


## Malaria in Pregnancy

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### Burden of Malaria in Pregnancy (MIP)

**45 million pregnancies in malaria-endemic areas**

- ➔ 23 million in high transmission areas of Africa

**Malaria contributes to negative health impact:**

#### Mothers

- ➔ 3-15% of severe anemia
- ➔ up to 10,000 malaria anemia-related deaths per year

#### Infants

- ➔ 8-14% of all low birth weight
  - 30% of preventable low birth weight
- ➔ 8-36% of prematurity
- ➔ 3-8% of infant mortality = 75,000-200,000 infant deaths/year

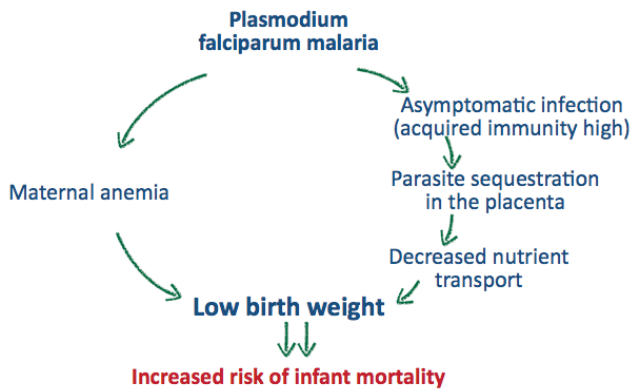
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### Presentation of MIP According to Endemicity

	ENDEMIC	EPIDEMIC
Mother	<ul style="list-style-type: none"> <li>➔ <b>High</b> Transmission Areas</li> <li>➔ Mothers <b>asymptomatic</b></li> <li>➔ Severe maternal <b>anemia</b></li> </ul>	<ul style="list-style-type: none"> <li>➔ <b>Low</b> Transmission Areas</li> <li>➔ <b>Severe</b> maternal symptoms</li> <li>➔ <b>Cerebral malaria</b></li> <li>➔ <b>Respiratory distress</b></li> <li>➔ <b>Death</b></li> </ul>
Infant	<ul style="list-style-type: none"> <li>➔ Low birth weight</li> <li>➔ Neonatal/infant mortality</li> </ul>	<ul style="list-style-type: none"> <li>➔ Miscarriage</li> <li>➔ Pre-term delivery</li> <li>➔ Low birth weight</li> <li>➔ Infant/neonatal mortality</li> </ul>

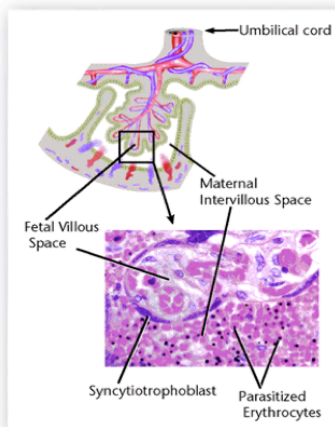
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## Malaria during Pregnancy High Transmission Areas



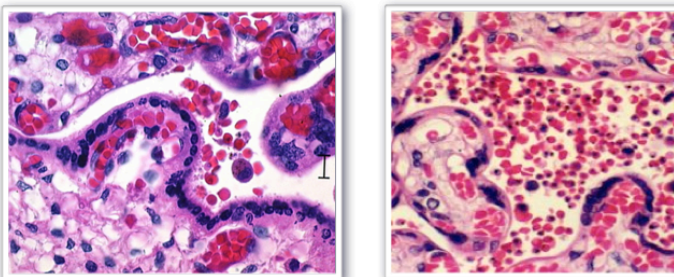
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## Malarial parasites sequester in the placental intervillous space



