Strategies for Malnutrition ‘Hotspots’

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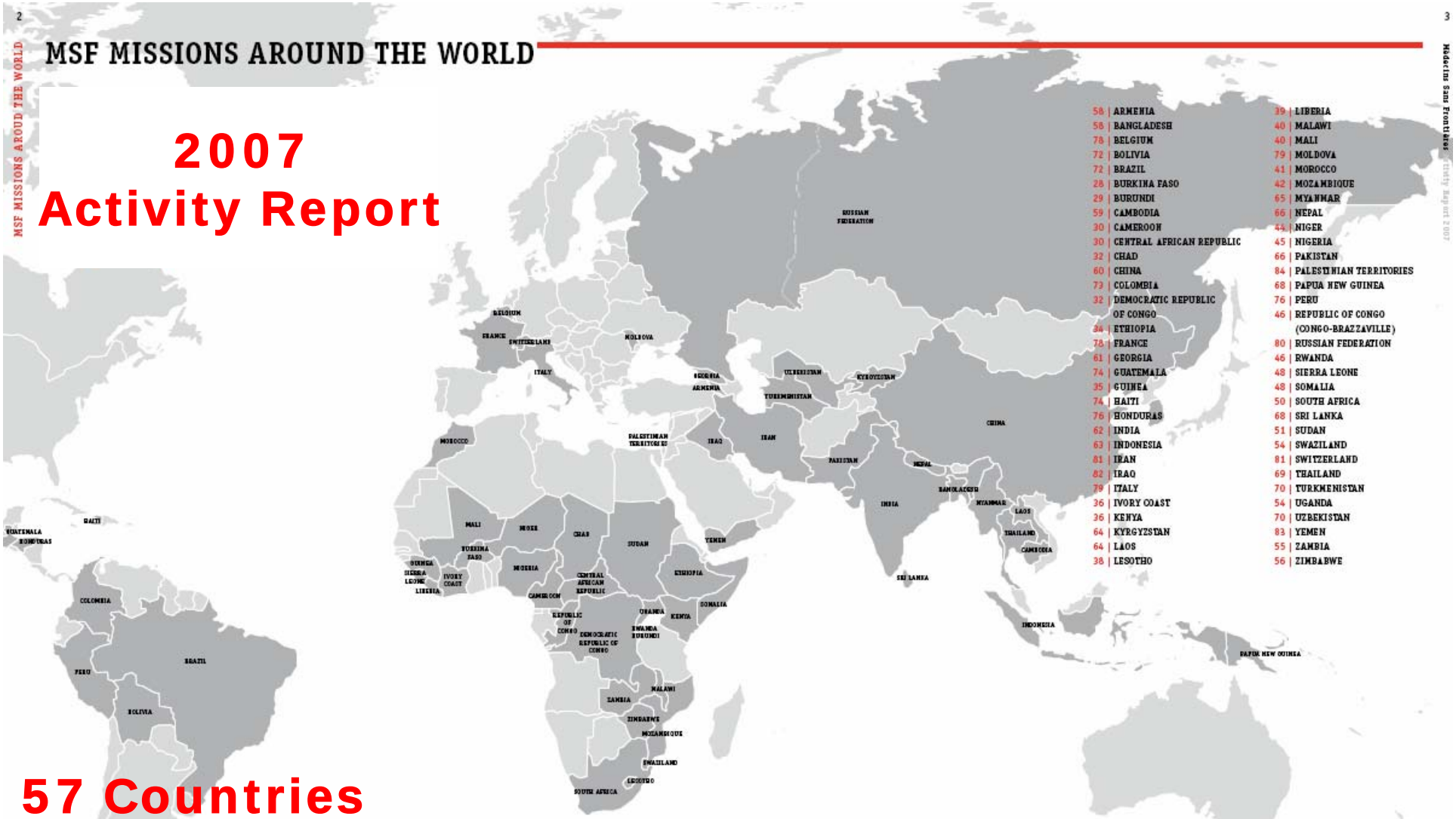
MSF – Access Campaign for Essential Medicines

Columbia University

September 11, 2008

MSF MISSIONS AROUND THE WORLD

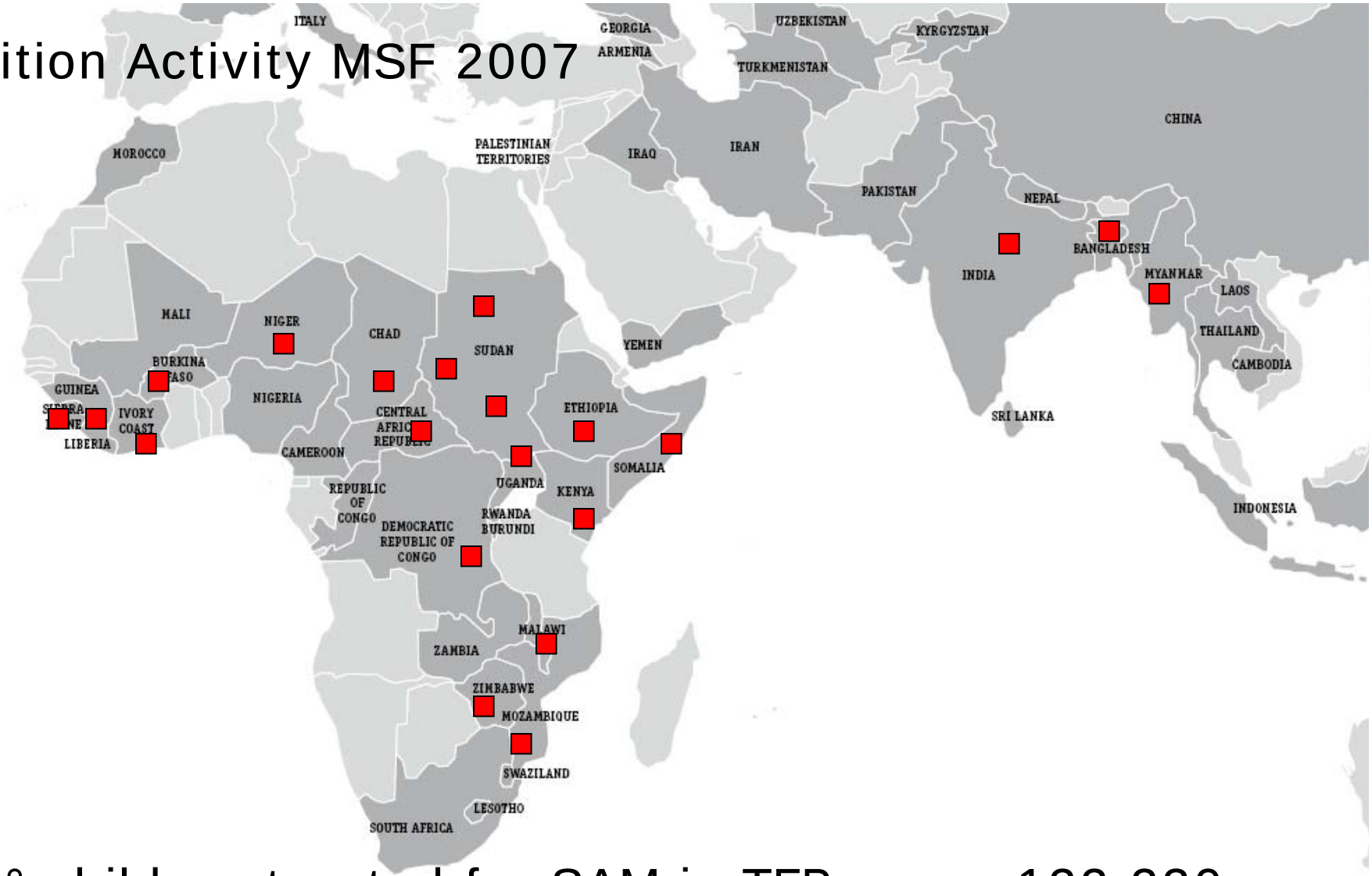
2007
Activity Report



58 | ARMENIA
58 | BANGLADESH
78 | BELGIUM
72 | BOLIVIA
72 | BRAZIL
28 | BURKINA FASO
29 | BURUNDI
59 | CAMBODIA
30 | CAMEROON
30 | CENTRAL AFRICAN REPUBLIC
32 | CHAD
60 | CHINA
73 | COLOMBIA
32 | DEMOCRATIC REPUBLIC OF CONGO
34 | ETHIOPIA
78 | FRANCE
61 | GEORGIA
74 | GUATEMALA
35 | GUINEA
74 | HAITI
76 | HONDURAS
62 | INDIA
63 | INDONESIA
81 | IRAN
82 | IRAQ
79 | ITALY
36 | IVORY COAST
36 | KENYA
64 | KYRGYZSTAN
64 | LAOS
38 | LESOTHO
39 | LIBERIA
40 | MALAWI
40 | MALI
79 | MOLDOVA
41 | MOROCCO
42 | MOZAMBIQUE
65 | MYANMAR
66 | NEPAL
44 | NIGER
45 | NIGERIA
66 | PAKISTAN
84 | PALESTINIAN TERRITORIES
68 | PAPUA NEW GUINEA
76 | PERU
46 | REPUBLIC OF CONGO (CONGO-BRAZZAVILLE)
80 | RUSSIAN FEDERATION
46 | RWANDA
48 | SIERRA LEONE
48 | SOMALIA
50 | SOUTH AFRICA
68 | SRI LANKA
51 | SUDAN
54 | SWAZILAND
81 | SWITZERLAND
69 | THAILAND
70 | TURKMENISTAN
54 | UGANDA
70 | UZBEKISTAN
83 | YEMEN
55 | ZAMBIA
56 | ZIMBABWE

