

Malaria in Children

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Outline of Presentation



- Burden of Disease
- Clinical features
- Diagnosis
- Treatment
- Prevention

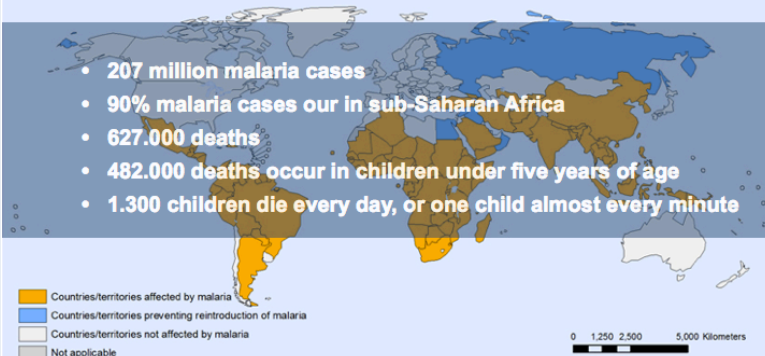
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Global Burden of Disease



- 207 million malaria cases
- 90% malaria cases occur in sub-Saharan Africa
- 627,000 deaths
- 482,000 deaths occur in children under five years of age
- 1,300 children die every day, or one child almost every minute



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Source: World Health Organization, Map Production Public Health Information and Geographic Information Systems (GIS), WHO, 2013

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Burden of Malaria in children



In malaria endemic countries:

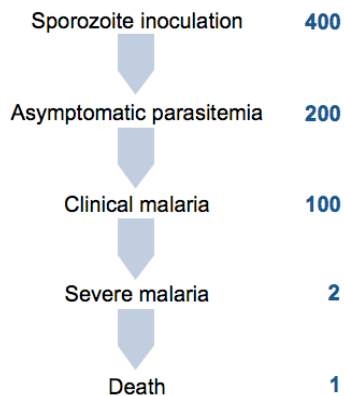
- Malaria in pregnancy causes 10-20% of low birth weight babies
- Reduce school attendance
- Impair intellectual development



Clinical spectrum of *P. falciparum* malaria



Immunological
Environmental
Genetic
Antimalarials



Clinical features of non-severe malaria in children



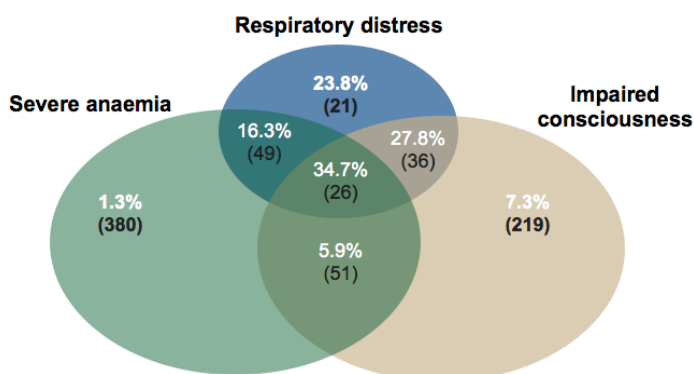
- Commonly manifests as a non-specific febrile illness
- Other common symptoms include abdominal pain, vomiting and mild diarrhea
- Older children may complain of headache and general body pain
- High index of suspicion

Severe malaria



- Complex multi-system disorder which affects all age groups
- Presents with a range of clinical features which varies in different age groups
- Important determinant of clinical pattern include immune status, age, and the degree of malaria endemicity

Spectrum of clinical syndrome in Kenyan children with severe malaria



Clinical features of severe malaria



- Impaired consciousness (including unreadable coma)
- Prostration, i.e. generalized weakness so that the patient is unable to sit, stand or walk without assistance
- Generalized multiple convulsions: more than two episodes within 24h
- Deep labored breathing and respiratory distress (acidotic breathing)
- Severe anemia (Hb < 5g/dl, packed cell volume < 15%)
- Hypoglycemia (< 2.2mmol/l or < 40mg/dl)

Cerebral Malaria



- Definition: Unroutable coma not attributable to any other cause in a patient with *falciparum* malaria
- Heterogeneous syndrome
- Metabolic derangement including hypoglycaemia and subclinical convulsions are important in many cases
- Sequestration plays a major role in some cases



Respiratory distress



- Present with deep breathing with indrawing of the bony structures in the absence of localized chest signs
- Suggests metabolic acidosis
- A sign of poor prognosis



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Severe Anaemia



Causes Include:

- Direct destruction of parasitized red blood cells
- Indirect destruction of non-parasitized red blood cells by immune mechanisms
- Marrow suppression associated with imbalance of cytokines



Malaria in Children

WHAT CAN BE DONE?

What can be done?



Step 1:

- Provision of rapid access to safe and effective treatment

Step 2:

- Prevention of malaria infection

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Provision of safe and effective treatment



- Early diagnosis
- Easy access to treatment
- Use of an effective drug



A photograph showing a healthcare worker in a blue uniform attending to a group of children in a clinic. The worker is standing and leaning over a table, while the children are sitting on the floor. The room has posters on the wall and a chalkboard.



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Malaria Diagnosis



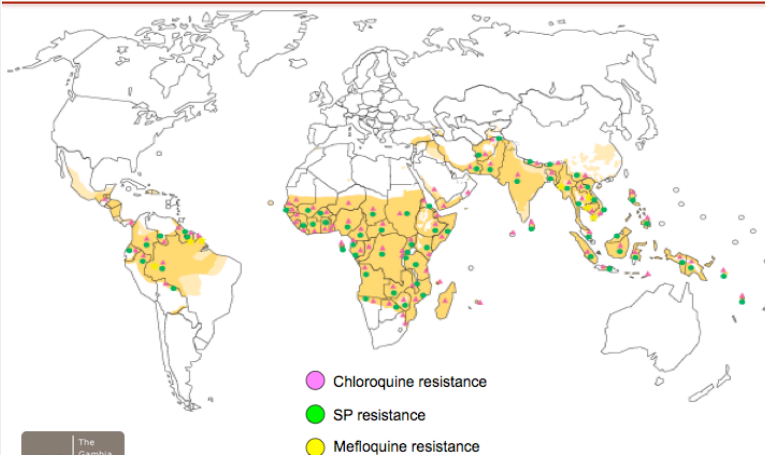
- Thick and thin blood smear microscopy examination remains the gold standard for diagnosis
- Antibody-based rapid diagnostic test that detect of Histidine-rich protein II (PfHRP2), lactate dehydrogenase or aldolase antigen
- HRP2-based test might remain positive for weeks after acute infection
- Polymerase chain reaction (PCR)

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Treatment must be effective



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Artemisinin Combination Therapy (ACT)



Advantages of artemisinins:

- Rapid acting
- Few side effects
- Acts on gametocytes



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Artemisia annua

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Why combination therapy ?



- Artemisinin monotherapy is not very effective
- Reduces the likelihood of the emergence and spread of resistant parasites

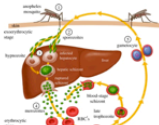
The tools for Malaria prevention



Indoor residual spraying (IRS)



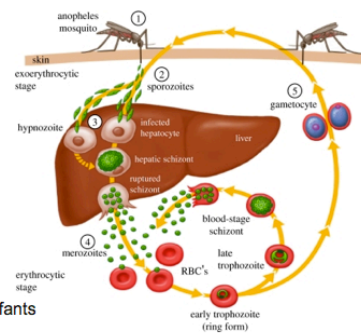
Insecticide treated bednets (ITNs)



Chemoprevention

- Pregnancy, children, infants

(Vaccines)



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