

**TRAINING FOR IMPROVED PRACTICE:  
Public Health and Nutrition in Emergencies**

**COMMUNICABLE DISEASES:  
PRINCIPLES AND PRACTICES OF  
MALARIA CONTROL IN  
EMERGENCY SETTINGS**

**UNICEF Core Corporate Commitments Training**

In collaboration with:

**Feinstein International Famine Center, Tufts University**

**Mailman School of Public Health, Columbia University**

**International Emergency and Refugee Health Branch,**

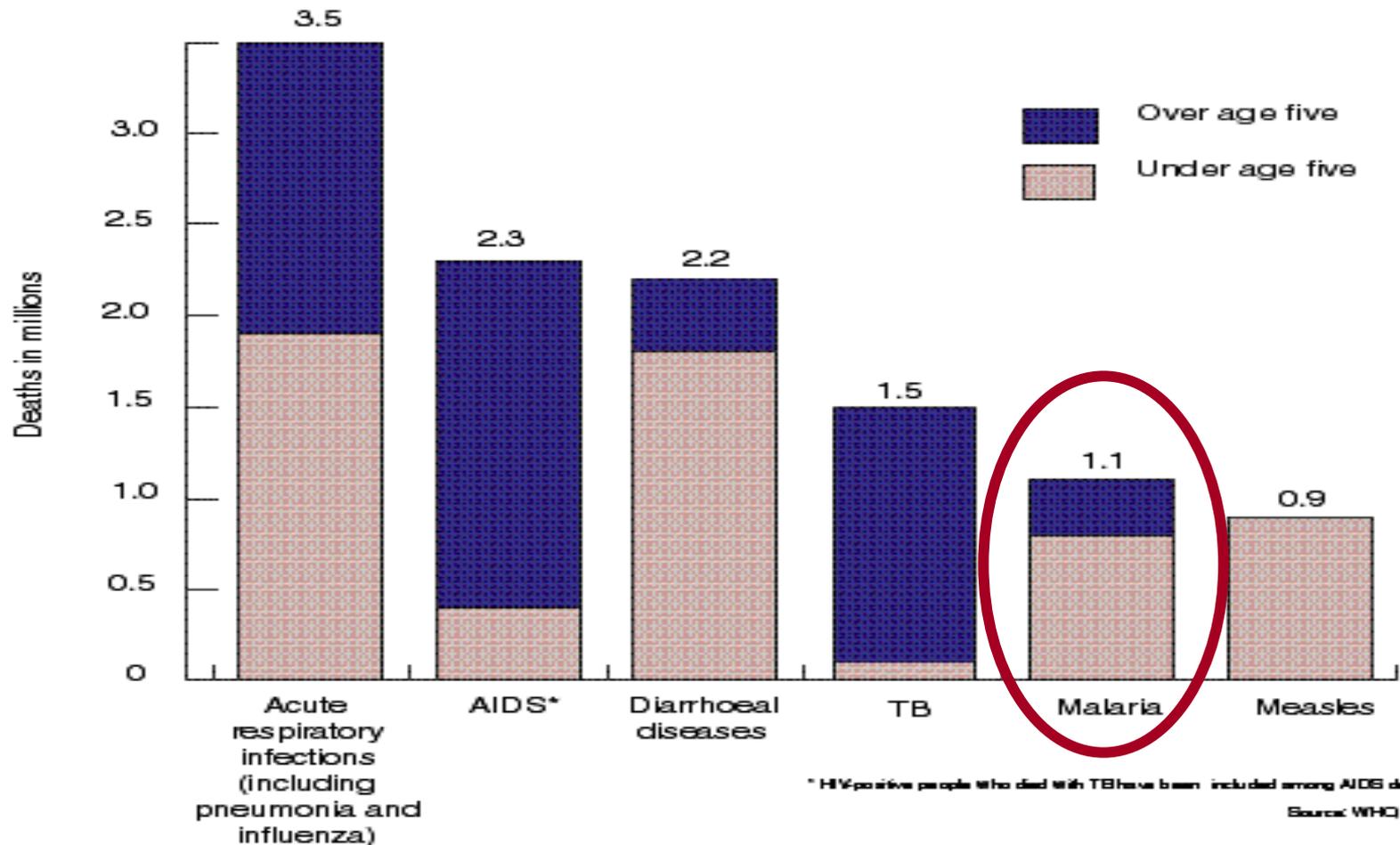
**Centers for Disease Control**

# Session Overview

- Burden of malaria disease
- Case management
- Drug resistance
- Malaria control in emergency settings
  - Prevention
  - Technical advances

# Leading infectious killers

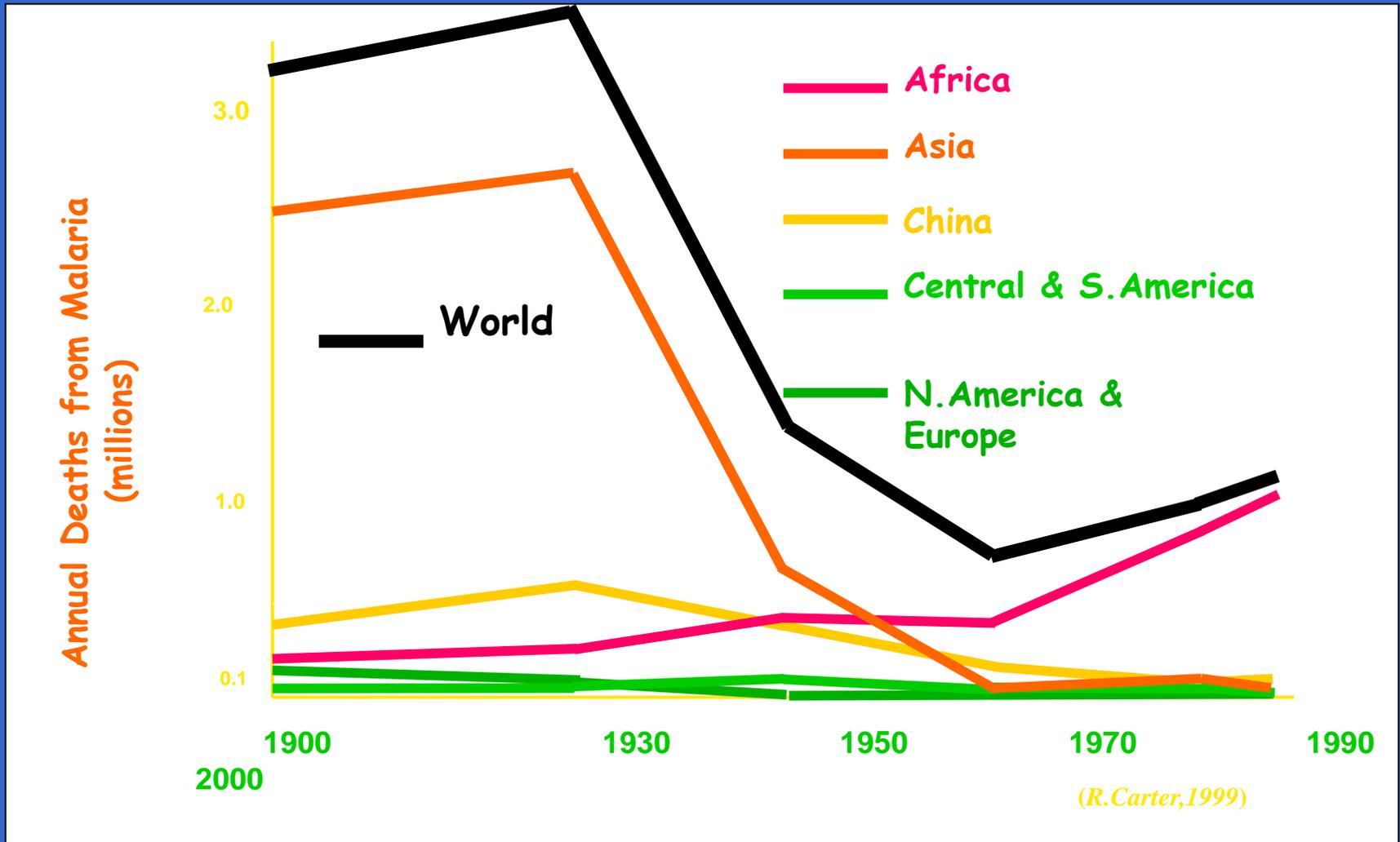
Millions of deaths, worldwide, all ages, 1998



