ANNUAL NUTRITION SURVEY REPORT
BORDER-WIDE
2008

Aide Médicale Internationale
American Refugee Committee
International Rescue Committee
Malteser International
Thailand Burma Border Consortium

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Background

Thailand Burma Border Consortium (TBBC) and CCSDPT Health Agencies conducted collaborative nutrition surveys of children age 6 to 59 months in all 9 camps in 2008. These surveys are conducted annually to examine trends in acute (wasting) and chronic (stunting) malnutrition, micronutrient deficiencies, and selective feeding and vitamin A supplementation program coverage.

CCSDPT Health Agencies involved in annual nutrition surveys include:

- Aide Médicale Internationale (AMI)
- American Refugee Committee (ARC)
- International Rescue Committee (IRC)
- Malteser International (MI)

Systematic random sampling of households from community health worker (CHW) or camp committee household lists were used to select households with the exceptions of Site 2, Ban Don Yan, and Tham Hin, which were exhaustive surveys (Table 1). All children ages 6-59 months in a selected household were surveyed. See Methodology (p 17) for more information on standardized survey methods used or our Nutrition Survey protocol on our website www.tbbc.org.

Table 1: Number of Households and Population of <5 for Sample Selection by Camp

Camp	Location	Health Agency	No. HH	Population 6 – 59 months	Source of HH/ population data
Site 1	Mae Hong Son	IRC	4,060	2,734	KnRC and CHW
Site 2	Mae Hong Son	IRC	na	406	KnRC and CHW
Mae La Oon	Mae Sarieng	MI	2,776	1,927	KRC and CHW
Mae Ra MaLaung	Mae Sarieng	MI	2,902	2,270	KRC and CHW
Mae La	Mae Sot	AMI	8,537	5,632	KRC and CHW
Umpiem Mai	Mae Sot area	ARC / AMI	3,623	2,432	KRC and CHW
Nu Poh	Umphang	ARC/ AMI	3,038	2,761	KRC and CHW
Ban Don Yang	Sanklaburi	ARC	na	590	CHW
Tham Hin	Suen Phueng	IRC	na	1,089	CHW

SURVEY RESULTS

DEMOGRAPHICS

- A total of 5156 children in 9 camps between ages 6 – 59 months were screened during the surveys (Table 2).
- 49% of children surveyed were female and 51% were male (Table 3).
- Age groups were normally distributed; although border-wide there were a greater percentage of girls attending the survey than boys between the ages of 12-23 months (Table 3).

Table 2: Number of children and percentage of border-wide surveys by camp

Camp	Number	Percent of Total Surveys
BDY*	501	9.7
ML	766	14.9
MLO	628	12.2
MRML	540	10.5
NP	426	8.3
UM	503	9.8
TH*	910	17.6
S2*	454	8.8
S1	428	8.3
Total	5156	100.0

*exhaustive survey

Table 3: Age/Sex Distribution of children surveyed border-wide

	Girls		Boys		Both sexes	
Age group	No.	%	No.	%	No.	%
6-11 months	305	12%	308	12%	613	12%
12 – 23 months	626	25%	633	24%	1259	25%
24-35 months	584	23%	611	23%	1195	23%
36-47 months	515	21%	563	21%	1078	21%
48-59 months	470	19%	513	20%	983	19%
TOTAL	2515	49%	2640	51%	5155	100%

DESCRIPTIVES

- The average age of a child for the survey was 31.7 months (Table 4). This information was obtained using the child's documented birth date from their health card or, if not documented, by asking the caregiver.
- The average birth-weight of children surveyed was 3.05 kg (Table 4). Birth-weight was obtained per child either from documentation on their health card or, if not documented, by asking the caregiver.
- On average, the mother of the child surveyed had been living in camp 111 months (9.2 years) (Table 4). This information was based solely on the response of the caregiver.
- The majority of children surveyed live in a medium sized household (62.4%) with 5-8 persons including the child (Table 5). This information was based solely on the response of the caregiver and not verified by documentation.

Table 4: Descriptives

	Number respondents	Missing Responses	Mean
Age of child (months)	5151	5	31.7
Birth Weight (kgs)	4257	898	3.05
Number of people in household	5152	3	6.32
Time in camp (months)	5145	10	111.44

Table 5: Household Size

Household Size	Number	% of Total
Small (1-4 persons)	1173	22.8%
Medium (5-8 persons)	3213	62.4%
Large (>9 persons)	766	14.9%

