Secondary Analysis of 2010 Cambodia Demographic and

Health Survey – Nutrition

Prepared by UNICEF for

Ministry of Health, National Maternal and Child Health Centre, National Nutrition Programme, Nutrition Working Group

March 2013

Table of Contents

[List of Figures and Tables 3](#_Toc346097177)

[Executive Summary 4](#_Toc346097178)

[Unreported Nutrition Indicators 5](#_Toc346097179)

[Nutrition Counseling during Antenatal Care 5](#_Toc346097180)

[Weekly Iron Folic Acid Supplementation 6](#_Toc346097181)

[Multiple Micronutrient Powder In-Home Fortification 7](#_Toc346097182)

[Trend Analysis of Child Anthropometry 8](#_Toc346097183)

[Anaemia and Iron Folic Acid Supplementation 11](#_Toc346097184)

[Infant and Young Child Feeding 14](#_Toc346097185)

[Early Initiation 14](#_Toc346097186)

[Formula 18](#_Toc346097187)

[Bottle Use 20](#_Toc346097188)

[Annex I. Additional Figures and Tables 21](#_Toc346097189)

[Underweight Trends 21](#_Toc346097190)

[Anemia 25](#_Toc346097191)

[Infant and Young Child Feeding 28](#_Toc346097192)

Conkle, J., Wise, A. : [jconkle@unicef.org](mailto:jconkle@unicef.org), awise@gmail.com

# List of Figures and Tables

[Figure 1. Trends in Under 5 Child Malnutrition from 2000-2010, DHS & CAS 8](#_Toc346097103)

[Figure 2. Trends in weight for age z score: Rural by Wealth, CDHS 2000-2010 9](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097104)

[Figure 3. Trends in weight for age z score: Urban by Wealth, CDHS 2000-2010 9](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097105)

[Figure 4. Percentage of Cambodian women age 15-49 with anemia from 2000-2010 11](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097106)

[Figure 5. Maternal Anemia Trends, CDHS 2000-2010 11](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097107)

[Figure 6. Early initiation of breastfeeding among last born children (from the previous 5 years) in Cambodia from 2000-2010 14](#_Toc346097108)

[Figure 7. Prelacteal feeding questions, CDHS 2000 15](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097109)

[Figure 8. Prelacteal feeding questions, CDHS 2005 and 2010 15](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097110)

[Figure 9. Early Initiation of Breastfeeding and Prelacteal Feeding Trend CDHS 2000-2010 16](#_Toc346097111)

[Figure 10. Trends in formula use: Urban and Rural by wealth, CDHS 2000-2010 18](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097112)

[Figure 11. Trend in formula use among children 0-5 months 19](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097113)

[Figure 12. Trend in formula use among children 6-23 months, CDHS 2000-2010 19](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097114)

[Figure 13. Trend in bottle use by age, CDHS 2005-2010 20](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097115)

[Figure 14. Trend in bottle use by residence and wealth, CDHS 2000-2010 20](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097116)

[Figure 15. Trend in bottle use: Urban and rural by wealth, CDHS 2000-2010 20](file:///C:\Users\jconkle\Desktop\Nutrition%20Analysis\2012%20sep%2017%20nut%20second%20anal.docx#_Toc346097117)

[Table 1. Among women aged 15-49 receiving antenatal care (ANC) for their most recent birth in the five years preceding the survey, the percentage who received nutrition counseling as part of their ANC, according to background characteristics. Cambodia DHS 2010. 5](#_Toc346097130)

[Table 2. Among non-pregnant women aged 15-49, the percentage taking weekly iron tablets, according to background characteristics. Cambodia DHS 2010 6](#_Toc346097131)

[Table 3. Percent of children aged 6-59 months who received micronutrient powder in the 7 days preceding the survey, according to background characteristics. Cambodia DHS 2010 7](#_Toc346097132)

[Table 4. Hemoglobin by postpartum iron folic acid supplementation among women delivering within the last six months CDHS 2010 12](#_Toc346097133)

[Table 5. Anemia by postpartum iron folic acid supplementation among women delivering withing the last six months, CDHS 2010 12](#_Toc346097134)

[Table 6. Early initiation of breastfeeding and prelacteal feeding by place of delivery, CDHS 2000-2010 16](#_Toc346097135)

[Table 7. Formula use by residence, wealth, and age of child, CDHS 2000-2010 18](#_Toc346097136)

# Executive Summary

The 2010 CDHS included some nutrition-related questions that were not analyzed. Indicators missing from the CDHS 2010 report include micronutrient powder (MNP), weekly iron folic acid (WIF) and nutrition counseling during antenatal care. Baseline estimates for MNP and WIF are 1.7% and 4% respectively. More than 80% of women attending antenatal care report receiving nutrition counseling. More information is needed on the quality and impact of nutrition counseling.

At the national level improvement in child nutrition stagnated from 2005 to 2010. Worsening nutritional status of one group was not the cause of this stagnation. Rather, there was stagnation among all groups, except the lower wealth quintiles of urban areas. The data suggests higher food prices are not the only reason for stagnation in nutritional improvement. Along with slowed poverty reduction, poor sanitation and inadequate child and maternal diet are restricting further progress in child nutrition among all wealth quintiles in rural areas. For urban areas, where toilet use became nearly universal by 2010, improvement has continued in most wealth quintiles. Inadequate maternal and child feeding may be the only remaining barrier to further improvement in most urban areas. For urban areas MDG 2015 targets on child nutrition have already been met and there is a growing gap between urban and rural areas for child nutrition.

