

# Newsletter

## Update on Malaria Part 1 Epidemiology, Pathogenesis, Diagnosis

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### Key facts about Malaria

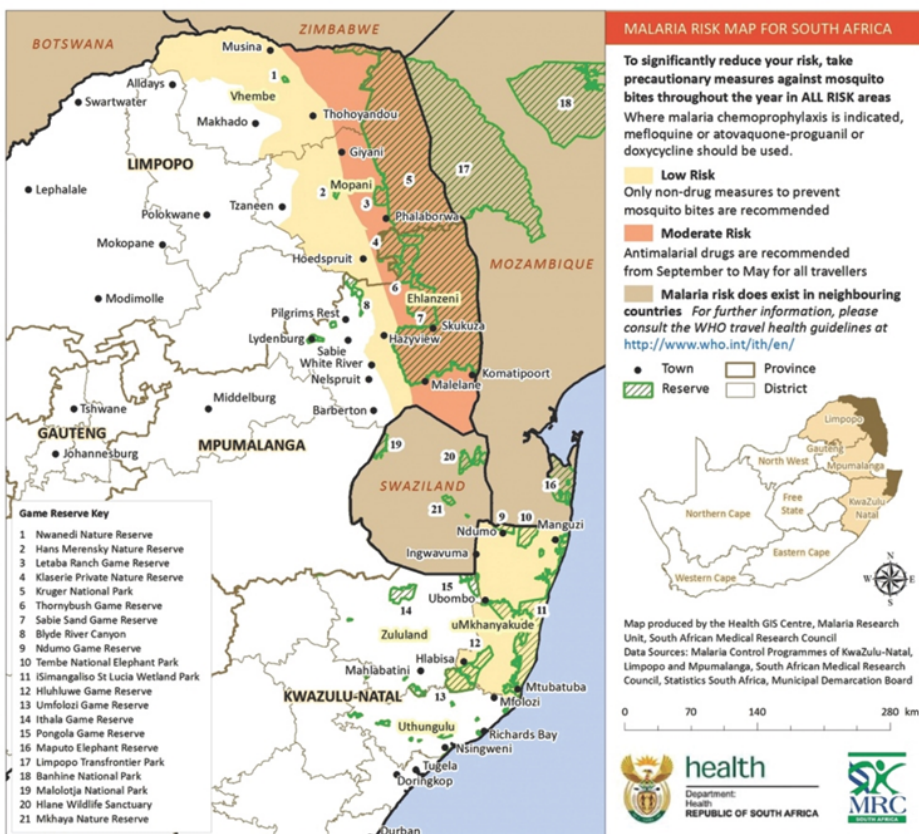
- Malaria is a **CATEGORY 1 NOTIFIABLE CONDITION** according to the National Department of Health's (NDOH) Notifiable Medical Conditions (NMC) list.
  - This is a medical condition that requires reporting by the most rapid means available upon diagnosis, followed by a written or electronic notification to the Department of Health within 24 hours of diagnosis by healthcare providers, private health laboratories or public health laboratories.
- Malaria is seasonal in South Africa, where the highest risk of malaria transmission occurs in the wet summer months (September to May).
- Malaria vector mosquitoes generally bite between dusk and dawn.
- Only female mosquitoes are associated with malaria transmission.
- Male mosquitoes DO NOT blood feed and play no role in the malaria transmission cycle.
- Three Plasmodium falciparum Anopheles vectors are associated with human transmission of malaria:
  - Anopheles gambiae
  - An. funestus
  - An. arabiensis
- Sub-Saharan Africa and India carry -85% of the global malaria burden.
- Plasmodium falciparum is the most prevalent parasitic infection in the WHO Africa region.
- One child dies every minute from malaria in Africa.
- Malaria immunity is rapidly lost in the absence of exposure to malaria.
- Non-immune travellers are at higher risk for severe malaria.
- Emergence of antimalarial drug and insecticide resistance threatens control and elimination efforts.



## What is Plasmodium knowlesi?

- It was first isolated & studied at the Kolkata School of Tropical Medicine in India in the early 1930s and named after the scientist Robert Knowles.
- First human case was detected 34 years after it was isolated, in a US army surveyor who acquired the infection while working in a forest in Malaysia.
- It is a natural pathogen of macaque monkeys, and humans are incidental hosts.
- Indistinguishable from *P. malariae* on blood smear.
- Responsible for significant morbidity & mortality in Malaysia.
- It is associated with metabolic acidosis, hepato-renal dysfunction, respiratory distress, severe anaemia, and refractory hypotension.

## Which are the malaria areas in South Africa?



## What is Odyssean malaria?

- Odysseus was the Greek hero, who, on his way home from the Trojan wars, wandered the Mediterranean region, experiencing many adventures and narrow escapes.
- The term "Odyssean malaria" was coined to describe the various modes of transport used by malaria vectors, e.g. suitcase/luggage/airport malaria; harbour container malaria; minibus taxi malaria.
- Malaria transmission outside of endemic areas is unexpected, therefore this delays diagnosis and treatment, and may result in a more severe illness or fatal outcome.