MALNUTRITION RATES

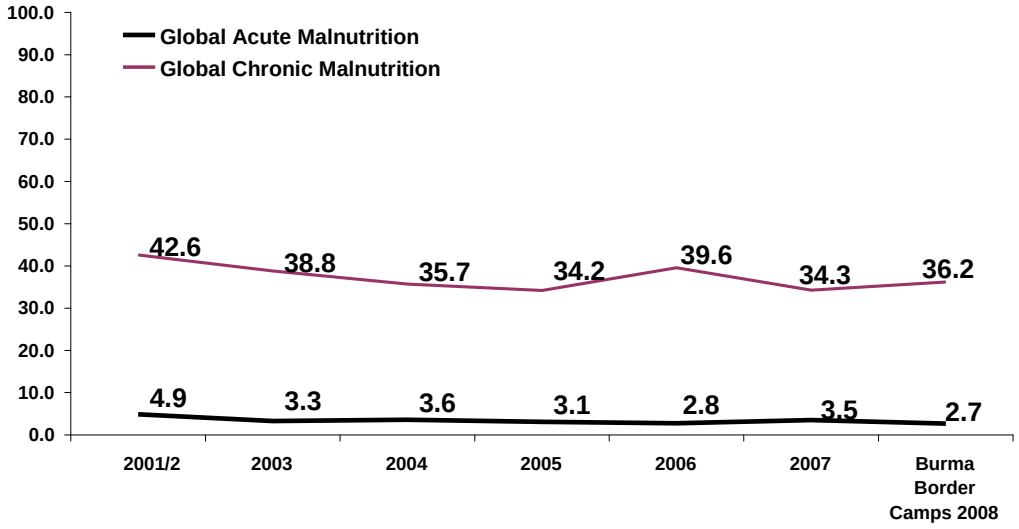
- Nutrition surveys have been conducted annually since 2003 with results available by camp for global acute malnutrition (GAM) and global chronic malnutrition (GCM) by camp (Table 6).
- Nutrition survey data from 2003 through 2008 indicate a stable trend in global acute malnutrition (GAM) and global chronic malnutrition (GCM) (Graph 1).

Table 6: GAM and GCM annual nutrition survey rates from 2003 to 2008 by camp

Camps	Global Acute Malnutrition (weight-for-height <-2 SD)						Global Chronic Malnutrition (height-for-age <-2 SD)					
	2003	2004	2005	2006	2007	2008	2003	2004	2005	2006	2007	2008
	%	%	%	%	%	%	%	%	%	%	%	%
Site 1	3.4	2.0	2.6	3.2	3.2	1.5	31.9	29.8	30.0	25.5	24.0	22.5
Site 2	2.2	1.3	2.3	1.0	5.8	2.2	37.1	35.3	37.1	45.3	25.1	29.8
MLO (MKK)	2.9	5.7	3.6	3.6	4.9	3.0	43.2	39.0	37.9	49.0	42.4	44.3
Mae Ra Ma Luang	2.5	2.4	5.0	5.0	3.0	2.8	30.9	40.5	33.1	47.6	38.8	40.0
Mae La	2.9	4.5	4.0	4.0	4.8	5.5	43.2	37.8	39.5	37.6	32.3	36.2
Umpiem Mai	3.9	3.8	3.4	2.1	3.5	1.4	48.4	42.0	38.2	32.9	29.2	33.1
Nu Po	4.1	5.0		1.6	2.9	1.7	42.7	28.5		37.9	41.5	34.0
Tham Hin			2.7	2.1	2.8	2.5			28.8	38.0	35.6	39.4
Ban Don Yang	4.3	2.9	3.9	1.6	2.2	2.0	34.1	46.7	36.6	41.8	37.7	38.8
	3.3	**3.6**	**4.2**	**2.8**	**3.5**	**2.7**	**38.8**	**35.7**	**34.2**	**39.6**	**34.3**	**36.2**

Note: Surveys were not conducted in Tham Hin camp in 2003; 2005 data for Nu Po camp were not completed due to staffing changes in the health agency.

Graph 1: GAM and GCM border-wide trend from 2003-2008



UNDER-WEIGHT MALNUTRITION (or GROWTH FALTERING)

- On average, 28.5% of children surveyed were under-weight border-wide.
- Males (28.6%) and females (28.3%) had a similar prevalence of under-nutrition (Table 7).
- Children living in camp less than one year had only a slightly higher (p-value not significant) prevalence of under-weight (29.4%) compared to children living in camp longer than one year (28.4%). Time living in camp was solely based on the response of the child's caregiver and was not verified by documentation (Table 9).

Table 7: Under-weight Malnutrition (Weight-for-Age z-scores) by Sex

	Female		Male		Total	
	Count	%	Count	%	Count	%
Not Underweight	1782	71.7%	1852	71.4%	3634	71.5%
Underweight	704	28.3%	743	28.6%	1447	28.5%
Total	2486	100.0%	2595	100.0%	5081	100.0%

Table 8: Under-weight Malnutrition rates by camp

Camps	% Underweight per Camp	Number Underweight per Camp	Number Surveyed
BDY	30.0	149	497
ML	32.5	247	760
MLO	35.3	218	617
MRML	38.9	207	532
NP	21.1	89	422
UM	19.5	97	497
TH	29.5	267	904
S2	23.7	106	448
S1	16.6	67	404
Total	28.5	1447	5081

Table 9: Under-weight Malnutrition rates by time living in camp(s)

New Arrival	Mean	N
in camp more than 12 months	28.4	4815
in camp less than 12 months	29.4	255
Total	28.4	5070

ACUTE MALNUTRITION (or WASTING)

- Border-wide 2.7% of children are acutely malnourished (Table 10), while 9.4% are at risk of becoming malnourished (W/H z-score $\leq$-1.5 but $\geq$-2).
- Males (2.7%) and females (2.7%) have the same prevalence of global acute malnutrition (GAM) border-wide (Table 10).

- Rates of GAM, according to WHO cut-offs, are within 'acceptable' limits of less than 5% of the under-five population (Table 10). The exception is Mae La, where the rate has increased since 2007 from 4.8% to 5.5% in 2008 (Graph 1). We will continue to monitor this situation.
- At least 5% of 1-2 year olds surveyed were acutely malnourished (Graph 2).
- Children living in camp less than one year had only a slightly higher (p-value not significant) prevalence of under-weight (29.4%) compared to children living in camp longer than one year (28.4%). Time living in camp was solely based on the response of the child's caregiver and was not verified by documentation (Table 12).

