The First Malaria Indicator Survey in Somalia, 2014

Developed and Endorsed by the Zonal NMCPs/MOHs of the Fedral Government, Puntland and Somaliland

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The 2014 Somalia Malaria Indicator Survey is the first of its kind in Somalia. The Malaria Control Programmes implemented the survey between January and April 2014. Funding for the survey was received from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) through the Principal Recipient- the United Nation Children's Fund and the sub-recipient, the World Health Organization-Eastern Mediterranean Regional Office (WHO-EMRO). Technical assistance was provided by the WHO-EMRO (Dr Jamal Amran; Dr Abdikarim Musa and Mr Fahmi Yusuf), the Kenya Medical Research Institute/Wellcome Trust Research Programme (Prof Abdisalan M Noor). Staff from the NMCPs and other government departments and malaria stakeholders participated in the survey.

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Partners

National Malaria Control Programmes
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World Health Organization - Somalia
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Abbreviations

ELISA	Enzyme-Linked Immunosorbent Assay
EMRO	Eastern Mediterranean Regional Office
EPR	Epidemic Preparedness and Response
GFATM	Global Fund to fight AIDS, Tuberculosis and Malaria
HMIS	Health Management Information System
IEC	Information Education and Communications
IPT	Intermittent Preventive Treatment
ITNs	Insecticide Treated Nets
IVM	Integrated Vector Management
LLINs	Long Lasting Insecticidal Mosquito Nets
M&E	Monitoring and Evaluation
MSH	Management Sciences for Health
NGOs	Non-Governmental Organisations
PCR	Polymerase Chain Reaction
RBM	Roll Back Malaria
SP	Sulfadoxine-Pyrimethamine
UN	United Nations
UNICEF	United Nations Children's Fund
WHO	World Health Organization

SUMMARY OF SURVEY RESULTS

The Somalia Malaria Indicator Survey (SMIS) of 2014 was undertaken at different times in the three zones of Central South (January-February 2014); Puntland (December 2013-January 2014) and Somaliland (March to April 2014). This coincided largely with the malaria transmission season except perhaps in Somaliland where the survey may have been undertaken slightly outside the transmission season.

This is the first MIS in Somalia and a deliberate decision was made that the fieldwork would be managed, supervised and implemented by the malaria control programmes in the three zones. The aim was to build local programme capacity to fully undertake future health surveys. However, there were important contextual, sampling and survey related issues that should be taken into consideration in the interpretation of the reported results. These are:

- Several parts of Somalia have remained unstable for many years and a national census has not been conducted since 1975. However, it is estimated that almost 60% of the population of Somalia resides in the Central South zone. This is where malaria has historically been endemic and is also where insecurity is highest. The security situation has remained dynamic and consequently it has been difficult to establish a validated sampling frame and guarantee sampled clusters would be accessible during fieldwork.

- For security reasons the whole of Middle Juba region was excluded from the survey and its clusters were distributed across other neighbouring regions. In other regions also several clusters had to be replaced during fieldwork. These replacements were not done efficiently and the sampling balance achieved during the survey design stage was compromised. As a result several regions had more clusters than would be proportionately assigned to them and/or the distribution was disproportionately in favour of urban clusters.

- Despite extensive training and advise from technical partners, there were a number of other issues during field work such as poor call backs for respondents who were not at home during the survey day and/or skewed focus on female respondents who were either the most responsive or frequently available during survey that affected the overall balance of sample population.

As a consequence of the uncertainty in the sampling frame, the unsupervised replacement of clusters in the field due to poor access and insecurity resulting in more urban clusters than expected and the poor follow up of mainly male household members, the following issues arose:

- In some regions the sampled urban population is higher than would be the case in a balanced sample
- A substantial proportion of the male population in the age range 15-29 years appeared not have been enumerated during survey resulting in a population pyramid that unusually more female than male in several age groups. This has also resulted in a mean household size that is lower (3.9) than expected (5.7)
- All survey results in this report are un-weighted due to the difficulty of determining the reliability of the sampling frame. Therefore, as much as possible aggregate national, urban/rural and zonal estimates should be used as the most precise results.

The summary of the main results presented as national aggregates or by residence and zone are shown below.

Somalia MIS 2013- Summary of main results overall, by residence and zone.						
	National	Urban	Rural	Central South	Puntland	Somaliland
Survey sample						
Number of clusters	267	98	164	160	37	70
Number of households	5,220	1,975	3,245	3,099	721	1,400
Number of household members	20,104	7,970	12,134	12,374	2,685	5,045
Number of women 15-49 years	3,262	1,276	1,985	2,192	329	741
Number of children under the age of five years	3,849	1,571	2,278	2,668	328	853
Vector control						
Percentage of households with at least one mosquito net	27.1	30.4	25.1	25.3	20.2	34.5
Percentage of Households with at least one LLINs	19.1	20.2	18.4	16.9	7.2	29.9
Percentage of Households with at least one LLIN per 1.8 persons	8.3	8.6	8.1	6.0	4.3	15.5
Percentage of households members who slept under net	28.4	32.8	25.6	25.5	22.4	36.4
Percentage of households members who slept under LLIN	19.8	23.0	17.7	17.1	8.1	28.9
Percentage of children U5 who slept under LLIN	22.5	25.8	20.7	17.3	14.4	36.5
Percentage of pregnant women who slept under a net	31.5	37.8	27.0	28.8	18.0	39.3
Percentage of pregnant women who slept under LLIN	23.0	28.4	19.1	19.2	8.6	32.8
Treatment seeking						
Percentage of persons who had fever in the last 2 weeks	20.2	11.2	26.1	25	15	11.7
Percentage of persons who had fever and took action	27.9	35.3	25.8	28.3	31.5	24.6
Percentage with fever in the last two weeks who action and treated at a public health facility	32.5	34.3	31.1	30.1	27.9	37.0
Percentage with fever in the last two weeks who took action and were treated with antimalarials	14.5	4.3	18.5	15.0	11.8	13.8
Percentage with fever in the last two weeks who took action and were treated with antimalarials and received AS+SP	59.4	43.8	60.9	50.1	77.8	52.6
Parasite prevalence						
Number of persons tested using RDT	16,362	6,443	9,919	10,142	1,433	4,787
Percentage parasite prevalence using RDT	1.9	1.0	2.4	2.8	1.1	0.0*
Knowledge						
Number of people 12 years and above	12129	5018	7111	6397	1071	4661
Number of people with access to malaria information	2282	1146	1136	1019	104	1159
Percentage of people with access to malaria information	18.8	22.8	15.9	15.9	9.7	24.9
Of those who received malaria information percentage who received malaria messages through radio and/or TV	39.1	36.0	42.2	46.1	84.6	28.8
Percentage with no knowledge of malaria symptoms	15.1	16.8	14	9.2	7.2	30.1
Percentage of people who know mosquitoes transmit malaria	67.0	67.0	67.0	64.5	82.5	66.6
Percentage of people who rank LLLIN/IRS as the main methods for preventing malaria	60.0	61.4	60.6	57.9	80.7	60.3
Percentage women 15-59 years who rank LLINs or IRS as one of the main methods of preventing malaria	61.6	62.0	61.4	58.0	82.0	62.7
Women 15-49 years if age						
Number of women receiving ANC services	1379	602	777	764	123	492
Percentage with access to ANC services who were attended to by a qualified health worker	73.4	85.9	62.9	70.9	78.9	76.1
Percentage of women breastfeeding	82.3	78.2	84.7	78.3	57.7	93.3
Percentage of women breastfeeding exclusively	38.4	41.6	36.1	40.8	57.7	32.2

*only one case of malaria infection was reported in Somaliland

Implications of results and Recommendations

1. Malaria infection prevalence is very low nationally at about 1.9% with over 90% of all infections from the Central South zone. Infection rates in Puntland were just above 1% and only one infected person was reported from Somaliland. Reported access and use of long lasting insecticidal nets (LLINs) was higher in Somaliland. Less than 10% of households in Central South where universal coverage of LLIN is the national strategy have 1 LLIN for every 1.8 persons. In Bakool region in Central South, none of the households reported owning an LLIN, despite reports from the NMCP that close to 100,000 LLINs were distributed in this region in the period 2011-2013. In Hiraan province, where 13% of persons who were tested were malaria positive, LLIN usage was also the highest with about 43% of the population sleeping under an LLIN. Although most LLINs used in Somalia were acquired within the last three years, the level of coverage clearly remains well below the target for universal coverage particularly in the Central South and rapid scale up is required in this zone. In the other zones targeted scale up of LLINs with a zonal reserve for epidemic response is likely to be more cost effective than universal coverage.

2. The low level of malaria prevalence has other important implications for malaria control in Somalia. While the current strategy of universal LLIN coverage in Central South is appropriate in the short and medium term, the main intervention in Somaliland and Puntland should be investment in high quality surveillance and early warning systems combined highly focal distribution of LLINs in empirically defined hot spots. These surveillance systems should be a combination of significant upgrade in the current routine reporting systems and the establishment and expansion of sentinel sites as the basis of an early warning system. The selection of these sentinel sites should be underpinned by a careful understanding of epidemic risk.

3. Fever prevalence was around 20% nationally with only about 28% of persons who were febrile in the last two weeks prior to survey seeking treatment. Of these only 33% were treated at a public health facility with the use of the private sector high across most regions. Detailed investigation on the determinants of access to the public health sector and the quality of care provided in the private sector are required to increase the reach of malaria case management and improve best practice. Given the weakness of the public service system in General in Somalia and the significant role of the private sector in health, urgent steps should be undertaken to enhance public and private partnerships for malaria control in the country.

4. Where a person was treated for malaria, they were often (59%) prescribed AS+SP, which is the recommended first line antimalarial. The use of SP and CQ monotherapy however remain relatively high accounting for over 23% of all antimalarial treatments. It is unclear whether the use of these monotherapies is related to availability of drugs in the health system or a lack of adherence to national treatment guidelines. A national quality of care study at a representative sample of public and private health facilities should be implemented to the level of commodity availability and best practices for malaria case management.

5. Among respondents aged 12 years and above exposure to malaria information remains h at about 19% nationally. Among those who had received malaria messages the commonest medium (39%) was radio and/or television followed by information at health facilities (see Chapter 7, Table 7.1). Greater efforts should be invested in malaria awareness campaigns across the country with special focus on areas where it is most prevalent.

6. Despite the self-reported low access to malaria messaging indicative of low scale up of BCC in Somalia, only 15% of the population had no knowledge of malaria symptoms, majority (67%) of

people knew that mosquitoes were the main source of malaria transmission while 60% ranked LLIN and IRS as the main approaches for malaria prevention. Among women 15-49 years 62% knew mosquitoes transmitted malaria and 62% responded that LLIN and IRS were the main approaches for malaria transmission.

7. Surprisingly access to advise from a health worker during pregnancy is high nationally at 73% and over 70% across all zones. These results are higher than was reported in the MICS 2011 of Puntland and Somaliland and may be indicative of a general contact with a health worker during pregnancy and not access to full ANC services. The results show that significant opportunities exist for using health facilities as dissemination point for malaria information. In addition, where the risk of malaria is relatively high with potential harmful effects during pregnancy, routine distribution of LLINs could be targeted to mother pregnant women and infants.

8. As discussed in the opening section of the survey summary, there is a lack of reliable sampling frame for Somalia and efforts should be undertaken across all zones to develop one. In addition, it is common knowledge that Somalia has suffered an acute professional human resource capacity since the beginning of the civil conflict. Although many community-based surveys have been undertaken for many years, there has been limited investment in institutional capacity building to implement complex surveys. One of the objectives of the MIS was to foster national skill base for future surveys and while the malaria programmes have been enthusiastic and diligent in undertaking the MIS there is need for further capacity building to improve their competence.

9. The MIS 2014 was structured so that a single day was spent to survey each cluster. However, this restriction meant that the process of callbacks was not efficient. Due to the complex nature of the situation in Somalia and poor transport infrastructure future MIS should be undertaken over 2 days per cluster. Where possible an extra day should also be allowed for between cluster movement especially in rural areas. Increasing the survey days per cluster will have significant cost implications which should be factored into future budgets.

CHAPTER 1: INTRODUCTION

1.1 Background

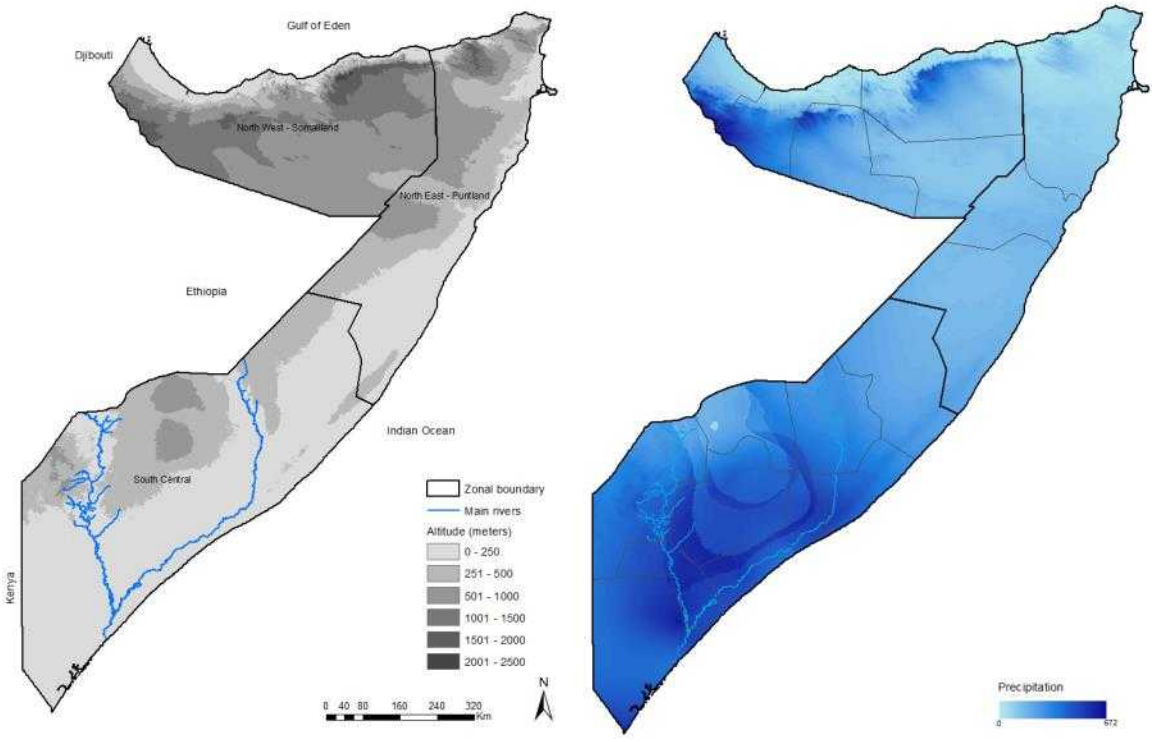
Monitoring the progress of indicators aimed at controlling malaria and the parasitological and clinical consequences of increased intervention coverage are fundamental requirements of all National Malaria Control Programmes. Monitoring and evaluation (M&E) is now a key component of management of national health programmes for a number of reasons. National cluster randomized household surveys, referred to as malaria indicator surveys (MIS) were identified as the main source of information on the progress of key malaria indicators. This stand-alone household surveys are aimed at collecting data at the national and regional levels from a representative sample of respondents to support national malaria control programs and international health organizations to make evidence based decisions in malaria control.

The MIS addresses a number of topics including household ownership of insecticide-treated mosquito nets and their use by children under five years of age and pregnant women; intermittent preventive treatment against malaria during pregnancy; and the type and timing of treatment of high fever in children under five years of age; indoor residual spraying of insecticide to kill mosquitoes; and the prevalence of malaria infection. It is recommended that MIS surveys are done during the high malaria transmission season to provide programmatically relevant information on the key indicators. To help countries undertake national MIS, the RBM-MERG [http://www.rollbackmalaria.org/mechanisms/merg.html#MIS] has provided detailed guidelines on survey design, sampling and implementation, which form the basis of this proposal. This report presents the results of an MIS undertaken in the three zones of Somalia (Central South, Puntland and Somaliland) between January and April 2014.

1.2 Geography, climate and administration of Somalia

Somalia is the eastern most county in Africa and its terrain consists mainly of plateaus and plains with a few highland areas in the northern margins [Hadden 2007]. In the far north are the east-west ranges of the Karkaar Mountains rising as high as 2440 m (Figure 1.1.A). On the eastern and northern sides is the longest coastline in Africa. On the west is the vast Somali plateau consisting of series of tablelands. In the East and the South, the plateau ends in arid steppes, from under 200 meters at the Indian Ocean. The plains drain into the Juba River in the south and Shabelle River in the centre, which disappears into a swamp before reaching the coast (Figure 1.1). Most of Somalia receives less than 500 mm of rain annually, and a large area encompassing the northeast and much of northern Somalia receives as little as 50 to 150 mm (Figure 1.1 B). The southwest receives 330 to 500 mm.

Figure 1.1: A) altitude map showing the three zones of Somalia; B) mean annual precipitation map of Somalia



Mean daily maximum temperatures throughout the country range from 30°C to 40°C, except at higher elevations and along the Indian Ocean coast. Mean daily minimum temperatures vary from 20°C to more than 30°C. Northern Somalia experiences the greatest temperature extremes, with readings ranging from below freezing in the highlands in December to more than 45°C in July in the coastal plain skirting the Gulf of Aden. The north's relative humidity ranges from about 40 in mid-afternoon to 85 at night, varying with the season. Temperatures in the south are less extreme, ranging from about 20°C to 40°C. The hottest months are February through April. The coastal zone's relative humidity usually remains about 70 even during the dry seasons. This diversity of climatic conditions from south to north has a marked effect on the distribution, abundance and infectivity of malaria by dominant vectors.

Somalia is now split into three largely autonomous areas, referred to here as zones, and include the self-declared Republic of Somaliland, Puntland and Central South Zones (Figure 1A) all with separate ministries of health and national malaria control programmes.

1.3 Malaria epidemiology and control in Somalia

1.3.1 Epidemiology

Published descriptions of malaria in Somalia began as early as the 1930s with reports on malaria in the Banadir region [Gelonesi 1931; 1932]. A malariometric survey undertaken between 1935 and 1936 suggests that *Plasmodium falciparum* prevalence of above 50% in several areas in southern Somalia [Cicchitto 1938]. In a report to the WHO in 1955 by a consultant entomologist, Dr Giglioli, several observations were made on the epidemiology of malaria in Somalia [WHO 1960].