This analysis provides the first national evidence on the effectiveness of the iron folic acid (IFA) supplementation programme for pregnant and postpartum women in Cambodia. Coverage of IFA supplementation has increased in recent years and there is moderately strong evidence that it is reducing anemia levels during pregnancy and postpartum. IFA supplementation is likely contributing to a reduction in low birth weight and decreased child anemia in the first six months, but this impact is not yet measurable.

Breastfeeding practices have seen remarkable improvement over the last decade. Changes in exclusive breastfeeding (only breastfeeding for the first six months) were well documented after CDHS 2005, but there has not been in-depth analysis of starting breastfeeding just after birth (early initiation). Trend analysis shows that the public health sector played a major role in the equitable improvement of early initiation. Prelacteal feeding, or giving liquid to children just after birth, was the major reason for early initiation not happening. This analysis also shows that prelacteal feeding trends from the DHS reports are not correct because water was not included as a prelacteal feed in 2000. Revised estimates show that early initiation and prelacteal feeding changed at the same time.

For children less than six months there were large increases in formula use from 2000 to 2005, but after 2005 formula use has decreased or stagnated for all groups. This is likely the result of the heavy focus of public health campaigns on exclusive breastfeeding for the first six months. It appears that breastfeeding protection efforts have been effective for the youngest children. However, for urban areas formula use among children 6-23 months nearly doubled from 2005 to 2010. These trends may be the result of increased promotion of “follow-on milk.” The use of “follow-on milk” is associated with a higher risk for diabetes and other chronic disease later

in life. Illegal promotion by the private sector could be threatening the recent gains made in infant and young child feeding.

Trend analysis shows a substantial increase in bottle use over the last five years. Most of the change has occurred among children older than

six months, with bottle use nearly tripling among children 6 to 9 months. The increase has happened in all areas, with the sharpest increase occurring among urban poor. Increased bottle use in rural areas and among urban poor is of particular concern because of poor sanitation in these areas; the trend of bottle use is likely to be limiting the effectiveness of interventions to reduce infectious diseases. If high rates of diarrhea persist, this will be a barrier to further improvement in child nutrition.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Background Characteristic | |  | Received Nutrition Counseling | Number of women |  |
|  |  |  |  |  |  |  |
|  | **Mother's age at birth** | |  |  |  |  |
|  |  | <20 |  | 78.9 | 512 |  |
|  |  | 20-34 |  | 82.1 | 4,483 |  |
|  |  | 35-49 |  | 79.6 | 809 |  |
|  |  |  |  |  |  |  |
|  | **Residence** | |  |  |  |  |
|  |  | Urban |  | 90.9 | 1,019 |  |
|  |  | Rural |  | 79.5 | 4,785 |  |
|  |  |  |  |  |  |  |
|  | **Province** | |  |  |  |  |
|  |  | Banteay Meanchey |  | 89.2 | 214 |  |
|  |  | Kampong Cham |  | 68.9 | 701 |  |
|  |  | Kampong Chhnang |  | 97.1 | 259 |  |
|  |  | Kampong Speu |  | 91.9 | 358 |  |
|  |  | Kampong Thom |  | 81.1 | 286 |  |
|  |  | Kandal |  | 66.9 | 559 |  |
|  |  | Kratie |  | 91.7 | 115 |  |
|  |  | Phnom Penh |  | 95.0 | 534 |  |
|  |  | Prey Veng |  | 89.0 | 473 |  |
|  |  | Pursat |  | 97.5 | 191 |  |
|  |  | Siem Reap |  | 95.8 | 415 |  |
|  |  | Svay Rieng |  | 56.5 | 217 |  |
|  |  | Takeo |  | 59.5 | 407 |  |
|  |  | Otdar Meanchey |  | 86.6 | 79 |  |
|  |  | Battambang / Pailin |  | 86.5 | 421 |  |
|  |  | Kampot / Kep |  | 81.8 | 256 |  |
|  |  | Preah Sihanouk / Koh Kong |  | 80.3 | 128 |  |
|  |  | Preah Vihear / Steung Treng |  | 79.3 | 114 |  |
|  |  | Mondol Kiri / Ratanak Kiri |  | 68.6 | 77 |  |
|  |  |  |  |  |  |  |
|  | **Mother's education** | |  |  |  |  |
|  |  | None |  | 76.1 | 879 |  |
|  |  | Primary |  | 79.2 | 3,263 |  |
|  |  | Secondary + |  | 88.8 | 1,662 |  |
|  |  |  |  |  |  |  |
|  | **Wealth quintile** | |  |  |  |  |
|  |  | Lowest |  | 76.8 | 1,267 |  |
|  |  | Second |  | 79.9 | 1,190 |  |
|  |  | Middle |  | 80.1 | 1,138 |  |
|  |  | Fourth |  | 81.9 | 1,104 |  |
|  |  | Highest |  | 89.7 | 1,106 |  |
|  |  |  |  |  |  |  |
|  | Total | |  | 81.5 | 5,804 |  |
|  | Table 1. Among women aged 15-49 receiving antenatal care (ANC) for their most recent birth in the five years preceding the survey, the percentage who received nutrition counseling as part of their ANC, according to background characteristics. Cambodia DHS 2010. | | | | |  |
|  |  |  |  |  |  |  |

# Unreported Nutrition Indicators

This section includes three indicators that were part of the questionnaire, but not included in the CDHS 2010 report.

## Nutrition Counseling during Antenatal Care

Indicators on the quality of antenatal care were part of the CDHS 2010, including blood pressure, urine sample, blood sample, weight, and nutrition counseling. However, nutrition counseling was not included in the CDHS 2010 report (National Institute of Statistics).

Four out of five women attending antenatal care report that they received nutrition counseling. With 92% of women now attending antenatal care, this means that out of all pregnant women 3 of 4 receive nutrition counseling.

