

Malaria & children

Progress in
intervention coverage



Summary update 2009

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The fight against malaria

On World Malaria Day in 2009, just over 600 days remain until 31 December 2010, UN Secretary-General Ban Ki-moon's deadline for all endemic countries to achieve universal coverage with essential malaria control interventions.¹ Data presented here highlight major signs of progress across Africa toward this goal.

The World Health Organization (WHO) has estimated that between 190 and 330 million malaria episodes occurred in 2006, resulting in nearly 1 million deaths. About 90 per cent of all malaria deaths occur in sub-Saharan Africa, most among children under age five (figure 1).²

Some 50 million pregnant women are exposed to malaria each year, with malaria in pregnancy

contributing to nearly 20 per cent of low birthweight babies in endemic areas.³ Malaria in pregnancy can also lead to stillbirth and maternal deaths.⁴

Malaria control is a major development priority. Ambitious new global goals, laid out in *The Global Malaria Action Plan* (Roll Back Malaria 2008), are challenging countries to implement bold plans for universal coverage (box 1).⁵ Malaria has also been included among major global development targets, notably the Millennium Development Goals. One of the eight goals relates specifically to malaria, AIDS and other infectious diseases, and many of the other goals, including those for child mortality and maternal health, will be difficult to achieve in malaria-endemic areas without substantially reducing the malaria burden.

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Box 1 Global malaria goals

The Roll Back Malaria Partnership was established in 1998 to coordinate a global approach to combating malaria. The overall goal is to halve the malaria burden by 2010, a vision shared by the Millennium Development Goals, which call for reducing the number of malaria cases and deaths.

Since 2007, and building on the recent momentum in the fight against malaria, the UN Secretary-General, the African Union and others have called for a bolder, long-term goal of eliminating malaria as a global public health problem. To realize this vision, the Roll Back Malaria Partnership revised its goals and targets, as set out in its 2008 *Global Malaria Action Plan*.

Roll Back Malaria Partnership goals and targets:

- Achieve universal coverage for all populations at risk using locally appropriate interventions for prevention and case management by 2010 and sustain universal coverage until local field research suggests that coverage can gradually be targeted to high-risk areas and seasons only, without the threat of a generalized resurgence.
- Halve the malaria burden between 2000 and 2010 and reduce by 2015 the number of cases

by three-quarters and the number of preventable deaths to near zero.

- Eliminate malaria in 8-10 countries by 2015 and afterwards in all countries that are in the pre-elimination phase today. In the long term, eradicate malaria worldwide by reducing the global incidence to zero through progressive elimination in countries.

Millennium Development Goal 6: Combat HIV/AIDS, malaria and other diseases.

- Target 6.C: By 2015 have halted and begun to reverse the incidence of malaria and other major diseases.
- Indicator 6.6 Incidence and death rates associated with malaria.
- Indicator 6.7 Proportion of children under age 5 sleeping under insecticide-treated nets.
- Indicator 6.8 Proportion of children under age 5 with fever treated with appropriate antimalarial drugs.

Source: Roll Back Malaria 2008; UN Statistics Division 2009.



Bonnie Gillespie/Vocals for a Malaria-Free Future

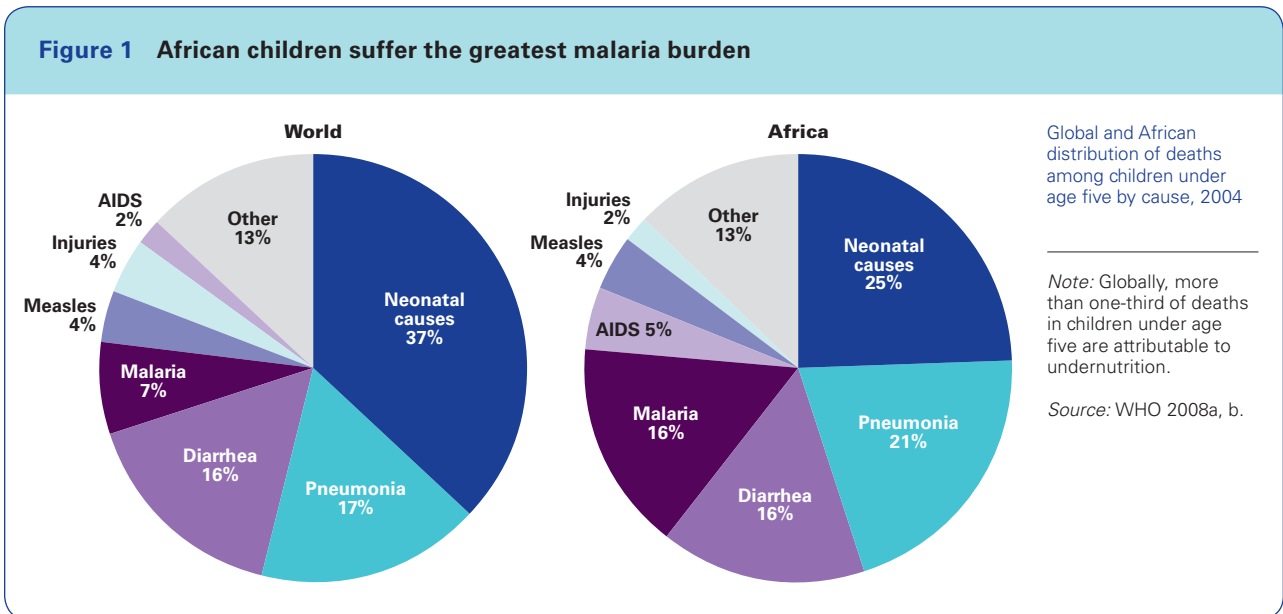
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Global funding for malaria control has risen significantly in recent years. The Roll Back Malaria Partnership estimates that international funding has grown from \$250 million in 2004 to \$700 million in 2007, with funding expected to have reached \$1.1 billion in 2008 alone, due largely to the Global Fund to Fight AIDS, Tuberculosis and Malaria; the World Bank; the U.S. President’s Malaria Initiative and others.⁶ Many African countries recently achieved unprecedented success in obtaining Global Fund resources in the latest round of malaria grant applications (box 2). And in 2008, world leaders committed billions more towards malaria control.

Indeed, a new phase in the fight against malaria has begun. Data presented here show that the malaria community has accelerated efforts to deliver critical interventions, while also reducing bottlenecks in their production, procurement and distribution. Countries have been quicker to adopt more effective strategies that would have been out of reach with less funding available, such as changing national drug policies to more effective—but more expensive—

treatment courses and expanding diagnostics to better target treatment. A focus on behavior change communication programmes is also improving the effective use of malaria interventions. Roll Back Malaria partners, including UNICEF, are supporting efforts to integrate malaria control activities into other maternal and child health services as they accelerate delivery of these essential interventions (box 3). And new actors, such as individual contributors and faith-based organizations, are becoming increasingly involved in the fight against malaria.

We are witnessing substantial increases in coverage of key interventions, notably insecticide-treated nets, with 19 of 22 sub-Saharan African countries with trend data showing at least a threefold increase in insecticide-treated net use among children since around 2000—17 of them with at least a fivefold increase. Most of these nets have been distributed through maternal and child health services such as antenatal care and immunization. However, while antimalarial treatment is moderately high across Africa, many children are still using less effective medicines



Global funding for malaria control has risen significantly in recent years. Indeed, a new phase in the fight against malaria has begun

and many countries have shown little or no progress in expanding coverage since 2000. But important steps have been taken to improve coverage with effective treatment. Based on recent

efforts to scale up programs, some areas are now showing major reductions in the number of malaria cases and deaths, with more declines expected in coming years.⁷

Box 2 Success in leveraging resources for scaling up malaria prevention and treatment

The global financial crisis has raised concerns about international funding for global health, including malaria. In September 2008, the UN Secretary-General's office concluded that funding is already below what is needed to reach the Millennium Development Goals in 2015. This situation makes it even more important for countries to develop strong programmes, to spend their resources effectively and demonstrate tangible results.