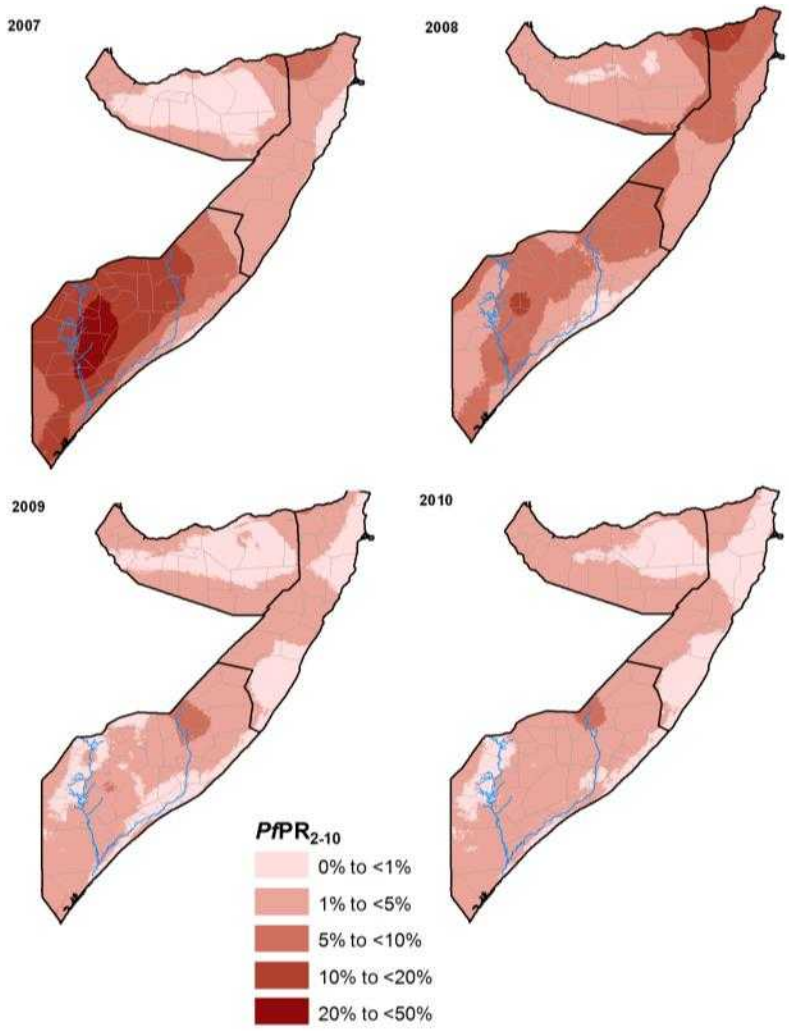
- The arid northern and central parts of Somalia were considered to very low malaria risk.
- In these arid areas the likelihood of epidemics were associated with heavy rains while local endemic foci were likely to be around water collection points such as springs, wells and dams
- The coastal regions were considered malaria free.
- Endemic malaria was associated with the riverine regions in the south.
- Transmission was largely seasonal and therefore there were no areas of holo-endemic transmission.
- Little was known about the malaria epidemiology among nomadic pastoralists.

Malariometric surveys undertaken mainly in the southern regions of Somalia by the National Malaria Service and the Italian Naval Medical Research Centre in the 1950s showed mean parasite prevalence of 2 to 10 in the upper, middle and lower Shabelle areas; 2 to 60 in the upper Juba region; and up to 20% in the middle and lower Juba [WHO 1960].

Entomological evidence shows that *Anopheles arabiensis* is the main and often, the only vector in the country [Maffi, 1958; 1960; Maffi & Colluzi, 1960; Mouchet *et al.*, 2004]. The presence of *An. merus* in Mogadishu has not been confirmed [Mouchet *et al*., 2004]. *An. funestus* and *An. nili* have also been reported in the South [Maffi, 1958]. In the North East *An. pharoensis* and *An. d'thali* have been described [Choumara, 1961]. The two malaria seasons were identified as following the spring (May-August) and the autumn (December – January) rains.

In 2008 an empirical map using just under 500 community parasite prevalence survey data from 2005 to 2007 was used to develop a malaria risk map at 5 x 5 km in Somalia using Bayesian geostatistical methods [Noor et al 2008]. This map revealed in the north of the country parasite prevalence was less than 2 with pockets of between 5% and 9%. In the South especially around the riverine areas, point estimates ranged from 0% to 52% with a median estimate of 5%. Similar patterns were observed in a revised map developed using about 1500 clusters from the period 2005 to 2009 with most parts of the country under prevalence of <5% [Snow et al 2009]. A recent analysis of the scale up of malaria control under Round 6 funding by the Global Fund and subsequent changing epidemiology of malaria in Somalia showed a dramatic decline in malaria infection rates from 2007 to 2010 (Figure 1.2) which are likely to be due to a combination of interventions and the long drought in 2009-2010 [Noor et al 2013].

Figure 1.2 Endemicity map generated from the posterior annual mean *Pf*PR_{2-10} prediction of 2007 to 2010 at 1×1 km grid location in Somalia. The thick black lines show the zone boundaries, the thin black lines show the regional boundaries and the thin grey lines show the district boundaries. The blues lines show the location of the Juba (lower) and Shabelle (upper) Rivers. (Source: Noor *et al* 2013)



1.3.2 Malaria control programs

By the time the Abuja Declaration was launched by the RBM partnership in 2000, there were hardly any remaining organised malaria control activities in Somalia. In 2002, the Health Sector Committee of the SACB applied for funding from the Global Fund to Fight Aids, Tuberculosis and Malaria (GFATM) [SACB, UNICEF and WHO, 2006] and was successfully awarded 12.9 million USD over 3 years to develop a national strategy and begin implementation of activities beginning July 2004. The Somalia National Malaria Strategy 2005-2010 was launched in 2005 [Capobianco, 2005] with the goal to "*reduce the malaria burden in Somalia by 50%*" by 2010 with the following intervention targets by 2010:

- 80% of children under 5 and 80% of pregnant women sleep under an Insecticide treated net (ITN) in hyper and meso endemic areas
- 40% of children above 5 years and 40 of adults sleep under an ITN in hyper and meso endemic areas
- 70% of pregnant women in stable malaria areas receive at least two doses of IPT under direct observation
- 90% of epidemic prone regions have epidemic preparedness plans and detection/rapid response systems for local malaria epidemics
- 80% of malaria epidemics are detected within two weeks of onset
- 70% of confirmed epidemics are effectively contained through selective interventions including effective case management, ITNs and/or IRS, community mobilization
- 80% of population in hyper-meso endemic areas knows and utilizes methods of prevention/ treatment of malaria

In 2006, a further 25 million USD was awarded by the GFATM to Somalia to scale up interventions in Somalia in support of the 2005-2010 strategic plan [Noor et al 2013]. This was followed by an improved national malaria programme capacity, increase in LLIN and ACT distribution, increased health worker training, focus spraying activities and improved diagnostic capabilities. In the same year 2006 Somalia changed its first line malaria therapy to the artemisinin combination therapy (ACT), artesunate-sulphadoxine pyerimethamine (AS-SP). Since 2008, microscopy quality assurance has been undertaken in 60 of laboratories, rapid diagnostic tests have been scaled up at all levels of the health sector including community health posts and almost 2 million LLIN distributed. The reporting of malaria cases has also been improved through the setting up and expansion of malaria sentinel health facilities and through increasing reporting of the routine health management and information systems (HMIS). Despite significant improvements, challenges still remain around the quality of microscopy and RDT implementation, adherence to test results and malaria data quality. These activities were supported through Round 6 GFATM funding for Somalia and were undertaken by several partners [Noor et al 2013]. These activities were the Coordination for International Support to Somalia (CISS) a coordinating body which evolved out of the Somalia Aid Coordination Body (SACB) previously functioning since 1993. The CISS has the mandate of supporting and facilitating coordination for a constructive and effective partnership between the international aid community and Somali counterparts.

In 2010, the second National Strategic Plan (NSP) 2010-2015 was launched with the goal of achieving, by 2015, near zero (<1% parasite prevalence) malaria prevalence within areas of historically low transmission (Somaliland, Puntland and Central parts of Central South Zone) and sustain universal coverage resulting in 50% reduction of malaria prevalence in malarious areas of the country (Southern parts of Central South Zone). These was to be to done by achieving the following intervention targets:

1. At least 80% of suspected malaria cases are diagnosed using RDTs or microscopy within 24 hours of fever onset
2. 100% of confirmed *Plasmodium falciparum* malaria cases are treated with ACTs
3. 100% of households in malaria transmission areas own at least two LLINs
4. At least 80% of the population (under 5s and total population) used LLIN previous night
5. At least 80% of pregnant women used LLIN previous night
6. At least 85% of households in focal transmission areas in Somaliland and Puntland sprayed in previous 12 month
7. At least 80% pregnant women receiving IPTp2 in malarious areas in CSZ

8. At least 90% of people living in malarious areas recognize the importance of using an LLIN, having their house sprayed, seeking treatment within 24 hours of fever onset for the prevention of malaria.
9. Strengthen the capacity of the ministries of health in close collaboration with national and international partners.

To the support these implementation of the NSP 2010-2015 Somalia was awarded approximately 36 million USD by the GFATM during the Round 10 funding [GFATM Somalia Profile]. This MIS aims to establish the epidemiological and control evidence base to support the implementation of the Phase 2 Round 10 grant.

1.4 Objectives of the Malaria Indicator Survey of 2013

To collect data to monitor progress and to provide evidence for further investment and implementation of national malaria strategy by collecting information on the coverage of malaria indicators and the prevalence of malaria infection measuring-ring the difference between this MIS and the MIS 2008.

1.4.1 Specific objectives:

1. To examine the status of (ITN, ACT, and IEC) coverage and use among households and household members of all ages in Somalia
2. To assess the treatment seeking patterns for fever/malaria treatment in Somalia
3. To measure the prevalence of malaria parasite (*P. falciparum and P. vivax*) in all age groups using rapid diagnostic tests (RDTs) and microscopy.
4. To measure the prevalence of malaria parasite infections using Polymerase Chain Reaction (PCR) and antibodies using Enzyme-Linked Immunosorbent Assay (ELISA) from the blood sample collected among a sub-sample of the population in areas of generally very low transmission
5. To build capacity of the NMCP and its partners in the implementation of MIS.
6. To use the infection or serological prevalence data to improve the precision of malaria stratification in the country
7. To assess Knowledge Attitude and Practice (KAP) related to Malaria
8. To provide strategic orientation of malaria control programmes using the results of the MIS.

1.5 Methodology

The survey covered all three zones in Somalia and targeted a nationally and zonally representative sample of households to provide precise estimates of core malaria control indicators at the national and zonal and region levels and for urban and rural populations.

1.5.1 Sample size estimation and sample selection

To estimate the actual number of survey households and clusters (villages) to be visited, recent information on prevalence of key indicators and population distribution are required. The selected key indicator for sampling was the '*proportion of pregnant women who slept under an ITN the night before survey*' was used. The estimate for this indicator was obtained from MICs 2011, which was undertaken in Somaliland (20) and Puntland (21). Although such data was not available for South Central zone, estimated use of ITNs among pregnant women is likely to be higher than that of northern zones owing

to the large scale up of ITNs in this zone. Population distribution data, particularly the proportion of the population who are likely to be pregnant and the average household size were also obtained from the MICs survey.

1.5.1.1 Multi-stage probability sampling

A traditional multi-stage cluster sample survey design proceeds by an initial random selection of population clusters (weighted by population where appropriate) and the subsequent random selection of households within each sampled cluster. Decisions on the sample size (the number of clusters, and households within each cluster, to sample) are generally based on a desired level of precision in indicator summary estimates, generally at a prescribed level of spatial aggregation defined by administrative units. Stratifications, such as between urban and rural areas, can also be introduced to ensure areas with known distinct characteristics are captured.

The sampling approach for the Somalia MIS 2013 had two stages. In the first stage, the traditional household cluster sample design (equation 1) was used to define the overall sample size as follows:

$$n = [4\,(r)\,(1 - r)\,(f)\,(1.1)] / [(e*r)^2\,(p)\,(n_h)] \quad \text{.....equation 1}$$

where

n = the required sample size for the KEY indicator,
4 = a factor to achieve the 95 percent level of confidence,
r = the predicted or anticipated prevalence (coverage rate) for the key indicator, in this case the proportion of children under 5 years of age sleeping under ITN the night before survey which was estimated about 25%, almost.
1.2 = the factor necessary to raise the sample size by 10 percent for non-response,
f = the design effect *(deff)*, 2.0 was selected for the purposes of this survey
e = the margin of error to be tolerated (0.12 as advised in the MIS sampling manual)
p = the proportion of the total population that the smallest group comprises (4% of the population were pregnant according to MICS 2011)
n_h = the average household size (this was about 6.4 from the MICs 2011)

Based on this sampling approach, a total of 5,371 households was estimated to provide precise estimates of the key indicator at the national and regional levels and for urban and rural populations. Rounded off to 5,400 households and at an average of 20 households per cluster, therefore, 270 clusters were selected for the 2013 MIS in Somalia. These clusters were then allocated into urban and rural categories proportionately within each zone. Once the clusters were classified into urban (settlements with >6000 people) and rural, a list of regions provided by the NMCP was used to randomly select clusters using probability proportional to size method.

1.5.2 Survey planning

Preparation for survey began in October 2013. Activities scheduled during this period included the drafting of the survey protocol and meetings by the NMCP and partners to harness focus towards survey activities; development of tools; identification of field workers and budgeting. A training of the trainers was undertaken from October 21st 2013 for a week in Kampala, Uganda.

1.5.2.1 Questionnaires

The development of the survey questionnaires and manuals began in September 2013. Three survey questionnaires were developed first in English and then translated to Somali. These questionnaires were the household questionnaire (Annex 1A); the household member's questionnaire (Annex 1B) and the birth history questionnaire (Annex 1C).

The household questionnaire was used to list all usual members and visitors of the selected households. For each household member the following data were collected: age, sex, education, and relationship to the head of the household. The household questionnaire was also used to collect data on household head's education level and household assets to assess household socio-economic status. Information on the household ownership of mosquito nets and their use by household members, household exposure to indoor insecticide spraying (IRS) and information-education-communication (IEC) activities were collected. Household coordinates were recorded using Global Positioning Systems (GPS).

The household members' questionnaire recorded information on all consenting household members including whether individual had fever in the last 14 days and whether they sought treatment for the fever in that time; sources of treatment and drugs used. Exposure to IEC through the COMBI strategy was asked of all individuals 12 years or more. Temperatures measured to ascertain fever at the time of interview. This was followed by a section detailing recent travel history and net use while travelling and the final section recorded information on malaria infection status for each assenting individual who was examined for parasitaemia first using RDTs; thick and thin blood smears. Individuals who tested positive for parasite infection using the RDT test were treated with nationally recommended antimalarial drugs. Likely severe malaria cases or individuals assessed by health worker to need additional medical attention were immediately be referred to the nearest health facility.

The birth history questionnaire was administered to women between the ages of 15 and 44 years to capture information on pregnancy, access to delivery, parity and birth history.

1.5.3 Training and Pre-test activities

Survey teams were selected for each region by the malaria control programs in each zone. Interviewers were required to speak, read and write in both English and Somali. Training of trainers (TOT) for the survey was undertaken with the supervision of the international consultant in last week of October 2013 in Kampala. These ToTs comprised the Directors of the NMCPs from the three zones, the HMIS and laboratory focal persons, the WHO and UNICEF focal persons. The ToTs then ensured that field workers were able to undertake all aspects of survey implementation and to ensure the quality of data collected. Methods of training included interactive lectures, discussion, tests and quizzes and role-play as well as practice. Questionnaires were pre-tested and necessary adjustments were made before using them in the study. Training assessment was undertaken on general interviewing skills, administration of consent forms, filling of questionnaires, collection of blood samples and the appropriate treatment of individuals found positive for malaria. Training of field workers took place in Central South in Mogadishu during 18-23 January 2014, in Puntland at Garowe from 21-26 December 2013 and in Somaliland at Hargeisa from 15-20 January 2014.

1.5.4 Composition of survey management and field team

Overall, the survey management team was composed of an international consultant; a international survey liaison officer; a national data manager; 3 national managers; 6 national coordinators (3 lab focal

persons and 3 HMISM&E focal persons from the zones); regional coordinators and 27field team supervisors of 4 interviewers each.

The role of the international consultant was, in collaboration with international survey liaison, data manager ad 3 national managers, responsible for general survey oversight; developing a scientifically sound survey protocol; design of the survey sample; developing survey tools; field manuals; budget; electronic data entry forms; coordinating training to trainers of trainees; undertaking data cleaning and analysis and writing of survey report. The national managers worked closely with the other team members to achieve the survey objectives.

The national managers were made up of NMCP managers from the zones or their approved replacements and assisted the consultants in all aspects of survey preparation and management; were in charge of the actual survey implementation; management of survey budget; hiring of survey teams; procurement of survey materials; storage of survey questionnaires and samples; management of data entry; and participated in the data analysis and report writing. The national coordinators were primarily responsible for the dissemination of survey results.

The national survey coordinators were selected at the national level to act as trainers of the survey field teams and in-charge of day-to-day management of the survey for a set of regions. They also acted as the bridge between the field teams and the national level management team. They were responsible for daily checking of questionnaires and proper storage of survey materials; briefing of survey teams each day prior to start of survey and ensured appropriate inventory and registration of survey questionnaires; RDTs and slides before they handed over to the relevant teams for analysis and provide daily feedback to survey team.

Each field team consisted of 3 persons comprising 1 interviewer; 1 laboratory technician and 1 team supervisor. Survey teams visited a selected cluster a day to complete interviews of sampled households. The team supervisor ensured that all survey procedures were followed and field teams conducted household interviews appropriately. The supervisor checked that all questionnaires had been correctly coded and filled before departing the cluster. The supervisor was responsible for ensuring that callbacks are attended to. He/she was also responsible for handing over the questionnaires and other survey materials to the regional supervisors. The field team and regional supervisors and the national coordinators and managers maintained a complete registry of these materials.

