Zambia National Malaria Control Programme
Technical Brief

Ministry of Health

# 2006 National Malaria Indicator Survey Results and 2007 Malaria Control Actions:

Malaria intervention coverage and an evaluation of the impact of ITN coverage on fever, parasitemia and severe anaemia in children under six years of age

# Background

Malaria is a major public health problem in sub-Saharan Africa, each year taking its toll on the most vulnerable, mainly young children and pregnant women. Affected adults cannot work, resulting in major economic losses at the household and national level. Zambia is no exception: every year, nearly four million clinical cases are diagnosed and malaria is believed to be responsible for 50,000 deaths annually[1].

In an effort to significantly reduce the disease burden, the Zambian Ministry of Health (MOH) has committed to aggressively scaling up nationwide coverage of anti-malarial interventions, and aims to reduce malaria incidence by 75% by 2011 and thereby reduce all-cause child mortality by 20% [2]. The core interventions include prevention with insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS), and intermittent preventive treatment during pregnancy (IPTp); and treatment including improved diagnosis and case management with artemesinin-based combination therapy (ACTs).

Robust programme monitoring and impact evaluation are essential to measuring progress in these areas. In order to understand the progress made, the Zambian MOH, together with key partners, including the Central Statistics Office, the Malaria Control and Evaluation Partnership in Africa (MACEPA, a programme at PATH), the World Health Organization, the US Centers for Disease Control and Prevention (CDC) and the University of Zambia (UNZA), conducted a malaria indicator survey (MIS) in May 2006. The Zambia MIS used the Roll Back Malaria (RBM) Monitoring and Evaluation Reference Group (MERG) survey package, which provides standardized household survey methods, questionnaires and materials[3].

This summary report presents the main results of the progress in intervention scale-up and a focused look at the impact of ITNs on fever, anaemia and parasitemia in children under age six. The complete MIS report can be downloaded from the National Malaria Control Centre (NMCC) website[4].

# Methods

The MIS was based on a nationally representative two-stage cluster sample of 3000 households (HHs). HHs were surveyed from 120 standard enumeration areas, randomly selected from 58 of 72 districts from all nine provinces, to provide representative national, urban, and rural estimates, as well as estimates for the ten RBM sentinel districts. Field work was conducted during May and June 2006 by eleven field teams (for a total of 59 team members) using standardized questionnaires. Questionnaires were pre-programmed onto hand-held personal digital assistants in order to facilitate data entry, extraction, and analysis. Malaria parasite testing was done using Paracheck Pf® Rapid Diagnostic Tests, as well as thick and thin blood smears. Anaemia testing was done using Hemocue® Hb 201 analyzers and microcuvettes.

[1] Ministry of Health Zambia, Health Management Information System (HMIS Unit). Lusaka: HMIS; 2004.
[2] Ministry of Health Zambia. *A Road Map for Impact on Malaria in Zambia, a 6-Year Strategic Plan*, 2006-2011. Lusaka: National Malaria Control Centre, RBM Task Force; 2006.
[3] *Malaria Indicator Survey: Basic Documentation for Survey Design and Implementation,* World Health Organization, UNICEF, MEASURE DHS, MEASURE Evaluation, U.S. Centers for Disease Control and Prevention
[4] http://www.nmcc.org.zm