As with other indicators of quality, there are differences by education and wealth. Wealthier and more educated women are more likely to report having received nutrition counseling.

In complement to nutrition counseling, CDHS 2010 reports that more than 90% of women attending antenatal care are weighed. CDHS 2010 also reports that of women that receive antenatal care, 92% go to the public sector. Public sector facilities are weighing and providing nutrition counseling to the large majority of pregnant women in Cambodia. There is no evidence on the quality or impact of this counseling.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Background Characteristic | |  | Takes iron weekly | Number of women |  |
|  |  |  |  |  |  |  |
|  | **Age** | |  |  |  |  |
|  |  | 15-19 |  | 3.1 | 3,613 |  |
|  |  | 20-29 |  | 5.9 | 5,809 |  |
|  |  | 30-39 |  | 4.4 | 4,039 |  |
|  |  | 40-49 |  | 2.3 | 4,360 |  |
|  |  |  |  |  |  |  |
|  | **Residence** | |  |  |  |  |
|  |  | Urban |  | 1.3 | 3,787 |  |
|  |  | Rural |  | 4.8 | 14,035 |  |
|  |  |  |  |  |  |  |
|  | **Province** | |  |  |  |  |
|  |  | Banteay Meanchey |  | 5.1 | 685 |  |
|  |  | Kampong Cham |  | 2.4 | 1,968 |  |
|  |  | Kampong Chhnang |  | 3.3 | 693 |  |
|  |  | Kampong Speu |  | 2.1 | 1,022 |  |
|  |  | Kampong Thom |  | 2.2 | 894 |  |
|  |  | Kandal |  | 0.9 | 1,855 |  |
|  |  | Kratie |  | 0.3 | 407 |  |
|  |  | Phnom Penh |  | 1.0 | 2,109 |  |
|  |  | Prey Veng |  | 1.1 | 1,269 |  |
|  |  | Pursat |  | 25.9 | 503 |  |
|  |  | Siem Reap |  | 2.7 | 1,163 |  |
|  |  | Svay Rieng |  | 22.3 | 722 |  |
|  |  | Takeo |  | 2.0 | 1,114 |  |
|  |  | Otdar Meanchey |  | 0.7 | 240 |  |
|  |  | Battambang / Pailin |  | 1.8 | 1,247 |  |
|  |  | Kampot / Kep |  | 16.1 | 850 |  |
|  |  | Preah Sihanouk / Koh Kong |  | 1.3 | 417 |  |
|  |  | Preah Vihear / Steung Treng |  | 1.1 | 401 |  |
|  |  | Mondol Kiri / Ratanak Kiri |  | 0.6 | 264 |  |
|  |  |  |  |  |  |  |
|  | **Education** | |  |  |  |  |
|  |  | None |  | 3.6 | 2,820 |  |
|  |  | Primary |  | 4.2 | 8,772 |  |
|  |  | Secondary + |  | 3.9 | 6,230 |  |
|  |  |  |  |  |  |  |
|  | **Wealth quintile** | |  |  |  |  |
|  |  | Lowest |  | 5.1 | 3,220 |  |
|  |  | Second |  | 4.9 | 3,302 |  |
|  |  | Middle |  | 4.7 | 3,447 |  |
|  |  | Fourth |  | 3.9 | 3,581 |  |
|  |  | Highest |  | 2.0 | 4,271 |  |
|  |  |  |  |  |  |  |
|  | Total | |  | 4.0 | 17,821 |  |
|  | Table 2. Among non-pregnant women aged 15-49, the percentage taking weekly iron tablets, according to background characteristics. Cambodia DHS 2010 | | | | |  |
|  |  |  |  |  |  |  |

Weekly Iron Folic Acid Supplementation

Weekly iron folic acid (WIF) supplementation is provided through the public health sector to non-pregnant women, aged 15 to 49 years. Currently, targeting of low socio-economic status is included in policy (National Nutrition Programme), but the intervention is implemented universally in selected provinces; in some areas WIF has been distributed via garment factories.

Four percent of women of reproductive age report taking WIF supplements. There is large variation by province and it appears that the intervention is implemented in three domains: Pursat, Svay Rieng, and Kampot/Kep.

While targeting of WIF supplementation is not explicit, it does appear to be reaching poor, rural women disproportionately. 4.8% of rural women report taking the supplement, compared to 1.3% of urban women. 5.1% of women in the lowest wealth quintile report taking the supplement, compared to 2.0% in the highest wealth quintile.

