The Learner Treatment Kit Study
Evaluation of a primary school-based malaria case management programme on school attendance in Zomba District, Malawi

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Malaria prevalence in school-age children

School-age children less likely to:
- Sleep under an ITN [Noor et al., 2009], [Buchwald et al., 2016].
- Be brought for any type of malaria treatment [Walldorf et al., 2016].

80.0% Southern Mali
Clarke et al., unpub.

63.3% Cote d’Ivoire
Yapi et al., 2014

41.5% (21-63%)
Western Ghana
Sarpong et al., 2015

48% (32-48%)
Western Kenya
Kepha et al., 2016

13% (0-75%)
Coastal Kenya
Halliday et al., 2012

38.1% (16.7-51.4%)
Western Tanzania
Kim et al., 2015

4.5%
Central Tanzania
Mboera et al., 2015

31% (Rainy season)
Blantyre, Chikwawa & Thyolo, Malawi
Walldorf et al., 2015

60.0%
Zomba, Malawi
Mathanga et al., 2015

30.0%
Eastern Uganda
Nankabirwa et al., 2013

22.4%
Highland Rwanda
Sifft et al., 2016

4.5%
Central Tanzania
Mboera et al., 2015

6.5%
Western Tanzania
Kim et al., 2015

13%
Coastal Kenya
Halliday et al., 2012

80.0%
Southern Mali
Clarke et al., unpub.
Malaria control options in schools

Prevention education: ITNs & treatment-seeking

SMC: Seasonal malaria chemoprevention

Case management: RDTs and ACTs

ITNs: Universal coverage

Malaria infection

Clinical attack

Asymptomatic parasitaemia

IPC: Intermittent Parasite Clearance

IST: Intermittent Screen & Treatment

ANAEMIA

Anaemia

Reduced attention during lessons

Absent from school

Educational Attainment

BCC

NJL

ITNs

SMC

RDTs

ACTs

Prevention education: ITNs & treatment-seeking

SMC: Seasonal malaria chemoprevention

Case management: RDTs and ACTs

ITNs: Universal coverage

Malaria infection

Clinical attack

Asymptomatic parasitaemia

ANAEMIA

Anaemia

Reduced attention during lessons

Absent from school

Educational Attainment
Why school-based malaria case management?

• Experience of presumptive school-based malaria case management at scale in Malawi – Pupil Treatment Kit (PTK):
  • Decreased absenteeism [Simwaka et al., 2009]
  • Reduced overall and malaria specific mortality [Pasha et al., 2003]

• Acceptable [Okabyashi et al., 2006] and effective [Magnussen et al., 2001] platforms to address malaria.

• Supports national target of universal access to safe, prompt and quality diagnosis and treatment of malaria (MoH) and aim of “...healthy children who can fulfil their optimum learning potential...” (MoEST-SHN)
The Learner Treatment Kit

- At each school between **2-4 teachers** trained in the use of LTK.
  - 7 day training facilitated by MoH officers
  - 2 day refresher training at 9 months
- Schools are attached to a **local health facility** where they collect **supplies**.
- **Supervision & quality assurance** conducted by **district taskforce**
- Teachers demonstrated **safe and accurate use of RDTs and ACTs** following training, retained for up to 9 months of routine use [Witek-McManus et al., 2015].
The Learner Treatment Kit

Treatments:
- Paracetamol
- Oral Rehydration Therapy
- Tetracycline Eye Ointment

Wound & injury management:
- Methylated spirit
- Povidone-iodine
- Chlorhexidine solution
- Bandages & gauze
- Vaseline gauze
- Scissors

Malaria specific materials:
- Artemesinin Combination Therapy
- Malaria rapid diagnostic tests
- Gloves
- Sharps container
- Weighing scales

General:
- Cotton wool
- Waste bin & bin-liners
- Medicine bags
- Water cup
The Learner Treatment Kit

When to use an RDT

- child feels ill or appears unwell
- current fever or fever within last three days?

YES
- complains of headache
  - use mRDT + paracetamol
- General aches and muscle/joint pains
  - use mRDT + paracetamol
- nausea/vomiting/loss of appetite
  - use mRDT + ORS
- complains of diarrhoea
  - use mRDT + ORS
- complains of feeling weak
- complains of stomach ache
- complains of cough

NO
- RDT not appropriate

How to use an RDT

- Job-aids to support critical LTK tasks
- Adapted from pre-tested materials by WHO-TDR and ACT Consortium
- In line with national guidelines for use of RDTs and ACTs and SHN Curriculum
The Learner Treatment Kit trial

Cluster-randomised trial in 58 primary schools in Zomba, Malawi to evaluate the impact of school-based malaria case management (as part of a ‘first-aid kit’) on child absenteeism, wellbeing, health & education.

