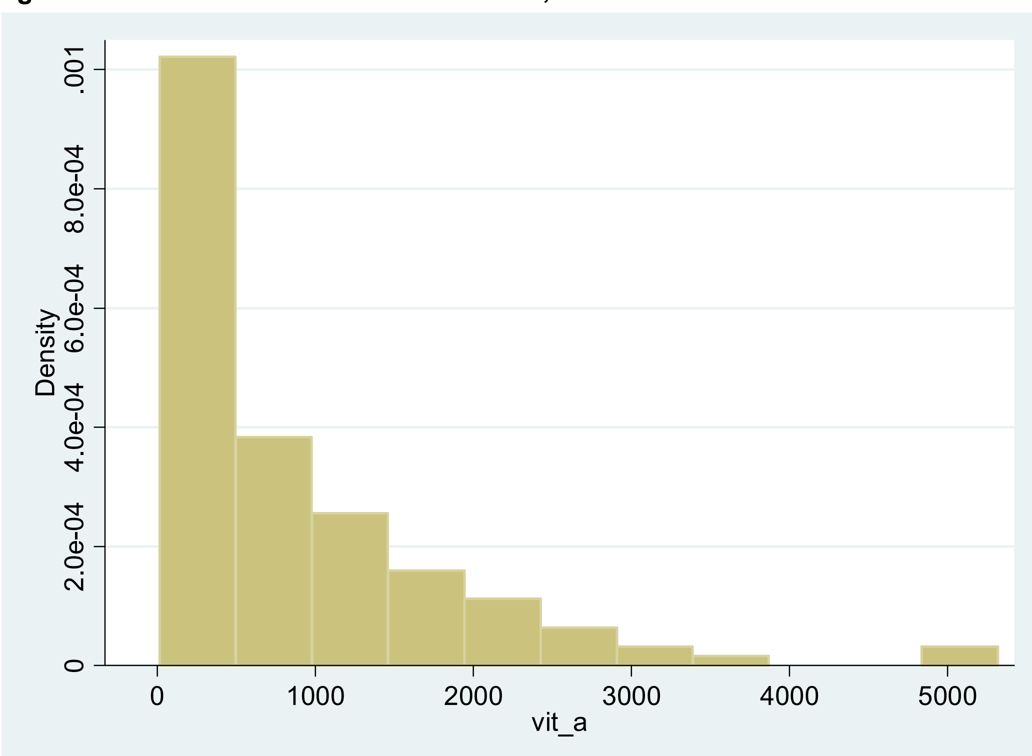


Figure N9. Distribution of Calcium Intakes, NPNL Women

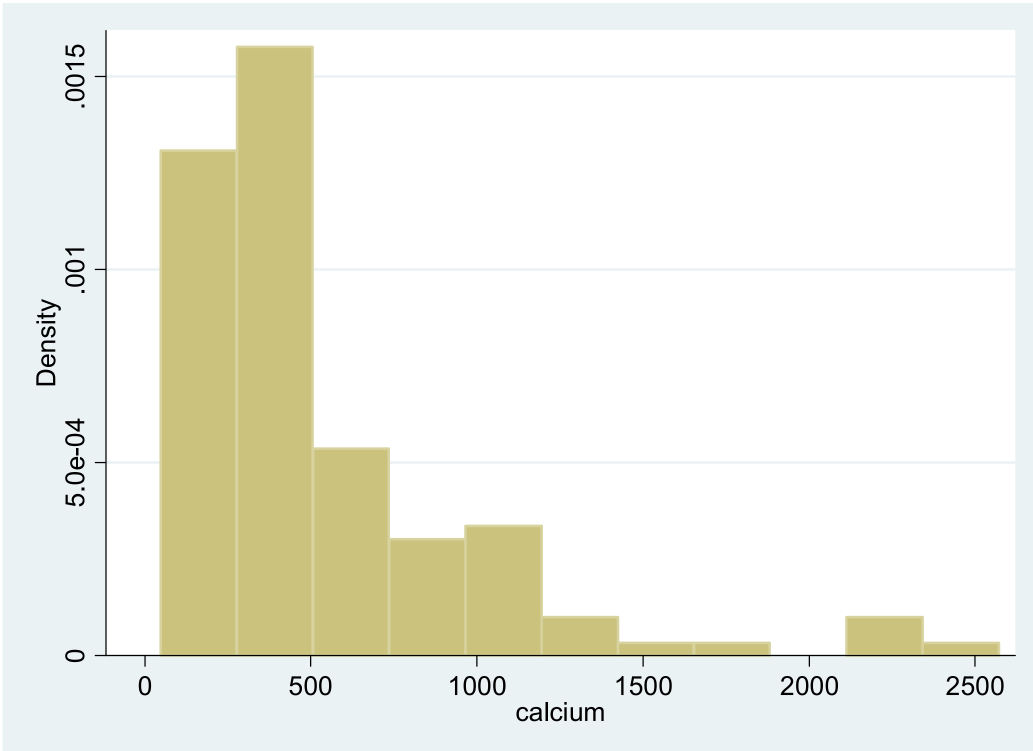


Figure N10. Distribution of Iron Intakes, NPNL Women

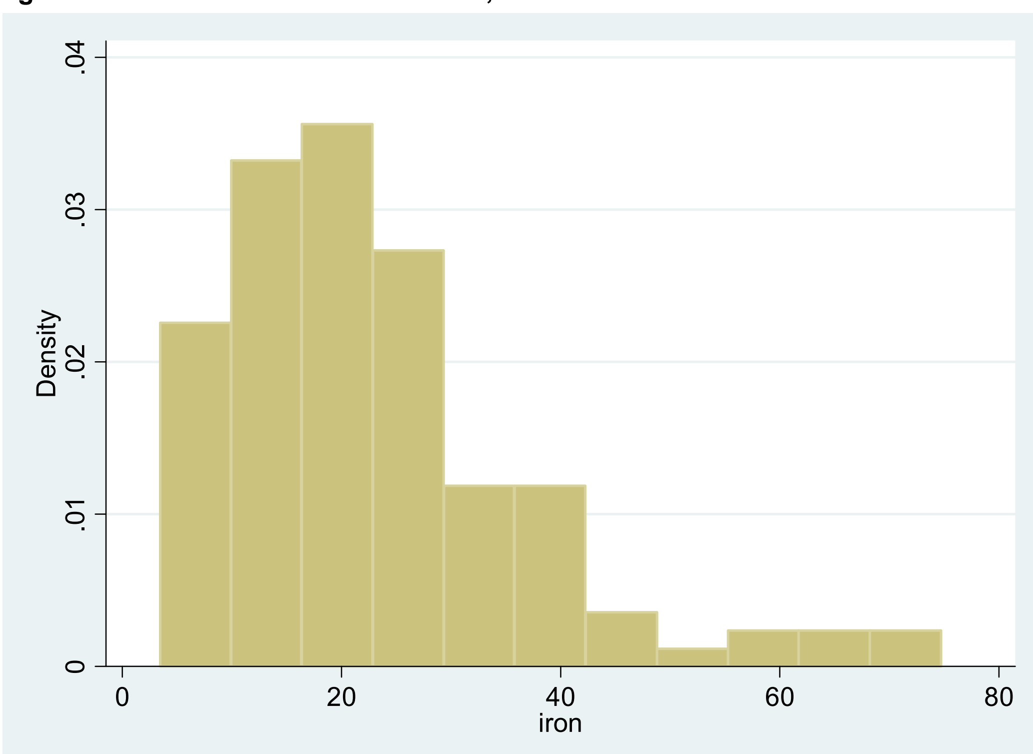


Figure N11. Distribution of Zinc Intakes, NPNL Women

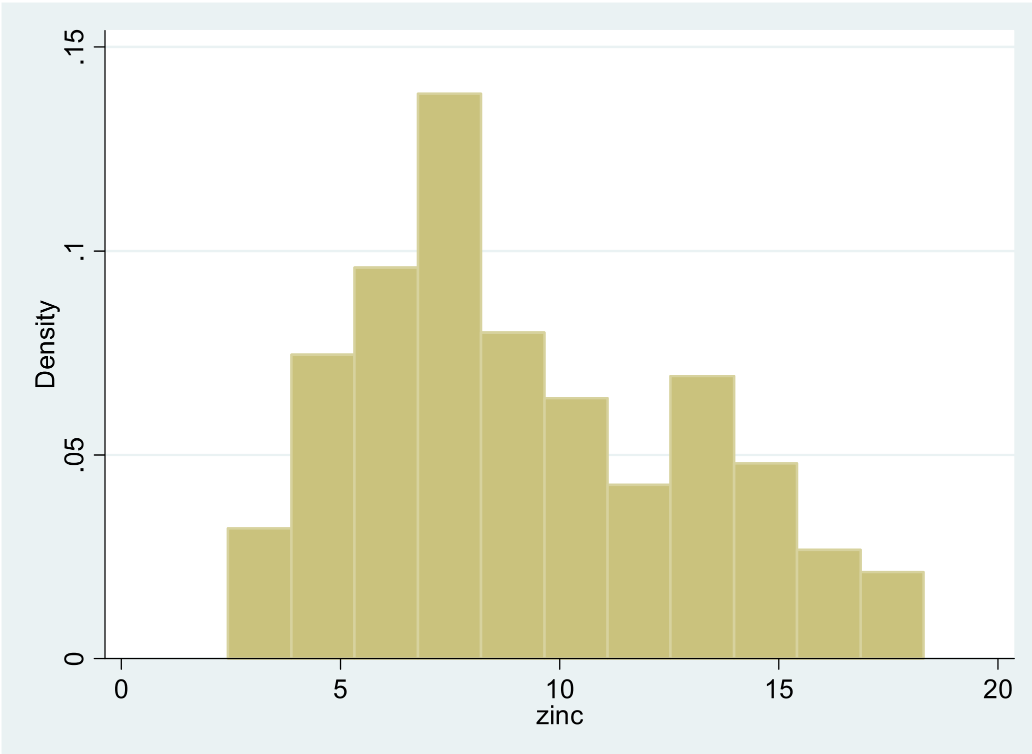


Figure N12. Intra-Individual SD of Thiamin Intakes, NPNL Women

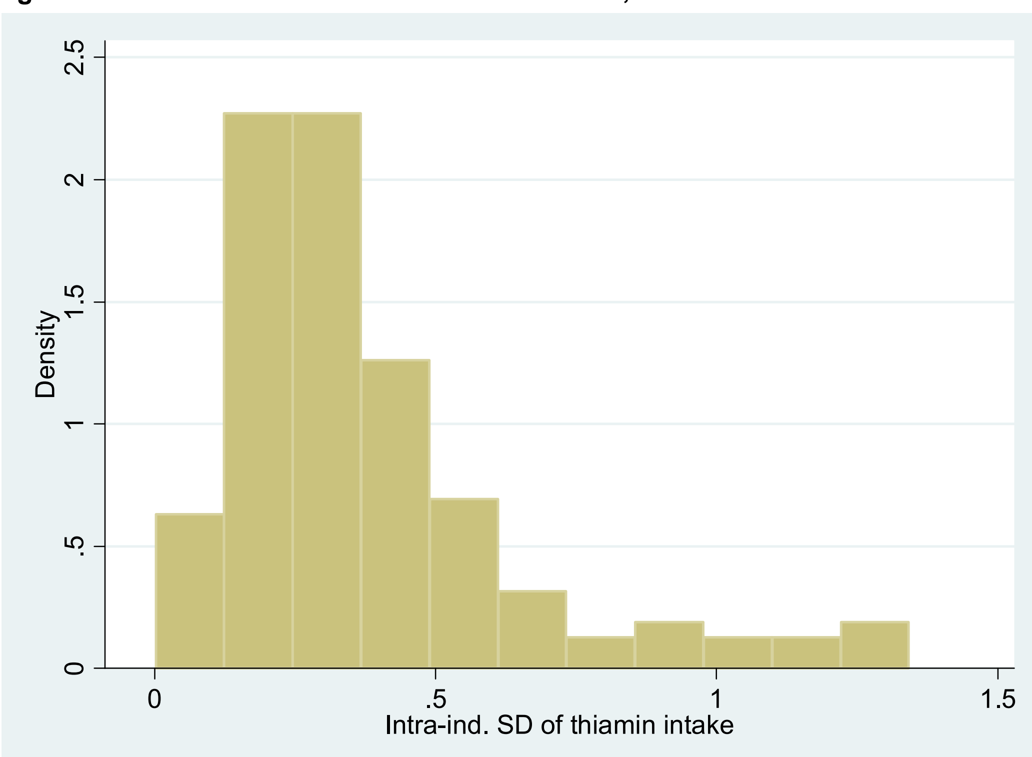


Figure N13. Intra-Individual SD of Riboflavin Intakes, NPNL Women

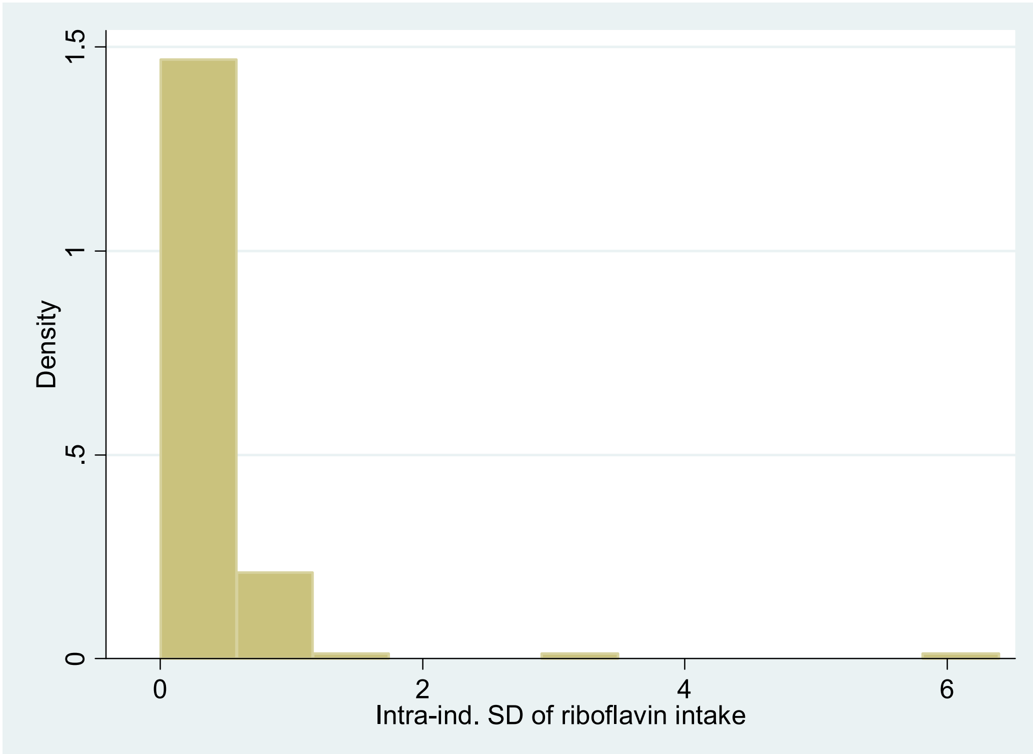


Figure N14. Intra-Individual SD of Niacin Intakes, NPNL Women

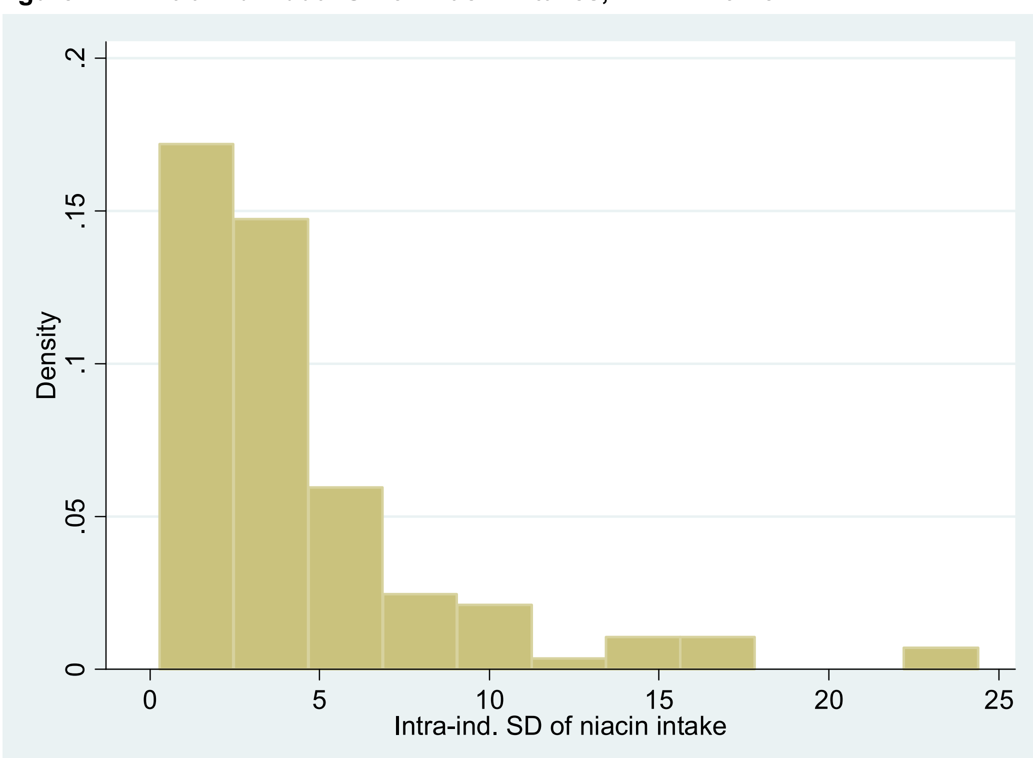


Figure N15. Intra-Individual SD of Vitamin B6 Intakes, NPNL Women

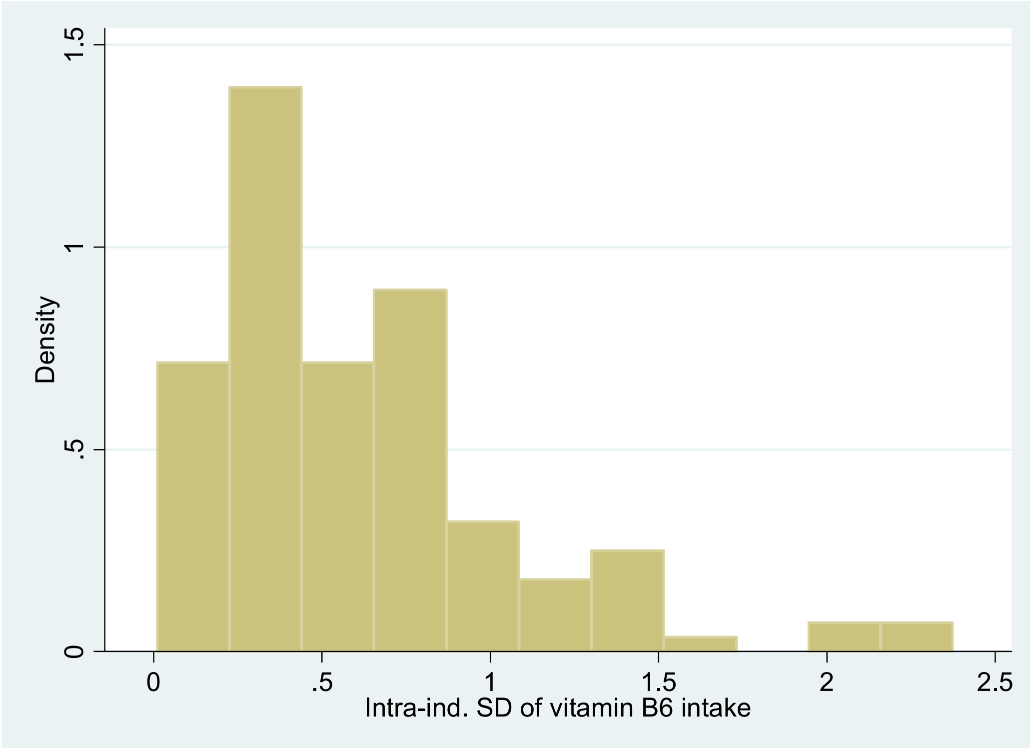


Figure N16. Intra-Individual SD of Folate Intakes, NPNL Women

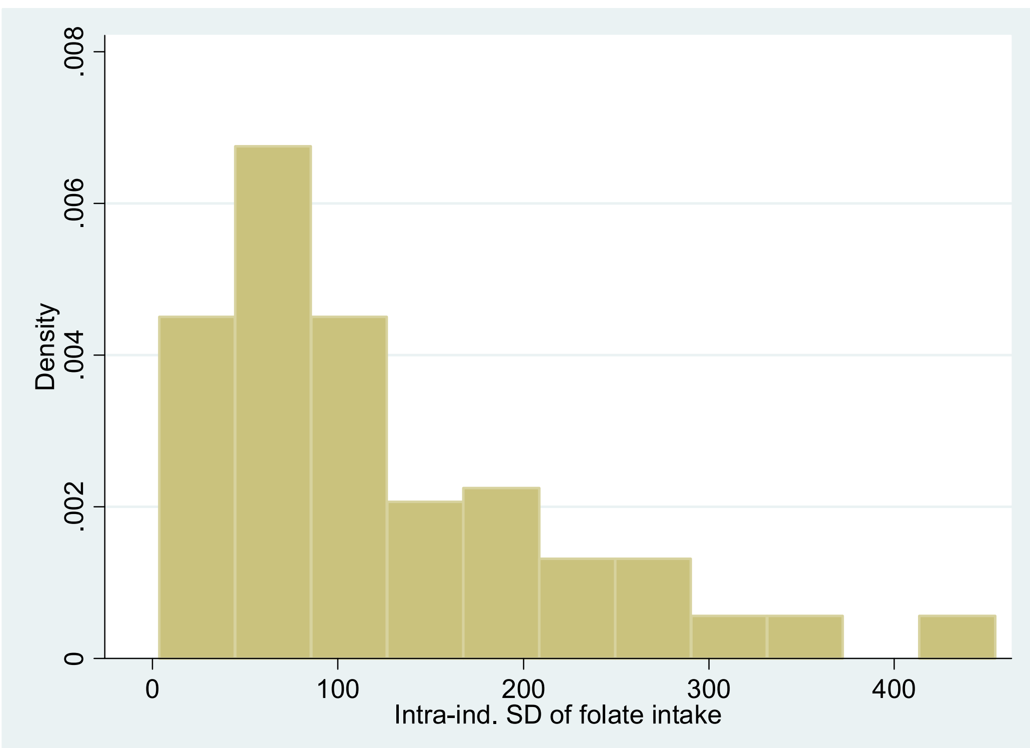


Figure N17. Intra-Individual SD of Vitamin B12 Intakes, NPNL Women

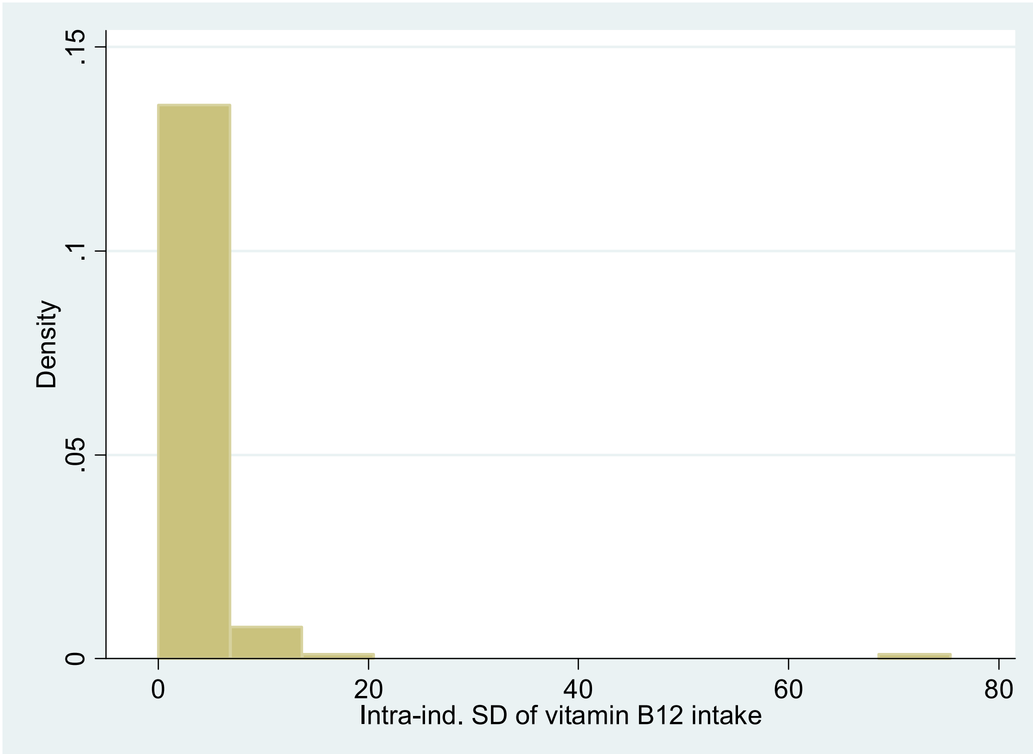


Figure N18. Intra-Individual SD of Vitamin C Intakes, NPNL Women

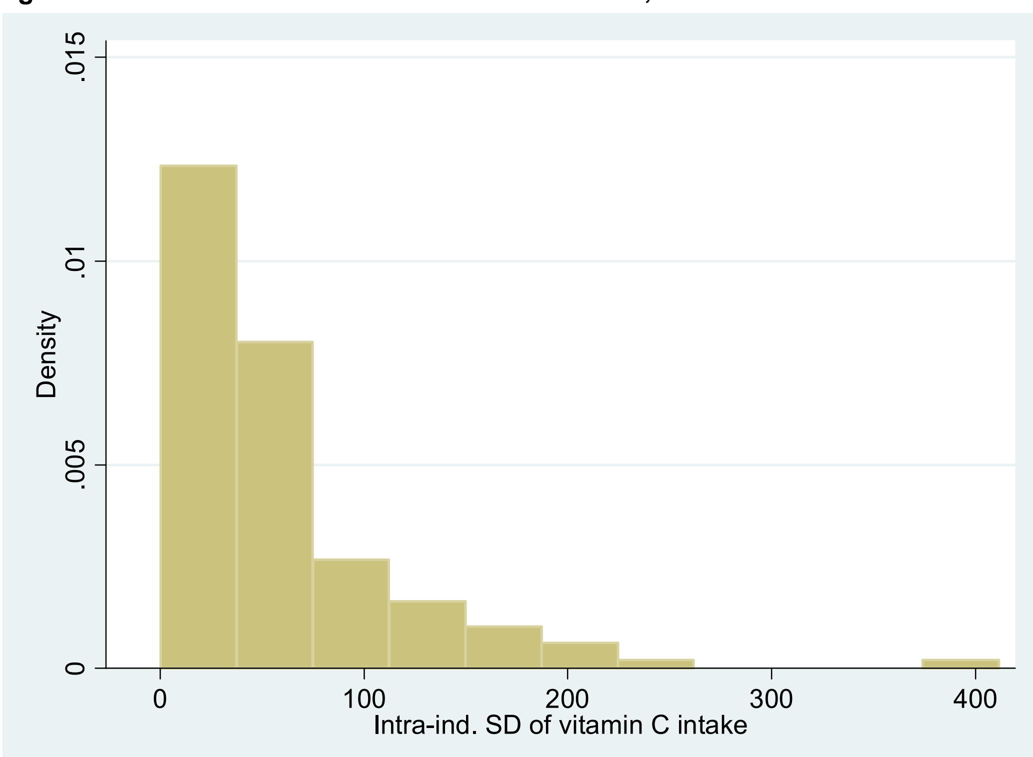


Figure N19. Intra-Individual SD of Vitamin A Intakes, NPNL Women

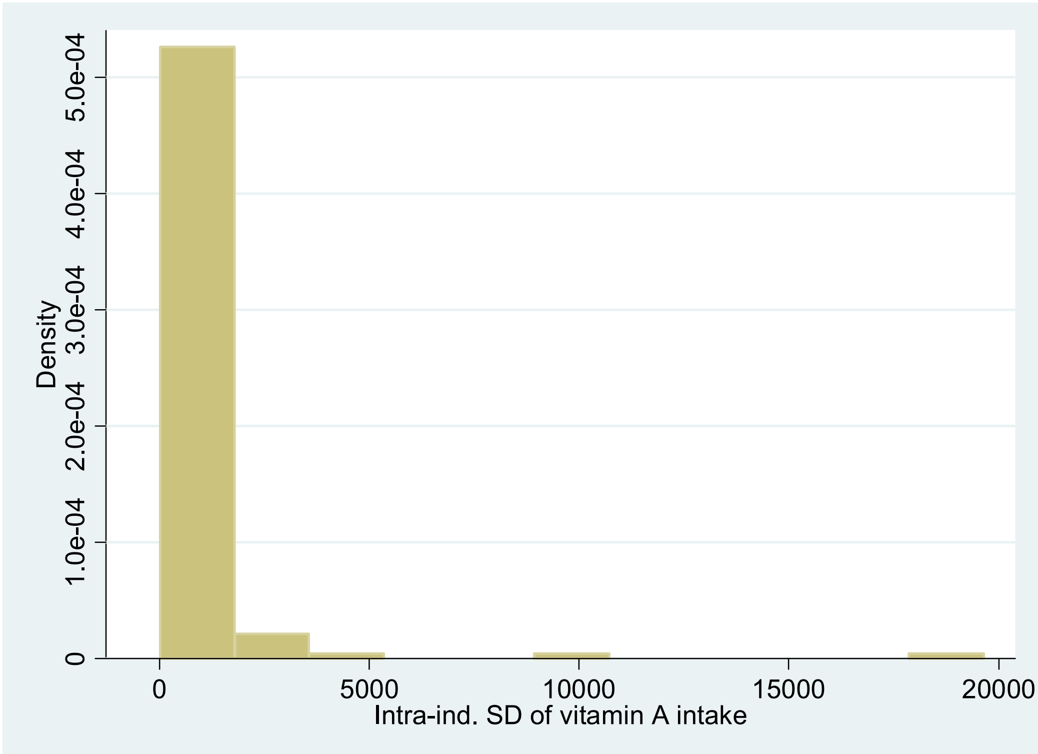


Figure N20. Intra-Individual SD of Calcium Intakes, NPNL Women

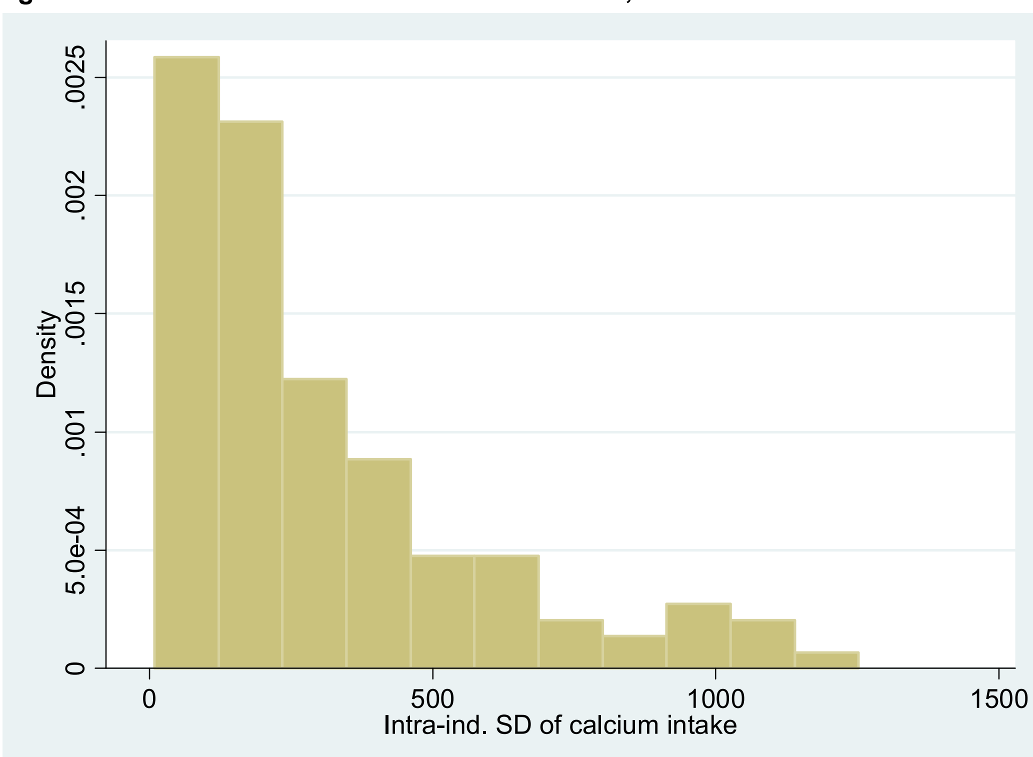


Figure N21. Intra-Individual SD of Iron Intakes, NPNL Women

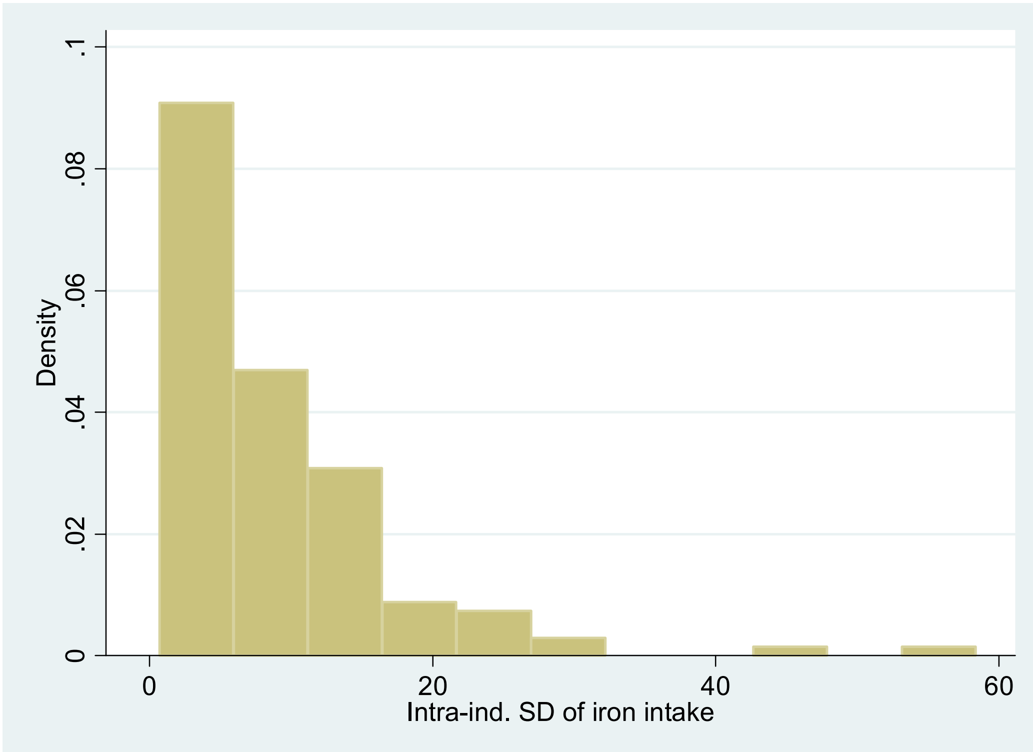


Figure N22. Intra-Individual SD of Zinc Intakes, NPNL Women

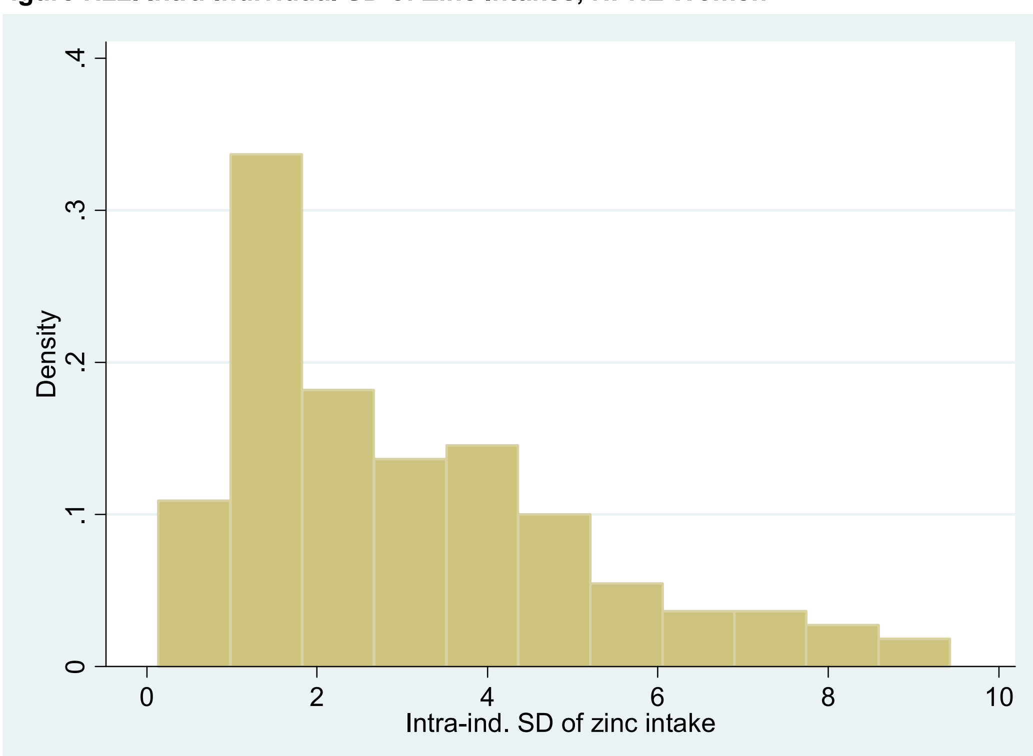


Figure N23. Distribution of Scores for FGI-6, NPNL Women