The Roll Back Malaria partners can support governments in these efforts, including through partner harmonisation efforts such as the Roll Back Malaria Harmonisation Working Group, currently co-chaired by UNICEF and the UN Special Envoy's Office. This group provided critical support to countries

submitting malaria proposals to the Global Fund to Fight AIDS, Tuberculosis and Malaria. African countries had experienced low malaria proposal success rates, with only 23 per cent of proposals successful in 2005 and 32 per cent in 2006. Countries were supported with technical assistance, training workshops and country peer review of proposals. In 2007, \$1 billion was mobilized to support scale-up in endemic countries. In 2008, \$2.4 billion was leveraged, representing 78 per cent success rate in malaria grant proposals among countries receiving support. Most countries submitted proposals that supported universal coverage of malaria interventions by 2010.

Source: Roll Back Malaria Harmonisation Working Group 2009; Garrett 2008.

Box 3 UNICEF's role in malaria control and monitoring progress

UNICEF works closely with Roll Back Malaria partners to support malaria-endemic countries to achieve universal coverage with key malaria control interventions. In 2007, UNICEF spent \$1.4 billion on child survival programming, including funding for malaria control. It actively supports countries in leveraging other resources to support their malaria programmes through the Global Fund to Fight AIDS, Tuberculosis and Malaria, UNITAID and others.

UNICEF supports integrated programming, including net distribution through maternal and child health services, such as antenatal care, child health days and integrated campaigns alongside measles immunization, deworming and vitamin A supplementation.

UNICEF is also the largest global procurer and distributor of insecticide-treated nets worldwide and provides extensive technical and operational support in countries for procurement and supply chain management, behavior change communication programmes and operational research (such as intermittent preventive treatment for infants).

UNICEF provides technical and financial support to countries to collect data through the Multiple Indicator Cluster Surveys, implemented in about 100 countries since 1995. Alongside the Demographic and Health Surveys, the surveys are a major source of data for monitoring the Millennium Development Goals.

Prevention

4

Insecticide-treated mosquito nets are one of the most effective ways to prevent malaria transmission. Studies show that high coverage and regular use can reduce all-cause mortality rates in children under age five by nearly 20 per cent in malaria-endemic areas.⁸ Since 2004 the number of insecticide-treated nets produced worldwide has more than tripled—from 30 million to 100 million in 2008 (figure 2)—leading to a

Figure 2 Global production of mosquito nets has more than tripled since 2004

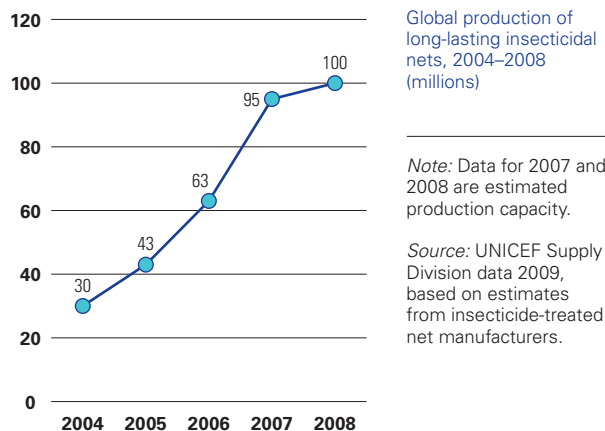
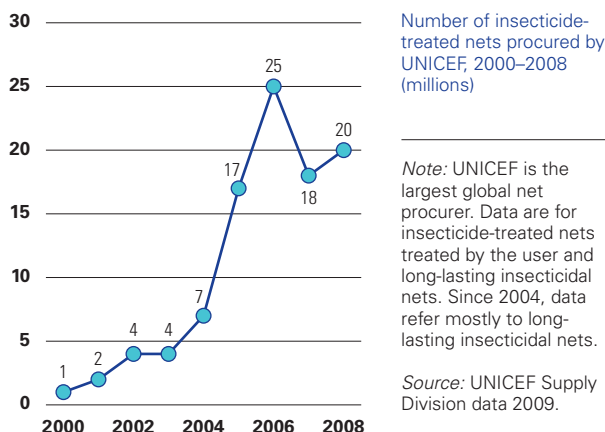


Figure 3 UNICEF insecticide-treated net procurement is 20 times greater today than in 2000



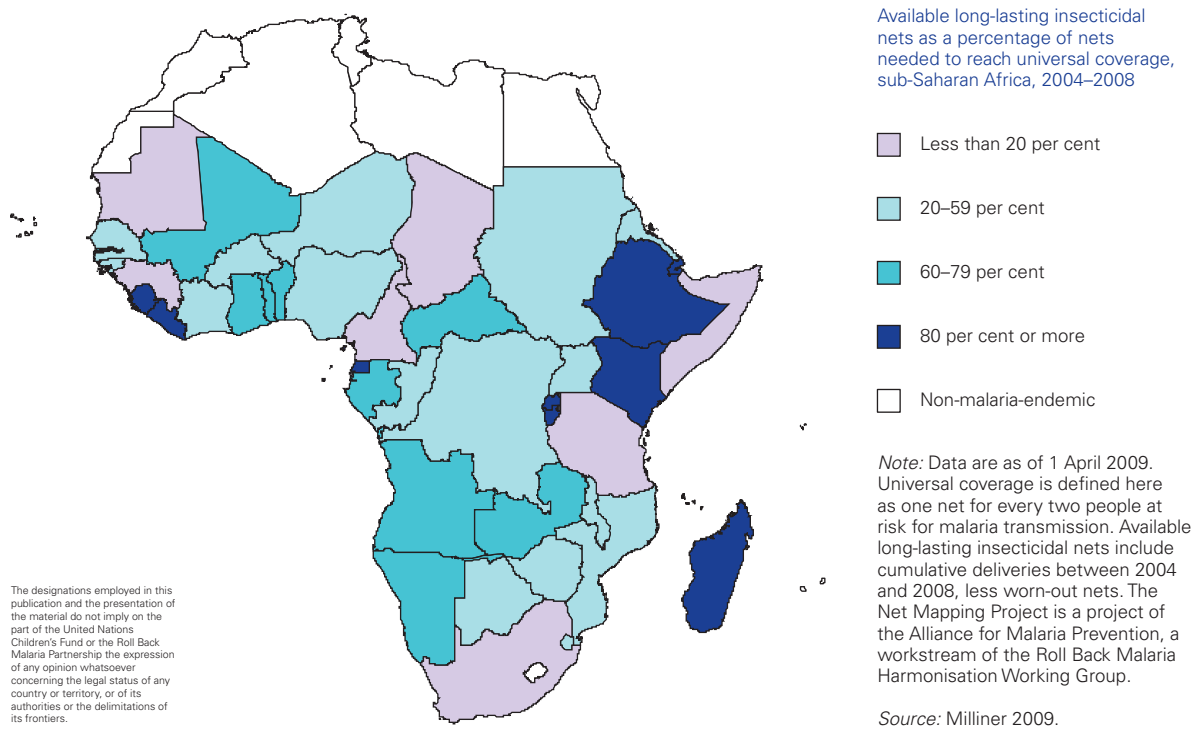
rapid rise in the number of nets procured and distributed. The number of nets procured by UNICEF—the largest global net procurer—is 20 times greater today than in 2000 (figure 3). Programs supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria distributed 70 million nets by the end of 2008. Most nets are distributed through integrated maternal and child health services, such as in Madagascar (box 4). Many countries are now working to develop monthly distribution plans to help ensure distribution by the 31 December 2010 deadline to achieve universal coverage.