## High risk groups for acquiring malaria

- Children under the age of 5 years
- People older than 65 years of age
- Pregnant and postpartum women
- Immunocompromised patients (e.g. patients receiving chemotherapy & HIV-infected patients)
- Splenectomised individuals
- People with co-morbid conditions

## Malaria pathogenesis

Mature trophozoites & schizonts sequester in deep venous microvasculature

**Sequestration is promoted by:**

- Adherence of infected erythrocytes to endothelial cells.
- Rosetting – the binding of infected erythrocytes to uninfected erythrocytes.
- Reduced erythrocyte deformability.
- Platelet-mediated clumping of infected erythrocytes.

Sequestration in microvessels prevents filtration & subsequent destruction by the spleen

The low oxygen tension environment in the post-capillary venules enhances the survival & propagation of malaria parasites

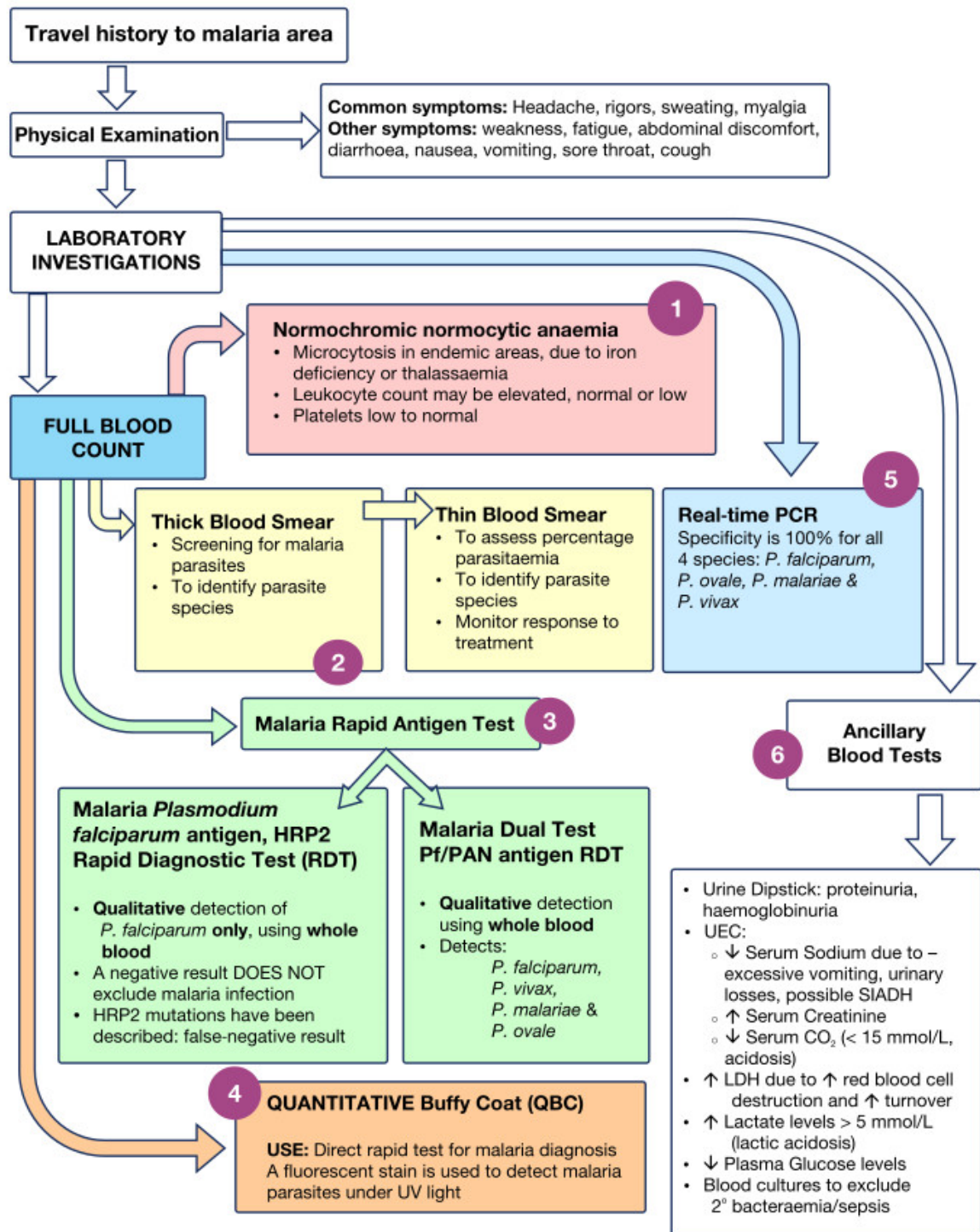
Infected erythrocytes have dense protrusions ("knobs") on the surface - Plasmodium falciparum erythrocyte membrane protein 1 [PfEMP-1]  
These "knobs" enable attachment to the endothelium & support cytoadherence & sequestration

## Differential diagnosis

The differential diagnosis for a patient presenting with fever, malaise, headache, and prostration include:

- Influenza
- Viral hepatitis
- Meningitis
- Gastroenteritis
- HIV seroconversion illness
- Urinary tract infection
- Enteric fever (Salmonella serotype Typhi, Salmonella serotype Paratyphi)
- Bacteraemia/sepsis
- Dengue fever
- Acute schistosomiasis
- Leptospirosis (Leptospira interrogans)
- African tick bite fever (Rickettsia africae)
- Yellow fever

## LABORATORY DIAGNOSIS of malaria at LANCET LABORATORIES



References available on request