PAPUA NEW GUINEA’S EXPANDING MALARIA PROGRAM

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National Malaria Control Program
## WHO IS AT RISK?

<table>
<thead>
<tr>
<th>Province</th>
<th>Population 2012</th>
<th>% Population</th>
<th>Malaria Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-400m</td>
<td>3,688,540</td>
<td>48.1</td>
<td>Very High Stable</td>
</tr>
<tr>
<td>400-800m</td>
<td>335,750</td>
<td>4.4</td>
<td>High Stable</td>
</tr>
<tr>
<td>800-1200m</td>
<td>246,517</td>
<td>3.2</td>
<td>Stable</td>
</tr>
<tr>
<td>1200-1600m</td>
<td>942,092</td>
<td>12.3</td>
<td>Unstable Epidemic</td>
</tr>
<tr>
<td>1600-2000m</td>
<td>1,738,389</td>
<td>22.7</td>
<td>Very Low</td>
</tr>
<tr>
<td>2000-2400m</td>
<td>581,203</td>
<td>7.6</td>
<td>Absent</td>
</tr>
<tr>
<td>Above 2400m</td>
<td>128,299</td>
<td>1.7</td>
<td>Absent</td>
</tr>
<tr>
<td>Total Population 2012</td>
<td>7,660,790</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Who is at risk?
Background:

Historical impact of malaria on health services

- One of the leading causes of consultations, admissions and of recorded deaths (2011).
- In 2011: only 184K out of 1,151K reported malaria cases were tested, of which 70K (38%) were positive (confirmed)
- Out of 17K malaria admissions: 431 deaths malaria deaths representing a case fatality rate of 2.4%
- Cases from Aid posts (representing approximately 40% of patient consultations) not reported through NHIS
**Background:**
Malaria as a proportion of all causes morbidity, PNG 2008 - 2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Out patient attendance (new)</th>
<th>Admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All cause</td>
<td>Malaria</td>
</tr>
<tr>
<td>2008</td>
<td>8,838,540</td>
<td>1,606,843 (18.2%)</td>
</tr>
<tr>
<td>2009</td>
<td>5,034,900</td>
<td>1,431,395 (28.4%)</td>
</tr>
<tr>
<td>2010</td>
<td>5,680,608</td>
<td>1,379,787 (24.3%)</td>
</tr>
<tr>
<td>2011</td>
<td>3,780,786</td>
<td>1,151,353 (30%)</td>
</tr>
</tbody>
</table>
Until 2011, most treatment of malaria had been based on clinical symptoms as the only form of malaria control for decades after the Eradication Programme was abandoned in the 1980s.

Chloroquine was the first line treatment for many years.

Chloroquine resistance to *P. falciparum* was first noted in 1976 and *P. vivax* in the late 1980’s with very much treatment failure noted in the 1990’s.

In 2000 SP was added to CQ as the first line treatment.
A Change Came: New Treatments and Vector Control

• In 2010, chloroquine and SP combination was finally abandoned and ACTs were introduced (Coartem: artemether lumefantrine).
• Together with Coartem, RDTs (Rapid Diagnostic Tests) were introduced for compulsory diagnosis.
• 2011 saw the full implementation of ACTs and RDTs ensuring universal coverage.
• While LLIN distribution started in 2004, access and use of LLINs accelerated between 2009-2014.
ACT treatment of confirmed malaria cases increased over time. (NHIS)
## Summary of first and second line treatment

<table>
<thead>
<tr>
<th>Classification</th>
<th>Condition</th>
<th>First line</th>
<th>Second line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncomplicated</td>
<td>Falciparum malaria</td>
<td>AL tablets</td>
<td>DHP tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vivax malaria</td>
<td>AL plus PQ tablets</td>
<td>DHP plus PQ tablets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mixed infection of pf/pv</td>
<td>Same as falciparum; give PQ if pv/po confirmed</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>Falciparum or vivax</td>
<td>Artesunate IV/IM or artemether IM followed by AL</td>
<td>QN injection followed by oral plus doxycycline when able to swallow</td>
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</table>
Management of Malaria in Pregnancy

- Uncomplicated malaria
  - First trimester: QN plus Fansidar
  - Second & third trimesters:
    - First line: AL
    - Second line: QN + Fansidar

- Severe malaria
  - Artesunate IV or IM (or artemether IM or QN IM) followed by oral QN and Fansidar when patient able to swallow

- Intermittent preventive Treatment (IPTp): 3 doses of Fansidar starting after 16 weeks (quickening) and then after at least 4 weeks
Ownership, access and use increased substantially over Round 3 & 8 grants.

