Ethiopia National Malaria Indicator Survey 2011

Technical Summary

FEDERAL DEMOCRATIC
REPUBLIC OF ETHIOPIA
MINISTRY OF HEALTH

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Background

Malaria is seasonal in most parts of Ethiopia, with unstable transmission that lends itself to the outbreak of epidemics. The transmission patterns and intensity vary greatly due to the large diversity in altitude, rainfall, and population movement; areas below 2,000 meters (m) are considered to be malarious (or potentially malarious). Those areas are home to approximately 68% of the Ethiopian population and cover almost 75% of the country's landmass.

The updated 2010 National Strategic Plan for Malaria Prevention, Control, and Elimination 2011–2015 is embedded in the health sector's overarching framework, the Government of Ethiopia's Health Sector Development Plan Four (HSDP IV) 2011–2015. The goals of the national strategic plan are:

- By 2015, achieve malaria elimination within specific geographical areas with historically low malaria transmission.
- By 2015, achieve near-zero malaria deaths in the remaining malaria-endemic areas of the country.

In 2005, the program launched a massive scale-up of key interventions. Since that time, Ethiopia has distributed 42 million insecticide-treated bednets (ITNs)and long-lasting insecticidal nets (LLINs)and conducted indoor residual spraying (IRS)for4.2 millionhouseholds. In addition, access to Coartem® as a first-line treatment for uncomplicated malaria has led to more than 48 million treatment courses.

A Demographic and Health Survey (DHS) took place in Ethiopia in 2005 before this scale-up occurred. In order to evaluate progress, in 2007 the Federal Ministry of Health (FMOH) conducted a Malaria Indicator Survey (MIS), applying the Roll Back Malaria Monitoring and Evaluation Reference Group tool that uses similar methods to DHSs and multiple indicator cluster surveys. The followup 2011 MIS sheds light on progress and challenges ahead. The 2011 MIS was carried out by the Ethiopian Health & Nutrition Research Institute (EHNRI)/FMOH with support from several key partners: the Central Statistics Agency (CSA), the World Health Organization, the United States Agency for International Development, the US Centers for Disease Control and Prevention/President's Malaria Initiative, The Carter Center, the United Nations Children's Fund, the Center for National Health Development in Ethiopia, the Malaria Consortium,Research TriangleInstitute, Family Health International, International Center for AIDSCare and TreatmentPrograms at Columbia University, and the Malaria Control and Evaluation Partnership in Africa(MACEPA), a program at PATH.

Objective

The 2011 Ethiopia MIS was conducted to measure progress toward achieving the goals and targets set in the Ethiopia National Strategic Plan for Malaria Prevention and Control 2005–2010.

Methods

The 2011 MIS was based on a two-stage cluster sample design of 10,444 households (HHs) in malarious areas, defined as areas below 2,000m altitude, and in malaria epidemic-prone areas, defined as areas between 2,000m and 2,500m. The sample was designed to generate nationally representative data, but also to accommodate specific partner needs, providing regional data for Oromiya, SNNP, Tigray, and Amhara, as well as combined Afar/Somali regional states and Benishangul-Gumuz/Bambella regional states. All enumeration areas in the country in villages with a mean altitude lower than 2,500m were stratified to provide the following estimation domains:

- National (country): urban for altitudes ≤ 2,000m.
- National (country): rural for altitudes ≤ 2,000m.
- National (country): for altitudes of < 2,500m.
- Sub-National: Amhara, Oromia, SNNP, Tigray regional states as well as combined Afar/Somali regional states and Benishangul-Gumuz/Gambella regional states.

The survey was conducted during October, November, and December 2011 by 31 teams, using standard questionnaires programmed into personal digital assistants (PDAs).

In each selected enumeration area, all households were mapped, and 25 households were randomly selected by the PDA program. Interviews regarding household characteristics and nets were conducted in those 25 households.

A total of 444 enumeration areas of 25 households each were sampled nationally, randomly selected with population proportional to size.

Blood samples were taken from all children under five years of age (U5) in every household and from persons of all ages in every fourth household. Malaria parasite testing was done using CareStart™ rapid diagnostic tests to facilitate case management during the survey, and both thick and thin smear blood slides were taken to assess malaria infection rates. Hemoglobin testing for anemia was done using HemocueHb 201 analyzers for children U5.

Results

A total of 432 clusters, 10,444 households and 47,248 people were surveyed, with more than half (5,819 households) in areas under 2,000m,including 15.7% children under five years of age and 6.7% self-reported pregnant women.

