

ERADICATION OF MALARIA

POLITICAL RHETORIC

Part 1

- Malaria is by far the most important insect transmitted disease (Gilles and Warrell, 1993). Latest W.H.O. estimates are that there are 300-500 million cases of clinical malaria per year, with 1.4-2.6 million deaths, mainly among African children.

Note: This presentation was originally developed in 2010 and I suspect that dengue will or has eclipsed malaria in 2013 when this was posted. However, I believe my comments remain relevant.

The disease is caused by a parasite transmitted by the female anopheles mosquito and is the leading killer of children under the age of five in sub-Saharan Africa

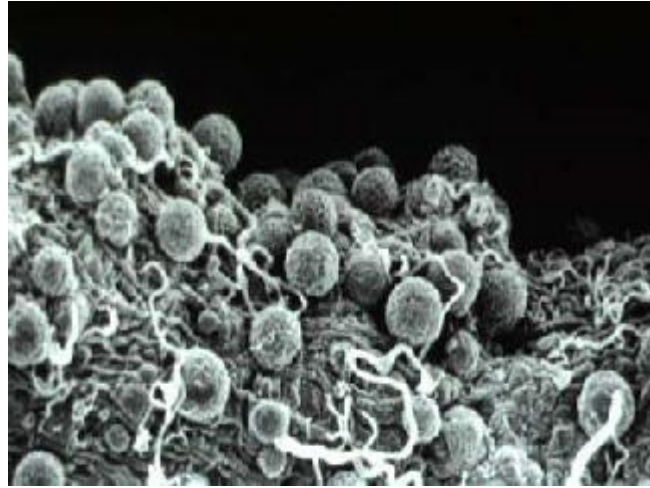


Anopheles gambiae



The vectors of human malaria all belong to the genus *Anopheles* whose adults are recognized by their "tail in the air" posture, dappled wings in most tropical species and long pair of palps beside the proboscis in the female.

Plasmodium oocysts on the outside of a mosquito's midgut.



Soon after emergence the adults mate and the female goes in search of its first blood meal. If this contains gametocytes of malaria parasites (which belong to the genus *Plasmodium*), male and female gametes of the parasite undergo fertilization in the mosquito's stomach, the zygotes develop into oocysts on the outer surface of the stomach wall and sporozoites develop in the oocysts, over a period of about 12 days, before populating the mosquito's salivary glands.

Anopheles gambiae

During feedings the injection of saliva into the host carries sporozoites, which may establish a new malaria infection in the host. During the approximately 12 days required for sporozoite development, a member of most female tropical anopheline mosquito species would be expected, if it survives, to re-visit houses 3 or 4 times to take blood meals and thus initiate new cycles of egg development.



Anopheles larva



As in other mosquitoes only the females bite and they use the proteins from a blood meal to produce a batch of eggs. These are laid in relatively clean water, such as in marshes, puddles, irrigation water etc. Unlike other mosquito larvae, those of *Anopheles* float parallel to the water surface. They develop through 4 larval instars to a short lived, motile pupal stage. The whole process from egg to emergence of the adult from the pupa takes little more than a week at tropical temperatures.

Symptoms of malaria include fever, headache, and vomiting, and usually appear between 10 and 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs.

