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The Impact of Title II Maternal and Child Health and Nutrition Programs on the Nutritional Status of Children

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Executive Summary

Over the past seven years, Title II Maternal and Child Health and Nutrition (MCHN) activities have evolved from predominantly facility-based food distribution programs targeted at undernourished children and their mothers, combined with some growth monitoring, to integrated community-based development programs with long-term health and sustainability objectives. The result of this shift has been a significant improvement in the nutritional status of children benefiting from these programs. This paper presents the results of a recent review of the impact of Title II MCHN programs on the prevalence of stunting and underweight in their target populations.

Information on the impact of the Title II MCHN program on child nutritional status was available for 29 programs. The review focused on Title II MCHN programs that ended in 2000 and 2001, for which final evaluation or annual results reports with data on anthropometry were available. Of the 35 Title II MCHN programs with end dates prior to 2002, evaluations with information on program impacts on child nutritional status were available for 25 (71 percent). In addition, final evaluation reports were available for four programs with end dates in 2002 (all in Ethiopia) and for a joint evaluation of all the Ethiopia programs. Approximately 6.6 million children benefited from the Title II MCHN programs that were reviewed.

The review of evaluations clearly shows that the Title II MCHN programs have been successful in improving the nutritional status (as measured by stunting and/or underweight) of children in their target populations. A large majority of the evaluations that reported on stunting (16 of 18) documented a reduction in the prevalence of stunting between the baseline and final evaluation – on average stunting was reduced by 2.4 percentage points per year, from an average prevalence of stunting at baseline of 53 percent. The median length of time between the baseline and final evaluation was four years. The 95 percent confidence interval is -3.6 to -1.3; this clearly supports the conclusion that the programs were associated with a reduction in stunting among the target population. However, the averages do mask considerable variability in the results. The standard deviation for all evaluations is 2.3.

The Title II MCHN programs were also associated with a reduction in the prevalence of underweight in the target population. On average, underweight was reduced by 1.9 percentage points per year, from an average prevalence of underweight at baseline of 42 percent. Again, the 95 percent confidence interval (from -2.8 to -0.9) clearly supports the conclusion of successful reductions in underweight.

Contents

1. Introduction

Over the past seven years, Title II Maternal and Child Health and Nutrition (MCHN) activities have evolved from predominantly facility-based food distribution programs targeted at undernourished children and their mothers, combined with some growth monitoring, to integrated community-based development programs with long-term health and sustainability objectives. This paper presents the results of a recent review of the impact of Title II MCHN programs on the prevalence of stunting and underweight in their target populations, which demonstrates that this shift has resulted in a significant improvement in the nutritional status of children benefiting from these programs.

The United States Public Law 480 Title II development food aid program constitutes the single largest source of USAID funding focused on food security and nutrition. Food aid is a flexible resource that can be programmed for direct distribution or monetized to generate local currency to support development activities. Approximately half of Title II development resources ($188 million in Fiscal Year 2002) were used in MCHN programs, which may also include water and sanitation activities. Prior to 1995, MCHN programs were predominantly facility-based programs focused on growth monitoring and food supplementation. The lack of necessary complementary interventions and the absence of a community-level focus hampered the ability of the programs to reduce the prevalence of undernutrition in the target populations. USAID's 1995 Policy Food Aid and Food Security Policy Paper stressed "that food transfer alone is not enough to achieve the goal of reducing malnutrition and that various other complementary activities are essential to achieve household food security."[1]

Currently, Title II MCHN programs revolve around a select set of interventions essential to household food security that have been proven to reduce maternal and child death and disease and combat undernutrition. Title II MCHN programs directly support proven interventions to improve child survival and nutrition, such as promotion of exclusive breastfeeding, appropriate complementary feeding and increased micronutrient consumption; prevention and treatment of preventable childhood diseases, including diarrhea; and improvements in ante-natal care. Some Title II MCHN programs also seek to create linkages between health and nutrition activities and the agriculture sector so that improvements in agricultural productivity and income may translate into better nutrition among households. The Title II MCHN programs predominantly target children under the age of two and their mothers, since children under the age of two are at the greatest risk of becoming undernourished and also receive the greatest benefit from preventative interventions. In addition to improving the design and implementation of Title II MCHN programs over the past several years, USAID and the Title II implementing partners have focused on improving the ability of the Title II MCHN programs to monitor and report the impacts of the activities on the nutritional status of children.