Interviews regarding reproductive history, fever treatment, and malaria knowledge were conducted with 8,817 women of childbearing age. A total of 11,933 blood slides and 4,846 anemia tests were examined.While comparisons of MIS 2007 to 2011 may be revealing, statistical approaches used differed and so results should be interpreted with caution.

Net ownership

Nationally, the results show that the percentage of households with at least one mosquito net in malaria-endemic areas is lower in MIS 2011 (55.2%) than in MIS 2007(68.9%). Regional comparison shows that Tigray households increased the most in ownership of at least one net per household (53.7% in 2007 goes up to65.8% in 2011).Figure1 depicts that Oromia had the lowest achievement in net ownership (45.6% in 2007 and 44.3% in 2011).

Figure 1National and regional comparison between MIS 2007 and MIS 2011 by percentage of households with at least one net and more than one mosquito net in areas <2,000m (Ethiopia MIS 2011)

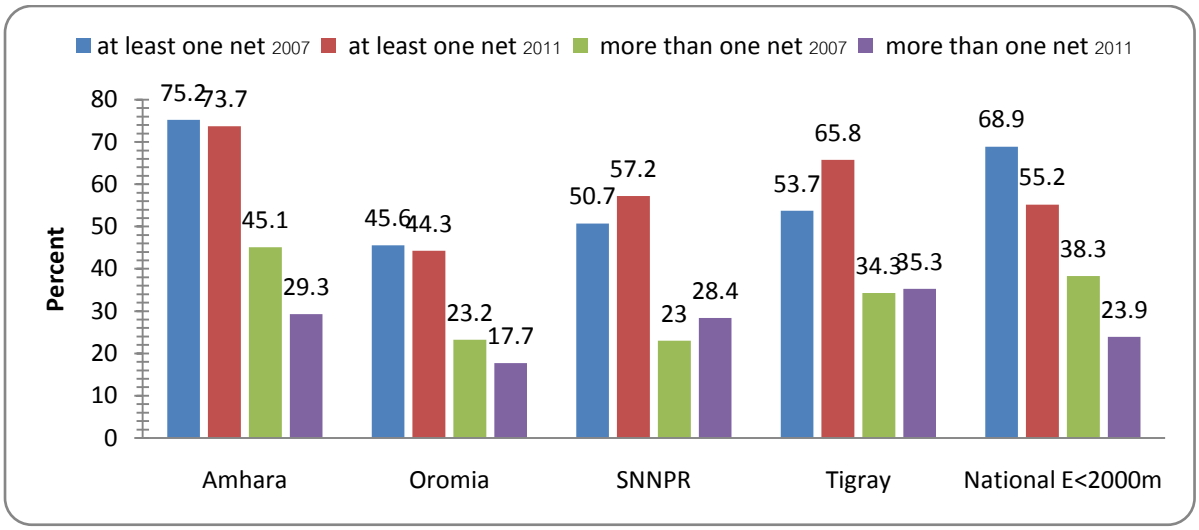
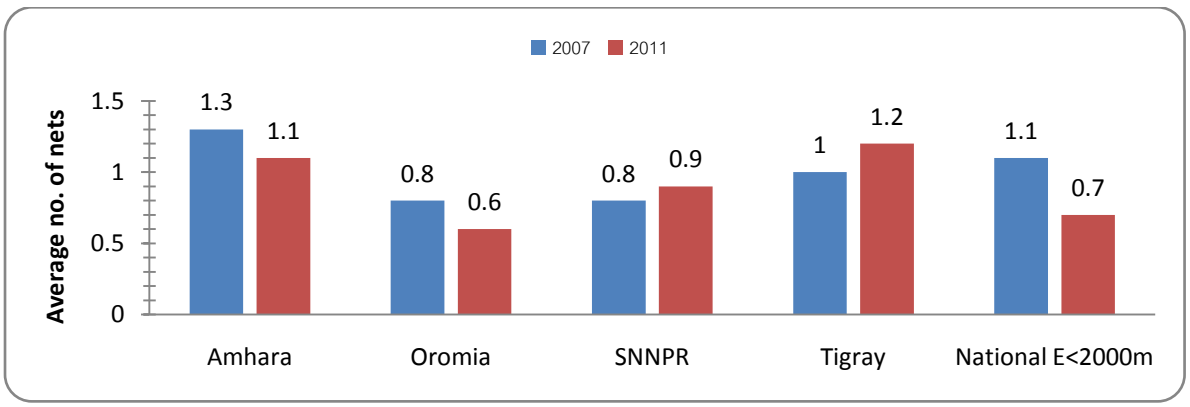


Figure 2 shows a decrease in the average number of nets per household at national level (1.1 in 2007 and 0.7 in 2011). However, in some regions the average number of nets per household has increased. The largest increase was in Tigray, followed by SNNPR.