1.5.5 Parasite prevalence

All consenting individuals were tested first using RDT (SD Bioline, Standard Diagnostics Inc., South Korea). All RDT positive cases detected during the household survey were treated with the recommended first line treatment. Using the same finger prick thick and thin blood smear were prepared for all sampled individuals. The smears were stained in 4 Giemsa solution for 30 minutes and labeled slides transported to each Region headquarters. Thick blood films were read using a light microscope with x 100 oil-immersion lens and x 10 eyepiece. One hundred high power fields were examined before a slide was considered negative. Two independent microscopists read the slides and any discrepancies were further reviewed by a third independent expert parasitologist. The first reading of the slides were undertaken at the Region by qualified microscopists and were transported to the national headquarters for a second and third reading by a selected set of independent expert microscopists.

1.5.6 PCR and ELISA

Under low transmission settings, PCR have a higher sensitivity in detecting malaria infections than both RDTs and microscopy [Okell et al 2009]. In addition the main advantage of using serological parameters examined using ELISA techniques over direct parasite measurement is that antibodies can persist for months or years after infection, thus providing a more robust measure of parasite exposure where there are short-term variations in transmission. Antimalarial antibodies persist much longer than individual malaria infections or infected mosquitoes and thus seroprevalence rates can provide a reliable tool for assessing malaria endemicity. Antibodies targeting proteins specific to pre-erythrocytic stages, such as the circumsporozoite protein (anti-CSP), or proteins specific to blood stages, such as merozoite surface protein 1 (anti-MSP1) have been used in epidemiological studies [Ramasamy et al., 1994; Webster et al., 1992; Druilhe et al., 1986; Drakeley et al., 2005] and improvements made by the inclusion of highly immunogenic AMA-1 in assays [Corran et al., 2007; 2008]. Using species specific recombinant antigens allows independent assessment of transmission of both *P. falciparum* and *P. vivax.*

Sero-prevalence sampling was undertaken among all individuals in each fifth sampled household. All children below six months were excluded. Blood spots were collected onto pre-prepared filter paper (Whatman no 1, Whatman 3MM; Whatman, Maidstone, UK) in volumes from 1 µl to 45 µl as per established protocols and careful pre-survey training (Corran et al., 2008). Spots were allowed to dry at ambient temperature and relative humidity overnight and labeled with the individuals Region-Cluster-ID number on the covering cardboard. Each household's filter papers were stored in individual self-sealing plastic bags (25cm x 25cm approximately). These bags were then shipped in tupperware boxes with silica gel sachets labeled for each survey cluster to a refrigerated storage (2-8^{o}C). The ELISA assays on each sample would be performed with technical assistance from WHO-EMRO.

1.5.7 Field work and quality control

The survey fieldwork began and ended in Central South from 27 January to 14 February 2014, in Puntland from 28 December 2013 to 14 January 2014 and in Somaliland from 17 March to 4 April 2014. Each survey team visited a cluster per day. At the end of each survey day, all questionnaires, RDTs and blood slides were submitted to the regional supervisors or their representative for review and storage. The regional supervisors reviewed the survey team's daily submissions and suggested corrections where necessary. The NMCP national managers and coordinators also visited the regions to observe overall survey process. At the end of every week, the regional supervisors submitted completed questionnaires, slides and filter papers to the NMCP national offices where a central data entry system was established. For some of the large and sparsely populated regions extra survey days were allocated as necessary. Due to inaccessibility of some of the originally sampled clusters several were replaced during survey. The whole of Middle Juba region was excluded form survey due to insecurity.

To minimize the inconvenience and pain caused during the collection blood samples, only a single finger prick were used for the collection of the different blood samples during malaria testing. The first drop was wiped off from the finger using a swab dipped in methylated spirit, the second drop was applied to the RDT; the third sets of drops were used to prepare a thick and thin blood films and the fourth set was collected on filter papers. All leftover materials used for the collection of blood samples, such as lancets and swabs were carried from the household in a special biohazard box and appropriately disposed of at the end of the survey day.

1.5.8 Data entry and analysis

Trained data entry personnel were used to capture information from the survey questionnaires using customized data entry screens developed in Microsoft Access 2007. Once entered data were checked

for consistencies by the data manager and necessary corrections were made. The results of the blood slides were recorded in customized forms with members ID. Data entry was undertaken for a period of 2-3 weeks in all the zones.

1.5.9 Ethical considerations & ethical review

Initially, the research protocol was reviewed and approved by Institutional Review Board of the Ministries of Health in each zone. Later on administrative approval was sought from local authority in each region. Finally, the purpose of the study was explained to potential study participants and written informed consent was taken from them. Strict aseptic precautions were followed to collect blood specimen to obviate the risk of infection to both participants and laboratory technicians. Confidentiality of the collected information has been maintained through all phases of the study. All specimens have a unique identifier to match the databases following sample analysis but no names or other identifiers. All malaria positive cases were referred to nearest health facility to be treated. Pregnant women with fever (axillary temperature ≥ 99.5^{o}F) and clinical signs suggestive of malaria were referred to the region hospital or MCH clinics for confirmation of diagnosis and treatment. Cases of fever among which malaria is not observed were referred to the nearest health facility for further investigation and management. All referred cases were given a “referral note” stating the reason for referral.

CHAPTER 2: CHARACTERISTICS OF HOUSEHOLDS AND RESPONDENTS

This chapter presents the findings on the household population, including demographic and socioeconomic characteristics and information on household facilities and assets that have been used in defining household socioeconomic status in subsequent chapters. For the purpose of this survey, a household was defined as a person or group of persons, related or not, living together in the same dwelling unit, under one household head, sharing a common source of food. The household questionnaire collected basic demographic and socio-economic characteristics for each person who spent the night preceding the survey in the sampled household, including usual residents and visitors, as well as information on their household characteristics. The survey enumerated all de jure (persons usually resident in the selected households) and de facto (populations' resident on the night prior to survey). The difference between these two populations is small and unless otherwise specified all tables in this chapter refer to the de facto population.

2.1 Household population and education of household head

Table 2.1 presents the distribution of the surveyed household population by age group, sex and residence. A total of 20,114 individuals were enumerated with slightly more female (52.0%) than male members (48.0%), 42% urban and 58% rural. The whole of Middle Juba region was excluded from the survey as it was under the occupation of Al Shabaab militia and therefore inaccessible to the field team.

The national mean household size was 3.9 persons with the mean marginally higher in urban areas (4.1) relative to rural areas (3.8) (Table 2.2). The mean household size was 4.0 persons in Central South Zone, 3.7 persons in Puntland and 3.6 persons in Somaliland. These findings differ from those of the MICS 2006 where average household size was 5.7 persons. Out of the 17 regions in which the survey was undertaken, nine had reported a difference between the percentage of male and female respondents of >5%. In six of these regions, there were more female than male with the difference in male to female exceeding 10% in Banadir, Middle Shabelle, Nugaal and Togdheer.

Not only was there a major difference in the male and female proportion in more than half of the regions, but also overall the population pyramid appeared unbalanced across several age groups. These were the age ranges 15-29 years where the difference between the percentage male to female was 16% to 28%. Big differences by sex were also present in the age groups 50 to 54 years, and greater than 60 years (Table 2.1 and Figure 2.1).

These differences are a reflection of an unbalanced sample which occurred due to uncertainty in the sampling frame that was used, unsupervised replacement of clusters in the field due to poor access and insecurity and poor follow up of male household members, particularly men of the working age group, who may have been out of the house at the time of survey. For these reasons, survey results throughout the report must be interpreted with caution and where possible results by national, urban and rural ad zone only should be used.

Table 2.1 Household population

Percentage distribution of de facto household population by sex by residence, age, zone and region, Republic of Somalia MIS 2014

	Male	Female	Total household members
Residence			
Urban	46.9	53.1	7970
Rural	48.8	51.2	12134
Age group			
0_4	51.6	48.4	3849
5_9	50.1	49.9	3081
10_14	48.3	51.7	2152
15_19	36.2	63.8	1594
20_24	38.4	61.6	1877
25_29	42.2	57.8	2025
30_34	52.6	47.4	1460
35_39	51.4	48.6	957
40_44	66.4	33.6	766
45_49	59.6	40.4	461
50_54	37.4	62.6	735
55_59	51.4	48.6	292
60_64	55.3	44.7	347
65_70	55.8	44.2	156
70_74	51.7	48.3	145
75_79	59.6	40.4	47
80_84	51.2	48.8	43
85+	57.1	42.9	28
Region			
Awdal	54.6	45.4	1020
Bakool	57.1	42.9	643
Banadir	41.8	58.2	1125
Bari	50.5	49.5	1183
Bay	48.4	51.6	1730
Galgadud	54.0	46.0	729
Gedo	47.4	52.6	894
Hiraan	46.2	53.8	931
Lower Juba	51.6	48.4	1047
Middle Juba*	-	-	-
Lower Shabelle	49.5	50.5	3225
Middle Shabelle	44.3	55.7	2050
Mudug	48.9	51.1	786
Nugaal	44.8	55.2	299
Sanaag	48.7	51.3	713
Sool	45.3	54.7	413
Togdheer	37.1	62.9	856
WooqoyiGalbeed	47.3	52.7	2460
Zone			
Central South	48.2	51.8	12374
Puntland	49.5	50.5	2685
Somaliland	46.7	53.3	5045
Total	**48.0**	**52.0**	**20104**

*The whole of Middle Juba region was inaccessible due to insecurity

Table 2.2 population distribution by household size
Mean distribution of de facto household population by household size, residence, and region, Republic of Somalia MIS 2014

	Mean household size
Residence	
Urban	4.1
Rural	3.8
Zone	
Central South	4.0
Puntland	3.7
Somaliland	3.6
Region	
Awdal	4.6
Bakool	3.1
Banadir	4.5
Bari	4.2
Bay	3.9
Galgadud	5.2
Gedo	3.6
Hiraan	3.1
Lower Juba	3.5
Lower Shabelle	4.3
Middle Shabelle	4.3
Mudug	3.3
Nugaal	3.0
Sanaag	3.2
Sool	3.4
Togdheer	2.9
Wooqoyi Galbeed	3.8
Total	**3.9**

Figure 2.1 Percent distribution of the household population by five-year age groups, according to gender, Somalia Malaria Indicator Survey 2014.

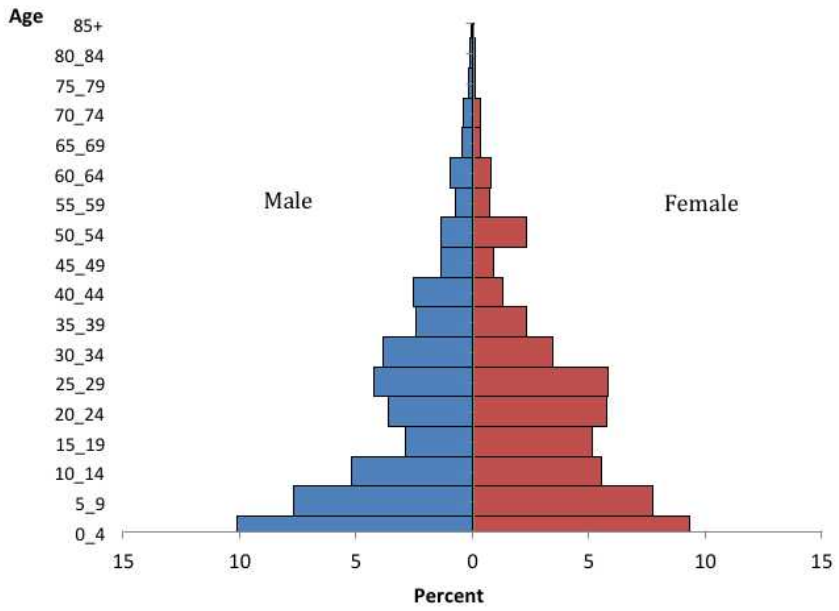


Table 2.3 summarizes the educational level of the household heads. 48% of household heads had never been to school and 24% attended a madrasa or Koranic school. About 12.5% had incomplete primary school education and 7.2% had complete primary school education. Less than 10% of the sampled household heads had secondary education or above. Lack of formal education was much higher among women relative to male household heads. The percentage of people who have never been to school was highest in Somaliland compared to the other zones.

Table 2.3 Household head education by sex of household head, residence, region and zone, Republic of Somalia MIS 2014

	Never been to school	Madrasa and or Koranic school	Primary incomplete	Primary complete	Secondary incomplete	Secondary complete	Diploma and/or Degree	Total
Residence								
Urban	45.2	19.6	11.9	9.9	4.9	5.8	2.6	1975
Rural	49.7	27.0	12.9	5.6	2.1	2.2	0.6	3245
Household head sex								
Male	37.4	28.3	15.1	8.5	3.8	4.9	2.1	3115
Female	63.8	18.2	8.6	5.3	2.1	1.5	0.4	2105
Region								
Awdal	73.6	5.9	3.2	2.7	2.3	3.6	8.6	220
Bakool	6.8	36.6	47.3	5.9	1.0	2.4	0.0	205
Banadir	58.1	13.3	9.3	7.7	6.0	3.6	2.0	248
Bari	34.5	38.1	9.3	8.2	5.3	4.6	0.0	281
Bay	21.0	35.9	11.3	11.7	7.7	8.1	4.3	443
Galgadud	65.7	22.1	5.7	1.4	2.9	2.1	0.0	140
Gedo	30.9	43.4	17.7	4.4	2.0	1.2	0.4	249
Hiraan	37.3	43.7	12.7	3.3	1.3	1.7	0.0	300
Lower Juba	13.4	31.9	25.2	17.4	4.4	5.0	2.7	298
Lower Shabelle	52.6	24.7	11.0	8.1	2.2	1.5	0.0	744
Middle Shabelle	67.6	26.1	3.0	0.2	0.6	2.5	0.0	472
Mudug	48.8	28.3	4.2	9.6	3.8	4.6	0.8	240
Nugaal	35.0	14.0	14.0	16.0	7.0	10.0	4.0	100
Sanaag	67.3	14.1	7.3	6.4	0.5	4.1	0.5	220
Sool	63.3	10.0	16.7	5.8	1.7	0.8	1.7	120
Togdheer	65.7	9.3	11.0	8.3	3.3	1.7	0.7	300
Wooqoyi Galbeed	61.4	8.1	14.8	6.9	3.0	4.4	1.4	640
Zone								
Central South	41.4	30.3	13.9	7.1	3.1	3.2	1.1	3099
Puntland	40.2	30.9	8.2	9.6	4.7	5.5	0.8	721
Somaliland	66.8	7.3	11.6	6.4	2.4	3.2	2.4	1400
Total	**48.0**	**24.2**	**12.5**	**7.2**	**3.1**	**3.5**	**1.4**	**5220**

2.2 Household characteristics

2.2.1 Drinking water and sanitation

Table 2.4 shows the percent distribution of households by source of drinking water stratified by residence, region and zone. About 68% of the population (81% urban and 61% rural) had access to improved water sources (pied water, protected well or rain harvests). Banadir, Bakool and Galgaduud had the highest levels of access to improved water sources of greater than 90% of households.

Table 2.4 Household source of drinking water

Percent distribution of households by source of drinking water, and sanitation, according to urban-rural residence, and by Regions, Republic of Somalia MIS 2014

	Improved source					Non-Improved source						Number of households
	piped dwelling	piped nearby	protected well	Rain	Total	Unprotected rain/dam	Tanker	River	Bottled	Dug well	Total	
Residence												
Urban	32	21.5	12.5	14.6	80.6	1.7	5	1.7	8.5	2.7	19.6	1975
Rural	12.2	13	21.8	13.7	60.7	4.9	15.6	3.2	11.6	4.1	39.4	3245
Zone												
Central South	24.5	20.4	17.6	11.1	73.6	3.3	14.2	4.3	0.6	4.1	26.5	3099
Puntland	18.9	1.7	2.4	20.2	43.2	1.4	11.9	0	42	1.5	56.8	721
Somaliland	9.5	14.5	28	17.2	69.2	5.8	5.5	0.3	15.9	3.4	30.9	1400
Region												
Awdal	18.6	7.3	6.4	17.7	50	29.5	10.5	0	6.4	3.6	50	220
Bakool	18	12.2	61.5	1.5	93.2	0	0	0	0	6.8	6.8	205
Banadir	58.5	16.9	17.3	2.4	95.1	0.8	0	0	0	4	4.8	248
Bari	18.9	0	0	14.6	33.5	0.4	18.1	0	45.6	2.5	66.6	281
Bay	40.2	34.5	8.1	1.1	83.9	2	11.1	0.2	0.2	2.5	16	443
Galgadud	57.1	18.6	0	14.3	90.1	0	0	0	0	10	10	140
Gedo	3.6	34.1	6	26.1	69.8	5.2	22.1	1.6	0.4	0.8	30.1	249
Hiraan	3	18.3	8	14	43.3	0.7	43	12	0	1	56.7	300
Lower Juba	8.4	22.5	33.6	3.7	68.2	3	13.8	8.7	4.7	1.7	31.9	298
Lower Shabelle	27.4	13	19	12.9	72.3	3.6	11.8	5.8	0	6.5	27.7	744
Middle Shabelle	15	17.4	12.5	20.3	65.2	8.5	16.7	4.7	0.4	4.4	34.7	472
Mudug	29.6	4.6	4.2	23.3	61.7	3.8	6.7	0	27.5	0.4	38.4	240
Nugaal	3	0	1	31	35	0	11	0	52	2	65	100
Sanaag	10.9	0.5	53.6	5	70	1.8	0	0	25.9	2.3	30	220
Sool	0.8	0.8	30	10.8	42.4	0	6.7	0.8	48.3	1.7	57.5	120
Togdheer	10.7	14.7	30.3	12	67.7	2.7	1.7	1	25	2	32.4	300
Woqooyi Galbeed	6.9	22.2	21.7	25	75.8	0.6	7.7	0	11.7	4.2	24.2	640
Total	**19.7**	**16.2**	**18.3**	**14**	**68.2**	**3.7**	**11.6**	**2.6**	**10.4**	**3.6**	**31.8**	**5220**

About 68% of the surveyed households had access to either a flush toilet (3.4%) or a pit latrine (64.3%) (Table 2.5). Banadir, Bakool and Galgaduud reported >90% access to improved toilet facilities. By zone, Puntland had the highest number of household with access to improved toilet facilities (83%) compared to Central South (67%) and Somaliland (61%).

