



# Malaria detection in relation to fever among malnourished children in Ethiopia

## Have we got it right ?

M. Khogali., R.Zachariah, A.Keiluhu, K. van den Brande, K. Tayler-Smith, L. Ayada  
D. Jima, S.G. Hinderaker, A.D Harries

Medecins Sans Frontieres

University of Bergen, Centre for International Health

Ministry of Health, Ethiopia

International Union Against Tuberculosis and Lung Diseases

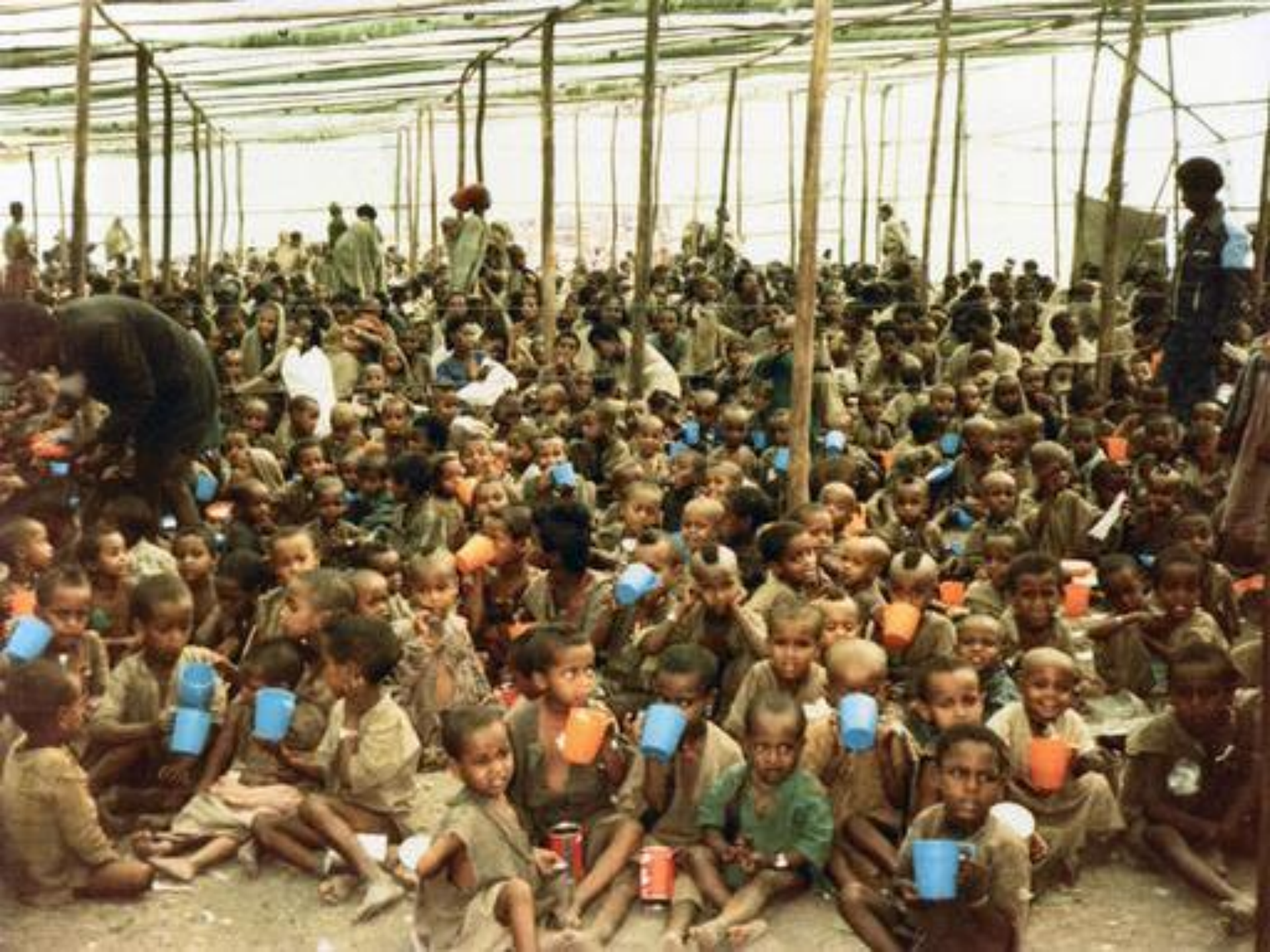
London school of Hygiene and Tropical Medicine

