

# Issues in malaria diagnosis and treatment

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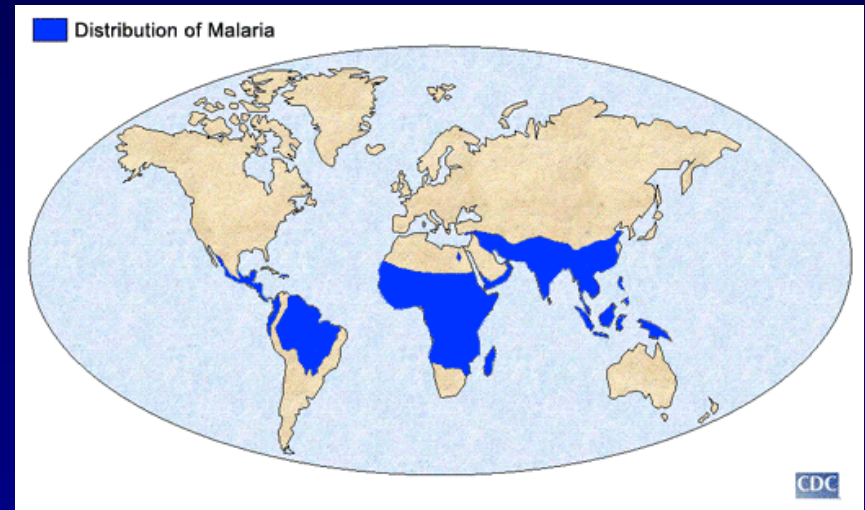


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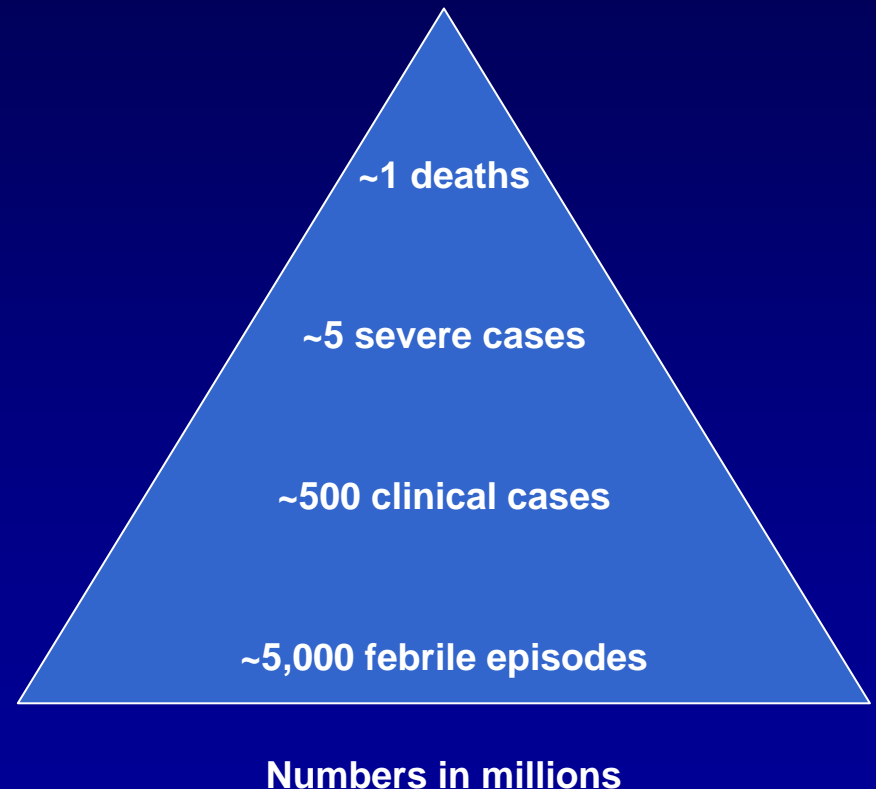
# Burden of malaria I

- 50% of world's population at risk
- ~515 million cases
- ~1 million deaths
  - Mostly *Plasmodium falciparum*
  - Mostly African children (~800,000)
  - 18% of child deaths in Africa