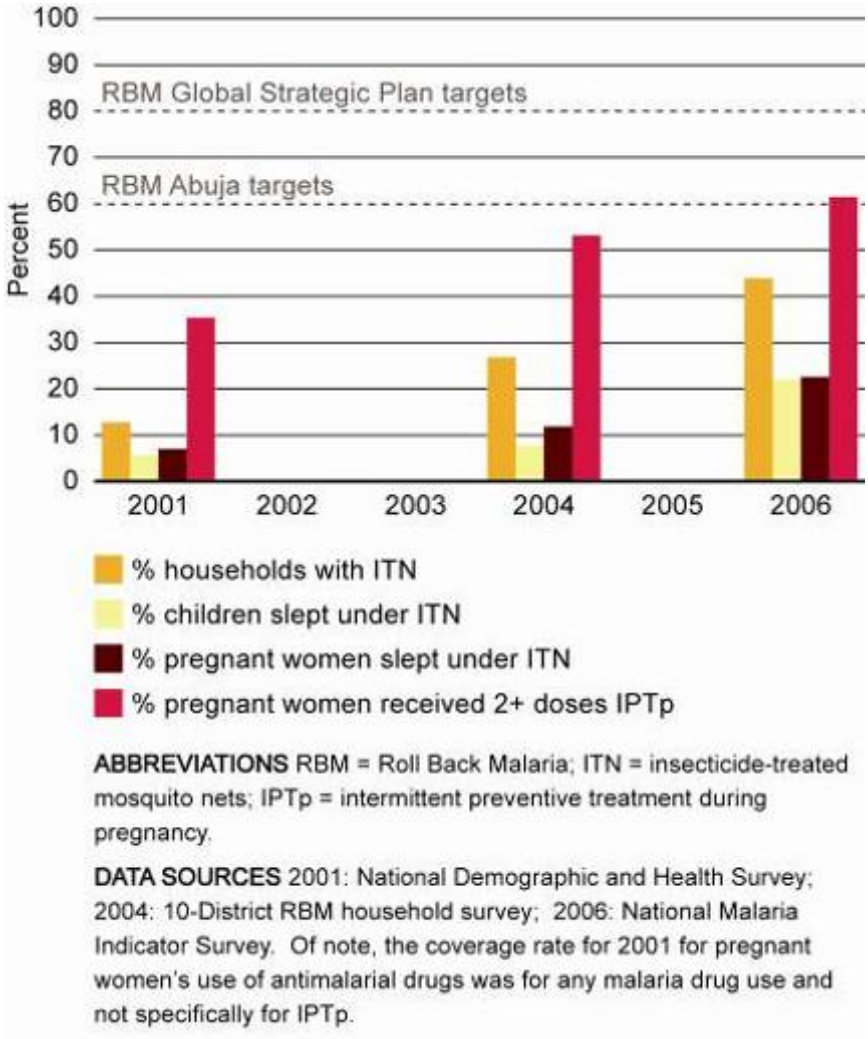
# Results

### Prevention: ITN and IPTp coverage

There have been substantial increases since 2001 in ownership and use of ITNs and the provision of 2 or more doses of IPTp. Figure 1 shows the increases documented between 2001, 2004, and in the 2006 MIS. By 2006, Zambia had exceeded the RBM Abuja target for prevention coverage with IPTp. ITN coverage has increased substantially and the usage rate for ITNs is approximately 50% among those owning an ITN.

**Figure 1.**

Coverage rates for core malaria prevention interventions, Zambia, 2001 – 2006.




**ABBREVIATIONS** RBM = Roll Back Malaria; ITN = insecticide-treated mosquito nets; IPTp = intermittent preventive treatment during pregnancy.

**DATA SOURCES** 2001: National Demographic and Health Survey; 2004: 10-District RBM household survey; 2006: National Malaria Indicator Survey. Of note, the coverage rate for 2001 for pregnant women's use of antimalarial drugs was for any malaria drug use and not specifically for IPTp.

### Prevention: IRS coverage

By 2004, Zambia began to scale up IRS with a focus on 15 of the most urban districts. Households in the urban and peri-urban areas were targeted to receive IRS with a coverage goal of >85%. At the beginning, both the goal and the timeliness of spraying (prior to the rainy season) were not met. By 2006 and documented in the MIS and by IRS team reports, overall 34% of targeted households were sprayed with some areas at 77% (close to reaching the goal). In 2007, the insecticides and spray equipment were put in place, the teams were trained, and Zambia has already achieved its goal of >85%IRS coverage in all 15 target districts prior to the onset of the rainy season.