Manufacturers' estimates indicate that more than 150 million nets were delivered to African countries during 2004–2008 and are available for use out of the more than 340 million nets needed to achieve universal coverage in areas with malaria transmission (defined here as one net for every two people).⁹ Based on these estimates, endemic African countries overall have received enough nets during 2004–2008 to cover more than 40 per cent of their at-risk populations (map 1), and financing is available to purchase an estimated 240 million additional nets in 2009–2010. Nigeria, for example, has funding to support the distribution of 60 million nets to work towards universal coverage. The next round of surveys is expected to show higher coverage in many countries based on these estimates.¹⁰

The wealth of new malaria data from household surveys shows that sub-Saharan Africa has quickly scaled up insecticide-treated net use among children—rising from 2 per cent in 2000 to 20 per cent in 2006. Indeed, 19 of 22 African countries with trend data at least tripled coverage during this time, with 17 of them experiencing at least a fivefold increase (figure 4). Although overall net use still falls short of global targets—and children in rural areas or in the poorest households are even less likely to use insecticide-treated nets (figures 5 and 6)—the next round of surveys is expected to show higher coverage.

Since 2004 the number of insecticide-treated nets produced worldwide has more than tripled—from 30 million to 100 million in 2008—leading to a rapid rise in the number of nets procured and distributed

Map 1 African countries overall have received enough nets from manufacturers to cover more than 40 per cent of their at-risk population



Box 4 Madagascar rapidly scaled up insecticide-treated nets through integrated campaigns

In October 2007 Madagascar's Ministry of Health and its partners implemented a national mother-child health campaign focusing on 2.8 million children under age five. The campaign combined distribution of long-lasting insecticidal nets with measles vaccination, vitamin A supplementation and treatment for intestinal worms. Distribution took place in 59 of the country's 111 districts, primarily in the western and southern areas, which had not previously benefited from mass distribution of nets.

households owned at least one long-lasting insecticidal net. A Demographic and Health Survey is now under way to provide further data on national coverage of key malaria control interventions. Madagascar is also a leading country for the roll-out of community based treatment with artemisinin-based combination therapies and widespread use of malaria diagnostics. It also supports indoor residual spraying in highland areas as part of its overall malaria control programming.

A follow-up campaign evaluation in 2008 indicated that six months after the campaign more than half of

Source: Madagascar Ministry of Health 2007.

Insecticide-treated nets are one of the most effective ways to prevent malaria transmission. Much progress has been made across sub-Saharan Africa in quickly scaling up insecticide-treated net coverage in recent years

Figure 4 Rapid progress in scaling up insecticide-treated net use among children across all African countries with trend data

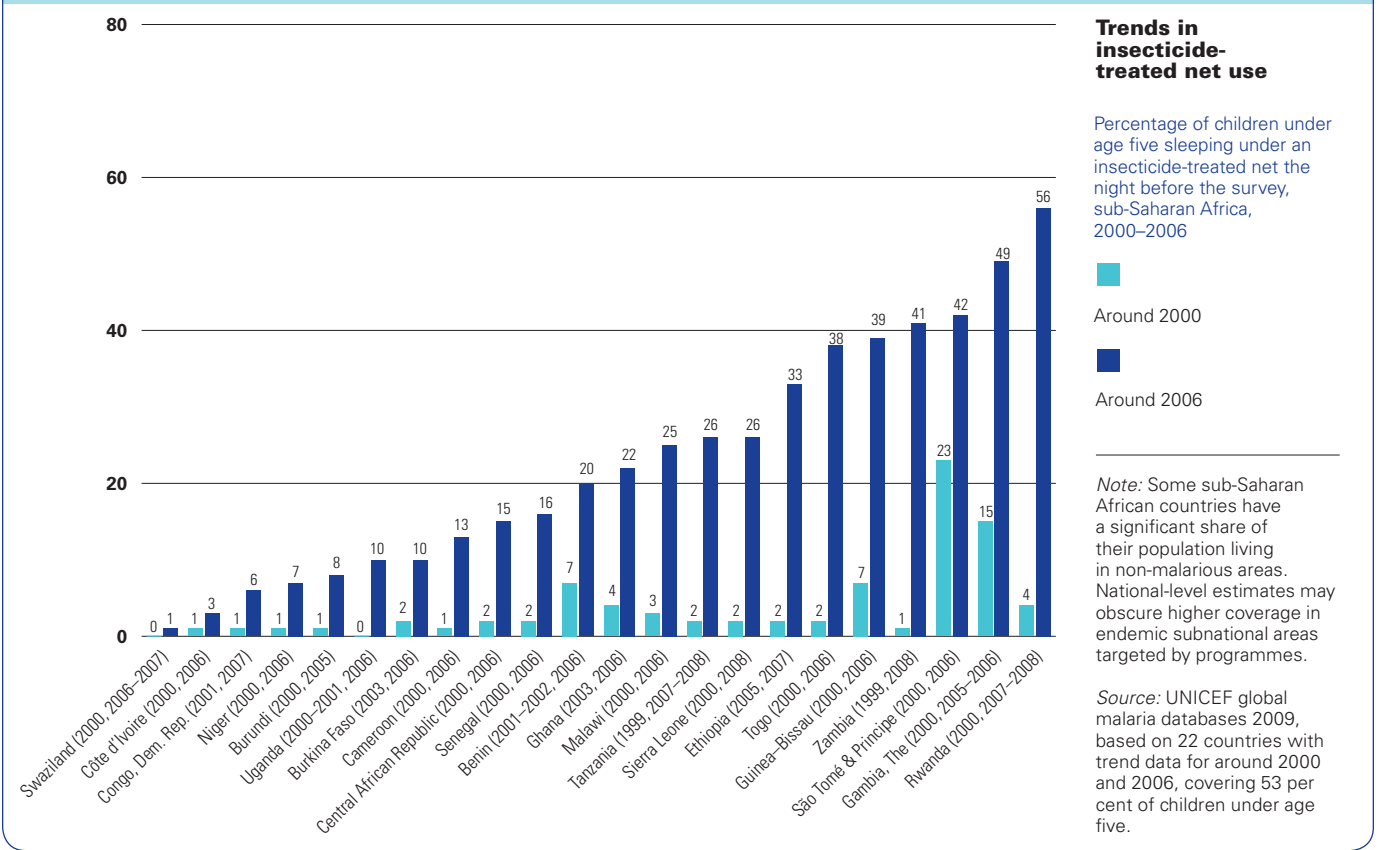
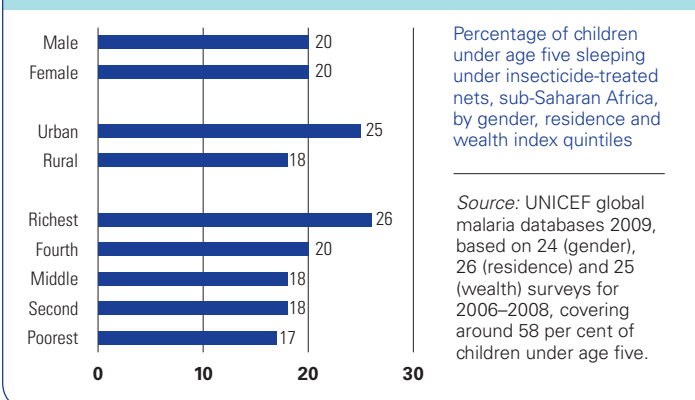


Figure 5 Use of insecticide-treated nets is lowest among African children in rural areas and the poorest households