57 Countries
8.45 million outpatient consults
340,690 hospital admissions
Staff 24,500 (8% international)

Nutrition Activity MSF 2007



N° children treated for SAM in TFP: 122,230

N° children treated for MAM in SFP: 64,980

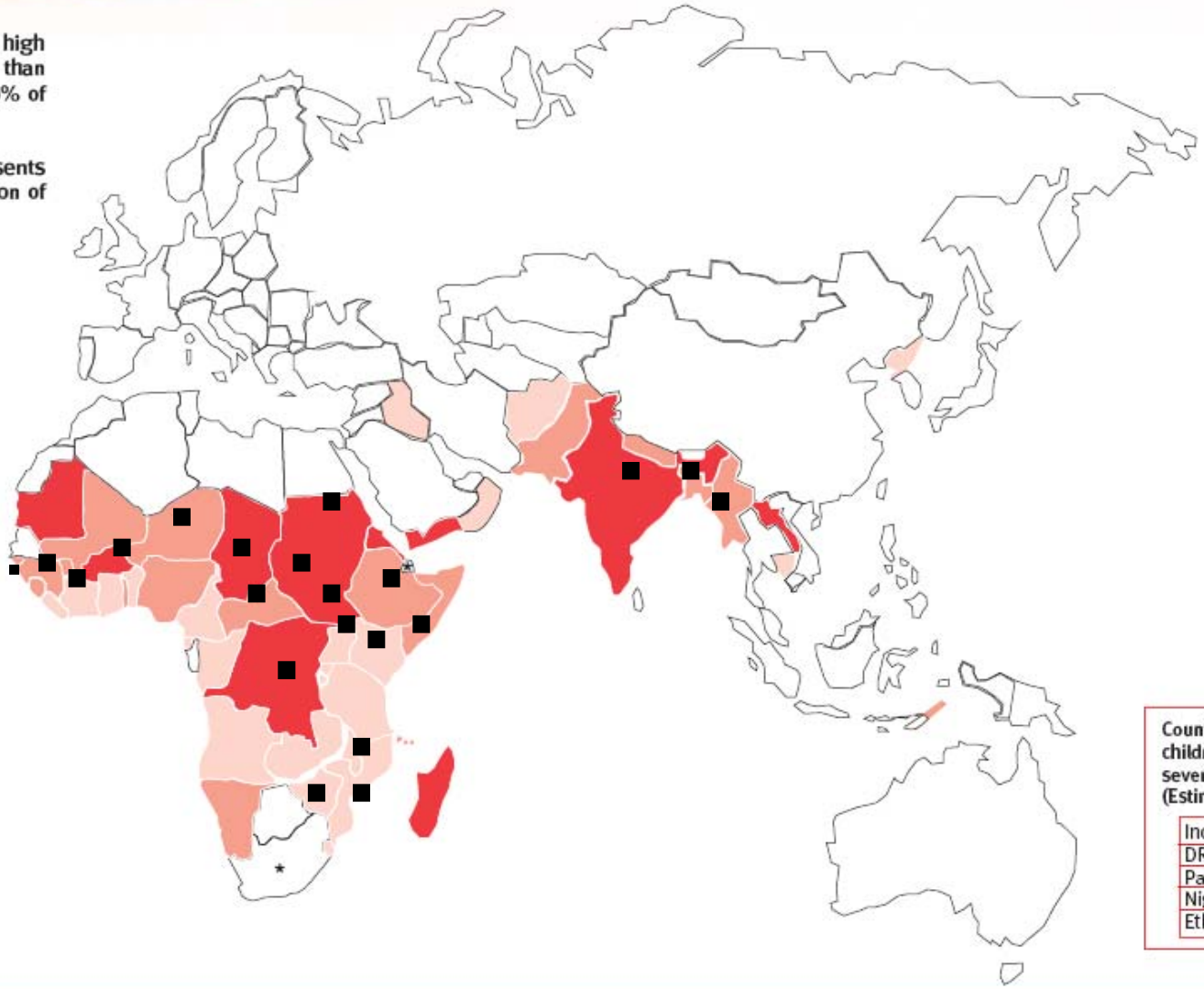
N° children receiving RUF blanket: 67,000

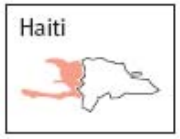
Malnutrition Hotspots

The 50 shaded countries have a high under-five mortality rate (greater than 50 per 1,000) and greater than 30% of stunting[8] in under-fives.

The following legend represents wasting[9] in the under-five population of these countries.

- Countries with more than 15% acute malnutrition[10]
- Countries with more than 10% acute malnutrition[11]
- Countries with more than 4% acute malnutrition[12]
- * No data





Countries with the most children under-five with severe acute malnutrition. (Estimates in millions)

India	8.0
DRC	1.3
Pakistan	1.2
Nigeria	1.1
Ethiopia	0.6

■ Denotes Country with MSF Nutrition Program

What is an Undernutrition Hotspot?

High mortality + High prevalence stunting,
wasting is variable and fluctuates rapidly

Delhi: U5M = 47/1000

Stunting 42%

Rajasthan: U5M = 85/1000

Stunting 44%. SAM 7.3%

Gujarat: U5M = 61/1000

Stunting 52%

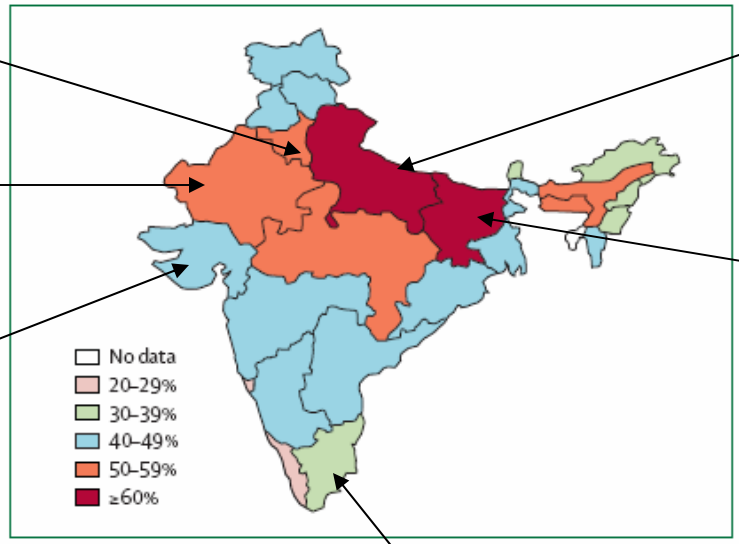


Figure 3: Prevalence of stunting among children under 5 years old in India by state

Uttar Pradesh: U5M = 96/1000

Stunting 57%. SAM 5.1%

Bihar + Jharkhand:

U5M = 90/1000

Stunting 50%. SAM 8.3%

Tamil Nadu: U5M = 35/1000

Stunting 31%

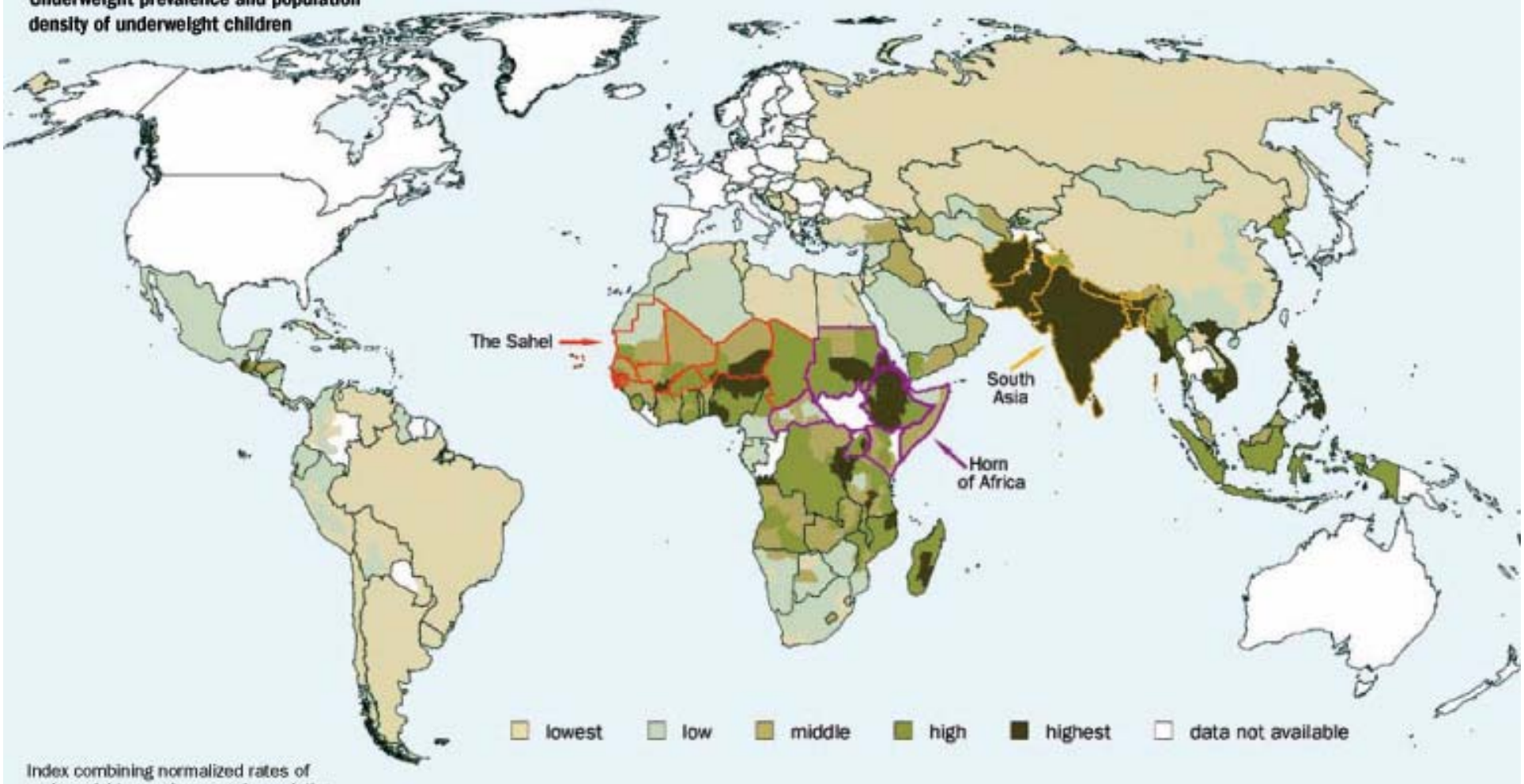
India NFHS 2005	**6.4% SAM**	**49% stunting**	**U5M 74/1000**