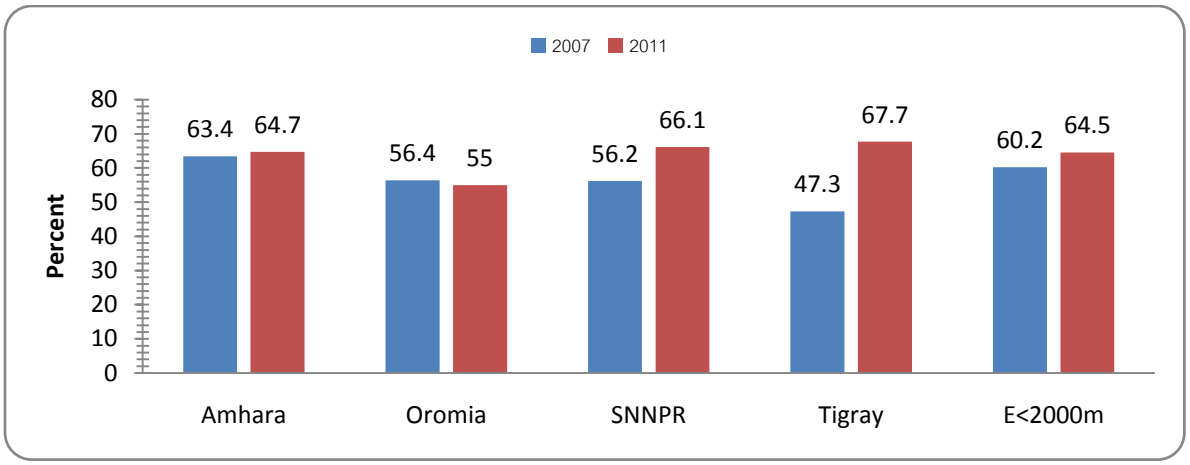
Figure 2National and regional comparison of average number of nets per household in areas <2,000m between MIS 2007 and MIS 2011 (Ethiopia MIS 2011)



Insecticide-treated mosquito net use

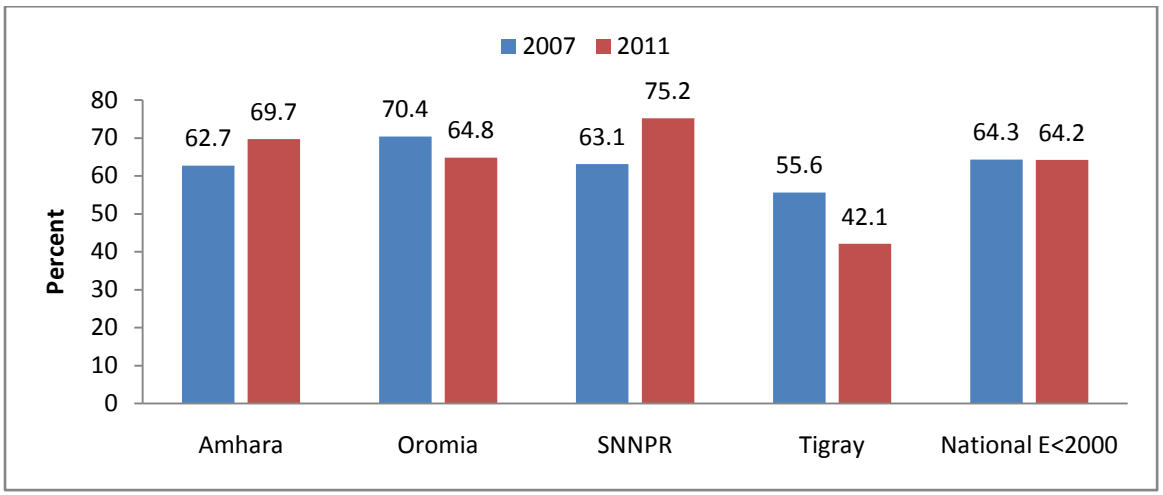
Nationally, progress has been observed in terms of net use among children U5 in households that owned nets. The percentage of childrenU5 who had slept under a mosquito net the night preceding the survey was 60.2% in 2007, increasing to 64.5% in2011. Tigray demonstrated the highest increase, with 47.3% in 2007 and 67.7% in 2011. Oromia showed a decrease in net use by children U5 (Figure3).