Estimates of WIF supplementation from the CDHS 2010 provide a baseline for future programme evaluation.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  | Background Characteristic | |  | Received MN powder | Number of children |  |
|  |  |  |  |  |  |  |
|  | **Age in months** | |  |  |  |  |
|  |  | 6-8 |  | 0.8 | 414 |  |
|  |  | 9-11 |  | 2.1 | 413 |  |
|  |  | 12-17 |  | 0.9 | 817 |  |
|  |  | 18-23 |  | 2.4 | 797 |  |
|  |  | 24-35 |  | 2.0 | 1,610 |  |
|  |  | 36-47 |  | 1.2 | 1,537 |  |
|  |  | 48-59 |  | 2.0 | 1,514 |  |
|  |  |  |  |  |  |  |
|  |  | 6-23 |  | 1.6 | 2,440 |  |
|  |  | 24-59 |  | 1.7 | 4,661 |  |
|  |  |  |  |  |  |  |
|  | **Child sex** | |  |  |  |  |
|  |  | Male |  | 1.4 | 3,692 |  |
|  |  | Female |  | 2.0 | 3,409 |  |
|  |  |  |  |  |  |  |
|  | **Residence** | |  |  |  |  |
|  |  | Urban |  | 4.7 | 1,144 |  |
|  |  | Rural |  | 1.1 | 5,956 |  |
|  |  |  |  |  |  |  |
|  | **Province** | |  |  |  |  |
|  |  | Banteay Meanchey |  | 0.0 | 251 |  |
|  |  | Kampong Cham |  | 1.0 | 882 |  |
|  |  | Kampong Chhnang |  | 0.8 | 324 |  |
|  |  | Kampong Speu |  | 0.1 | 424 |  |
|  |  | Kampong Thom |  | 2.2 | 375 |  |
|  |  | Kandal |  | 0.7 | 704 |  |
|  |  | Kratie |  | 0.2 | 211 |  |
|  |  | Phnom Penh |  | 8.5 | 589 |  |
|  |  | Prey Veng |  | 0.6 | 512 |  |
|  |  | Pursat |  | 2.6 | 233 |  |
|  |  | Siem Reap |  | 0.4 | 519 |  |
|  |  | Svay Rieng |  | 5.3 | 238 |  |
|  |  | Takeo |  | 0.0 | 451 |  |
|  |  | Otdar Meanchey |  | 1.9 | 92 |  |
|  |  | Battambang / Pailin |  | 1.0 | 494 |  |
|  |  | Kampot / Kep |  | 3.1 | 317 |  |
|  |  | Preah Sihanouk / Koh Kong |  | 0.7 | 154 |  |
|  |  | Preah Vihear / Steung Treng |  | 0.7 | 189 |  |
|  |  | Mondol Kiri / Ratanak Kiri |  | 0.2 | 141 |  |
|  |  |  |  |  |  |  |
|  | **Mother's education** | |  |  |  |  |
|  |  | None |  | 1.6 | 1,293 |  |
|  |  | Primary |  | 1.2 | 4,026 |  |
|  |  | Secondary + |  | 2.8 | 1,781 |  |
|  |  |  |  |  |  |  |
|  | **Wealth quintile** | |  |  |  |  |
|  |  | Lowest |  | 1.0 | 1,828 |  |
|  |  | Second |  | 1.1 | 1,522 |  |
|  |  | Middle |  | 1.1 | 1,311 |  |
|  |  | Fourth |  | 1.2 | 1,235 |  |
|  |  | Highest |  | 4.5 | 1,204 |  |
|  |  |  |  |  |  |  |
|  | Total | |  | 1.7 | 7,100 |  |
|  | Table 3. Percent of children aged 6-59 months who received micronutrient powder in the 7 days preceding the survey, according to background characteristics. Cambodia DHS 2010 | | | | |  |
|  |  |  |  |  |  |  |

Multiple Micronutrient Powder In-Home Fortification

Multiple Micronutrient Powder In-Home Fortification (MNP) is designed for children 6-59 months of age. In Cambodia, MNP is provided through the public health sector to children 6 to 23 months of age. At the time of the CDHS 2010 the intervention was still being researched and implementation of the programme had not yet started (Conkle).

1.6% of caretakers of children 6 to 23 months of age report that they received MNP in the last seven days. This estimate provides a baseline before programme implementation.

The 120 caretakers of children 6 to 59 months of age that report receiving MNP are likely referring to a multivitamin product procured from the private sector. In Phnom Penh, 8.5% of caretakers report receiving MNP.

For future programme evaluations it will be important that surveys are able to distinguish between public and private sector sources. Public sector distribution may increase demand for a private sector MNP in areas without the programme and/or for older children outside of the target age group.

# Trend Analysis of Child Anthropometry

Stagnation in nutritional improvement of children in Cambodia, shown in three national surveys from 2008 to 2011 (Figure 1), coincided with rising food prices (Mishra). It was hypothesized that higher food prices would have more of a detrimental effect on net food buyers: landless, rural households and urban, poor households. This section aims to determine if an increase in child malnutrition among specific groups is responsible for the stagnation in nutritional improvement.

Figure 1. Trends in Under 5 Child Malnutrition from 2000-2010, DHS & CAS

The 2012 Cambodia Equity Analysis (CEA) showed that there was a statistically-significant, two percentage point increase in child wasting (weight-for-height) from 2005 to 2010; the analysis also showed no change in child underweight (weight-for-age), except among one group (Wise). Underweight is the preferred anthropometry indicator for trend analysis because it is the easiest to measure and the most reliable. The equity analysis showed that underweight stagnated for boys and girls, among all wealth groups, and by all levels of maternal education. The only group to see continued improvement was urban (8.6% pt. decrease) and the gap between urban and rural areas grew by more than ten percentage points. It would appear that urban areas are not responsible for stagnation in nutritional improvement, but the equity analysis did not look at urban/rural trends disaggregated by wealth.

Underweight status is determined by a z-score, which measures the distance a child is from what is considered a normal weight for his or her age. For an individual child, a z-score less than -1 indicates mild underweight and a score below -2 is considered moderately underweight. Figure 2 shows in all wealth quintiles in rural areas the average of child weight is lower than normal in all three years. In a healthy population the average z-score would be 0. The figure also shows that after improvement from 2000 to 2005, all wealth quintiles have stagnated from 2005 to 2010. This suggests that high food prices are not the only cause of stagnation in nutritional improvement.