## Treatment: Case management coverage

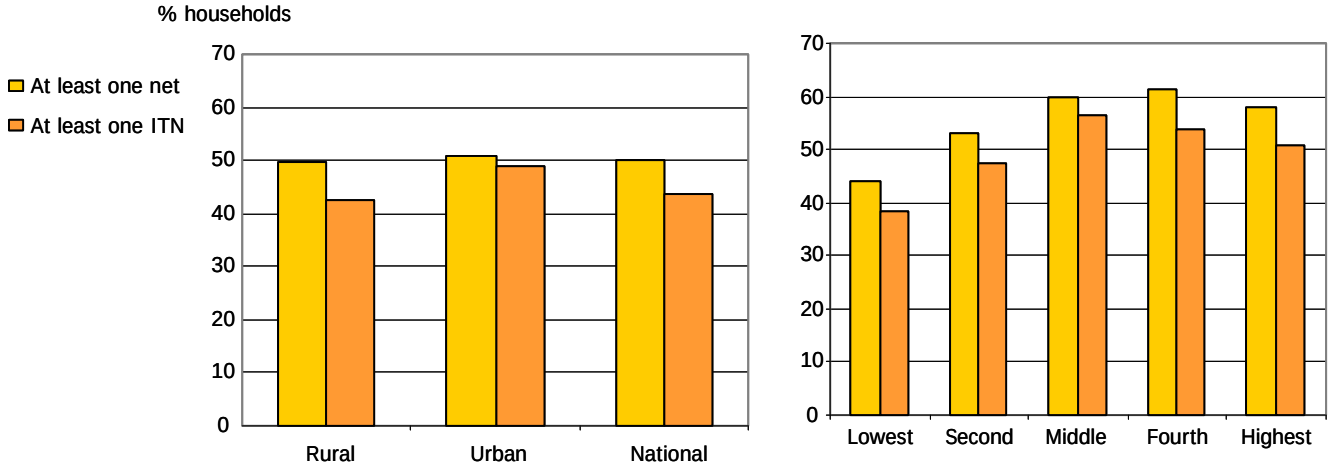
In 2003, Zambia changed its national policy for first-line malarial treatment from chloroquine to an artemesinin-based combination therapy (using artemether-lumefantrine or Coartem®). The transition to Coartem has not been easy as supplies and distribution systems needed attention and shortages and distribution presented initial problems. The higher cost of ACTs meant that the drug was initially limited to use by trained health workers in facilities. By 2006, approximately 58% of febrile children were treated with an antimalarial drug and 13% received an ACT within 24 hours of onset of illness. Today, Coartem supplies are adequate, distribution to districts is more even, policy has evolved to allow further outreach, and community health workers are being trained to better diagnose (including using rapid diagnostic tests) and treat malaria with ACTs.

## Impact of ITN Coverage

Nearly 50% of all households own one or more mosquito net, regardless of region or wealth index. At the national level, more than 85% of nets available are insecticide-treated. (See Figure 2). Children living in households with two or more ITNs available are more likely to have slept under one the night preceding the survey, than those in households with only one ITN (61% vs. 44% of children under age six, data not shown). Other key determinates for net use included being the youngest child in the household and having a mother who knows that sleeping under an ITN protects against malaria.

**Figure 2:**

Percent of households that own at least one net or at least one ITN by region and wealth index, MIS 2006, Zambia[5].

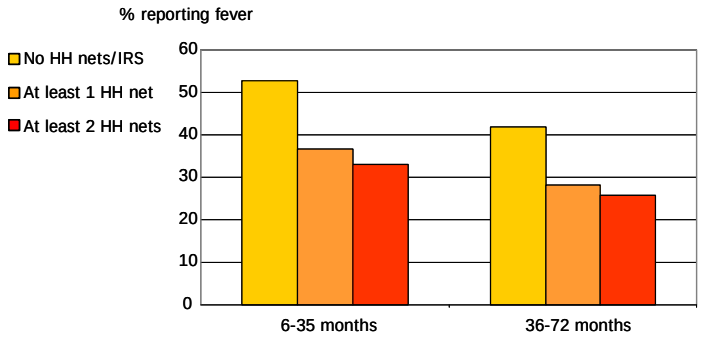



[5] *Zambia National Malaria Indicator Survey 2006.*

For the young children in these households, we observed that compared to children in households without ITNs or IRS, those with ITNs had ~38% less fever illness (Figure 3), ~51% less malaria infection (Figure 4), and ~56% less severe anaemia (Figure 5). Households with 2 or more ITNs had the greatest protection.