Through efforts such as the Title II MCHN program, USAID and its partners contribute to reaching the goal of halving the proportion of people who suffer from hunger and food insecurity between 1990 and 2015, as stated in the United Nations Millenium Declaration, signed in September 2000 by 189 nations, including the United States. The overall effort involves finding solutions to intractable poverty, hunger, malnutrition and disease; promoting gender equality and the empowerment of women; guaranteeing a basic education for everyone and supporting the principles of sustainable development. The target of halving hunger is measured by two key indicators: 1) proportion of population below minimum level of dietary energy consumption and 2) prevalence of underweight in children under five years of age.[2]

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[1] Patricia Bonnard, Patricia Haggerty, Anne Swindale, Gilles Bergeron, and James Dempsey, *Report of the Food Aid and Food Security Assessment: A Review of the Title II Development Food Aid Program*, (Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development, 2002).

[2] As viewed at http://www.developmentgoals.org/About_the_goals.htm

The choice of a nutrition indicator to measure the poverty and hunger reduction goal is significant because of the relative ease of measuring and reporting on nutritional status and because good nutrition directly aids poverty reduction. A focus on nutrition enables an explicit connection to be made between actions to improve human capital and the special needs of vulnerable groups such as women and children. Ultimately, improved nutrition in these groups enables program benefits to be sustained across generations, reinforcing poverty reduction strategies.

2. Methods

Information on the impact of the Title II MCHN program on child nutritional status was available for 29 programs.[3] The review focused on Title II MCHN programs that ended in 2000 and 2001, for which final evaluation or annual results reports with data on anthropometry were available. Of the 35 Title II MCHN programs with end dates prior to 2002, evaluations with information on program impacts on child nutritional status were available for 25 (71 percent). In addition, final evaluation reports were available for four programs with end dates in 2002 (all in Ethiopia) and for a joint evaluation[4] of all the Ethiopia programs. Approximately 6.6 million children benefited from the Title II MCHN programs that were reviewed.

The reviewed programs reported a range of indicators of child nutritional status. The review focused on indicators of the prevalence of stunting and underweight (percent of children of a given age range with height-for-age z-score less than -2, and percent of children of a given age range with weight-for-age z-score less than -2, respectively). Stunting is an indicator of past growth failure (chronic undernutrition) and reflects a number of long-term factors including chronic insufficient food intake, frequent infection, sustained less-than-optimal feeding practices and poverty. Underweight reflects both chronic and acute undernutrition (being too short, too thin or a combination of the two).

A total of 18 evaluations (62 percent) reported on the prevalence of stunting among the target population; a total of 15 (52 percent) reported on the prevalence of underweight. Because the length of time between the baseline measure and the final evaluation measure varied, an annualized indicator was generated: percentage point change in prevalence per year. Table 1 presents a list of the Title II MCHN programs included in the review.

The quality of the data and the evaluation design as reflected in program documents varied widely, a fact that should be kept in mind when interpreting the results reported in this paper, since all of the programs for which data were available were included in the analysis unless otherwise specified. The data and the evaluation design for each of the 29 programs reviewed was rated as either poor, average, good or unclear (See Table 2).[4]

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[3] The review covered the Title II MCHN programs that had submitted copies of baseline and final evaluation reports and/or annual results reports to USAID, copies of which have been made available to FANTA. A follow-up of 10 programs not included in this study shows no systematic exclusion of poorly performing programs. Four excluded programs did not collect community baseline data or monitor community-wide nutritional results because they had not transitioned to the new program model (programs in Uganda and Peru.) Two Nicaragua programs were reoriented to respond to needs arising from Hurricane Mitch, so a comparison with the baseline would have been meaningless. Of the four programs with results gathered after this paper was completed, two reported improvement of height and/or weight measures of children under five, one reported deterioration of both weight and height, and one report shows improvements in one project area of a country and deterioration in another area. In the opinion of the authors, including these excluded reports would have not significantly altered the results of the study.