# Malaria Challenge: The World's Burden

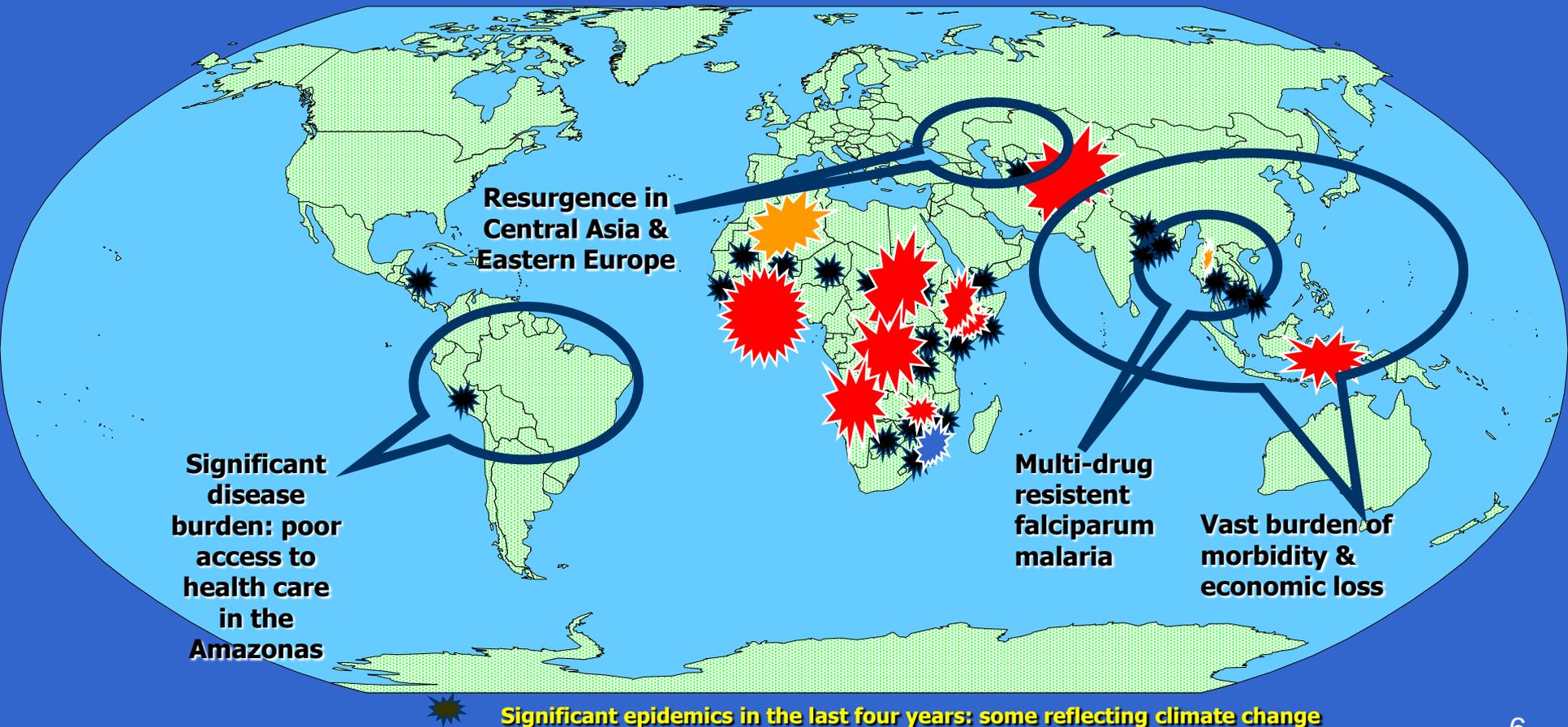
- One fifth of the World's population at risk: poorest people are most vulnerable
- Facing a HUGE Disease Burden
  - 300-500 million clinical cases per year
  - More than 1 million deaths per year
  - Major impact on human and economic development, \$12 billion lost annually
    - treatment,
    - work time lost
    - lost harvest

# The Malaria Challenge



# The Malaria Challenge

- Regional variation in malaria situation
- One third of all cases occur in emergency countries
- One third of malaria deaths occur in emergencies



# Malaria Burden in countries affected by emergencies

- Estimated 40 million refugees/displaced persons globally
- 80% of emergency countries are malaria endemic
- Over 120 million people affected by emergencies e.g. Afghanistan, Myanmar, Indonesia, Liberia, Sudan, .....

# Why are people more at risk from malaria in emergencies?

- Increased vulnerability of displaced populations - malnutrition, poor access to health care
- Increased risk of epidemics - movement of non-immunes to high malaria transmission areas
- Environmental deterioration encouraging vector breeding

# Who Suffers

- 38% of all cases are children < 5 years
- 71% of deaths are children <5 years
- 10-13% of maternal deaths



