Housing modifications as a malaria control strategy in peri-urban Cameroon

Peter Williams
ARCHIVE Global
CONSTRUIRE LA
PRÉVENTION DU PALUDISME
BUILDING MALARIA PREVENTION: A GLOBAL DESIGN COMPETITION
Minkoameyos (Cameroon)
Integrated Design – Vector Control Study

Cameroon: Yaoundé

Permanent
Semi-Permanent

Temporary
Patchwork
Traditional
Why Cameroon?
- Low LLIN usage among Under 5s.
- Year-round transmission
- Widespread substandard housing and high poverty

Purpose
- To assess the effectiveness of improved housing design as malaria prevention in peri-urban Cameroon

Objectives
- Improve living conditions for 264 households in Minkoameyos
- Train 4,000 community members
- Reduce malaria incidence by 20% among 264 households
Partners

Civil Sector
• Cameroon Coalition Against Malaria
• National Malaria Control Program
• local community and faith-based organizations

Private Sector
• University of Yaounde I
• School of Architecture of Cameroon (ESSACA)
• Local Materials Promotion Authority (MIPROMALO)

Public Sector
• Ministry of Health
• Ministry of Urban Development and Habitat

Funders
• UBS Optimus Foundation
• SELAVIP
Malaria Prevention: Housing Improvements

Design
- Specifications
- Reduces indoor humidity and temperatures

Timeline

Cost

Expected outcomes
- ‘Malaria proof’ housing provided for 264 families
- Development of best-practice guidelines
Malaria Prevention: Training

- Over 100 community and technician trainings to be held
- Combination of group trainings and household-level approaches
- Over 3,000 people trained as of December 2014
  - Community based organizations
  - Primary and secondary schools
  - Technical colleges
Malaria Prevention: Evaluation and Research

Address current research gaps

- Quantify impact on malaria incidence in holoendemic, peri-urban areas
- Assess comfort/usability of design (indoor humidity and temperature)

Develop evidence base for bringing this approach to scale
Research

• Partners
  • Cameroon Coalition Against Malaria and the University of Yaounde I

• Timeline
  • Surveyor training, June 2013
  • Community baseline assessment of 70 households, June 2013
  • Construction, May 2014-September 2014
  • Data collection in 45 households, November 2014-October 2015

• Participating Households
  • Total of 45 households currently enrolled
  • 22 intervention, including 43 children under 5 years
  • 23 control, including 39 children under 5 years
Data Collection: Entomological Survey Methodology

Mosquito collection
- Timeline: November 2014-October 2015
- Mosquitoes collected via human landing catches
- Each home (n=45) to be sampled 4 times over a period of 12 months

Laboratory procedures
- Procedures conducted at the Biotechnology Center of the University of Yaounde
- Specimens assessed for presence of plasmodium via ELISA
- Specimens identified to species complex via PCR

Research outcomes
- Mosquito density: human-vector contact
- Mosquito composition: distribution of species
- Mosquito infectivity: % specimens infected by plasmodium
- Entomological Inoculation Rate: Number of infective bites/person/night
Assessment of malaria incidence

Timeline
• November 2014-October 2015

Calculation of malaria incidence period of 12 months
• RDT
• Microscopy

Treatment of infections via ACT

Research outcomes
• Comparison of malaria incidence across trial groups
Baseline Assessment

- Completed in June-July 2013
- 5 local residents trained to conduct interviews in 70 randomly selected households
- Purpose:
  - Determine local housing characteristics
  - Identify household-level factors associated with higher risk of infection
  - Assess knowledge, attitudes, and practices associated with malaria and its prevention
  - Estimate community malaria prevalence across age groups
Results

**Housing Characteristics (n=70)**
- 64.3% had unscreened windows
- 65.7% had openings in the roof
- 75.7% had standing water around the house perimeter

**Prevention Behaviors (n=410)**
- Over 65% did not have enough nets for all occupants
- 58% did not sleep under a net the previous night

**Malaria Prevalence via RDT(n=403)**
- 32.8% tested positive for malaria
- 53.1% of all infections were among children aged 10 years and younger
Household characteristics associated with increased risk of infection

- Lack of cement walls
- Lack of ceiling
- Large holes in walls
- Bushy environment around the home
- Standing water around the home
Impacts

- Expansion of healthy living environments for 264 families and 4,000 trained
- Development of a stronger evidence base to inform policy

Opportunities

- Integration into regional or national control policy
- Designation of clear indicators and more easily measurable outcomes