Table 10: Global Acute Malnutrition (GAM) rates by sex

	Female		Male		Total	
	Number	% of Total Female	Number	% of Total Male	Number	% of Total
GAM	68	2.7%	70	2.7%	138	2.7%
SAM	0	.0%	0	.0%	0	0.1%*
MAM	68	2.7%	70	2.7%	138	2.7%
At Risk GAM	225	9.1%	250	9.6%	475	9.4%

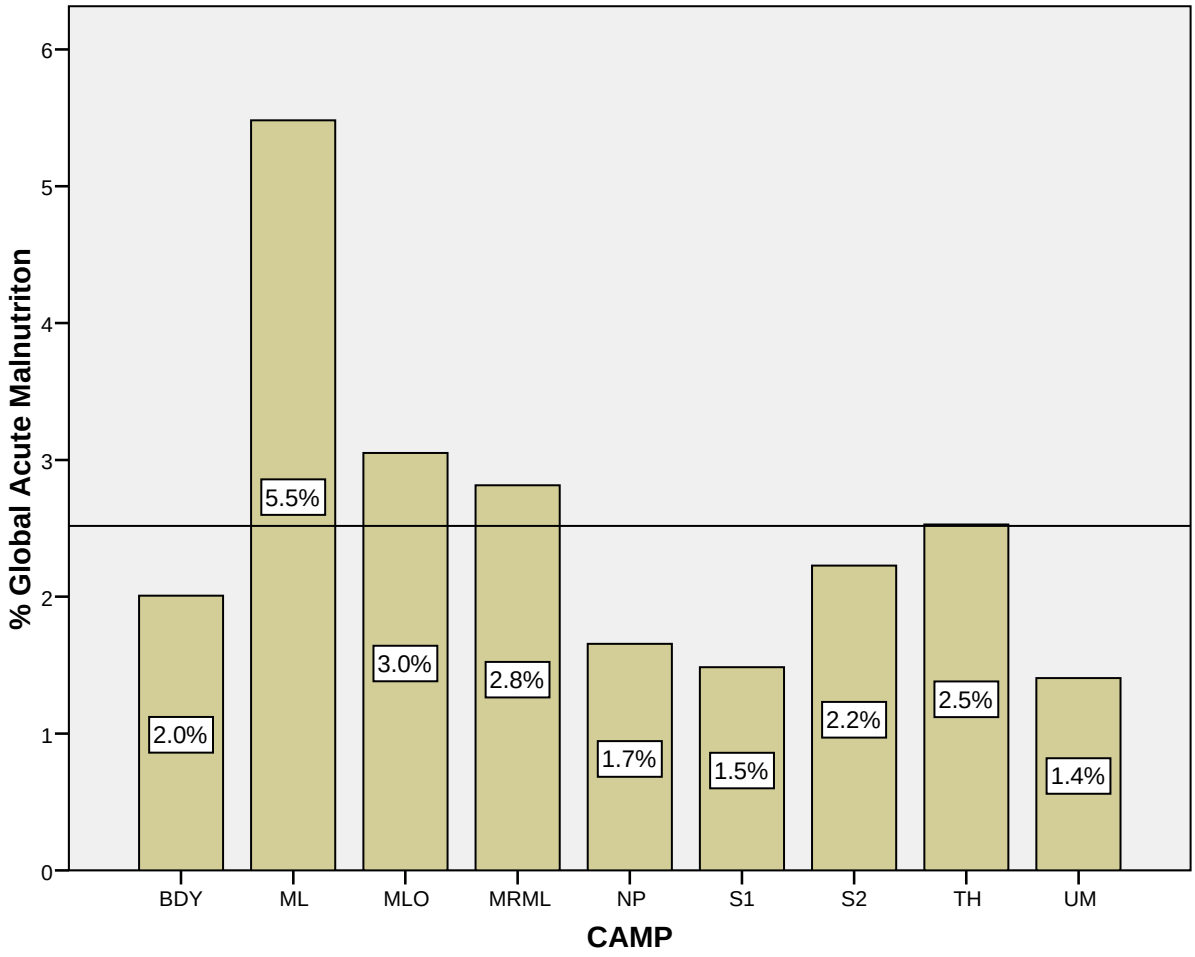
*SAM – no children in the survey were found with a W/H <-3 z-score; however, 3 cases of bilateral pitting oedema were identified (also classified as severe malnutrition).

Note: GAM (Global Acute Malnutrition) = moderate + severe acute malnutrition (<-2 z-score W/H); SAM (Severe Acute Malnutrition) = <-3 z-score W/H; MAM (Moderate Acute Malnutrition) = <-2 but ≥-3 z-score W/H; At Risk GAM = ≤-1.5 but ≥-2 z-score W/H.