# Ethiopia

- Endemic for Malaria
- High childhood burden of Malaria & Malnutrition
- Malnourished children with malaria parasitaemia:
  - *may* or *may not* present with fever.
  - need treatment  $\Rightarrow$  risk of severe malaria and death







# Ethiopia - MSF (2008)

- Supported 48 nutritional centers with Artemisinin-based malaria treatment (ACT)
- All children with and without fever were routinely tested for malaria using paracheck (RDT)



# Ethiopia - MSF

## Paracheck results & Artemisinin treatment

- Paracheck (+) with or without Fever
  - ⇒ Artemisinin
- Paracheck (-) with fever
  - ⇒ search for conditions other than malaria

# Ethiopia – National Guidelines

- Restrict paracheck testing to children with fever
  - Children with parasitemia but without fever are likely to be missed
- ⇒ No malaria treatment !



# Operational Research Question

What proportion of malnourished children with and without fever have *plasmodium falciparum* malaria ?



# Objectives

## To determine:

- the frequency of temperature recording under routine conditions
- the proportion of malnourished children with and without fever who had falciparum malaria
- the association between malaria and grades of malnutrition

# Method

- Study design: Retrospective analysis of program data sourced from patients' cards.
- Study period: June - November 2008
- Study setting: 48 MSF nutritional centers southern Ethiopia.
- Study population: All malnourished children aged <15 years
- Ethics: MOH-Ethiopia, MSF and The Union

# Package of care



# Admission criteria

- Mid upper arm circumference(MUAC)



- Weight for height



# Grading of malnutrition

Malnutrition was graded into:

- Mild
- Moderate
- Severe

# Measuring of temperature

- Temperature was measured using standard mercury thermometer



# Antibiotic



# Vitamin A

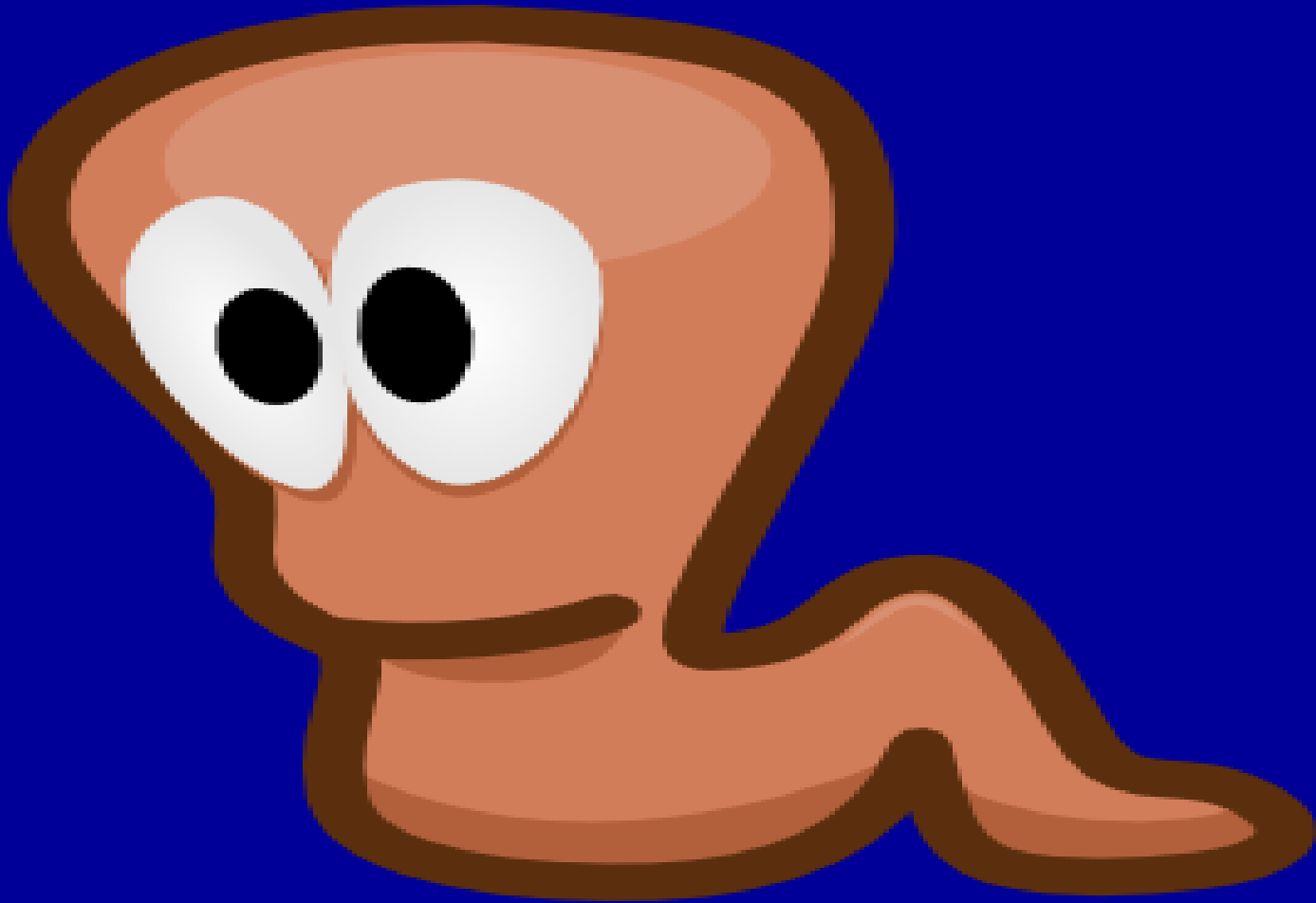




# Measles vaccination



# De-worming



# Folic acid



# Malaria screening Paracheck (RDT)



# Results 1

## Patient Characteristics

■ Admitted to nutrition programme	19,200
■ Paracheck not recorded	2484 (13%)
■ Included in study	16,716
■ Males	7412 (44%)
■ Mean age (years)	4.4

# Results 2

## Grades of malnutrition

Grade of Malnutrition	n (%)
Mild	3767 (27)
Moderate	5986 (35)
Severe	6399 (38)

# Results 3

## Recorded temperature and malaria

Fever Temperature >37°C	Malaria Paracheck (+)	Total
Yes	57 (28%)	206
No	122 (10%)	1262
Unrecorded	1174 (8%)	15,248 (91%)
Total	1353 (9%)	16,716

# Results (4)

## Malnutrition grade & malaria prevalence

Malnutrition	Total	Malaria Paracheck (+)
Mild	3767	184 (5%)
Moderate	3986	480 (8%)
Severe	6399	632 (10%)

$\chi^2$  linear trend 78  
 $P < 0.001$



# DISCUSSION (1)

- Seven in ten children with fever did not have malaria.
- Universal RDTs
  - Promoted rational use of artimesinin
  - Prevented waste through empirical administration of ACT to all those with fever

# DISCUSSION (2)

- 10% children without fever had malaria and without RDT ⇒ No malaria treatment !
  - Ethiopia guidelines: 2000 children without fever but with malaria would have missed malaria treatment and progressed to severe malaria and probably die !
  - This study influenced WHO revision of Ethiopian malnutrition guidelines.

# DISCUSSION (3)

- 91% lacked temperature recording ! Why ?
  - Perception - with RDT, temperature recording is redundant?
    - ⇒ awareness raising / education / training
  - Workload related to “manual” mercury thermometers ?
    - ⇒ digital (user-friendly) thermometers
- Fever with negative RDT ⇒ Further investigation for fever
- Short coming in clinical practice
- (Operational research +)

# LIMITATIONS

- Unrecorded Temperature



- Use of Paracheck



# CONCLUSION

In malaria-endemic Ethiopia:

- This study confirms the value of universal RDT malaria screening among malnourished children irrespective of fever



# ACKNOWLEDGMENTS

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- Data encoder in MSF mission in Ethiopia