Every 30 seconds a child dies of malaria

# Malaria in Pregnancy

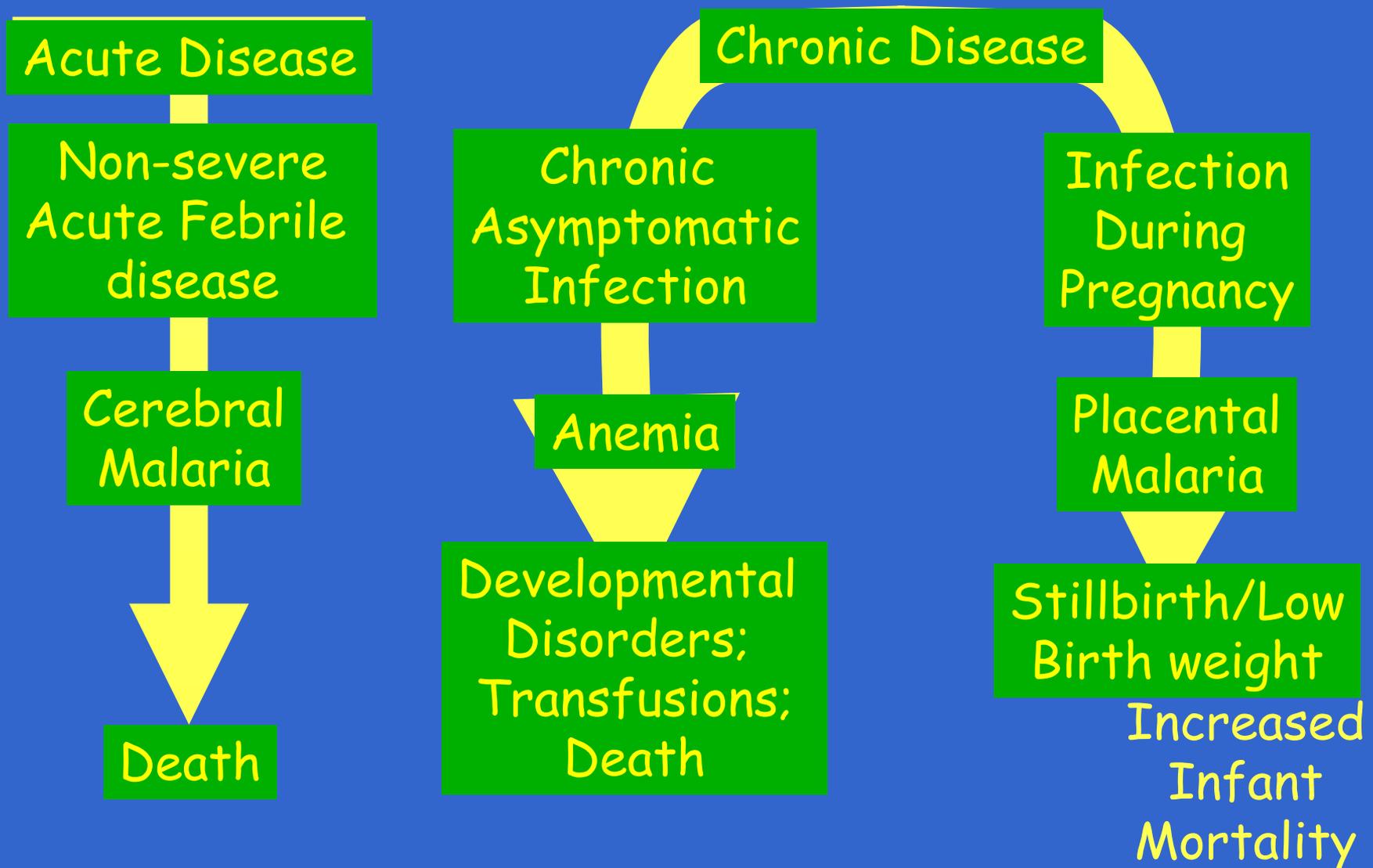
- **Up to 4 million babies (16%) each year, are Low Birth Weight (LBW).**
- **In 40% LBW is due to maternal malaria**
- **LBW is the single greatest cause of neonatal death**
- **In up to 60% of maternal malaria cases spontaneous abortions are reported**

# Malaria in Pregnancy

**WHO recommends a three-pronged approach to the prevention and management of malaria during pregnancy:**

- Insecticide-treated nets (ITNs)
- Intermittent presumptive treatment
- Effective case management of malarial illness.

# Malaria -- Clinical Manifestations



# Unit-dose packaging of antimalarials



Early diagnosis and prompt, effective treatment of malaria is a key strategy for malaria control.

home treatment requires an understanding of care-seeking behaviour

# Malaria Risk factors for Displaced People

- No or poor housing / exposure
- Previously uninhabited areas
- Areas near water
- Overcrowding
- Proximity to livestock
- Immune status / movement from non-endemic to endemic area
- Lack of health care

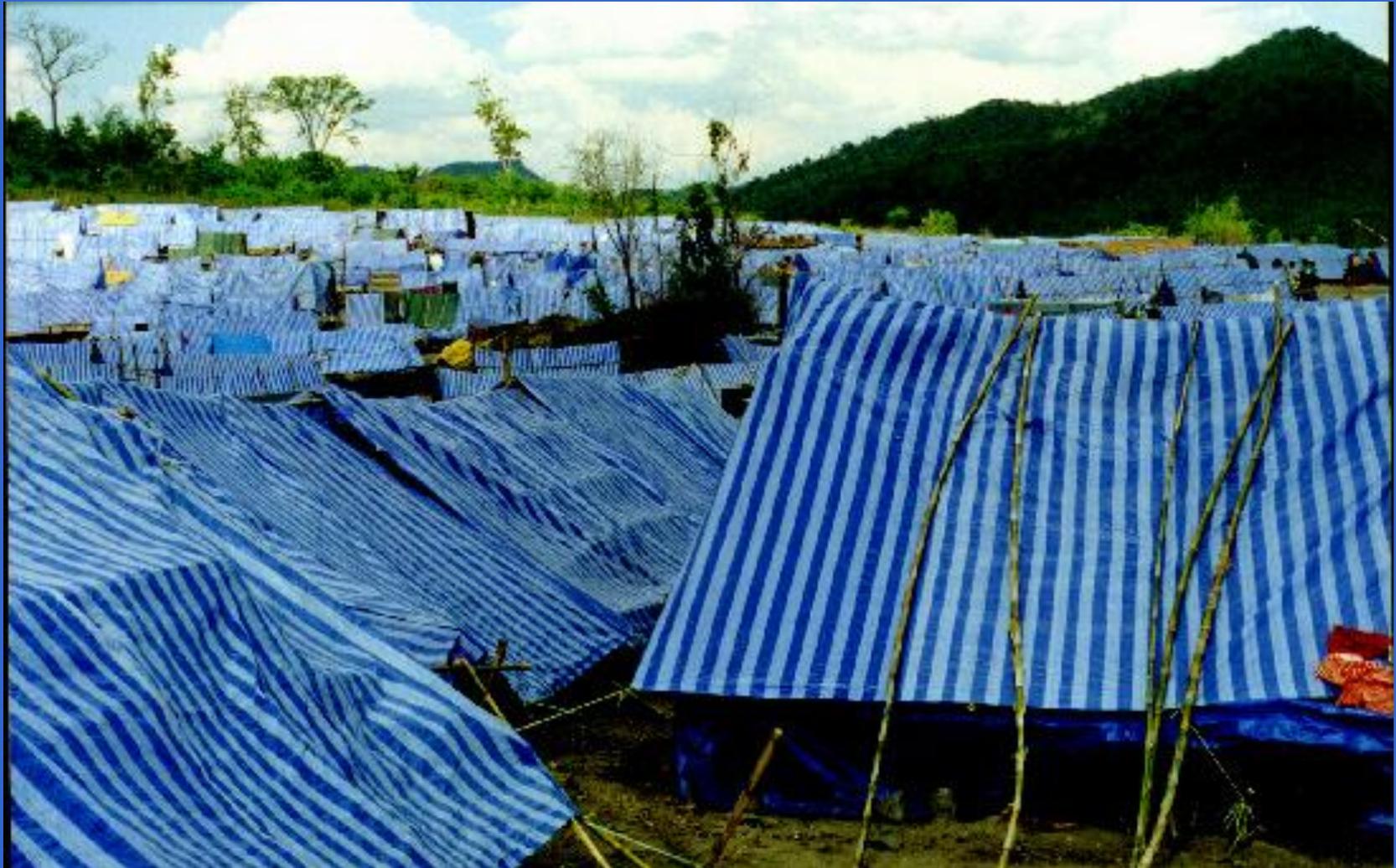


# Exposure to the elements

# Generally stable camp situations where movements of entire camps occur episodically: Thai/Burmese border



# Temporary Housing Thai-Burmese Border



# Longer term camps with steady influx of newcomers: Tanzania





*Up to 90% destruction*



# Malaria in East Timor

- Falciparum - 60%, Vivax - 40%
- Chloroquine resistance - 68% (Merlin & Australian army 2000)
- Suspected malaria - 20% of all OPD consultations in September 99
- 10% of OPD consultations before conflict
- But after rains started October - 40% of OPD consultations
- Parasite surveys - 50% OPD patients with fever were positive