Indoor residual spraying is also an effective prevention method where epidemiologically and logistically appropriate. National programme records may provide the most useful data for monitoring coverage since this intervention is often targeted to subnational areas. In collaboration with national malaria control programmes, the U.S. President’s Malaria Initiative has supported implementation and scale-up of indoor residual spraying programmes in 14 of the initiative’s 15 countries. In 2008 alone, more than 6 million houses were sprayed and more than 24 million people were protected by indoor residual spraying as a result of these efforts.¹¹

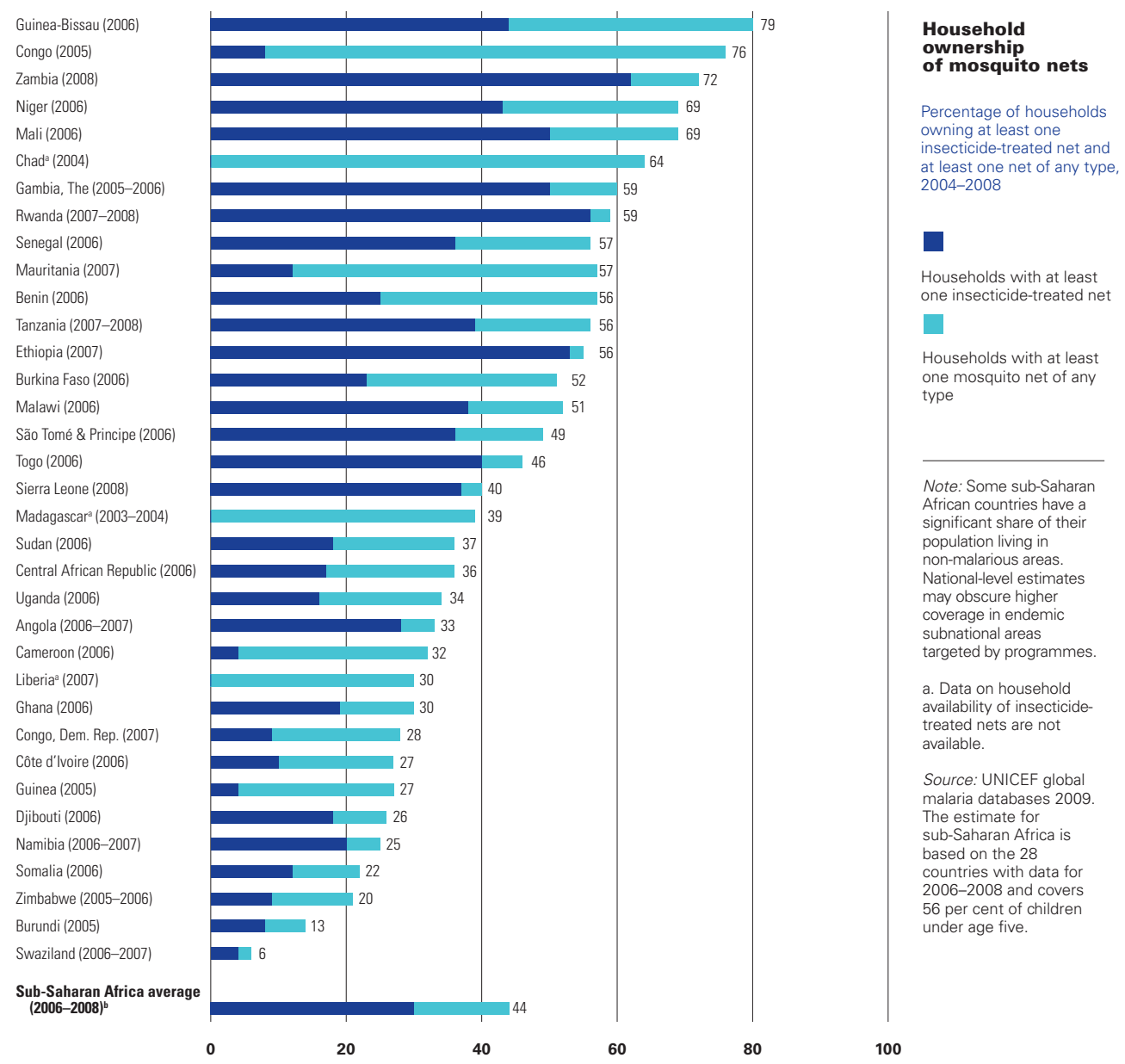


UNICEF/HQ07-0688/Giacomo Pirozi



M. Halahar/Sumitomo Chemical-Olyset® Net

Figure 6 Household ownership of any type of net is relatively high, but increases are needed in ownership of insecticide-treated nets



Household ownership of mosquito nets

Percentage of households owning at least one insecticide-treated net and at least one net of any type, 2004–2008

- Households with at least one insecticide-treated net
- Households with at least one mosquito net of any type

Note: Some sub-Saharan African countries have a significant share of their population living in non-malarious areas. National-level estimates may obscure higher coverage in endemic subnational areas targeted by programmes.

a. Data on household availability of insecticide-treated nets are not available.

Source: UNICEF global malaria databases 2009. The estimate for sub-Saharan Africa is based on the 28 countries with data for 2006–2008 and covers 56 per cent of children under age five.

Treatment

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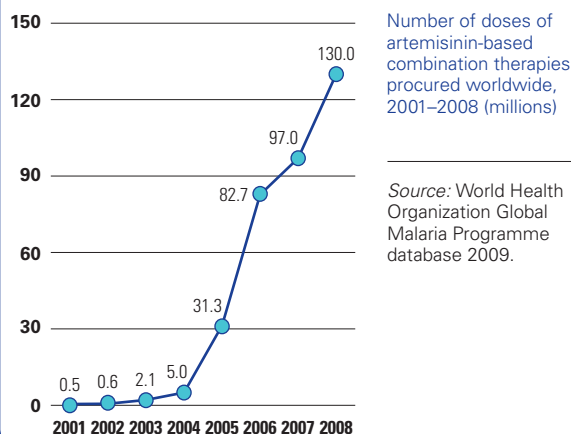
Prompt and effective treatment of malaria within 24 hours of the onset of symptoms is important to prevent life-threatening complications. In recent years, the sub-Saharan Africa region has experienced a major transition, with nearly all countries rapidly shifting national drug policies to include

artemisinin-based combination therapies and substantially increasing financing and procurement for these medicines since around 2005 (figure 7).

The use of these newer medicines, rather than traditional monotherapies, is critical for improving treatment efficacy and delaying the development of drug resistance. While most studies still conclude that the efficacy of artemisinin-based combination therapies remains high, new evidence suggests increased tolerance along the Cambodian and Thailand border.¹²

While antimalarial treatment in children with fever is moderately high across Africa, many febrile children are still being treated at home and with less effective medicines (figures 8 and 9). Many African countries also have made little or no progress in expanding treatment coverage since 2000, which mirrors trends across Africa in the treatment of other major childhood illnesses, such as diarrheal diseases and pneumonia (figure 10). This underscores the urgent need to strengthen integrated community-based case management of major childhood illnesses (box 5).