Figure 3National and regional comparison of percentage of children U5 who slept under a net in a household with at least one net in areas <2,000m between MIS 2007 and MIS 2011 (Ethiopia MIS 2011)



National findings showed no improvement in net use among pregnant women in 2011 compared to 2007. However, a regional difference is observed in net use among pregnant women in households that own at least one net (Figure 4). SNNPR demonstrated the highest increment in net use among pregnant women—from 63.1% in 2007 to 75.2% in 2011.

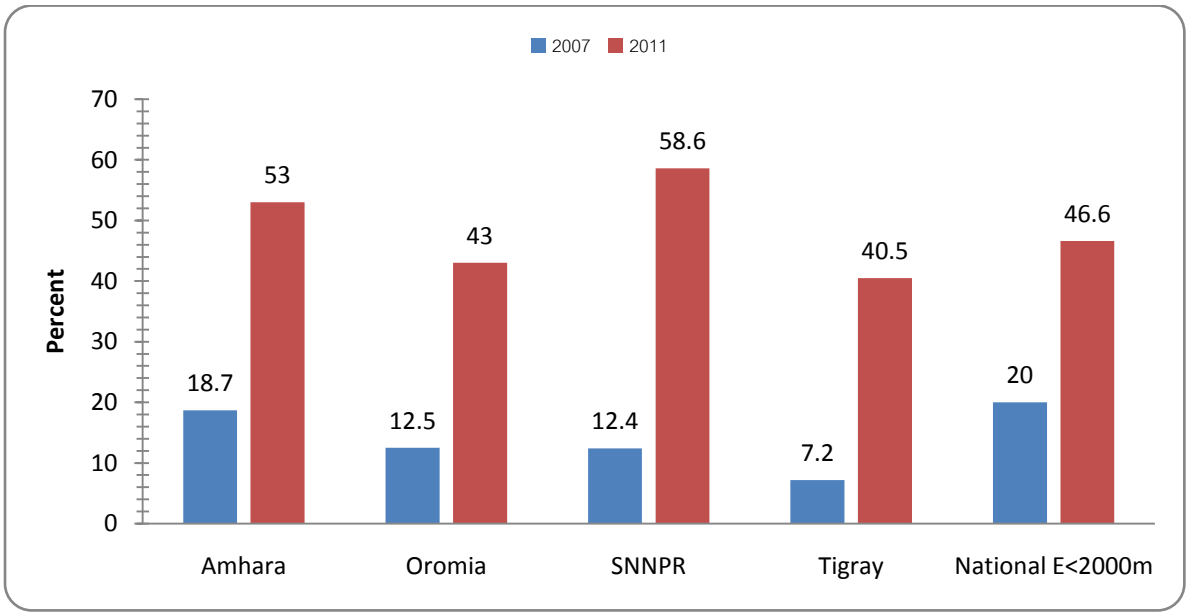
Figure 4Percentage of pregnant women who slept under a net the previous night in a household that has at least one net



Indoor residual spraying

Compared to the MIS 2007, the MIS 2011 demonstrated a significant increase with respect to IRS coverage. The percentage of households sprayed in the 12 months preceding the surveys were 20% in 2007 and 46.6% in 2011.In 2011, only 8.5% of households living >2,000mwere covered with IRS, suggesting better targeting of IRS resources compared to LLINs within non-malarious areas. Figure 5 demonstrates the achievements of all regional states with respect to IRS.