Table 2.5 Household sanitation

Percent distribution of households by source of sanitation, according to urban-rural residence, and by Regions, Republic of Somalia MIS 2014

	Improved facilities			Non-Improved facilities			
	Flush	Pit latrine	**Total**	Trench	Bush	**Total**	Total number of

	toilet						Households
Residence							
Urban	5.5	82.0	87.5	4.4	8.1	12.5	1975
Rural	2.0	53.5	55.5	8.9	35.6	44.5	3245
Zone							
Central South	4.5	62.8	67.2	10.8	22.4	29.4	3099
Puntland	3.3	79.3	82.7	1.5	16.9	17.6	721
Somaliland	0.9	59.9	60.8	2.1	37.2	35.1	1400
Region							
Awdal	3.2	50.0	53.2	2.7	44.1	46.8	220
Bakool	0.5	96.1	96.6	0.5	2.9	3.4	205
Banadir	13.3	77.4	90.7	6.5	3.6	10.1	248
Bari	0.7	71.5	72.2	2.5	27.0	29.5	281
Bay	2.3	78.3	80.6	5.6	14.0	19.6	443
Galgadud	3.6	92.1	95.7	1.4	3.6	5	140
Gedo	0.8	73.1	73.9	12.4	14.1	26.5	249
Hiraan	0.3	30.0	30.3	19.0	50.7	69.7	300
Lower Juba	9.7	69.1	78.9	17.4	3.7	21.1	298
Lower Shabelle	5.9	49.9	55.8	15.9	29.0	44.9	744
Middle Shabelle	2.8	49.2	51.9	7.0	41.7	48.7	472
Mudug	7.5	76.3	83.8	0.4	16.7	17.1	240
Nugaal	2.0	96.0	98.0	2.0	0.0	2	100
Sanaag	0.9	42.7	43.6	0.9	55.9	56.8	220
Sool	0.0	89.2	89.2	0.8	10.0	10.8	120
Togdheer	1.0	62.0	63.0	6.7	31.0	37.7	300
Woqooyi Galbeed	0.5	67.7	68.1	0.3	31.6	31.9	640
Total	**3.4**	**64.3**	**67.6**	**7.2**	**25.6**	**36.5**	**5220**

2.3 Construction of household Wealth quintile from household assets

Using the household asset and other indicators described in section 2.2.2-2.2.4, principal component analysis (PCA), which is a data reduction technique, was used to construct weights for each indicator. These weights represented the importance and direction of each selected indicator's contribution to household wealth. The weights were then applied to each household to compute a composite Wealth quintile, which was then used to rank households from the wealthiest (5) to the poorest (1) wealth quintiles.

2.2.3 Household access to electricity and possession of durables

Table 2.6 Household possession of durable goods

Percent distribution of households by type of durable goods and means of transportation according to urban-rural residence, zones and regions, Republic of Somalia MIS 2014

	Electricity	Radio	Television	Telephone	Refrigerator	Total Number of households
Residence						
Urban	48.8	51.8	30.2	46.2	5.9	1975
Rural	17.3	42.8	8.2	45.6	1.1	3245
Region						
Bakool	44.4	69.8	44.9	54.1	2.0	205
Banadir	69.4	65.3	35.1	28.6	8.9	248
Bay	50.6	71.1	25.1	68.2	1.6	443
Galgadud	30.0	44.3	3.6	19.3	2.9	140
Gedo	15.7	39.4	6.8	55.0	1.2	249
Hiraan	6.3	10.7	6.7	52.3	3.7	300
Lower Juba	52.3	70.5	29.2	53.0	4.7	298
Lower Shabelle	28.0	44.9	12.2	47.3	1.5	744
Middle Shabelle	6.8	48.7	5.7	48.9	0.8	472
Bari	23.8	55.2	17.4	65.5	1.4	281
Mudug	35.4	83.3	25.0	77.9	0.8	240
Nugaal	67.0	77.0	23.0	79.0	0.0	100
Sanaag	51.7	65.0	21.7	68.3	5.0	220
Sool	23.8	10.0	5.0	6.3	2.5	120
Awdal	34.1	51.8	22.7	36.8	7.7	220
Togdheer	30.3	32.0	20.3	43.3	10.7	300
Wooqoi Galbeed	13.9	21.7	9.8	21.6	1.9	640
Zone						
Central South	31.7	51.2	17.3	49.9	2.6	3099
Puntland	34.8	65.6	20.1	68.1	1.2	721
Somaliland	20.7	25.4	12.9	25.4	4.5	1400
Total	**29.2**	**46.2**	**16.5**	**45.8**	**2.9**	**5220**

2.2.4 Household mode of transport

Table 2.7 Household means of transportation

Percent distribution of households by type of durable goods and means of transportation according to urban-rural residence, zones and regions, Republic of Somalia MIS 2014

	Bicycle	Car/Truck	Donkey/Camel/Horse cart	Total Number of Households
Residence				
Urban	1.6	4.0	5.6	1975
Rural	1.0	1.6	10.1	3245
Region				
Bakool	1.5	2.4	6.3	205
Banadir	2.0	2.0	2.4	248
Bay	2.5	6.8	13.1	443
Galgadud	1.4	1.4	10.0	140
Gedo	1.2	2.8	20.1	249
Hiraan	0.0	0.0	13.3	300
Lower Juba	5.0	8.4	12.4	298
Lower Shabelle	0.9	0.9	5.9	744
Middle Shabelle	3.0	1.5	16.7	472
Bari	0.4	0.7	2.5	281
Mudug	0.0	3.8	13.3	240

Nugaal	1.0	1.0	1.0	100
Sanaag	0.0	5.0	0.6	220
Awdal	0.5	5.9	7.7	220
Sool	1.3	1.3	6.8	120
Togdheer	0.0	2.3	1.3	300
Wooqoi Galbeed	0.2	0.9	4.5	640
Zone				
Central South	1.9	2.8	11.0	3099
Puntland	0.3	2.1	5.8	721
Somaliland	0.2	1.9	3.7	1400
Total	**1.2**	**2.5**	**8.3**	**5220**

CHAPTER 3: COVERAGE OF KEY MALARIA INTERVENTIONS

3.1 Household ownership of mosquito nets

The national goal for insecticide treated nets (ITNs) distribution is to have universal coverage in targeted regions in Puntland and Somaliland and all of Central South zone. In order to achieve high coverage various delivery methods have been adopted. These include mass distribution campaign, and distribution to focal vulnerable groups such as refugees.

Table 3.1 Household ownership of mosquito nets

Percent of household ownership of any nets; an insecticide-treated nets (ITN) ; and long lasting insecticidal nets (LLINs), by residence, regions, zone and wealth quintile, Republic of Somalia MIS 2014

	Any Net		LLIN		
	with at least one net	Average number of nets per household	with at least one net	with at least two nets	Average number of nets per household
Residence					
Urban	30.4	0.71	20.2	13.3	0.46
Rural	25.1	0.51	18.4	12.0	0.34
Region					
Awdal	21.4	0.71	18.2	15.5	0.61
Bakool	0.0	0.00	0.0	0.0	0.00
Banadir	12.1	0.24	5.2	1.2	0.08
Bari	8.2	0.12	0.7	0.4	0.01
Bay	25.5	0.73	9.9	7.7	0.26
Galgadud	13.6	0.23	6.4	2.1	0.09
Gedo	36.5	0.86	25.7	18.9	0.59
Hiraan	47.0	0.80	38.3	26.3	0.66
Lower Juba	43.0	0.88	17.1	10.1	0.34
Lower Shabelle	25.0	0.46	24.1	15.3	0.44
Middle Shabelle	16.3	0.30	10.6	4.4	0.17
Mudug	45.8	0.93	19.6	12.5	0.36
Nugaal	4.0	0.06	0.0	0.0	0.00
Sanaag	16.4	0.45	12.7	9.5	0.22
Sool	34.2	0.81	20.0	13.3	0.38
Togdheer	43.7	1.03	36.7	24.3	0.76
Wooqoi Galbeed	37.0	0.81	34.4	22.8	0.73
Zone					
Central South	25.3	0.52	16.9	10.7	0.32
Puntland	20.2	0.38	7.2	4.3	0.13
Somaliland	34.5	0.83	29.9	20.7	0.66
Wealth quintile					
Highest	29.1	0.52	24.4	14.1	0.41
Fourth	22.2	0.42	17.2	10.6	0.31
Middle	26.0	0.54	17.6	12.6	0.35
Fourth	28.6	0.66	19.4	13.1	0.42
Last	29.5	0.78	16.8	12.0	0.43
Total	**27.1**	**0.58**	**19.1**	**12.5**	**0.39**

Table 3.1 provides information on the percentage of households that reported owning at least one mosquito net/LLIN and the average number of net/LLIN per household. About 27% of all households owned at least one net, 19% owned at least one LLIN and 12.5% owned at least 2 LLINs. Average numbers of mosquito net and LLINs per household were 0.58 and 0.39 respectively. Ownership of LLINs was highest in Somaliland. Surprisingly all sampled households in Bakool region reported not to own a mosquito net.

When ownership was analyzed based on the percentage of household with at least one LLIN per 1.8 household members, the coverage rate was 8 nationally and highest in Somaliland at 15.5% (Table 3.2).

Table 3.2 Percentage of household with at least one LLIN per1.8 persons of the household members, by residence, regions, zone and wealth quintile, Republic of Somalia MIS 2014

	LLIN	Number of Households
Residence		
Urban	8.6	1975
Rural	8.1	3245
Region		
Awdal	10.9	220
Bakool	0.0	205
Banadir	1.2	248
Bari	0.4	281
Bay	5.9	443
Galgadud	0.7	140
Gedo	16.9	249
Hiraan	16.7	300
Lower Juba	9.4	298
Lower Shabelle	3.8	744
Middle Shabelle	1.5	472
Mudug	12.5	240
Nugaal	0.0	100
Sanaag	8.6	220
Sool	11.7	120
Togdheer	23.0	300
Wooqoi Galbeed	14.2	640
Zone		
Central South	6.0	3099
Puntland	4.3	721
Somaliland	15.5	1400
Wealth quintile		
Highest	9.7	1048
Fourth	6.0	1045
Middle	7.2	1037
Fourth	8.8	1041
Last	9.6	1049
Total	**8.3**	**5220**

3.2 Net conditions and age

Table 3.3 presents information on the condition of nets in the surveyed households. 76.4% of nets observed during the survey had no holes while 17.5% had holes smaller than the size of adult thumb. All the nets observed in Awdal and Nugaal were intact while more than half the nets observed in Gedo had holes and this represented the largest proportion observed across the regions. The condition of nets was generally poorer in Central South where 63% of nets were intact compared to Puntland (73%) and Somaliland (88%).

Table 3.3 The condition of nets
The condition of nets owned by residence, zone and region, Republic of Somalia MIS 2014

	No Holes	Smaller than a thumb	Greater than a thumb but smaller than a fist	Larger than a fist but smaller than a head	Larger than a head	Number of nets
Residence						
Urban	82.2	13.0	3.1	0.9	0.9	1403
Rural	72.7	20.5	5.0	1.3	0.6	1649
Zone						
Central South	62.6	29.0	6.8	0.9	0.6	1610
Puntland	73.0	21.4	4.3	1.4	0.0	274
Somaliland	88.4	7.1	2.2	1.2	1.0	1168
Region						
Awdal	100.0	0.0	0.0	0.0	0.0	157
Bakool						0
Banadir	87.5	6.3	6.3	0.0	0.0	60
Bari	69.4	22.2	5.6	2.8	0.0	34
Bay	70.5	19.9	6.2	0.7	2.7	324
Galgadud	66.7	33.3	0.0	0.0	0.0	32
Gedo	45.2	42.5	9.6	2.7	0.0	214
Hiraan	70.5	25.3	4.2	0.0	0.0	239
Lower Juba	59.4	39.1	1.4	0.0	0.0	261
Lower Shabelle	55.5	34.6	8.4	1.6	0.0	340
Middle Shabelle	77.1	8.6	14.3	0.0	0.0	140
Mudug	73.5	20.8	4.4	1.3	0.0	223
Nugaal	100.0	0.0	0.0	0.0	0.0	6
Sanaag	95.0	5.0	0.0	0.0	0.0	100
Sool	90.7	9.3	0.0	0.0	0.0	97
Togdheer	83.5	10.4	2.9	1.4	1.8	309
Wooqoi Galbeed	89.4	5.7	2.6	1.6	0.8	516
Total	**76.4**	**17.5**	**4.2**	**1.2**	**0.7**	**3052**

Almost all nets were obtained within the last 3 years and were within the life span that they are likely to be effective (Table 3.4). About 47 of nets were between 0-6 months old while 33.4% were between 6-12 months old; 14% were between 1-2 years old; and 2.3% were more than 3 years old. About 3.6% of households did not know the age of nets they owned.

About 49% of nets were obtained from private shops, 42% through campaigns and 6.7% from clinics. All the nets in Banadir and Galgudud were obtained from private shops (Table 3.5). The private sector was the main source of nets across all zones including over 70% of nets in Puntland. However, when only LLINs were considered, almost 64% were obtained through mass campaigns (Table 3.6). Only 7.3% of nets were obtained from clinics with urban residents more likely to obtain their nets from this source compared to rural dwellers. None of the nets owned in Nugaal province were LLIN.

Table 3.4 The age of nets in the household
Age of LLINs owned by households by residence, zone and region, Republic of Somalia MIS 2014

	Don't know	0-6 months	6-12 months	12-36 months	>36 months	Number of nets
Residence						
Urban	4.4	58.9	24.3	10.4	2.0	1403
Rural	3.2	38.5	39.4	16.4	2.5	1649
Zone						
Central South	7.4	26.7	44.0	19.9	2.0	1610
Puntland	3.6	53.0	26.7	16.4	0.4	274
Somaliland	0.7	60.0	27.5	8.6	3.2	1168
Region						
Awdal	0.0	100.0	0.0	0.0	0.0	157
Bakool	0.0	0.0	0.0	0.0	0.0	0.0
Banadir	75.0	18.8	6.3	0.0	0.0	60
Bari	8.3	58.3	27.8	5.6	0.0	34
Bay	11.6	47.9	26.7	13.0	0.7	324
Galgadud	33.3	50.0	8.3	8.3	0.0	32
Gedo	2.7	41.1	56.2	0.0	0.0	214
Hiraan	2.1	24.2	53.7	20.0	0.0	239
Lower Juba	5.8	31.9	52.2	10.1	0.0	261
Lower Shabelle	1.0	1.6	51.3	39.8	6.3	340
Middle Shabelle	11.4	37.1	37.1	14.3	0.0	140
Mudug	3.1	51.3	26.5	18.6	0.4	223
Nugaal	0.0	71.4	0.0	28.6	0.0	6
Sanaag	3.3	85.0	11.7	0.0	0.0	100
Sool	0.0	80.4	12.4	1.0	6.2	97
Togdheer	1.1	33.3	43.7	16.5	5.4	309
Wooqoi Galbeed	0.3	70.0	22.5	5.9	1.3	516
Total	**3.6**	**46.6**	**33.4**	**14.0**	**2.3**	**3052**

Table 3.5 Source of Mosquito nets.
Source of mosquito nets used in the household, by residence, zone and region, Republic of Somalia MIS 2014

	Don't know	Private shop	Clinic	Campaign	Other	Number of nets
Residence						
Urban	1.3	50.4	7.0	39.9	1.3	1403
Rural	1.7	47.4	6.5	43.4	1.0	1649
Zone						
Central South	4.1	41.6	11.9	42.4	0.0	1610
Puntland	0.4	71.9	1.4	26.0	0.4	274
Somaliland	0.0	46.1	4.4	47.3	2.2	1168
Region						
Awdal	0.0	0.0	100.0	0.0	0.0	157
Bakool	0.0	0.0	0.0	0.0	0.0	0.0
Banadir	25.0	75.0	0.0	0.0	0.0	60
Bari	0.0	91.7	5.6	0.0	2.8	34
Bay	9.6	62.3	16.4	11.6	0.0	324
Galgadud	0.0	100.0	0.0	0.0	0.0	32
Gedo	0.0	27.4	13.7	58.9	0.0	214
Hiraan	0.0	47.4	24.2	28.4	0.0	239
Lower Juba	0.0	63.8	4.3	31.9	0.0	261
Lower Shabelle	2.1	10.5	5.8	81.7	0.0	340
Middle Shabelle	11.4	60.0	14.3	14.3	0.0	140
Mudug	0.4	68.1	0.0	31.4	0.0	223
Nugaal	0.0	100.0	0.0	0.0	0.0	6
Sanaag	0.0	85.0	3.3	11.7	0.0	100
Sool	0.0	69.1	8.2	22.7	0.0	97

Togdheer	0.0	64.2	3.9	25.8	6.1	309
Wooqoi Galbeed	0.0	22.0	4.1	73.6	0.3	516
Total	**1.6**	**48.6**	**6.7**	**42.0**	**1.1**	**3052**

Table 3.6 Source of LLINs
Source of LLINs used in the household, by residence, zone and region, Republic of Somalia MIS 2014

	Don't know	Private shop	Clinic	Campaign	Other	Number of LLIN
Residence						
Urban	0.5	25.8	9.5	62.4	1.9	917
Rural	0.9	27.2	6.0	64.8	1.1	1096
Zone						
Central South	2.0	24.9	10.6	62.6	0.0	1000
Puntland	0.0	21.1	3.2	75.8	0.0	94
Somaliland	0.0	28.8	5.8	62.8	2.6	919
Region						
Awdal	0.0	0.0	100.0	0.0	0.0	135
Bakool						
Banadir		100.0				19
Bari	0.0	75.0	25.0	0.0	0.0	4
Bay	4.8	40.5	33.3	21.4	0.0	114
Galgadud	0.0	100.0	0.0	0.0	0.0	13
Gedo	0.0	4.5	4.5	90.9	0.0	147
Hiraan	0.0	33.9	22.0	44.1	0.0	197
Lower Juba	0.0	53.7	5.6	40.7	0.0	102
Lower Shabelle	1.7	9.2	4.6	84.5	0.0	327
Middle Shabelle	15.0	50.0	10.0	25.0	0.0	81
Mudug	0.0	19.5	0.0	80.5	0.0	87
Nugaal						0
Sanaag	0.0	45.5	18.2	36.4	0.0	49
Sool	0.0	6.3	25.0	68.8	0.0	45
Togdheer	0.0	57.1	4.6	31.1	7.1	228
Wooqoi Galbeed	0.0	14.1	4.6	81.0	0.3	465
Total	**0.7**	**26.6**	**7.3**	**63.9**	**1.4**	**2013**

3.3 Use of mosquito bed nets by household members

Table 3.7 shows the percentages of the household population that slept under any mosquito net/LLINs the night before the survey, regardless of availability of nets in households. Overall, 29% of household members slept under any mosquito net the night prior to the survey while 20.1% slept under an LLIN. A higher proportion of household members under the age of 5 years used any net/LLIN compared to the other age groups. The highest proportion of net and LLIN use was recorded in Hiraan (53.3% and 42.3% respectively) with no individual sleeping under a net in Bakool where all households reported not to own a bed net (Figure 3.1).