# East Timor

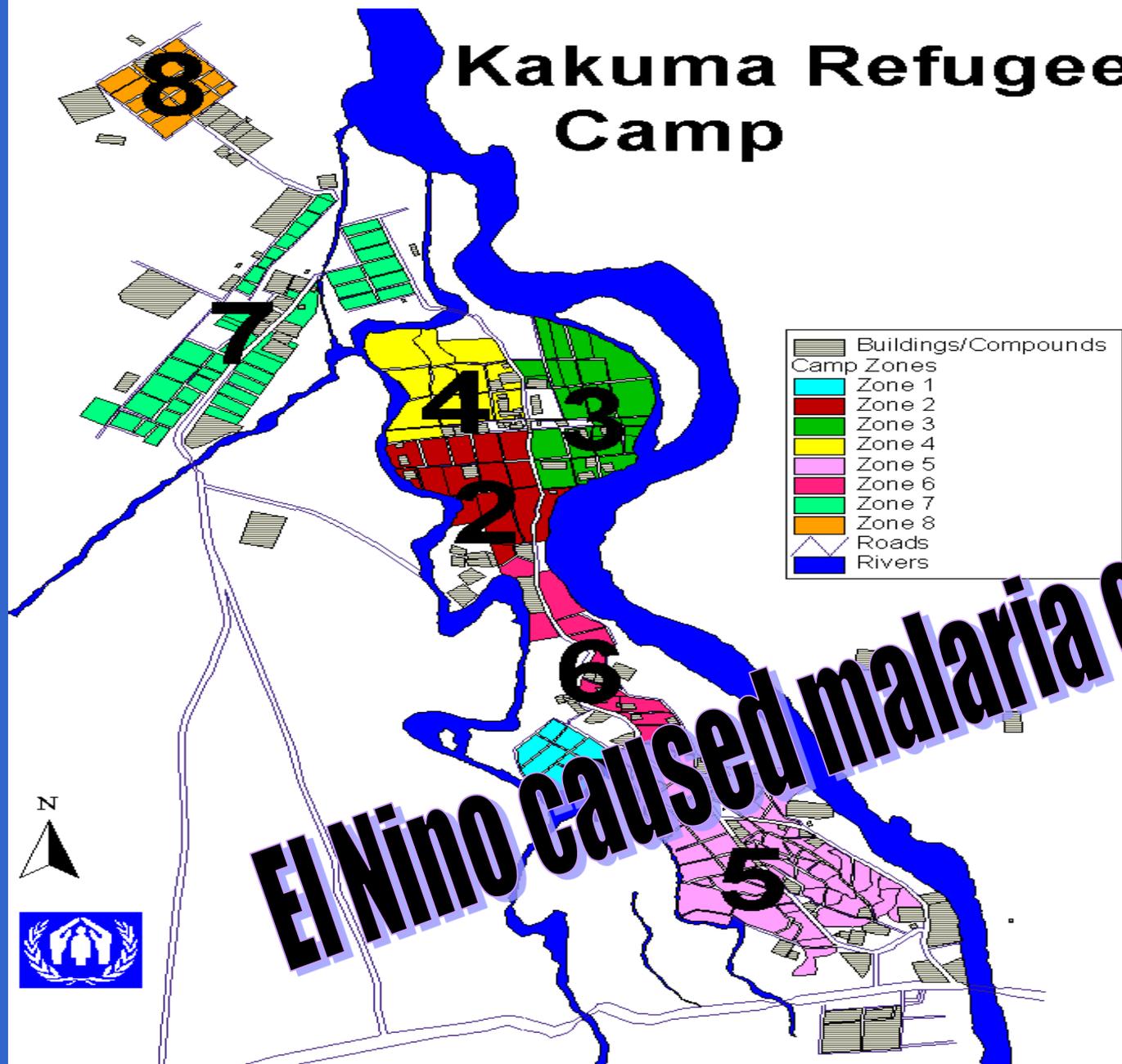
- A total of 10,000 cases of malaria were reported in East Timor in 1998
- Surveillance detected 30,000 cases in just the first 3.5 months of the crisis (1999)



# Problems highlighted by agencies and local staff working in East Timor

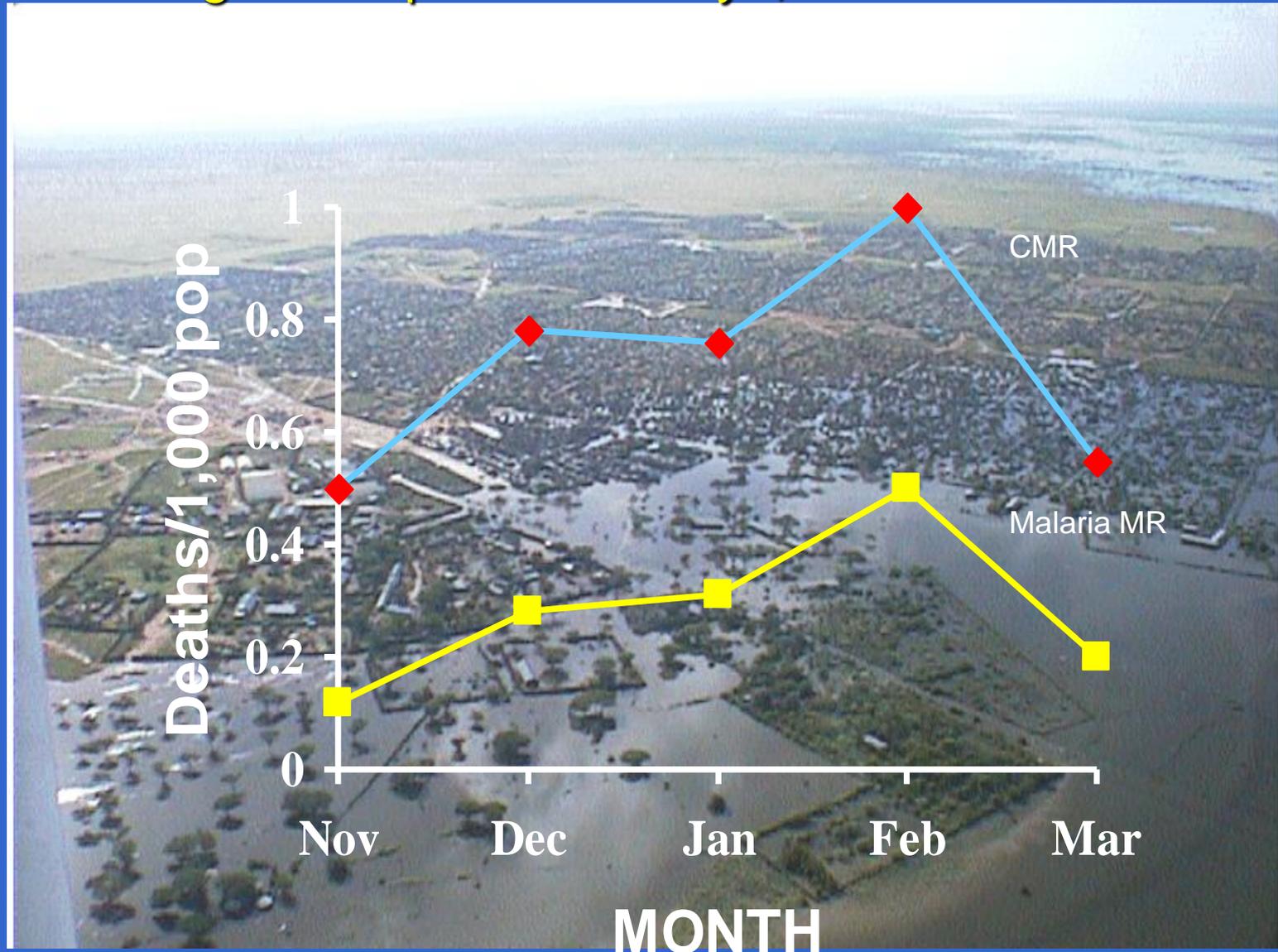
- Lack of technical knowledge of malaria among operational agencies
- Lack of information on drug resistance
- Delays in access to supplies, transport barriers
- Poor co-ordination between NGOs, UN agencies and local authorities
- Lack of useable tools with which to intervene
- Lack of data in complex emergencies
- Lack of funding