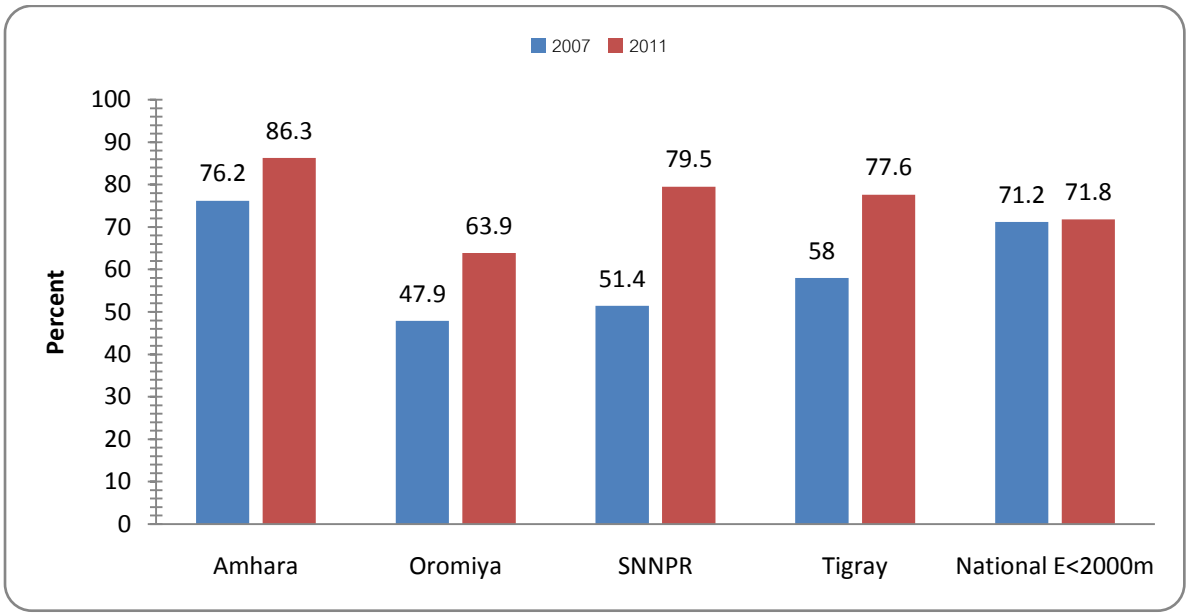
Figure 5National and regional comparison of percentage of households sprayed in the last 12 months in areas <2,000m between MIS 2007 and MIS 2011 (Ethiopia MIS 2011)



Households protected by nets, LLINs, and/or IRS

The MIS 2011 demonstrated improvement in the percentage of households that are protected by at least one LLIN and/or IRS, compared to MIS 2007, as shown in Figure 6.

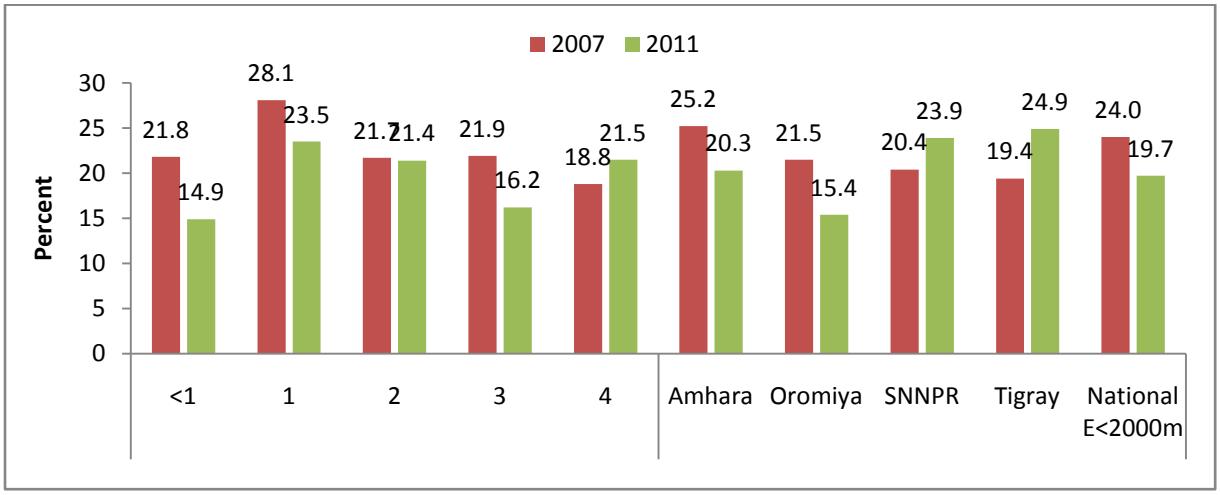
Figure 6National and regional comparison of percentage of overall protection, by IRS and/or LLIN, in areas <2,000m between MIS 2007 and MIS 2011 (Ethiopia MIS 2011)