CAMPAIGN FOR ACCESS TO ESSENTIAL MEDICINES

MEDECINS SANS FRONTIERES

Malnutrition Hotspots

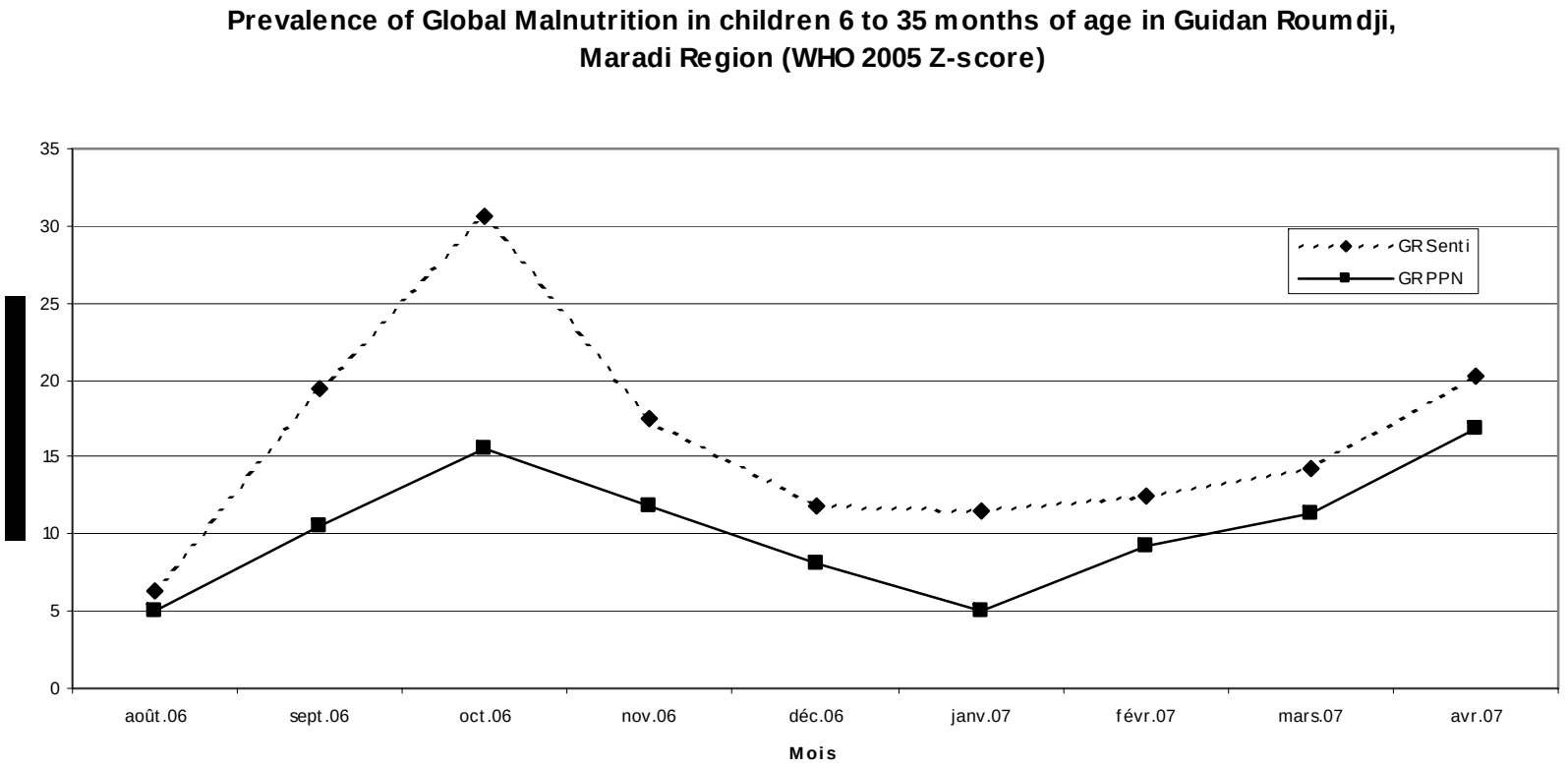
Underweight prevalence and population density of underweight children



Index combining normalized rates of underweight prevalence and population density of underweight children.

Adapted from UN Millennium Project 2005. Halving Hunger: It Can Be Done. Task Force on Hunger.