Figure 2. Trends in weight for age z score: Rural by Wealth, CDHS 2000-2010

In urban areas there was an increased rate of improvement in child nutrition from 2005 to 2010. The rate of underweight decreased from 33% in 2000, to 28% in 2005, to 19% in 2010. Averaged over the entire decade this gives an annual improvement rate of 1.4 percentage points. Figure 3 looks at child underweight trends in urban areas disaggregated by wealth. The figure shows that improvement over the last five years is not restricted to the richer wealth quintiles. It is the opposite. Improvement among the richest wealth quintile has stagnated, while the lower wealth quintiles have seen improvement. It should be noted that the nutritional status of children in the richest wealth quintile remains much better than other wealth quintiles. The richest wealth quintile is the only quintile that does not have an average less than -1, or mildly underweight.

Figure 3. Trends in weight for age z score: Urban by Wealth, CDHS 2000-2010

At the national level improvement in underweight stagnated from 2005 to 2010. Disaggregating underweight trends by education, urban/rural and wealth shows that worsening nutritional status of one group was not the cause of this stagnation. Rather, there was stagnation among all groups, except the lower wealth quintiles of urban areas. Improvement among these groups did not improve the national estimate because the lower wealth quintiles of urban areas are a small population; the national estimates are driven by the rural population. While not conclusive, the data suggests that stagnation in nutritional improvement is not caused by higher food prices alone. Slowed poverty reduction, caused by higher food prices and slower economic growth, is one cause for the stagnation in nutritional improvement, but there are others. High rates of infectious disease and inadequate maternal and child diet may also be limiting further improvement. Child feeding practices have not changed for any group and it is unlikely that maternal diet has changed much either. By 2010 toilet use became nearly universal in urban areas, while in rural areas the majority of the population does not use a toilet. Diarrhea prevalence in urban areas is ½ that of rural areas; children in urban areas may no longer be experiencing the repeated bouts of diarrhea that cause growth faltering. For rural areas children from households in all wealth quintiles share an environment with poor sanitation. Changes in sanitation can help to explain stagnation among all wealth quintiles in rural areas and improvement among the lower wealth quintiles of urban areas. The wealthy in urban areas may have reached the full potential of improved food security and environmental conditions by 2005. Inadequate maternal and child diet remains a barrier to improvement in child nutrition for all wealth quintiles in both urban and rural areas, and may be the only remaining barrier for wealthy urban households.

# Anaemia and Iron Folic Acid Supplementation

Figure 4. Percentage of Cambodian women age 15-49 with anemia from 2000-2010

From 2000 to 2005 there was a nine percentage point drop in anemia in pregnant women and a twelve percentage point drop in anemia among breastfeeding women. These large improvements mirrored anemia reduction in women of reproductive age, which declined by eleven percentage points (Figure 4). The similar improvement among all groups and the lack of a large scale anemia reduction programme suggests that improvement was caused by the effect of general economic development on diet and disease.

Figure 5. Maternal Anemia Trends, CDHS 2000-2010

From 2005 to 2010 there was no significant improvement in anemia in women of reproductive age (Figure 5), but improvement did continue for pregnant and postpartum women (Figure 5). For pregnant women anemia declined by four percentage points, and for breastfeeding women anemia declined by seven percentage points from 2005 to 2010. The continued improvement occurred after large increases in the coverage of IFA supplementation and deworming for pregnant and postpartum women. Anemia improvement among breastfeeding and pregnant women and the lack of improvement in the broader population of women of reproductive age suggests that the IFA supplementation programme is having a positive impact.

In order to further test the effectiveness of IFA supplementation, bivariate analyses of postpartum supplementation by hemoglobin and postpartum supplementation by anemia status were carried out (Tables 4 and 5). The analysis includes women age 15-49 that had given birth within the last six months. There is a statistically significant difference between those who did and did not receive supplementation with respect to both hemoglobin and anemia prevalence. For hemoglobin the supplemented group had

Table 4. Hemoglobin by postpartum iron folic acid supplementation among women delivering within the last six months CDHS 2010

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Post-partum iron | Hb (g/dL) | N |  | F-stat | prob>F |
| Yes | 12.08 | 167 |  | 9.69 | 0.002 |
| No | 11.62 | 185 |  |  |  |
| Total | 11.86 | 352 |  |  |  |
|  |  |  |  |  |  |
| Diff: | 0.463 |  |  |  |  |

Table 5. Anemia by postpartum iron folic acid supplementation among women delivering withing the last six months, CDHS 2010

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Post-partum iron | Anaemia | N |  | F-stat | prob>F |
| Yes | 0.462 | 168 |  | 5.76 | 0.017 |
| No | 0.589 | 186 |  |  |  |
| Total | 0.523 | 354 |  |  |  |
|  |  |  |  |  |  |
| Diff: | -0.127 |  |  |  |  |

levels .46 g/dL higher than the non-supplemented group. This difference in hemoglobin corresponds to a 12.7 percentage point difference in anaemia rates. Women that do not receive supplementation are 1.27 times more likely to be anemic when compared to women that do receive supplementation.

A 2009 Cochrane review found that at one month postpartum the average difference between supplemented and non-supplemented with iron alone was .07 g/dL; the range of differences in the six included studies was .04 g/dL to .14 g/dL (Pena Rosas JP). The one study included in the review that looked at postpartum hemoglobin after iron and folic acid supplementation found a difference of .10. Although not completely comparable because this analysis of CDHS data cannot follow the methodology of the studies included in the Cochrane Review, comparing the .46 g/dL difference in Cambodia to the average effects in the Cochrane Review gives an indication that there is a large impact of IFA supplementation in Cambodia. Some of this effect could be the result of not controlling for covariates, but this is unlikely to be a major factor as IFA supplementation is very equitable. There is no difference in the coverage of IFA supplementation between the richest and poorest wealth quintiles.