Prevalence and prompt treatment offever

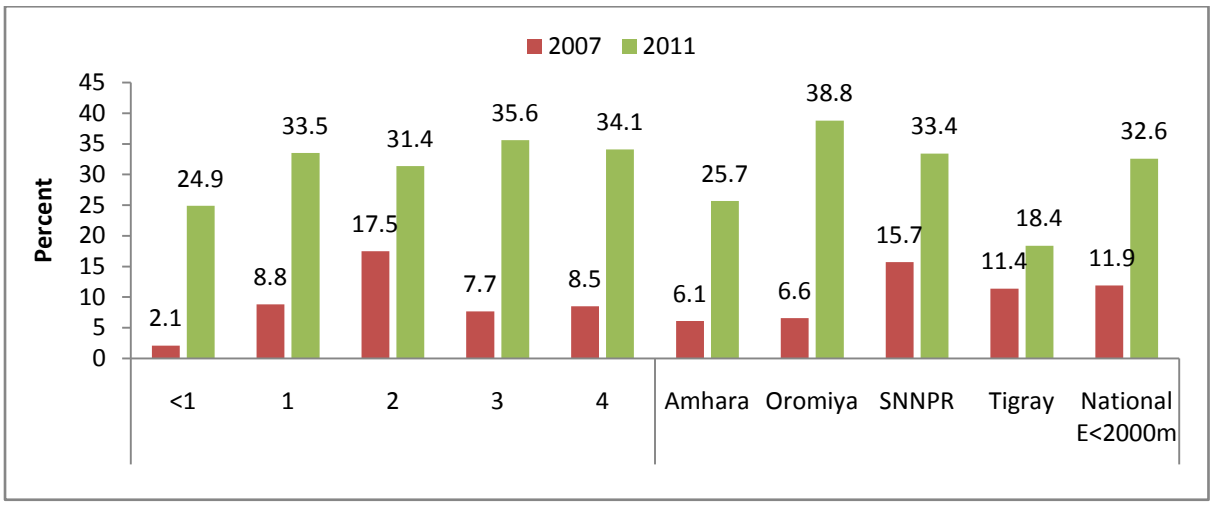
National fever prevalence among children U5 decreased from 24.0% in 2007 to 19.7% in 2011 (Figure 7). Declines were steepest among children less than one year of age (from 21.8% in 2007 to 14.9% in 2011).

Figure 7Percentage of children U5 with fever in the two weeks preceding the survey, by age category (A) and national and regional comparison (B), between MIS 2007 and MIS 2011 in areas <2,000m (Ethiopia MIS 2011)



The percentage of children under 5 years of age living <2000m who took anti-malaria drug within 24 hours of the onset of fever has showed significant increase in MIS 2011 compared to the MIS 2007 11.9% and 32.6%, respectively) (Figure 8). These findings likely indicate increased availability and access to quality malaria diagnostic and treatment services for children U5 with fevers at new health centers and health posts staffed with health extension workers and other providers since the 2007 MIS.

Figure 8Age category (A) and national and regional comparision (B) of children U5 with fever who took antimalaria drug between MIS 2007 and 2011 in areas < 2000m (Ethiopia MIS 2011)