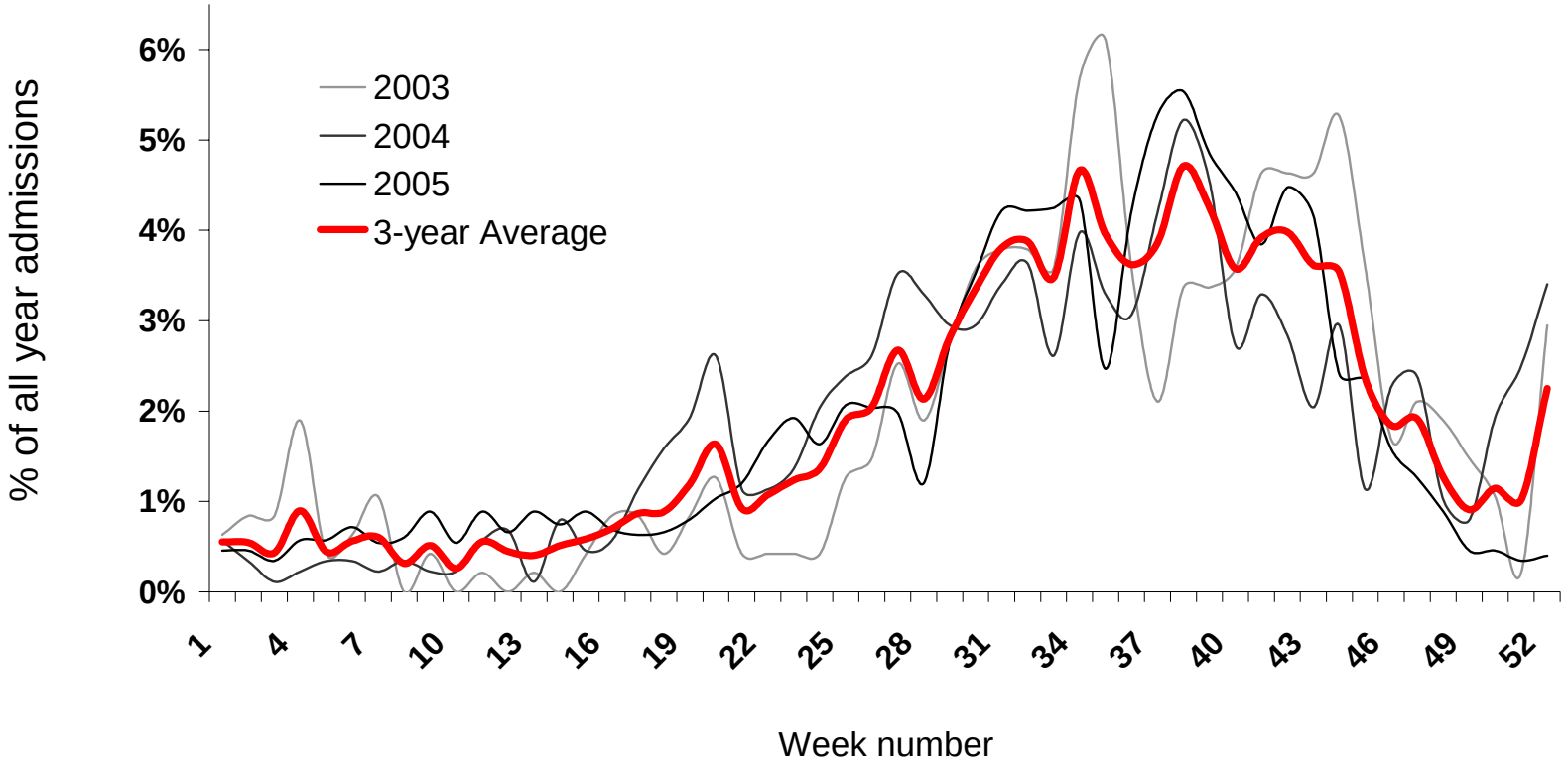
Nutrition Surveys: a snap-shot in time



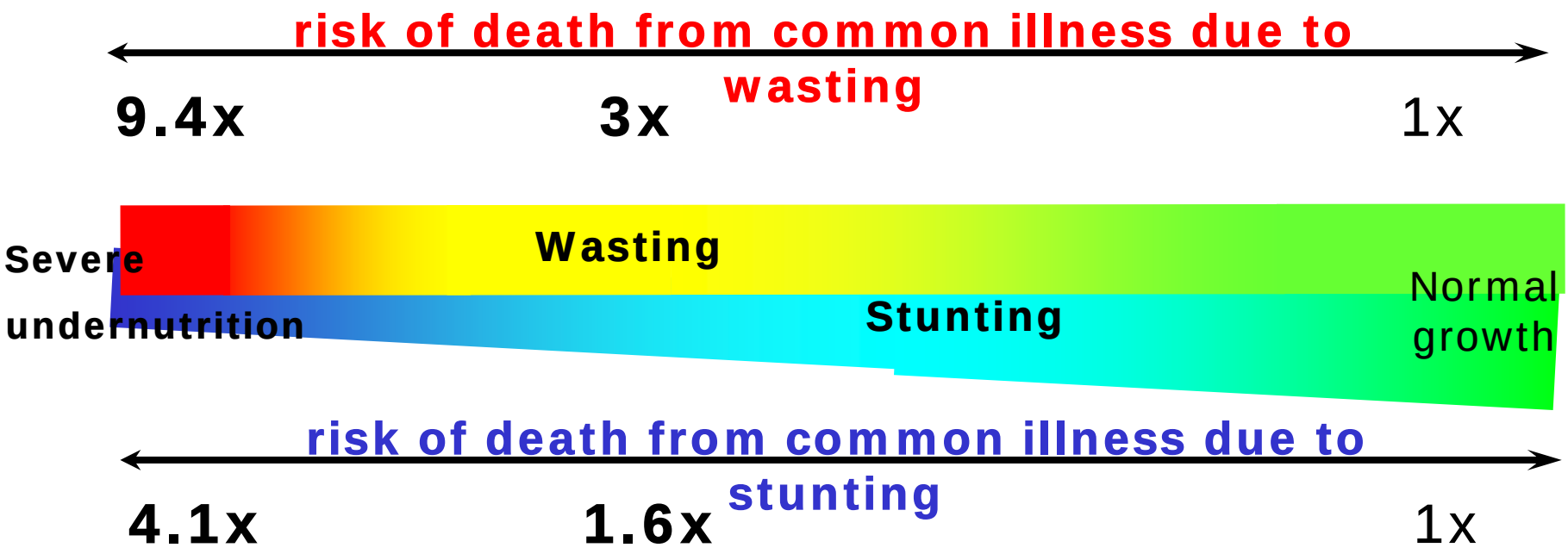
Seasonality severe malnutrition

Admissions of children with W/H < 70% (NCHS)
weekly proportion of total inclusions in the year

Guidan Roumji, Niger, 2003-2005



Wasting + Stunting Overlap



Govt of Niger Nutrition Survey Oct 2005:

70% of children with moderate or severe wasting were also stunted

Relationships between Undernutrition and under 5 mortality

	<–3 (95% CI)	–3 to <–2 (95% CI)	–2 to <–1 (95% CI)	More than –1
Weight-for-age (Z score)				
Overall*	9·7 (5·2–17·9)	2·5 (1·8–3·6)	1·8 (1·2–2·7)	1·0
Diarrhoea*	9·5 (5·5–16·5)	3·4 (2·7–4·4)	2·1 (1·6–2·7)	1·0
Pneumonia*	6·4 (3·9–10·4)	1·3 (0·9–2·0)	1·2 (0·7–1·9)	1·0
Malaria†	1·6 (1·0–2·7)	1·2 (0·5–3·5)	0·8 (0·2–3·2)	1·0
Measles‡	6·4 (4·6–9·1)	2·3 (1·7–3·2)	1·3 (1·1–1·5)	1·0
Height-for-age (Z score)				
Overall*	4·1 (2·6–6·4)	1·6 (1·3–2·2)	1·2 (0·9–1·5)	1·0
Diarrhoea*	4·6 (2·7–8·1)	1·6 (1·1–2·5)	1·2 (0·9–1·7)	1·0
Pneumonia*	3·2 (1·5–6·7)	1·3 (0·9–2·1)	1 (0·6–1·6)	1·0
Malaria†	2·1 (0·9–4·9)	1·0 (0·4–2·4)	0·7 (0·5–0·9)	1·0
Measles‡	2·8 (1·4–5·8)	1·7 (0·8–3·6)	0·7 (0·5–0·9)	1·0
Weight-for-height (Z score)				
Overall*	9·4 (5·3–16·8)	3·0 (2·0–4·5)	1·5 (1·2–1·9)	1·0
Diarrhoea*	6·3 (2·7–14·7)	2·9 (1·8–4·5)	1·2 (0·7–1·9)	1·0
Pneumonia*	8·7 (4·8–15·6)	4·2 (3·2–5·5)	1·6 (1·1–2·4)	1·0
Malaria†	2·3 (1·6–3·2)	3·0 (1·0–8·9)	0·9 (0·3–2·6)	1·0
Measles‡	6·0 (4·3–8·2)	3·7 (2·5–5·5)	1·8 (0·9–3·6)	1·0

*Ghana, Senegal, Guinea Bissau, the Philippines, India, Nepal, Bangladesh, Pakistan. †Ghana, Senegal, and Guinea Bissau. ‡Nepal, Ghana, Senegal, Guinea Bissau, and the Philippines.

Table 2: Odds ratio for mortality by weight-for-age, height-for-age and weight-for-height by cause of death

stunting

wasting

Black R et al. Maternal and Child Undernutrition: Global and Regional Exposures and Health Consequences. Lancet 2008; 371: 243-60.

WHO 2005 Growth Standards

- Multi-centric study:
  - 8 440 children
  - 6 countries (Brazil, Ghana, India, Oman, Norway, USA)
- Breast-fed children
- Applicable to children from 0 to 60 months
- Important implications for the measured prevalence of acute malnutrition

Numerator: NCHS vs WHO

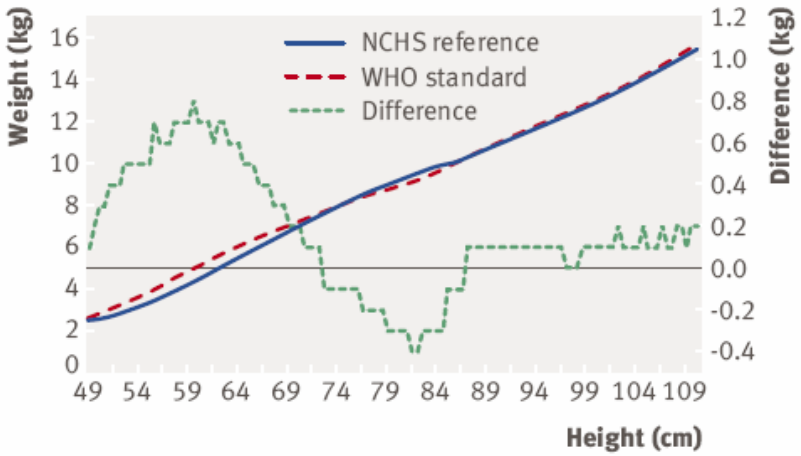


Fig 2 | Comparison of weight for height −2 z score cut-offs for diagnosing acute malnutrition in boys

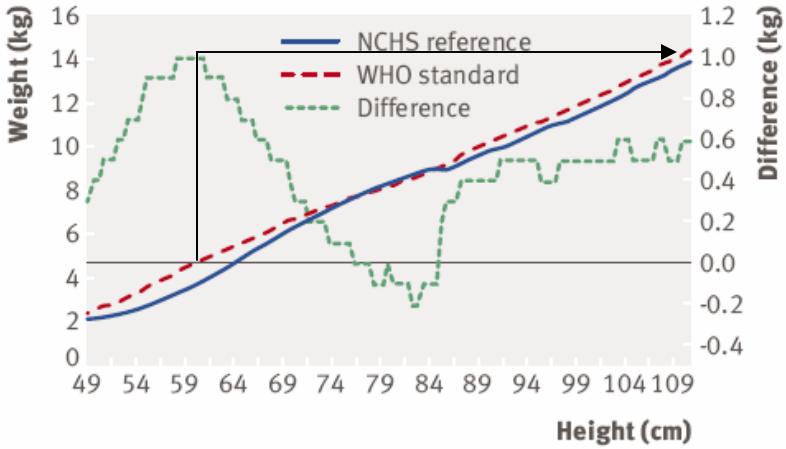


Fig 1 | Comparison of weight for height −3 z score cut-offs for diagnosing acute malnutrition in boys

- WHO identifies more shorter children as acutely wasted
- The effect on severe wasting (<-3Z) is far more than that on moderate wasting
- Increase in prevalence of acute wasting influenced by prevalence of stunting
- Cut-offs still being discussed

BMJ

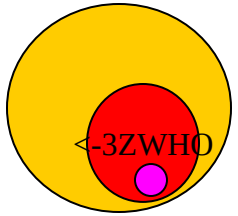
Operational implications of using 2006 World Health Organization growth standards in nutrition programmes: secondary data analysis

Andrew Seal and Marko Kerac

BMJ 2007;334;733; originally published online 23 Feb 2007;

ARCHIVES OF PEDIATRICS & ADOLESCENT MEDICINE

NM Dale, RF Grais, A Minetti, J Miettola, NC Barengo



Risk of Death *vs.* Different Classifications

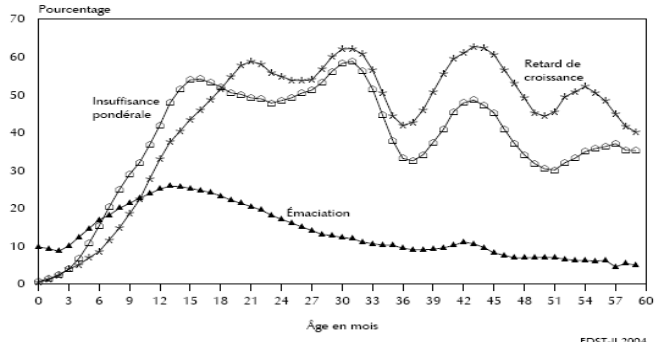
	N	Dead (%)	Risk
Moderate NCHS/Moderate WHO[1]	31,370 (59%)	71 (26)	0.23%
Moderate NCHS/Severe WHO[2]	19,781 (37%)	129 (47)	0.65%
Severe NCHS/Severe WHO[3]	2,238 (4%)	72 (27)	3.22%
Total	53,389	272 (100)	---

1 moderately malnourished (NCHS and WHO)
2 moderately malnourished (NCHS); severely malnourished (WHO)
3 severely malnourished (NCHS and WHO)

Arch Pediatr Adolesc Med. (*in press*) 2008

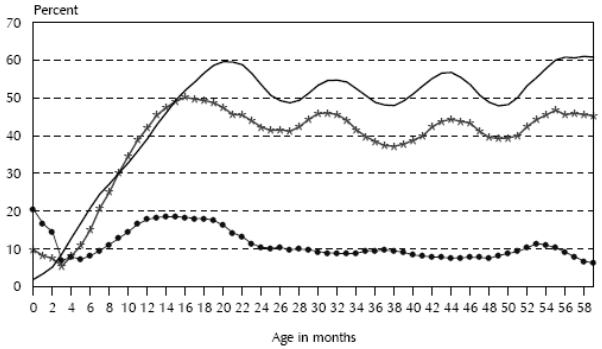
Acute vs Chronic?