Table 11: Global acute malnutrition (GAM) rates by camp

Camps	% GAM per Camp	Number with GAM per Camp	Total Surveyed in camp
BDY	2.0%	10	498
ML	5.5%	41	748
MLO	3.0%	19	623
MRML	2.8%	15	533
NP	1.7%	7	423
UM	1.4%	7	498
TH	2.5%	23	910
S2	2.2%	10	449
S1	1.5%	6	404
Total	2.7%	138	5086

Graph 1: GAM by camp



Graph 2: GAM by age groupings border-wide

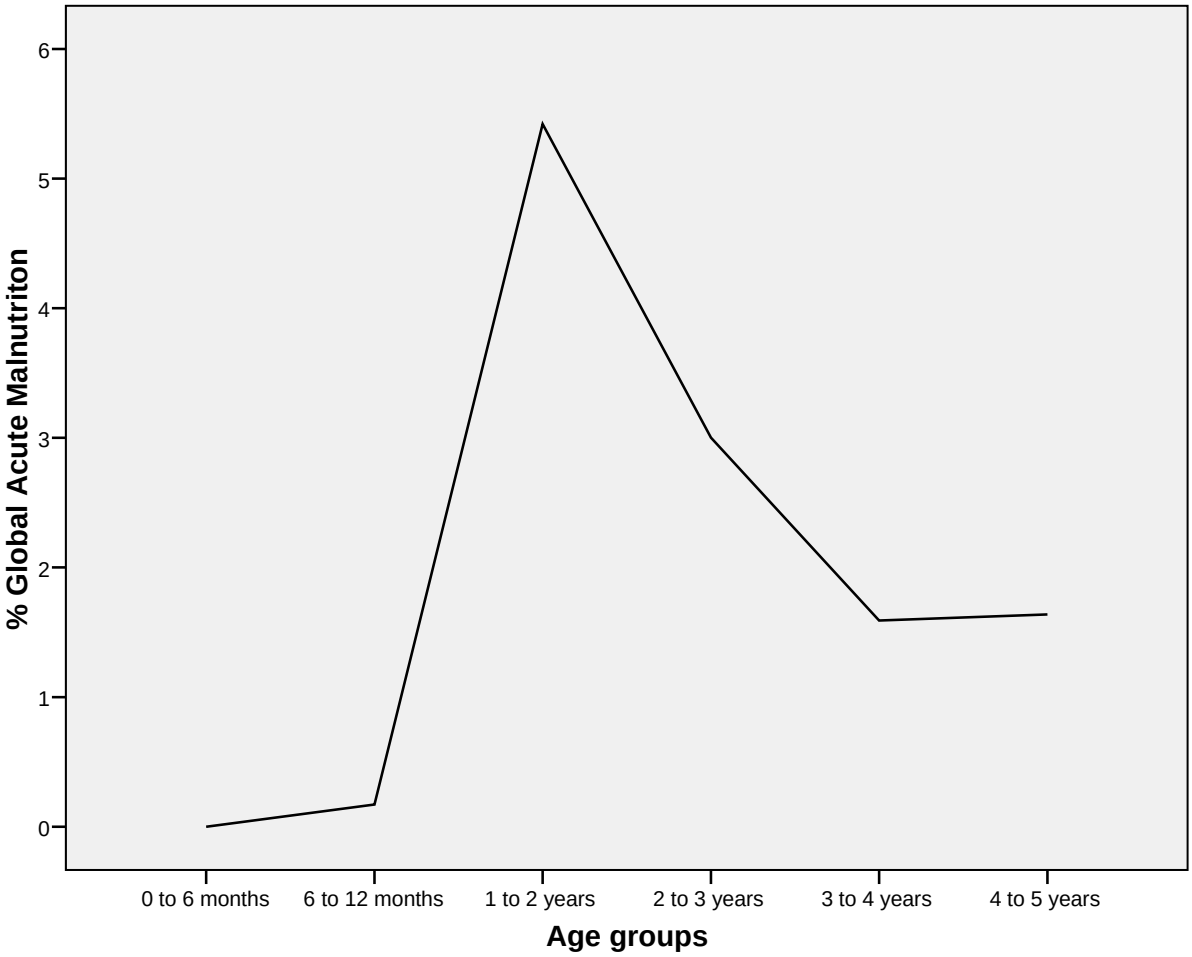


Table 11: Global acute malnutrition rates by new arrival

New Arrival	Mean	Number
In camp more than 12 months	2.7	4818
In camp less than 12 months	3.5	257
Total	2.7	5075

CHRONIC MALNUTRITION

- Border-wide 36% of children are chronically malnourished (Table 12), while 20% are at risk of becoming chronically malnourished (H/A z-score $\leq$-1.5 but $\geq$-2).
- Males (37%) and females (36%) have a similar prevalence of chronic malnutrition (GCM) border-wide (Table 12).

- Border-wide prevalence of GCM, according to WHO cut-offs, is 'high' with between 30-39.9% of the under-five population chronically malnourished. All camps are within this range except for Site1 and Site2, considered 'medium' and MLO and MRML considered 'very high' per WHO cut-off values.
- Approximately 50% of 4-5 year olds surveyed are chronically malnourished (Graph 4).
- Children living in camp less than one year had only a slightly higher (p-value not significant) prevalence of chronic malnutrition (37%) compared to children living in camp longer than one year (36%). Time living in camp was solely based on the response of the child's caregiver and was not verified by documentation (Table 14).