Figure 7 Recent and rapid scale-up in the global procurement of artemisinin-based combination therapies



Box 5 Scaling up home management of malaria in Zambia

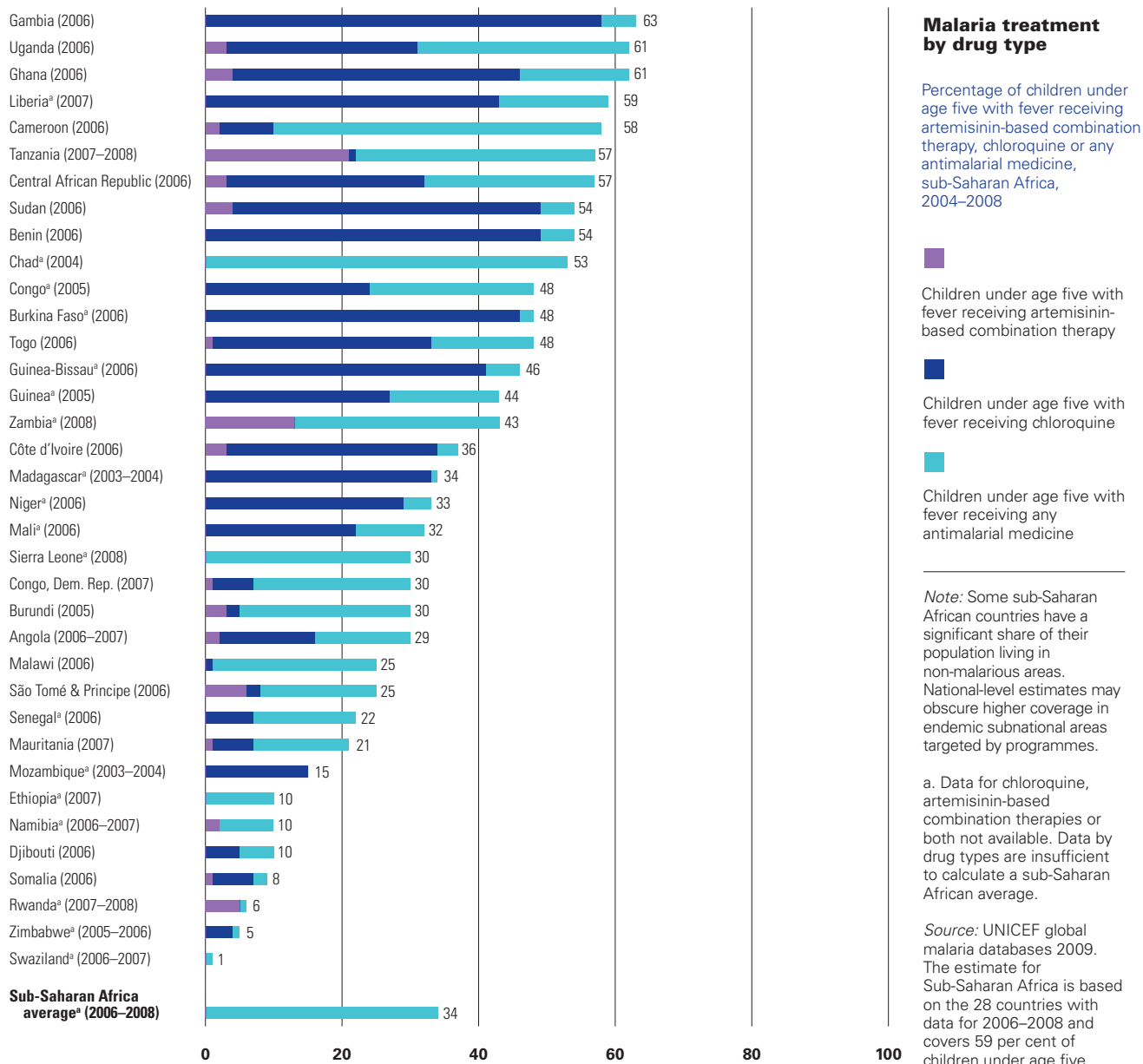
Zambia is actively working to expand treatment coverage by strengthening its community-based case management of malaria. This is an essential measure since most malaria cases occur in rural or poor areas, often without good access to health facilities. Fourteen districts have already implemented training of community health workers and health facility staff in the home management of malaria, and expansion to another 14 districts is planned for mid-2009. Such training includes instruction on national malaria diagnostic and treatment guidelines, appropriate use of antimalarial medicines, stronger referral procedures and reinforced links between health facilities and community health workers, as well as improved malaria surveillance at the community level.

Because functional microscopy is limited in most rural areas, the training teaches community health workers to diagnose malaria using rapid diagnostic tests. These rapid tests are becoming more widely available as international funding increasingly supports their purchase and use. A recent study in Zambia found that community health workers could use these rapid diagnostic tests safely and effectively when provided with clear instructions and appropriate training. Use of the tests has better targeted prompt and effective treatment to children with malaria and is extending the front-line fight against malaria deeper into affected populations.

Source: Harvey and others 2008.

The use of artemisinin-based combination therapies, rather than traditional monotherapies, is critical for improving treatment efficacy and delaying the development of drug resistance

Figure 8 Despite moderately high treatment coverage, many children are still using less effective medicines



Malaria treatment by drug type

Percentage of children under age five with fever receiving artemisinin-based combination therapy, chloroquine or any antimalarial medicine, sub-Saharan Africa, 2004–2008

- Children under age five with fever receiving artemisinin-based combination therapy
- Children under age five with fever receiving chloroquine
- Children under age five with fever receiving any antimalarial medicine

Note: Some sub-Saharan African countries have a significant share of their population living in non-malarious areas. National-level estimates may obscure higher coverage in endemic subnational areas targeted by programmes.

a. Data for chloroquine, artemisinin-based combination therapies or both not available. Data by drug types are insufficient to calculate a sub-Saharan African average.

Source: UNICEF global malaria databases 2009. The estimate for Sub-Saharan Africa is based on the 28 countries with data for 2006–2008 and covers 59 per cent of children under age five.



BASF AG Public Health/MENTOR/VOICES/Benoist Carpentier



UNICEF/HQ07-0127/Giacomo Piazzi

But in this rapidly changing malaria environment, trends in treatment coverage will become increasingly difficult to interpret, particularly in areas with substantial declines in the number of malaria cases due to scaled up prevention measures and in areas with more widely available diagnostics (box 6). Other data sources may provide useful information to interpret trends in case management, such as health facility data.

Some countries are greatly expanding the use of diagnostics to better target treatment only to febrile patients with a positive diagnosis. Systematic implementation will support the more

rational use of anti-malarial medicines. There is also increasing emphasis on integrated community case management of major childhood diseases, particularly malaria, diarrhea and pneumonia, and on strengthening private sector support for treatment, such as the through the Affordable Medicines Facility for Malaria, which is hosted by the Global Fund to Fight AIDS, Tuberculosis and Malaria.

These actions, coupled with investments in strengthening health facilities and distribution mechanisms within countries, suggest that many more children suffering from malaria will receive prompt and effective treatment in coming years.

Box 6 Interpretation of malaria treatment data

Interpreting malaria treatment data from population-based household surveys can be complicated, particularly where scaling up prevention measures has substantially lowered the number of malaria cases and where diagnostics are becoming more widely available.

In areas of high malaria transmission and where quality diagnostics are not available, the World Health Organization (WHO) currently recommends that all febrile children under age five be treated presumptively for malaria. Household surveys collect treatment data for children experiencing fever at some point in the two weeks before the survey. Some countries are moving away from presumptive malaria treatment by scaling up the use of diagnostics through microscopy in health facilities and rapid diagnostic tests at peripheral levels of the health system. In these areas, measuring treatment among all febrile

children will become less useful for monitoring the success of programmes that are better targeted towards treating only confirmed cases. In addition, comparisons of historical survey data reflecting presumptive treatment with newer data based on laboratory-confirmed malaria would inevitably show a downward trend in treatment coverage among all febrile children. This issue becomes more critical as countries scale up preventive measures, resulting in even fewer febrile cases due to malaria.

The Roll Back Malaria Monitoring and Evaluation Reference Group is currently reviewing this treatment indicator in light of the major scale-up of malaria control activities across Africa and has recommended collecting data on diagnostics use in the next round of surveys to help interpret trends.

Source: Roll Back Malaria Monitoring and Evaluation Reference Group.