This analysis provides the first national evidence on the effectiveness of the IFA supplementation programme in Cambodia. It is not a comprehensive evaluation, but it does provide moderately strong evidence that the IFA supplementation programme is reducing anemia levels during pregnancy and postpartum. The 2009 Cochrane Review concludes that reducing anemia during pregnancy with IFA supplementation does reduce the chance of having a “small for gestational age” baby, and on average will increase birth weight by 57.7g and birth length by .38cm. The intervention is likely contributing to a reduction in low birth weight and decreased anemia in the first six months, but this impact cannot yet be seen in the data. Anemia is only measured for children older than six months and birthweight trend analysis is made difficult by large increases in the percentage of children being measured at birth. When data is available from the 2014/5 CDHS IFA supplementation should be nearly reaching universal coverage; at that time a comprehensive evaluation that includes multivariate analysis, additional anthropometric outcomes, and information on duration/dosage should be carried out. Duration and dosage is an important area for further research in Cambodia because domestic policy does not follow international recommendations (National Nutrition Programme) (Stoltzfus).

# Infant and Young Child Feeding

## Early Initiation

From 2000 to 2010 there was steady improvement in the early initiation of breastfeeding (Figure 6) and exclusive breastfeeding. The change in exclusive breastfeeding is well documented and was attributed to a large scale communication campaign. The communication campaign that helped to reduce giving water and increased exclusive breastfeeding also included messages on early initiation. The full extent of the progress in early initiation was not seen until 2010 because the indicator measures the 5 years prior to the survey, while exclusive breastfeeding measures the past 24 hours. In ten years breastfeeding within one hour increased by 54 percentage points and the 2012 CEA shows that the improvement was equitable. Along with the increase in early initiation, there was a corresponding decrease in prelacteal feeding, which dropped from 57% in 2000 to 19% in 2010. Surprisingly, there was no change seen in 2005 and all of this change occurred from 2005 to 2010. Additional analysis of CDHS 2010 data was carried out to provide better evidence on the improvements in early initiation and prelacteal feeding.

Figure 6. Early initiation of breastfeeding among last born children (from the previous 5 years) in Cambodia from 2000-2010

One of the difficulties in assessing improvement in exclusive breastfeeding was that the DHS questionnaire changed from 2000 to 2005. Analyzing the questionnaire for early initiation and prelacteal feeding indicators shows that one of the indicators may be affected by a change in the questionnaire. There was no change in the early initiation indicator, but there were multiple changes for prelacteal feeding (Figures 7 and 8). In 2005 a skip question was added and the wording of the question was revised. Changes to the wording of the question, including removal of “before milk flowing” and mentioning of the traditional prelacteal feed, may have changed how respondents perceived the meaning of the question. Changes to the questionnaire could explain some of why prelacteal feeding is the only indicator that does not show improvement in 2005, but there is an additional reason with a more obvious impact.

Figure 8. Prelacteal feeding questions, CDHS 2000

Figure 7. Prelacteal feeding questions, CDHS 2005 and 2010

More differences can be found in how the indicators are calculated. Starting in 2005 only the “last-born” child is included in both the prelacteal feeding and early initiation indicators. This difference is not considered to have had a large impact on estimates, but excluding “plain water” as a prelacteal feed in 2000 resulted in an approximate 35 percentage point underestimation of the indicator. In 2000 more than 90% of children received a prelacteal feed if “plain water” is included. There was significant improvement in prelacteal feeding from 2000 to 2005, but the improvement was hidden by calculating the indicator with different criteria.

By recalculating the indicators to include “plain water” as a prelacteal feed in 2000, and by plotting results of all three surveys by year of birth of the child, it is obvious that the increase in early initiation and the decrease in prelacteal feeding occurred at the same time. The indicators mirror each other in an inverse relationship (Figure 9).

Figure 9. Early Initiation of Breastfeeding and Prelacteal Feeding Trend CDHS 2000-2010

Communication on breastfeeding was and continues to be delivered via mass media nationwide and through interpersonal communication by health center staff and community volunteers. Limiting analysis to children born in the last two years and disaggregating by delivery location gives an indication of the impact of health staff on breastfeeding behaviours. Table 6 shows that women delivering in a public or private facility are more likely to initiate breastfeeding early when compared to delivering at home. No difference between public and private suggests that both providers are promoting early initiation. However, women delivering in private facilities are more than two times more likely to give a prelacteal feed when compared to delivery in a public facility or at home. This is likely the result of private sector providers promoting the use of infant formula. Promotion of infant formula is illegal in Cambodia and poses an immediate threat to the gains made in breastfeeding over the last decade.

Table 6. Early initiation of breastfeeding and prelacteal feeding by place of delivery, CDHS 2000-2010

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Early Initiation (<2 years)** | | |  | **Prelacteal (<2 years)** | | |
|  | **2000** | **2005** | **2010** |  | **2000** | **2005** | **2010** |
| **Public** | 17.4a | 45.3a | 69.9b |  | 92.8 | 32.8b | 15.2b |
| **Private** | 13.0 | 35.6 | 66.0 |  | 90.5 | 52.6 | 34.1 |
| **Home** | 10.5 | 32.9 | 59.3 |  | 94.1 | 47.0 | 21.4 |
|  | aSignificantly different from Home | | |  |  |  |  |
|  | bSignificantly different from Private and Home | | | |  |  |  |

Breastfeeding practices have seen remarkable improvement over the last decade and the improvement has been equitable. This analysis shows that improvements in prelacteal feeding mirrored those of early initiation. This is not surprising as the two indicators have a causal relationship. Prelacteal feeding was the major reason for not initiating breastfeeding early. The analysis also shows that the public health sector has played an important role in the improvements, but at the same time the private sector is undermining public health efforts around breastfeeding by promoting infant formula.