Table 12: Global chronic malnutrition rates by sex (Height-for-Age z-scores)

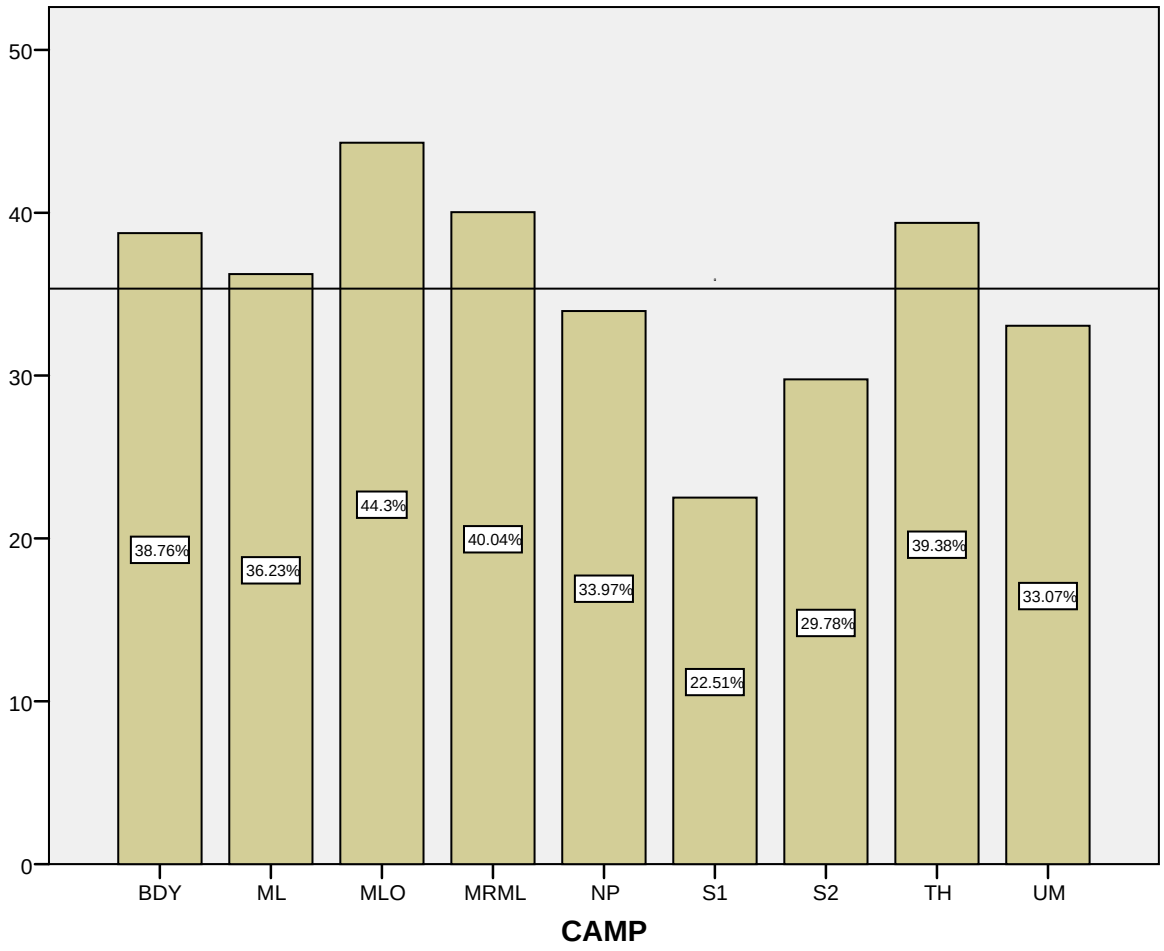
	Female		Male		Total	
	Number	% of Females	Number	% of Males	Number	% of Total
GCM	890	35.8%	956	36.6%	1846	36.2%
SCM	217	8.8%	249	9.6%	466	9.2%
MAM	669	27.1%	704	27.0%	1373	27.1%
At Risk GCM	490	19.8%	506	19.4%	996	19.6%

Note: GCM (Global Chronic Malnutrition) = moderate + severe chronic malnutrition (<-2 z-score H/A); SCM (Severe Chronic Malnutrition) = <-3 z-score H/A; MCM (Moderate Chronic Malnutrition) = ≥-3 but <-2 z-score H/A; At Risk GCM = ≤-1.5 but ≥-2 z-score H/A.

Table 13: Global chronic malnutrition rates by camp

Camps	% GCM per Camp	Number with GCM per camp	Total Number in Camp
BDY	38.8%	193	498
ML	36.2%	271	748
MLO	44.3%	276	623
MRML	40.0%	215	537
NP	34.0%	143	421
UM	33.1%	165	499
TH	39.4%	354	899
S2	29.8%	134	450
S1	22.5%	95	422
Total	36.2%	193	5097