Graphique 12.3 État nutritionnel des enfants de moins de 5 ans



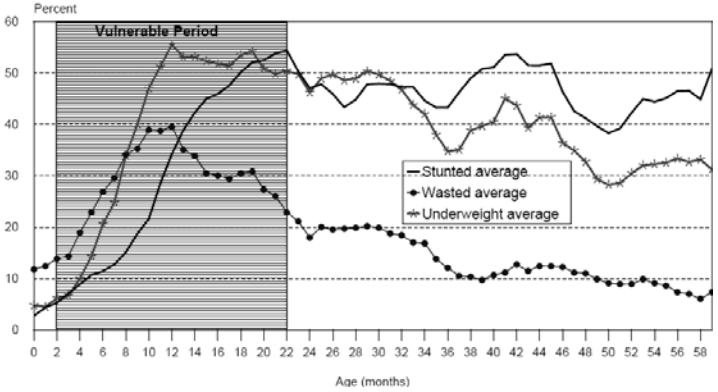
Chad: Jul 2004 – Dec 2005

Figure 11.3 Nutritional Status of Children Under Age Five



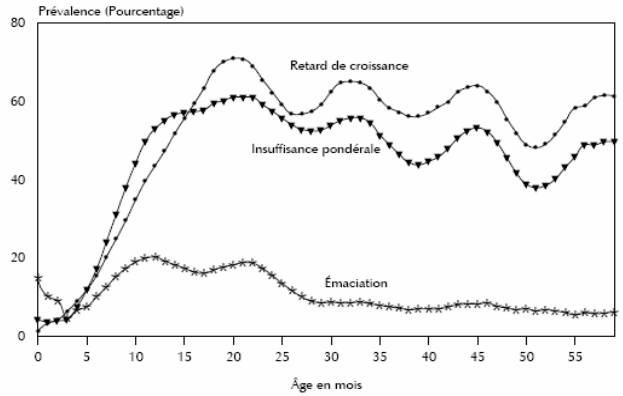
Ethiopia: May- Aug 2005

Stunting, Wasting, and Underweight by Age, Burkina Faso



Burkina Faso Aug-Dec 2003

Graphique 11.3 État nutritionel des enfants de moins de 5 ans



Niger: Jan-April 2006

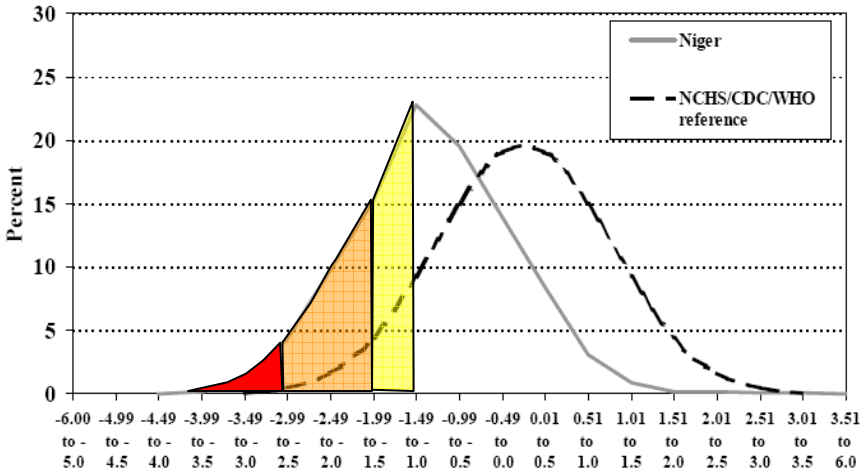
Improved Severe Acute Malnutrition Measure

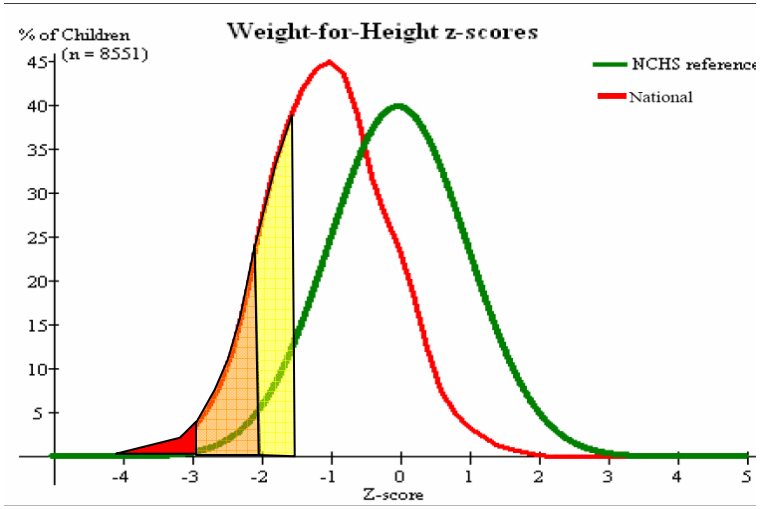
<-3 Z WFH NCHS	→	<-3 Z WFH WHO
Children < 59 mo.		Children < 35 mo.

- WHO classifies more younger and more stunted children as severely wasted. These are the children with the highest mortality risk.
- Focus on the age group (6 months – 2 to 3 years) most at risk for wasting and time period when stunting reversible

« Sick Population »

Figure 3: Répartition des scores z poids/taille, Enquête sur la nutrition en situation de crise, Niger, 17 septembre - 14 octobre 2005





Nutritional Survey, Govt of Niger-UNICEF-CDC. Oct-Nov 2005
NCHS

- **Prevalence acute wasting = 15.3 %**
- **Prevalence of severe wasting =1.8 %**
- **Mean WFH Z score = 1.5**

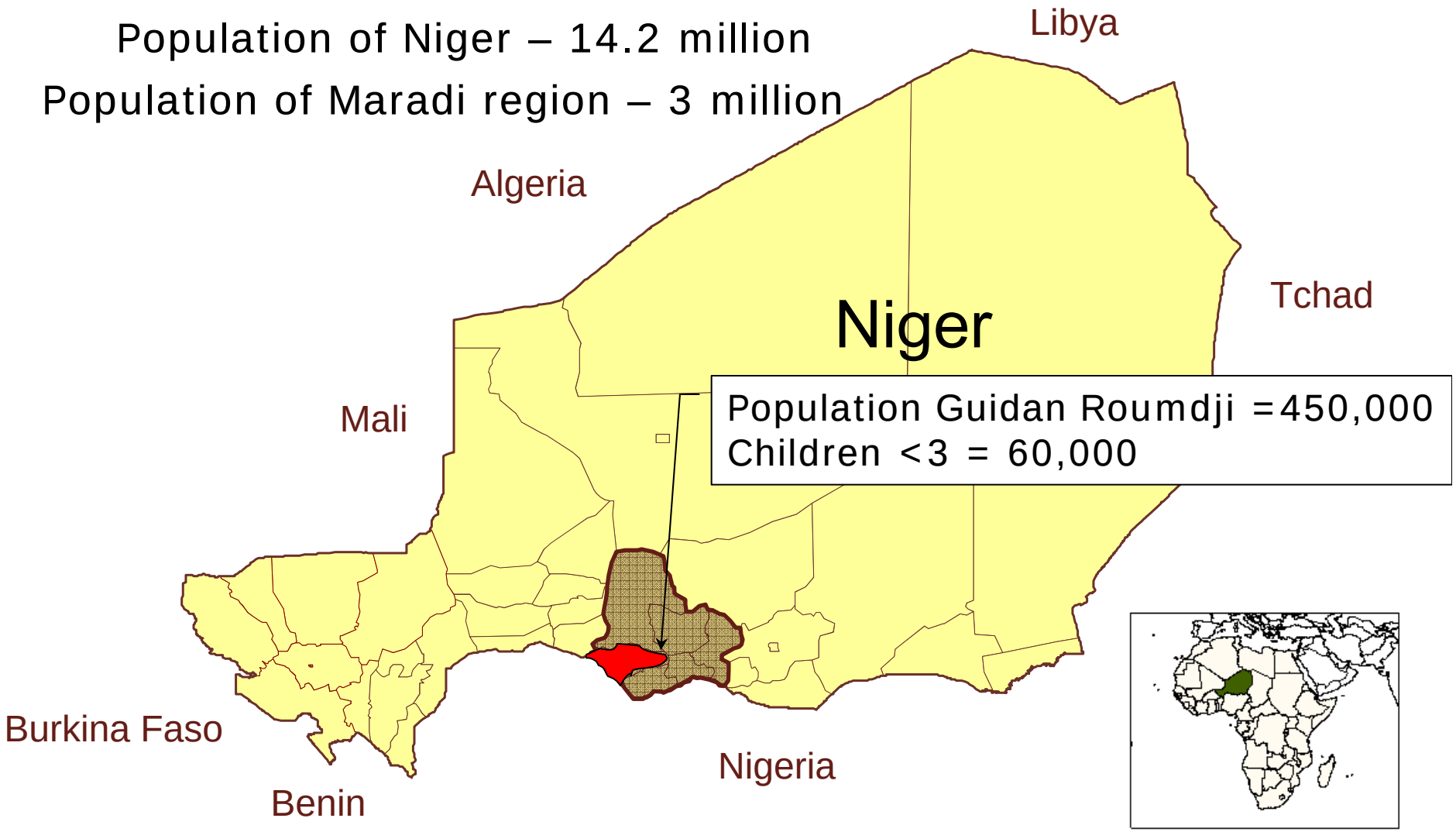
Nutritional Survey, Govt of Niger-UNICEF June 2007
NCHS

- **Prevalence acute wasting =11.2 %**
- **Prevalence of severe wasting =1.0 %**
- **Mean WFH Z score = 1.02**

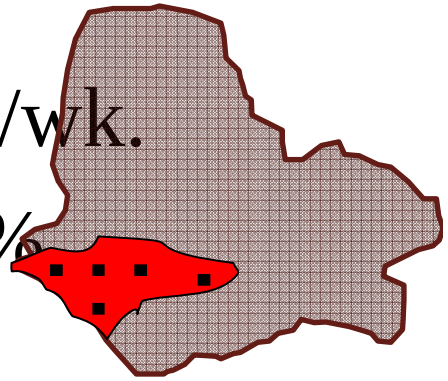
Region of Maradi

Population of Niger – 14.2 million

Population of Maradi region – 3 million



2006: RUTF for Moderate Acute Malnutrition



- Passive recruitment, 5 centers open 5 d/wk.