## Formula

In Cambodia nearly all children are breastfed and from 2000 to 2010 more women started to breastfeed immediately after birth and more women started to give only breastmilk for the first six months. Over the same time period there was substantial economic development and there is a growing concern in the country over the promotion of infant formula. DHS reports do not provide a national estimate for formula use, but do provide estimates for children less than 3 years disaggregated by breastfeeding status. Among breastfeeding children infant formula use increased from 0.1% in 2000, to 3.5% in 2005, to 4.7% in 2010. Among non-breastfed children infant formula increased from 0.3% in 2000, to 11.1% in 2005, to 25.5% in 2010. Table 7 provides national estimates for children under 2, and the data shows that there have been statistically significant increases from survey to survey. There has been a steady increase of two percentage points per year. In the last five years all of the increase has happened in children older than six months.

Table 7. Formula use by residence, wealth, and age of child, CDHS 2000-2010

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2000** | | | **2005** | | | **2010** | | |
|  | 0-5 mos | 6-23 mos | Total | 0-5 mos | 6-23 mos | Total | 0-5 mos | 6-23 mos | Total |
| **TOTAL** | **3.4** | **4.8** | **4.4** | **7.0** | **6.5** | **6.7** | **6.8** | **9.3** | **8.7** |
| urban | 11.8 | 17.2 | 15.7 | 19.6 | 18.6 | 18.9 | 20.8 | 32.6 | 30.0 |
| rural | 2.1 | 2.9 | 2.7 | 4.9 | 4.5 | 4.6 | 4.1 | 4.7 | 4.6 |
| Q5 | 13.7 | 21.0 | 18.8 | 25.4 | 25.3 | 25.3 | 21.3 | 34.7 | 31.9 |
| Q1 | 0.3 | 1.6 | 1.2 | 0.0 | 0.6 | 0.4 | 1.6 | 0.6 | 0.9 |

The DHS reports do not show infant formula use by socio-economic characteristics. It is evident from the previous table that most formula is consumed by the wealthy in urban areas; looking at formula use by wealth and residence provides further insight into trends. Figure 10 shows that from 2000 to 2005 the increase came among wealthy households in rural households. However, over the last five years it is among the urban wealthy that formula use has increased.

Figure 10. Trends in formula use: Urban and Rural by wealth, CDHS 2000-2010

Looking at trends in formula use by age, residence and wealth (Figures 11 and 12) gives a more nuanced picture of trends in the country. For children less than six months there were large increases from 2000 to 2005, but after 2005 formula use has decreased or stagnated for all groups. This is likely the result of the heavy focus of public health campaigns on exclusive breastfeeding for the first six months. It appears that breastfeeding protection efforts have been effective for the youngest children. Neighboring countries in the region that have experienced similar economic development see large increases in formula use for children less than six months.

For older children it is a different situation. After modest increases for urban and wealthy from 2000 to 2005, there was a sharp increase in formula use after 2005. For urban areas formula use among children 6-23 months nearly doubled from 2005 to 2010. For rural areas and the poorest wealth quintile there was no change over the last five years. These trends may be the result of increased promotion of “follow-on milk.” As the use of “follow-on milk” is associated with a higher risk for diabetes and other chronic disease later in life, these trends need to be addressed by the public health community.

Figure 12. Trend in formula use among children 6-23 months, CDHS 2000-2010

Figure 11. Trend in formula use among children 0-5 months

There is a large amount of anecdotal evidence that breastmilk substitutes are promoted by doctors and nurses working in the private sector. Promotion of breastmilk substitutes by health professionals is illegal according to Cambodian law. Table 8 shows that 1 of 4 women delivering in a private clinic use infant formula, which is 3x more than women delivering in the public sector. This difference is likely attributable to both wealth, women delivering in a private facility are wealthier and more able to purchase infant formula, and illegal promotion by health workers.

Table 8 Formula use by place of delivery and age of child, CDHS 2010

|  |  |  |  |
| --- | --- | --- | --- |
|  | 0-5 mos | 6-23 mos | Total |
| public | 5.1 | 10.1 | 8.8 |
| private | 26.1 | 26.9 | 26.7 |
| home | 3.8 | 2.4 | 2.7 |

## Bottle Use

Figure 13. Trend in bottle use by age, CDHS 2005-2010

From the DHS reports it is evident that after a slight decrease in bottle use from 2000 to 2005, there has been a large increase after 2005. Most of the increase from 2005 to 2010, as shown in Figure 13, has occurred among children older than six months. The DHS report does not provide estimates disaggregated by socio-economic characteristics.

Figure 14. Trend in bottle use by residence and wealth, CDHS 2000-2010

Looking at bottle use by residence and wealth (Figure 14) shows a higher percentage of bottle use among urban and wealthy. Figure 14 also shows that the increase from 2005 to 2010 has occurred in both urban and rural areas and among both the wealthiest and poorest wealth quintiles. As formula use has not increased among all groups, the increase in bottle use is not only related to formula use. Anecdotally, there is evidence that many caretakers use a bottle to feed their child sugar water or tea.

Figure 15. Trend in bottle use: Urban and rural by wealth, CDHS 2000-2010

Further disaggregation, looking at wealth within urban and rural areas, shows that the sharpest increase in bottle use has happened among urban poor. Increased bottle use in rural areas and among urban poor are of particular concern because of poor sanitation in these areas.

# Bibliography

Conkle, J., Moore, D. "Caretaker Perceptions of Multiple Micronutrient Powder In-Home Fortification." Phnom Penh: UNICEF, 2012.

Mishra, U. "Worrying Nutrition Results from CDHS 2010 In The Context of High Food Prices." Phnom Penh: UNICEF, 2012.