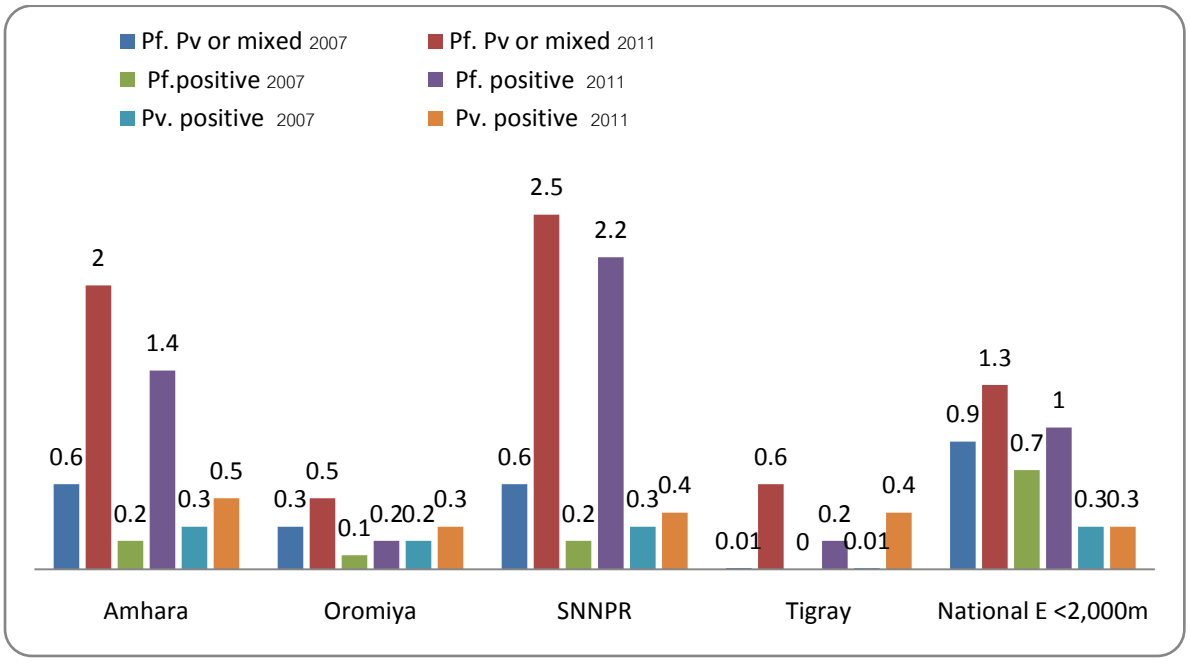


Malaria parasites

Compared to the MIS 2007 results, the MIS 2011 microscopic blood-smear test results for altitudes <2,000m showed a small increase in malaria prevalence, from 0.9% to 1.3%, respectively (Figure9). There was very little malaria (0.1%) detected by microscopy at altitudes >2,000m, and the malaria detected there was almost exclusively found to be *P. vivax*.The 13-fold higher malaria prevalence detected by microscopy in areas <2,000m compared to areas >2,000m confirmed the long-standing FMOH practice of using altitude as a proxy for malaria risk and,therefore, as a basis for targeting malaria-related resource allocations.

Onechallenge in implementing the MIS 2011 was that mapping resources from CSA and others were inadequate for planning the survey, resulting in major misclassifications of EAs surveyed based upon their planned versus measured altitudes by PDA/GPS. Better maps (with accurate altitude measurements) are needed to properly classify rural areas of Ethiopia so that expensive resources including LLINs, IRS, and Coartem® are properly aligned and targeted to households living at altitudes <2,000m,which have substantially higher malaria prevalence (and probably higher malaria illness risk).

Figure 9National and regional comparison of malaria parasiteprevalence by percentage of slide positivity rate in areas <2,000m between MIS 2007 and MIS 2011 (Ethiopia MIS 2011)



General malariaknowledge

Comparing 2007 and 2011 MIS results, the proportion of women living in malaria-endemicareaswho knewthat malaria is causedby mosquito bites increased from 41.1%to 71.2% (Figure 10). This knowledge had increased in every major region surveyed.

Figure 10National and regional comparison of percentage of women in areas <2,000m who reported mosquito bites as the cause of malaria between MIS 2007 and MIS 2011 (Ethiopia MIS 2011)