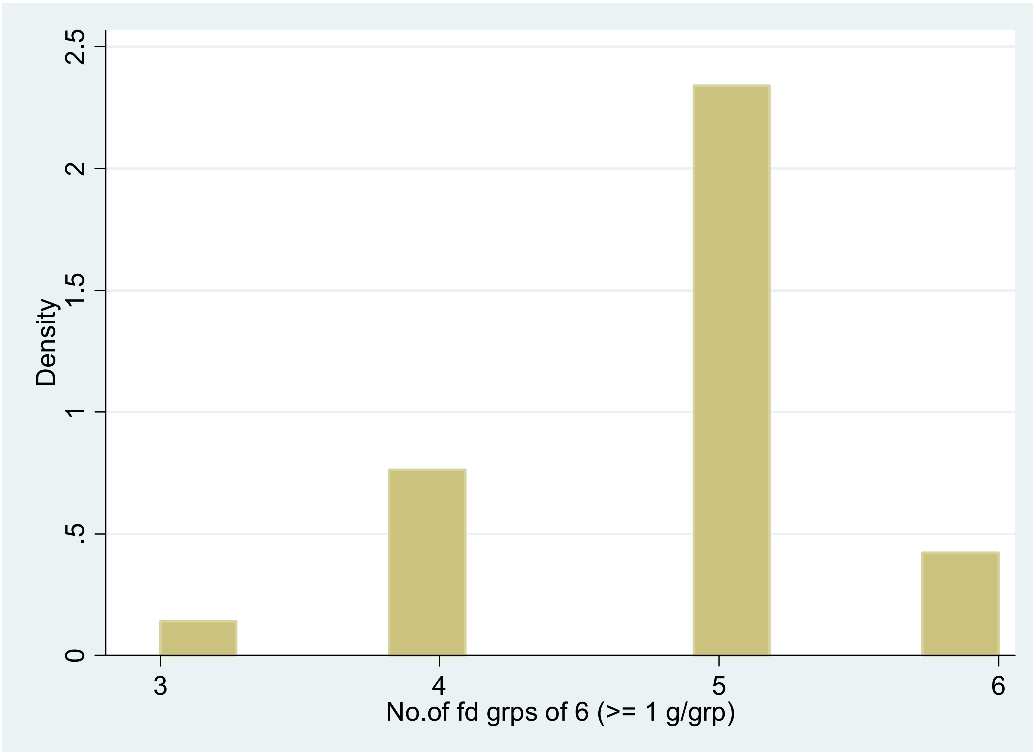


Figure N24. Distribution of Scores for FGI-6R, NPNL Women

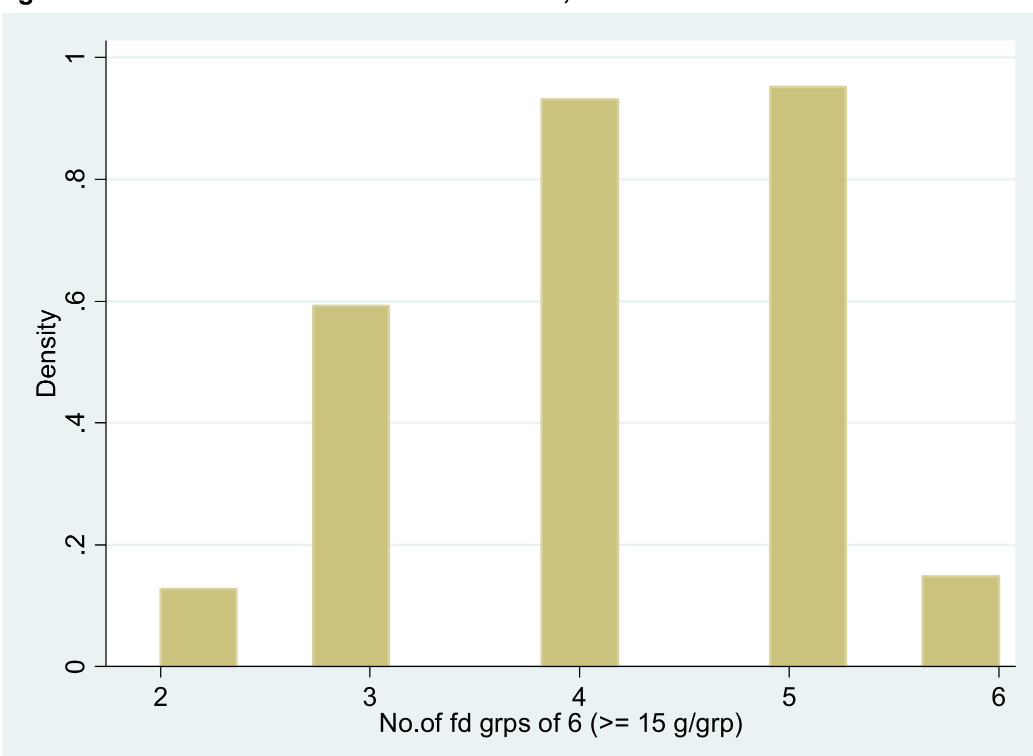


Figure N25. Distribution of Scores for FGI-9, NPNL Women

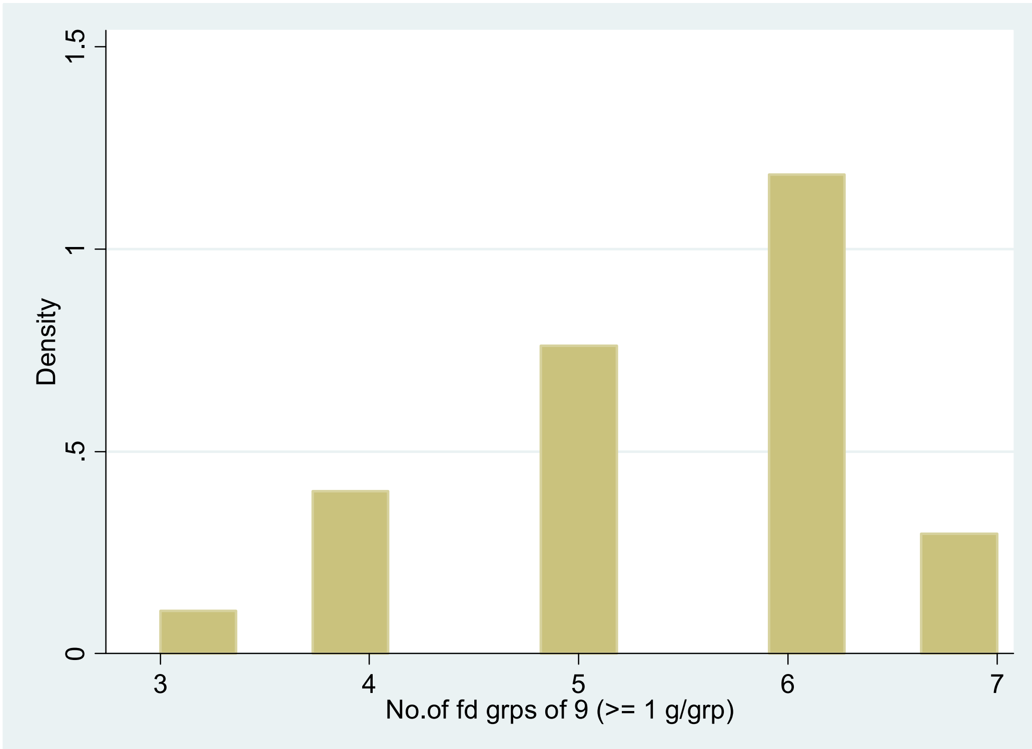


Figure N26. Distribution of Scores for FGI-9R, NPNL Women

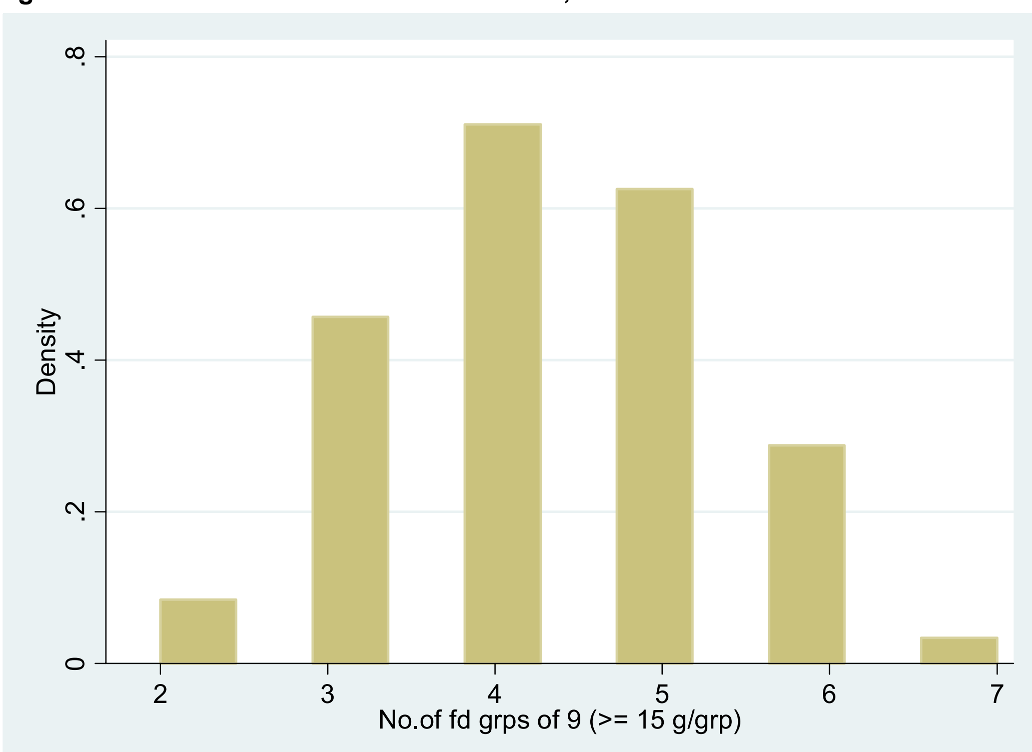


Figure N27. Distribution of Scores for FGI-13, NPNL Women

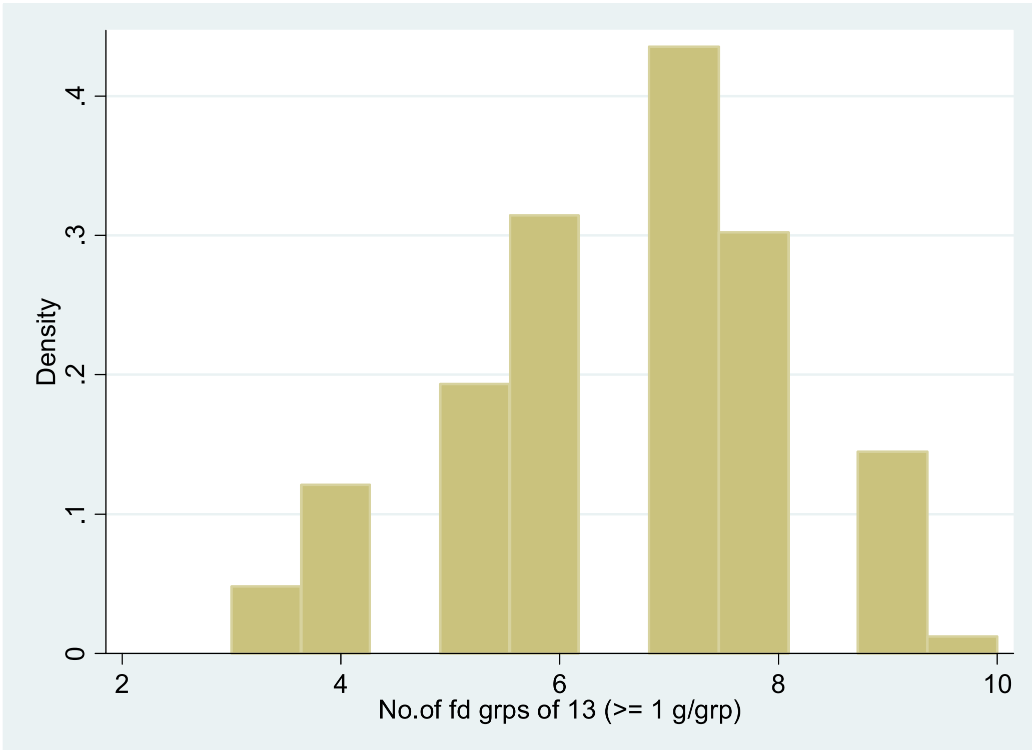


Figure N28. Distribution of Scores for FGI-13R, NPNL Women

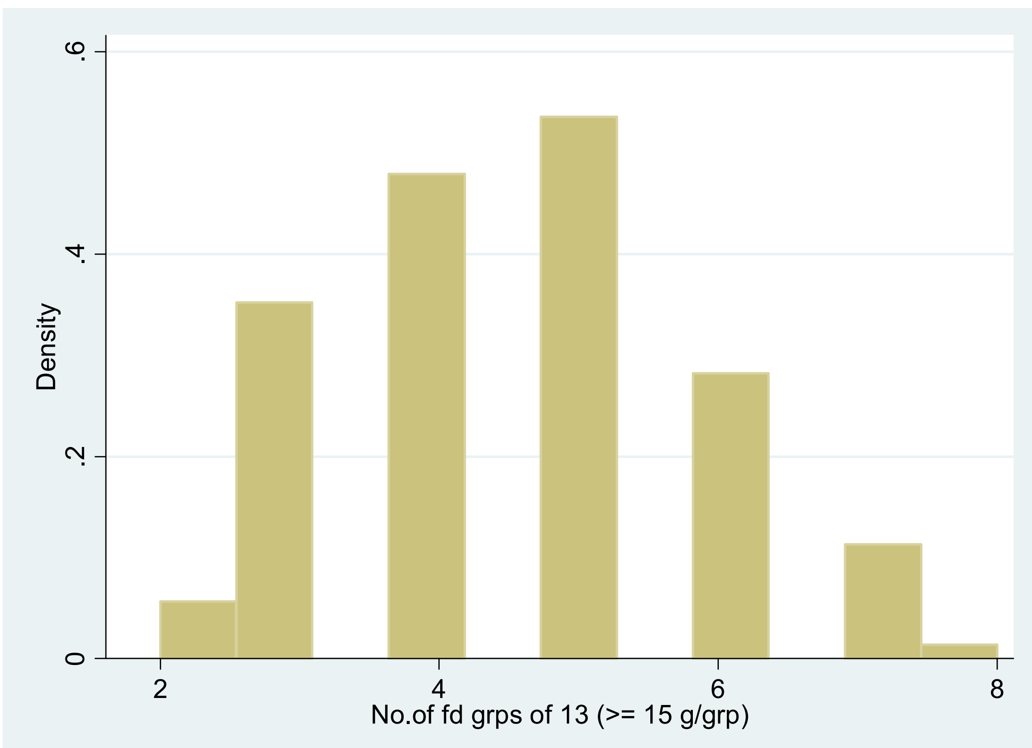


Figure N29. Distribution of Scores for FGI-21, NPNL Women

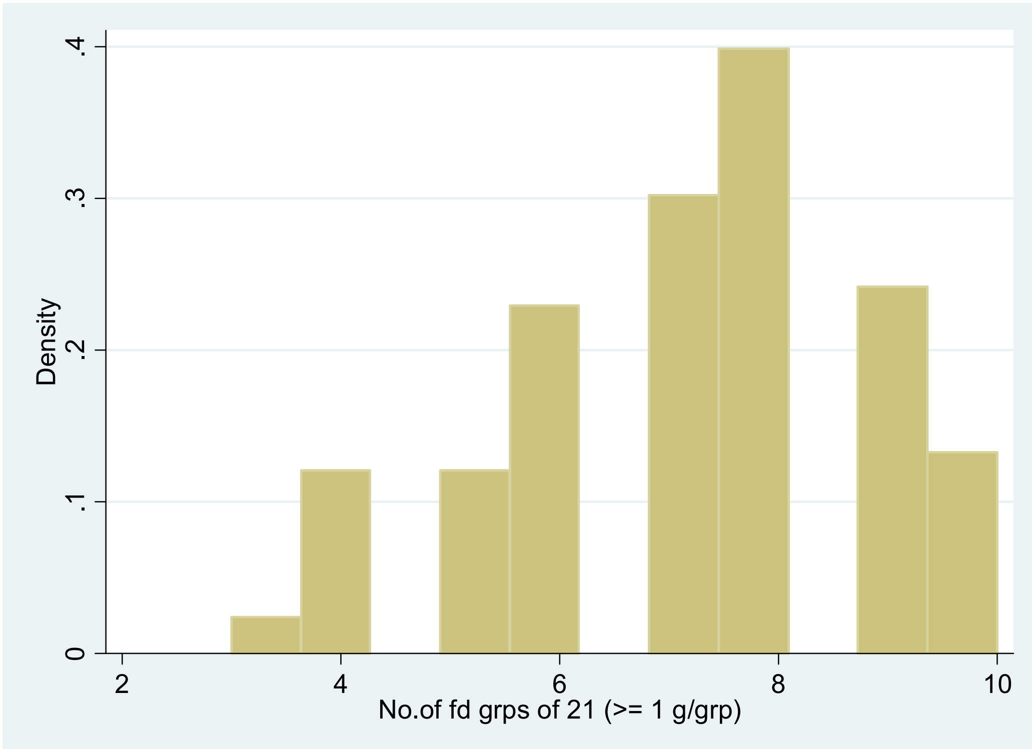


Figure N30. Distribution of Scores for FGI-21R, NPNL Women

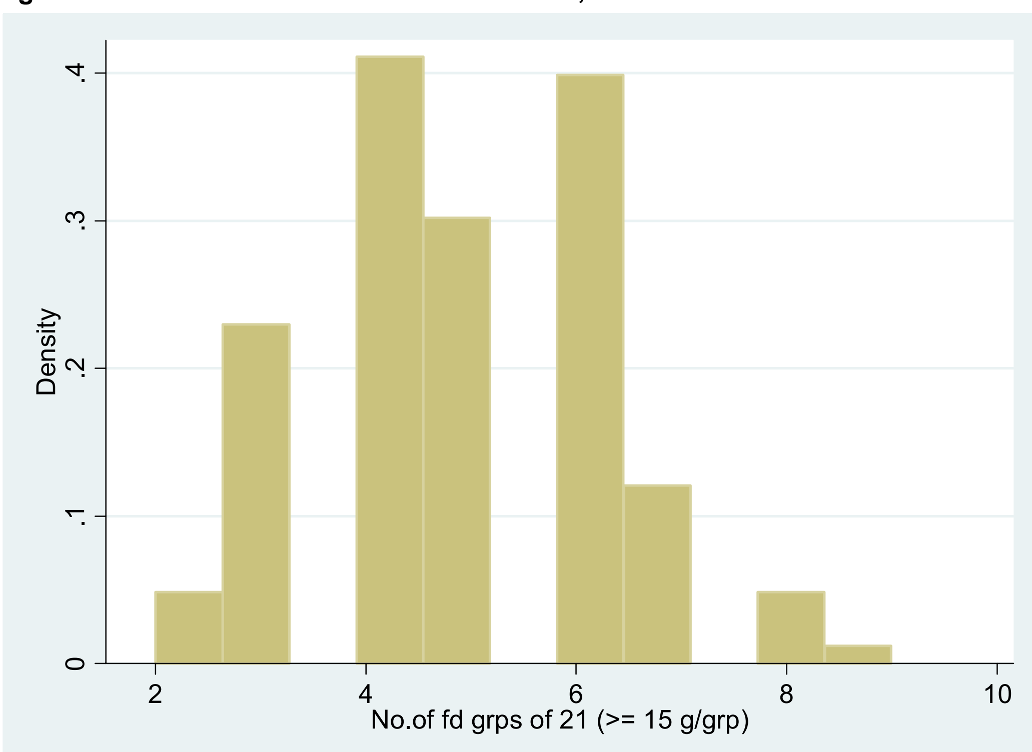


Table N6. Percent of Observation Days at Each Food Group Diversity Score, NPNL Women, R2

Number of food groups eaten	Diversity indicators							
	FGI-6	FGI-6R	FGI-9	FGI-9R	FGI-13	FGI-13R	FGI-21	FGI-21R
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	4.6	0.0	3.7	0.0	3.0	0.0	3.3
3	3.7	22.1	3.7	21.4	3.0	19.9	1.3	14.8
4	20.2	33.8	14.6	32.0	7.9	25.1	8.1	26.4
5	65.6	34.6	28.9	28.6	11.2	29.7	6.9	18.9
6	10.5	4.9	43.4	13.1	20.6	15.7	14.6	25.0
7			9.4	1.3	27.7	5.8	19.9	7.4
8			0.0	0.0	20.2	0.6	25.8	3.6
9			0.0	0.0	8.9	0.0	15.2	0.6
10					0.6	0.0	8.2	0.0
11					0.0	0.0	0.0	0.0
12					0.0	0.0	0.0	0.0
13					0.0	0.0	0.0	0.0
14							0.0	0.0
15							0.0	0.0
16							0.0	0.0
17							0.0	0.0
18							0.0	0.0
19							0.0	0.0
20							0.0	0.0
21							0.0	0.0