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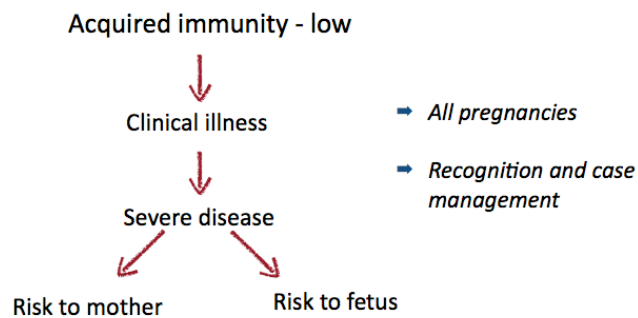
**Placental parasitemia can occur with >90% of all placental red blood cells infected**



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## Malaria in Pregnancy

### Low Transmission Areas

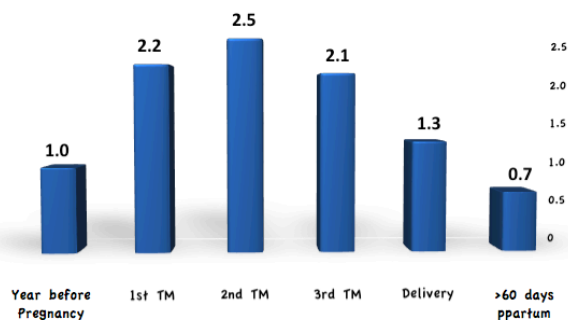


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## A Few Key Facts About Malaria in Pregnancy from Studies in sub-Saharan Africa

**Pregnant women are more susceptible to malaria than non-pregnant adults**

## Odds of *P. falciparum* Parasitemia

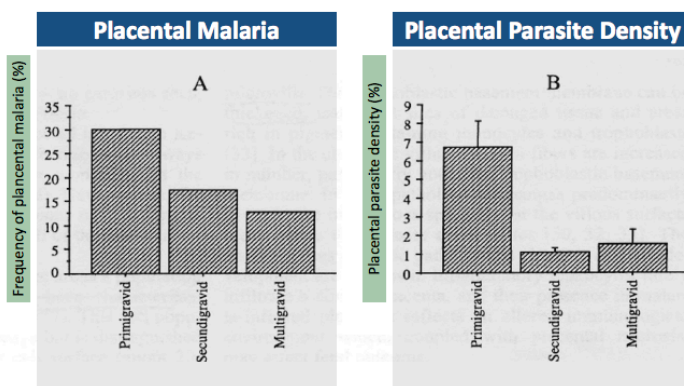


Diagne N et al NEJM 2000.

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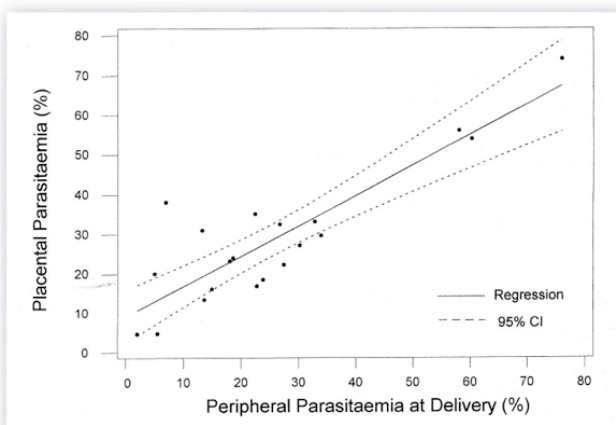
**Malaria is more frequent and more severe among nulliparous women compared to multiparous women**

### Parity-specific Immunity

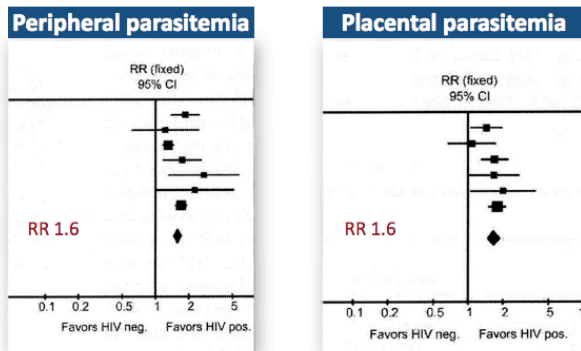


Fried and Duffy J Mol Med. 1998 11

### Placental parasitaemia occurs in the absence of peripheral parasitemia



## HIV increases risk for peripheral and placental parasitemia



Ter Kuile F. Am J Trop Med Hyg 2004

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## HIV and Malaria in Pregnancy