National Institute of Statistics, Ministry of Planning. *Cambodia Demographic and Health Survey*. Phnom Penh: Measure DHS, 2010.

National Nutrition Programme, National Maternal and Child Health Centre. "National Policy and Guidelines for Micronutrient Supplementation to Prevent and Control Deficiencies in Cambodia." Phnom Penh: Ministry of Health, 2011.

Pena Rosas JP, Viteri FE. "Effects and Safety of Preventive Oral Iron or Iron+Folic Acid Supplmentation for Women During Pregnancy (Review)." 2009.

Stoltzfus, R., Dreyfuss, M. "Guidelines for the Use of Iron Supplements to Prevent and Treat Iron Deficiency Anemia." International Nutritional Anemia Consultative Group, 2005.

Wise, A., Conkle, J. "Cambodia Equity Analysis." Phnom Penh: UNICEF, 2012.

# Annex I. Additional Figures and Tables

## Underweight Trends

Mean underweight z score by age, CDHS 2010

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **2010 CDHS** | | | | |  |  |  |
|  |  | **Underweight** | | | | |  |  |  |
|  |  | **Urban Areas** | |  | **Rural Areas** | |  |  |  |
|  |  | **Mean** | **N (unweighted)** |  | **Mean** | **N (unweighted)** |  | **Percentage Point Difference (Urban - Rural)** | **Percentage Point Difference (Urbantotal - Urban)** |
| Banteay Meanchey |  | 14.1% | 90 |  | 18.1% | 145 |  | -4.0% | 4.7% |
| Kampong Cham |  | 21.6% | 47 |  | 32.0% | 167 |  | -10.4% | -2.8% |
| Kampong Chhnang |  | 35.6% | 49 |  | 30.5% | 210 |  | 5.1% | -16.8% |
| Kampong Speu |  | 31.4% | 39 |  | 35.0% | 163 |  | -3.6% | -12.6% |
| Kampong Thom |  | 12.6% | 33 |  | 35.3% | 184 |  | -22.7% | 6.2% |
| Kandal |  | 20.9% | 44 |  | 25.1% | 146 |  | -4.2% | -2.1% |
| Kratie |  | 23.8% | 50 |  | 31.3% | 190 |  | -7.6% | -5.0% |
| PP |  | 16.6% | 172 |  | 36.8% | 32 |  | -20.2% | 2.2% |
| Prey Veng |  | 22.8% | 26 |  | 25.5% | 193 |  | -2.7% | -4.0% |
| Pursat |  | 13.0% | 35 |  | 31.4% | 162 |  | -18.4% | 5.8% |
| Siem Reap |  | 18.6% | 64 |  | 38.1% | 148 |  | -19.4% | 0.2% |
| Svay Rieng |  | 17.1% | 29 |  | 30.0% | 152 |  | -12.9% | 1.7% |
| Takeo |  | 16.1% | 18 |  | 31.3% | 171 |  | -15.2% | 2.7% |
| Otdar Meanchey |  | 25.6% | 57 |  | 31.2% | 121 |  | -5.6% | -6.8% |
| Battambang / Pailin |  | 22.4% | 42 |  | 21.7% | 140 |  | 0.7% | -3.6% |
| Kampot / Kep |  | 23.1% | 41 |  | 30.5% | 133 |  | -7.3% | -4.3% |
| Preah Sihanouk / Koh Kong | | 12.9% | 90 |  | 26.5% | 123 |  | -13.6% | 5.9% |
| Preah Vihear / Stung Treng | | 31.0% | 62 |  | 37.6% | 192 |  | -6.7% | -12.2% |
| Mondul Kiri / Rattanak Kiri | | 31.0% | 63 |  | 34.6% | 230 |  | -3.6% | -12.2% |
|  |  |  |  |  |  |  |  |  |  |
| **Total** |  | **18.8%** |  |  | **30.0%** |  |  |  |  |

## Anemia

Hemoglobin and anemia by weekly iron folic acid supplementation for women of reproductive age

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| WIF | Hb (g/dL) | N |  | F-stat | prob>F |
| Yes | 12.04 | 275 |  | 0.77 | 0.381 |
| No | 12.12 | 7,102 |  |  |  |
| Total | 12.11 | 7,377 |  |  |  |
|  |  |  |  |  |  |
| Diff: | -0.079 |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| WIF | Anaemia | N |  | F-stat | prob>F |
| Yes | 0.429 | 275 |  | 0.01 | 0.923 |
| No | 0.426 | 7,103 |  |  |  |
| Total | 0.426 | 7,378 |  |  |  |
|  |  |  |  |  |  |
| Diff: | 0.003 |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| sample: Women aged 15-49 that were not pregnant nor breastfeeding and were tested for anaemia during the 2010 CDHS. | | | | | |

Anemia status by deworming among children 12-59 months

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Deworm | Anaemia | N |  | F-stat | prob>F |  |
| Yes | 0.486 | 1,207 |  | 7.63 | 0.006 | \*Difference is significant |
| No | 0.538 | 1,781 |  |  |  |  |
| Total | 0.507 | 2,988 |  |  |  |  |
|  |  |  |  |  |  |  |
| Diff: | -0.0515 |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| sample: Children aged 12-59 months who were tested for anaemia during the 2010 CDHS. | | | | | |  |

## https://lh3.googleusercontent.com/Gf_fV6FWPbE2SqjTPw3sT1UjYsXcrKET4iRgrghW08pTJ7PFuS5ntXfsSqPNEZ3CDYaSwo-kuhSSWZLO23iTRwvI0QaZ49vOssirxReZNUCHsXBsoNg

## Infant and Young Child Feeding