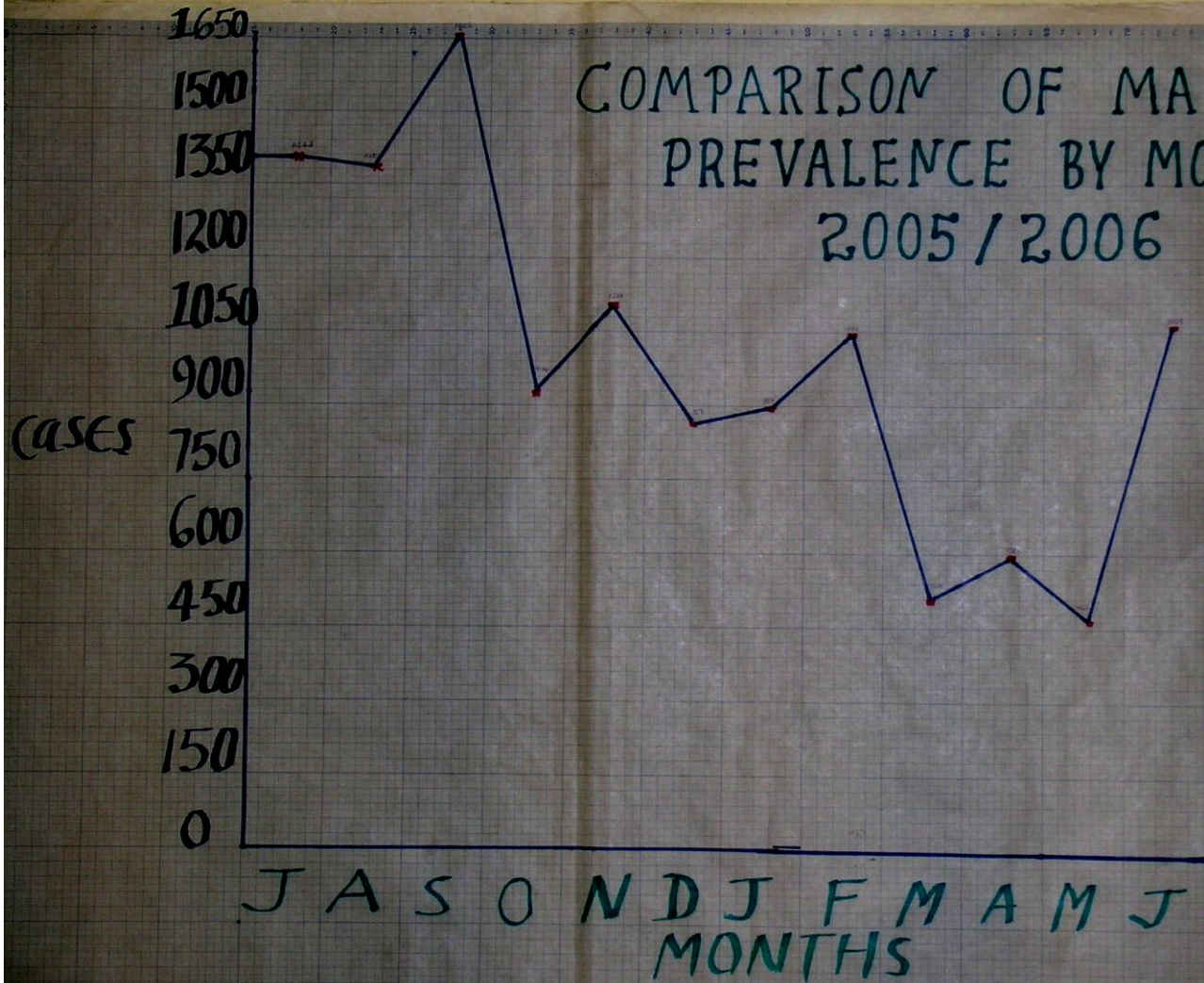
Hospital Records

Gambella, Ethiopia

THE MOST TEN TOP DISEASES SEEN AT ABOBO WOREDA IN 1999 E-C.

S/ No.	DISEASES	QUARTER 1		QUARTER 2		QUARTER 3		QUARTER 4		TOTAL	
		No	%	No	%	No	%	No	%	No	%
1	MALARIA	1575	56%	2275	57%	1894	50%	1968	52%	7712	54%
2	RTI	414	14%	536	13%	586	16%	584	16%	2120	15%
3	HELMINTIASIS	148	5%	217	5%	197	5%	150	4%	712	5%
4	DIARRHEA	110	4%	156	4%	240	6%	201	5%	707	5%
5	OTHER GIT DISEASES	125	5%	171	4%	212	6%	147	4%	655	4%
6	COMMON COLD	121	4%	183	5%	160	4%	136	4%	600	4%
7	GASTRICES	102	4%	111	3%	134	4%	168	5%	515	4%
8	RHEUMATISM	78	3%	150	4%	112	3%	125	3%	465	3%
9	ANEMIA	66	2%	95	2%	134	4%	115	3%	410	3%
10	SKIN INFECTION	92	3%	102	3%	84	2%	129	4%	407	3%
	TOTAL	2831	100%	3996	100%	3753	100%	3723	100%	14303	100%

COMPARISON OF MALARIA PREVALENCE BY MONTHS 2005/2006



Corner Stones to the Current Efforts to “Eradicate” Malaria

1. Anti-malarial Drugs
2. Residual Sprays Inside Homes
3. Insecticide Treated Bed Nets

WHO

Bill & Melinda Gates Foundation

In a perfect world – these activities might be sufficient – BUT it is not a perfect cooperative world

CHALLENGE #1

The terminology - Eradication

DEFINITION

ERADICATE:

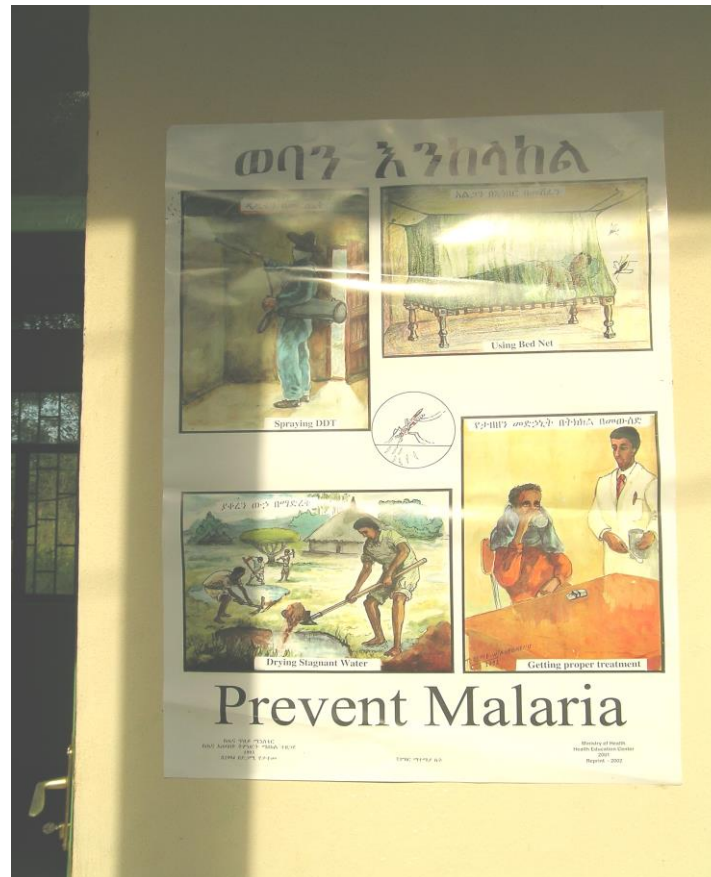
To destroy utterly

Funk & Wagnall

The use of the term and the goal is
premature at this time!

Malaria Control Poster

Prevention – More Appropriate & Realistic



CHALLENGE #2

In a “perfect world” perhaps the three components:

1. Anti-malarial Drugs
2. Residual Sprays Inside Homes
3. Insecticide Treated Bed Nets

would be the “perfect” solution but it is not

“ A Perfect World”

1. Anti-Malarial Drugs

W.H.O. emphasizes early diagnosis and prompt treatment of malaria with anti-malaria drugs.

Chloroquine which has been the mainstay of malaria treatment, especially in Africa, because of its low cost and relative freedom from side effects.

Drug Resistance

Drug resistance to chloroquine has been confirmed in 2 of the 4 human malaria parasite species, *Plasmodium falciparum* and *P. vivax*, and this resistance has been linked to increases in malaria morbidity and mortality.

25 February 2009 -- The emergence of parasites resistant to artemisinin could seriously undermine the success of the global malaria control efforts.

WHO are providing new evidence that such parasites have emerged along the border between Cambodia and Thailand.

Causes of Resistance

Under dosing

- Patients not completing treatments and sharing unused drugs with relatives and friends
- Black market products with less than sufficient concentrations

Additional Concerns

Some anti-malarial drugs must be refrigerated during storage and transit; if not they are useless.

Case in Point: I visited a small hospital with an overwhelming number of malaria cases, the patients were medicated with no response. The shipment had been spoiled because it was not refrigeration.

The nurse in charge was frustrated to say the least and was not happy about constantly writing survey reports.

Rural Hospital

Gambella, Ethiopia



Additional Concerns at Hospitals

- High case load numbers; too few nurses and doctors in the field
- Emphasis on reporting the number of cases and then reports being lost
- Too many bureaucrats and not enough technicians in the field

FRUSTRATION & EXHAUSTION

Other Concerns

Antimalarial drugs are most available to pregnant women and children leaving non-treated as a source of infection



NOT A PERFECT WORLD

Drug treatment is a necessary component of IVM but it has major problems:

1. Resistance
2. Human frailty
3. Logistics
4. Little local ownership in the program & the approach supports strong reliance on outside institutions.

2. Residual Sprays Inside Homes



WHO promotes widespread use of residual sprays in homes.

THEORY: If the mosquito can be killed at any one of 3 or 4 house visits, it can never develop sporozoites and become a disease vector.