# Burden of malaria II

- **Direct**
  - Clinical episodes
  - Cerebral malaria
  - Severe anemia
- **Indirect and comorbid**
  - Maternal anemia
  - Low birth weight
  - Impaired child development
  - Poor school performance
  - HIV infection 2/2 transfusion
- **Economic**
  - Health system costs
  - Household costs
  - Decreased productivity
  - Reduced economic growth



# Strategies for malaria control

- **Vector control**
  - ITNs / IRS
  - Larviciding / fogging / civil engineering
- **Case management**
- **Preventive treatment**
  - IPTp / IPTi / IPTc
  - Prophylaxis in HIV patients
- **Epidemic response**

# Case management

- **Cases of malaria should be treated with correct, affordable, and appropriate treatment within 24 hours of the onset of symptoms**
- **Benefits**
  - Cure infection
  - Prevent progression
  - Reduce transmission

# Designing case management programs

- **Malaria epidemiology**
- **Antimalarial policy issues**
- **Antimalarial delivery issues**

# Malaria epidemiology

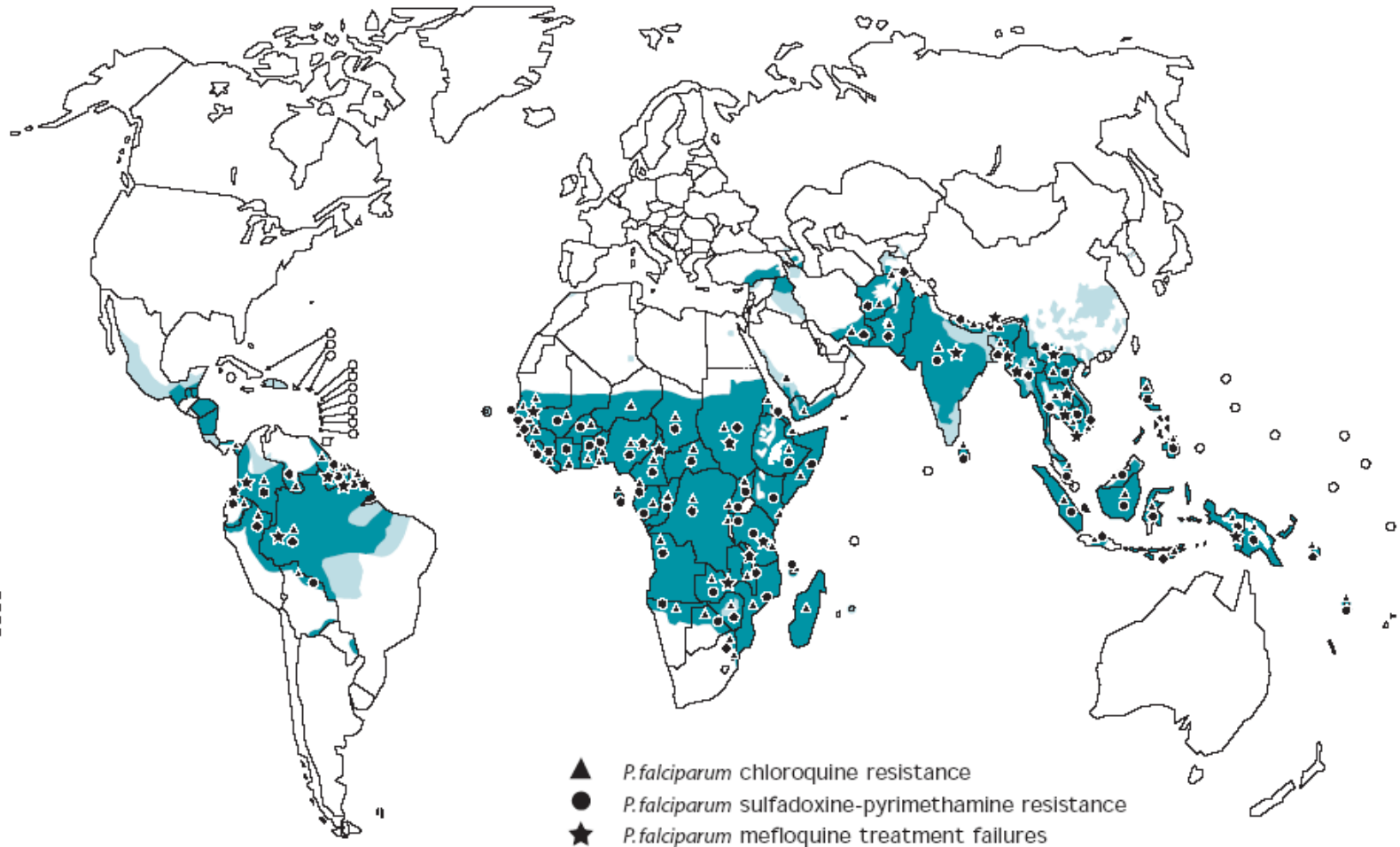
- **Population at risk**
  - **Species present**
    - *P. falciparum* vs. *P. vivax* or others
  - **Transmission intensity**
    - Geographic distribution
    - Disease prevalence
    - Risk groups (children vs. all ages)
    - Severe manifestations (cerebral malaria vs. severe anemia)