**Figure 3:**

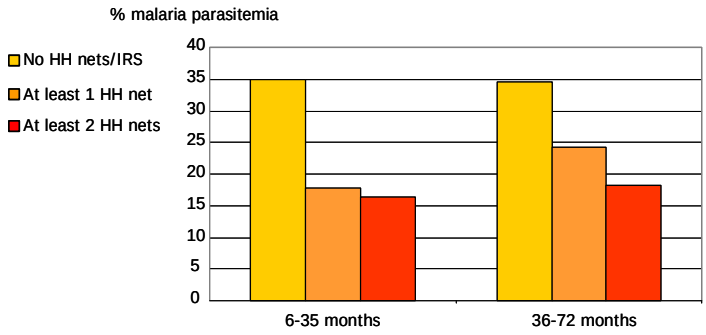
Percent reporting fever in previous two weeks by age group and access to malaria prevention, MIS 2006, Zambia.




Children under 6 years of age living in a house with two or more mosquito nets had 38% less reported fever compared to those in houses without a mosquito net or IRS.

**Figure 4:**

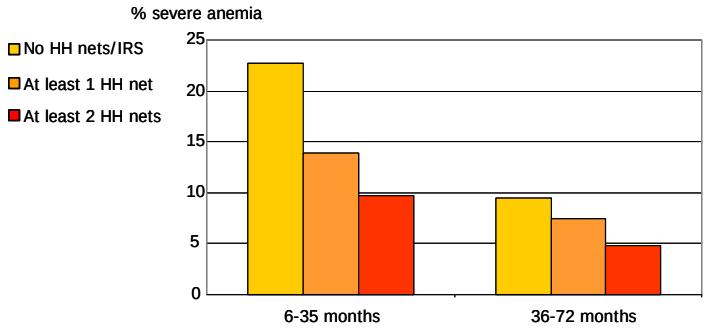
Percent malaria parasitemia by child age group and access to prevention, MIS 2006, Zambia.




Children under 6 years of age living in a house with two or more mosquito nets had 51% less malaria infection compared to those in houses without a mosquito net or IRS.

**Figure 5:**

Percent severe anaemia (Hb<8mg/dl) by child age group and access to malaria prevention, MIS 2006, Zambia.