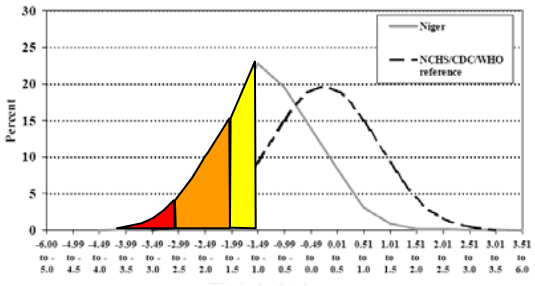
  Admission criteria : NCHS W/H < 80%

  Discharge : 2 weights >80%

- All children are managed by medical personnel (20 nurses – 1 doctor)
  - Only change to protocol: <u>No systematic antibiotics</u>
  - RUTF: 2 packets per day

2006 – Results: RUTF for Moderate Acute malnutrition

Figure 3: Répartition des scores z poids/taille, Enquête sur la nutrition en situation de crise, Niger, 17 septembre - 14 octobre 2005

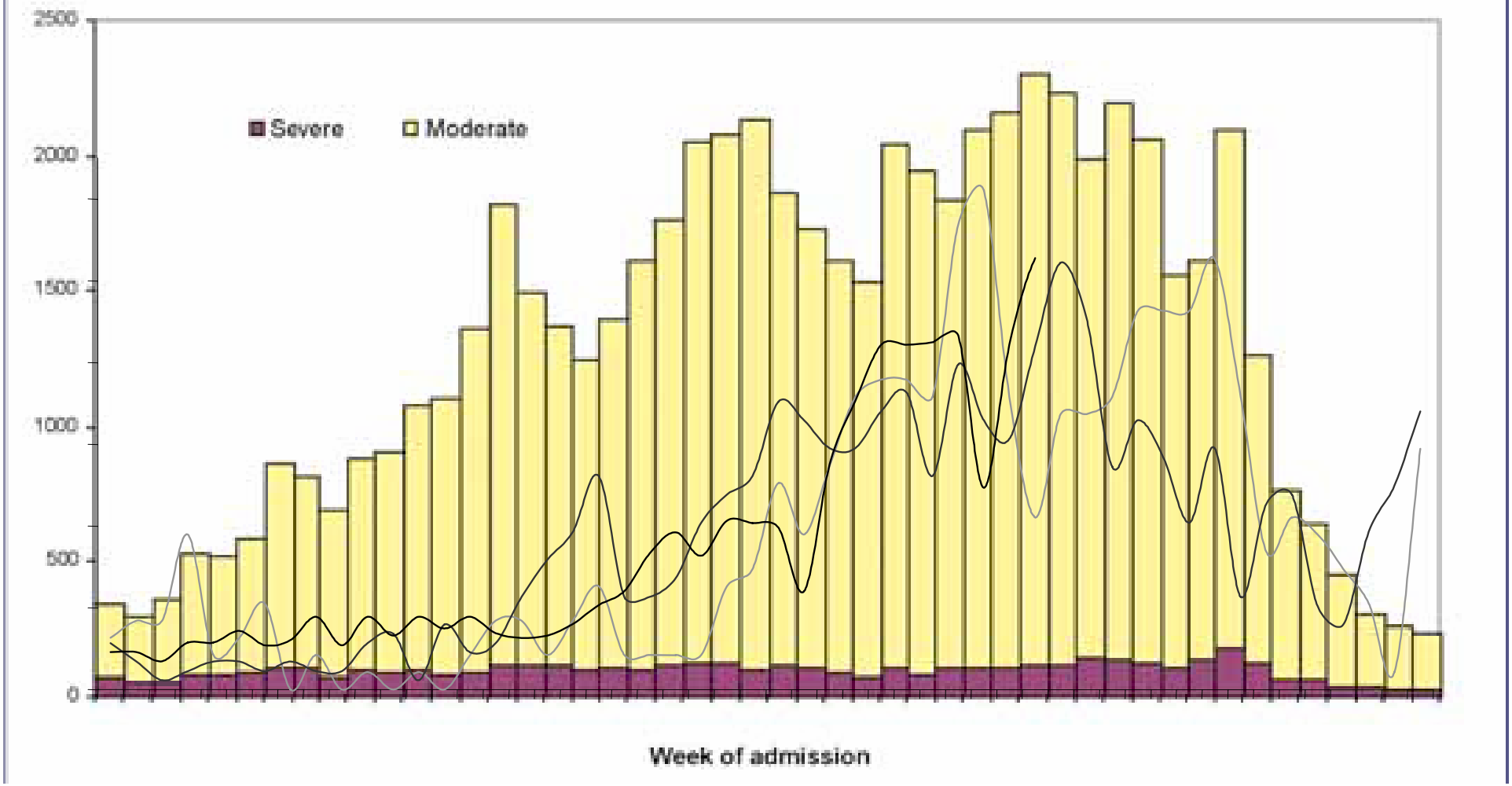


- 32,262 admissions for est 60,000 children < 3 yrs

  AROUND 50% OF CHILDREN IN THE DISTRICT

- 32,254 discharged, all screened by medical personnel
- Exit criteria : 2 consecutive weeks, W/H > 80%
- Recovery rate : 95.5%
- Weight gain (g/kg/day) : 5.3 (5.25 ;5.32)
- Mean length of stay (days) : 31.4 (31.3;31.6)

Figure 1 Weekly admissions of children, MSF therapeutic nutrition programme, Maradi region, Niger, 2006



Defourny, I et al. Field Exchange. Sept 2007

Randomised effectiveness trial

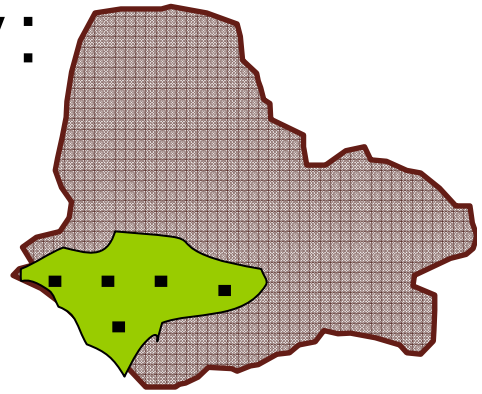
Magaria, Niger, 2007-2008

Plumpy'nut® (1000 Kcal/day) *vs* **Premix** (CSB, oil and sugar - 1231 Kcal/day)

Children 6-59 months with W/H 70 to <80% (median NCHS)

Preliminary results	PPN (n = 215)	Premix (n = 236)	P or Diff. [IC95%]
Recovery (W/H >= 85% - NCHS)	79 %	64 %	< 0.001
Transfer (CRENI)	9 %	19 %	0.003
Death	3 %	3 %	0.86
Defaulter	3 %	5 %	0.18
«Not-responding»	6 %	9 %	0.25
Weight gain (g/kg/d)			
up to recovery (children cured)	5.7 ± 3.0	4.6 ± 2.6	1.1 [0.5 ; 1.7]
first 2 wks (all children)	5.3 ± 4.2	3.5 ± 4.3	1.8 [1.0 ; 2.7]
Median length of stay (child. cured)	4 weeks	6 weeks	0.001
No evidence for a difference in MUAC gain, morbidity rate, height and haemoglobin gain, relapse at 1 and 3 months after recovery			

2007 -The Population Strategy: Targeted Distribution



- ***Blanket distribution***

  RUSF (46 g/ day) every month for 6 months during hunger gap for all children 6m to 3 yrs. (1.3 kg/month)

- 52 distribution sites

- 7 teams of 5 people + daily workers
- SAM treated using WHO standards (<-3z)