# Antimalarial policy issues

- **Choosing antimalarials**
  - **Indication**
    - Uncomplicated malaria
    - Severe malaria
    - Preventive treatment
  - **Efficacy**
  - **Safety**
  - **Ease of use**
  - **Cost**

# Choosing antimalarials: efficacy

Malaria transmission areas and reported *P. falciparum* resistance, 2004



# Choosing antimalarials: safety

- **Adverse events**
- **Safety in special populations**
  - Pregnant women
  - Lactating mothers
  - Infants

# Choosing antimalarials: ease of use

- **Formulation (e.g. tablet vs. syrup)**
- **Durability (e.g. shelf life, heat stability)**
- **Dosing regimen (once a day vs. twice a day)**

## Choosing antimalarials: cost

- Chloroquine \$0.11
- SP (Fansidar) \$0.14
- Quinine \$1.27
- Mefloquine \$2.55
- Artemether-lumefantrine \$9.12/2.40/1.80
- Artemether-SP \$2.40
- A-P (Malarone) \$48.00

# Artemisinin-based combination therapy (ACTs)

- Many countries changing to ACTs due to rising resistance
- ACTs
  - Co-formulated artemether-lumefantrine (Coartem<sup>®</sup>)
  - Co-packaged artesunate-amodiaquine
  - Other artesunate-based combinations
  - Dihydroartemisinin-piperaquine
- Concern about affordability
  - External funding required

# Changing antimalarial policy

- **Assess resistance**
- **Engage stakeholders and build consensus**
- **Obtain funding**
- **Identify new antimalarial**
- **Obtain regulatory approvals**
- **Build supply chain**
- **Revise treatment guidelines**
- **Train health workers**
- **Sensitize community**

# Antimalarial delivery issues I

- **Health system infrastructure**
  - **Health facilities**
    - **Staff**
    - **Medications and supplies**
    - **Diagnostic capability**
  - **Private sector health services**
  - **Community health worker programs**
  - **Accredited and non-accredited drug shops**

# Antimalarial delivery issues II

Public vs. private

Regulation / control

HW skill level

Use of diagnostics

Timeliness of treatment

Integration with other programs

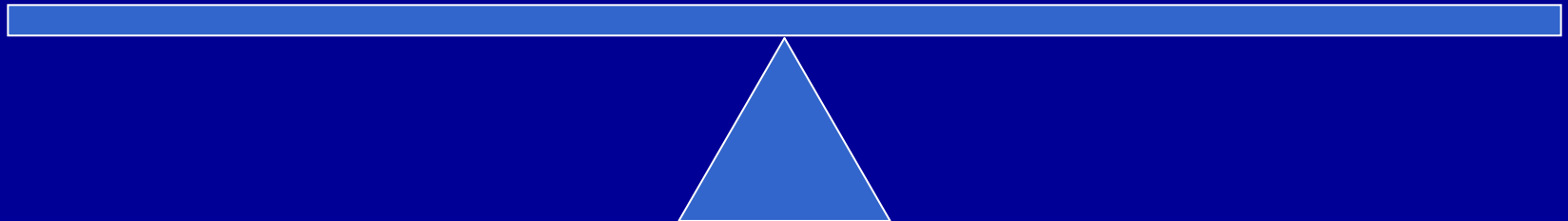
Surveillance

HF-based

Accredited drug shops

Community HWs

Home-based mgmt.