Figure N31. Distribution of PA for Thiamin, NPNL Women

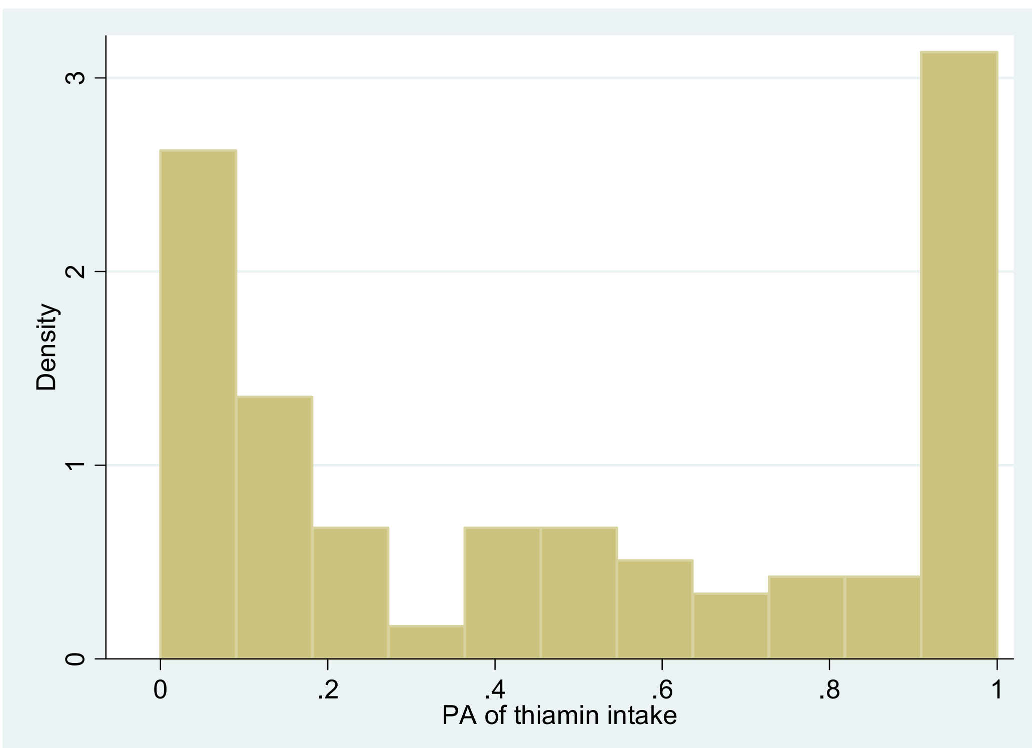


Figure N32. Distribution of PA for Riboflavin, NPNL Women

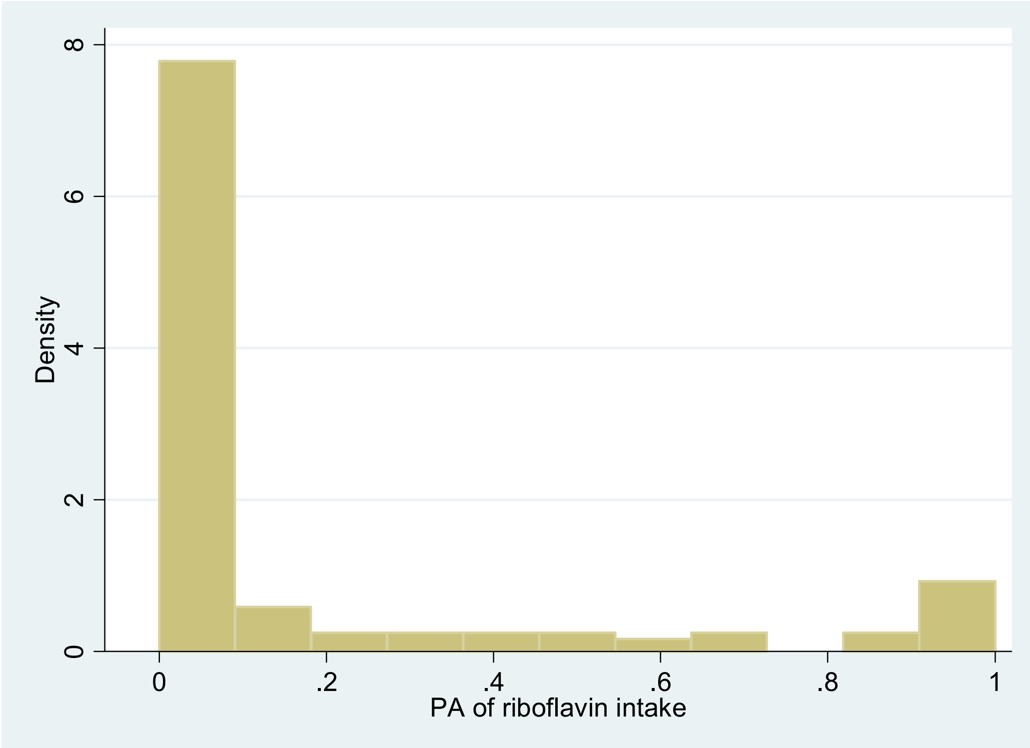


Figure N33. Distribution of PA for Niacin, NPNL Women

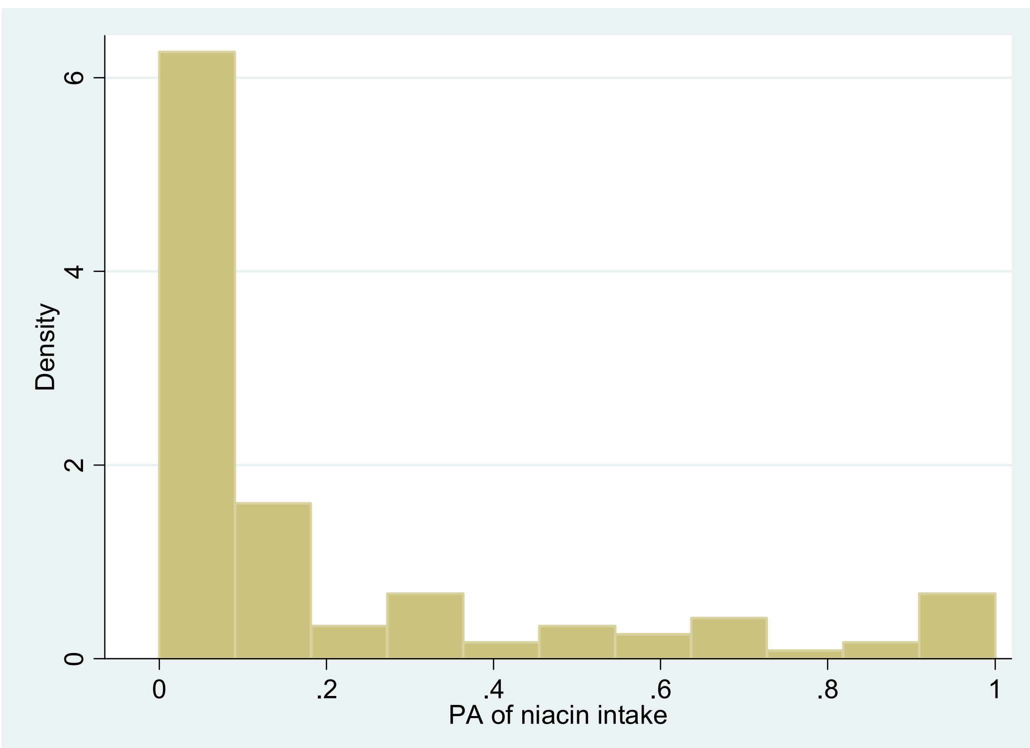


Figure N34. Distribution of PA for Vitamin B6, NPNL Women

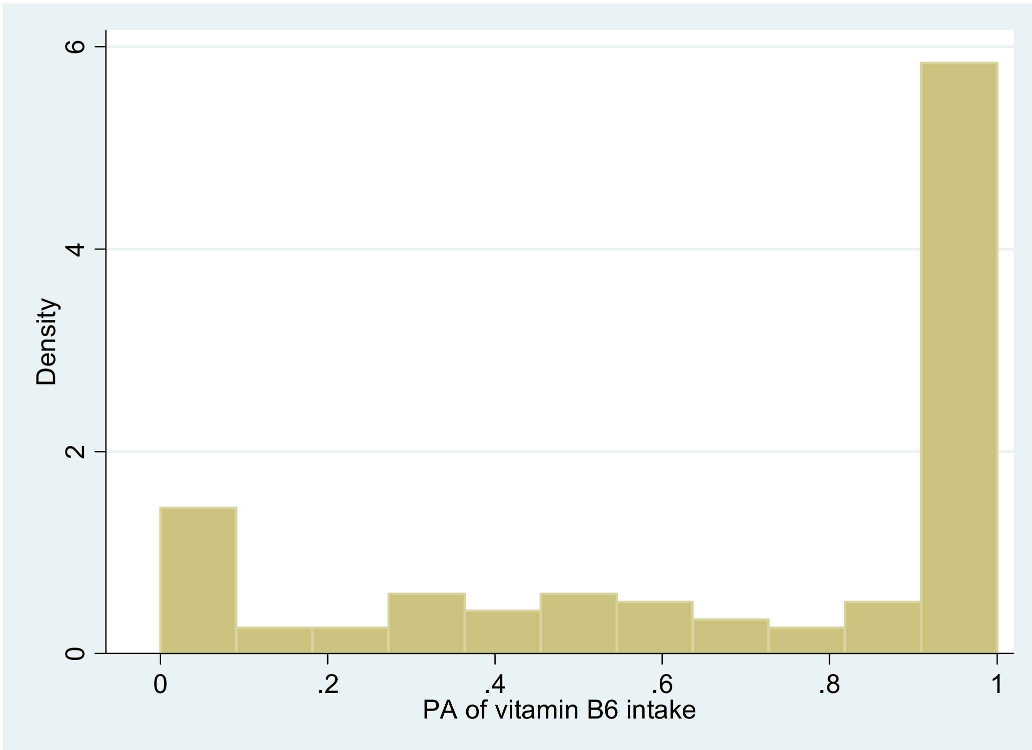


Figure N35. Distribution of PA for Folate, NPNL Women

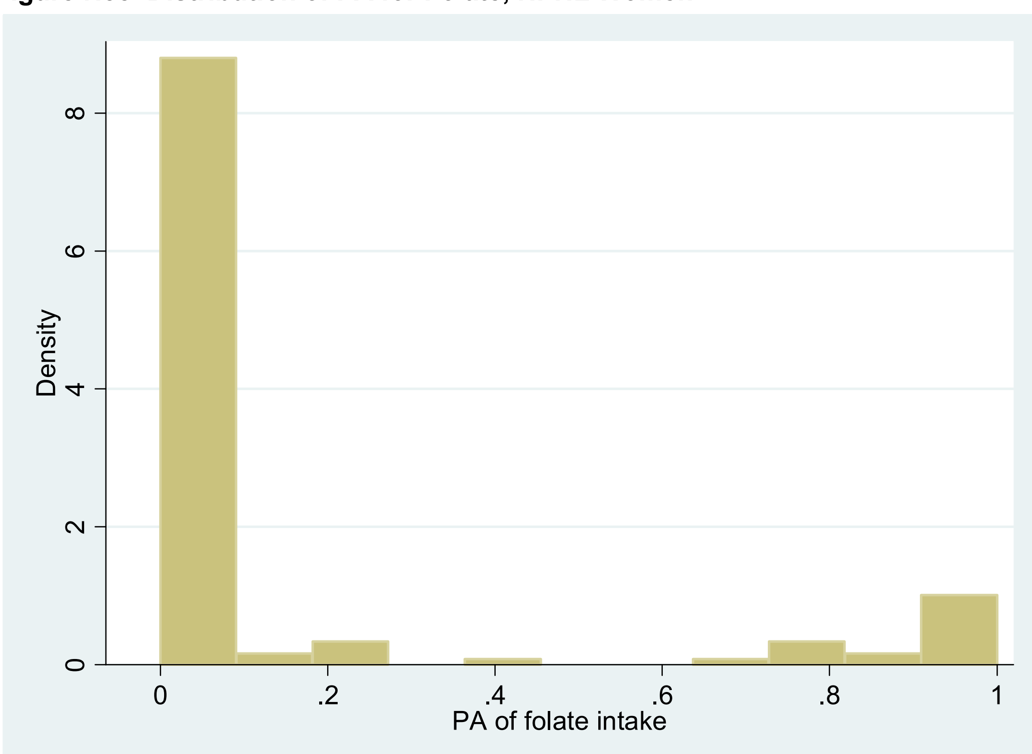


Figure N36. Distribution of PA for Vitamin B12, NPNL Women

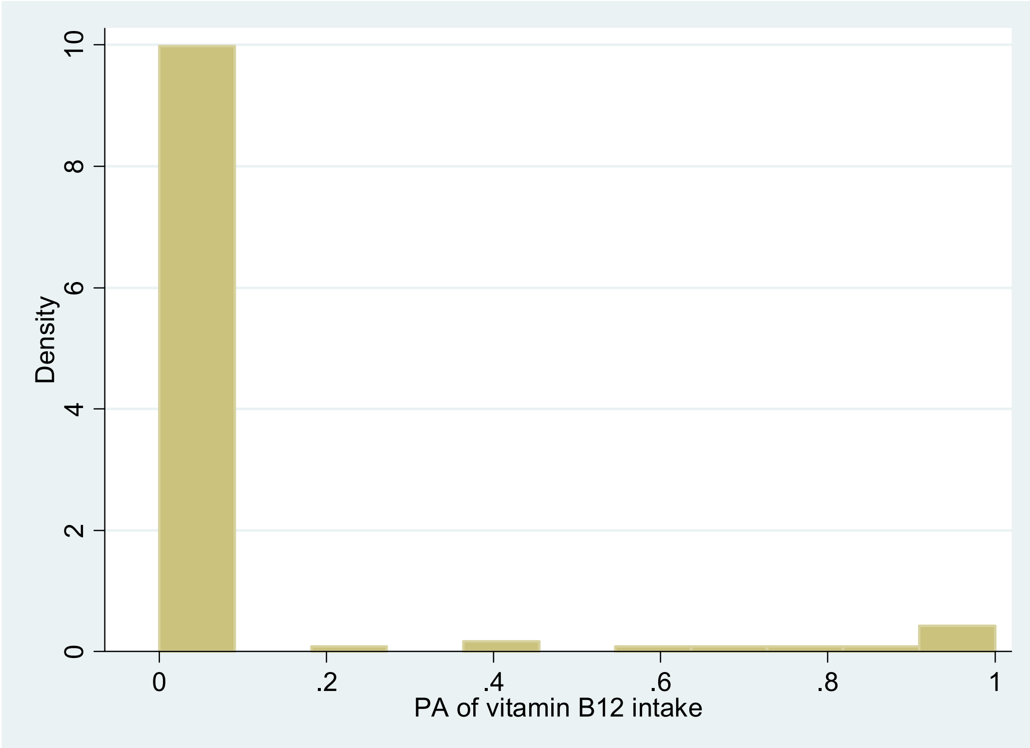


Figure N37. Distribution of PA for Vitamin C, NPNL Women

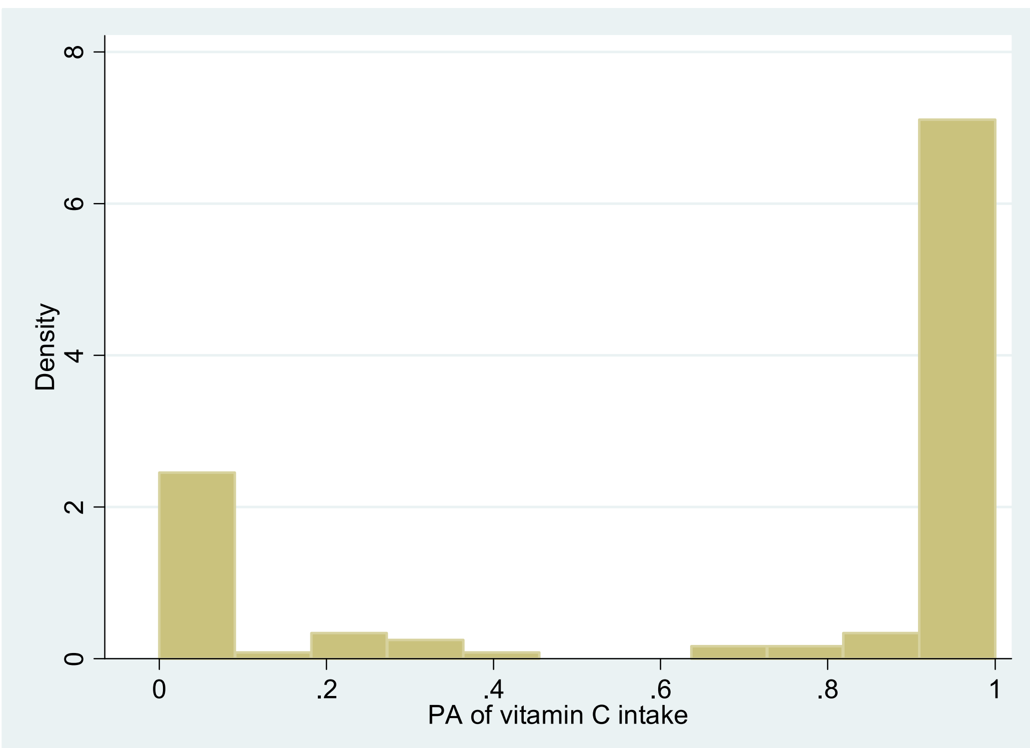


Figure N38. Distribution of PA for Vitamin A, NPNL Women

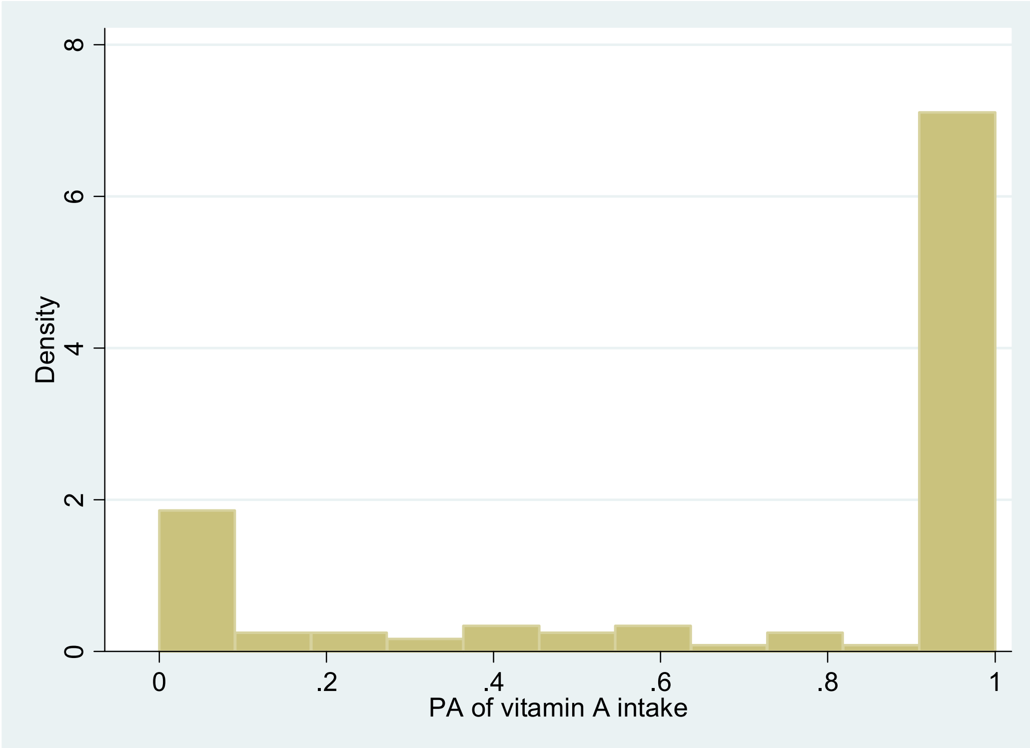


Figure N39. Distribution of PA for Calcium, NPNL Women

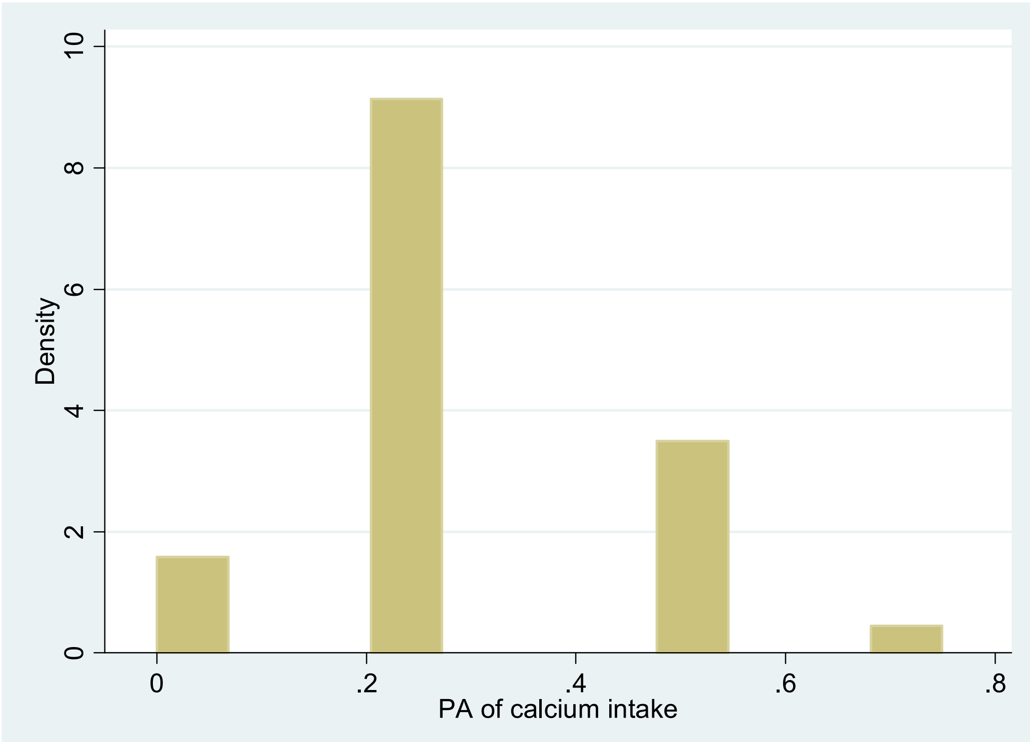


Figure N40. Distribution of PA for Iron, NPNL Women

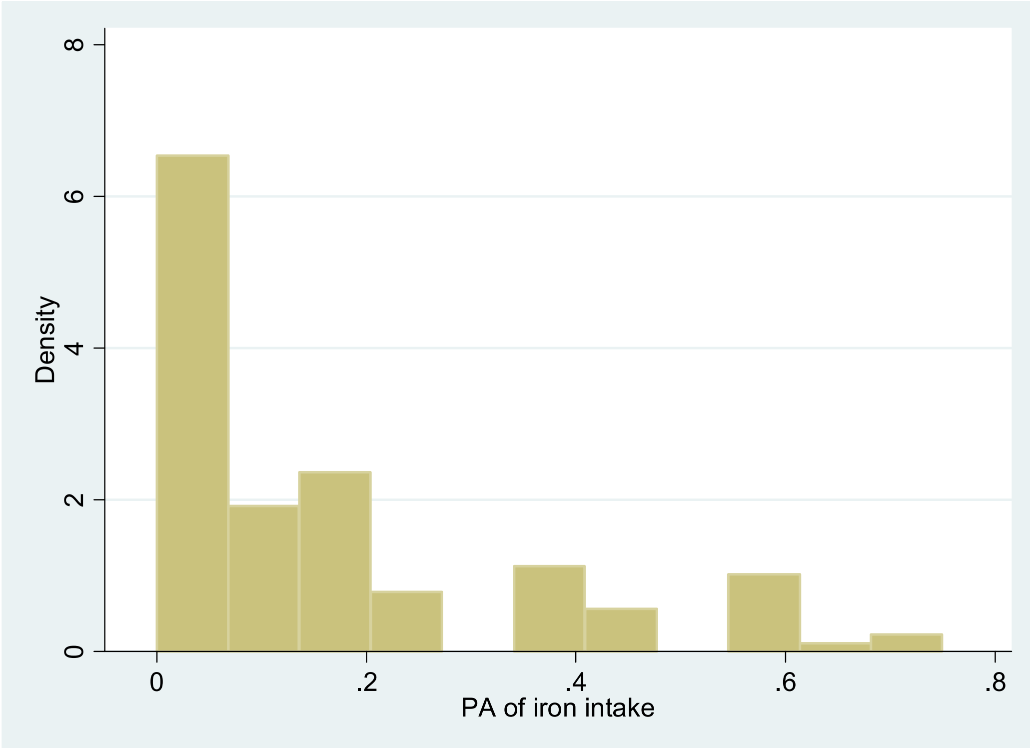


Figure N41. Distribution of PA for Zinc, NPNL Women

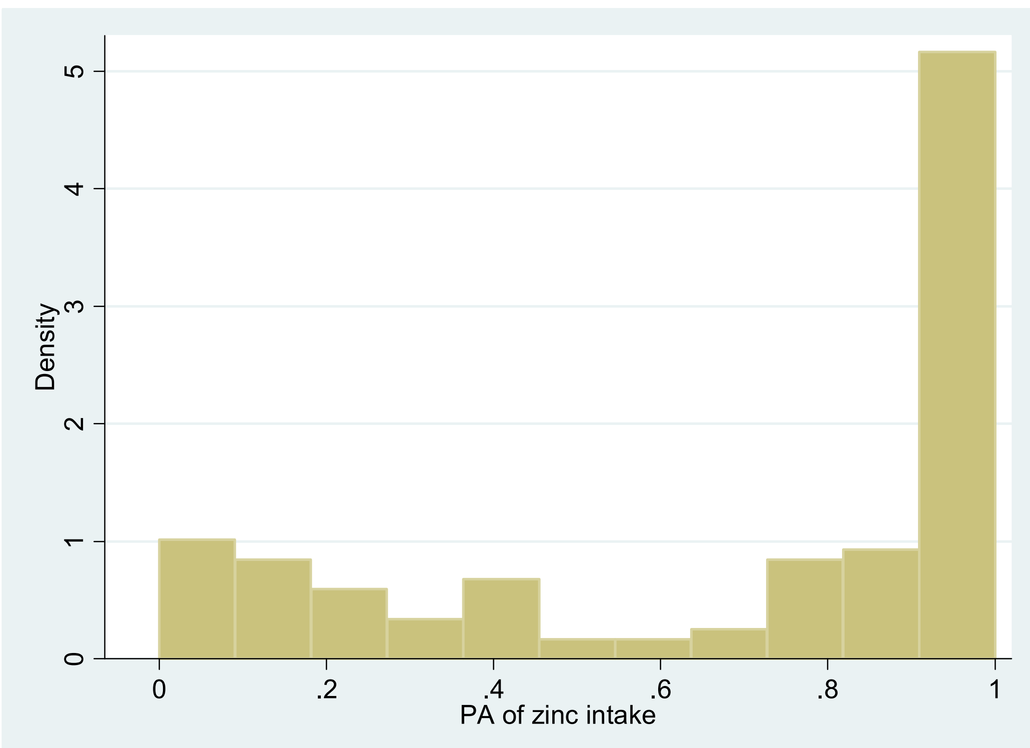
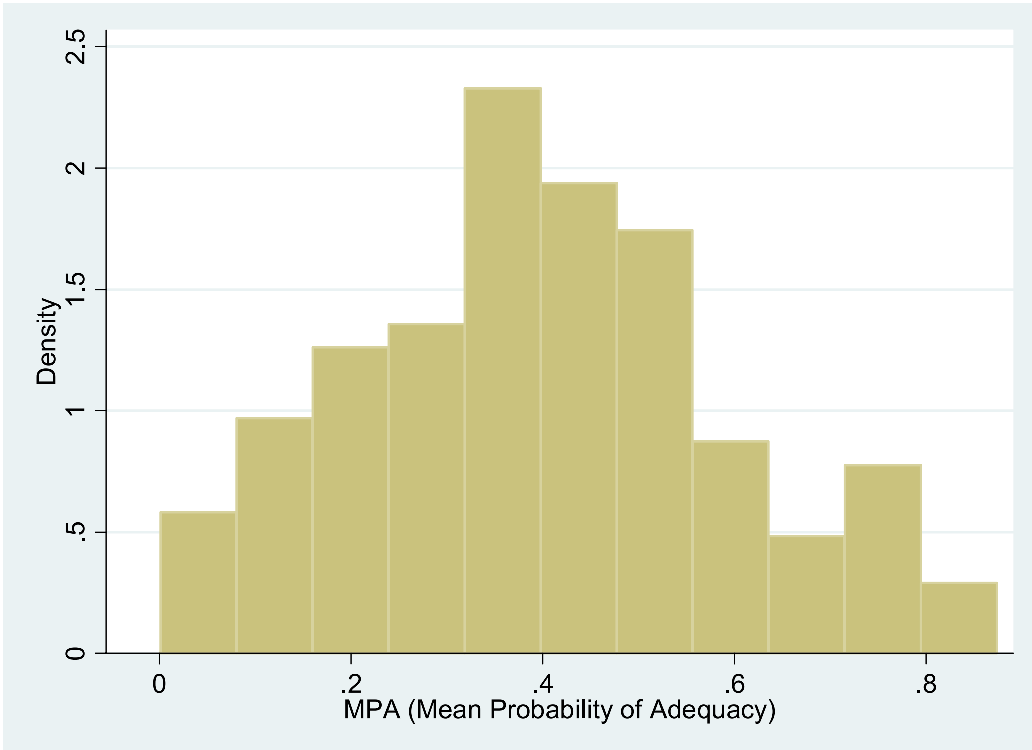


Figure N42. Distribution of MPA, NPNL Women



Appendix 3. List of Sub-Groups of the Qualitative Dietary Diversity Questionnaire

Cereals
Other tubers and roots
Soumbala [1]
Vitamin A-rich yellow/orange/red vegetables
Tomato puree [2]
Vitamin A-rich fruits
Red palm oil
Any fried food [3]
Eggs
Pork meat and processed meat
Liver
Fish powder [4]
Fresh or tined fish and other seafood
Added sugar
Sweet beverages
Alcohol drinks
Orange-fleshed sweet potato
Legumes
Nuts and seeds (including soya)
Vitamin A-rich dark green leafy vegetables
Other vegetables
Other fruits (or pure fruit juices)
Other oils and vegetable fats
Animal-source fats
Milk, yogurt, cheese, or any dairy
Poultry
Other meats (including offal's)
Dried or smoked fish
Salt or "Maggi" cube or sauce
Sweet products and pastries
Tea or coffee
Other

No minimal quantity was required for a group to be counted. However, this list was designed to separate consumptions of very small quantities of ingredients poured in sauces (e.g., tomato puree, fish powder, soumbala) from significant consumption of foods from the same sub-group.

Each woman involved in the study was asked to recall all the dishes, snacks or other foods she had eaten during the 24 hours preceding the survey, in chronological order, regardless of whether the food was eaten inside or outside the compound. From a practical point of view, we first let the woman spontaneously describe her food consumption and then we prompted her to be sure that no meal or snacks had been forgotten. Next the detailed list of all the ingredients of the dishes, snacks or other foods mentioned was collected and corresponding sub-groups were ticked. Once the recall was finished, women were prompted for food sub-groups that were not mentioned.

[1] Soumbala is a local condiment made out of fermented seeds or nuts, most often African locust beans seeds or groundnuts. This particular group was recorded separately to avoid these condiments being counted as a real consumption of groundnuts, or soya, etc.
[2] As with soumbala, this group was also recorded to separate tomato puree used as a condiment from real consumption of fresh tomatoes.
[3] This group was separated from the preceding to remind surveyors to record oil consumed in fried foods.
[4] Fish powder used in small quantity, as a condiment.

Appendix 4. Tables for First and Third Observation Days

Table A4-1a. Description of Sample, All Women, R1

	n	Mean	SD	Median	Range
Age (year)	180	31.2	7.4	30.0	17.0-49.0
Height (cm)	164	163.2	6.1	163.0	150.0-182.0
Weight (kg)	163	61.6	11.4	60.3	38.2-102.1
BMI	163	23.1	3.9	22.6	16.1-37.1
Ever attended school	181	46.5			
% Lactating	181	20.2			
% Pregnant	181	7.4			
	n	**Percent**			
BMI <16	0	0.0			
BMI 16-16.9	6	3.8			
BMI 17-18.49	8	5.2			
BMI 18.5-24.9	103	62.4			
BMI 25-29.9	39	24.1			
BMI ≥ 30	7	4.5			

Table A4-2a. Energy and Macronutrient Intakes, All Women, R1

	Mean	SD	Median	Range	Percent of kcal
Energy (kcal)	2,190.1	829.5	2,019.5	459.1-4,558.5	
Protein (g)	57.7	26.7	52.8	4.1-153.3	10.6
Animal source (g)	14.1	16.1	8.2	0.0-104.3	2.6
Plant source (g)	43.7	21.8	39.9	4.1-121.6	8.0
Total carbohydrate (g)	358.1	141.2	341.8	66.0-879.5	65.8
Sugars (g)	67.9	55.7	54.0	2.6-282.5	12.7
Total fat (g)	56.7	40.0	46.2	4.2-262.1	22.6
Saturated fat (g)	-	-	-	-	-

Table A4-8a. Mean and Median Nutrient Intake, All Women, R1 [a]

Nutrient	Mean	SD	Median	EAR [b]	SD [b]
Energy	2,190.1	829.5	2,019.5		
Protein (All Sources) (% of kcal)	10.60	2.93	10.29		
Protein from animal sources (% of kcal)	2.62	2.52	1.67		
Total carbohydrate (% of kcal)	65.84	10.45	67.62		
Sugars (% of kcal)	12.69	10.12	9.53		
Total fat (% of kcal)	22.59	10.30	21.38		
Saturated fat (% of kcal)					
Thiamin (mg/d)	1.00	0.54	0.92	0.9	0.09
Riboflavin (mg/d)	0.72	0.40	0.63	0.9	0.09
Niacin (mg/d)	10.08	6.54	9.02	11	1.65
Vitamin B6 (mg/d)	1.50	0.86	1.29	1.1	0.11
Folate (µg/d)	248.53	188.00	185.20	320	32