In households that owned at least one LLIN (Table 3.8), 95.3% of the residents slept under an LLIN. No significant inequalities existed in utilization by wealth although slightly more people in urban areas slept under an LLIN compared to rural areas. Sanaag had the lowest (31.7%) number of people sleeping under an LLIN among households with at least one LLIN relative to other regions.

Table 3.7 General use of mosquito nets by household members (regardless of the availability of mosquito net in their households)

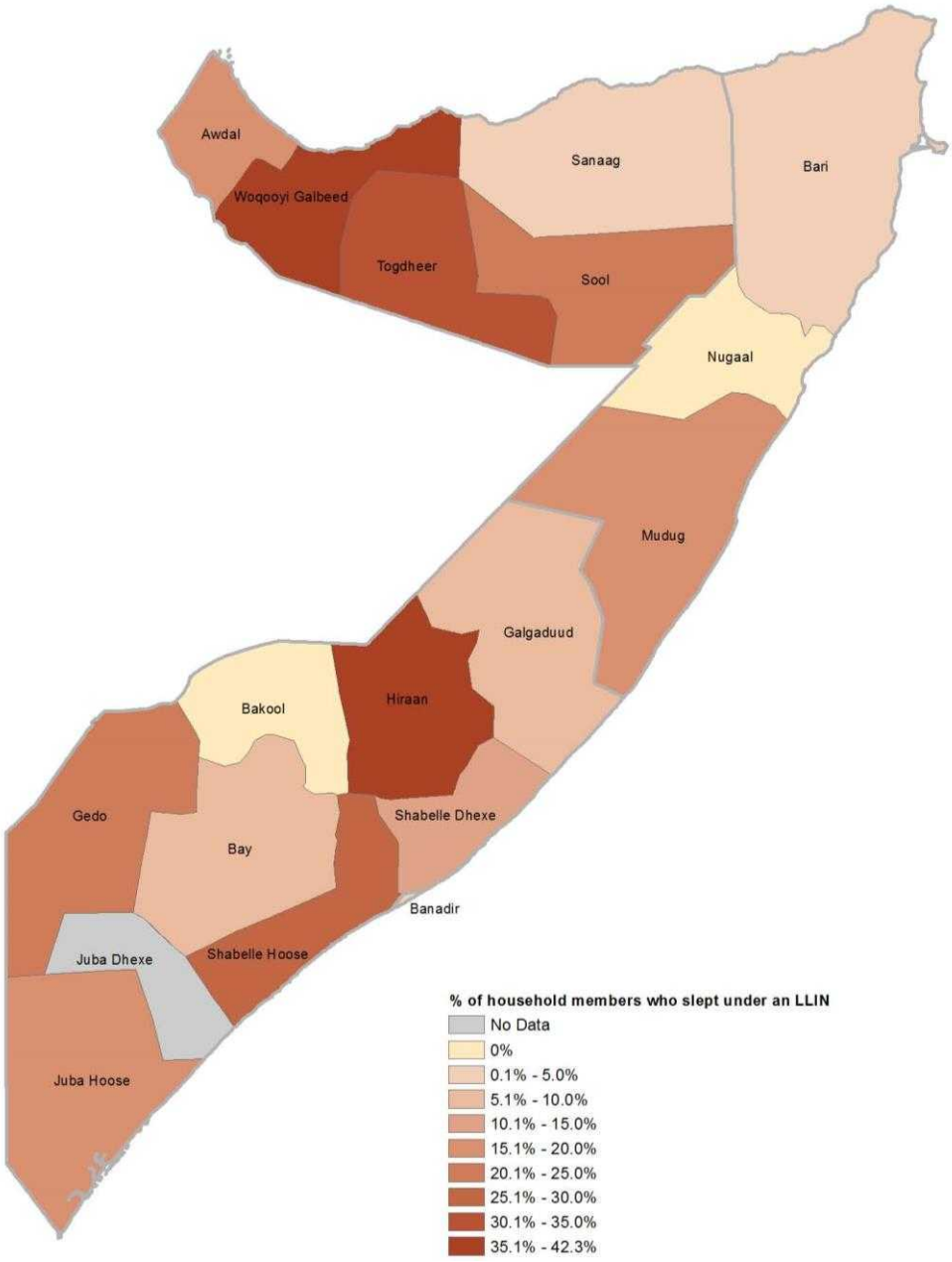
Percentage of the de facto household population who slept under any nets and a long lasting insecticidal nets (LLINs) the night before survey by sex, residence, age group, zone, region and wealth quintile, Republic of Somalia MIS 2014

	Any net	LLIN	Number of Individuals
Sex			
Male	28.7	20.2	7272
Female	28.2	19.4	9170
Residence			
Urban	32.8	23.0	6476
Rural	25.6	17.7	9966
Age group			
0_4	30.7	22.5	3095
5_19	28.5	20.2	5402
20-44	28.2	18.9	6038
45+	25.4	16.6	1907
Zone			
Central South	25.5	17.1	10208
Puntland	22.4	8.1	1442
Somaliland	36.4	28.9	4792
Region			
Awdal	22.1	19.1	982
Bakool	0.0	0.0	615
Banadir	13.6	4.1	993
Bari	8.7	1.3	527
Bay	26.7	9.3	1589
Galgadud	14.0	6.9	537
Gedo	34.7	21.6	685
Hiraan	52.4	41.6	898
Lower Juba	42.9	17.0	524
Lower Shabelle	26.6	25.7	2777
Middle Shabelle	18.9	12.3	1590
Mudug	45.2	18.5	551
Nugaal	3.7	0.0	163
Sanaag	16.3	4.1	515
Sool	40.5	19.7	346
Togdheer	43.7	29.6	830
Woqooyi Galbeed	41.5	37.6	2316
Wealth quintile			
Highest	23.2	15.2	3302
Fourth	28.1	19.3	3376
Middle	28.7	20.6	3159
Fourth	34.6	25.7	3254
Last	27.7	18.2	3351
Total	**28.4**	**19.8**	**16442**
Women pregnant in the last 12 months			
National	**31.5**	**23.0**	**1698**
Urban	37.8	28.4	707
Rural	27.0	19.1	991
Central South	28.8	19.2	982
Puntland	18.0	8.6	139
Somaliland	39.3	32.8	577

Table 3.8 Use of LLINs by household members who slept under a net in households with at least one LLIN, by sex, residence, zone, region, and wealth quintile, Somalia MIS 2014

	LLIN	Number of people in households with at least one LLIN
Sex		
Male	95.6	1506
Female	95.1	1820
Residence		
Urban	96.9	1525
Rural	93.9	1801
Zone		
Central South	98.1	1726
Puntland	100.0	117
Somaliland	91.6	1482
Region		
Awdal	100.0	188
Banadir	97.6	42
Bari	100.0	7
Bay	89.2	166
Galgadud	100.0	37
Gedo	95.2	146
Hiraan	100.0	354
Lower Juba	98.9	90
Lower Shabelle	99.6	708
Middle Shabelle	98.9	183
Mudug	100.0	102
Sanaag	31.7	63
Sool	87.2	78
Togdheer	81.3	294
Woqooyi Galbeed	98.0	867
Wealth quintile		
Highest	91.5	541
Fourth	97.1	653
Middle	96.8	650
Fourth	94.9	859
Last	95.7	622
Total	**95.3**	**3325**

Figure 3.1 The distribution of percentage of people sleeping under an LLIN the night before survey



CHAPTER 4: FEVER AND TREATMENT SEEKING

Of the 16,442 respondents, 20.2% reported to have had fever within the last two weeks (Table 4.1). Fever prevalence was higher in rural areas, in Central South zone and among household members in the poorest quintile. There were no major differences by age or gender. By region, fever prevalence was above the national average in Lower Juba, Lower Shabelle, Middle Shabelle, Hiraan and Bay. Among persons who had fever in the last two weeks, only about 28% took action to treat the fever. Treatment seeking was highest among urban respondents and in Puntland. Interestingly treatment seeking did not vary much by age or wealth quintile and was lowest in several regions with highest fever prevalence.

Among those who sought treatment, less than 50% were treated within 48 hours and only 28% within 24 hours. Prompt treatment seeking was substantially higher among urban residents and those living in Puntland and marginally among the persons in lowest household wealth quintile (Table 4.2).

Majority of urban residents used private clinics for the treatment of fever while among rural dwellers the majority used the public health sector. Public health sector use was highest in Central South and Somaliland and lowest in Puntland (Table 4.3). Travel time to the nearest source of treatment was on average about 30 minutes across most regions and population groups (Table 4.4). Private clinics, Health posts, MCH centers and private hospitals were the most commonly used type of formal health services (Table 4.5).

At about 75%, antipyretics were most commonly prescribed to those who sought treatment for fever (Table 4.6). Only 14.5% of those sought treatment were prescribed antimalarial. Prescription of antimalrials was highest in rural areas, Central South zone and marginally in the poorest households. By region prescription was highest in Nugaal and Bakool regions both of which no use of LLINs among household members.

Among household respondents who were treated with antimalarials, about 59% were treated with AS+SP which is the first line recommended drug for uncomplicated malaria in Somalia (Table 4.7). AS+SP use was highest in rural areas, in Puntland and among the poorest households. SP was the next most commonly used antmalarial although no report of its use was reported in Puntland. Chloroquine use remain at about 8% and mainly in Central South and Somaliland.

4.1 Fever prevalence, diagnosis and treatment

Table 4.1 Prevalence and treatment of fever

Percentage of persons who reported to have had fever the two weeks before and on the day of the survey by sex, residence, age group, region, zone and wealth quintile, Republic of Somalia MIS 2014

	Percentage of persons with fever in the two weeks preceding survey	Of those with fever percentage who took action	Number of persons interviewed
Sex			
Male	20.1	28.1	7272
Female	20.3	27.7	9170
Residence			
Urban	11.2	35.3	6476
Rural	26.1	25.8	9966
Age group			
0_4	19.8	27.0	3095
5_19	20.4	28.4	5402
20-44	21.2	28.3	6038
45+	17.1	26.3	1907
Zone			
Central South	25.0	28.3	10208
Puntland	15.0	31.5	1442
Somaliland	11.7	24.6	4792
Region			
Awdal	11.3	25.2	982
Bakool	16.9	28.8	615
Banadir	6.6	42.4	993
Bari	17.1	25.6	527
Bay	28.6	30.1	1589
Galgadud	10.6	36.8	537
Gedo	16.9	26.7	685
Hiraan	28.3	28.0	898
Lower Juba	34.4	27.8	524
Lower Shabelle	32.8	27.2	2777
Middle Shabelle	25.7	26.0	1590
Mudug	14.2	35.9	551
Nugaal	11.0	38.9	163
Sanaag	15.1	26.9	515
Sool	15.0	32.7	346
Togdheer	13.4	23.4	830
Woqooyi Galbeed	10.3	23.5	2316
Wealth quintile			
Highest	15.7	27.4	3302
Fourth	20.2	28.1	3376
Middle	21.6	29.4	3159
Second	21.4	29.2	3254
Lowest	22.4	25.5	3350
Total	**20.2**	**27.9**	**16442**

Table 4.2 Prompt treatment of fever

The percentage of persons who took action by time action was taken from the start of fever , by sex, residence, age group, zone, region, and wealth quintile, Republic of Somalia MIS 2014

	<24 hrs	24-<48 hrs	48 - <72	>=72 hrs	Total who took action to treat fever
Sex					
Male	27.0	25.5	24.3	23.1	411
Female	29.4	20.9	22.1	27.7	517
Residence					
Urban	57.0	19.1	19.1	4.7	256
Rural	17.4	24.4	24.6	33.6	672
Age group					
0_4	23.5	23.5	25.9	27.1	166
5_19	29.4	24.9	24.3	21.4	313
20-44	28.4	20.7	21.5	29.5	363
45+	33.7	24.4	19.8	22.1	86
Zone					
Central South	28.3	24.2	21.5	26.0	722
Puntland	32.4	10.3	29.4	27.9	68
Somaliland	26.8	22.5	28.3	22.5	138
Region					
Awdal	35.7	14.3	32.1	17.9	28
Bakool	3.3	46.7	23.3	26.7	30
Banadir	57.1	28.6	14.3	0.0	28
Bari	21.7	17.4	30.4	30.4	23
Bay	28.5	25.5	19.0	27.0	137
Galgadud	61.9	9.5	14.3	14.3	21
Gedo	16.1	16.1	41.9	25.8	31
Hiraan	28.2	29.6	12.7	29.6	71
Lower Juba	42.0	18.0	16.0	24.0	50
Lower Shabelle	27.0	25.8	22.2	25.0	248
Middle Shabelle	20.8	16.0	28.3	34.9	106
Mudug	35.7	7.1	25.0	32.1	28
Nugaal	14.3	14.3	42.9	28.6	7
Sanaag	28.6	38.1	23.8	9.5	21
Sool	35.3	11.8	23.5	29.4	17
Togdheer	19.2	19.2	38.5	23.1	26
Woqooyi Galbeed	28.6	21.4	25.0	25.0	56
Wealth quintile					
Highest	25.4	23.9	26.1	24.6	142
Fourth	30.2	24.0	21.4	24.5	192
Middle	25.5	19.5	22.5	32.5	200
Fourth	29.1	29.1	20.7	21.2	203
Last	30.9	18.3	25.7	25.1	191
Total	**28.3**	**23.0**	**23.1**	**25.6**	**928**

4.2 Source of treatment for fever

Table 4.3 Percentage of persons who reported to have had fever the two weeks prior to the survey and took action by source of treatment, by sex, residence, age group, zone, region, and wealth quintile, Republic of Somalia MIS 2014

	Public health facility	Private clinic or hospital	Drug store/Pharmacy	Other (Sheikhs, Herbalists	Self-management	Total who took action to treat fever
Sex						
Male	34.3	27.7	21.9	8.5	7.5	411
Female	31.1	33.3	24.6	5.8	5.2	517
Residence						
Urban	20.3	58.9	20.1	0.4	0.0	256
Rural	37.2	20.1	24.6	9.5	8.6	672
Age group						
0_4	34.9	26.5	21.1	7.2	10.2	166
5_19	32.9	31.3	25.2	6.1	4.5	313
20-44	31.7	33.3	21.5	6.9	6.6	363
45+	30.2	26.7	29.1	10.5	3.5	86
Zone						
Central South	32.1	30.1	23.8	6.9	7.1	722
Puntland	27.9	39.7	23.5	5.9	2.9	68
Somaliland	37.0	30.4	21.0	8.0	3.6	138
Region						
Awdal	25.0	39.3	25.0	7.1	3.6	28
Bakool	30.0	10.0	33.3	13.3	13.3	30
Banadir	17.9	60.7	21.4	0.0	0.0	28
Bari	34.8	21.7	30.4	8.7	4.3	23
Bay	35.8	33.6	18.2	6.6	5.8	137
Galgadud	33.3	47.6	19.0	0.0	0.0	21
Gedo	41.9	25.8	16.1	3.2	12.9	31
Hiraan	23.9	35.2	21.1	8.5	11.3	71
Lower Juba	16.0	32.0	32.0	10.0	10.0	50
Lower Shabelle	37.1	25.8	23.4	7.3	6.5	248
Middle Shabelle	30.2	26.4	31.1	6.6	5.7	106
Mudug	21.4	53.6	17.9	7.1	0.0	28
Nugaal	42.9	14.3	28.6	0.0	14.3	7
Sanaag	33.3	33.3	23.8	4.8	4.8	21
Sool	29.4	29.4	41.2	0.0	0.0	17
Togdheer	46.2	11.5	26.9	15.4	0.0	26
Woqooyi Galbeed	39.3	39.3	8.9	7.1	5.4	56
Wealth quintile						
Highest	36.6	28.9	23.2	4.9	6.3	142
Fourth	27.1	37.0	21.4	7.8	6.8	192
Middle	32.5	26.0	26.0	7.5	8.0	200
Fourth	36.5	29.6	21.7	6.9	5.4	203
Last	30.9	32.5	24.6	7.3	4.7	191
Total	**32.5**	**30.8**	**23.4**	**7.0**	**6.3**	**928**

Table 4.4 Average travel time to health facility

Average time (in minutes) to access health services for persons who reported to have fever/malaria the two weeks prior to the survey and took action (sought treatment**)** by sex, residence, age group, zone, region, and wealth quintile**.** Republic of Somalia MIS 2014

Sex	
Male	32.9
Female	32.0
Residence	
Urban	19.6
Rural	38.4
Age Group	
0_4	34.8
5_19	30.2
20-44	33.5
45+	31.5
Zone	
Central South	31.9
Puntland	28.5
Somaliland	36.9
Region	
Awdal	29.8
Bakool	40.0
Banadir	17.7
Bari	29.6
Bay	33.4
Galgadud	28.3
Gedo	42.4
Hiraan	29.4
Lower Juba	23.5
Lower Shabelle	34.1
Middle Shabelle	30.6
Mudug	26.9
Nugaal	47.3
Sanaag	35.9
Sool	30.6
Togdheer	35.1
Woqooyi Galbeed	40.3
Wealth Quintile	
Highest	33.9
Fourth	30.4
Middle	31.8
Fourth	34.2
Last	32.0
Total	**32.4**

Table 4.5 Type of health facility utilized, Republic of Somalia MIS 2012
Type of health facility used by those who took action for fever and visited a health facility by sex, residence, age group, zone, region, and wealth quintile, Republic of Somalia MIS 2014