Graph 3: GCM by camp



Graph 4: GCM by age groupings border-wide

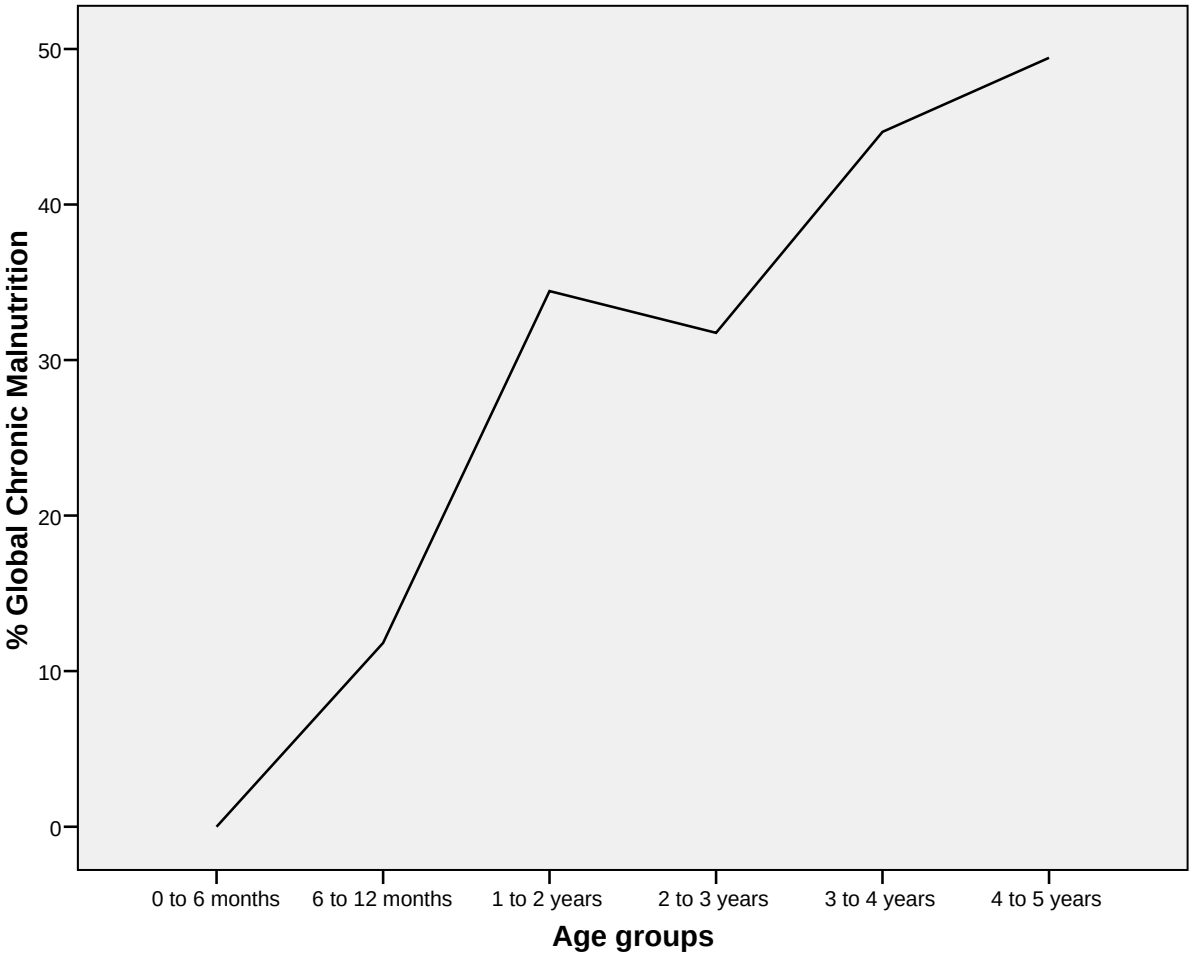


Table 14: Global chronic malnutrition by new arrival

New Arrival	% of GCM	Number
In camp more than 12 months	36.1	4831
In camp less than 12 months	37.3	255
Total	36.2	5086

BIRTH WEIGHT

- Birth weight was determined by documentation on the child's health card, if not documented, the caregiver was asked the birth weight.
- Border-wide 10% of children had a low birth weight (Table 15), while 0.6% had a very low birth weight.
- Average birth weight border-wide is 3.05 kg (Table 16).
- There is a statistically significant correlation between a child's birth weight and malnutrition (Table 17).

Table 15: Average birth weight border-wide

	Number	% of Total
Normal Birth Weight (> 2.5 kg)	3804	89.4%
Low Birth weight (2.5 – 1.5 kg)	426	10.0%
Very Low Birth Weight (< 1.5 kg)	27	0.6%

Table 16: Average birth weight by camp

Camp	Mean (in kgs)	N
BDY	2.98	410
ML	2.94	623
MLO	2.91	595
MRML	3.34	396
NP	3.08	324
UM	3.09	391
TH	2.99	715
S2	3.18	385
S1	3.12	418
Total	3.05	4257

Table 17: Prevalence of Under-weight, GAM and GCM by birth-weight border-wide

	Number of Cases	% GAM (Borderwide: 2.7%)	%GCM (Borderwide: 36.2%)	% Under-weight (Borderwide: 28.5%)
Normal Birth Weight (> 2.5 kg)	3748	2%	32%	24%
Low Birth weight (2.5 – 1.5 kg)	421	8%	54%	53%
Very Low Birth Weight (< 1.5 kg)	26	15%	81%	67%
Significance		P-value < .001 Very Significant for GAM, GCM and Underweight		

MICRONUTRIENT DEFICIENCIES and OEDEMA

Table 18: Number and percent of children presenting with angular stomatitis

	Number	Percent
No	5106	99.0
Yes	50	1.0
Total	5156	100.0

Table 19: Number and percent of children presenting with bilateral pitting oedema