Defaulter rate in the distribution

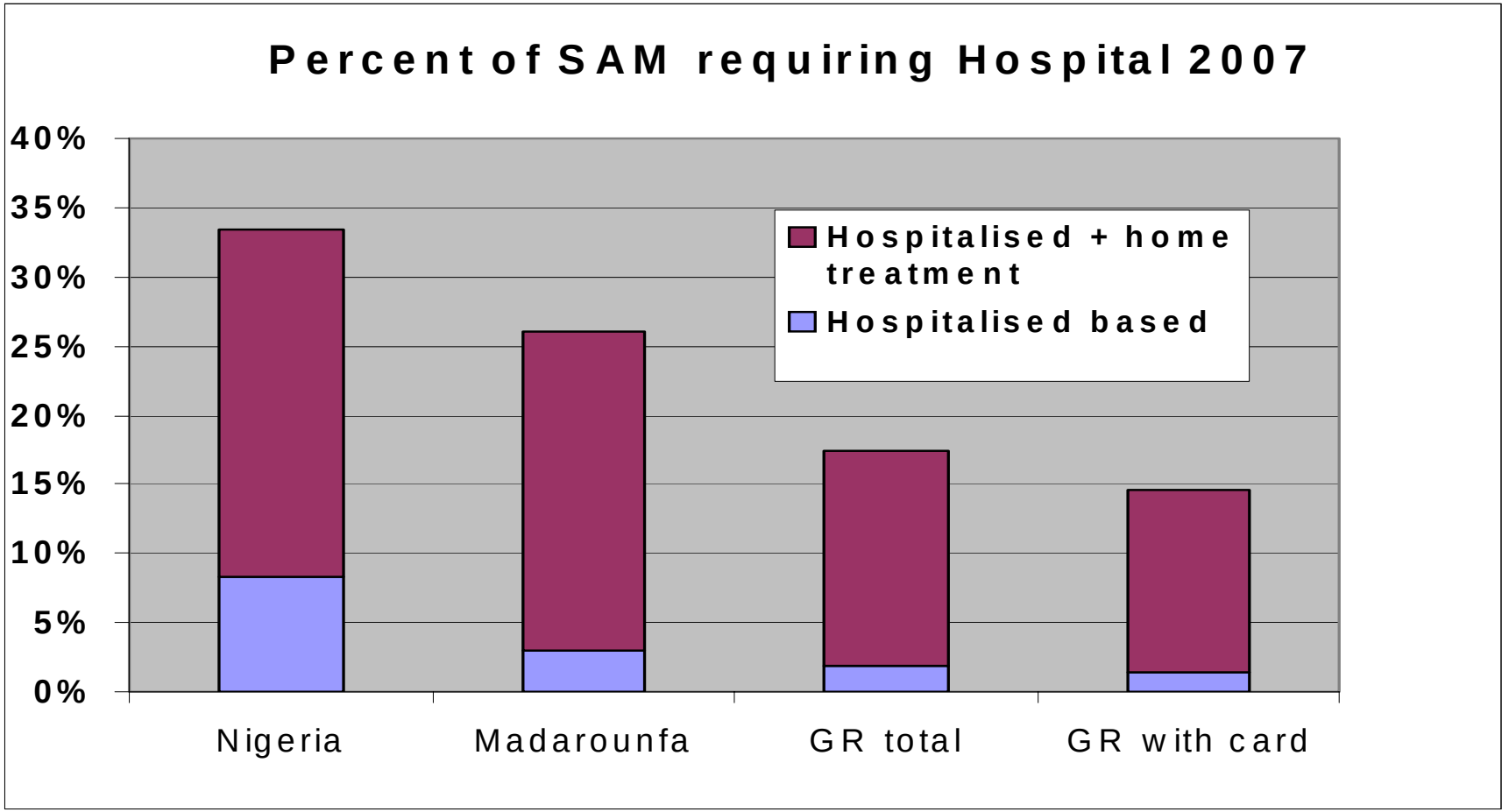
	Beneficiaries	Drop out	Drop out
Month	#	#	%
May	62,922	0	0.0
June	62,902	20	0.0
July	62,865	57	0.1
August	62,756	166	0.3
September	62,680	242	0.4
October	61,961	961	1.6

Targeted distribution in 2007

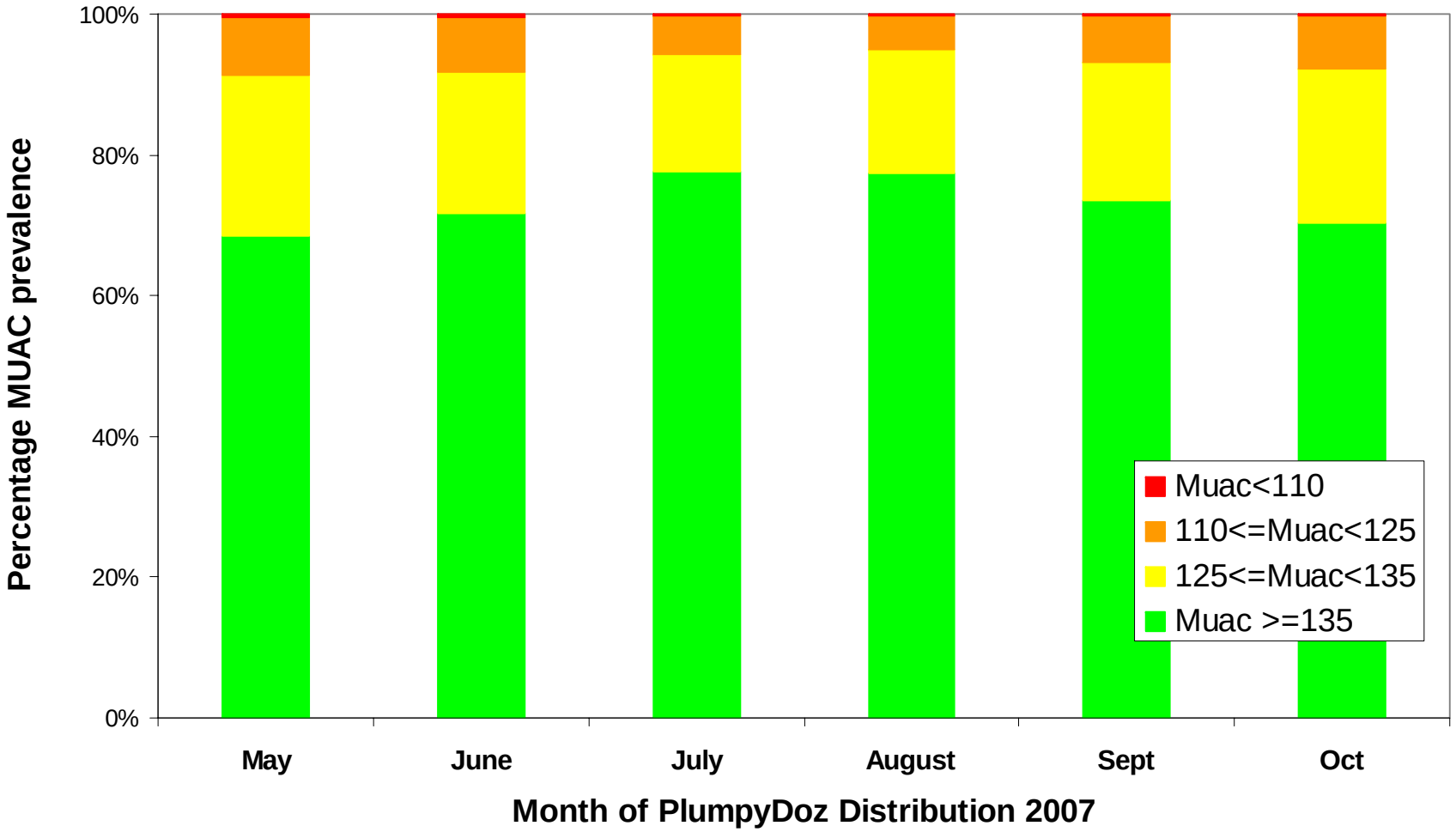
- 62 878 children 6 months to 3 yr
- Total ration per child during hunger gap:

  7.8 kg RUSF
- 7258 severely wasted admitted to therapeutic program (WHO 2005)
  - Cure rate : 89%
  - 1532 were severely malnourished according to NCHS

…relative decrease in severity of SAM



Monthly MUAC prevalence, Guidam Roumdji, distribution of PlumpyDoz, 2007 (n=62,680)

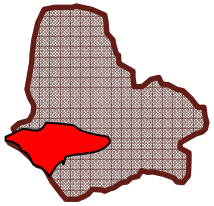


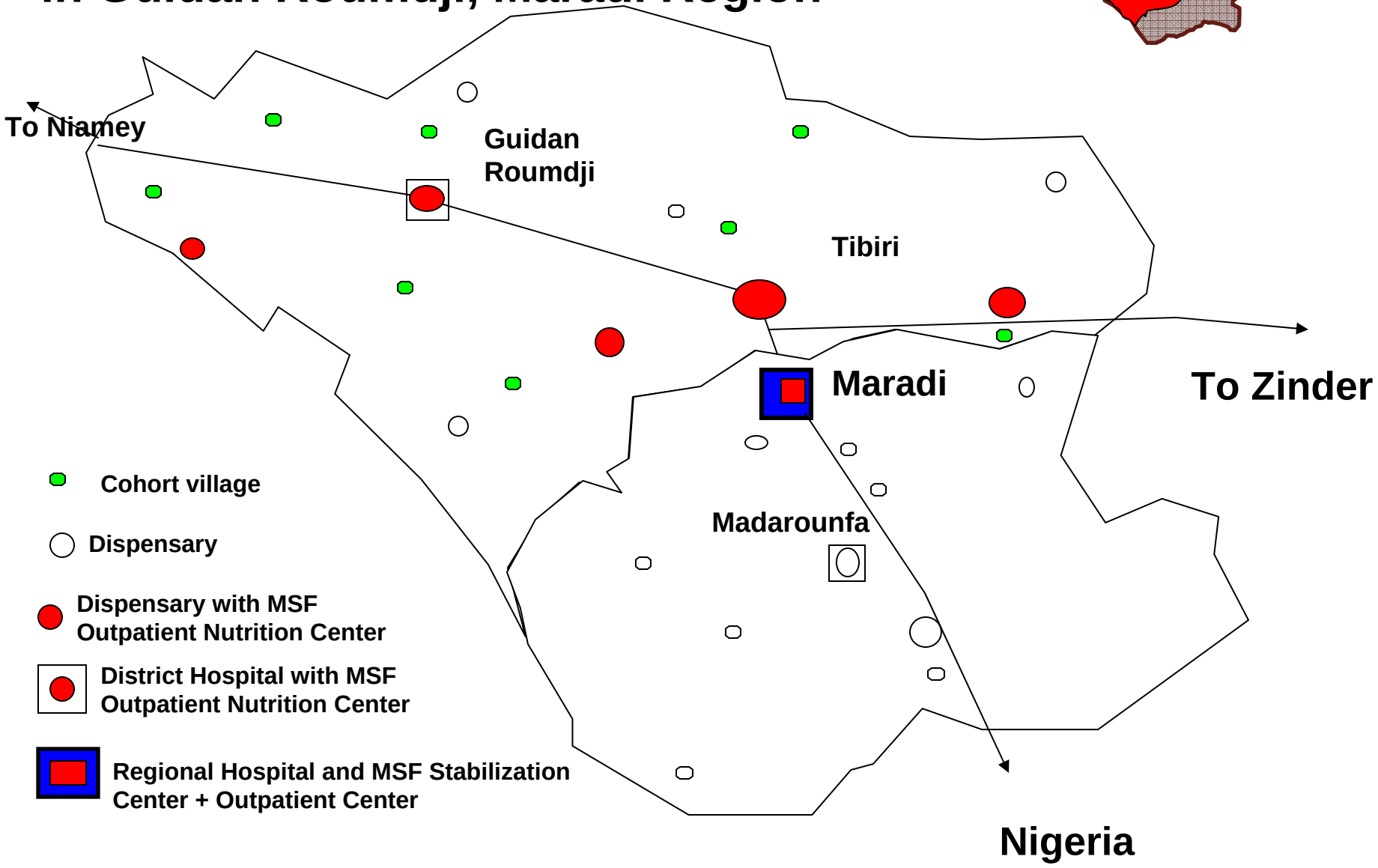
Detection of children with SAM by MUAC <110mm