	Public Sector				Private Sector			
	Health post	MCH	Health Center	Hospital	Private Clinic	Private Hospital	Pharmacy/Drug Store	Number of people who visited a health facility
Sex								
Male	14.2	14.2	4.3	8.1	24.1	9.0	26.1	345
Female	13.9	8.9	5.0	7.2	25.9	11.5	27.6	460
Residence								
Urban	0.0	0.4	3.5	16.5	32.2	27.1	20.4	281
Rural	20.6	16.2	5.3	3.5	21.8	2.7	30.0	524
Age Group								
0_4	16.7	12.3	3.6	9.4	23.9	8.7	25.4	138
5_19	12.5	11.1	4.3	9.0	24.0	10.8	28.3	279
20-44	13.4	11.1	6.4	5.7	26.8	11.8	24.8	314
45+	17.6	9.5	1.4	6.8	24.3	6.8	33.8	74
Zone								
Central South	13.8	11.0	4.0	8.5	25.3	9.7	27.7	621
Puntland	9.7	8.1	6.5	6.5	29.0	14.5	25.8	62
Somaliland	17.2	13.9	7.4	3.3	22.1	12.3	23.8	122
Region								
Awdal	8.0	12.0	8.0	0.0	32.0	12.0	28.0	25
Bakool	9.1	22.7	4.5	4.5	13.6	0.0	45.5	22
Banadir	0.0	0.0	0.0	17.9	21.4	39.3	21.4	28
Bari	15.0	5.0	10.0	10.0	15.0	10.0	35.0	20
Bay	11.7	16.7	5.0	7.5	29.2	9.2	20.8	120
Galgadud	0.0	0.0	14.3	19.0	28.6	19.0	19.0	21
Gedo	34.6	7.7	0.0	7.7	23.1	7.7	19.2	26
Hiraan	17.5	5.3	0.0	7.0	36.8	7.0	26.3	57
Lower Juba	5.0	2.5	5.0	7.5	22.5	17.5	40.0	40
Lower Shabelle	15.9	13.6	4.7	8.9	23.8	6.1	27.1	214
Middle Shabelle	16.1	8.6	3.2	6.5	21.5	8.6	35.5	93
Mudug	7.7	7.7	3.8	3.8	42.3	15.4	19.2	26
Nugaal	16.7	16.7	16.7	0.0	16.7	0.0	33.3	6
Sanaag	5.3	15.8	15.8	0.0	26.3	10.5	26.3	19
Sool	5.9	17.6	0.0	5.9	23.5	5.9	41.2	17
Togdheer	31.8	9.1	9.1	4.5	13.6	0.0	31.8	22
Woqooyi Galbeed	20.4	14.3	4.1	6.1	20.4	24.5	10.2	49
Wealth quintile								
Highest	15.1	14.3	4.8	7.1	22.2	10.3	26.2	126
Fourth	11.6	10.4	2.4	7.3	29.3	14.0	25.0	164
Middle	13.0	11.2	6.5	7.7	23.1	7.7	30.8	169
Fourth	17.4	11.8	4.5	7.9	25.8	7.9	24.7	178
Last	13.1	8.9	5.4	7.7	24.4	12.5	28.0	168
Total	**14.0**	**11.2**	**4.7**	**7.6**	**25.1**	**10.4**	**27.0**	**805**

4.3 Type of drugs used for treatment of fever

Table 4.6 Type of drugs used for treatment for fever cases
Percentage of persons who reported to have had fever the two weeks prior to the survey and took action by type of drug used for fever treatment by sex, residence, age, zone, region and wealth quintile, Republic of Somalia MIS 2014

	Don't Know	Herbs/Traditional medicine	Antipyretics	Antibiotics	Antimalarial	Others	Total who took action
Sex							
Male	4.1	4.4	73.7	2.2	14.8	0.7	411
Female	2.9	2.9	76.6	1.5	14.3	1.7	517
Residence							
Urban	0.4	0.0	84.4	6.3	4.3	4.7	256
Rural	4.6	4.9	71.9	0.2	18.5	0.0	672
Age Group							
0_4	2.4	5.4	79.2	0.6	10.7	1.8	168
5_19	3.8	2.2	76.3	1.3	15.1	1.3	312
20-44	3.0	3.6	74.3	2.8	15.5	0.8	362
45+	5.8	4.7	68.6	2.3	16.3	2.3	86
Zone							
Central South	3.5	3.5	75.6	1.5	15.0	1.0	722
Puntland	2.9	2.9	75.0	5.9	11.8	1.5	68
Somaliland	3.6	4.3	73.9	1.4	13.8	2.9	138
Region							
Awdal	3.6	3.6	75.0	7.1	7.1	3.6	28
Bakool	3.3	10.0	60.0	0.0	26.7	0.0	30
Banadir	0.0	0.0	78.6	3.6	10.7	7.1	28
Bari	4.3	4.3	73.9	0.0	17.4	0.0	23
Bay	5.1	1.5	76.6	1.5	14.6	0.7	137
Galgadud	0.0	0.0	90.5	4.8	4.8	0.0	21
Gedo	3.2	0.0	77.4	0.0	16.1	3.2	31
Hiraan	2.8	5.6	76.1	2.8	11.3	1.4	71
Lower Juba	4.0	6.0	80.0	0.0	6.0	4.0	50
Lower Shabelle	3.6	3.6	73.0	2.0	17.7	0.0	248
Middle Shabelle	2.8	3.8	78.3	0.0	15.1	0.0	106
Mudug	3.6	3.6	78.6	7.1	7.1	0.0	28
Nugaal	0.0	0.0	71.4	0.0	28.6	0.0	7
Sanaag	0.0	4.8	71.4	4.8	19.0	0.0	21
Sool	0.0	0.0	82.4	5.9	0.0	11.8	17
Togdheer	11.5	3.8	69.2	0.0	15.4	0.0	26
Woqooyi Galbeed	1.8	5.4	73.2	0.0	16.1	3.6	56
Wealth Quintile							
Highest	2.8	2.1	81.0	1.4	12.7	0.0	142
Fourth	3.6	4.2	72.9	3.1	12.5	3.6	192
Middle	3.5	4.0	78.5	0.5	13.0	0.5	200
Fourth	3.4	3.4	71.4	2.0	18.2	1.5	203
Last	3.7	3.7	74.3	2.1	15.7	0.5	191
Total	**3.4**	**3.6**	**75.3**	**1.8**	**14.5**	**1.3**	**928**

Table 4.7 Percentage of persons who reported to have had fever the two weeks prior to the survey and were treated with antimalarial by drug type, sex, residence, age, zone, region and wealth quintile. Republic of Somalia MIS 2014

	AS+SP*	SP	Chloroquine	Coartem	Cotexin	Quinine	Don't Know	Total
Sex								
Male	57.8	15.6	4.7	15.6	3.1	3.1	0.0	64
Female	60.8	15.2	10.1	7.6	1.3	2.5	2.5	79
Residence								
Urban	43.8	12.5	0.0	12.5	18.8	6.3	6.3	15
Rural	60.9	15.6	8.6	10.9	0.8	2.3	0.8	128
Age group								
0_4	61.1	11.1	0.0	16.7	5.6	5.6	0.0	18
5_19	64.6	12.5	8.3	12.5	0.0	2.1	0.0	48
20-44	58.7	15.9	9.5	7.9	3.2	1.6	3.2	63
45+	42.9	28.6	7.1	14.3	0.0	7.1	0.0	14
Zone								
Central South	59.1	17.4	7.0	9.6	1.7	3.5	1.7	115
Puntland	77.8	0.0	0.0	11.1	11.1	0.0	0.0	9
Somaliland	52.6	10.5	15.8	21.1	0.0	0.0	0.0	19
Region								
Awdal	50.0	0.0	50.0	0.0	0.0	0.0	0.0	2
Bakool	75.0	12.5	0.0	12.5	0.0	0.0	0.0	8
Banadir	0.0	0.0	0.0	66.7	0.0	33.3	0.0	3
Bari	75.0	0.0	0.0	25.0	0.0	0.0	0.0	4
Bay	56.5	17.4	8.7	8.7	4.3	4.3	0.0	23
Galgadud	100.0	0.0	0.0	0.0	0.0	0.0	0.0	1
Gedo	20.0	40.0	20.0	20.0	0.0	0.0	0.0	5
Hiraan	50.0	25.0	12.5	12.5	0.0	0.0	0.0	8
Lower Juba	60.0	20.0	0.0	0.0	20.0	0.0	0.0	5
Lower Shabelle	65.2	13.0	4.3	8.7	0.0	4.3	4.3	46
Middle Shabelle	62.5	25.0	12.5	0.0	0.0	0.0	0.0	16
Mudug	66.7	0.0	0.0	0.0	33.3	0.0	0.0	3
Nugaal	100.0	0.0	0.0	0.0	0.0	0.0	0.0	2
Sanaag	50.0	25.0	0.0	25.0	0.0	0.0	0.0	4
Togdheer	50.0	0.0	25.0	25.0	0.0	0.0	0.0	4
Woqooyi Galbeed	55.6	11.1	11.1	22.2	0.0	0.0	0.0	9
Wealth quintile								
Highest	50.0	11.1	5.6	27.8	0.0	5.6	0.0	18
Fourth	58.3	25.0	12.5	4.2	0.0	0.0	0.0	24
Middle	58.6	13.8	10.3	10.3	6.9	0.0	0.0	29
Fourth	64.1	10.3	2.6	15.4	0.0	2.6	5.1	39
Last	60.6	18.2	9.1	3.0	3.0	6.1	0.0	33
Total	**59.4**	**15.4**	**7.7**	**11.2**	**2.7**	**2.8**	**1.4**	**143**

*33% of AS+SP treatments were at public health facilities; and 60% from the private sector.

CHAPTER 5: MALARIA PARASITE PREVALENCE

All consenting individuals were tested first using RDT (SD Bioline Ag Pf/Pv). All RDT positive cases detected during the household survey were treated with the recommended first line treatment. Using the same finger prick thick and thin blood smears were prepared. Dry blood samples were collected on filter paper for all members in in fifth household (five households per cluster). Two independent microscopists read slides and any discrepancies were further reviewed by a third independent expert microscopist.

5.1 Prevalence of malaria parasites using rapid diagnostic tests (RDTs)

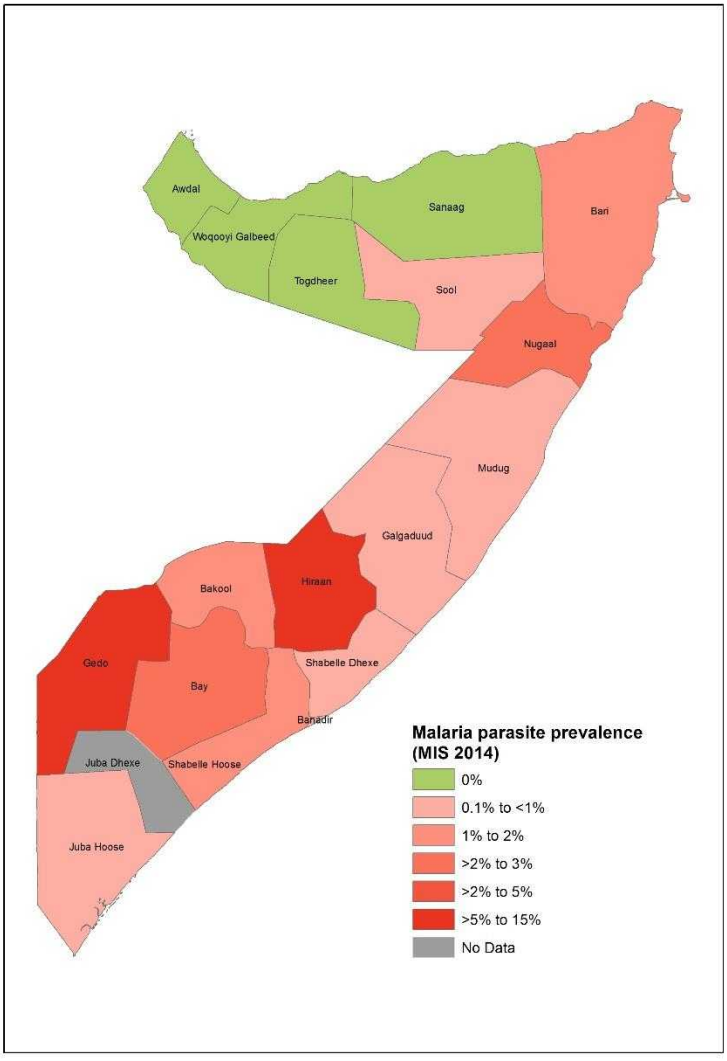
Table 5.1 Malaria parasite prevalence using RDT
Summary of malaria parasite prevalence using RDT among individuals who were tested during the survey by sex, residence, age, region, zone and wealth quintile, Republic of Somalia MIS 2014

	RDT Results			Parasite species		
	Number positive	% Positive	Number of persons examined	Pf	Pv	Mixed
Sex						
Male	139	1.9	7237	97.1	2.2	0.7
Female	165	1.8	9125	96.4	3.6	
Residence						
Urban	67	1.0	6443	91.0	9.0	
Rural	237	2.4	9919	98.3	1.3	0.4
Age category (years)						
0-4	57	1.8	3084	100.0	0.0	
5-19	101	1.9	5365	98.0	2.0	
20-44	125	2.1	6013	94.4	4.8	0.8
45+	21	1.1	1900	95.2	4.8	
Zone						
Central South	287	2.8	10142	96.9	3.1	
Puntland	16	1.1	1433	93.8	0.0	6.3
Somaliland	1	0.0	4787	100.0	0.0	
Region						
Awdal	0	0.0	982			
Bakool	8	1.3	614	100.0	0.0	
Banadir	7	0.7	992	100.0	0.0	
Bari	6	1.1	524	83.3	0.0	16.7
Bay	45	2.8	1584	88.9	11.1	
Galgadud	2	0.4	536	50.0	50.0	
Gedo	37	5.4	684	97.3	2.7	
Hiraan	115	12.9	891	100.0	0.0	
Lower Juba	2	0.4	519	100.0	0.0	
Lower Shabelle	56	2.0	2738	98.2	1.8	
Middle Shabelle	15	0.9	1584	93.3	6.7	
Mudug	4	0.7	547	100.0	0.0	
Nugaal	4	2.5	163	100.0	0.0	
Sanaag	0	0.0	514			
Sool	2	0.6	346	100.0	0.0	
Togdheer	0	0.0	831			
Wooqoi Golbeed	1	0.0	2313	100.0	0.0	
Wealth quintile						
Highest	14	0.4	3288	100.0	0.0	
Fourth	71	2.1	3365	98.6	1.4	
Middle	66	2.1	3151	97.0	1.5	1.5
Fourth	76	2.3	3239	97.4	2.6	
Last	77	2.3	3319	93.5	6.5	

Total	**304**	**1.9**	**16362**	**96.7**	**3.0**	**0.3**

Table 5.1 shows the percentage of individual who were found positive for malaria infection using the RDT. A total of 16,362 individuals were tested out of which 304 were positive for malaria resulting in a national malaria prevalence of 1.9%. Infection was higher among rural (2.4%) compared to urban (1.0%) residents. The highest prevalence was reported in the region of Hiraan (13%) accounting for almost 115 individuals who were positive for malaria. Among those who were positive, the prevalence of *Pf* was 97%, while 3% of infections were *Pv.* Infections were concentrated in the Central South zone (2.8%) compared to the other zones and accounted for almost 95% of all infections (Table 5.1 and Figure 5.1).

Figure 5.1 The prevalence of *P. falciparum* infection measured using rapid diagnostic tests by region during the Somalia MIS 2014.



5.2 Prevalence of malaria parasites using microscopy

Prior to the survey, extensive training of key laboratory personnel on malaria microcopy was undertaken to act as trainers of trainees. However, the resulting slides prepared for most of the regions had several quality issues including: acidic stains; poor smear preparations; slides with artifact and debris and incomplete and/or unreadable labeling. For this reason, the microscopy results, despite three separate readings, were considered unreliable. Therefore, the RDT results were considered as the final results on parasitaemia for this survey.

CHAPTER 6: WOMEN'S ACCESS TO SERVICES AND BREASTFEEDING PRACTICES

A total of 3,262 women aged 15-49 years were interviewed in 5,220 households (Table 6.1). 28% of these women had no education and about 25% had informal education (madrasa and Koranic schools). About 43% had some form of primary education.

Table 6.1 Women Educational attainment
Percent distribution of women age 15-49 by highest level of schooling attended or completed, by residence, age, zone and region. Republic of Somalia MIS 2014

	No Education	Informal education	Basic/primary education	Secondary education	Completed or higher than secondary education	Total Number of women
Residence						
Urban	29.2	22.3	41.1	6.4	0.9	1276
Rural	27.3	26.5	44.5	1.7	0.1	1985
Age group						
15-19	13.9	33.9	48.3	3.9	0.0	381
20-24	24.9	26.6	43.9	3.4	1.1	758
25-29	25.6	27.0	42.9	4.1	0.3	885
30-34	33.0	24.1	39.9	2.5	0.4	551
35-39	33.7	18.9	42.9	4.2	0.3	359
40-44	43.8	11.5	41.3	3.4	0.0	208
45-49	42.5	12.5	42.5	2.5	0.0	120
Zone						
Central South	7.7	31.5	57.2	3.2	0.4	2192
Puntland	46.8	23.4	20.4	8.8	0.6	329
Somaliland	79.9	5.7	11.7	2.2	0.5	741
Region						
Awdal	79.2	6.2	10.7	1.7	2.2	178
Bakool	4.2	70.7	24.0	1.2	0.0	167
Banadir	7.2	10.8	70.5	9.6	1.8	166
Bari	41.7	27.8	22.2	8.3	0.0	108
Bay	6.4	43.3	45.2	4.5	0.6	330
Galgadud	16.5	38.1	40.2	5.2	0.0	97
Gedo	7.0	26.6	66.4	0.0	0.0	128
Hiraan	6.1	63.1	29.7	1.1	0.0	263
Lower Juba	2.7	43.5	42.2	10.3	1.3	223
Lower Shabelle	10.9	7.6	81.1	0.4	0.0	503
Middle Shabelle	8.3	12.7	77.5	1.6	0.0	315
Mudug	57.3	19.8	18.3	4.6	0.0	131
Nugaal	34.9	7.0	32.6	20.9	4.7	43
Sanaag	75.0	16.7	4.8	3.6	0.0	84
Sool	57.4	19.7	18.0	4.9	0.0	61
Togdheer	67.9	13.1	16.1	2.9	0.0	137
Woqooyi Galbeed	85.0	1.5	11.0	2.4	0.0	327
Total	**28.0**	**24.8**	**43.2**	**3.6**	**0.4**	**3262**

73% of women 15 to 49 years of age who were pregnant in the previous 12 months had attended an ANC clinic at least once during the pregnancy (Table 6.2). Majority of these women were attended to by a nurse (38.2%) or a doctor (28.3%). A traditional birth attendant attended to about 21% of women during a pregnancy in the 12 months before the survey. It is unclear what proportion of these birth attendants had received some formal training in the provisions of ANC services. Use of formal ANC services was much higher among urban women compared to those in rural areas and by zone was lowest in Central South (71%) compared to Puntland (79%) and Somaliland (76%). There were no major

differences in ANC use by wealth quintile. Surprisingly Mudug and Nugal regions reported over 90 use of ANC services among pregnant women. These estimates are much higher than those reported in the MICS 2011 in Puntland and Somaliland and must be considered with caution. They are likely to be a better indication of contact with a health worker during pregnancy and not necessarily access to full range of ANC services.