Systematic implementation of diagnostics will support the more rational use of antimalarial medicines, particularly important since the newer drugs are often more expensive

Figure 9 Many African children with fever taking antimalarial medicines receive treatment only at home

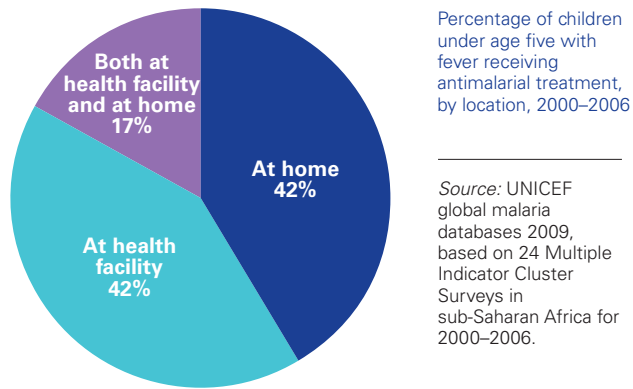
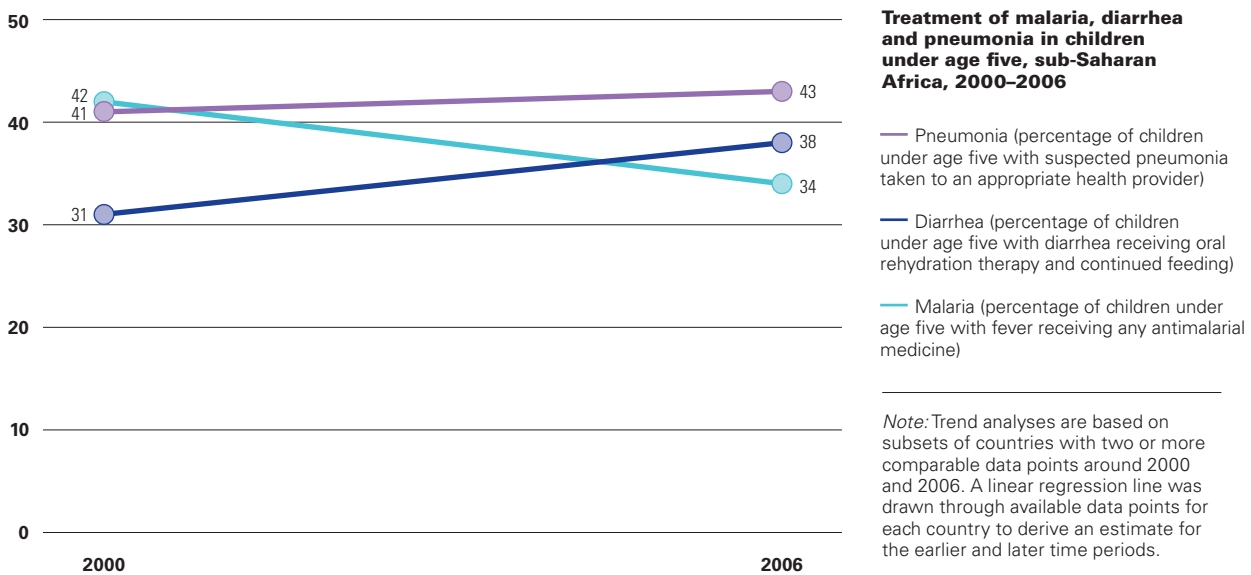


Figure 10 Little or no progress in expanding treatment coverage for major childhood illnesses across Africa since 2000 (pneumonia, diarrhea and malaria)



Source: UNICEF global malaria databases 2009, based on 31 (pneumonia), 28 (diarrhea) and 25 (malaria) countries with trend data for around 2000 and 2006, covering 74 per cent (pneumonia), 50 per cent (diarrhea) and 54 per cent (malaria) of children under age five.

Malaria during pregnancy

Together with regular use of insecticide-treated nets, intermittent preventive treatment during pregnancy is critical for preventing malaria among pregnant women in stable malarious areas. The treatment consists of at least two doses of an effective antimalarial drug during the second and third trimesters of pregnancy. This intervention is highly effective in reducing the proportion of women with anemia and placental malaria infection at delivery. Sulfadoxine-pyrimethamine is a safe and appropriate drug for intermittent preventive treatment for pregnant women.¹³

Most countries have only recently adopted intermittent preventive treatment as a recommended regimen for pregnant women. The next round of

surveys is expected to show higher coverage. Some countries have already achieved relatively high levels, including Zambia (60 per cent in 2008) and Senegal (49 per cent in 2006; figure 11). The higher coverage is due largely to early adoption and implementation of intermittent preventive treatment as a key part of national reproductive health and malaria control activities. Indeed, many countries with more recent data show higher values, and better coverage is expected in the next round of surveys.

Use of insecticide-treated nets by pregnant women is also low across Africa, although many countries with more recent survey data show higher coverage, and further gains are expected in coming years (figure 12).

Figure 11 Despite major progress in some countries, intermittent preventive treatment coverage remains too low

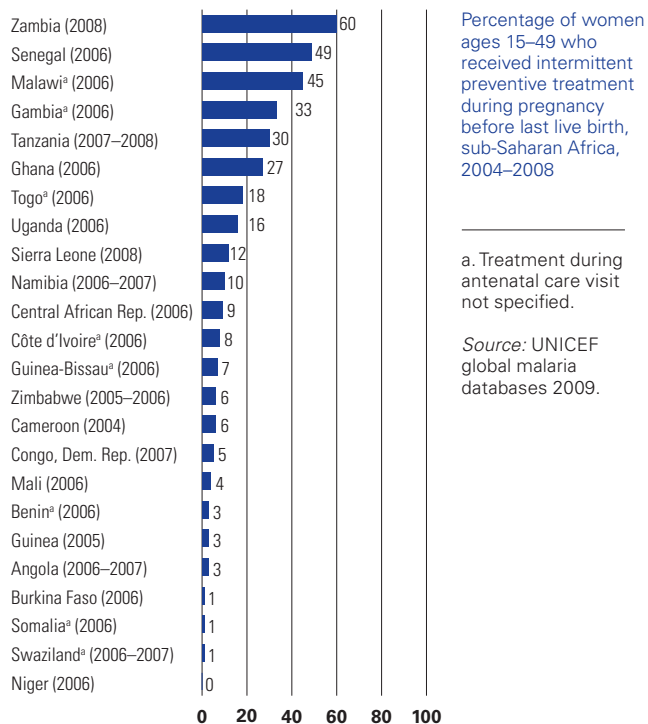
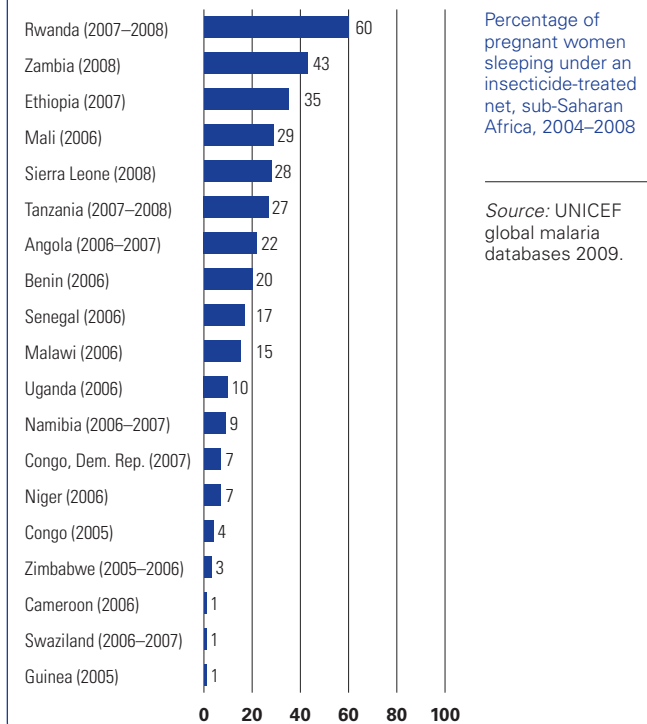