Lowest ownership in Highlands, lowest use (if access) in Highlands, Islands, Northern P. & Milne Bay P. (2013/14)

[PNGIMR Malaria Indicator Surveys 2008/09 (1,958 HH; 10,258 indiv.), 2010/11 (1,996 HH; 12,548 indiv.), 2013/14 (2167 HH; 11,665 indiv.)]
PNG – MALARIA PROGRAMME

Progress in mosquito net coverage and Usage

**LLIN access** (% individuals with access to LLIN in household)

- **2009**
- **2011**
- **2014**

![Source: PNGIMR](source)

**LLIN use** (% individuals sleeping under LLIN last night)

- **2009**
- **2011**
- **2014**

![Source: PNGIMR](source)
The Change Showed Results: Malaria Incidence per year after interventions (2000-2014)
PNG: Malaria Admissions and Deaths 2006-2015

Malaria admissions and deaths (per 100,000)

- Admissions (all species)
- Admissions (P. vivax)
- Deaths (all species)
- Deaths (P. vivax)
Targeting vivax malaria and G6PD deficiency

- Vivax malaria has been steadily increasing in PNG.
- Good quality testing will diagnose vivax malaria and allow targeted treatment.
- PQ is continued in this protocol for vivax and ovale malaria. PQ eliminates tissue forms of the parasite, reducing relapses and transmission.
Targeting vivax malaria and G6PD deficiency (cont.)

- Use of PQ in children should be based on microscopy or RDT (for non-falciparum malaria only)
- Precautions on treatment of vivax malaria patients with G6PD deficiency
- PQ should NOT be given to patients with known G6PD deficiency
- Patients taking PQ must be advised, that if their urine becomes dark, they must stop taking the PQ immediately and return to the clinic
Radical cure of vivax malaria: Needs to overcome the challenges of PQ use

- The full 14-day Primaquine treatment course must be adhered to for full prevention of relapse.
- Methods to improve adherence to Primaquine include patient counselling, better packaging and directly observed treatment, in which each dose is given by a trained health worker.
- Patients should be advised of the possible risks and told that they should stop the Primaquine if they become ill or if their urine is dark or becomes black.
Successful large-scale LLIN campaign

Introduction and massive scale up of RDT and continued distribution of ACTs

Gradual increase of reported confirmed malaria diagnosed by RDTs & microscopy

Result: a marked reduction in the reported prevalence and incidence
Challenges

- Strengthening malaria program at provincial and importantly district level.
- Ensuring sustained reliable funding.
- Procurement and supply management of antimalarial.
- Correctly and timely recording and reporting malaria data.
- Better health care access especially due to geographical and other barriers.
• Malaria in PNG has seen many changes in prevalence and incidence due to malaria control, treatment practices and drug resistance.
• The introduction of LLINs, ACTs and RDTs has led to a decline of 70% or more in malaria incidence and prevalence in most areas.
• However, some areas are not responding as well as others have.
• Sustained programme support and uniform access to interventions across all endemic settings remains a challenge for the future.
Acknowledgements

- The PNG government
- Department of Health
- The Global fund
- Defat
- PNG IMR
- World Health Organization
- Rotarians Against Malaria
- Population services international
- CPHL
- PIMI
- Tri lateral Malaria Project
- Provincial health departments
- DWU
THE REALITIES OF DISTRIBUTING MALARIA COMMODITIES IN PNG
Rural Roads??
Mountains and rivers