Vitamin B12 (µg/d)	1.11	2.19	0.43	2.0	0.2
Vitamin C (mg/d)	86.16	85.37	53.95	30	3.0
Vitamin A (RE/d)	795.39	942.37	461.12	270	54
Calcium (mg/d)	515.76	422.17	402.02	-- [b]	-- [b]
Iron (mg/d)	0.26	16.48	19.24	See tables A6-2 & A6-3	
Zinc (mg/d)	8.94	4.18	8.26	15% bioavail: 6.67	1.67
MPA across 11 micronutrients	0.38	0.19	0.35		

[a] EAR and SD are presented for the predominant physiological group i.e., NPNL women (19-65 years); however, the sample also includes pregnant women (7.2 percent), lactating women (19.3 percent) and adolescent girls (1.7 percent). See table A6-1 for sources of data.
[b] There is no EAR and no SD for calcium; 1000 mg is the Adequate Intake (AI).

Table A4-N1a. Description of Sample, NPNL Women, R1

	n	Mean	SD	Median	Range
Age (year)	132	31.8	7.9	30.0	17.0-49.0
Height (cm)	129	163.3	6.1	163.0	150.0-182.0
Weight (kg)	128	63.0	11.8	61.5	38.2-102.1
BMI	128	23.6	4.1	23.1	16.1-37.1
Ever attended school	133	51.3			
% Lactating	133	0.0			
% Pregnant	133	0.0			
	n	**Percent**			
BMI <16	0	0.0			
BMI 16-16.9	4	3.4			
BMI 17-18.49	6	5.2			
BMI 18.5-24.9	77	59.1			
BMI 25-29.9	34	26.5			
BMI ≥ 30	7	5.8			

Table A1-N2a. Energy and Macronutrient Intakes, NPNL Women, R1

	Mean	SD	Median	Range	Percent of kcal
Energy (kcal)	2,092.6	843.6	1,932.5	459.1-4,558.5	
Protein (g)	55.8	28.9	49.6	4.1-153.3	10.6
Animal source (g)	15.3	18.5	8.2	0.0-104.3	2.9
Plant source (g)	40.5	21.8	37.1	4.1-121.6	7.8
Total carbohydrate (g)	334.5	132.9	324.1	66.0-719.6	64.9
Sugars (g)	64.0	50.8	53.3	2.6-239.6	12.8
Total fat (g)	57.3	44.7	46.2	4.2-262.1	23.4
Saturated fat (g)	-	-	-	-	-

Table A4-N8a. Mean and Median Nutrient Intake, NPNL Women, R1

Nutrient	Mean	SD	Median	EAR [a]	SD [a]
Energy	2,092.6	843.6	1,932.5		
Protein (All Sources) (% of kcal)	10.65	3.15	10.32		
Protein from animal sources (% of kcal)	2.89	2.83	2.10		
Total carbohydrate (% of kcal)	64.92	11.17	66.01		
Sugars (% of kcal)	12.79	10.33	9.73		
Total fat (% of kcal)	23.42	11.17	22.00		
Saturated fat (% of kcal)					
Thiamin (mg/d)	0.97	0.56	0.87	0.9	0.09
Riboflavin (mg/d)	0.69	0.38	0.61	0.9	0.09
Niacin (mg/d)	9.79	7.26	8.18	11	1.65
Vitamin B6 (mg/d)	1.45	0.85	1.27	1.1	0.11
Folate (µg/d)	238.22	188.91	177.42	320	32
Vitamin B12 (µg/d)	1.22	2.51	0.41	2.0	0.2
Vitamin C (mg/d)	85.33	82.09	54.41	30	3.0
Vitamin A (RE/d)	782.18	928.89	473.63	270	54
Calcium (mg/d)	509.63	438.78	399.42	-- [b]	-- [b]
Iron (mg/d)	21.04	15.75	18.16	See tables A6-2 & A6-3	
Zinc (mg/d)	8.35	4.34	7.51	15% bioavail: 6.67	1.67
MPA across 11 micronutrients	0.40	0.20	0.39		

[a] EAR and SD are presented for the predominant physiological group i.e., NPNL women (19-65 years); however, the sample also includes adolescent girls (2.3 percent). See table A6-1 for sources of data.
[b] There is no EAR and no SD for calcium; 1000 mg is the Adequate Intake (AI).

Table A4-1b. Description of Sample, All Women, R3

	n	Mean	SD	Median	Range
Age (year)	172	31.2	7.4	29.0	17.0-49.0
Height (cm)	157	163.1	6.0	163.0	150.0-180.0
Weight (kg)	156	61.4	11.3	60.3	38.2-102.1
BMI	156	23.1	4.0	22.4	16.1-37.1
Ever attended school	173	45.7			
% Lactating	173	21.2			
% Pregnant	173	7.1			
	n	**Percent**			
BMI <16	0	0.0			
BMI 16-16.9	6	4.0			
BMI 17-18.49	8	5.4			
BMI 18.5-24.9	98	62.1			
BMI 25-29.9	37	23.7			
BMI ≥ 30	7	4.7			

Table A4-2b. Energy and Macronutrient Intakes, All Women, R3

	Mean	SD	Median	Range	Percent of kcal
Energy (kcal)	2,267.9	905.3	2,128.2	813.6-6,179.6	
Protein (g)	59.5	28.3	54.2	13.2-228.4	10.7
Animal source (g)	15.8	23.4	8.0	0.0-207.9	2.8
Plant source (g)	43.7	19.2	40.3	9.1-101.8	7.9
Total carbohydrate (g)	376.4	169.9	354.1	60.3-1,193.5	66.3
Sugars (g)	86.1	93.4	66.7	4.9-748.2	14.3
Total fat (g)	55.7	35.9	47.8	2.6-253.6	22.0
Saturated fat (g)	-	-	-	-	-

Table A4-8b. Mean and Median Nutrient Intake, All Women, R3

Nutrient	Mean	SD	Median	EAR [a]	SD [a]
Energy	2,267.9	905.3	2,128.2		
Protein (All Sources) (% of kcal)	10.73	3.40	10.29		
Protein from animal sources (% of kcal)	2.80	3.44	1.57		
Total carbohydrate (% of kcal)	66.33	11.28	67.88		
Sugars (% of kcal)	14.32	10.18	11.99		
Total fat (% of kcal)	22.00	10.93	20.14		
Saturated fat (% of kcal)					
Thiamin (mg/d)	1.01	0.47	0.91	0.9	0.09
Riboflavin (mg/d)	0.86	0.89	0.67	0.9	0.09
Niacin (mg/d)	10.42	6.11	8.99	11	1.65
Vitamin B6 (mg/d)	1.55	0.95	1.37	1.1	0.11
Folate (µg/d)	251.22	173.81	210.67	320	32
Vitamin B12 (µg/d)	3.06	17.87	0.45	2.0	0.2
Vitamin C (mg/d)	94.00	96.90	65.54	30	3.0
Vitamin A (RE/d)	1,123.57	2,474.39	547.07	270	54
Calcium (mg/d)	528.57	403.22	455.54	-- [b]	-- [b]
Iron (mg/d)	23.09	13.17	20.00	See tables A6-2 & A6-3	
Zinc (mg/d)	9.31	4.02	8.62	15% bioavail: 6.67	1.67
MPA across 11 micronutrients	0.38	0.19	0.35		

[a] EAR and SD are presented for the predominant physiological group i.e., NPNL women (19-65 years); however, the sample also includes pregnant women (6.9 percent), lactating women (20.2 percent) and adolescent girls (1.2 percent). See table A6-1 for sources of data.
[b] There is no EAR and no SD for calcium; 1000mg is the Adequate Intake (AI).