Figure 12 Insecticide-treated net use among pregnant women is too low in most African countries



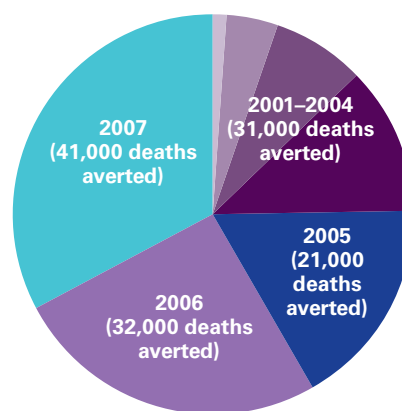
Impact on children's lives

There are significant challenges to monitoring changes in the malaria burden over time. Further investments are needed in the quality of vital registration and in health information systems in high-burden African countries with poor access to health care and inadequate disease surveillance systems. In some areas, data from these sources do suggest that major declines in the malaria burden are becoming increasingly evident.

While improving these data systems in high-burden countries is the long-term objective, modeling efforts provide crude estimates of the potential number of deaths averted due to scaling up malaria control interventions over time and may be used alongside data from other sources to provide an overall indication of mortality impact of programs. This model, known as the Lives Saved Tool (or LiST model), links coverage of key child survival interventions (including those for malaria) with their known impact on mortality in children under age five (box 7).

A recent evaluation for The Global Fund to Fight AIDS, Tuberculosis and Malaria using this model indicates that an estimated 125,000 malaria deaths were averted in 10 African countries in

Figure 13 An estimated 125,000 malaria deaths averted in 10 African countries by scaling up insecticide-treated nets, most since 2006



Estimated number of deaths due to malaria averted in children under age five by insecticide-treated-net scale-up in 10 African countries included in the GFATM evaluation, 2001–2007, by year

Note: Countries include Benin, Burkina Faso, Burundi, Democratic Republic of the Congo, Ethiopia, Ghana, Malawi, Rwanda, Tanzania and Zambia.

Source: GFATM forthcoming.

2001–2007 through the scaling up of insecticide-treated nets (figure 13).¹⁴ This estimate does not reflect the impact of changes in the other malaria control interventions, such as antimalarial treatment. Based on this model's predictions, the Global Fund evaluation suggests that most of these deaths were averted since 2006, reflecting the recent and significant gains made in malaria control across a number of African countries.

Box 7 Lives Saved Tool (LiST)

A consortium of academic and international organizations, led by Institute of International Programs at the Johns Hopkins Bloomberg School, has developed a user-friendly tool (Lives Saved Tool, LiST) to estimate the impact of scaling up maternal, newborn and child health interventions. The model derives its estimates of trends in cause-specific under-five mortality based on the methods outlined in Jones and others (2003), which were incorporated into the Spectrum Demographic Software (1,2). This model estimates the potential number of deaths averted in children under age five by cause through changes in key child survival intervention coverage (including those

for malaria) with empirical evidence of the effect of these interventions on preventing deaths in children under age five. Estimates of the impact of insecticide-treated nets on all-cause under-five mortality in Africa are based on the work of Lengeler (2004). The model's predictions also takes into account current demographic projections and country-specific cause of death profiles for children under age five. More information on the model is available at: www.jhsph.edu/dept/IH/IIP/list/index.html.

Source: Johns Hopkins University 2009; Jones and others 2003; Lengeler 2004.

STATISTICAL TABLE (CONTINUED)
Demographics and key malaria control indicators

Country or territory	Under-five mortality rate (per 1,000 live births) 2007	Number of under-five deaths (thousands) 2007	Number of under-five children (thousands) 2007	Percentage of households		Percentage of children under age five		Percentage of children under age five with fever		Percentage of pregnant women		Source
				With at least one mosquito net of any type 2006–2008 ^d	With at least one insecticide-treated mosquito net 2006–2008 ^d	Sleeping under any mosquito net ^a 2006–2008 ^d	Sleeping under an insecticide-treated mosquito net ^a 2006–2008 ^d	Receiving antimalarial medicines ^b 2006–2008 ^d	Receiving antimalarial medicines on same or next day ^b 2006–2008 ^d	Receiving intermittent preventive treatment ^c 2006–2008 ^d	Sleeping under an insecticide-treated mosquito net ^a 2006–2008 ^d	
Korea, Dem. People's Rep. of	55	17	1,562	—	—	—	—	—	—	—	—	
Korea, Rep. of	5	2	2,319	—	—	—	—	—	—	—	—	
Kuwait	11	1	242	—	—	—	—	—	—	—	—	
Kyrgyzstan	38	4	514	—	—	—	—	—	—	—	—	
Lao People's Dem. Rep.	70	11	720	—	—	82 ^e	18 ^e	9 ^e	—	—	—	MICS 2000
Latvia	9	0	103	—	—	—	—	—	—	—	—	
Lebanon	29	2	362	—	—	—	—	—	—	—	—	
Lesotho	84	5	271	—	—	—	—	—	—	—	—	
Liberia	133	25	725	30	—	—	—	59	—	—	—	DHS 2007
Libyan Arab Jamahiriya	18	3	688	—	—	—	—	—	—	—	—	
Liechtenstein	3	0	2	—	—	—	—	—	—	—	—	
Lithuania	8	0	150	—	—	—	—	—	—	—	—	
Luxembourg	3	0	27	—	—	—	—	—	—	—	—	
Macedonia, TFYR	17	0	115	—	—	—	—	—	—	—	—	
Madagascar	112	81	3,190	39 ^e	—	30 ^e	0 ^e	34 ^e	—	—	—	DHS 2003–2004
Malawi	111	64	2,461	51	38	31	25	25	21	45 ^f	15 ^e	MICS 2006; DHS 2004
Malaysia	11	6	2,756	—	—	—	—	—	—	—	—	
Maldives	30	0	31	—	—	—	—	—	—	—	—	
Mali	196	117	2,321	69	50	41	27	32	15	4	29	DHS 2006
Malta	5	0	20	—	—	—	—	—	—	—	—	
Marshall Islands	54	0	6	—	—	—	—	—	—	—	—	
Mauritania	119	12	462	57	12	31 ^e	2 ^e	21	10	—	—	MICS 2007
Mauritius	15	0	94	—	—	—	—	—	—	—	—	
Mexico	35	73	10,342	—	—	—	—	—	—	—	—	
Micronesia, Fed. Sts. of	40	0	14	—	—	—	—	—	—	—	—	
Moldova	18	1	211	—	—	—	—	—	—	—	—	
Monaco	4	0	2	—	—	—	—	—	—	—	—	
Mongolia	43	2	232	—	—	—	—	—	—	—	—	
Montenegro	10	0	38	—	—	—	—	—	—	—	—	
Morocco	34	22	3,005	—	—	—	—	—	—	—	—	
Mozambique	168	144	3,700	—	—	10 ^e	—	15 ^e	8 ^e	—	—	DHS 2003–2004 ^h
Myanmar	103	92	4,132	—	—	—	—	—	—	—	—	
Namibia	68	4	248	25	20	12	11	10	—	10	9	DHS 2006–2007
Nauru	30	0	1	—	—	—	—	—	—	—	—	
Nepal	55	44	3,651	—	—	—	—	0	—	—	—	DHS 2006
Netherlands	5	1	969	—	—	—	—	—	—	—	—	
New Zealand	6	0	285	—	—	—	—	—	—	—	—	
Nicaragua	35	5	673	42 ^e	—	—	—	2 ^e	—	—	—	DHS 2001
Niger	176	123	2,797	69	43	15	7	33	25	0	7	DHS 2006
Nigeria	189	1,126	24,823	12 ^e	2 ^e	6 ^e	1 ^e	34 ^e	25 ^e	1 ^e	1 ^e	DHS 2003
Niue	—	—	0	—	—	—	—	—	—	—	—	
Norway	4	0	284	—	—	—	—	—	—	—	—	
Occupied Palestinian Terr.	27	4	685	—	—	—	—	—	—	—	—	
Oman	12	1	271	—	—	—	—	—	—	—	—	
Pakistan	90	400	19,333	6	0	2	—	3	3	—	—	DHS 2006–2007