[4] Annex 1 contains detail on the criteria were used to classify the quality of program data/evaluation designs.

Table 1. Title II MCHN programs with data on the prevalence of child undernutrition[5]

Country	PVO	Data available on the prevalence of undernutrition		Country	PVO	Data available on the prevalence of undernutrition	
		Stunting	Underweight			Stunting	Underweight
Africa				**Asia**			
Benin	CRS	√		**India**	CARE		√
Ethiopia	CARE	√			CRS		√
	CRS	√		**Latin America**			
	EOC	√		**Bolivia**	ADRA	√	
	SCF	√			CARE	√	
	WV	√			FHI	√	
	all Title II	√			PCI	√	
Gambia	CRS	√		**Guatemala**	CARE	√	
Kenya	CRS		√	**Haiti**	CARE		√
Madagascar	CRS		√		CRS	√	
Mozambique	Africare	√		**Honduras**	CARE	√	
	FHI	√		**Nicaragua**	PCI		√
				Peru	CARE	√	

Table 2. Quality of data and evaluation design

	Poor	Average	Good	Not clear
Number of Title II MCHN programs	6	5	8	10

3. Results

The review of evaluations clearly shows that the Title II MCHN programs have been successful in improving the nutritional status (as measured by stunting and/or underweight) of children in their target populations. A large majority of the evaluations that reported on stunting (16 of 18) documented a reduction in the prevalence of stunting between the baseline and final evaluation – on average **stunting was reduced by 2.4 percentage points per year**, from an average prevalence of stunting at baseline of 53 percent. The median length of time between the baseline and final evaluation was four years. When results from the nine programs with stunting data rated "average" or "good" are examined, these results are even more impressive – an average reduction of 2.7 percentage points per year were reported. The 95 percent confidence interval is -3.6 to -1.3 for all evaluations and -4.0 to -1.5 for the higher quality evaluations; this clearly supports the conclusion that the programs were associated with the reduction of stunting among the target population. However, the averages do mask considerable variability in the results. The standard deviation for all evaluations is 2.3 and 1.6 for the higher quality evaluations.[6]

[5] Twenty-four of the 29 programs reviewed had data on the prevalence of stunting and/or underweight. These were the programs included in the results reported in Section 3 of this paper. The remaining five programs were not included because they used non-standard indicators of child growth.

[6] Annexes 2 through 4 present the baseline and final evaluation prevalence data used in the analysis.

The Title II MCHN programs were also successful in reducing the prevalence of underweight in the target population. On average, **underweight was reduced by 1.9 percentage points per year**,[7] from an average prevalence of underweight at baseline of 42 percent.[8] Again, the 95 percent confidence interval (from -2.8 to -0.9) clearly supports the conclusion that the programs are associated with reductions in underweight.

The variability in results has both programmatic and technical explanations. The Title II MCHN programs are implemented in a wide range of country contexts and cover a range of interventions types and quality. In addition, the age range for the indicators reported by the programs and included in the analysis varied considerably (see Table 3 below).

Table 3. Age range of stunting and underweight indicators reported by Title II MCHN programs

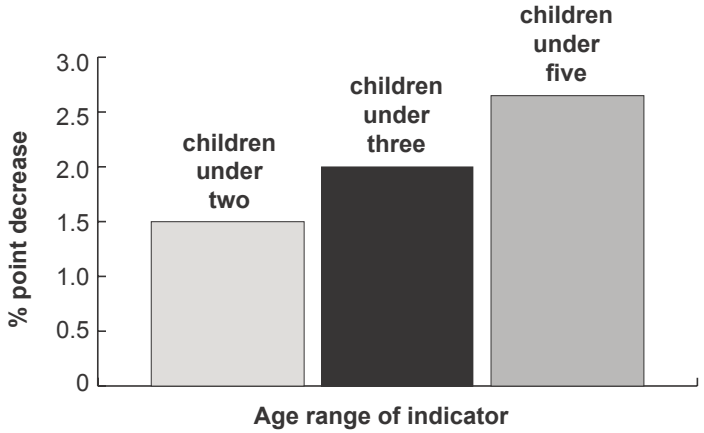
Age range of indicator	Percent of stunting indicators	Percent of underweight indicators
Up to five years old		
0-59 months	27.8	21.6
3-59 months	5.6	
6-59 months	27.8	16.2
24-60 months	22.2	
Up to four years old		
0-47 months	5.6	
Up to three years old		
0-35 months		5.4
6-35 months		2.7
18-36 months	5.6	5.4
24-35 months	5.6	2.7
Up to two years old		
0-23 months		43.2
12-23 months		2.7