Table A4-N1b. Description of Sample, NPNL Women, R3

	n	Mean	SD	Median	Range
Age (year)	125	32.0	7.9	30.0	17.0-49.0
Height (cm)	122	163.3	5.9	163.0	150.0-178.0
Weight (kg)	121	62.7	11.7	61.5	38.2-102.1
BMI	121	23.6	4.2	23.1	16.1-37.1
Ever attended school	126	50.9			
% Lactating	126	0.0			
% Pregnant	126	0.0			
	n	**Percent**			
BMI <16	0	0.0			
BMI 16-16.9	4	3.6			
BMI 17-18.49	6	5.5			
BMI 18.5-24.9	72	58.5			
BMI 25-29.9	32	26.3			
BMI ≥ 30	7	6.2			

Table A4-N2b. Energy and Macronutrient Intakes, NPNL Women, R3

	Mean	SD	Median	Range	Percent of kcal
Energy (kcal)	2,071.6	740.2	2,023.6	813.6-6,179.6	
Protein (g)	57.0	29.3	51.9	13.2-228.4	11.1
Animal source (g)	17.5	26.8	8.1	0.0-207.9	3.2
Plant source (g)	39.5	17.4	38.0	9.1-101.8	7.9
Total carbohydrate (g)	336.0	130.0	327.9	60.3-913.8	65.3
Sugars (g)	78.9	67.0	59.7	4.9-434.3	14.6
Total fat (g)	53.7	34.5	46.9	2.6-253.6	22.8
Saturated fat (g)	-	-	-	-	-

Table A4-N8b. Mean and Median Nutrient Intake, NPNL Women, R3

Nutrient	Mean	SD	Median	EAR [b]	SD [b]
Energy	2,071.6	740.2	2,023.6		
Protein (All Sources) (% of kcal)	11.09	3.76	10.56		
Protein from animal sources (% of kcal)	3.21	3.96	1.71		
Total carbohydrate (% of kcal)	65.33	11.57	67.54		
Sugars (% of kcal)	14.59	10.22	12.58		
Total fat (% of kcal)	22.78	11.17	21.41		
Saturated fat (% of kcal)					
Thiamin (mg/d)	0.93	0.42	0.83	0.9	0.09
Riboflavin (mg/d)	0.82	1.00	0.63	0.9	0.09
Niacin (mg/d)	9.76	6.19	8.14	11	1.65
Vitamin B6 (mg/d)	1.37	0.77	1.24	1.1	0.11
Folate (μg/d)	237.72	169.86	179.03	320	32
Vitamin B12 (μg/d)	3.98	21.21	0.45	2.0	0.2
Vitamin C (mg/d)	85.11	94.06	55.17	30	3.0
Vitamin A (RE/d)	1,150.37	2,864.68	514.44	270	54
Calcium (mg/d)	494.45	381.21	389.97	[d]	[d]
Iron (mg/d)	20.90	11.64	18.61	See tables A6-2 & A6-3	
Zinc (mg/d)	8.49	3.57	8.17	15% bioavail: 6.67	1.67
MPA across 11 micronutrients	0.39	0.19	0.39		

[b]EAR and SD are presented for the predominant physiological group i.e., NPNL women (19-65 years); however, the sample also includes adolescent girls (1.6 percent). See table A6-1 for sources of data.
[d] There is no EAR and no SD for calcium; 1000 mg is the Adequate Intake (AI).

Appendix 5. Women's Food Group Recall in DHS 5

579 Now I would like to ask you about (other) liquids or foods that (NAME FROM 577)/you may have had yesterday during the day or night. I am interested in whether your child/you had the item even if it was combined with other foods. **(15)**

Did (NAME FROM 577)/you drink (eat):

		CHILD			MOTHER		
		YES	NO	DK	YES	NO	DK
a) Milk such as tinned, powdered, or fresh animal milk?	**a**	1	2	8	1	2	8
b) Tea or coffee?	**b**	1	2	8	1	2	8
c) Any other liquids?	**c**	1	2	8	1	2	8
d) Bread, rice, noodles, or other foods made from grains? **(16)**	**d**	1	2	8	1	2	8
e) Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside? **(17)**	**e**	1	2	8	1	2	8
f) White potatoes, white yams, manioc, cassava, or any other foods made from roots?	**f**	1	2	8	1	2	8
g) Any dark green, leafy vegetables? **(18)**	**g**	1	2	8	1	2	8
h) Ripe mangoes, papayas, or [INSERT ANY OTHER LOCALLY AVAILABLE VITAMIN A-RICH FRUITS]?	**h**	1	2	8	1	2	8
i) Any other fruits or vegetables?	**i**	1	2	8	1	2	8
j) Liver, kidney, heart, or other organ meats?	**j**	1	2	8	1	2	8
k) Any meat, such as beef, pork, lamb, goat, chicken, or duck?	**k**	1	2	8	1	2	8
l) Eggs?	**l**	1	2	8	1	2	8
m) Fresh or dried fish or shellfish?	**m**	1	2	8	1	2	8
n) Any foods made from beans, peas, lentils, or nuts?	**n**	1	2	8	1	2	8
o) Cheese, yogurt, or other milk products?	**o**	1	2	8	1	2	8
p) Any oil, fats, or butter, or foods made with any of these?	**p**	1	2	8	1	2	8
q) Any sugary foods such as chocolates, sweets, candies, pastries, cakes, or biscuits?	**q**	1	2	8	1	2	8
r) Any other solid or semi-solid foods?	**r**	1	2	8	1	2	8

[15] A separate category for any foods made with red palm oil, palm nut, or palm nut pulp sauce must be added in countries where these items are consumed. A separate category for any grubs, snails, insects or other small protein food must be added in countries where these items are eaten. Items in each food group should be modified to include only those foods that are locally available and/or consumed in the country. Local terms should be used.

[16] Grains include millet, sorghum, maize, rice, wheat, or other local grains. Start with local foods (e.g., ugali, nshima, fufu, chapatti) then follow with bread, rice, noodles, etc.

[17] Items in this category should be modified to include only vitamin A rich tubers, starches, or yellow/orange/red vegetables that are consumed in the country.

[18] These include cassava leaves, bean leaves, kale, spinach, pepper leaves, taro leaves, amaranth leaves or other dark green, leafy vegetables.

Source: ORC Macro DHS website at: http://www.measuredhs.com/aboutsurveys/dhs/questionnaires.cfm. Accessed September 7, 2007.

Appendix 6: Estimated Average Requirements

Note that WHO/FAO requirements are not given separately for pregnant or lactating adolescents. For girls aged 15-18 who were pregnant or lactating, we used the requirements for pregnant/lactating adult women for most nutrients, as the requirements are higher. The exception to this is calcium, for which the requirement is higher for adolescents (1,300 mg/d), so this value (US AI) was used for pregnant and lactating adolescents.

Table A6-1. EAR to be Used for Assessing PA [a, b]

	Females 19-50 years		**Females 15-18 years**		**Pregnant women**		**Lactating women**	
	EAR	**SD [c]**	**EAR**	**SD [c]**	**EAR**	**SD [c]**	**EAR**	**SD [c]**
Vit A (RE/d) [d]	270 [e]	54	365 [e]	73	370[e]	74	450 [e]	90
Vit C (mg/d)	38 [f]	3.8	33 [f]	3.3	46 [f]	4.6	58 [f]	5.8
Thiamin (mg/d)	0.9 [f]	0.09	0.9 [f]	0.09	1.2 [f]	0.12	1.2 [f]	0.12
Riboflavin (mg/d)	0.9 [f]	0.09	0.8 [f]	0.08	1.2 [f]	0.12	1.3 [f]	0.13
Niacin (mg/d)	11 [f]	1.6	12 [f]	1.8	14 [f]	2.1	13 [f]	2.0
Vit B_6 (mg/d)	1.1 [f]	0.11	1.0 [f]	0.1	1.6 [f]	0.16	1.7 [f]	0.17
Folate (µg/d)	320 [e]	32	330 [e]	33	520 [e]	52.0	450 [e]	45.0
Vit B_{12} (µg/d)	2.0 [e]	0.2	2.0 [e]	0.2	2.2 [e]	0.22	2.4 [e]	0.24
Calcium (mg/d) [g]	1,000	-	1,300	-	1,000		1,000	
Iron (mg/d)	See table A6-2	-	See Table A6-3	-	22 [h]	2.07	10% bioavail: 11.7 [i] 5% bioavail: 23.40	3.51 7.02
Zinc (mg/d)	Lower bioavail: 7 [j] Higher bioavail: 6 [k]	0.88 0.75	Lower bioavail: 9 Higher bioavail: 7	1.13 0.88	Lower bioavail: 10 Higher bioavail: 8	1.25 1.0	Lower bioavail: 8 Higher bioavail: 7	1.00 0.88

[a] All values are taken from WHO/FAO (2004) unless otherwise stated.

[b] Values for EAR are adjusted for an assumed bioavailability (WHO/FAO 2004). Thus, EAR refers to intake of the nutrients and not the physiological need for the absorbed nutrient.

[c] All SDs were calculated based on EAR and CV (SD = CV*EAR/100). CV is assumed to be 10 percent for all micronutrients except 15 percent for niacin (IOM 2000a), 20 percent for vitamin A (IOM 2000a), and 12.5 percent for zinc (IZiNCG 2004), 9.4 percent and 30 percent for iron, for pregnant and lactating women, respectively (IOM 2000a).

[d] One µg RE is equal to 1 µg all-trans-retinol, 6 µg β-carotene and 12 µg α-carotene or β-cryptoxanthin (WHO/FAO 2004). Note also the EAR for vitamin A refers to intake adequate to prevent the appearance of deficiency-related syndromes (WHO/FAO 2004).

[e] EAR taken from WHO/FAO (2004).

[f] EAR back-calculated from RNI (Recommended Nutrient Intake) (WHO/FAO 2004).

[g] This is not an EAR, but rather AI from IOM (1997). Following Foote et al. (2004), we calculate probabilities of adequacy to be 0 percent when intake ≤ 1/4 of the AI; 25 percent for intakes > 1/4 and ≤ 1/2 of the AI; 50 percent for intakes > 1/2 and ≤ 3/4 of the AI; 75 percent for intakes > 3/4 and ≤ AI; and 100 percent for intakes above the AI.

[h] EAR for iron intake, as presented in IOM (2000a, page 347). IOM estimates that bioavailability is 18 percent in the first trimester and 25 percent in the second and third. As information on month of pregnancy will not be available in most data sets, a weighted average of 23 percent absorption was used for all pregnant women.

[i] Gives EAR for iron for two levels of absorption for lactating women, based on IOM (2006). According to WHO/FAO (2004), either a very low (5 percent) or low (10 percent) absorption level can be assumed in a developing country setting.

[j] This is the estimated median requirement of zinc to be used for diets with a lower bioavailability (unrefined, cereal based diets), as suggested by IZiNCG (2004).

[k] This is the estimated median requirement of zinc to be used for diets with a higher bioavailability (mixed or refined vegetarian diets), as suggested by IZiNCG (2004).

Table A6-2. PA of Iron (mg/d) and Associated Ranges of Usual Intake in Adult Women Not Using Oral Contraceptives (OC) [a]

PA	Total absorbed iron	10% bioavailability	5% bioavailability
0	<0.796	<7.96	<15.91
0.04	0.796-0.879	7.96-8.79	15.91-17.59
0.07	0.880-0.981	8.80-9.81	17.60-19.65
0.15	0.982-1.120	9.82-11.20	19.66-22.42
0.25	1.121-1.237	11.21-12.37	22.43-24.76
0.35	1.238-1.343	12.38-13.43	24.77-26.88
0.45	1.344-1.453	13.44-14.53	26.89-29.08
0.55	1.454-1.577	14.54-15.77	29.09-31.56
0.65	1.578-1.734	15.78-17.34	31.57-34.69
0.75	1.735-1.948	17.35-19.48	34.70-38.98
0.85	1.949-2.349	19.49-23.49	38.99-47.01
0.92	2.350-2.789	23.50-27.89	47.02-55.79
0.96	2.790-3.281	27.90-32.81	55.80-65.63
1	>3.28	>32.81	>65.63

[a] This table was adapted from Table G-7 in IOM (2006), which gives PA for various levels of iron intake, assuming 18 percent absorption. In order to construct the table above, the associated level of *absorbed* iron was back-calculated from Table G-7. The table above presents usual intake levels to achieve the same amount of absorbed iron, but adjusted for absorption at two lower levels (10 percent and 5 percent).

Table A6-3. PA of Iron (mg/d) and Associated Ranges of Usual Intake in Adolescent Girls (15-18 Years) Not Using Oral Contraceptives (OC) [a]

PA	Total absorbed iron	10% bioavailability	5% bioavailability
0	<0.833	<8.33	<16.67
0.04	0.833-0.911	8.33-9.11	16.67-18.22
0.07	0.912-1.010	9.12-10.10	18.23-20.20
0.15	1.011-1.136	10.11-11.36	20.21-22.72
0.25	1.137-12.37	11.37-12.37	22.73-24.73
0.35	1.238-1.330.	12.38-13.30	24.74-26.60
0.45	1.331-1.424	13.31-14.24	26.61-28.49
0.55	1.425-1.526	14.25-15.26	28.50-30.53
0.65	1.526-1.647	15.27-16.47	30.54-32.94
0.75	1.648-1.805	16.48-18.05	32.95-26.11
0.85	1.806-2.077	18.06-20.77	36.12-41.54
0.92	2.078-2.354	20.78-23.54	41.55-47.09
0.96	2.355-2.664	23.55-26.64	47.10-53.28
1	>2.664	>26.64	>53.28

[a] This table was adapted from Table G-6 in IOM (2006), which gives PA for various levels of iron intake, assuming 18 percent absorption. In order to construct the table above, the associated level of *absorbed* iron was back-calculated from Table G-6. The table above presents usual intake levels to achieve the same amount of absorbed iron, but adjusted for absorption at two lower levels (10 percent and 5 percent).

DISCUSSION ON THE SELECTION OF EAR AND CV

Vitamin A

According to WHO/FAO,[1] the CV for vitamin A requirements is unknown. IOM, however, has used 20 percent. The WDDP uses the EAR of WHO/FAO with a CV of 20 percent. For adolescents (ages 15-18), WHO/FAO give a range for the EAR of 330-400 µg/d. The WDDP uses the mid-point of this range.

Calcium

WHO/FAO's EAR for calcium is quite high, and based on WDDP working group discussions, the justification for these high levels does not appear to be strong/persuasive. The group therefore proposed to use the method described in Foote et al.,[2] which takes the AI of 1,000 mg/d as a starting point (or 1,300 mg/d for adolescents). The DRI include AI when insufficient evidence is available to set an EAR and CV. The AI is an observed estimate of nutrient intake by a defined group of healthy people. Some seemingly healthy individuals may require higher intakes and some individuals may be at low risk on even lower intakes. The AI is believed to cover their needs, but lack of data or uncertainty in the data prevent being able to specify with confidence the percentage of individuals covered by this intake.[3] An individual with a usual intake of calcium at or above AI can be assumed to have an AI. Foote et al.[4] estimated probabilities of adequacy as follows:

0 percent when intake ≤ 1/4 of the AI,
25 percent for intakes > 1/4 and ≤ 1/2 of the AI,
50 percent for intakes > 1/2 and ≤ 3/4 of the AI,
75 percent for intakes > 3/4 and ≤ AI,
100 percent for intakes above the AI.

The AI is the same for pregnant and lactating women and adolescents and for NPNL women (1,000 mg/d for women and 1,300 mg/d for adolescents).

Iron

For estimating the probability of AI of iron for **NPNL women** the WDDP used a modified version of the PA tables in IOM.[5] The table is based on an assumption of 18 percent absorption, which is higher than expected in most developing country settings. The WDDP adjusted the table to find the PA for the two levels of absorption: five percent and ten percent. The tables above (one for adult women and one for adolescents) are thus entirely based on IOM.[6] Each researcher must select an assumed level of absorption (five percent or ten percent), based on his/her own expertise/knowledge of the local food intake.

For pregnant and lactating women, CVs have been given by the IOM. We therefore used the usual method of EAR for estimating PA for these two groups.

For pregnant women, the WDDP used the EAR suggested by IOM, because WHO/FAO[7] does not provide a requirement level for pregnant women. However, WHO and FAO state that iron absorption can increase up to approximately four times NPNL levels by the third trimester. Therefore, using IOM requirements – which assume 18 percent absorption in first trimester and 25 percent absorption in second and third

---

[1] 2004.
[2] 2004.
[3] IOM 1997.
[4] 2004.
[5] Table I-6 and I-7; 2000b.
[6] 2000b.
[7] 2004.

trimesters – seems reasonable, in the absence of more specific guidance from WHO and FAO on absorption during pregnancy.

For lactating women, IOM gives an EAR for iron intake of 6.5 mg/d, assuming 18 percent absorption. We calculated the EAR of absorbed iron (6.5 mg times 18/100) as 1.17 mg/d. This is similar to the WHO/FAO EAR for lactating women (1.1 mg/day).[8] In the table above, we give EARs for two levels of absorption (five percent and ten percent). Researchers should apply the same levels of absorption as used for NPNL women. This study used coefficient of variation from IOM (30 percent) for lactating women.

Zinc

IZiNCG recently presented revised dietary zinc requirements, including EAR.[9] It also estimated a CV for the requirement distribution of 12.5 percent, indicating a narrower requirement distribution than implied by the WHO/FAO[10] CV of 25 percent. Hotz[11] assessed the internal validity of these new requirements and found that they predicted zinc status. They also yielded similar estimates of prevalence of zinc deficiency as did biochemical indicators, including among pregnant and non-pregnant women. Therefore, we adopted these requirements for the purposes of the WDDP.

As with the WHO/FAO requirements, researchers must choose a requirement depending on an assumption for absorption, which is based on knowledge of diet patterns and likely bioavailability. For mixed or refined vegetarian diets (with a phytate to zinc molar ratio of 4-18) an absorption level of 34 percent is suggested. For high phytate, unrefined cereal-based diets (molar ratio greater than 18), an absorption level of 25 percent is suggested.[12] Note that the level of absorption IZiNCG suggests for high phytate diets (25 percent) is considerably higher than the absorption level suggested by the WHO/FAO requirements document (15 percent).

[8] WHO/FAO 2004, page 265.
[9] IZiNCG 2004.
[10] 2004.
[11] 2007.
[12] IZiNCG 2004.

Appendix 7. Nutrient Intakes and Probability of Adequacy when Immediate Absorption is Assumed for Iron and Zinc [a]

Nutrient	Mean	SD	Median	EAR [b]	SD [b]	PA (Mean)	PA (Median)	Lambda (Box-Cox transformation) [c]
Energy	2,316	876	2,189					
Protein (All Sources) (% of kcal)	11	4	10					
Protein from animal sources (% of kcal)	3	4	2					
Total carbohydrate (% of kcal)	66	11	68					
Sugars (% of kcal)	13	10	11					
Total fat (% of kcal)	22	10	21					
Saturated fat (% of kcal)								
Thiamin (mg/d)	1.06	0.49	0.98	0.9	0.09	0.44	0.38	0.236
Riboflavin (mg/d)	0.78	0.46	0.67	0.9	0.09	0.13	0.00	0.033
Niacin (mg/d)	9.84	5.72	8.38	11	1.65	0.20	0.06	0.110
Vitamin B6 (mg/d)	1.57	0.86	1.35	1.1	0.11	0.60	0.65	0.106
Folate (µg/d)	255.79	185.31	201.55	320	32	0.12	0.00	0.170
Vitamin B12 (µg/d)	1.00	1.78	0.41	2.0	0.2	0.04	0.00	0.146
Vitamin C (mg/d)	85.65	98.92	53.24	30	3.0	0.68	0.99	0.182
Vitamin A (RE/d)	795.17	978.59	424.64	270	54	0.67	0.97	0.101
Calcium (mg/d)	544.21	432.93	410.61	[d]	[d]	0.31	0.25	0.062
Iron (mg/d)	24.72	15.03	21.40	See tables A6-2 & A6-3		0.73	0.85	0.106
Zinc (mg/d)	9.83	4.61	9.05	30% bioavail: 3.33	0.83	0.93	1.00	0.291
MPA across 11 micronutrients	0.44	0.18	0.42					

[a] Mean and median nutrient intakes are for first observation day; PA are based on estimated usual intake, calculated using repeat observations for a subset of the sample.
[b] EAR and SD are presented for the predominant physiological group, i.e., NPNL women (19-65 years). However, the sample also includes pregnant women (7.6 percent), lactating women (20.5 percent) and adolescent girls (2.3 percent). See table A6-1 for sources of data.
[c] This documents the transformation parameters selected for each nutrient. The power transformations result in approximately normal distributions.
[d] There is no EAR and no SD for calcium; 1000 mg is the AI.

Appendix 8. Comparison of Individual Intakes Assessed by 24-Hour Recall and Weighing Method

n = 133 women for whom all food consumptions were directly observed on Day 1

	Weighing Method		24h-Recall		Individual Differences (weighing minus recall)							T-test *
	mean	SD	mean	SD	mean	% **	SD	min	max	1st quartile	3rd quartile	p-value
Energy (kcal)	2,072.7	829.6	2,123.2	760.4	-50.5	-2.4	828.9	-2,165.0	4,050.3	-478.0	351.7	0.484
Protein (g)	53.9	26.2	56.1	24.0	-2.2	-4.1	26.5	-78.0	97.8	-11.9	7.5	0.339
Total carbohydrate (g)	345.9	150.5	349.7	131.3	-3.7	-1.1	151.5	-443.0	861.6	-79.4	61.5	0.776
Total fat (g)	51.1	30.4	54.2	38.0	-3.1	-6.0	34.2	-148.8	152.9	-15.5	14.1	0.304
Thiamin (mg)	0.9	0.5	1.0	0.5	-0.1	-5.6	0.4	-1.2	1.6	-0.2	0.1	
Riboflavin (mg)	0.6	0.5	0.7	0.4	0.0	-6.9	0.4	-1.1	2.6	-0.2	0.1	
Niacin (mg)	8.7	5.5	9.4	4.5	-0.6	-7.4	5.1	-22.0	26.1	-2.4	0.9	
Vitamin B6 (mg)	1.3	0.8	1.4	0.7	-0.1	-6.7	0.8	-2.6	5.7	0.4	0.2	
Folate (µg)	215.9	164.9	244.0	174.9	-28.1	-13.0	144.4	-592.7	781.0	-64.1	27.5	
Vitamin B12 (µg)	0.9	1.9	1.1	2.2	-0.1	-11.5	2.1	-17.0	12.1	-0.3	0.1	
Vitamin C (mg)	68.5	65.3	86.3	88.0	-17.8	-25.9	72.4	-326.4	156.2	-26.8	9.6	
Vitamin A (RE)	540.0	685.3	779.5	1,000.9	-239.5	-44.3	928.1	-6,559.9	3,165.8	-320.4	78.0	
Calcium (mg)	421.9	434.3	488.6	408.3	-66.7	-15.8	392.3	-2,092.8	2,061.7	-149.7	73.7	
Iron (mg)	20.4	18.0	22.4	15.0	-2.1	-10.2	14.7	-49.9	90.3	-5.8	1.4	
Zinc (mg)	8.8	4.4	8.8	3.9	0.0	-0.6	3.9	-11.6	20.8	-1.5	1.4	

* Paired t-test. A t-test requires that observations are randomly selected in a sample where the variable is normally distributed; this was not the case here, particularly for micronutrients. However, the distributions of energy and macronutrient values were not too far from normality and the investigators decided to perform the test. For micronutrients, distributions were too far from normality and variables should probably be transformed before a statistical comparison can be made.
** Percentage of change: 100 * (mean individual difference / mean weighing method)

Appendix 9. Food Composition Table

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Grains and Grain Products												
2	Biscuit, non sucré	3	400.643	13	6	72.9	2.4	0	0	20	1.2	1
11	couscous de sorgho blanc	70.767	110.6667	3.366667	0.8	25.06667	0.233333	2	0	5	1.36667	0.26667
14	Macaroni, bouilli	60	152.4649	4.7	0.9	31	0.2	0	0	8	0.6	0.58
15	Macaroni, séché	9	355.5847	11.9	1.3	73.1	0.5	0	0	25	1	1.4
18	Maïs, blanc, noyau entier, séché	12	366.5635	9.4	4.2	72	5	0	0	16	3.6	1.8
20	Maïs, farine blanche	12	352.9412	8	1	77	3	0	0	6	1.1	1.8
32	Riz, indigène, grain entier, écorcé, rouge	11.3	362.3006	7.4	2.2	77.3	0.7	0	0	38	2.8	2.1
367	Maïs, jaune, écrasé	11	332.7483	7.61	0.73	72.99	0.4	17.368	0	8	5.85	1.48
368	Maïs, blanc, écrasé	9.5	326.9993	8.78	0.22	71.51	0.17	1.002	0	4	0.9	0.43
369	Mil à chandelles, grain entier avec son	12	344.3915	9.5	4.9	64.9	1.6	0.501	0	11	7.5	2.9
370	Mil à chandelles, farin (sans son)	12	313.0674	7.96	3.16	62.49	2.11	0.501	0	13.5	5.8	2.9
372	Riz, blanc, poli	11	345.3489	6.1	0.46	78.2	0.01	0.668	0	8.13	0.37	1.26
374	Sorgho, farine	11	349.2713	10.37	1.7	72.2	0.37	0.167	0	12	5.8	2.14
375	Blé, farine, blanc	11.61	342.2458	10.3	1.5	70.97	0.4	0	0	13	4.54	1.07
1030	Couscous cuit nature	72.57	112	3.79	0.16	23.22	0.1	0	0	8	0.38	0.26
1050	bouillie de petit mil RHD (valeurs de la bouillie de petit mil fermentée)	93.39	26.93443	0.613408	0.346364	5.34088	1.316733	0	0.112863	0.87252	1.40132	0.15048
1204	bouillie de maïs	83.995	59.9508	1.3682	0.126	13.1424	0.072	3.126808	0	1.4403	1.0622	0.27
1219	brisure de mil bouillie	78.58	86.632	2.618	0.7616	17.136	0.952	0.79492	0	6.188	2.618	0
1281	Pain de blé	41.57	220.334	6.7447	0.9675	45.6306	0.2564	0.214094	0	11.243	2.9645	0.7371
3220	pop corn	3.32	387	12.94	4.54	77.9	0.87	14.863	0	7	3.19	3.08
3290	hamburger	46.14	258	13.07	10.07	28.79	5.22	4.843	0.3	74	2.53	2.06
9921	pain du ghana	27.81	289	11.75	1.83	56.44	2.56	0	0.2	44	3.63	0.93
All Other Starchy Staples												
44	Igname, tubercule, frais	69	118.7664	1.9	0.2	27	0	2.505	6	52	0.8	0.5
46	Manioc, sucré, séché	8.7	352.9888	1.3	0.5	84.8	2.2	14	72	121	1.9	0.7
50	Pomme de terre, crue	78	80.63825	1.7	0.1	18	1	2.004	21	13	1.1	0.3
152	Banane plantain, mûr, cru	65	137.1	1.2	0.3	32	7	65.13	20	8	0.6	0.14
1275	Pommes frites	70.604	144.7	1.5385	8.1905	16.29	0.905	1.81362	19.005	14.355	0.9955	0
1276	Pommes frites douces	62.459	181.8	1.448	8.281	25.34	2.715	5.289725	33.485	32.455	1.81	0
9025	patate pelée bouillie	47.31	80.6	1.7	0.1	18	1	1.7	13.65	11.05	0.935	0.49