# Diagnosis I

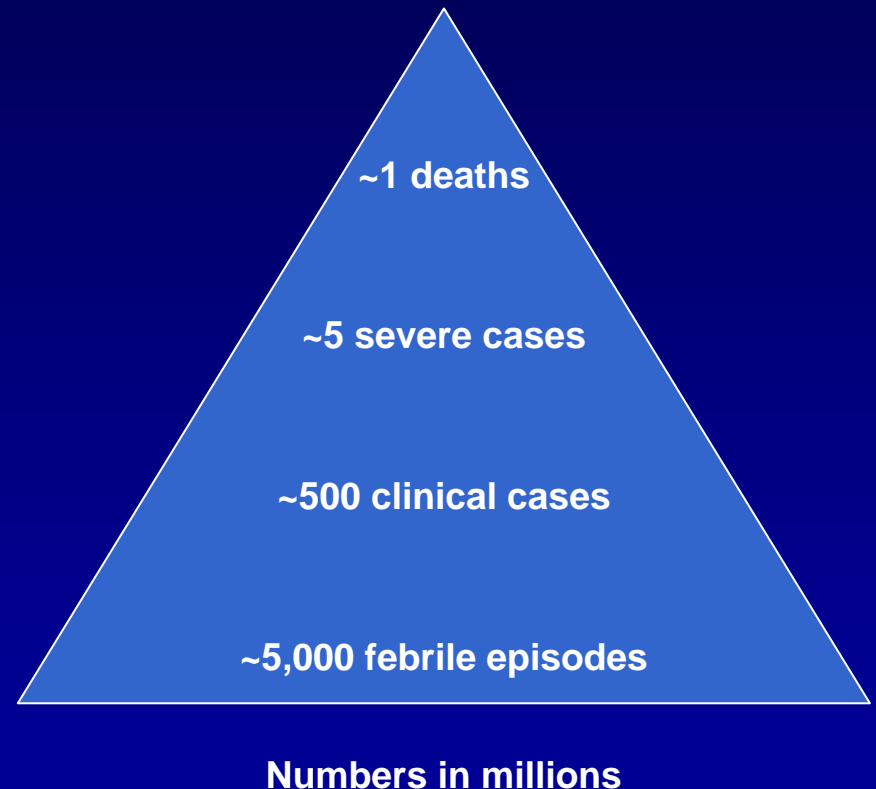
- In era of expensive ACTs, diagnostics key
- Increased use of diagnostics might lead to:
  - Better targeting of antimalarials
  - Reduced drug costs

# Diagnosis II

	<b>Clinical dx</b>	<b>Microscopy</b>	<b>RDTs</b>
<b>Sensitivity</b>	<b>85%</b>	<b>60-95%</b>	<b>85-95%</b>
<b>Specificity</b>	<b>40%</b>	<b>75-95%</b>	<b>95%</b>
<b>Infrastructure needed</b>	<b>Minimal</b>	<b>High</b>	<b>Moderate</b>
<b>Skill needed</b>	<b>Minimal</b>	<b>High</b>	<b>Moderate</b>
<b>Cost</b>	<b>\$0</b>	<b>\$0.10-0.40</b>	<b>\$0.70-1.00</b>
<b>Current use</b>	<b>High</b>	<b>Moderate</b>	<b>Minimal</b>

# Conclusions I

- **Malaria is treatable**
- **But, overwhelming number of cases**
- **Vector control needed to reduce number of cases**
- **Case management needed to reduce morbidity and mortality**



# Conclusions II

- **Case management success dependent on:**
  - **Correct antimalarial**
  - **Antimalarial delivery**
    - **Health system infrastructure**
      - **Health facility-based vs. home-based management**
      - **Use of diagnostics (clinical vs. microscopy vs. RDTs)**
  - **Adequate funding**

**Thank you for your attention**



## Contact:

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