While not statistically significant, the data do indicate a pattern where the magnitude of change is associated with the width of the age range of the indicator. In other words, those programs that measured children across a wider age range tended to report greater decreases in the prevalence of underweight (see Figure 1). This tends to support the argument that, while children under two should be the **beneficiaries** of program interventions, the measurement of the nutritional status of a broader age group may more completely capture the total magnitude of the impact of a program over time (e.g., five years) since it will include those children who are no longer active participants but who were likely to have benefited from program interventions when they were younger. Another explanation may be that the wider age range is correlated with the length of time in the program, so children who have been in the program for a longer period of time will show greater benefits.

[7] Standard deviation = 1.7.

[8] The average annual reduction was 1.8 percentage points in the seven programs with data rated as average or good.

Figure 1. Average annual percentage point decrease in the prevalence of underweight by the age range of the indicator*



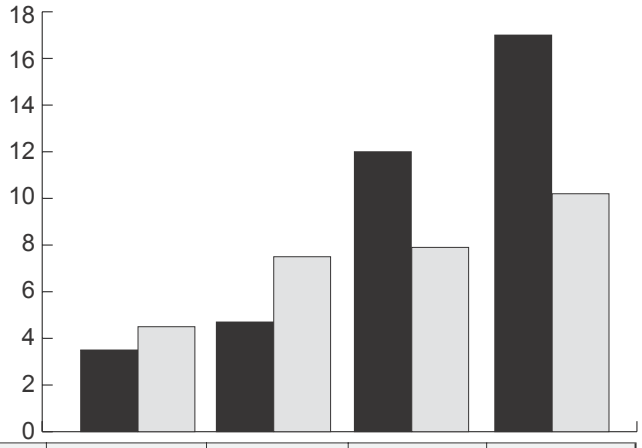
* Children under two includes data from indicators of children 0-23 months; children under three includes 0-35 and 6-35 months, children under five includes 0-59 months, 3-59 months and 6-59 months. A similar chart was not generated for stunting data, because there are no stunting indicators reported for under twos or under threes. See Table 3.

One would expect that, if Title II MCHN programs are successful in addressing the causes of undernutrition, the total impact of the program on the prevalence of undernutrition would increase with the length of time that the community has benefited from the interventions. Figure 2 shows that this appears to be the case for both stunting and underweight (although, as with all of the disaggregated results reported in this paper, the sample size is too small and the variation is too large for the differences to be statistically significant).

Not only does the amount of change appear to increase with the length of time of the program, the rate of change, particularly for the reduction in the prevalence of stunting, increases dramatically when program length is longer than three years. This pattern supports the view that changing behaviors takes time and that shortening the length of Title II programs to three years, as has been suggested in order to increase the flexibility in programming of resources, might result in a significant loss in the potential to reach the program objectives of improving the nutritional status of children.

One limitation of the evaluations reviewed is that few of the evaluation designs included a comparison group, which would have permitted greater attribution of the results to the Title II MCHN program interventions. To be effective for attribution purposes, a comparison group needs to have similar characteristics to the intervention group, with the main difference between the groups being that the intervention group benefited from the program interventions and the comparison group did not. Since Title II programs target the most food insecure population in a geographic area, it is often difficult to identify a comparison group for attribution purposes because the population not targeted by the program is by definition less food insecure than the population that is targeted. However, some Title II programs have been able to take advantage of the phasing in of program interventions over a period of time to implement an evaluation design that includes a comparison group. See Box 1 for an example of the results from an evaluation carried out by CARE Honduras that used this approach.