(continued)

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Cooked Dry Beans and Peas												
68	Haricot á l'oeil noir, cosse mûre, sèchée	11	336.2	23	1.4	57	7	2.505	2	80	5	3.4
1040	lentilles, préparées	69.64	114.0	9.02	0.38	19.54	1.8	0.835	1.5	19	3.33	1.27
9934	petits pois, conserve	81.7	69.0	4.42	0.35	12.58	4.16	53.44	9.6	20	0.95	0.71
Nuts and Seeds												
53	Cajou	2	602.4	15.3	46.4	32.5	5.01	0	0	45	6	5.6
55	Arachide grillée, salée, écorcée	7	570.6	23	45	20	3.8	0	1	49	3.8	3.3
56	Arachide, fraiche, écorcée	22.3	545.6	13.5	48.5	15.7	2.4	0.2505	0	30	3.9	2.1
57	Arachide, séchée, entier, écorcé	7	570.6	23	45	20	3.8	0	1	49	3.8	3.3
60	Datou (kenaf / kando), graine, fermentée	10.5	346.5	21.4	20.3	20	0.043373	36.37952	3.253012	320	4.09032	0.58433
78	Pate d'arachide	7.2	583.9	25	47.2	16.5	3.8	0	0	61	6	3.3
82	Sésame, graine, entière, séchée	5.8	571.0	17.9	48.4	17.8	0.3	5.01	0	816	8.1	7.75
236	Graine d'Oseille de Guinée(datou)rouge,séchée	7	388.0	16.8	17.8	40.3	0.043373	36.37952	3.253012	373	4.2	0.6
371	Farine d'arachide, avec graisse	4.3	551.3	26.64	46.6	8.11	3.22	0	0	41	6.1	3.99
380	Soumbala; néré, graine, fermentée;	17.2	412.4	30.58	32.25	1.1	0.04	33.6171	3	415.6	69.6	5.05
9936	graines de coton, séchées, poudre	6.3	359.0	40.96	6.2	40.54	0	44	2.4	478	12.66	11.69
9947	pistache	1.99	571.0	21.35	45.97	27.65	7.81	26.219	2.3	110	4.2	2.3
Vitamin A-Rich Deep Yellow/Orange/Red Vegetables												
154	Carotte, crue	89	37.7	0.9	0.1	8.2	8.2	1002	8	35	0.7	0.3
193	Piment, seché	10.2	335.1	13.8	14	38.5	1.1	177.02	180	130	7.8	2.5
265	Epices	8.46	305.8	6.09	8.69	50.52	1.1	4161	76	661	7	1.01
279	Tomate concentré	72	96.5	4.5	0.2	18.9	12.6	210.42	4	27	3.5	0.7
381	Courge, vapeur	86.9	16.8	0.75	0.09	3.2	3.2	640.779	6.5	27	0.5	0.7
394	Tomates, séché, poudre	3	291.7	12.91	0.44	58.18	0	862	116.7	166	4.56	1.71
Vitamin A-Rich Dark Green Leafy Vegetables												
164	Epinard, cru	92	21.9	2.6	0.6	1.5	0.4	551.1	54	130	4.5	1.1
200	Salade, cru	94	22.8	1.2	0.2	4	3.7	325.65	10	26	0.7	0.3
207	Feuille d'amarante, crue	84	48.7	4.6	0.2	7	0	384.1	50	410	8.9	0.5
211	Feuille d'haricot, sechée	10	275.0	28	1.8	36	7.8	601.2	461.25	1500	35	4.5
214	Feuille d'oignon, séchée	4.6	272.3	13.8	4.9	42.8	0.2	172.01	18	2070	43	9.2
216	Feuille de baobab, crue	77	70.7	3.8	0.3	13	0	519	52	400	1.1	0.4
223	Feuille de jute, crue	80.4	63.0	4.5	0.3	10.4	0	1070.47	80	360	7.2	0.4
227	Feuilles, vertes foncé, crue	80	61.3	4.5	0.3	10	0	551.1	80	360	7.2	0.4
228	Feuilles, medium vert, crue	92	25.2	1.8	0.2	4	0	225.45	41	76	1.8	0.4

(continued)

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Vitamin A-Rich Dark Green Leafy Vegetables (continued)												
239	Feuille laurier, séchée	5.4	301.5	7.6	8.4	48.6	0.4	619.57	0	830	43	3.7
377	Feuille de baobab, séchée	7.3	139.1	16.59	4.07	8.9	4.3	974.278	1.76	2363	66.74	1.88
378	Feuille de fakouhoye, séchée	7.3	185.6	22.72	2.77	17.09	6.33	1886.265	2.97	1416	58.4	2.82
382	Feuille d'oignon, crue	91	26.8	1.87	0.35	4	0.16	1147.457	41	557	4.1	0.16
383	Feuille d'haricot, crue	86.2	44.3	4.0625	0.4	6	0	858.714	25	1130	5.29	0.48
2151	feuilles d'oseille sèches	--	306.6	30.65714	1.657143	60.48571	0	4300.286	273.4286	1748.286	25.6857	3.31429
2152	oseille, feuilles,fraiche	88.8	37.0	3.7	0.2	7.3	0	519	33	211	3.1	0.4
2651	persil, frais	88.8	37.0	3.7	0.2	7.3	0	519	33	211	3.1	0.4
9939	poireau, frais	83	61.0	1.5	0.3	14.15	3.9	167	12	59	2.1	0.12
Vitamin C-Rich Vegetables												
65	Haricot, vert, bouilli	82	52.5	4.4	0.4	7.7	3.6	66.8	10	20	1	0.7
150	Aubergine, indigène, crue	89	40.8	1.4	1	6.5	0.5	13	20	13	0.2	0.1
151	Avocat, crue	80	120.0	1.4	11	4.3	3	66.8	18	19	1.4	0.4
155	Chou, cru	90	27.6	1.4	0.1	5.2	5.1	11.022	54	47	0.3	0.2
159	Concombre, cru	95	16.3	0.8	0.1	3	2.6	0	14	13	0.5	0.25994
170	Gombo, cosse cru	89	38.6	2.1	0.2	7	0.3	31.73	47	84	1.2	0.4
183	Oignon, échalote, cru	88	40.6	1.2	0.1	8.6	7	0	11	27	0.8	0.2
191	Piment, doux, vert, cru	86	47.5	2	0.8	8	7.7	121.91	140	29	2.6	0.4
192	Piment, fort, cru	87.4	43.0	1.1	0.1	9.3	1.1	55.11	40	5	1.2	0.1
201	Tomates, crues	94	22.0	1	0.2	4	3	63.46	26	10	0.6	0.1
209	Feuille d'haricot á l'oeil noir, crue	85	46.0	4.7	0.3	6	1.3	116.9	56	255	5.7	0.4
226	Feuilles, vertes claire, crue	91	28.0	1.7	0.1	5	4.8	12.525	54	47	0.7	0.4
230	Fleur de kapok, séchée	6.8	295.3	4.9	1.4	65	1.1	91	14	1760	13.3	2.5
241	Menthe frais	84.9	43.0	3.8	0.7	5.3	5.3	123.58	31	210	9.5	0.9
247	Oignon et feuille d'oignon, non mûrs	92.9	21.9	1.3	0.1	3.9	0.4	96	17	90	0.7	0.2
651	haricot vert cru	--	35.0	1.9	0.3	7.9	0.3	67	10	46	1.3	0.4
2011	tomate bien mûre crue	94.5	18.0	0.88	0.2	3.92	2.63	74.983	12.7	10	0.27	0.17
2012	tomate verte/peu mûre	93	23.0	1.2	0.2	5.1	4	57.782	23.4	13	0.51	0.07
9010	chou préparé	92.57	20.5	1.0402	0.0743	3.8636	3.7893	7.76435	28.0854	34.921	0.2229	0.1486
All Other Vegetables												
38	Betterave, crue	86.7	46.2	1.9	0.1	9.3	1.3	3.34	2	16	0.9	0.4
149	Aubergine, crue	90	31.7	1	0.2	6.4	6	2.839	9	14	1.3	0.2
225	Feuille de tamarin, séchée	3.9	309.7	14	3.9	54	0	0	2.59	326	91	2.7
379	Gombo, cosse, séché, poudre	6.7	163.8	14.54	1.62	22.4	12.3	48.597	0.44	697.75	78.18	4.75
393	Céleri, cru	94.6	12.2	0.75	0.14	1.95	1.83	6.68	7	40	0.4	0.13
1591	courgette	--	16.0	0.7	0.2	3.4	0.2	23	5	22	0.3	0.3

(continued)

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Vitamin A-Rich Fruits												
180	Mangue, mûre, crue, épluchée	83	64.9	0.6	0.2	15	13	400.8	42	11.6	1.2	0.1
243	Néré, arbre à farine, fruit	13.2	290.6	3.4	0.4	67.5	3.6	405.81	242	124	3.6	0.6
Red Palm Oil and Nut												
252	Huile de palme rouge	1	872.4	0	99	0	0	2004	0	6	0	0
9006	graine de palme	72.5	203.0	0.6	20.2	6.7	2.1	1002	4	3	0.2	0.1
9901	extraction par l'eau de "farine" de palme	90.833	67.7	0.2	6.733333	2.233333	0.7	334	1.333333	1	0.06667	0.03333
Vitamin C-Rich Fruits												
75	Noix de cola, crue	62.9	143.2	2.2	0.4	32.3	10.6	4.175	54	58	2	0.6
77	Pain de singe, graine, séchée	7.8	469.3	30	29.6	21.5	0.6	0	210	263	13.9	0.3
81	Prune noire, pulpe, cru	70.6	112.0	0.7	0.4	26.1	6	10	9	34	2.7	0.1
148	Ananas, frais	87	53.1	0.4	0.1	12.5	12	11.69	34	16	0.4	0.1
153	Banane, mûre, crue	77	87.9	1.5	0.1	20	17	15.03	9	9	0.05	0.2
157	Citron, lime, cru	90	41.9	0.6	0.8	8	5	1.336	45	19	0.7	0.1
167	Finsan	69.2	208.6	5	20	3	3	92.685	26	40	2.7	0.1
175	Jus d'orange, en conserve	88.8	39.8	0.7	0.15	8.8	8.8	7.515	39	10	0.24	0.05
176	Jus d'orange, frais, nonsucré	89.3	38.2	0.7	0.2	8.3	8.3	11.69	44	17	0.4	0.04
177	Jus de citron, en conserve	92.5	14.4	0.4	0.3	2.5	0.3	1.503	20	11	0.13	0.06
178	Jus de citron, frais	90.8	17.1	0.4	0.1	3.6	3.6	2.004	37	7	0.14	0.05
179	Mandarine, orange, cru	88	46.4	0.6	0.08	10	9	38.41	46	28	0.1	0.1
181	Mangue, non mûre, crue, épluchée	84	59.6	0.5	0.1	14	6	10.02	86	7	1.4	0.1
194	Pomme d'cajou, crue	86.2	51.0	0.9	0.5	10.6	1	82.498	218	8	1.2	0.2
199	Saba, fruit, cru	21.67	264.3	1.03	1.31	61.4	6	0	48	51	1	0.1
203	Baobab pulpe, pain de singe	16	299.0	2.2	0.8	69.9	0.6	11.69	270	284	7.4	0.3
231	Fruit d'Oseille de Guinée (dâh), rouge, cru	84.5	50.3	1.9	0.1	10.3	0	50.1	14	172	2.9	0.4
234	Fruit de tamarin, séché	21	236.1	5	0.6	52	7	7.515	9	165	2.2	0.3
9930	jus d'ananas	86.37	53.0	0.36	0.12	12.87	9.98	0.501	10	13	0.31	0.11
9935	melon, blanc	91.85	28.0	1.11	0.1	6.58	5.69	0	21.8	11	0.34	0.07
All Other Fruits												
74	Noix de coco, noyau mûr, frais	43	386.6	3.6	39	7	7	2.171	2	21	2.5	1.1828
163	Dattes, séchées	17.3	271.7	2.7	0.6	63.1	63.1	5.01	0	69	2.7	0.4
195	Pomme, crue	86	42.6	0.3	0.1	10	9.9	1.837	1	5	0.1	0
235	Fruit de tamarin, très sec	5	305.4	8.2	2.4	62	0	0	3	244	3	2.3
399	Dattes, crues	20.53	282.0	2.45	0.39	75.03	63.35	1.002	0.4	39	1.02	0.29
9929	olive verte	75.28	145.0	1.03	15.32	3.84	0.54	38.577	0	52	0.49	0.04

(continued)

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Eggs												
137	Oeuf de poule, cru	75	140.7	12	10	1	0	152	0	45	2	1.4
3170	Oeuf dur	74.62	142.9	12.1824	10.152	1.0152	0	203.04	0	45.684	2.0304	1.42128
Milk and Yogurt												
125	Lait concentré sucré	32.2	297.0	8.1	5.4	53.5	53.5	62	1	262	0	0.9
132	Lait entier frais, vache,	85	77.9	3.8	4.8	5	5	40.36	1	145	0	0.4
1288	Café avec sucre et lait	84.326	68.0	1.752	1.7425	11.2531	10.7188	0	1.86	59.577	0.6772	0.2842
1446	Café au lait concentré	77.229	99.3	2.7217	1.7992	17.8977	17.8155	0	0.333	87.528	0.0088	0.0008
1481	Lait, reconstitué de poudre, Nido	86.024	68.4	2.7756	3.024	7.5392	7.5392	0	3.24	100.475	1.08	0.486
3190	yaourt, fan (sucré)	87.9	61.0	3.47	3.25	4.66	4.66	27.835	0.5	121	0.05	0.59
9004	lait en poudre	2.47	496.0	26.32	26.71	38.42	38.42	260.181	8.6	912	0.47	3.34
Cheese												
9026	fromage vache qui rit (fromage fondu)	53.75	349.0	7.55	34.87	2.66	0.2	373.863	0	80	1.2	0.54
Chicken, Duck, Turkey, Pigeon, Guinea Hen, Game Birds												
139	Poulet, cru	72	138.2	20	6.5	0	0	85.02	0	10	1.1	1.1
1212	poulet télévisé, cuit	60.11	197.0	28.49286	9.260179	0	0	90.82098	0	13.53411	1.4104	1.56711
Beef, Pork, Veal, Lamb, Goat, Game Meat												
134	Boeuf estomac, cru	72	108.0	15.8	5	0	0	0	3	8	4	0.7
136	Lapin, cru	73	124.3	22	4	0	0	10	0	13	1.8	1.7
140	Viande de boeuf, très maigre, crue	74.6	116.9	20.6	3.8	0	0	0	0	22	4.6	2.3
141	Viande de boeuf, séchée, salée, crue	29.4	237.5	55.4	1.5	0	0	0	0	49	4.9	5
142	Viande de boeuf, un peu grasse, crue	63	231.5	18	18	0	0	0	0	11	3.6	2.7
143	Viande de chèvre, un peu grasse, crue	68	169.8	18	11	0	0	0	0	11	2.3	4
144	Viande de mouton, seché, salé, crue	31	446.7	29.8	37	0	0	17	0	16	2.4	5
145	Viande de mouton, un peu grasse, crue	61	253.9	17	21	0	0	10	0	10	2	2.3
146	Viande de porc, un peu grasse, crue	46	401.0	12	40	0	0	0	0	11	1.8	1.6
1201	boyaux préparés	81.65	108.0	15.8	5	0	0	0	2.4	8	3.8	0.7
1202	porc au four	55.04	401.0	12	40	0	0	0	0.3	8.25	1.44	1.6
3152	boeuf, brochette	58.64	258.8	20.12108	20.12108	0	0	20.81973	0	12.29622	3.82301	0

(continued)

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Beef, Pork, Veal, Lamb, Goat, Game Meat (continued)												
9012	viande de mouton préparée	54	299.4	20.05128	24.76923	0	0	9.435897	0	11.79487	2.35897	2.71282
9015	viande de boeuf préparée	58.64	258.8	20.12108	20.12108	0	0	22.20771	0	12.29622	4.02422	0
9017	viande de chèvre préparée	68.21	169.8	18	11	0	0	0	0	11	2.3	4
9023	boyaux de boeuf	81.65	108.0	15.8	5	0	0	0	2.4	8	3.8	0.7
9903	saucisson de boeuf	52.3	311.0	16.37	25.39	3.05	0	0	0	18	1.4	2.1
9913	peau de boeuf, cuite	0	889.0	0	98.59	0	0	0	0	0	0	0
9937	corned beef	52.5	308.0	14.4	26.2	2.9	0	0	0	11	2.32	2.53
9942	merguez	49.78	339.0	19.43	28.36	0	0	12	0.7	13	1.36	2.08
Organ Meat												
389	Mouton foie, cru	71.3	133.5	20.3	5	1.8	0	7390	4	7	7.37	4.66
1203	foie braisé	56.2	209.8	30.8167	7.013969	5.745486	5.745486	13533.42	20.89267	10.44634	11.4622	6.46181
Small Fish Eaten Whole with Bones												
88	Capitaine, perche de Nil, séché	12.2	401.5	70	13.4	0	0	0	0	170	1.4	1.7
119	Silure; poisson-chat, fumé et séché	11.5	384.7	77.6	8	0	0	0	0	41	1.4	1.7
120	Silure; poisson-chat, séché, entier	20.6	308.5	62.5	6.3	0	0	0	0	1370	3.6	1
Large Whole Fish/Dried Fish/Shellfish and Other Seafood												
84	Carpe d'Afrique, bouillie *	79.2	80.8	16.9375	1.39	0	0	2.8	1.3	190	0.83	1.28
85	Carpe d'Afrique, crue*	81.3	68.2	15.6875	0.53	0	0	7	2	42	1.3	1.5
86	Capitaine de mer, cru*	78.3	82.8	19.8	0.3	0	0	7	1	177	0.2	0.3
105	Poisson, bouilli, maigre*	77.113	94.6	18.1562	2.3938	0	0	10	0.65	127.7	1.235	0.9
108	Poisson, fumé	5.8	378.1	76.0417	7.9667	0	0	35	0	1019	16.7267	3.6567
117	Sardines à huile, conserve#	53	283.1	24	21.1	0	0	115.672	0	191	2.8	2
121	Carpe, bouillie *	78.6	86.1	17.625	1.67	0	0	3.3	0.65	81.6	1.68	0.76
1051	poisson frais synchar	88.1	53.0	11.4	0.5	0	0	7	1	7	0.3	0.3
1277	Poisson frit	48.754	369.6	10.3831	37.185	0	0	0	0	4.255	0	0
9932	thon, conserve	74.51	116.0	25.51	0.82	0	0	17	0	11	1.53	0.77
9933	oeufs de poisson frits	58.63	204.0	28.62	8.23	1.92	0.12	91	16.4	28	0.77	1.28
9949	gambas, cuite	52.86	242.0	21.39	12.28	11.47	0	64	1.5	67	1.26	1.38

(continued)

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Other												
147	Ail	64	135.2	7.9	0.6	24.2	1.6	0	17	19	1.9	1
168	Gingembre, racine, frais	80.9	67.0	2.3	0.9	12.3	1.538133	6.68	6	20	2.6	0.30763
249	Beurre de karité	0	880.3	0	99.9	0	0	0	0	0	0	0
250	Huile d'arachide (b)	0	881.2	0	100	0	0	0	0	0	0	0
251	Huile de coton (b)	0	881.2	0	100	0	0	0	0	0	0.03	0.01
254	Huile de soja	0	880.3	0	99.9	0	0	0	0	0	0.1	0
255	Miel	19.2	323.1	0.4	0	79.4	79.4	0	0	11	0.6	0.2
257	Sucre	0	404.9	0	0	100	100	0	0	1	0	0
258	Bière Europeenne, 4.4 vol%	91	38.7	0.4	0	3.2	0.4	0	0	3	0	0
259	Bonbon	3	393.5	3	0	94.2	78	0	0	89	1.1	0.1
261	Chewing gum	3	376.9	0.4	0	92.7	81	0	0	1152	7.4	0.1
262	Cube maggi/Jumbo	3.3	170.5	17.3	4	16.1	15	15	0	60	2.23	0.21
264	Eau	100	0.0	0	0	0	0	0	0	0	0	0
267	Levure, sec	5	278.4	35.6	1.5	29.9	0	0	0	80	20	8
268	Mayonnaise, 80% graisse	16	719.9	1.2	80	2.5	0	43.503	0	10	0.5	0.1
269	Nescafé, sec	3.1	220.2	12.2	0.5	41.1	0	0	0	141	4.4	0.35
270	Poivre noir	10.5	228.3	10.9	3.3	38.3	38.3	19.038	21	437	28.9	1.4
272	Potassium, liquide	99.9	0.0	0	0	0	0	0	0	2.8	0	0.004
273	Potassium, solide (de maïs)	8.6	2.1	0.513	0	0	0	0	0	38	0	0.26
277	Sucrerie, cola, fanta	90	40.5	0	0	10	10	0	0	0	0	0
278	Thé noir, lipton sans sucre	100	1.2	0.3	0	0	0	0	0	0	0	0
280	sauce Maggi	0	350.2	86.5	0	0	0	30	0	60	2.23	0.21
281	Vinaigre	93.8	23.9	0	0	5.9	0	0	0	6	6	0
396	Anis graine	9.54	354.8	17.6	15.9	35.42	0	15.531	21	646	36.96	5.3
398	Moutarde	6	110.3	6.4	0.3	20.2	14.5	0	0	95	1.8	1
401	Sel sans iode	1	2.0	0	0	0.5	0	0	0	10	0.3	0.1
402	Café sans sucre et sans lait	99	2.0	0.1	0	0.4	0	0	0	3	0	0
1287	Café avec sucre	83.034	66.8	0.1342	0.0055	16.3521	15.9	0	0	1.71	0.0484	0.0044
1290	Oseille de Guiné bouilli + sucre	85.985	55.1	0.247	0.013	13.339	12	6.513	1.82	22.48	0.377	0
1291	Gingembre + sucre	82.635	69.7	0.1403	0.0549	16.9503	16.2	0.40748	0.366	1.382	0.1586	0
1294	Jus de tamarin + sucre	68.569	122.0	0.286	0.0286	29.7726	28.6	0	1.144	8.866	0	0
1295	Thé vert avec sucre	82.4	71.4	0.024	0	17.6	17.6	0	0	0.176	0	0
1297	Boisson du pain de singe, d'eau + sucre	66.653	126.0	0.4835	0.1758	30.2478	14.8851	2.569228	59.3407	62.5664	1.6264	0
3070	biscuits emballés	26.7	365.0	6.2	16.5	48.5	3.48	0	0	49	3.3	0.48
3231	caramel avec lait et sucre	0.55	560.0	1.07	32.75	64.72	63.47	324.688	0.2	34	0.03	0.12

(continued)

FOOD		NUTRIENT CONTENT										
Code of Food	Name in French	Water (g)	Energy (kcal)	Protein (g)	Fat (g)	Carbohy-drates (g)	Sugar (g)	Vitamin A (RE)	Vitamin C (mg)	Calcium (mg)	Iron (mg)	Zinc (mg)
Other (continued)												
4060	jus de fruit industriel, indéfini	86.2	54.0	0.2	0	13.41	9.36	1.169	15	2	0.11	0.02
4080	dolo	96	41.0	0.3	0	3.7	0	0	0	5	0	0
4100	vin, sangria	86.58	83.0	0.07	0	2.72	0.79	0	0	8	0.37	0.13
9908	beurre indéfini/margarine	18.5	714.0	0.5	80.3	0.5	0	869.87	0.1	17	0	0
9911	graisse de mouton	0	902.0	0	100	0	0	0	0	0	0	0
9912	beurre de lait	17.94	717.0	0.85	81.11	0.06	0.06	697.386	0	24	0.02	0.09
9923	levure chimique	5	53.0	0	0	27.7	0	0	0	5876	11.02	0.01
9931	chocolat en poudre sucré	0.9	405.0	3.3	3.1	90.9	83.88	0	0.7	37	3.14	1.55
9938	Aloe Vera	88.9	40.0	0.9	0.2	9.3	2.3	2.5	8.5	24	0.46	0.18
9941	huile d'olive	0	884.0	0	100	0	0	0	0	1	0.56	0
9951	huile de palme	0	862.0	0	100	0	0	0	0	0	0	0