Demographics and key malaria control indicators

Country or territory	Under-five mortality rate (per 1,000 live births) 2007	Number of under-five deaths (thousands) 2007	Number of under-five children (thousands) 2007	Percentage of households		Percentage of children under age five		Percentage of children under age five with fever		Percentage of pregnant women		Source
				With at least one mosquito net of any type 2006–2008 ^d	With at least one insecticide-treated mosquito net 2006–2008 ^d	Sleeping under any mosquito net ^a 2006–2008 ^d	Sleeping under an insecticide-treated mosquito net ^a 2006–2008 ^d	Receiving antimalarial medicines ^b 2006–2008 ^d	Receiving antimalarial medicines on same or next day ^b 2006–2008 ^d	Receiving intermittent preventive treatment ^c 2006–2008 ^d	Sleeping under an insecticide-treated mosquito net ^a 2006–2008 ^d	
Turkey	23	32	6,646	—	—	—	—	—	—	—	—	
Turkmenistan	50	5	494	—	—	—	—	—	—	—	—	
Tuvalu	37	0	1	—	—	—	—	—	—	—	—	
Uganda	130	188	6,028	34	16	22	10	61	29	16	10	DHS 2006
Ukraine	24	10	2,025	—	—	—	—	—	—	—	—	
United Arab Emirates	8	1	327	—	—	—	—	—	—	—	—	
United Kingdom	6	4	3,503	—	—	—	—	—	—	—	—	
United States	8	34	20,957	—	—	—	—	—	—	—	—	
Uruguay	14	1	252	—	—	—	—	—	—	—	—	
Uzbekistan	41	26	2,879	—	—	—	—	—	—	—	—	
Vanuatu	34	0	31	—	—	—	—	—	—	—	—	
Venezuela, B.R.	19	11	2,896	—	—	—	—	—	—	—	—	
Viet Nam	15	25	8,109	97	19	95	5	3	2	—	15 ^e	MICS 2006; ONS 2005
Yemen	73	63	3,740	—	—	—	—	—	—	—	—	
Zambia	170	80	2,030	72	62	48	41	43	29	60	43	MIS 2008
Zimbabwe	90	34	1,706	20	9	7	3	5	3	6	3	DHS 2005–2006
Regional groupings												
Sub-Saharan Africa	148	4,480	127,624	44	30	28	20	34	21	—	—	
Eastern & Southern Africa	123	1,761	61,296	48	39	31	26	30	16	—	32	
Western & Central Africa	169	2,719	66,328	40	21	25	13	39	26	—	—	
Middle East & North Africa	46	445	44,789	—	—	—	—	—	—	—	—	
South Asia	78	2,985	175,250	32	—	—	—	7	—	—	—	
East Asia & the Pacific	27	799	144,441	—	—	—	—	—	—	—	—	
Latin America & Caribbean	26	302	55,622	—	—	—	—	—	—	—	—	
CEE/CIS	25	138	26,458	—	—	—	—	—	—	—	—	
Industrialized countries	6	66	54,922	—	—	—	—	—	—	—	—	
Developing countries	74	9,109	562,128	—	—	—	—	—	—	—	—	
Least developed countries	130	3,775	124,237	46	32	30	21	32	18	—	—	
World	68	9,216	629,106	—	—	—	—	—	—	—	—	

— not available.

Note: Data are from the UNICEF malaria databases, which include survey data from Demographic and Health Surveys (DHS), Malaria Indicator Surveys (MIS), Multiple Indicator Cluster Surveys (MICS) and other national surveys (ONS). The complete databases (including time series, disparities and detailed source information) are available at www.childinfo.org. Demographic information is based on United Nations Population Division estimates (children under age five) and Interagency Group for Child Mortality Estimation (under-five deaths).

a. Data are for the night before the survey.

b. Data are for the two weeks before the survey.

c. Data are for women ages 15–49 with a live birth in the previous two years who received two or more doses of sulfadoxine-pyrimethamine/Fansidar during pregnancy through an antenatal care visit.

d. Data are for the most recent year available during the period specified.

e. Data are for years or periods other than those specified.

f. Data do not specify that intermittent preventive treatment was received through an antenatal care visit.

g. Preliminary report.

h. National report.

i. Data are for two or more doses of chloroquine received during pregnancy.

Notes, technical note and references

Notes

1. Chambers 2009.
2. WHO 2008b.
3. Crawley and others 2007.
4. Desai and others 2007.
5. Roll Back Malaria Partnership 2008.
6. Roll Back Malaria Partnership 2008.
7. WHO 2008b.
8. Lengeler 2004.
9. Different definitions of universal coverage have been used by different countries and their development partners. For planning purposes, many countries currently use the definition of one net for every two people at risk of malaria, which is used by the Net Mapping Project assessment.
10. Estimates are derived from the Roll Back Malaria Harmonisation Working Group database.
11. U.S. President's Malaria Initiative 2009.
12. WHO 2007.
13. Marchesini and Crawley 2004; Ter Kuile, van Eik, and Filler 2007; Crawley and others 2007; WHO 2005.
14. GFATM forthcoming.

Technical note

Figures presented in this booklet have been adapted and updated from the publication: UNICEF and RBM, 2007, *Malaria and Children: Progress in Intervention Coverage*, New York: UNICEF.

UNICEF headquarters maintains a series of public-access databases on key malaria prevention and treatment indicators. Data are derived from national-level households surveys, including the UNICEF-supported Multiple Indicator Cluster Surveys (MICS), USAID-supported Demographic and Health Surveys (DHS) and Malaria Indicator Surveys (MIS). Most of the indicators presented in this booklet draw on the UNICEF malaria databases. The complete databases (including time series, disparities and detailed source information), along with information on

data interpretation, are available at www.child-info.org.

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On World Malaria Day in 2009, just over 600 days remain until the 31 December 2010 deadline set by UN Secretary-General Ban Ki-moon for all endemic countries to achieve universal coverage with key malaria control interventions. Data presented here highlight major signs of progress across sub-Saharan Africa toward this goal.

Malaria has become a major development priority. New and ambitious goals are challenging countries to implement bold plans to scale up their programs—critical for achieving the Millennium Development Goals in affected countries. There have also been major increases in funding for malaria control in recent years, and in 2008 world leaders again committed billions more towards malaria control.

Indeed, a new phase in the fight against malaria has begun. Net manufacturers' estimates indicate that malaria-endemic countries in Africa have now received enough nets to cover more than 40 per cent of their at-risk populations. Across sub-Saharan Africa, more children are using insecticide-treated nets, with 19 of the 22 countries with trend data showing at least a threefold increase since around 2000 and 17 showing at least a fivefold increase. Most of these nets are distributed through integrated maternal and child health services, such as antenatal care and immunization.

Despite major increases in procurement of artemisinin-based combination therapy since around 2005, many African children are still using less effective medicines and there has been little or no progress in expanding coverage in most countries since 2000. But important work is now under way to improve coverage with effective treatment.

Based on these efforts, some areas are now showing major reductions in the number of malaria cases and deaths, with more declines expected in the coming years.