Figure 2. Average total decrease in the prevalence of stunting and underweight by length of time of the program



# of years	2	3	4	5
stunting	3.5	4.7	12.0	17.0
underweight	4.5	7.5	7.9	10.2

In an attempt to control for secular trends in the countries, which may account for the improvement of children's nutritional status even in the absence of program interventions, the degree of improvement reported by the Title II MCHN programs was compared against national (or regional, where available) trends in the prevalence of stunting and underweight.[9] Three-quarters of the Title II MCHN programs that reported on stunting showed better results than the national (or regional) trend; about 60 percent of programs reporting on underweight did better than the national (or regional) trend. This indicates the likelihood that at least some of the observed improvements in nutritional status are attributable to Title II program interventions.

The interaction of undernutrition with childhood infection and mortality is well recognized; undernutrition is a contributing factor in more than half of infant and child deaths in the developing world.[10] Recently, a study to develop and validate methods for estimating changes in child mortality from changes in child undernutrition was completed.[11] Based on the models presented in the paper, it is now possible to estimate the lives saved and the impact on child mortality and under-five mortality from reductions in underweight children under five years of age.[12] Based on the number of beneficiaries of the Title II MCHN programs that were successful in reducing the prevalence of undernutrition, approximately 5.9 million children, we estimate that approximately 47,899 (range of 29,026 - 66,398) children's lives were saved annually over the past six years for a total estimated 287,394 (175,560 – 398,358) children's lives saved.

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[9] Data on national and regional trends in child nutritional status were obtained from the Population, Health and Nutrition Information Project (PHNIP) Data Online for Population, Health and Nutrition (DOLPHN) database (www.phnip.com/dolphn/) and the World Health Organization (WHO) Global Database on Child Growth and Malnutrition (www.who.int/nutgrowthdb/registration_form/welcome.html).

[10] David L. Pelletier, Edward A. Frongillo, Dirk G. Shroeder, and Jean-Pierre Habicht, "A Methodology for Estimating the Contribution of Malnutrition to Child Mortality," Journal of Nutrition 124:2106S-2122S, 1994.

[11] David L. Pelletier and Edward A. Frongillo, "Changes in Child Survival are Strongly Associated with Changes in Malnutrition in Developing Countries," Journal of Nutrition 133:107-113, 2003 (available at www.fantaproject.org).

[12] Bruce Cogill, *Simulation of Lives Saved for Ethiopia from reductions in child malnutrition,* Draft, (Washington, D.C.: Food and Nutrition Technical Assistance (FANTA) Project, Academy for Educational Development, 2003).

Box 1: An example of a pre-post comparison group evaluation design

CARE Honduras has been implementing a Title II development activity (DAP) in Western Honduras since 1996. The DAP consists of three components: the Community-Based Health Services, Agricultural Extension, and Rural Opportunities for Employment and Development programs. A baseline survey of the proposed intervention area was carried out in 1997. A final evaluation survey was carried out in 2001.

One of the main objectives of the evaluation survey was to document the impacts of the integrated approach, where at least two of the three DAP components are implemented in the same community. The expansion of coverage of the integrated approach is the focus of CARE's new 2001-2005 DAP. The sample for the final evaluation survey was stratified into three groups: communities where only one of the three DAP components was implemented, communities where at least two of the three components were implemented (the integrated approach), and communities that had been including in the baseline but where the DAP had not yet been implemented. The latter group was used as a comparison group for comparison with the integrated approach communities.

The evaluation found a statistically significant reduction in stunting and underweight in the integrated approach communities when compared with the communities that had not yet received any of the DAP interventions. The baseline prevalence of stunting among children aged 24 to 59 months was 55 percent in the program area (which included communities where CARE planned to implement the integrated approach and communities where CARE did not plan to intervene during the period of performance of the first DAP). In communities where the integrated approach had been implemented, stunting was reduced to 47 percent by 2001, while it had increased to 66 percent in the communities that had not received any CARE interventions. The baseline prevalence of underweight children (aged 12 to 23 months) was 33 percent. Underweight was reduced to 28 percent by 2001 in the integrated communities, while no change in the prevalence of underweight was documented in the non-intervened communities.