# Kakuma Refugee Camp



**El Niño caused malaria outbreak**

# Crude Mortality Rate and malaria mortality rate after flooding in 3 refugee camps in NE Kenya, Nov 97 - Feb 98

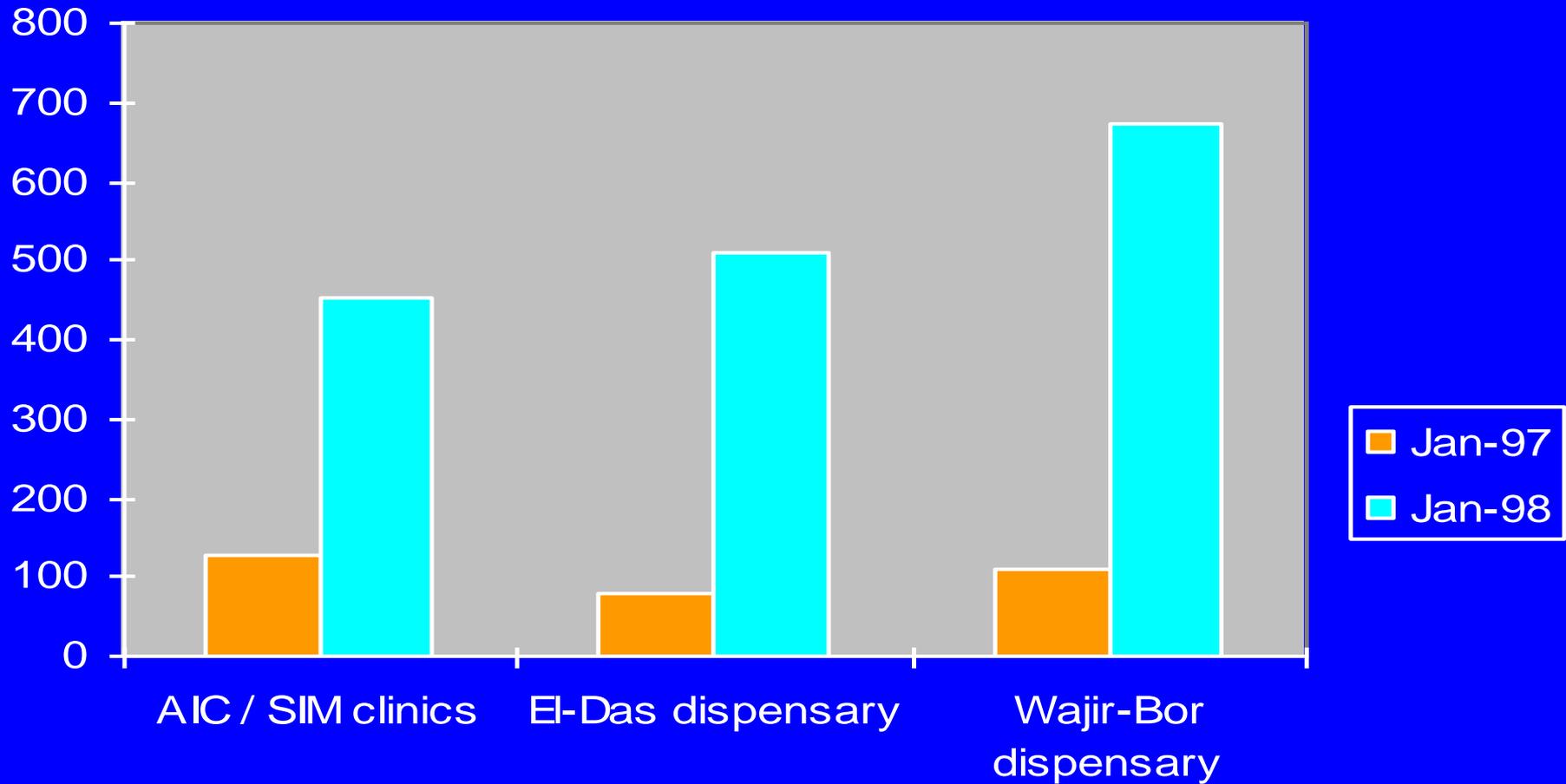


# The emergency

- 5 malaria deaths per day per 10,000 in over 5's
- 9 malaria deaths per day per 10,000 in under 5's
- Risk of measles outbreak

