

Health facility-based evaluation of malaria in Luanda, Angola

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Background

Luanda, Angola

- **Location:** northwest coast of Angola
- **Population:** 4.8 - 5.7 million people
- **Malaria endemic**

Question

What is the burden of malaria in Luanda?

- According to data reported facilities using Coartem, 31% of 1.2 million patient visits had a positive smear for malaria in 2007
- Preliminary review of health facility records shows that >1/2 of patients present with fever, and ~1/2 of smears are read as positive
- Malaria Indicator Survey (MIS) 2006 showed 5.5% of children <5 years had parasitemia, compared to 29% in rural hyper-endemic areas
- Routine entomologic surveillance for January 2007-January 2008: 35 Anopheline mosquitoes trapped in Luanda, compared to 10,342 Culicines

Objectives

- To determine what proportion of patients in Luanda presenting for outpatient consultation with fever or history of fever have laboratory-confirmed malaria
- To determine what proportion of patients with laboratory-confirmed malaria in Luanda may have contracted malaria outside Luanda

Methods

Sampling

- 30 health facilities selected throughout the city of Luanda
- Stratified by urban, peri-urban, and rural designation
- Approximately equal distribution of health facilities in each strata

Inclusion Criteria

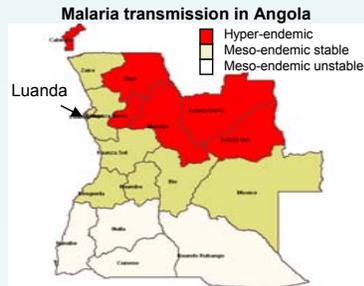
- Fever (axillary temperature $\geq 37.5^{\circ}\text{C}$) or history of fever in past 24 hours
- First consultation for current illness
- Weighing ≥ 5 kg
- No signs of severe illness

Procedures

- Team of nurse interviewers and a laboratorian visited each health facility for one day
- 30 patients with fever were selected sequentially in each facility
- After completing clinic consultation, consenting patients
 - Underwent fingerstick for rapid diagnostic test (RDT) and malaria blood smear
 - Answered a questionnaire about demographics, ITN use, prior treatment, exposure history, and travel history
- Patients with positive RDT were treated with Coartem if they had not already received it
- Smears read by two expert microscopists at National Malaria Reference Lab, National Institute of Public Health (trained by CDC team in 2007 with PMI funding)

Data collection

- Administered on Personal Digital Assistant (PDA)
 - Simultaneous questionnaire administration, data entry, and data quality checks
 - Rapid downloading of data daily for review
 - Preliminary analysis complete <24 hrs after completion of data collection
 - Preliminary results shared with partners 2 days after completion of data collection



Results

Demographics

Gender	Female	57.2%
Age group	< 5 yrs	59.0%
	5 - 14 yrs	12.0%
	≥ 15 yrs	28.9%
Documented fever		47.7%
Fever duration		3.0 days

Exposure Characteristics

Resident in Luanda	96.3%
No travel out of Luanda in past 3 mo	93.5%
Any work on a farm	4.5%
5 minute walk from a farm	12.9%
5 minute walk from open water source	34.3%
5 minute walk from bus stop	19.1%

Malaria smears positive: 32/864 (3.7%)

By age group:

<5 years	2.4%
5-14 years	8.7%
≥ 15 yrs	4.4%

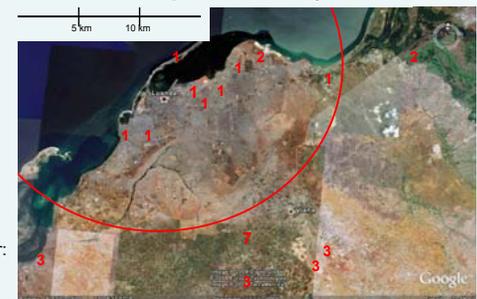
By strata:

Urban	4.5%
Peri-urban	1.2%
Rural	6.0%

By distance from city center:

<15 km	1.4%
>15 km	9.2%

Location of positive smears by health center



- Patients with fever at health facilities >15 km from city center were 6.9 times more likely to have malaria than patients at health facilities <15 km from center (95% CI 3.1 - 15.0).
- Patients at health facilities > 15 km from city center made up 28.8% of total patients, and 71.9% of total cases.

Odds of positive smear if: *

	Odds ratio	95% CI	P-value
<5 years	0.30	0.13-0.68	0.004
Female	0.38	0.17-0.84	0.017
5 minute walk to farm	2.23	1.01-4.94	0.047
Documented fever	2.88	1.26-6.57	0.012
Travel to Bengo (neighboring province)	5.85	1.36-25.25	0.018
Health facility >15 km from city center	6.69	2.89-15.50	<0.0001

*in multivariate analysis

Conclusions

- Proportion of febrile patients in Luanda with malaria is very low, but increases in the surrounding rural areas (>15 km from city center)
- Most febrile patients have diseases other than malaria
- Travelers make up a small proportion of malaria cases, and through travel does not contribute significantly to malaria risk, travelers to Bengo are at greater risk

Recommendations

- Intensify training and supervision of HCWs to improve differential diagnosis
- Increase resources for laboratory diagnosis of malaria and other febrile illnesses
- Focus resources for prevention and treatment of malaria in rural areas outside Luanda
- Aggressive malaria control in surrounding rural areas could potentially eliminate malaria in Luanda province, representing 1/3 of the population of Angola

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