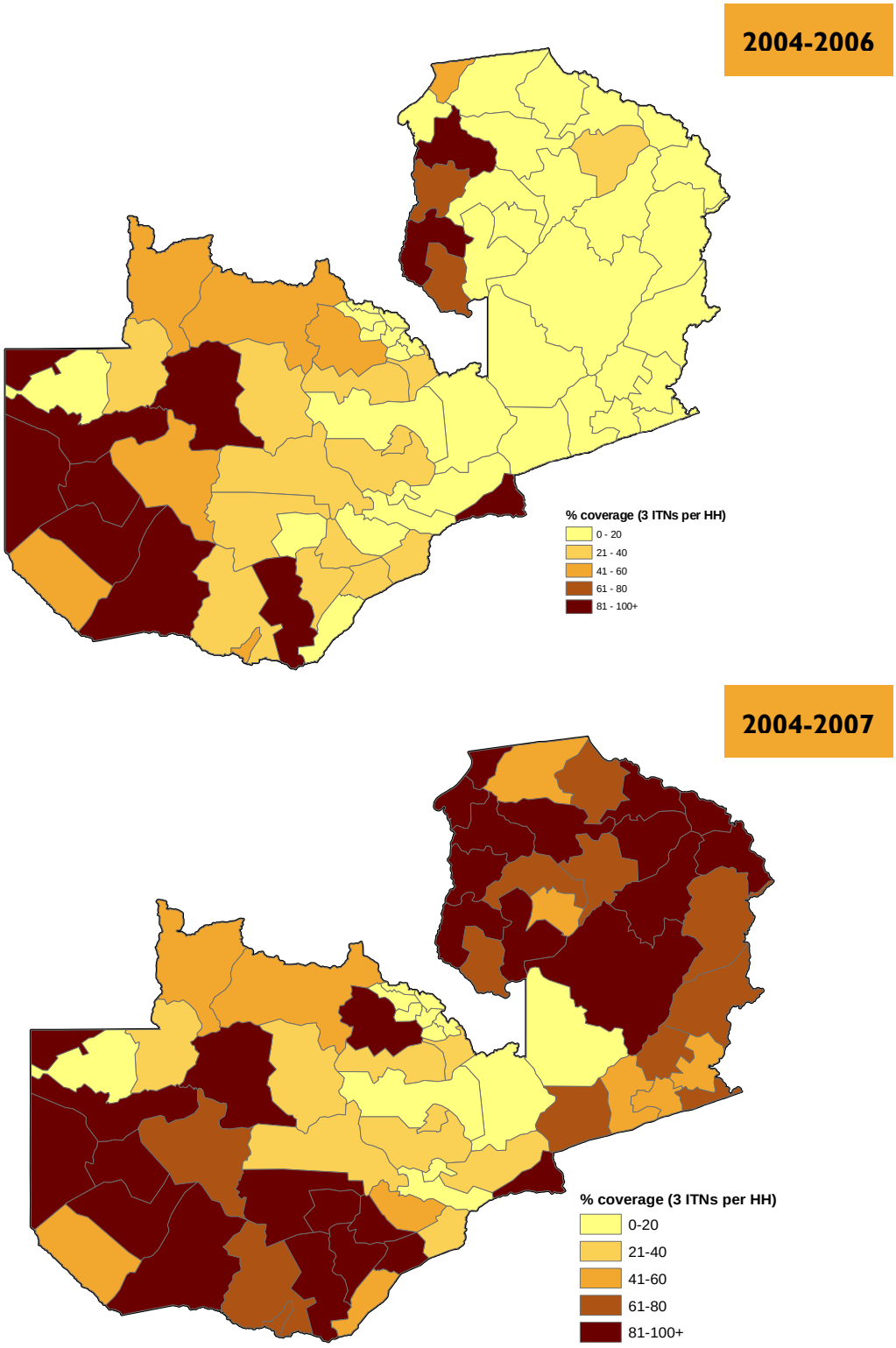



Overall, 16% of children under 6 years of age suffer from severe anaemia. Children living in a house with two or more mosquito nets had 30% less severe anaemia compared to those in houses without a mosquito net or IRS. In the most vulnerable group <36 months old, mosquito nets were associated with a 56% reduction in severe anaemia. Consistent with many other studies, malaria-associated anaemia was much less common after age 3 and minimally affected by the interventions.

Progress in ITN coverage across the nation has continued in 2007. The following two maps show ITN distribution in Zambia since 2004 with the top map showing ITNs distributed through 2006 and the bottom map showing ITNs distributed through 2007. This highlights the substantial progress in 2007 with approximately 3.4 million long-lasting ITNs distributed – triple the number distributed the previous year.

**Figure 6:**

ITN distribution by all programmes[6].




[6] Numerator equals the number of ITNs delivered; denominator equals three per household with number of households in the district.

# Comments

The Zambian 2006 MIS provided key updated information on malaria intervention coverage compared to previous years and shows substantial improvements for each of the interventions. In addition, the 2006 Zambia MIS represents the first nationwide effort to understand the impact of scaling-up malaria control interventions. It provides valuable insight on the effect of mosquito net availability and use on rates of fever illness, malaria parasitemia, and severe anaemia in children under age six. The significant reductions observed in these disease burden indicators in children living in households with at least one or at least two nets confirm the benefits of a rapid, large-scale effort to prevent and treat malaria. ITN coverage has nearly doubled in the past five years, reaching over 50% at the time of the survey. During the 2006 transmission season, over one million nets were distributed and in 2007, that number tripled. These substantial efforts are required to reach the ambitious goal set by the national strategic plan of three nets per Zambian household, i.e., one for every two people, to ensure that 80% of the Zambian population sleeps under an ITN by the end of 2008.

Of note, the 2006 MIS showed that among households with at least one ITN, less than 50% of children under six actually slept under the ITN the night preceding the survey. Thus, the children who reported recent fever or tested positive for malaria parasites, whilst stating they had slept under a net, could be a result of inconsistent ITN use[7].

Given the encouraging results presented here even with modest utilization rates, one can expect to observe even greater impact by reinforcing the behaviour change communication component of malaria programming to increase net use. Promoting knowledge among mothers that ITNs are an effective malaria prevention method should accompany efforts to widely distribute ITNs, and should lead to a dramatic reduction in rates of child fever, parasitemia, severe anaemia. Together with other key interventions (IRS, IPTp, prompt and effective case management), increase in ITN availability, as shown by the maps with dramatic increases in national coverage, and increase in ITN use will contribute to the reduction of child mortality and enable Zambia to reach its goal of reducing national malaria incidence by 75% in 2011.

[7] Community-level intervention coverage and the burden of malaria in Zambia: results of a national malaria indicator survey, Miller JM *et al*., submitted?

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