Appendix 10. References for Nutrient Values in Food Composition Table

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Grains and Grain Products									
2	Biscuit, non sucré	Mali	2	Biscuit, non sucré	NA	10	14.0	57.2	25.7
11	couscous de sorgho blanc	World-food	1013	SORGHUM, COUSCOUS, RAW	YIELD factors	1	170.0	170.0	170.0
14	Macaroni, bouilli	Mali	14	Macaroni, bouilli	sugar and zinc = TACAM ref 15 ("macaronis secs") + adjustment on dry matter	68	1.0	1086.2	162.9
15	Macaroni, séché	Mali	15	Macaroni, séché	NA	79	0.5	314.5	30.4
18	Maïs, blanc, noyau entier, séché	Mali	18	Maïs, blanc, noyau entier, séché	folate and zinc = FCT Sénégal Worldfood : ref 1080 (MAIZE, WHOLE KERNEL, DRIED) + no adjustment on dry matter (not given in Worldfood)	2	0.5	69.2	34.8
20	Maïs, farine blanche	Mali	20	Maïs, farine blanche	folate and zinc = FCT Sénégal Worldfood : ref 1082 (MAIZE, FLOUR) + no adjustment on dry matter (not given in Worldfood)	713	0.3	640.1	117.1
32	Riz, indigène, grain entier, écorcé, rouge	Mali	32	Riz, indigène, grain entier, écorcé, rouge	sugar, riboflavin, vit B6, folate, vit C and zinc = FCT Sénégal Worldfood : ref 1064 (RICE, RED NATIVE) + no adjustment on dry matter (not given in Worldfood)	1	101.1	101.1	101.1
367	Maïs, jaune, écrasé	Mali	367	Maïs, jaune, écrasé	vit B6 & folate = FCT Sénégal Worldfood : ref 1082 (MAIZE, FLOUR) + no adjustment on dry matter (not given in Worldfood)	102	7.5	429.4	151.1
368	Maïs, blanc, écrasé	Mali	368	Maïs, blanc, écrasé	vit B6 & folate = FCT Sénégal Worldfood : ref 1080 (MAIZE, WHOLE KERNEL, DRIED) + no adjustment on dry matter (not given in Worldfood)	5	20.6	677.8	200.4
369	Mil à chandelles, grain entier avec son	Mali	369	Mil à chandelles, grain entier avec son	vit B6 & folate = FCT Sénégal Worldfood : ref 1005 (MILLET, WHOLE GRAIN) + no adjustment on dry matter (not given in Worldfood)	25	4.2	236.6	71.6
370	Mil à chandelles, farin (sans son)	Mali	370	Mil à chandelles, farin (sans son)	vit B6 & folate = FCT Sénégal Worldfood : ref 1008 (MILLET, FLOUR) + no adjustment on dry matter (not given in Worldfood)	301	1.0	529.0	78.6

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Grains and Grain Products (continued)									
370	Mil à chandelles, farin (sans son)	Mali	370	Mil à chandelles, farin (sans son)	vit B6 & folate = FCT Sénégal Worldfood : ref 1008 (MILLET, FLOUR) + no adjustment on dry matter (not given in Worldfood)	301	1.0	529.0	78.6
372	Riz, blanc, poli	Mali	372	Riz, blanc, poli	vit B6 & folate = FCT Sénégal Worldfood : ref 1060 et 1061(RICE, MILLED AND POLISHED and RICE, BROKEN INDUSTRIAL) + no adjustment on dry matter (not given in Worldfood)	1136	0.3	785.4	113.2
374	Sorgho, farine	Mali	374	Sorgho, farine	vit B6 & folate = FCT Sénégal Worldfood : ref 1002 (SORGHUM, FLOUR, RED) + no adjustment on dry matter (not given in Worldfood)	35	17.4	350.8	135.9
375	Blé, farine, blanc	Mali	375	Blé, farine, blanc	folate = FCT Sénégal Worldfood : ref 1100 (WHEAT, FLOUR, 72% EXTRACTION) + no adjustment on dry matter (not given in Worldfood). Vitamin A = adjustment of beta-caroten according to Doets	92	1.2	464.1	71.5
1030	Couscous cuit nature	USDA	20029	"'COUSCOUS, COOKED"	NA	6	66.4	631.0	322.6
1050	bouillie de petit mil RHD (valeurs de la bouillie de petit mil fermentée)	local infor-mation	NA	bouille de petit mil	Nutrient values are from local studies by IRD-UR106 on fermented millet gruels consumed in Ouagadougou except sugar, vit A, thiamin, riboflavin, vit B6, vit B12, niacin, folate, vit C, zinc that are from FCT Mali : vmean values for references 1203, 1403, 2008 ("bouillie de mil avec gruau")+adjustment on known dry matter of gruels in Ouagadougou	241	29.8	1717.6	513.0
1204	bouillie de maïs	Mali	1204	bouillie de maïs	Kayes' gruel chosen rather than Bamako's according to value of water content	17	14.5	765.1	346.0
1219	brisure de mil bouillie	Mali	1219	brisure de mil bouillie	NA	8	4.0	250.8	113.2
1281	Pain de blé	Mali	1281	Pain de blé	NA	328	8.3	207.9	61.8
3220	pop corn	USDA	19034	"'POPCORN,AIR-POPPED"	NA	2	20.0	22.0	21.0

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Grains and Grain Products (continued)									
3290	hamburger	USDA	21108	"FAST FOODS, HAMBURGER; SINGLE, REG PATTY; W/ CONDMNT"	NA	1	207.0	207.0	207.0
9921	pain du ghana	USDA	18029	BREAD, FRENCH OR VIENNA (INCLUDES SOURDOUGH)	NA	7	25.0	90.0	48.2
All Other Starchy Staples									
44	Igname, tubercule, frais	Mali	44	Igname, tubercule, frais	vit B6, folate and zinc = FCT Sénégal Worldfood : ref 1229 (YAM) + no adjustment on dry matter (not given in Worldfood)	32	39.2	1594.0	506.1
46	Manioc, sucré, séché	Mali	46	Manioc, sucré, séché	sugar, vit A, thiamin, riboflavin, vit B6, niacin, folate, vit C, iron, zinc = FCT Sénégal Worldfood : ref 1202 (CASSAVA, ROOT, DRIED MEAL). Vit A recalculated from retinol and beta-carotene. No adjustment on dry matter (not given in Worldfood)	62	9.5	301.7	111.7
50	Pomme de terre, crue	Mali	50	Pomme de terre, crue	zinc = FCT Sénégal Worldfood : ref 1251 (POTATO, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	23	3.9	657.2	194.2
152	Banane plantain, mûr, cru	Mali	152	Banane plantain, mûr, cru	NA	25	12.9	430.0	177.3
1275	Pommes frites	Mali	1275	Pommes frites	NA	8	36.0	323.0	198.2
1276	Pommes frites douces	Mali	1276	Pommes frites douces	NA	7	100.0	214.3	157.1
9025	patate pelée bouillie	Mixed	x	x	TACAM ref 50 "Pomme de terre, crue" + adjustment of water content on USDA 20 ref 11364 "POTATOES,BKD,SKN,WO/SALT" + retention factor ref 501 "LEGUMES,CKD 15/20MIN,BOILED,DRAINED"	2	11.8	57.4	34.6
44	Igname, tubercule, frais	Mali	44	Igname, tubercule, frais	vit B6, folate and zinc = FCT Sénégal Worldfood : ref 1229 (YAM) + no adjustment on dry matter (not given in Worldfood)	32	39.2	1594.0	506.1

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Cooked Dry Beans and Seeds									
68	Haricot á l'oeil noir, cosse mûre, sèchée	Mali	68	Haricot á l'oeil noir, cosse mûre, sèchée	Zinc = FCT Sénégal Worldfood : ref 1331 (COWPEA, WHOLE DRIED) + no adjustment on dry matter (not given in Worldfood)	239	2.7	455.2	88.2
1040	lentilles, préparées	USDA	16370	"'LENTILS,MATURE SEEDS,CKD,BLD,W /SALT"	NA	5	29.3	128.3	86.3
9934	petits pois, conserve	USDA	11813	PEAS,GRN,CND,N O SALT,DRND SOL	NA	1	23.4	23.4	23.4
Nuts and Seeds									
53	Cajou	Mali	53	Cajou	sugar, vit A, vit B6, folate, zinc = USDA20 code 12085 ('CASHEW NUTS, DRY RSTD, WO/SALT) + no adjustment on dry matter because same moisture (2 in TACAM, 1.7 in USDA)	1	88.4	88.4	88.4
55	Arachide grillée, salée, écorcée	Mali	55	Arachide grillée, salée, écorcée	sugar, vit B6 and zinc = FCT Sénégal Worldfood : ref 1304 (PEANUT, ROASTED, SHELLED) + no adjustment on dry matter (not given in Worldfood). Vitamin A = adjustment of beta-caroten according to Doets	14	3.6	50.0	20.8
56	Arachide, fraiche, écorcée	Mali	56	Arachide, fraiche, écorcée	sugar, vit B6 and zinc = FCT Sénégal Worldfood : ref 1300 (PEANUT, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	133	0.5	83.8	19.4
57	Arachide, séchée, entier, écorcé	Mali	57	Arachide, séchée, entier, écorcé	sugar and zinc = FCT Sénégal Worldfood : ref 1302 (PEANUT, DRIED, SHELLED) + no adjustment on dry matter (not given in Worldfood). Vitamin A = adjustment of beta-carotene according to Doets	15	6.0	270.2	42.8
60	Datou (kenaf / kando), graine, fermentée	Mali	60	Datou (kenaf / kando), graine, fermentée	for iron, zinc, niacin, riboflavin =TACAM: values for ref 236 (Datou séché) adjusted for dry matter. For sugar, vit A, vit B6, folate, vit C, =TACAM: values for ref 380 ('Soumbala; néré, graine, fermentée;)	28	0.3	53.6	8.2

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Nuts and Seeds (continued)									
78	Pate d'arachide	Mali	78	Pate d'arachide	sugar, vit A, vit B6, folate, vit C, zinc = FCT Sénégal Worldfood : ref 1305 (PEANUT, PATE) + no adjustment on dry matter (not given in Worldfood)	522	0.5	200.5	25.4
82	Sésame, graine, entière, séchée	Mali	82	Sésame, graine, entière, séchée	sugar, vit B6, folate, vit C, zinc = USDA20 code 12023 ('SESAME SEEDS, WHOLE, DRIED). No adjustment on dry matter because same moisture (5,8 for food and 4,69 for USDA food)	4	48.8	60.0	55.7
236	Graine d'Oseille de Guinée(datou)rouge, séchée	Mali	236	Graine d'Oseille de Guinée(datou)rouge, séchée	sugar, vit A, vit B6, folate, vit C= TACAM : value for ref 380 ('Soumbala; néré, graine, fermentée;). Adjusted to dry matter of reference 60 ('Datou (kenaf / kando), graine, fermentée)	2	2.3	2.4	2.3
371	Farine d'arachide, avec graisse	Mali	371	Farine d'arachide, avec graisse	vit B6, vit C & folate = FCT Sénégal Worldfood : ref 1305 (PEANUT, PATE) + no adjustment on dry matter (not given in Worldfood). Vitamin A = adjustment of beta-carotene according to Doets	87	0.7	40.3	10.7
380	Soumbala; néré, graine, fermentée;	Mali	380	Soumbala; néré, graine, fermentée;	vit B6, vit C & folate = FCT Sénégal Worldfood : ref 1340 (AFRICAN LOCUST BEAN, FERMENTED, DRIED) + no adjustment on dry matter (not given in Worldfood)	708	0.0	51.6	2.5
9936	graines de coton, séchées, poudre	USDA	12007	COTTONSEED FLR, PART DEFATTED (GLANDLESS)	for sugar, TACAM ref 64 (graine de soja séché)	2	11.8	21.0	16.4
9947	pistache	USDA	12152	PISTACHIO NUTS, DRY RSTD, WO/SALT	NA	4	1.5	9.8	6.6

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Minimum Intake	Maximum Intake	Mean Intake
Vitamin A-Rich Deep Yellow/Orange/Red Vegetables									
154	Carotte, crue	Mali	154	Carotte, crue	NA	100	0.4	76.5	11.7
193	Piment, seché	Mali	193	Piment, seché	sugar, vit B6, folate, fer, zinc = FCT Sénégal Worldfood : ref 1701(PEPPER, RED OR HOT, DRIED) + no adjustment on dry matter (not given in Worldfood)	29	0.1	9.7	1.3
265	Epices	Mali	265	Epices	sugar, vit A, vit C = FCT Sénégal Worldfood : ref 1703 (PEPPER, SPICE, DRIED). Vit A recalculated from retinol and beta-carotene. No adjustment on dry matter (not given in Worldfood)	26	0.2	2.1	0.9
279	Tomate concentré	Mali	279	Tomate concentré	NA	1092	0.0	31.8	3.7
381	Courge, vapeur	Mali	381	Courge, vapeur	vit B6, vit C & folate = FCT Sénégal Worldfood : ref 1544 (SQUASH, DEEP YELLOW, FRUIT) + retention factors + no adjustment on dry matter (not given in Worldfood)	1	2.7	2.7	2.7
394	Tomates, séché, poudre	Mali	394	Tomates, séché, poudre	sugar =FCT Sénégal Worldfood : ref 1763 (TOMATO, POWDERED) + no adjustment on dry matter (not given in Worldfood)	104	0.0	0.8	0.2
Vitamin A-Rich Dark Green Leafy Vegetables									
164	Epinard, cru	Mali	164	Epinard, cru	NA	25	2.2	53.7	19.2
200	Salade, cru	Mali	200	Salade, cru	NA	105	3.6	333.5	61.2
207	Feuille d'amarante, crue	Mali	207	Feuille d'amarante, crue	vit B6, zinc = FCT Sénégal Worldfood : ref 1507 (LEAF, AMARANTH, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	108	0.6	282.7	77.7
211	Feuille d'haricot, sechée	Mali	211	Feuille d'haricot, sechée	thiamin, riboflavin, vit B6, niacin, folate, vit C, zinc=TACAM: values for reference 228(feuille medium vert cru)+ yield factors	3	1.5	2.1	1.8
214	Feuille d'oignon, séchée	Mali	214	Feuille d'oignon, séchée	sugar, thiamin, riboflavin, vit B6, niacin, folate, vit C, zinc=FCT Sénégal Worldfood : ref 1685 (GREEN ONION LEAF, DRIED) + no adjustment on dry matter (not given in Worldfood)	7	0.1	1.4	0.7

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Vitamin A-Rich Dark Green Leafy Vegetables (continued)									
216	Feuille de baobab, crue	Mali	216	Feuille de baobab, crue	sugar, vit A, thiamin, riboflavin, vit B6, niacin, folate, zinc=FCT Sénégal Worldfood : ref 1520 (LEAF, BAOBAB, FRESH-EP). Vit A recalculated from retinol and beta-carotene. No adjustment on dry matter (not given in Worldfood)	2	24.9	33.6	29.2
223	Feuille de jute, crue	Mali	223	Feuille de jute, crue	sugar, vit B6, folate, zinc=FCT Sénégal Worldfood : ref 1547 (LEAF, JUTE, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	30	2.3	174.6	40.3
227	Feuilles, vertes foncé, crue	Mali	227	Feuilles, vertes foncé, crue	sugar, vitB6, zinc = FCT Sénégal Worldfood : mean of all references of leaves (LEAF) + no adjustment on dry matter (not given in Worldfood)	29	1.1	65.4	15.2
228	Feuilles, medium vert, crue	Mali	228	Feuilles, medium vert, crue	sugar, zinc = FCT Sénégal Worldfood : mean of all references of leaves (LEAF) + no adjustment on dry matter (not given in Worldfood)	19	2.2	104.0	26.0
239	Feuille laurier, séchée	Mali	239	Feuille laurier, séchée	sugar = FCT Sénégal Worldfood : ref 1644 (LAUREL, SWEET BAY, LEAF, DRIED) + no adjustment on dry matter (not given in Worldfood)	293	0.0	0.6	0.1
377	Feuille de baobab, séchée	Mali	377	Feuille de baobab, séchée	vit B6 & folate = FCT Sénégal Worldfood : ref 1521 (BAOBAB LEAF, POWDERED) + no adjustment on dry matter (not given in Worldfood)	66	0.8	76.1	16.8
378	Feuille de fakouhoye, séchée	Mali	378	Feuille de fakouhoye, séchée	vit B6 & folate = TACAM : value for reference 228 (feuille medium vert cru)+ yield factors	148	0.9	192.3	13.1
382	Feuille d'oignon, crue	Mali	382	Feuille d'oignon, crue	vit B6, vit C & folate = TACAM : value for reference 228 (feuilles medium vert) (no yield factor because same moisture : 92 for the other food and 91 for the food)	656	0.1	98.6	9.6

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	**Name in French**	**Table of Origin**	**Code in FCT of Ref.**	**Name in Reference FCT**	**Notes**	**Frequency Over the 3 Rounds (Total N = 33980)**	**Mini-mum Intake**	**Maxi-mum Intake**	**Mean Intake**
Vitamin A-Rich Dark Green Leafy Vegetables (continued)									
383	Feuille d'haricot, crue	Mali	383	Feuille d'haricot, crue	sugar, vit B6, vit C & folate = FCT Sénégal Worldfood : ref 1611 (LEAF, GREEN SNAP BEAN, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	31	7.5	153.9	42.7
2151	feuilles d'oseille sèches	World-food	1681	SORREL, FOR TEA	NA	25	1.1	115.7	39.6
2152	oseille, feuilles,fraiche	World-food	1682	LEAF, SORREL, FRESH-EP	NA	215	1.3	185.4	41.6
2651	persil, frais	World-food	1710	PARSLEY, FRESH	NA	736	0.0	21.5	1.5
9939	poireau, frais	USDA	11246	LEEKS, (BULB & LOWER LEAF-PORTION), RAW	NA	2	0.6	0.6	0.6
Vitamin C-Rich Vegetables									
65	Haricot, vert, bouilli	Mali	65	Haricot, vert, bouilli	NA	18	0.6	82.0	8.9
150	Aubergine, indigène, crue	Mali	150	Aubergine, indigène, crue	sugar, vit A, thiamin, riboflavin, vit B6, niacin, folate, vit C, iron, zinc =FCT Sénégal Worldfood : ref 1760 (bitter tomato). Vit A recalculated from retinol and beta-carotene. No adjustment on dry matter (not given in Worldfood)	270	0.1	95.0	10.5
151	Avocat, crue	Mali	151	Avocat, crue	NA	65	4.7	300.0	81.9
155	Chou, cru	Mali	155	Chou, cru	NA	669	0.1	372.8	35.3
159	Concombre, cru	Mali	159	Concombre, cru	zinc =USDA20 code 11206 ('CUCUMBER, PEELED, RAW)+ yield factors (adjustment to dry matter => value in USDA*(100-moisture in TACAM)/(100-moisture in USDA20) + no adjustment on dry matter (not given in Worldfood)	70	3.5	360.1	56.1
170	Gombo, cosse cru	Mali	170	Gombo, cosse cru	sugar, zinc = FCT Sénégal Worldfood : ref 1600 (OKRA, FRESH) + no adjustment on dry matter (not given in Worldfood)	194	0.0	376.5	11.9

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Vitamin C-Rich Vegetables (continued)									
183	Oignon, échalote, cru	Mali	183	Oignon, échalote, cru	zinc = FCT Sénégal Worldfood : ref 1684 (ONION, FRESH) + no adjustment on dry matter (not given in Worldfood)	1484	0.1	214.0	15.0
191	Piment, doux, vert, cru	Mali	191	Piment, doux, vert, cru	zinc = FCT Sénégal Worldfood : ref 1708 (PEPPER, SWEET, FRESH) + no adjustment on dry matter (not given in Worldfood)	597	0.0	52.4	2.7
192	Piment, fort, cru	Mali	192	Piment, fort, cru	sugar, vit B6, folate, zinc = FCT Sénégal Worldfood : ref 1700 (PEPPER, RED OR HOT, FRESH) + no adjustment on dry matter (not given in Worldfood)	173	0.0	13.1	1.3
201	Tomates, crues	Mali	201	Tomates, crues	NA	535	0.0	134.4	14.0
209	Feuille d'haricot á l'oeil noir, crue	Mali	209	Feuille d'haricot á l'oeil noir, crue	zinc = FCT Sénégal Worldfood : ref 1672 (LEAF, COWPEA, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	144	0.1	23.6	3.4
226	Feuilles, vertes claire, crue	Mali	226	Feuilles, vertes claire, crue	zinc = FCT Sénégal Worldfood : mean of all references of leaves (LEAF) + no adjustment on dry matter (not given in Worldfood)	3	0.6	4.2	2.4
230	Fleur de kapok, séchée	Mali	230	Fleur de kapok, séchée	sugar, vit A, thiamin, riboflavin, vit B6, niacin, folate, vit C=FCT Sénégal Worldfood : ref 1601 (OKRA, DRIED); Vit A recalculated from retinol and beta-carotene. No adjustment on dry matter (not given in Worldfood)	100	0.6	42.9	8.2
241	Menthe frais	Mali	241	Menthe frais	NA	153	0.1	28.2	4.0
247	Oignon et feuille d'oignon, non mûrs	Mali	247	Oignon et feuille d'oignon, non mûrs	sugar, vit A, thiamin, riboflavin, vit B6, niacin, folate, fer, zinc=FCT Sénégal Worldfood : ref 1686 (ONION, GREEN). Vit A recalculated from retinol and beta-carotene. No adjustment on dry matter (not given in Worldfood)	160	0.2	25.1	4.6
651	haricot vert cru	World-food	1610	BEAN, GREEN SNAP, FRESH	NA	15	5.2	123.0	29.2
2011	tomate bien mûre crue	USDA	11529	"'TOMATOES, RED, RIPE, RAW, YEAR RND AVERAGE"	NA	1153	0.7	485.0	26.3

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Vitamin C-Rich Vegetables (continued)									
2012	tomate verte/peu mûre	USDA	11527	"TOMATOES, GREEN, RAW"	NA	52	3.0	117.2	44.2
9010	chou préparé	Mixed	x	x	TACAM ref 155 "Chou, cru" + adjustment of water content on USDA 20 ref 11110 "CABBAGE, CKD, BLD, DRND, WO/SALT"' + retention factor ref 3006 "VEG, GREENS, BOILED, WATER USED"	23	10.0	708.0	141.1
All Other Vegatables									
38	Betterave, crue	Mali	38	Betterave, crue	sugar = FCT Sénégal Worldfood : ref 1526 (BEET, ROOT, FRESH-AP) + no adjustment on dry matter (not given in Worldfood)	1	7.1	7.1	7.1
149	Aubergine, crue	Mali	149	Aubergine, crue	zinc = FCT Sénégal Worldfood : ref 1501 (EGGPLANT, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	426	0.2	100.0	16.0
225	Feuille de tamarin, séchée	Mali	225	Feuille de tamarin, séchée	sugar, thiamin, riboflavin, vit B6, niacin, folate, vit C=TACAM : values for reference 228(feuille medium vert cru)+ yield factors	33	0.0	40.8	8.0
379	Gombo, cosse, séché, poudre	Mali	379	Gombo, cosse, séché, poudre	vit B6 & folate = FCT Sénégal Worldfood : ref 1601 (OKRA, DRIED) + no adjustment on dry matter (not given in Worldfood)	300	0.2	103.2	6.7
393	Céleri, cru	Mali	393	Céleri, cru	sugar = USDA20 code 11143 ('CELERY, RAW) same moisture (94,6 in TACAM, 95,43 in USDA)	8	0.3	1.4	0.6
1591	courgette	World-food	1532	SQUASH, SUMMER, FRESH-AP	NA	268	0.0	177.0	18.8
Vitamin A-Rich Fruits									
180	Mangue, mûre, crue, épluchée	Mali	180	Mangue, mûre, crue, épluchée	Calcium adjusted according to Doets	257	53.7	1331.2	279.5
243	Néré, arbre à farine, fruit	Mali	243	Néré, arbre à farine, fruit	sugar, vit B6, folate, zinc = FCT Sénégal Worldfood : ref 1930 (AFRICAN LOCUST BEAN PULP, FRESH) + no adjustment on dry matter (not given in Worldfood)	2	50.0	61.0	55.5

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Red Palm Oil and Nut									
252	Huile de palme rouge	Mali	252	Huile de palme, éventée / Red palm oil, stale	zinc = FCT Sénégal Worldfood : ref 2604 (PALM OIL, LOCAL) + no adjustment on dry matter (not given in Worldfood)	51	0.3	36.8	3.8
9006	graine de palme	World-food	1470	PALM, NUT	NA	10	98.7	787.6	264.5
9901	extraction par l'eau de "farine" de palme	World-food	1470	PALM, NUT	YIELD factors	2	28.5	30.8	29.7
Vitamin C-Rich Fruits									
75	Noix de cola, crue	Mali	75	Noix de cola, crue	sugar, vit B6, folate and zinc = FCT Sénégal Worldfood : ref 1410 (COLANUT, FRESH-EP) + no adjustment on dry matter (not given in Worldfood)	52	2.6	28.0	10.9
77	Pain de singe, graine, séchée	Mali	77	Pain de singe, graine, séchée	sugar, vit A, vit B6, folate, vit C, zinc = FCT Sénégal Worldfood : ref 1815 (BAOBAB, PULP, FLOUR) + no adjustment on dry matter (not given in Worldfood)	2	3.0	5.0	4.0
81	Prune noire, pulpe, cru	Mali	81	Prune noire, pulpe, cru	sugar, vit A, riboflavin, vit B6, niacin, folate, zinc = missing. local fruit, impossible to find data. Very few consumed in small quantity. Value replaced by the most consumed fruit at this period i.e., mango. We select values for ripe mango to avoid artificially increasing vitamin A content.	5	4.0	25.0	13.5
148	Ananas, frais	Mali	148	Ananas, frais	NA	2	0.0	50.0	25.0
153	Banane, mûre, crue	Mali	153	Banane, mûre, crue	iron adjusted according to Doets, 2007	18	10.2	260.0	100.9
157	Citron, lime, cru	Mali	157	Citron, lime, cru	folate = FCT Sénégal Worldfood : ref 1830 (LEMON) + no adjustment on dry matter (not given in Worldfood)	1	5.0	5.0	5.0