Source: CARE Honduras Food Security Program, "Results of Quantitative Survey for Final Evaluation FY1996-2000 and Baseline Survey FY2001-2005," 2002.

4. Conclusion

The Title II MCHN programs have demonstrated considerable improvements in both program design and performance reporting over the past six or seven years. The results of the efforts made by USAID and its partners have helped improve the nutritional status and save the lives of hundreds of thousands of children. On average, the prevalence of chronic undernutrition among children in the target population was reduced by 2.4 percentage points a year. The review also shows that the programs were associated with a reduction in underweight and that the amount of improvement increases with the length of time of the program. These results should help strengthen the ability of the Title II implementing partners to set programmatic targets for improvements in nutritional status of children.

However, the review also found considerable variability in the quality and comparability of the data reported by the Title II MCHN programs. Continued efforts to improve the quality of the data collected and reported by the Title II MCHN programs are needed and will strengthen the ability of USAID and its partners to demonstrate the important achievements of the Title II program.

Annex 1. Criteria used to classify the quality of program data and evaluation designs. Note that all judgments were limited in that they were made based only on the reported documentation available to FANTA*

Poor	Average	Good	Unclear
• Incomparable Baseline/Final Evaluation Sampling Universes • Limited comparability between baseline and final data due to changing geography of program and different geographical areas represented by respective data points • Potential errors in anthropometric data observed in review of hard copy reporting, adding question and unreliability to use of data for analysis purposes	• Fair evaluation designs, but certain details may demonstrate compromised comparability, e.g., the reported age range for baseline and final data comparison may be unclear or incomparable (more than six month range of discrepancy between ages reported), the geographic universe for baseline and final data comparison may have changed slightly or the sample of localities taken for data collection does not meet the statistical requisites to be considered representative of the program intervention area	• Comparable baseline and final sampling universe • Certain cases have comparison groups included in final evaluation design • Only minor discrepancies in reporting of anthropometric data and age ranges in various Cooperating Sponsor (CS) documents (< one percentage point difference in anthropometric data and up to six months difference in reported age range discrepancies)	• Anthropometric data reported in various CS documents may be discrepant or the accuracy of the data may be unclear, adding question and unreliability to use of data for analysis purposes • Detail on the applied evaluation design is either not reported or remains unclear from description contained in CS documents available

*Note that all judgments were limited in that they were made based only on the reported documentation available to FANTA.

Annex 2. Prevalence of stunting at baseline and final by quality of data/evaluation design: pre-post design without a comparison group

Quality of data/ evaluation	Prevalence of stunting (HAZ ≤ -2)	
	Baseline	Final
Good	66.6	54.5
	61.1	39.5
	55.8	53.1
	54.9	47.2
	52.2	43.7
	50.0	43.8
Average	50.6	30.3
	41.3	32.0
	32.8	28.7
Poor	52.5	42.5
	48.5	56.0
	43.3	41.1
	41.2	34.6
Not clear	68.7	45.2
	57.9	58.0
	56.8	34.4
	48.6	37.3
	13.6	9.0

Annex 3. Prevalence of underweight at baseline and final by quality of data/evaluation design: pre-post design without a comparison group

Quality of data/ evaluation	Prevalence of underweight (WAZ ≤ -2)	
	Baseline	Final
Good	24.8	25.7
	24.8	15.1
Average	39.0	37.0
	32.5	25.3
	30.9	24.3
Not clear	52.9	34.8
	45.0	40.3
	42.9	32.9
	42.5	34.0
	37.2	21.8
	34.0	35.3
	29.8	17.5
	14.9	15.9

Annex 4. Prevalence of stunting and underweight at baseline and final: pre-post design with comparison group, two programs with quality of data/evaluation = good

Program 1

Prevalence of stunting (HAZ ≤ -2)			Prevalence of underweight (WAZ ≤ -2)		
Baseline	Final intervention group	Final comparison group	Baseline	Final intervention group	Final comparison group
54.9	47.2	65.8	33.3	27.7	33.5

Program 2

Prevalence of underweight (WAZ ≤ -2)		
Baseline	Final intervention group	Final comparison group
54.0	48.0	52.0

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