Resurgence of malaria after discontinuation of Indoor Residual Spraying of Insecticide

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Current Status of Malaria

• Burden of malaria remains high: 215 million cases and 438,000 deaths in 2015. 88% of cases are in sub-Saharan Africa.

• MDG 6C aims to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

• SDG 3 aspires to ensure health and well-being for all, including an end to the epidemics of AIDS, tuberculosis, malaria and other communicable diseases by 2030.
Current Malaria Control Measures

• Long-lasting insecticide treated nets (LLITNs) are the mainstay of malaria control in most of sub-Saharan Africa with many countries achieving universal coverage. Pyrethroids are the only insecticide used.

• IRS has been shown to be highly effective, but it is more resource-intensive and expensive to implement.
  o less than 10% of the population at risk in sub-Saharan Africa is currently protected by IRS.
  o Can use four different classes of insecticide.
  o Current knowledge of the role of IRS on endemicity rates is weak.
IRS Operations - Uganda

- Initial operations in late 1960s showed some positive results but were then abandoned due to political strife.

- In 2008 the IRS program was established in ten districts in northern Uganda with high transmission intensity.

- In 2014, the IRS program was moved to 14 districts in the central and Eastern part of the country.
Study Question

What happens to trends in malaria morbidity before, during, and after the implementation of IRS?
Methods

• This study utilizes data from an enhanced health facility-based malaria surveillance program established in an setting in Apac District.

• Apac has the highest entomological inoculation rate in Uganda with over 1,500 infectious bites per person per year.
• We looked at the test positivity rate: the number of patients who tested positive among those tested.

• We then looked at temporal changes in malaria morbidity in relation to IRS over four time periods using a time series analysis.
Temporal Trends

- The period of observation extended from July 2009 through November 2015:
  - baseline period (July 2009 – August 2010)
  - an initial period of effective IRS (September 2010 – February 2011)
  - sustained period of effective IRS (March 2011 – August 2014)
  - the 4-18 period following after IRS was discontinuation (September 2014 – November 2015)
Results

- Over the 77 month observation period, there were 126,260 patient encounters at the outpatient facility of which 67,634 (53.6%) were suspected of having malaria. Among patients with suspected malaria, 65,421 (96.7%) of patients with suspected malaria underwent laboratory testing.
Outpatient surveillance – age less than 5 years

- Actual
- Predicted

- alpha-cypermethrin
- Bendiocarb
Outpatient surveillance – age 5 years and older

- Actual
- Predicted

- alpha-cypermethrin
- Bendiocarb
Lessons Learned

• Implementation of IRS with the carbamate bendiocarb was associated with a rapid and marked decline in the malaria morbidity among outpatients.

• TPRs however, began to rise four months after IRS was discontinued, reaching pre-IRS levels within 18 months despite universal LLITN coverage.
Next Steps

• IRS works in areas of high transmission.

• Current gains in malaria reduction cannot be sustained if control measures are withdrawn or implemented based on limited data.

• Further research needs to be done to develop best practices of implementation of IRS in areas of high transmission, including exit and long-term strategies to prevent resurgence of malaria and to reduce the morbidity and mortality of the disease.
References


5. Lengeler C. Insecticide-treated bed nets and curtains for preventing malaria. Cochrane database of systematic reviews (Online) 2004; (2): CD000363.