Primary objective:
• Quantify impact on school attendance

Secondary objectives:
• Evaluate impact on child-reported wellbeing
• Quantify impact on anaemia, *P. falciparum* infection and educational performance
• Explore acceptability of intervention
• Determine competency of school teachers to diagnose and treat uncomplicated malaria using RDTs & ACTs
• Determine cost effectiveness of intervention
### Data Collection

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
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<th>2014</th>
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<td></td>
<td>Nov</td>
<td>Dec</td>
<td>Jan</td>
<td>Feb</td>
<td>Mar</td>
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<tr>
<td>Control</td>
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<td>May</td>
<td>Jun</td>
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<td>Aug</td>
<td>Sep</td>
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#### Implementation (Training)

<table>
<thead>
<tr>
<th>Date</th>
<th>Childs full name</th>
<th>age</th>
<th>sex</th>
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#### Teacher-recorded attendance

<table>
<thead>
<tr>
<th>Learner Attendance Record</th>
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<tbody>
<tr>
<td><strong>District</strong>: Zone</td>
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#### Unannounced attendance ‘spotcheck’

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Age</th>
<th>Sex</th>
<th>Ethnic</th>
<th>Notes</th>
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#### Child-reported wellbeing

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Age</th>
<th>Sex</th>
<th>Ethnic</th>
<th>Notes</th>
</tr>
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</table>
Usage by season:

- During first and second rainy seasons, greatest number of children seeking treatment, and greatest proportion of children testing malaria positive.

- Similar proportion of children testing malaria positive during both rainy and post-rainy seasons (76%-82%).
Usage by season:

- During first and second rainy seasons, greatest number of children seeking treatment, and greatest proportion of children testing malaria positive.
- Similar proportion of children testing malaria positive during both rainy and post-rainy seasons (76%-82%).
Usage by child age and sex:

- Significantly greater proportions of female children seeking care than male children in those 6 to 14 years old.

- Equal proportions of female and male learners seeking treatment in those 15 years and older.

- No significant difference in type of symptoms reported at any age (data not shown)
Effect on child absenteeism:

No significant difference in absenteeism between groups

- Teacher-reported registers: $\text{OR}=0.90$ (0.59-1.37), $p=0.621$

- Directly-observed spotcheck: $\text{OR}=1.11$ (0.89-1.39), $p=0.437$
Effect on reported child wellbeing:

- **No significant difference** between groups when considering child-reported well-being: (OR=0.86 (0.56-1.30), p=0.471)

![Bar chart showing child-reported wellbeing (% of days where wellbeing status reported)](chart.png)
### Effect on clinical and education outcomes:

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Group</th>
<th>n</th>
<th>Odds ratio (95% CI)*</th>
<th>p-value</th>
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<tr>
<td>Malaria parasitaemia</td>
<td>Control</td>
<td>1732</td>
<td>1.01 (0.65 – 1.57)</td>
<td>0.948</td>
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<tr>
<td></td>
<td>Intervention</td>
<td>1772</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaemia</td>
<td>Control</td>
<td>1736</td>
<td>1.05 (0.84 – 1.32)</td>
<td>0.656</td>
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<tr>
<td></td>
<td>Intervention</td>
<td>1776</td>
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</table>

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Group</th>
<th>n</th>
<th>Mean difference (95% CI)*</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeracy test score</td>
<td>Control</td>
<td>1438</td>
<td>-0.01 (-0.22 – 0.20)</td>
<td>0.921</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>1347</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literacy test score</td>
<td>Control</td>
<td>1394</td>
<td>-0.07 (-0.27 – 0.12)</td>
<td>0.471</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>1354</td>
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No significant difference in malaria parasitaemia, anaemia or educational performance between children in either group.
Effect on reported health seeking:

- Significant difference ($p<0.0001$) in source of care for last febrile event.
- Children in intervention schools most likely to have sought care from LTK.
- Children in control schools most likely to seek care from a shop or health centre.
### How do policy makers, schools and communities perceive the LTK?

**Increased access to prompt treatment:**
- **Preferential** choice for sick children due to perceived **convenience** and **reliability**
- **Supportive** and **consistent** with district and national strategic plans

**Perception of reduced absenteeism:**
- Reported to **reduce school absenteeism** and school **drop-out**
- “...[children] still come [to] school because they know that they will get medical attention”

**Workload during rainy season:**
- Recommendation of a **greater number** of teachers to be **trained**
- Expectation of in-kind or financial **compensation** for role

**Linkage with health system:**
- Initial **tension** between teachers and health workers
- Challenges encountered when **collecting supplies** and feedback following referral

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Why did the LTK have no effect on school attendance?

<table>
<thead>
<tr>
<th>Similar interventions?</th>
<th>• Decreased absenteeism [Simwaka et al., 2009] and reduced overall and malaria specific mortality [Pasha et al., 2003]</th>
<th>• Mixed evidence for WASH interventions on improved attendance [Jasper et al., 2012]</th>
</tr>
</thead>
</table>
| Study design? | • Unable to account for baseline measurement of attendance  
• Potential unmeasured contextual factors | • Randomised design, attendance measured using multiple methods, and longitudinal follow-up of a large number of children |
| Accurately recording attendance? | • More than 80% of absenteeism by spotcheck was for unknown reason(s)  
• Influence of intervention on teachers’ recording of attendance | • Significant resources required for greater resolution for absenteeism – e.g. follow up of children at home or when they return to school |
Summary:

• Despite high usage of *Learner Treatment Kit*, **no significant impact on school attendance**

• Widely supported as a **reliable** and **trusted** source of healthcare
  • Schoolchildren show **high demand** for school-based health care

• Teachers can **feasibly** use RDTs & ACTs to **routinely** deliver malaria case management to school children.
  • Further investigation into **compliance** with treatment and **sustainability** of intervention required
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Thank you for listening