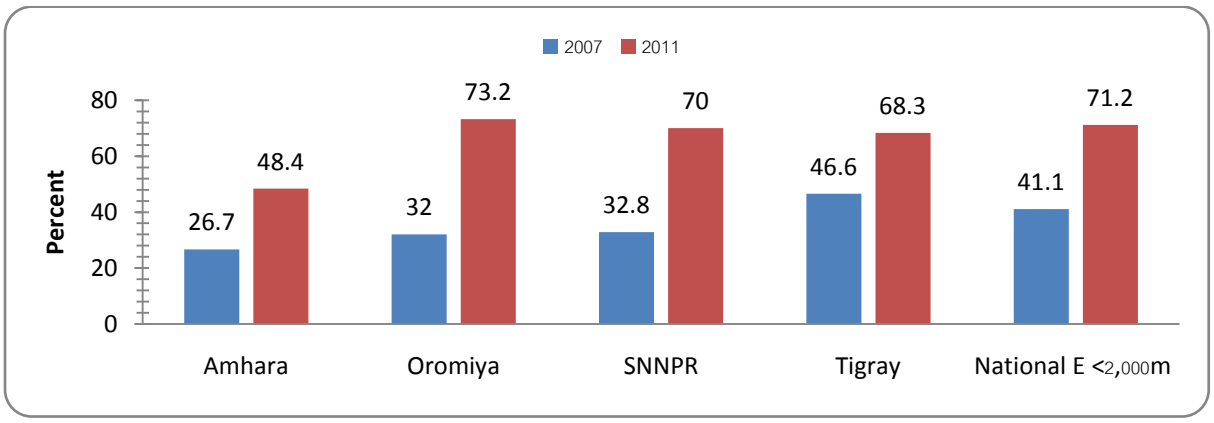
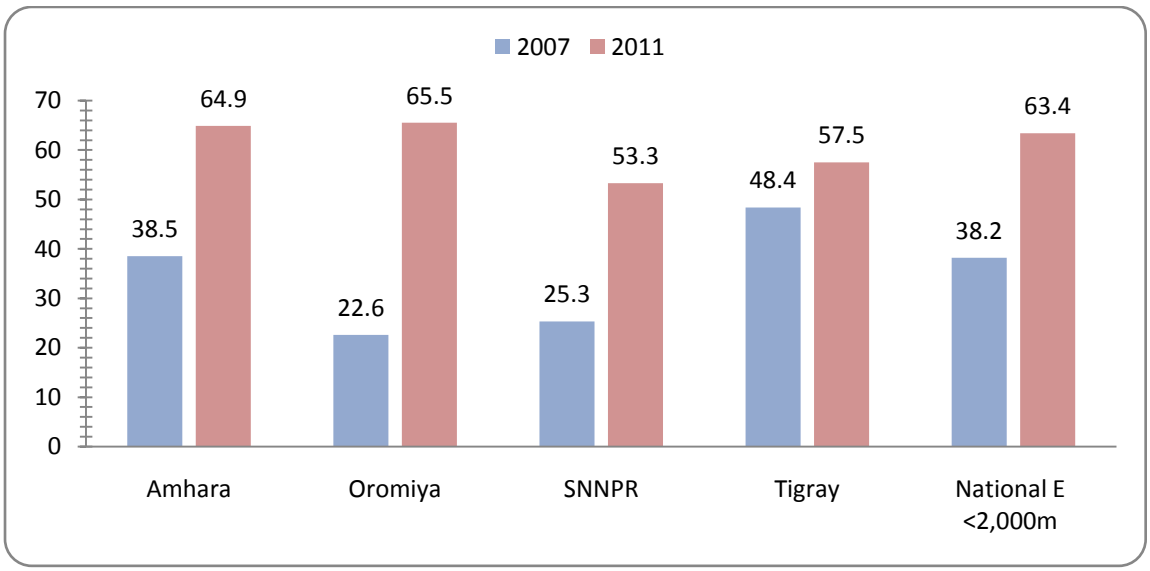


Figure 11 shows that the proportion of women living in malaria-endemic areas who knew that malaria transmission could be prevented by mosquito nets increased nationally from 38.2% in MIS 2007 to 63.4% in MIS 2011.

Figure 11National and regional comparison of percentage of women in areas <2,000m who reported mosquito nets as a prevention method for malaria between MIS 2007 and MIS 2011 (Ethiopia MIS 2011)



Conclusions

Having established itself in recent years as an African leader in halting malaria, Ethiopia today continues making important progress toward reducing the burden imposed on individuals, communities, the health system, and overall national development. The 2007 MIS was the country's first nationally representative survey comparing progress in a range of indicators based on the 2005 Demographic and Health Survey. The follow-up 2011 MIS demonstrates that Ethiopia is sustaining its commitment to progress.

Since 2007, Ethiopia intensified its focus on scaling up indoor residual spraying of households, resulting in a more than two-fold increase in IRS coverage (from 20% in 2007 to 46.6% in 2011). Similarly, there was an increase seen in the percentage of households protected by at least one LLIN and/or IRS (from 71.2% in 2007 to 71.8% in 2011). The percentage of children with fever in the last two weeks fell from 24% in 2007 to 19.7% in 2011, and the percentage of children with a fever who sought treatment from a facility/health provider the same /next day of fever onset increased from 11.9% in 2007 to 32.6% in 2011. Ethiopia faced challenges in ITN coverage from 2007 to 2011, with declines in the percentage of households that have at least one net (from 68.9% to 55.2%).Generally, Ethiopia's steep gains in IRS coverage to some extent offset the challenges in sustaining LLIN coverage. And among households that owned at least one net, the percentage of children under age 5 and pregnant women who slept under a net the night preceding the survey remained essentially unchanged from 2007 to 2011.

While differences in statistical approaches used for the 2007 and 2011 MISs mean that one should exercise caution in making direct comparisons, the general trends are informative. As Ethiopia sets its sights on eliminating malaria, sustaining commitments and expanding gains are critical.

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