Month	TOTAL	Normal		Severe		New severe	
2007	#	#	%	#	%	#	%
May	49,248	33,737	69	200	0.4		
June	56,172	40,784	73	204	0.4		
July	60,605	47,089	78	125	0.2	30	0.05
Aug	61,506	47,646	77	108	0.2	12	0.02
Sept	61,858	45,472	74	129	0.2	18	0.03
Oct	60,556	42,529	70	147	0.2	37	0.06

Longitudinal Cohort Villages

in Guidan Roumdji, Maradi Region



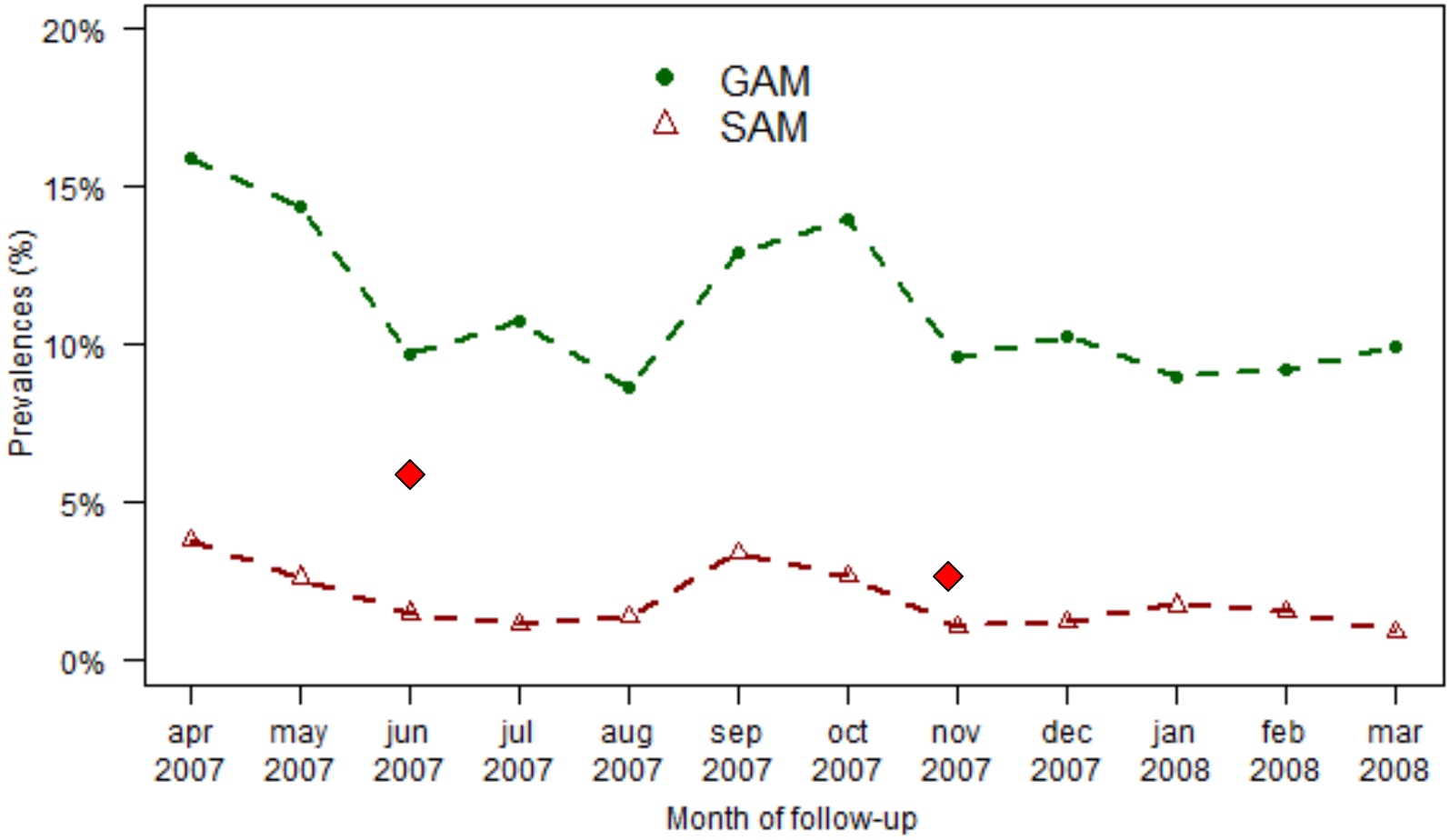


Adherence: population analysis

	Times received	Plumpy'doz N=383 % (N)
	July	95.3 (365)
	August	95 (364)
	September	95.6 (366)
	October	95.8 (367)

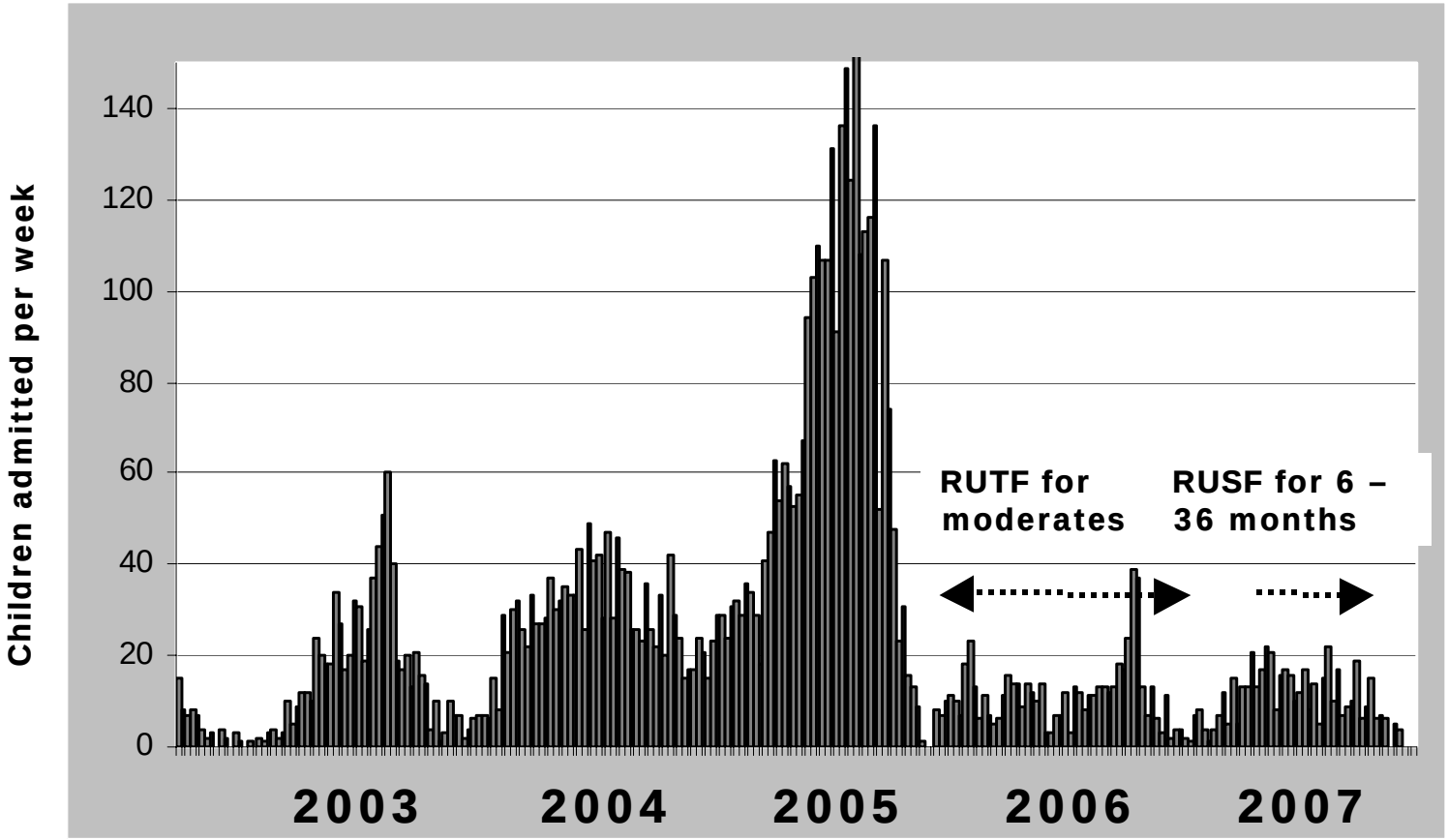
Monthly GAM and SAM prevalence, children 6-36 months

(WHO growth standards)



Source: Longitudinal cohort of children in Guidan Roumdji, Maradi, Niger
Epicentre, Ministry of Health, Niger

Admissions Guidan Roumdji by MUAC 2003-7



Key Messages

- Targeted feeding programs are most effective when they address the « few » at highest risk
- In high burden areas, must develop strategies to address the sick mean.
- Distribution of RUSF targeted to at-risk age group can affect the incidence of severe wasting.
- Places food quality at the center of effective response to childhood undernutrition