Table 6.2. Antenatal care during pregnancy

Percent distribution of women age 15-49 who were pregnant in the last 12 months preceding the survey, by antenatal care provider during pregnancy, by residence, age, zone and region. Republic of Somalia MIS 2014

	Formal				Informal		
	Doctor	Nurse/Midwife	Auxiliary midwife	Total	Traditional attendant	Other	Number of women receiving Antenatal care
Residence							
Urban	32.9	42.9	10.1	85.9	9.6	4.5	602
Rural	24.6	34.7	3.6	62.9	30.5	6.6	777
Age Group							
15-19	39.5	33.9	4.8	78.2	20.2	1.6	124
20-34	29.6	37.7	6.0	73.3	21.8	5.0	937
35-49	19.8	41.5	10.7	72.0	20.8	7.2	318
Zone							
Central South	30.9	30.8	9.2	70.9	20.9	8.2	764
Puntland	23.6	49.6	5.7	78.9	17.1	4.1	123
Somaliland	25.2	47.0	3.9	76.1	23.2	0.8	492
Region							
Awdal	31.2	23.1	0.0	54.3	45.7	0.0	173
Bakool	63.9	4.9	8.2	77.0	21.3	1.6	61
Banadir	9.5	34.5	8.3	52.3	2.4	45.2	84
Bari	33.3	31.5	3.7	68.5	25.9	5.6	54
Bay	31.1	24.4	1.1	56.6	33.3	10.0	90
Galgadud	51.0	9.8	3.9	64.7	33.3	2.0	51
Gedo	17.5	35.0	15.0	67.5	27.5	5.0	40
Hiraan	29.1	26.2	15.5	70.8	27.2	1.9	103
Lower Juba	23.8	45.2	16.7	85.7	4.8	9.5	42
Lower Shabelle	22.8	53.8	13.0	89.6	9.2	1.1	184
Middle Shabelle	42.2	15.6	1.8	59.6	36.7	3.7	109
Mudug	18.5	66.7	7.4	92.6	7.4	0.0	27
Nugaal	7.4	85.2	3.7	96.3	0.0	3.7	27
Sanaag	33.3	27.3	9.1	69.7	27.3	3.0	33
Sool	29.2	54.2	0.0	83.4	16.7	0.0	24
Togdheer	14.8	63.0	11.1	88.9	11.1	0.0	81
Woqooyi Galbeed	22.6	61.5	4.6	88.7	9.2	2.1	195
Wealth quintile							
Highest	24.8	35.7	8.0	68.5	25.2	6.3	286
Fourth	28.2	40.8	6.3	75.3	20.0	4.7	255
Middle	25.7	42.5	6.2	74.4	20.8	4.9	226
Second	25.2	40.8	8.2	74.2	20.9	5.0	282
Lowest	35.8	32.7	5.9	74.4	20.2	5.3	321
Total	**28.2**	**38.2**	**7.0**	**73.4**	**21.4**	**5.2**	**1379**

About 82% of women who were pregnant in the 12 months prior to the survey had breastfeed their children (Table 6.3). Almost 63% had breastfeed their babies within the first hour of birth. 88% of women who breastfeed did so for at least 6 months and about 38% had breastfeed exclusively.

Table 6.3. Initiation of breastfeeding

Percentage of pregnant women who breastfed by start and duration of breast feeding and the percentage who breast fed exclusively, by residence, age, zone and region. Republic of Somalia MIS 2014

		Breast feeding start				Brest feeding length				
	Breastfeeding	One hour	One day	One week	More than one week	Less than 6mnths	6 months	>6months	Exclusive breastfeeding	Number of women breastfeeding
Residence										
Urban	78.2	70.0	17.0	4.5	8.5	11.5	28.0	60.5	41.6	471
Rural	84.7	57.8	19.0	5.0	18.1	12.9	21.8	65.0	36.1	657
Age group										
15-19	79.0	51.0	14.3	4.1	30.6	8.2	28.6	63.3	58.2	98
20-34	82.2	62.6	17.7	5.1	14.7	13.9	24.2	61.9	39.0	770
35-49	81.8	68.5	21.2	4.2	6.2	8.8	26.2	65.0	29.2	260
Zone										
Central South	78.3	44.1	22.1	7.5	26.3	9.4	21.6	69.1	40.8	598
Puntland	57.7	93.0	7.0	0.0	0.0	23.9	52.1	23.9	57.7	71
Somaliland	93.3	82.8	14.8	2.0	0.4	14.2	25.3	60.6	32.2	459
Region										
Awdal	97.1	78.6	20.2	1.2	0.0	4.2	36.3	59.5	38.1	168
Bakool	86.9	7.5	5.7	3.8	83.0	7.5	60.4	32.1	79.2	53
Banadir	46.4	64.1	23.1	2.6	10.3	12.8	12.8	74.4	66.7	39
Bari	61.1	93.9	6.1	0.0	0.0	30.3	51.5	18.2	63.6	33
Bay	64.4	67.2	3.4	8.6	20.7	1.7	13.8	84.5	31.0	58
Galgadud	84.3	81.4	11.6	7.0	0.0	37.2	18.6	44.2	46.5	43
Gedo	77.5	61.3	29.0	0.0	9.7	9.7	3.2	87.1	25.8	31
Hiraan	83.5	14.0	3.5	3.5	79.1	2.3	30.2	67.4	82.6	86
Lower Juba	69.0	44.8	44.8	6.9	3.4	0.0	24.1	75.9	31.0	29
Lower Shabelle	95.1	33.1	48.6	12.0	6.3	9.1	21.7	69.1	4.6	175
Middle Shabelle	77.1	70.2	3.6	9.5	16.7	10.7	4.8	84.5	50.0	84
Mudug	40.7	90.9	9.1	0.0	0.0	18.2	63.6	18.2	63.6	11
Nugaal	44.4	100.0	0.0	0.0	0.0	16.7	33.3	50.0	66.7	12
Sanaag	90.9	73.3	20.0	6.7	0.0	16.7	26.7	56.7	3.3	30
Sool	95.8	82.6	13.0	4.3	0.0	13.0	30.4	56.5	73.9	23
Togdheer	95.1	89.6	10.4	0.0	0.0	16.9	15.6	67.5	24.7	77
Woqooyi Galbeed	89.7	85.7	10.9	2.3	1.1	22.9	21.1	56.0	29.7	175
Wealth quintile										
Highest	80.8	63.2	19.9	5.6	11.3	9.5	20.3	70.1	35.9	231
Fourth	84.3	54.9	19.1	4.2	21.9	12.6	27.0	60.5	40.0	215
Middle	79.6	60.6	16.7	4.4	18.3	14.4	23.9	61.7	42.2	180
Second	81.6	63.9	20.9	5.2	10.0	13.0	22.2	64.8	31.7	230
Lowest	82.2	69.7	14.4	4.5	11.4	12.5	31.1	56.4	43.2	264
Total	**82.3**	**62.9**	**18.2**	**4.8**	**14.1**	**12.2**	**25.0**	**62.8**	**38.4**	**1128**

CHAPTER 7: GENERAL MALARIA KNOWLEDGE

Table 7.1 shows individual response to source of malaria messages for those individuals who had accessed information on malaria. Overall, 40.5% of respondents reported radio and television as being the sources of malaria information. 28.7% heard information on malaria from health facilities while about for 6% of respondents the school and family was the main source of information.

Among those whose knowledge on malaria transmission was assessed mosquito bite as the main source of malaria infection was the response given by 67% of household members above the age of 12 years nationally and about 83% in Puntland (Table 7.2). These were no substantial variation by urban and rural or by sex. 61% of household members about mentioned LLIN and IRS as the main approaches for malaria prevention.

On prevention, 61% of people 12 years of age and above responded that use of LLIna dn IRS were the main approaches to prevent malaria and varied by zone with 81% of respondents in Puntland, 56% and 57% in Central South and Somaliland (Table 7.3).

Regarding malaria symptoms, 65% mentioned fever and 11% child as being a symptom of malaria (Table 7.4). About 16% of respondents did not know any malaria symptom.

In households without bed nets (Table 7.5), the most common reason (55.6%) for not having a net was because unavailability, with the proportion higher among rural (58) relative to urban households (52%). Price of nets (42%) was the second most common reason for households not having nets with half of the households in the poorest wealth quintile citing this as the main reason. 17.8% of households reported the absence of mosquitoes as one of the reasons for not using nets. About 12% cited the perceived danger of insecticides and absence of malaria as the reason for not having any net.

Table 7.6 shows household responses to the advantages of having nets among the households with nets. Overall, 75.7% of the surveyed household reported avoiding bites as being the main advantage of mosquito net. 54.7% reported minimizing malaria as being the main reason while 39.7% reported sleeping better as an advantage.

About half the households reported a family member having ever had malaria while 34 reporting a family member having had malaria in the last 3 months (Table 7.7). More than 50 of households in Banadir, Bay, Gedo, Hiraan, Lower Juba and Middle Shabelle reported having had an incidence of malaria in the last 3 months. 4.8 of households reported having had a household member dying from malaria in the last 12 months. Lower Juba (26.2) and Banadir (11.3) reported the highest number of people dying from malaria in the last 12 months.

Table 7.1 Access to malaria information by household heads
Malaria information source/media by sex, residence, zone region and wealth quintile, Republic of Somalia MIS 2014

	Radio/TV	Newspaper	Health Facility	Work place	School	Mosque	Family	Posters	Committee Meetings	Number of households exposed to malaria messages
Sex										
Male	40.7	7.9	23.8	2.9	6.7	3.8	6.5	4.5	12.4	1030
Female	37.8	5.4	31.9	1.4	4.9	1.1	6.2	3.3	12.7	1252
Residence										
Urban	36.0	9.7	23.9	2.2	8.5	2.1	10.3	4.2	14.4	1146
Rural	42.2	3.5	32.6	1.9	3.0	2.5	2.4	3.4	10.7	1136
Zone										
Central South	46.1	5.9	32.8	2.0	1.3	1.9	1.5	1.8	11.2	1019
Puntland	84.6	20.2	18.3	7.7	15.4	11.5	11.5	14.4	21.2	104
Somaliland	28.8	5.9	25.2	1.6	8.7	1.9	10.1	4.7	13.0	1159
Region										
Awdal	45.7	14.9	9.6	14.9	16.0	2.1	12.8	8.5	9.6	94
Bakool	35.8	1.2	64.2	2.5	0.0	5.6	0.0	0.0	0.6	162
Banadir	63.8	8.6	48.3	1.7	5.2	1.7	6.9	3.4	1.7	58
Bari	72.0	40.0	28.0	8.0	32.0	12.0	20.0	36.0	40.0	25
Bay	37.9	0.0	29.3	8.6	1.7	6.9	12.1	1.7	13.8	58
Galgadud	17.6	0.0	11.8	0.0	0.0	0.0	0.0	17.6	23.5	17
Gedo	53.6	3.6	21.4	0.0	0.0	0.0	0.0	17.9	7.1	28
Hiraan	44.6	0.8	46.9	3.1	0.8	2.3	0.0	0.0	7.7	130
Lower Juba	32.2	29.5	36.2	0.7	2.0	0.0	0.0	2.0	5.4	149
Lower Shabelle	70.9	0.5	10.3	0.0	0.0	0.0	0.5	0.5	2.0	203
Middle Shabelle	39.7	2.8	19.2	2.3	2.3	0.9	1.4	1.4	35.5	214
Mudug	87.5	15.6	14.1	4.7	4.7	14.1	7.8	6.3	7.8	64
Nugaal	90.0	10.0	20.0	10.0	20.0	0.0	10.0	10.0	40.0	10
Sanaag	55.7	0.8	15.3	3.1	6.1	0.8	2.3	15.3	4.6	131
Sool	21.8	9.0	26.9	1.3	3.8	0.0	0.0	3.8	0.0	78
Togdheer	25.3	1.1	52.7	0.5	11.5	1.1	0.5	2.2	2.2	182
Woqooyi Galbeed	23.5	6.5	21.5	0.1	8.3	2.5	15.0	2.8	19.9	678
Wealth index										
Highest	34.3	11.6	26.8	2.2	6.5	1.6	8.7	5.3	6.7	508
Fourth	35.1	5.8	27.2	1.2	4.8	2.1	8.9	3.1	13.7	518
Middle	41.4	5.4	29.1	1.7	3.9	2.0	5.4	2.0	15.4	461
Fourth	40.8	2.9	32.9	1.8	6.8	2.3	3.4	3.4	12.2	441
Last	46.6	6.2	25.1	4.0	6.8	4.2	4.0	5.6	16.1	354
Total	**39.1**	**6.5**	**28.3**	**2.1**	**5.7**	**2.3**	**6.3**	**3.8**	**12.6**	**2282**

Table 7.2 Knowledge on cause of malaria transmission by sex, residence, zone region and wealth quintile, Republic of Somalia MIS 2014

	Don't know	Contaminated food and drinks	Contac with infected person	Mosquito bite	Bite of other insects	Airborne	Contac with birds	Others
Sex								
Male	25.2	0.8	3.5	68.5	1.7	0.2	0.1	0.1
Female	27.4	0.9	2.8	65.9	2.7	0.3	0.1	0.1
Residence								
Urban	26.5	0.9	2.8	66.9	2.6	0.1	0.1	0.1
Rural	26.4	0.8	3.3	67.0	2.0	0.3	0.1	0.1
Zone								
Central								
South	29.7	0.8	3.5	64.5	1.2	0.2	0.1	0.0
Puntland	15.3	0.1	2.0	82.5	0.1	0.0	0.0	0.0
Somaliland	23.6	1.2	2.6	66.6	5.2	0.4	0.1	0.2
Wealth quintile								
1	24.6	0.8	3.4	68.0	2.8	0.2	0.1	0.1
2	26.9	0.8	3.8	65.5	2.5	0.4	0.1	0.0
3	28.1	0.8	4.0	64.9	1.7	0.3	0.1	0.2
4	24.9	1.1	2.6	69.1	2.0	0.2	0.0	0.1
5	27.8	0.6	1.7	67.4	2.2	0.1	0.1	0.0
Total	**26.5**	**0.8**	**3.1**	**67.0**	**2.2**	**0.2**	**0.1**	**0.1**

Table 7.3 Knowledge on malaria prevention approaches by sex, residence, zone region and wealth quintile, Republic of Somalia MIS 2014

	Don't know	Keep the surrounding clean	Use of mosquito nets	Use of mosquito repellent	Use of coils	Screening windows	Spraying insecticides indoor and outdoor	Taking antimalarial drugs in the transmission season	Filling up water puddles
Sex									
Male	26.6	1.1	60.1	5.1	2.1	0.4	2.0	1.2	1.4
Female	28.2	1.2	57.8	4.9	2.6	0.4	2.3	1.6	1.0
Residence									
Urban	26.9	1.4	59.5	5.0	3.0	0.3	1.9	1.3	0.6
Rural	27.9	1.0	58.2	5.0	2.0	0.5	2.4	1.5	1.6
Zone									
Central South	31.0	0.9	55.9	5.2	2.9	0.6	2.0	1.3	0.2
Puntland	15.4	0.1	80.5	2.9	0.9	0.0	0.2	0.0	0.1
Somaliland	24.6	2.1	57.1	5.3	1.8	0.1	3.2	2.1	3.6
Wealth quintile									
Highest	26.1	1.1	59.3	4.3	2.0	0.0	2.7	1.5	2.9
Fourth	27.5	0.8	59.3	5.6	3.1	0.6	1.3	1.3	0.6
Middle	28.4	1.2	57.5	5.7	1.8	0.6	2.2	1.8	0.7
Fourth	27.9	1.5	57.4	5.2	2.8	0.5	2.3	1.7	0.8
Last	27.8	1.2	60.2	4.3	2.2	0.3	2.5	0.8	0.8
Total	**27.5**	**1.1**	**58.8**	**5.0**	**2.4**	**0.4**	**2.2**	**1.4**	**1.2**

Table 7.4 General knowledge of malaria symptoms by household member 12 years or older
General knowledge of malaria symptoms by sex, residence, zone, region and wealth quintile, Republic of Somalia MIS 2014

	Don't Know	Fever	Chills	Sweating	Diarrhea	Pain	Number of persons aged 12 years or more
Sex							
Male	14.8	64.9	15.8	5.4	7.7	18.7	4,228
Female	16.3	64.3	14.4	5.4	6.8	18.2	5,995
Residence							
Urban	15.7	64.4	18.8	6.8	6.2	14.7	4,111
Rural	15.7	64.7	12.5	4.5	7.8	20.8	6,112
Zone							
Central South	13.1	69.0	16.9	3.7	8.8	18.4	6,163
Puntland	8.9	83.7	19.3	18.6	13.0	40.0	1,050
Somaliland	23.4	48.9	9.6	4.3	1.8	10.8	3,010
Region							
Awdal	35.2	42.3	14.8	9.0	4.6	7.9	634
Bakool	7.8	86.2	14.6	1.3	23.1	8.8	398
Banadir	13.6	65.7	28.4	8.9	2.3	14.5	559
Bari	8.4	86.3	23.7	24.0	15.1	36.9	371
Bay	6.8	80.3	19.1	6.6	13.2	18.6	985
Galgadud	7.7	46.4	11.5	2.5	1.6	27.6	366
Gedo	15.0	70.8	6.1	2.5	7.8	11.5	408
Hiraan	12.8	76.2	17.0	2.2	11.5	13.7	547
Lower Juba	4.1	89.2	1.4	3.2	14.6	17.0	507
Lower Shabelle	12.2	67.6	20.9	1.8	5.3	29.7	1,503
Middle Shabelle	30.3	45.6	17.6	3.7	5.8	9.1	890
Mudug	9.2	81.1	15.0	13.6	11.4	40.9	413
Nugaal	4.0	88.8	18.4	18.4	12.0	47.2	125
Sanaag	14.4	45.1	4.8	4.5	2.9	42.1	375
Sool	19.9	45.9	12.6	10.4	6.5	26.0	231
Togdheer	27.4	52.8	5.6	5.8	2.4	3.0	496
Wooqoyi Galbeed	18.6	55.0	10.6	2.1	0.4	6.8	1,412
Wealth quintile							
Highest	17.1	59.9	12.7	4.6	6.2	16.5	2,103
Fourth	15.3	66.8	17.8	4.7	7.5	15.3	2,118
Middle	16.7	64.6	11.7	4.9	6.4	22.2	1,967
Fourth	15.3	64.7	15.5	4.9	6.4	18.8	1,989
Last	14.0	67.0	17.2	7.9	9.2	19.5	2,046
Total	**15.7**	**64.6**	**15.0**	**5.4**	**7.2**	**18.4**	**10,223**