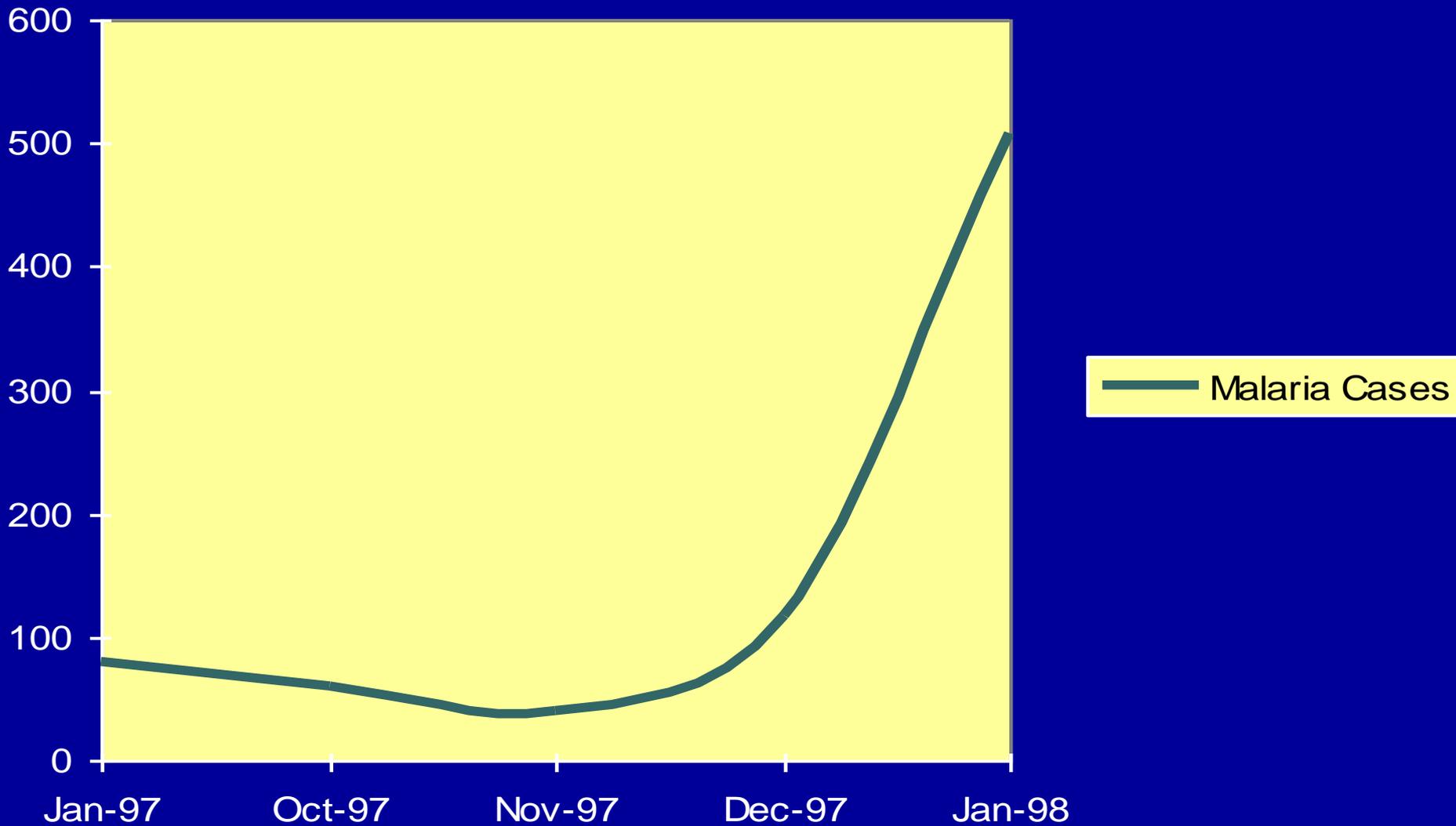
# Wajir District, Kenya

## Increase in Malaria Cases in 3 Health Facilities



# El-Das Dispensary, Wajir, Kenya

## Increase in Malaria cases detected



# Complex Factors

- Population - 200,000, some displaced by floods and violence
- 90% Ethnic Somali population
- Static and nomadic district population- 170,000
- Regular and violent cattle raids
- Ethnic / political conflict in Rift valley
- 80% of health staff absent and on strike

# Treatment

- Essential drugs and protocols were supplied to functioning health centres as staff returned (Merlin)
- Mobile clinical teams (Merlin) provided treatment and disease awareness in every area of the district on rotation
- Wajir hospital and town clinics supported (MSF-B)

# Results

- Mobile clinics treated 68,021 people
- In March 82.5% morbidity was due to malaria (9000 consultations)
- In October 45% morbidity was due to malaria (5000 consultations)
- 20,000 impregnated bed-nets were distributed through community leaders
- 28,000 children vaccinated against measles

# **Malaria control in emergencies requires a coordinated approach**

- Unstable government or no government
- Many partners - UN organisations, NGOs responsible for providing health services with local/national authorities
- Ongoing conflict, insecurity - long term planning difficult
- Physical and transport barriers - delays in access to supplies