### HIV-positive pregnant women have:

- ➔ Higher prevalence of malaria parasitemia
- ➔ Higher parasite densities
- ➔ Greater risk of placental infection
- ➔ ↑ risk of anemia
- ➔ ↑ risk of birth complications including LBW, preterm delivery, and IUGR

Placental malaria in HIV-infected pregnant women may increase **risk of HIV mother-to-child transmission**

Infants of HIV-infected pregnant women at greater risk of **serious malaria morbidity or mortality**

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## Malaria in Pregnancy Opportunities for Intervention

### Program opportunity

- ➔ In areas of Africa with greatest LBW > 60% women attend ANC

### Drugs

- ➔ Intermittent preventive treatment (IPTp)
- ➔ Case management

### Insecticide Treated Nets (ITNs)

### Treatment of anemia

- ➔ Iron/folate
- ➔ Nutritional counseling

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## ITN Donation

Antenatal Clinic near Blantyre, Malawi



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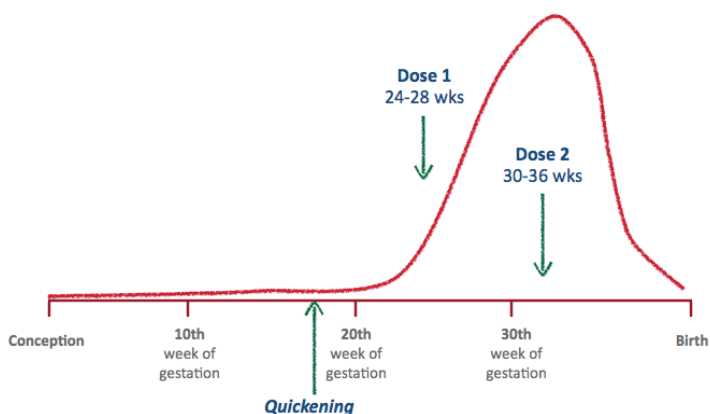
## Insecticide Treated Nets (ITN)

- Decrease peripheral parasitemia, anemia, placental malaria, pre-term delivery, and increase in mean birth weight
- 25% decrease in infants who were premature or SGA among women sleeping under ITNs
- Supply of ITNs in sub-Saharan Africa increasing, but disparity exists between urban and rural populations
- Need to increase access to ITNs for pregnant women

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## Intermittent Preventive Therapy (ITP)

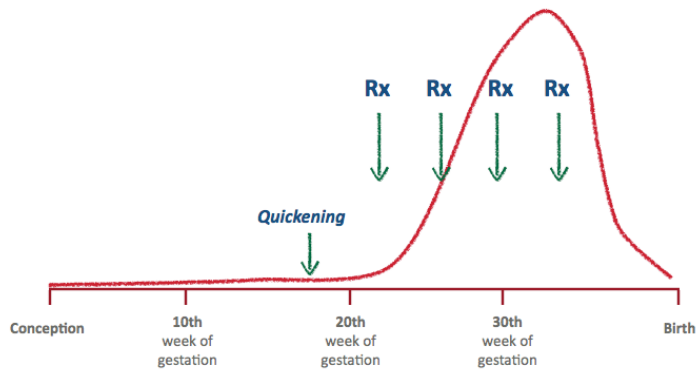
The two dose strategy



CDC

## Intermittent Preventive Therapy (ITP)

### The monthly dosing strategy



CDC

## Conclusions

- ➔ SP for IPTp may confer less protection than previously observed due to rising SP resistance
- ➔ WHO now recommends monthly dosing beginning after quickening
- ➔ Findings emphasize urgent need to evaluate alternative medications for IPT and potentially new strategies (IST)

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**Thank you!**