	N	Percent
No	5152	99.9
Yes	3	0.1
Total	5156	100.0

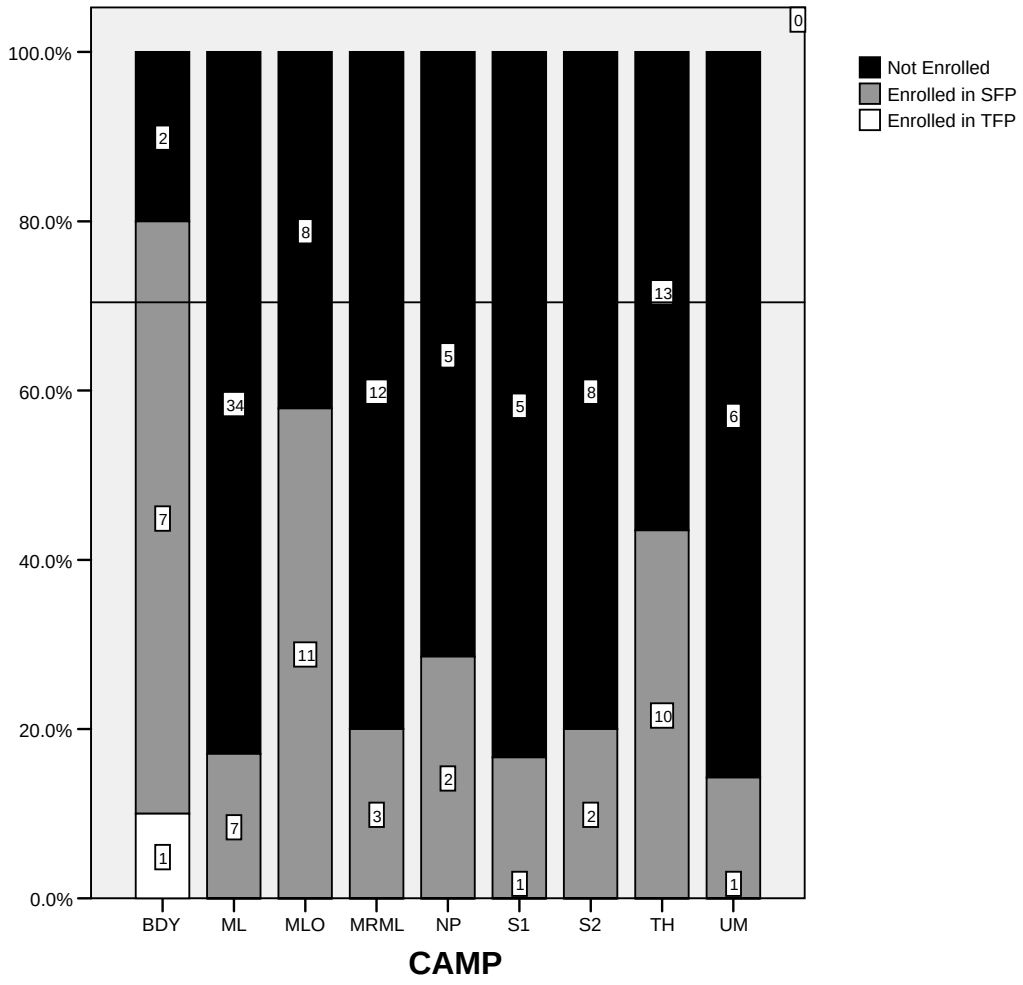
SELECTIVE FEEDING PROGRAM COVERAGE

- Supplementary feeding program (SFP) coverage in a camp setting should be at least 90% of children with <-2 wt/ht z-scores. TBBC's contract agreement with health agencies is for a minimum coverage of 70%.
- SFP enrolment was determined for the survey by looking for documentation on the child's health card, and if nothing was documented then by asking the caregiver if the child is currently enrolled in SFP or TFP. Health agencies are encouraged to have documentation to help ensure accuracy of SFP coverage data.
- Border-wide only 33% of children with acute malnutrition was currently enrolled in SFP during the survey.
- Only in Ban Don Yang were at least 70% of children identified as acutely malnourished currently enrolled in SFP (Graph 5).

Table 20: Selective feeding program coverage

Selective feeding programme	No. of children	%
Children with W/H z-score <-2	138	2.7%
Enrolled in programme with W/H z-score <-2	46	0.9%
Not enrolled with W/H z-score <-2	93	1.8%
Program coverage	46 of 138	33%

Graph 5: Selective feeding program (SFP) coverage by camp



VITAMIN A SUPPLEMENTATION COVERAGE

- Vitamin A supplementation coverage per the Burma Border Protocol is that ≥95% of children <5 years old should receive a preventive Vitamin A dose every 6 months.
- Vitamin A supplementation provision was determined for the survey only by looking for documentation on the child's health card. Health agencies are encouraged to have documentation available for the survey in order to help ensure accuracy of coverage data.
- Border-wide only 49% of children had received Vitamin A within the past 6 months (Table 21).

Table 21: Vitamin A supplementation programme coverage

	% children <5 that received Vit A supplement in the past 6 months	Average number of months since last Vit A supplement
Site 1	2.3%	25
Site 2	97.5%	3
MLO	20.9%	18
MRML	18.8%	15
Mae La	34.1%	8
Umpiem	24.0%	12
Nu Po	84.7%	5
Tham Hin	39.6%	12
Don Yang	100%	1
All Camps:	49.3%	10.3

METHODOLOGY

Sampling

Sampling Method: exhaustive survey for 3 of the 9 camps and systematic random sampling from community health worker or camp committee household lists for 6 of the 9 camps.

Sample Size Calculation for random sampling:

$$n = \frac{k \times t2 \times (1-p) \times p}{\gamma 2}$$

n= sample size
k= design effect- for simple random sample, use 1
t= confidence interval (1.96 for 95% confidence interval)
p= estimated prevalence of malnutrition
γ= precision

Sample Size from Above Formula (using 95% CI and a design effect of 1)

	Prevalence	Precision	Sample Size	+10%
Camp	**Acute**			

EXAMPLE: Sampling Interval Calculations

CAMP	
Total population of children <5	13,972 X 14.2% (UN reg and CHW population) = 1,985
# households in the camp	= 2,357
# children <5 per household	= 1985 / 2,357 = 0.84
# households needed to achieve the sample size	= 506 / 0.84 = 602
Sampling interval	= 2,357 / 602 = 3.9 (round up) = every '***3rd***' household

Sample Selection

1. The starting zone and section is randomly selected.
2. The first household in the zone or section is selected and marked, and then every ***'nth'*** household is selected and marked.
3. The process continues into the next section, until all sections are completed.
4. All households selected are recorded on a comprehensive list.
5. Home visitors and/or section leaders will determine if the households on the list have children between the ages of 6-59 months prior to the survey by visiting the selected households. Households without children 6-59 months will not be called to the survey.