# More treatment challenges

- Drug resistance

# CHLOROQUINE RESISTANCE: 1960



# CHLOROQUINE RESISTANCE: 1970



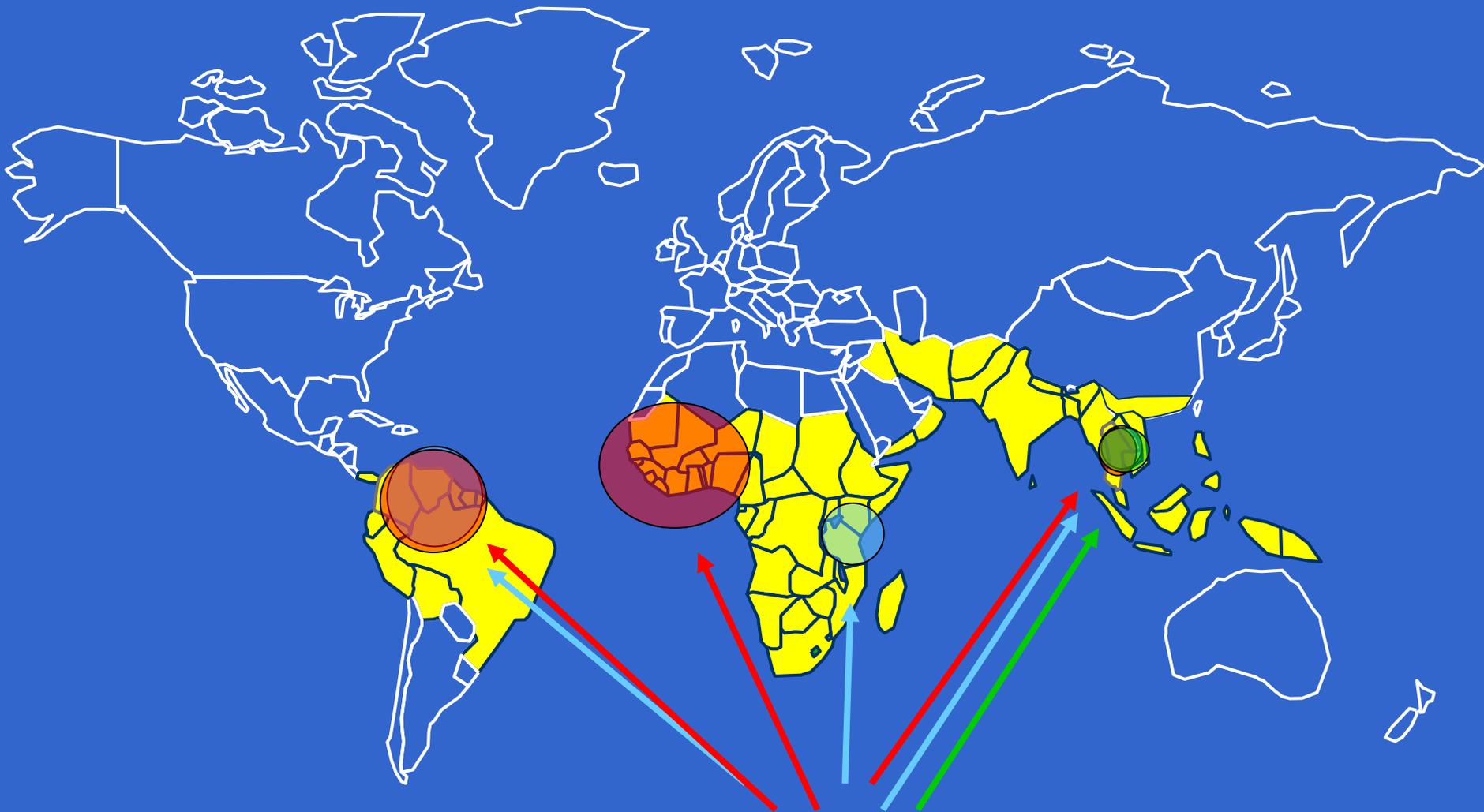
# CHLOROQUINE RESISTANCE: 1980



# CHLOROQUINE RESISTANCE: 1996



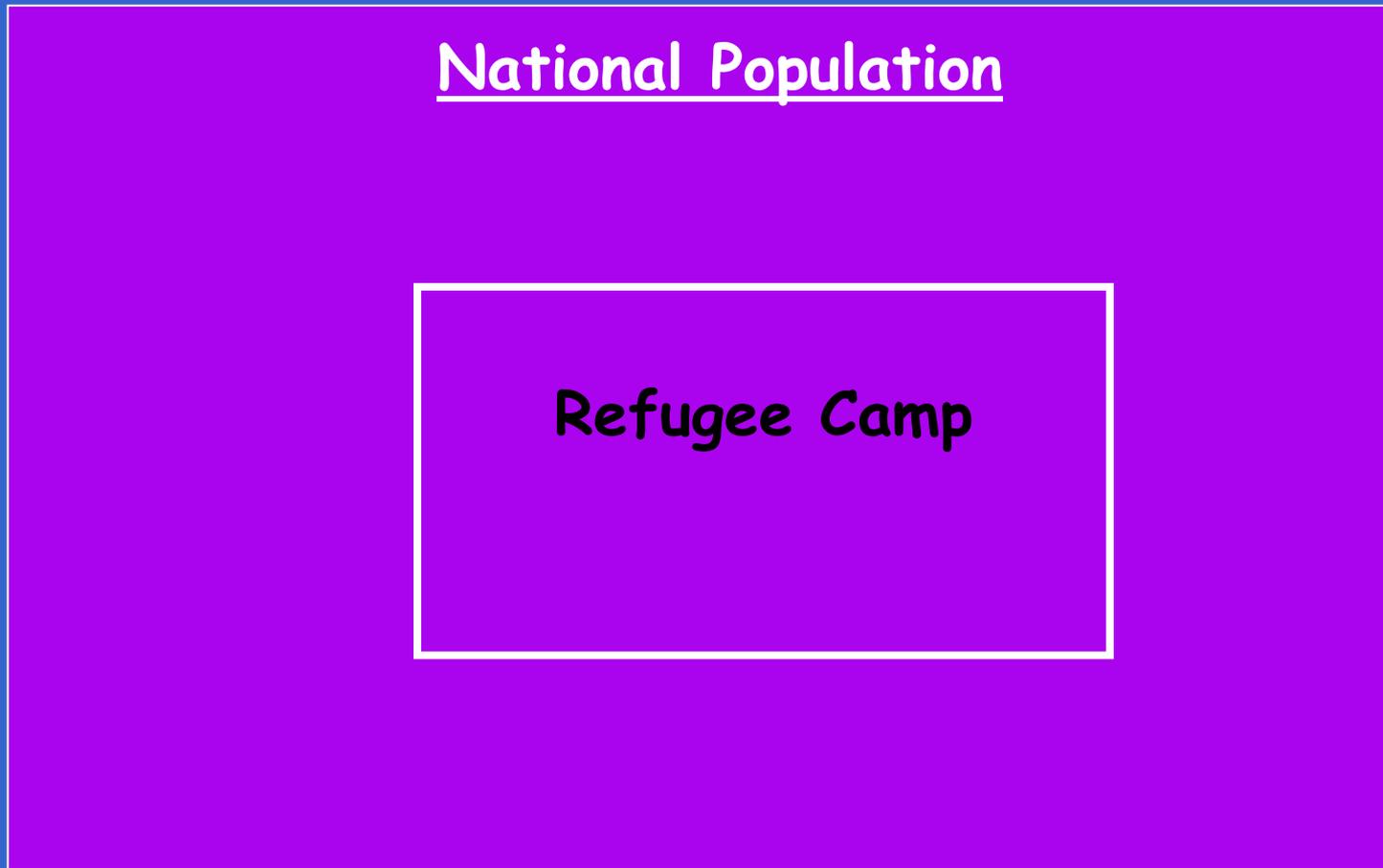
# RESISTANCE TO OTHER DRUGS



HIV, ART?

# Drug Use Policy Options

- Single national drug policy for all



*Problem:* May not be optimally effective for refugees

# Drug Use Policy Options

- Different policies for hosts and refugees



*Problem:* Politically sensitive if host population is using a less effective drug

# Drug Use Policy Options

## Refugee Affected Area



# Issues in Malaria Control

- personal protection
- vector control
- diagnosis
- drug policy

# Disease Prevention

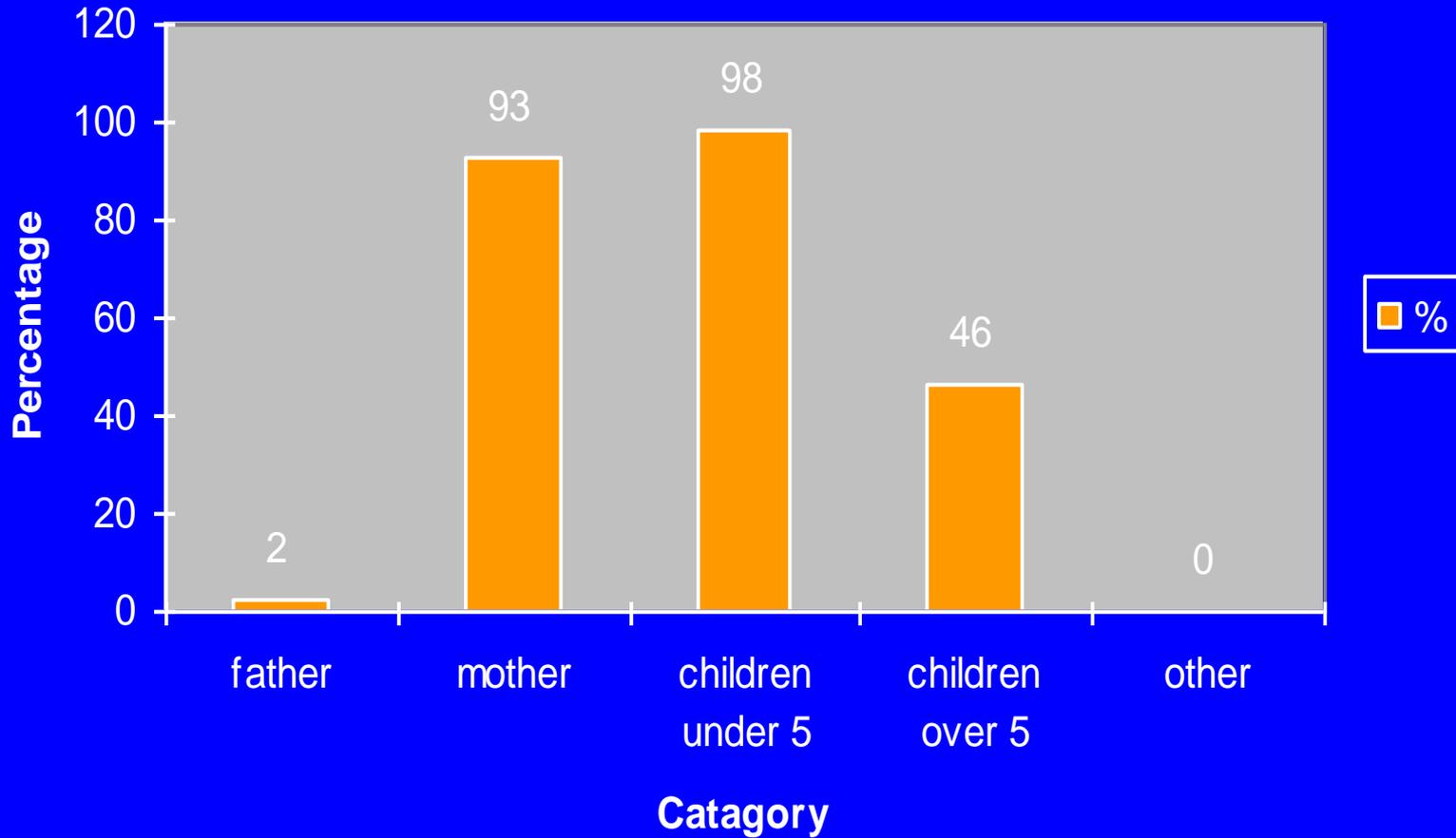
- Targeted distribution of impregnated bed nets for young children and pregnant women
- Disease education in affected communities
- Measles vaccination and Vitamin A