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Vitamin C-Rich Fruits (continued)									
167	Finsan	Mali	167	Finsan	sugar, vit B6, folate, zinc = missing. local fruit, impossible to find data. Very few consumed in very small quantity. Value replaced by the most consumed fruit at this period i.e., mango. We select values for ripe mango to avoid artificially increasing vitamin A content. sugar=3 because carbohydrates=3	2	1.6	1.7	1.6
175	Jus d'orange, en conserve	Mali	175	Jus d'orange, en conserve	NA	1	146.0	146.0	146.0
176	Jus d'orange, frais, nonsucré	Mali	176	Jus d'orange, frais, nonsucré	NA	4	12.3	37.0	18.6
177	Jus de citron, en conserve	Mali	177	Jus de citron, en conserve	sugar = FCT Sénégal Worldfood : ref 1830 (LEMON) + no adjustment on dry matter (not given in Worldfood)	2	29.3	44.5	36.9
178	Jus de citron, frais	Mali	178	Jus de citron, frais	NA	3	6.5	16.0	9.7
179	Mandarine, orange, cru	Mali	179	Mandarine, orange, cru	lipid adjusted according to Doets, 2007	10	125.0	375.0	233.0
181	Mangue, non mûre, crue, épluchée	Mali	181	Mangue, non mûre, crue, épluchée	NA	2	109.0	288.0	198.5
194	Pomme d'cajou, crue	Mali	194	Pomme d'cajou, crue	sugar, vit B6, folate, zinc = FCT Sénégal Worldfood : ref 1950 (CASHEW FRUIT) + no adjustment on dry matter (not given in Worldfood)	1	80.0	80.0	80.0
199	Saba, fruit, cru	Mali	199	Saba, fruit, cru	sugar, vit B6, folate, zinc = missing. local fruit, impossible to find data. Very few consumed in small quantity. Value replaced by the most consumed fruit at this period i.e., mango. We select values for ripe mango to avoid artificially increasing vitamin A content.	3	25.0	50.0	33.3
203	Baobab pulpe, pain de singe	Mali	203	Baobab pulpe, pain de singe	sugar, vit B6, folate, zinc = FCT Sénégal Worldfood : ref 1814 (BAOBAB, PULP) + no adjustment on dry matter (not given in Worldfood)	2	15.0	75.0	45.0

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Vitamin C-Rich Fruits (continued)									
231	Fruit d'Oseille de Guinée (dâh), rouge, cru	Mali	231	Fruit d'Oseille de Guinée (dâh), rouge, cru	sugar, thiamin, riboflavin, vit B6, niacin, folate, zinc=FCT Sénégal Worldfood : ref 1680 (SORREL, FRESH CALICES) + no adjustment on dry matter (not given in Worldfood)	17	0.0	68.7	15.8
234	Fruit de tamarin, séché	Mali	234	Fruit de tamarin, séché	folate, zinc = FCT Sénégal Worldfood : ref 1980 (TAMARIND, FRUIT, DRY) + no adjustment on dry matter (not given in Worldfood)	4	0.9	17.6	9.9
9930	jus d'ananas	USDA	09273	PINEAPPLE JUC,CND,UNSWTN D,WO/ VIT C	NA	1	638.0	638.0	638.0
9935	melon, blanc	USDA	09183	MELONS, CASABA, RAW	NA	1	300.0	300.0	300.0
All Other Fruits									
74	Noix de coco, noyau mûr, frais	Mali	74	Noix de coco, noyau mûr, frais	zinc = USDA20 code 12104 ('COCONUT MEAT,RAW) + yield factors (adjustement on dry matter => value in USDA20*(100-moisture in TACAM)/(100-moisture in USDA20)	6	10.0	51.0	33.1
163	Dattes, séchées	Mali	163	Dattes, séchées	NA	3	7.0	14.0	10.5
195	Pomme, crue	Mali	195	Pomme, crue	NA	6	32.5	146.0	102.4
235	Fruit de tamarin, très sec	Mali	235	Fruit de tamarin, séché	sugar, thiamin, riboflavin, vit B6, niacin, folate, vit C, =FCT Sénégal Worldfood : ref 1980 (TAMARIND, FRUIT, DRY) + no adjustment on dry matter (not given in Worldfood)	2	0.0	0.5	0.3
399	Dattes, crues	USDA	09087	"'DATES, DEGLET NOOR"	NA	1	15.0	15.0	15.0
9929	olive verte	USDA	09195	OLIVES, PICKLED, CND OR BTLD, GRN	NA	2	7.3	11.2	9.2

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	**Name in French**	**Table of Origin**	**Code in FCT of Ref.**	**Name in Reference FCT**	**Notes**	**Frequency Over the 3 Rounds (Total N = 33980)**	**Mini-mum Intake**	**Maxi-mum Intake**	**Mean Intake**
Eggs									
137	Oeuf de poule, cru	Mali	137	Oeuf de poule, cru	sugar = FCT Sénégal Worldfood : ref 2599 (EGG) + no adjustment on dry matter (not given in Worldfood). Vitamin A = adjustment of beta-caroten according to Doets, 2007	10	0.8	345.2	52.9
3170	Oeuf dur	Mixed	x	x	TACAM ref 137 "Oeuf de poule, cru" + adjustment of water content on USDA 20 ref 01129 "EGG, WHL, CKD, HARD-BOILED" + retention factor ref 105 "EGGS, HARD COOKED"	4	60.0	120.0	75.0
Milk and Yogurt									
125	Lait concentré sucré	Mali	125	Lait concentré sucré	vit A, vit B6, vit B12, zinc = FCT Sénégal Worldfood : ref 2510 (MILK, COW, CONDENSED, SWEETENED) + no adjustment on dry matter (not given in Worldfood) RQ vit A : no value for retinol or beta-carotene. BUT in USDA, retinol=73 and b-car=14 => for a RAE of 74 = we considere b-car is very small in condensed milk and keep the value of 177ott in the table, considering all the 177ott comes from retinol	16	3.7	103.1	36.1
132	Lait entier frais, vache	Mali	132	Lait entier frais, vache	zinc = FCT Sénégal Worldfood : ref 2500 (MILK, COW, FRESH) + no adjustment on dry matter (not given in Worldfood)	3	15.0	79.9	47.4
1288	Café avec sucre et lait	Mali	1288	Café avec sucre et lait	NA	37	20.1	626.7	307.8
1446	Café au lait concentré	Mali	1446	Café au lait concentré	NA	6	51.0	284.0	189.8
1481	Lait, reconstitué de poudre, Nido	Mali	1481	Lait, reconstitué de poudre, Nido	NA	1	500.0	500.0	500.0
3190	yaourt, fan (sucré)	USDA	01116	"'YOGURT, PLN, WHL MILK,8 GRAMS PROT PER 8 OZ"	NA	17	15.0	135.0	64.1
9004	lait en poudre	USDA	01090	"'MILK, DRY, WHOLE"	NA	65	5.0	174.0	32.2
Cheese									
9026	fromage vache qui rit (fromage fondu)	USDA	01017	CHEESE, CREAM	NA	8	11.3	17.0	15.2

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Chicken, Duck, Turkey, Pigeon, Guinea Hen, Game Birds									
139	Poulet, cru	Mali	139	Poulet, cru	folate = FCT Sénégal Worldfood : ref 2150 (CHICKEN, CLEAN, READY TO COOK) + no adjustment on dry matter (not given in Worldfood)	9	3.1	176.8	50.6
1212	poulet télévisé, cuit	Mixed	x	x	TACAM ref 139 "Poulet, cru"+ adjustment of water content on USDA 20 ref 05004 "CHICKEN, BROILERS OR FRYERS, MEAT & SKN & GIBLETS &NECK, RSTD" + retention factor ref 805 "CHICKEN, ROASTED"	7	86.0	841.3	332.4
Beef, Pork, Veal, Lamb, Goat, Game Meat									
134	Boeuf estomac, cru	Mali	134	Boeuf estomac, cru	vit B12 = FCT Sénégal Worldfood : ref 2104 (BEEF, TRIPE) + no adjustment on dry matter (not given in Worldfood)	194	0.1	12.9	2.6
136	Lapin, cru	Mali	136	Lapin, cru	NA	3	17.7	48.0	37.9
140	Viande de boeuf, très maigre, crue	Mali	140	Viande de boeuf, trés maigre, crue	Vitamin A = adjustment of beta-carotene according to Doets, 2007	115	0.9	134.0	30.0
141	Viande de boeuf, séchée, salée, crue	Mali	141	Viande de boeuf, séchée, salée, crue	vit B6, vit B12, folate & zinc = FCT Sénégal Worldfood : ref 2103 (BEEF, DRIED, W/O BONE) + no adjustment on dry matter (not given in Worldfood)	2	58.9	134.0	96.5
142	Viande de boeuf, un peu grasse, crue	Mali	142	Viande de boeuf, un peu grasse, crue	zinc = FCT Sénégal Worldfood : ref 2101 (BEEF, W/O BONE) + no adjustment on dry matter (not given in Worldfood). Vitamin A = adjustment of beta-caroten according to Doets, 2007	323	0.1	220.5	17.0
143	Viande de chèvre, un peu grasse, crue	Mali	143	Viande de chèvre, un peu grasse, crue	vit B6 = FCT Sénégal Worldfood : ref 2111 (GOAT, FRESH, W/O BONE) + no adjustment on dry matter (not given in Worldfood)	6	10.0	42.3	27.3
144	Viande de mouton, seché, salé, crue	Mali	144	Viande de mouton, seché, salé, crue	vit B6, vit B12, folate = TACAM: value for reference 145 (viande de mouton crue) + adjustment on dry matter	11	3.4	308.4	73.0

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Beef, Pork, Veal, Lamb, Goat, Game Meat (continued)									
145	Viande de mouton, un peu grasse, crue	Mali	145	Viande de mouton, un peu grasse, crue	folate & vit C = TACAM: mean value for all crude meats of the FCT (vitC) /value for reference 143 (Goat, moderately fat, raw) + yield factors (not found in other tables) (folates)	372	0.2	466.0	24.7
146	Viande de porc, un peu grasse, crue	Mali	146	Viande de porc, un peu grasse, crue	vitamin C = FCT Sénégal Worldfood : ref 2161 (PORK, RAW-EP) + no adjustment on dry matter (not given in Worldfood)	11	5.7	100.0	46.8
1201	boyaux préparés	Mixed	x	x	TACAM ref 134 "Boeuf estomac, cru" + adjustment of water content on USDA 20 ref 23640 "BEEF, VAR MEATS & BY-PRODUCTS, TRIPE, CKD, SIMMRD" + retention factor ref 1181 "'ORGAN MEATS (NOT LIVER) FRIED"	5	65.0	65.0	65.0
1202	porc au four	Mixed	x	x	TACAM ref 146 "Viande de porc, un peu grasse, crue" + adjustment of water content on USDA 20 ref 10009 "PORK, FRSH, LEG (HAM), WHL, LN & FAT, CKD, RSTD" + retention factor ref 1251 "PORK, FRESH, BROILED"	7	202.7	405.4	325.9
3152	boeuf, brochette	Mixed	x	x	TACAM ref 142 "Viande de boeuf, un peu grasse, crue" + adjustment of water content on USDA 20 ref + retention factor ref 602 "'BEEF, BROILED CUT"	11	32.0	96.0	53.6
9012	viande de mouton préparée	Mixed	x	x	TACAM ref 145 "Viande de mouton, un peu grasse, crue"+ adjustment of water content on USDA 20 ref 35141 "Mutton, cooked, roasted (Navajo)" + retention factor ref 2004 "VEAL, ROAST, SIMMERED, W/DRIPPINGS"	29	8.0	375.2	88.6
9015	viande de boeuf préparée	Mixed	x	x	TACAM ref 142 "Viande de boeuf, un peu grasse, crue" + adjustment of water content on USDA 20 ref + retention factor ref 754 "BEEF, GROUND, SIMMERED, W/DRIPPINGS"	63	3.0	405.0	54.7

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Beef, Pork, Veal, Lamb, Goat, Game Meat (continued)									
9017	viande de chèvre préparée	Mixed	x	x	TACAM ref 143 "Viande de chèvre, un peu grasse, crue" + adjustment of water content on USDA 20 ref 17169 "GAME MEAT, GOAT, CKD, RSTD"+ retention factor ref "BEEF, ROAST, BRAISED, W/DRIPPINGS"	3	7.3	51.0	30.0
9023	boyaux de boeuf	Mixed	x	x	TACAM ref 134 "Boeuf estomac, cru" + adjustment of water content on USDA 20 ref 23640 "BEEF, VAR MEATS & BY-PRODUCTS, TRIPE, CKD, SIMMRD" + retention factor ref 1181 "'ORGAN MEATS (NOT LIVER) FRIED"	13	8.3	132.2	45.5
9903	saucisson de boeuf	USDA	07050	MORTADELLA, BEEF, PORK	NA	3	75.0	300.0	165.0
9913	peau de boeuf, cuite	USDA	04606	MEAT DRIPPINGS (LARD, BF TALLOW, MUTTON TALLOW)	NA	3	30.0	30.0	30.0
9937	corned beef	USDA	07042	LUNCHEON MEAT, BEEF, LOAVED	NA	6	7.3	100.0	33.7
9942	merguez	USDA	07064	PORK SAUSAGE, FRSH, CKD	justification : no mutton sausage found. What people call 'merguez' in BF could be more closed to a simple pork sausage than to a blood sausage…	1	60.0	60.0	60.0
Organ Meat									
389	Mouton foie, cru	Mali	389	Mouton foie, cru	sugar = FCT Sénégal Worldfood : ref 2105 (BEEF, LIVER) + no adjustment on dry matter (not given in Worldfood)	5	15.8	27.6	20.5
1203	foie braisé	Mixed	x	x	TACAM mean of ref 389 (Mouton, foie, cru) and 135 (Bœuf, foie, cru) + yield factor for broiling (water content of USDA 20 ref 17201 "LAMB, VAR MEATS & BY-PRODUCTS, LIVER, CKD, PAN-FRIED") + retention factor for broiling (retention code ref 1151 "LIVER, FRIED")	8	12.5	250.0	73.7

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Large Whole Fish/Dried Fish/Shellfish and Other Seafood									
84	Carpe d'Afrique, bouillie *	Mali	84	Carpe d'Afrique, bouillie *	vit B6, vit B12, folate, vit C = FCT Sénégal Worldfood : ref 2323(FISH, CARP, RAW-EP) + TACAM retention factors + no adjustment on dry matter (not given in Worldfood)	2	135.0	202.5	168.8
85	Carpe d'Afrique, crue*	Mali	85	Carpe d'Afrique, crue*	vit A, thiamin, riboflavin, vit B6, vit B12, niacin, folate, vit C, calcium, iron, zinc = FCT Sénégal Worldfood : ref 2323 (FISH, CARP, RAW-EP) + no adjustment on dry matter (not given in Worldfood)	1	166.7	166.7	166.7
86	Capitaine de mer, cru*	Mali	86	Capitaine de mer, cru*	vit A, thiamin, riboflavin, vit B6, vit B12, niacin, folate, vit C, zinc = FCT Sénégal Worldfood : ref 2399 (FISH, FRESH) + no adjustment on dry matter (not given in Worldfood)	13	29.5	619.3	231.5
105	Poisson, bouilli, maigre*	Mali	105	Poisson, bouilli, maigre*	vit B6, vit B12, folate, vit C = FCT Sénégal Worldfood : ref 2399 (FISH, FRESH) + TACAM retention factors + no adjustment on dry matter (not given in Worldfood)	38	14.5	200.0	62.3
108	Poisson, fumé	Mali	108	Poisson, fumé	vit B6, vit B12, folate, vit C = FCT Sénégal Worldfood : ref 2446 (FISH, SMOKED, DRIED-EP) + no adjustment on dry matter (not given in Worldfood)	134	1.1	118.3	15.3
117	Sardines à huile, conserve#	Mali	117	Sardines à huile, conserve#	NA	12	4.6	150.0	56.5
121	Carpe, bouillie *	Mali	121	Carpe, bouillie *	vit B6, vit B12, folate, vit C = TACAM : values for reference 105 (poisson bouilli maigre). No adjustment on dry matter because same moisture (79,7 for food 105, 78.6 for food 121)	37	4.7	53.6	25.8
1051	poisson frais synchar	World-food	2324	FISH, CHINCHARD	NA	341	0.2	432.6	29.6
1277	Poisson frit	Mali	1277	Poisson frit	NA	385	0.1	236.7	27.4
9932	thon, conserve	USDA	15121	TUNA, LT, CND IN H2O,DRND SOL	NA	1	4.0	4.0	4.0

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Large Whole Fish/Dried Fish/Shellfish and Other Seafood (continued)									
9933	oeufs de poisson frits	USDA	15207	ROE, MXD SP, CKD, DRY HEAT	for sugar, USDA online ref 26207110 : Roe, shad, cooked	1	10.0	10.0	10.0
9949	gambas, cuite	USDA	15150	SHRIMP, MXD SP, CKD, BREADED & FRIED	for sugar & vitamin A , Worldfood International Mini List reference 2500 (shrimp boiled)	1	20.0	20.0	20.0
Other									
147	Ail	Mali	147	Ail	NA	579	0.0	16.3	0.9
168	Gingembre, racine, frais	Mali	168	Gingembre, racine, frais	sugar, vit B6, folate, zinc =USDA20 reference 11216 (GINGER ROOT, RAW) + adjustment on dry matter	163	0.0	52.6	7.0
249	Beurre de karité	Mali	249	Beurre de karité	vit A = FCT Sénégal Worldfood : ref 2655 (BUTTER, SHEA-BUTTERSEED) + no adjustment on dry matter (not given in Worldfood)	8	3.6	27.1	11.4
250	Huile d'arachide (b)	Mali	250	Huile d'arachide (b)	vit A = FCT Sénégal Worldfood : ref 2601 (PEANUT OIL, LOCAL) + no adjustment on dry matter (not given in Worldfood)	209	0.2	159.6	12.7
251	Huile de coton (b)	Mali	251	Huile de coton (b)	vit A = FCT Sénégal Worldfood : ref 2601 (PEANUT OIL, LOCAL) + no adjustment on dry matter (not given in Worldfood)	1395	0.2	162.7	12.8
254	Huile de soja	Mali	254	Huile de soja	vit A = FCT Sénégal Worldfood : ref 2601 (PEANUT OIL, LOCAL) + no adjustment on dry matter (not given in Worldfood)	1	16.0	16.0	16.0
255	Miel	Mali	255	Miel	vit A & zinc = FCT Sénégal Worldfood : ref 2050 (HONEY) + no adjustment on dry matter (not given in Worldfood)	1	13.0	13.0	13.0
257	Sucre	Mali	257	Sucre	vit A = FCT Sénégal Worldfood : ref 2000 (SUGAR, CANE, REFINED) + no adjustment on dry matter (not given in Worldfood)	648	0.1	732.5	46.4
258	Bière Europeenne, 4.4 vol%	Mali	258	Bière Europeenne, 4.4 vol%	NA	22	330.0	1300.0	730.5
259	Bonbon	Mali	259	Bonbon	NA	2	2.8	8.4	5.6
261	Chewing gum	Mali	261	Chewing gum	NA	3	4.8	12.0	9.6

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Other (continued)									
262	Cube maggi/Jumbo	Mali	262	Cube maggi/Jumbo	sugar = food industry information (Nestlé Maggi)	1803	0.0	34.0	1.4
264	Eau	Mali	264	Eau	sugar, vit A, thiamin, riboflavin, vit B6, niacin, folate, vit C, fer, zinc=USDA 20 code 14429 ('WATER, TAP, MUNICIPAL)	4627	0.2	4176.2	251.8
267	Levure, sec	Mali	267	Levure, sec	NA	189	0.0	8.1	1.7
268	Mayonnaise, 80% graisse	Mali	268	Mayonnaise, 80% graisse	NA	11	0.5	16.8	7.5
269	Nescafé, sec	Mali	269	Nescafé, sec	sugar, vit A = FCT Sénégal Worldfood : ref 2816 (COFFEE, POWDERED) + no adjustment on dry matter (not given in Worldfood)	14	0.5	4.0	1.6
270	Poivre noir	Mali	270	Poivre noir	NA	583	0.0	11.9	0.4
272	Potassium, liquide	Mali	272	Potassium, liquide	sugar, vit A, thiamin, riboflavin, vit B6, vit B12, niacin, folate, vit C, fer=expert decision (no nutritional content)	269	0.0	28.4	5.3
273	Potassium, solide (de maïs)	Mali	273	Potassium, solide (de maïs)	sugar, vit A, thiamin, riboflavin, vit B6, vit B12, niacin, folate, vit C, fer=expert decision (no nutritional content)	1144	0.0	7.7	0.6
277	Sucrerie, cola, fanta	Mali	277	Sucrerie, cola, fanta	sugar = Ref USDA20 numero 14147 (CARBONATED BEV, COLA, WO/CAFFEINE). Limited to 10 because carbohydrates=10	66	116.5	1557.0	518.1
278	Thé noir, lipton sans sucre	Mali	278	Thé noir, lipton sans sucre	NA	55	2.0	449.0	151.7
280	sauce Maggi	Mali	280	Vedan/MSG (monosodium glutamate)	sugar, vit A, thiamin, riboflavin, vit B6, niacin, folate, vit C, calcium, fer, zinc=TACAM : values for reference 262 (cube Maggi) (except=0 because carbohydrates=0)	6	1.4	32.8	15.0
281	Vinaigre	Mali	281	Vinaigre	sugar =FCT Sénégal Worldfood : ref 2834 (VINEGAR, WINE) + no adjustment on dry matter (not given in Worldfood)	57	0.1	13.9	3.5

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	Name in French	Table of Origin	Code in FCT of Ref.	Name in Reference FCT	Notes	Frequency Over the 3 Rounds (Total N = 33980)	Mini-mum Intake	Maxi-mum Intake	Mean Intake
Other (continued)									
396	Anis graine	Mali	396	Anis graine	sugar = Worldfood FCT for EGYPTE : reference 100320 "Anise tea". Check after adjustment on dry matter (90% for the seed, 0,2% for the tea)=> values for energy and carbohydrates are proportonal. Value for sugar=0 for anise tea	4	0.0	0.1	0.0
398	Moutarde	Mali	398	Moutarde	NA	11	0.4	28.4	8.9
401	Sel sans iode	Mali	401	Sel sans iode	NA	2299	0.0	55.0	2.4
402	Café sans sucre et sans lait	Mali	402	Café sans sucre et sans lait	NA	23	5.7	501.1	220.5
1287	Café avec sucre	Mali	1287	Café avec sucre	NA	1	377.0	377.0	377.0
1290	Oseille de Guiné bouilli + sucre	Mali	1290	Oseille de Guiné bouilli + sucre	NA	34	20.3	886.0	172.3
1291	Gingembre + sucre	Mali	1291	Gingembre + sucre	NA	40	149.0	1891.5	408.0
1294	Jus de tamarin + sucre	Mali	1294	Jus de tamarin + sucre	NA	10	89.0	199.0	166.1
1295	Thé vert avec sucre	Mali	1295	Thé vert avec sucre	NA	3	39.0	150.0	96.3
1297	Boisson du pain de singe, d'eau + sucre	Mali	1297	Boisson du pain de singe, d'eau + sucre	NA	5	27.0	54.0	37.8
3070	biscuits emballés	USDA	18009	'"BISCUITS, PLN OR BTTRMLK, COMMLY BKD"	NA	9	11.0	101.1	40.6
3231	caramel avec lait et sucre	USDA	19383	'"CANDIES, TOFFEE, PREPARED-FROM-RECIPE"	NA	7	12.0	63.0	30.4
4060	jus de fruit industriel, indéfini	USDA	42270	'"ORANGE JUICE DRINK"	NA	6	60.5	550.0	248.1
4080	dolo	World-food	2751	BEER, MADE FROM MILLET	NA	42	107.2	1789.5	628.2
4100	vin, sangria	USDA	14084	"ALCOHOLIC BEV, WINE, TABLE, ALL"	NA	5	152.0	375.0	288.0
9908	beurre indéfini/margarine	USDA	04131	MARGARINE, REG, UNSPEC OILS, WO/ SALT	NA	60	0.4	23.1	6.1

(continued)

FOOD		REFERENCE OF NUTRIENT VALUE				USE OF FOOD NUTRIENT VALUES IN WDDP WORK			
Code of Food	**Name in French**	**Table of Origin**	**Code in FCT of Ref.**	**Name in Reference FCT**	**Notes**	**Frequency Over the 3 Rounds (Total N = 33980)**	**Mini-mum Intake**	**Maxi-mum Intake**	**Mean Intake**
Other (continued)									
9911	graisse de mouton	USDA	04520	FAT, MUTTON TALLOW	NA	10	0.2	209.7	26.9
9912	beurre de lait	USDA	01145	BUTTER, WITHOUT SALT	NA	7	3.0	8.0	7.3
9923	levure chimique	USDA	18369	LEAVENING AGENTS, BAKING PDR, DOUBLE-ACTING, NA AL SULFATE	NA	4	0.7	2.2	1.1
9931	chocolat en poudre sucré	USDA	14175	CHOCOLATE-FLAVOR BEV MIX FOR MILK, PDR, WO/ ADDED NUTR	NA	1	5.0	5.0	5.0
9938	Aloe Vera	The Food Processor SQL	to be filled in	Juice, aloe vera	for folate and sugar, Worldfood international minilist, reference 139 "pulque, cactus" (= alcohol of cactus). Almost same dry matter (9% vs 11%) and energy (40 vs 43 kcal). we consider that folate=the same that the sugar of the aloe drink correspond to the alcohol of the pulque (No adjustment on dry matter)	5	1.0	24.0	10.2
9941	huile d'olive	USDA	04053	OIL, OLIVE, SALAD OR COOKING	NA	2	2.3	2.5	2.4
9951	huile de palme	USDA	04513	VEGETABLE OIL, PALM KERNEL	NA	149	0.4	83.5	10.1