Survey Procedure
All households will be called according to a schedule developed by the survey staff to a centralize location for the survey. All households selected are surveyed, even if the target number of children has already been reached. Households will be requested to bring the child's health card to the survey.

Every child between 6-59 months in the selected household is surveyed. If a child is found not to be between 6-59 months of age, they are not surveyed.
If the child is a patient at the IPD, the questionnaire is completed with the mother, and the child will be weighed and measured in the IPD.

If households fail to come to the survey, runners will follow up 3 times. If after 3 visits the household is not available, they are no longer included in the survey.

Clinical Exam and Measurements
Children are examined for angular stomatitis (fresh wound or healed, must be bi-lateral) and bilateral pitting edema. Weight measurements are taken using a Salter spring-type hanging scale to 25 kg. Height/length measurements are taken using a UNICEF standard height board. Children under 2 years or less than 85 cm in length are measured lying down; children above 2 years or greater than 85 cm in height are measured standing up.

A boy/girl combined z-score table will be used to find and refer children who are <-2 z scores to selective feeding programs. Any child found with angular stomatitis will be visited by a CHW. Any child found with bilateral pitting edema will be referred to the IPD and followed-up by a visit from a CHW. Any child identified as 'at risk' for acute malnutrition will be visited by a CHW.

Data Input and Analysis
TBBC Nutritionist and staff will enter, clean and analyze all data and then report back to health agencies.

Data Entry
- **ENA/SMART**: for each of the 9 camps data is entered directly into a camp specific ENA data entry template - id number, sex, birth date, and anthropometric data to calculate wt/age, wt/ht and ht/age z-scores (WHO/NCHS reference population) and all additional data input here.
- **SPSS 11.5**: data sets from ENA are then exported into one Excel spreadsheet which is then imported as a single dataset into SPSS for analysis.

CONCLUSIONS AND RECOMMENDATIONS

- Border-wide GAM levels are within 'acceptable' limits per WHO guidelines. The situation in Mae La (with GAM of 5.5%) will need further surveillance and monitoring.
- Border-wide GAM levels for children between the ages of 1-2 years old are at least 5%. Caregivers of children in this age range should be considered a high priority group for health, food and social service activities or programs.
- Border-wide GCM levels are considered 'high' with at least 50% of 4-5 year olds stunted. Although border-wide GCM has declined from 43% in 2003 to 36% in 2008 this is an area that needs greater support. Parents with children under 2 years of age should be targeted for health, food and social service activities or programs in order to have an impact on reducing stunting. After the age of 2 years it is difficult to reverse the effects of chronic malnutrition, or stunting.
- Health agencies should ensure that cooking demonstrations or other nutrition education activities are occurring in conjunction with SFP at least on a monthly basis, especially so caregivers are aware of how to use SFP specific foods and proper child feeding practices to help combat both acute and chronic malnutrition.
- Health agencies should ensure up-to-date and easily accessible documentation of SFP enrolment and Vitamin A supplementation prior to nutrition surveys.
- Border-wide, improvement is needed finding children with acute malnutrition and enrolling them into SFP. Since growth monitoring and promotion activities are the main way of identifying children who are malnourished and providing education to caregivers, health agencies need to ensure that proper procedures are being followed (growth monitoring for children from birth to 3 years every month and children from 3-5 years every 6 months).
- In 7 of 9 camps improvement is needed in the provision of preventative Vitamin A supplementation every 4-6 months to children 5 years old and younger (for Vitamin A protocol see Burma Border Guidelines Book or Vitamin A Burma Border Protocol online at www.tbbc.org/resources).

DEFINITIONS AND BENCHMARKS

Malnutrition

TERM	MEASURE	CUTOFF
global acute (GAM)	weight for height	<-2 z scores
moderate acute (MAM)	weight for height	<-2 to ≥-3 z scores
severe acute (SAM)	weight for height	<-3 z scores
global chronic (GCM)	height for age	<-2 z scores
moderate chronic (MCM)	height for age	<-2 to ≥-3 z scores
severe chronic (SCM)	height for age	<-3 z scores

WHO Classification: Global Acute Malnutrition

severity	prevalence in <5 population
acceptable	<5%
poor	5-9%
serious	10-14%
critical	>15%

'emergency' refers to acute malnutrition rates >20%

WHO Classification: Global Chronic Malnutrition

severity	prevalence in <5 year population
low	<20%
medium	20-29.9%
high	30-39.9%
very high	> 40%

Micronutrient Malnutrition

Angular stomatitis = presence of bilateral fissures on corners of mouth (fresh wounds or scars)

Edema = pitting, bi-lateral on top of foot

Selective Feeding Programs

Selective feeding program coverage = ≥90% in camp setting (Sphere Minimum Standards in Nutrition and Food Aid).

Vitamin A

Vitamin A coverage = ≥95% in children <5 years to receive 6 monthly preventive dose (see BBG or Burma Border Vitamin A Protocol).

Special thanks to Nick Kaufman and Sharmila Shewprasad for SPSS data analysis for this report.