# Insecticide-Treated Materials (ITM)



- Physical barrier
- Long-acting insecticide

## People sleeping under net



# Bed Net Survey

- 1065 Families visited  
(944 static & 121 nomadic)
- 99% retention (1-3 months)
- 64% of families slept 4 or more people under their nets
- Nomads put the most people under nets



# Insecticide treated mosquito nets

ITNs are effective for personal protection when biting occurs during the night

Pyrethroid treatment of nets at least double personal protection over an untreated net by irritating, repelling or killing blood sucking insects

If full coverage is achieved, mass impact on vector density and survival may become sufficient to interrupt transmission, hence providing community protection

# Long lasting insecticidal nets (LLINs)

- Ready to use pre-treated mosquito net which require no further treatment during its expected life span (4 to 5 years)
  - no need to organise re-treatment
  - no handling and storage of insecticide at household level
  - potentially safer (lower bio-available insecticide concentrations)
  - minimised environmental hazard caused by release of insecticide in natural water bodies

# Strategy to RBM in emergencies

- Well coordinated and supported strategic approach
- Evidence-based decisions
- Early diagnosis, rapid treatment
- Multiple prevention actions
- Operational research

# From ITNS to ITMaterials

- Impregnated collars for dogs (anthroponotic leishmaniasis)
- Long lasting insecticide treated tarpaulins for emergency settings
- Treated blankets, chadors, kangas, clothings..
- Roof lining with insecticide incorporated plastic films, fencing...

# Tools in development

- Rapid diagnostic tests - RDTs and Permanets
- Insecticide treated plastic sheeting for emergency shelters
- Evaluation of one day artemisinin-based combination therapies for use in acute phase emergencies only

# Tools in development

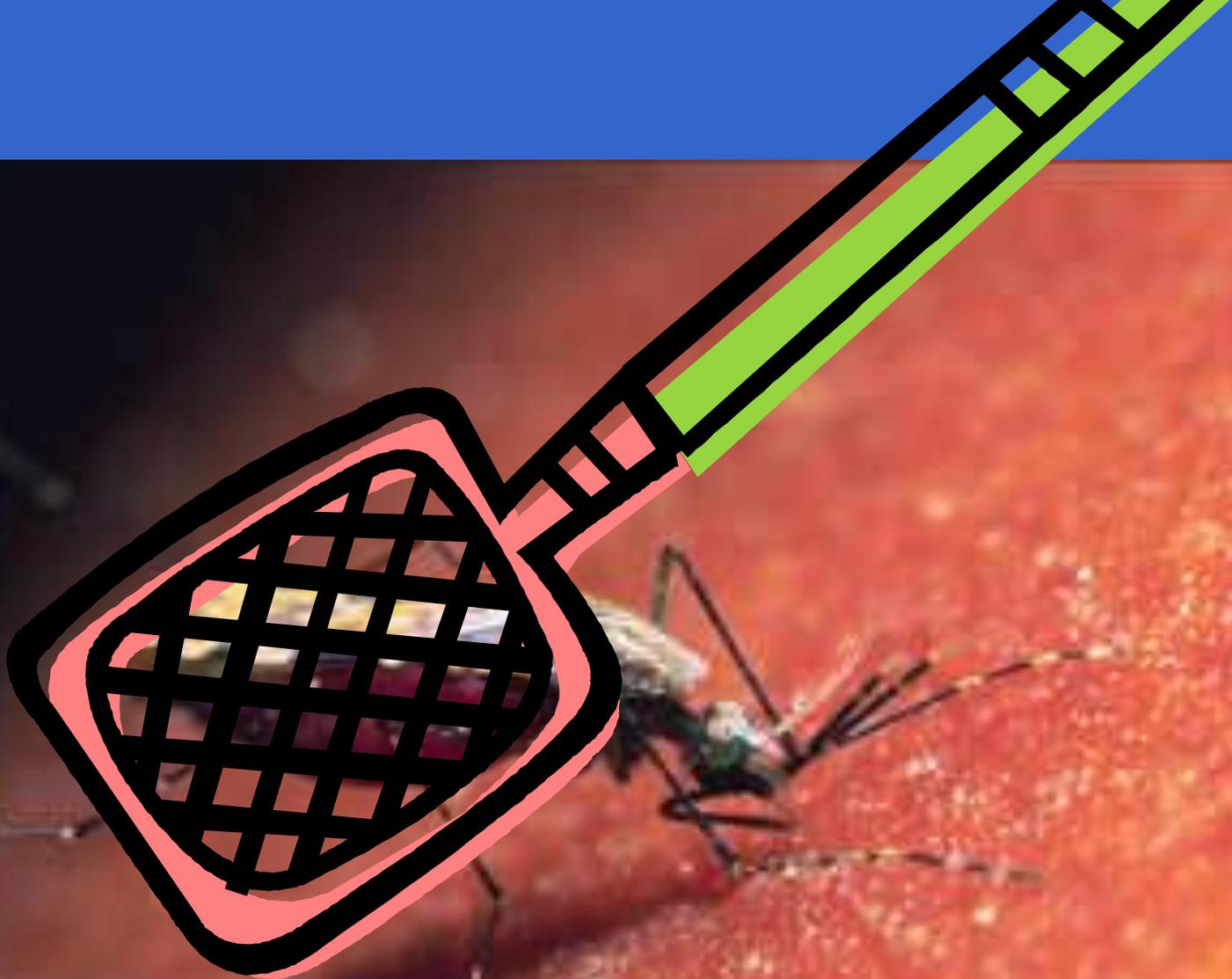
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- **Insecticide treated plastic sheeting for emergency shelters**
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# Exciting Times

- **Prompt and effective treatment reduces mortality by at least 50%**
- **Drug resistance can be delayed through combination therapy**
- **Insecticide-treated nets can reduce all cause mortality by 20%**
- **New rapid diagnostic techniques are accurate , easy to use and prices are lowering**
- **New tools, information and training is being developed to support better emergency responses**

# Malaria, Dengue & Yellow Fever

	Malaria	Dengue	Yellow Fever
Mosquito	Anopheline	Aedes	Aedes
Reservoir	Human	Human	Human
Bites	Night time	Day time	Day time
Incubation in man	4-30 days	4-7 days	3-6 days
in mosquito	12-15 days	8 – 12 days	9 – 12 days
Worst Manifestation	Cerebral malaria, death	Dengue hemorrhagic fever, shock, death	Severe flu-like illness, death



# Malaria Exercise

1. What do people believe causes malaria?
2. How do they try to prevent it?
3. What practices put people at risk of contracting malaria?
4. What do they do if they need treatment?
5. Outline a “behavior change communication” strategy to control malaria.

# Unicef's role in malaria control in emergencies

- ➡ Supply impregnated bednets
- ➡ Provide drugs
- ➡ Support vector control measures