Table 7.5 Reasons for not having mosquito nets among households without nets by residence, zone, region and wealth quintile, Republic of Somalia MIS 2014

	Never heard	Not affordable	Not available	No mosquito	No malaria	No bites	Not practical	Mosquito still bites	No space	Dangerous insecticide	Other	Number of Households without nets
Residence												
Urban	3.3	41.4	52.0	25.5	12.3	11.7	9.7	8.8	8.4	9.3	0.8	1445
Rural	1.0	42.4	57.8	13.0	11.0	12.2	10.7	10.9	11.2	13.1	1.2	2337
Zone												
Central South	1.4	27.1	61.2	13.5	6.8	7.9	7.7	7.6	8.4	10.4	1.5	2304
Puntland	1.4	81.5	45.3	30.1	23.8	24.5	21.9	20.3	20.5	20.6	0.7	572
Somaliland	3.5	55.1	47.9	21.1	15.7	14.6	9.7	9.9	7.9	9.1	0.0	906
Region												
Awdal	1.2	73.4	50.3	5.2	4.6	4.6	5.8	5.8	3.5	2.9	0.0	173
Bakool	1.5	27.3	57.6	15.1	15.1	18.5	16.1	12.2	20.0	20.5	0.5	205
Banadir	5.0	19.7	12.4	61.5	4.1	6.0	11.5	8.3	6.0	6.9	3.2	218
Bari	2.3	87.2	48.2	24.1	17.5	15.6	14.0	11.7	10.5	9.7	0.4	257
Bay	0.9	29.7	50.0	5.5	7.0	8.8	9.1	10.0	11.8	17.0	0.0	330
Galgadud	1.7	51.2	50.4	1.7	1.7	2.5	1.7	1.7	2.5	1.7	0.0	121
Gedo	0.0	28.7	72.6	4.5	2.5	3.8	1.9	3.2	3.2	3.2	0.6	157
Hiraan	0.6	9.1	87.0	0.0	0.0	1.9	2.6	2.6	2.6	0.6	0.6	154
Lower Juba	2.4	27.1	84.7	28.8	22.9	24.7	22.4	24.1	27.1	24.1	0.0	170
Lower Shabelle	0.9	7.3	78.9	6.8	6.6	7.2	5.9	6.6	6.1	13.3	2.7	558
Middle Shabelle	0.8	56.3	52.7	7.9	3.1	2.3	2.6	2.8	2.0	1.0	2.6	391
Mudug	0.0	62.8	37.2	37.2	38.0	49.6	39.5	36.4	39.5	41.1	0.0	129
Nugaal	0.0	88.4	42.1	31.6	22.1	25.3	24.2	24.2	23.2	23.2	0.0	95
Sanaag	3.3	69.9	55.2	15.8	11.5	6.6	7.7	8.7	9.3	9.8	0.0	183
Sool	6.6	72.4	21.1	3.9	0.0	1.3	1.3	0.0	0.0	0.0	3.9	76
Togdheer	3.6	40.7	36.5	16.2	9.6	5.4	2.4	3.0	2.4	0.6	0.0	167
Wooqoyi Galbeed	3.8	49.7	54.3	38.9	29.6	28.6	18.6	18.8	15.6	19.1	0.0	398
Wealth quintile												
Highest	1.6	50.2	57.3	11.9	6.5	7.1	6.7	7.0	6.5	6.0	0.5	733
Fourth	2.8	40.0	54.1	13.5	8.9	11.2	8.7	9.0	9.3	12.0	1.0	809
Middle	1.8	44.2	60.6	17.6	14.2	12.8	12.6	12.6	13.8	15.1	1.2	763
Fourth	1.2	41.0	57.5	19.5	14.0	14.8	11.9	10.6	11.2	11.5	1.1	742
Last	1.9	35.0	48.3	26.9	14.0	14.1	12.0	11.3	9.7	13.5	1.4	735
Total	**1.9**	**42.0**	**55.6**	**17.8**	**11.5**	**12.0**	**10.3**	**10.1**	**10.1**	**11.6**	**1.0**	**3782**

Table 7.6 Reported advantages of having mosquito nets among households with nets by residence, zone, region and wealth quintile, Republic of Somalia MIS 201

	Avoid bite	Minimize malaria	Sleep better	Number of Households with nets
Residence				
Urban	71.0	50.7	39.8	610
Rural	79.2	57.7	39.6	828
Zone				
Central South	84.7	54.1	42.0	795
Puntland	89.9	91.3	85.9	149
Somaliland	57.1	44.7	22.1	494
Region				
Awdal	76.6	70.2	59.6	47
Banadir	86.7	53.3	43.3	30
Bari	79.2	75.0	66.7	24
Bay	92.0	55.8	51.3	113
Galgadud	100.0	36.8	36.8	19
Gedo	87.0	40.2	25.0	92
Hiraan	84.9	37.7	18.5	146
Lower Juba	76.6	53.9	50.0	128
Lower Shabelle	78.5	68.8	66.1	186
Middle Shabelle	93.8	67.9	23.5	81
Mudug	91.0	93.7	88.3	111
Nugaal	100.0	100.0	100.0	5
Sanaag	89.2	35.1	43.2	37
Sool	77.3	52.3	31.8	44
Togdheer	63.2	46.6	12.0	133
Wooqoyi Galbeed	43.0	40.9	18.2	242
Wealth quintile				
Highest	78.7	47.9	27.3	315
Fourth	73.3	55.9	37.7	236
Middle	78.5	57.7	39.1	274
Fourth	71.6	56.9	44.8	299
Last	76.1	56.1	49.4	314
Total	**75.7**	**54.7**	**39.7**	**1438**

Table 7.7 Malaria incidence in the household.
Occurrence of malaria in households by residence, zone, region and wealth quintile, Republic of Somalia MIS 2014

	Member ever had malaria	Malaria in the last 3mths	Member ever died of malaria	Number of Households
Residence				
Urban	44.3	31.8	6.6	1975
Rural	53.0	35.5	3.7	3245
Zone				
Central South	73.0	55.4	6.8	3099
Puntland	12.2	1.0	2.8	721
Somaliland	17.0	3.7	1.4	1400
Region				
Bakool	60.5	38.5	4.4	205
Banadir	86.3	75.4	11.3	248
Bay	82.6	64.3	2.5	443
Galgadud	8.6	5.7	1.4	140
Gedo	79.1	60.6	5.2	249
Hiraan	63.3	50.0	5.0	300
Lower Juba	79.5	73.8	26.2	298
Lower Shabelle	64.1	33.3	3.2	744
Middle Shabelle	94.1	82.6	6.8	472
Bari	8.2	0.7	4.6	281
Mudug	24.2	1.7	0.8	240
Nugaal	5.0	1.0	2.0	100
Sool	6.3	6.3	5.5	120
Sanaag	1.7	0.0	0.0	220
Awdal	0.9	0.9	0.0	220
Togdheer	57.0	14.0	5.0	300
Wooqoyi Galbeed	9.4	0.5	0.5	640
Wealth quintile				
Highest	42.8	25.5	2.2	1044
Fourth	48.3	32.9	4.3	1073
Middle	51.4	35.1	5.3	1014
Fourth	52.6	39.5	5.9	1046
Last	52.8	37.2	6.3	1043
Total	**49.6**	**34.0**	**4.8**	**5220**

9.0 References

1. Choumara R. Notes sur le paludisme au Somaliland. *Riv di Malariol* 1961;40:9-34.
2. CIA World Factbook- Somalia: https://www.cia.gov/library/publications/the-world-factbook/geos/so.html.
3. Cicchito AM (1938). Ricerche sugl'indici malarici – splenico e parassitario – nella Somalia Italiana. Ospedale Civile Per Indigeni "Prince e di Piemonte" – Mogadiscio'. *Riv Malariologia*, xxx-xxx.
4. FSNAU Analytical systems. http://www.fsausomali.org/200510112504_baselines.php, Accessed 11th January 2012.
5. Gelonesi G (1931) La Malaria del Benadir, Part 1. *Ann Med Navale*, II: 525-545.
6. Gelonesi G (1931) La Malaria del Benadir, Part 2. *Ann Med Navale*, II: 667-687.
7. Gelonesi G (1932) La Malaria del Benadir, Part 3. *Ann Med Navale*, xx: 49-68
8. GFATM Project proposal.http://www.theglobalfund.org/search/docs/6SOMM_1418_0_full.pdf. Accessed 10 December 2007.
9. GFATM Progress report. http://www.theglobalfund.org/en/library/publications/progressreports/. Accessed 15 December 2011.
10. Hadden RL. *The Geology of Somalia: A Selected Bibliography of Somalian Geology, Geography and Earth Science*. Engineer Research and Development Laboratories, Topographic Engineering Centre. http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA464006&Location=U2&doc=GetTRDoc.pdf. Accessed 12 December 2011.
11. Hadden, Robert Lee. 2007. *The Geology of Somalia: A Selected Bibliography of Somalian Geology, Geography and Earth Science*. Engineer Research and Development Laboratories, Topographic Engineering Center
12. Ilardi I, Sebastian A, Leone F, *et al*. Epidemiological study of parasitic infections in Somali nomads. *Trans R Soc Trop Med Hyg* 1987;81:771-772.
13. Kamal M. *Entomological surveillance in Somalia*. In Consultancy report for WHO Somalia, 2007.
14. National Antimalaria Service (1984). *Malaria Control Programme-Somalia.*
15. Noor AM, Alegana VA, Patil AP, *et al*. Predicting the unmet need for biologically targeted coverage of insecticide treated nets in Somalia. *Am J Trop Med Hyg* 2010;83:854-860.
16. Noor AM, Clements ACA, Gething PW, *et al.* Spatial prediction of *Plasmodium falciparum* prevalence in Somalia. *Malar J* 2008;7:159.
17. Noor AM, Gething PW, Alegana VA, *et al*. The risks of malaria infection in Somalia in BMC *Infect Dis* 2009;9:e180.
18. UNOPS 2010. The Somali Support Secretariat Project Board Terms of Reference as promulgated at the 10 May 2010 Project Board Meeting. http://www.coordinate4somalis.info/images/stories/pdf/Somali20Support20Secretariat20Project20Board20Terms20of20Reference.pdf. Accessed 7 March 2012.
19. Warsame M, Perlmann H, Ali S, *et al.* The sero-reactivity against Pf155 (RESA) antigen in villagers from a meso-endemic area in Somalia. *Trop Med & Parasitol* 1989;40:412-414.
20. World Health Organization (1960). *Annexure to Plan of Operation for Pre-eradication Survey in Somalia*. xxxx
21. World Health Organization. Manual for developing a national malaria strategic plan, Geneva, WHO, September 2011.
22. World Health Organization: Malaria elimination: a field manual for low and moderate endemic countries, Geneva: World Health Organization; 2007.
23. World Health Organization-Roll Back Malaria. National Malaria Prevention and Control Monitoring and Evaluation Plan 2011 – 2015;2010.
24. World Health Organization-Roll Back Malaria. Somalia National Strategic Plan for Malaria 2011 – 2015;2010.

8.0 Annex 1 Questionnaires

THE FIRST MALARIA INDICATORS SURVEY – SOMALIA, 2013

HOUSEHOLD QUESTIONNAIRE (FORM – A)

---

1. HOUSEHOLD UNIQUE ID = |___|___| |___|___| |___|___| |___|___|**
Region District Cluster Household

This form is to collect information on household members, household characteristics and bed nets

Survey team and field supervisor Date of interview **|___|___| |___|___|**
D D M M

Name of Team Leader 1. |_____|
Name of Lab. technicians 1. |_____| 2. |_____|
Name of Interviewer 1. |_____|

Name(s) of person who reviewed the questionnaire at cluster 1. |_____|
Name(s) of the person who reviewed the questionnaire at region 1. |_____|
Name(s) of the person who reviewed the questionnaires at national level 1. |_____|
Name(s) of the person who entered the data 1. |_____|

Important notes **

1. Make sure to write the unique ID (no.1) as instructed (Region code /district code/village (cluster) code/ household number)
2. While collecting data, don't write in the box in front of each question
3. All questions bear one possible answer except those marked with *

Number of slides returned/Done |_____|_____|

Members who refused blood testing |_____||_____||_____||_____||_____||_____|

Members who were not present at time of survey |_____||_____||_____||_____||_____||_____|

	2. Region |_____|
	3. District |_____|
	4. Village |_____|
	4.1 (1)Urban (2) Rural
	5. Household number|___|___|___|
	6. Number of permanent residents of the household **|___|___|**
	7. Number of permanent residents who spent the previous night in the household. **|___|___|**
	8. Latitude |_____||_____||_____|.|_____||_____||_____||_____||_____|
	9. Longitude |_____||_____||_____|.|_____||_____||_____||_____||_____|

Ask about household members. Provide information on all permanent residents/visitors of this household

62	A	B	C	D	E	F	G	H	I	J
No. of household member	Name	Father's name	Is this person a visitor? **No = 0** **Yes = 1**	Age in (years) (0 if <1 year)	Age in months if <12 Months (0 if <1 month)	Sex Male .....1 Female .2	Did this person sleep in the house last night? No = 0 Yes = 1	**If Yes to G,** Did you sleep under a bed net last night No = 0 Yes = 1	Is this person present in the household at the time of survey? No = 0 Yes = 1	If female 15-49 years is the person Married .....1 Divorced ....2 Widowed....3 **Unmarried…4** **If woman is married, divorced or widowed please complete the women's questionnaire**
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										

Member of the household providing the information (specify number) |___|___|
Member of the household providing the information (specify number) |___|___|

No. of household member	Name	Father's name	Is this person a visitor? **No = 0** **Yes = 1**	Age in (years) (0 if <1 year)	Age in months if <12 Months (0 if <1 month)	Sex Male .....1 Female .2	Did this person sleep in the house last night? No = 0 Yes = 1	**If Yes to G,** Did you sleep under a bed net last night No = 0 Yes = 1	Is this person present in the household at the time of survey? No = 0 Yes = 1	If female 15-49 years is the person Married .....1 Divorced ....2 Widowed....3 **Unmarried…4** **If woman is married, divorced or widowed please complete the women's questionnaire**
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

Member of the household providing the information (specify number) |___|___|
Member of the household providing the information (specify number) |___|___|

Information about the head of the household and the house

	17. Sex of the head of the household (1) Man (2) Woman
	18. Is the head of the household able to (1) Read & Write (2) Read only (3) Neither
	19. Education attainment of the head of the household (completed)

(0) Never been to school (1) Madrasa (2) Koranic school (3) Primary incomplete (4) Primary complete (5) Secondary incomplete (6) Secondary complete (7) Diploma (8) Degree

	20. Main house wall type (1) Thatched Hut (2) Mud (3) Iron sheets (4) Brick/ Stone/Cement
	21. Which type of window have your HH (1) Window with glasses (2) Window with screen (3) Window with curtain (4) Window without glass 5) None
	22. The number of rooms or quarters including toilets and kitchen in the household |____|____|
	23. How many sleeping rooms in the household |____|____|
	24. What is the primary source of water in the household ***(tick all that apply)**

(1) Piped Inside Dwelling (2) Piped to a Nearby Spot (3) Protected Well/Spring (4) Unprotected Well/Spring (5) Rain Water/Dam/Berkad (6) Tanker Truck (7) River/Streams (8) Bottled Water (9) Others mention |_____|

	25. Where does the household go for its toilet needs ***(tick all what apply)**

(1) Flush toilet (2) Pit Latrine (3) Trench/Bucket (4) Bush; (5) Other (specify) |_____|

Does the household have

	26. Electricity	(0) No	(1) Yes
	27. Radio	(0) No	(1) Yes
	28. Television	(0) No	(1) Yes
	29. Telephone /mobile telephone	(0) No	(1) Yes
	30. Refrigerator	(0) No	(1) Yes
	31. Fan	(0) No	(1) Yes
	32. Air Conditioner	(0) No	(1) Yes

Does any member of your household have

	33. Bicycle/Motorcycle	(0) No	(1) Yes
	34. Car or truck	(0) No	(1) Yes
	35. Donkey cart	(0) No	(1) Yes

Livestock possessed by family

	36. Does the family possess any livestock (0) No (1) Yes
	37. Goats (specify the number of heads) |____|____|____|
	38. Sheep (specify the number of heads) |____|____|____|
	39. Cows (specify the number of heads) |____|____|____|
	40. Camels (specify the number of head) |____|____|____|

Preventive measures around the household

	41. Does the family own mosquito bed nets (0) no (1) yes

<u>If Q41 yes proceed to question 42 and if no proceed to question 53</u>

	42. How many mosquito nets does the household have **|___|___|**
	43. Number of untreated nets **|___|___|**
	44. Number of LLITN **|___|___|**

	Net number	Net 1	Net 2	Net 3	Net 4	Net 5	Net 6	Net 7
47 A-G	Ask to see the net available	Not observed ….0 Observed ………..1	Not observed ….0 Observed ………..1	Not observed ….0 Observed ………..1	Not observed ….0 Observed ………..1	Not observed ….1 Observed ………..0	Not observed ….0 Observed ………..1	Not observed ….0 Observed ………..1
48 A-G	Net condition	1-No holes 2-Smaller than a thumb 3->thumb but smaller than fist 4->fist but smaller than head 5-larger than head	1-No holes 2-Smaller than a thumb 3->thumb but smaller than fist 4->fist but smaller than head 5-larger than head	1-No holes 2-Smaller than a thumb 3->thumb but smaller than fist 4->fist but smaller than head 5-larger than head	1-No holes 2-Smaller than a thumb 3->thumb but smaller than fist 4->fist but smaller than head 5-larger than head	1-No holes 2-Smaller than a thumb 3->thumb but smaller than fist 4->fist but smaller than head 5-larger than head	1-No holes 2-Smaller than a thumb 3->thumb but smaller than fist 4->fist but smaller than head 5-larger than head	1-No holes 2-Smaller than a thumb 3->thumb but smaller than fist 4->fist but smaller than head 5-larger than head
49 A-G	Source of net	Don't know …….0 Private shop ……1 ANC/Clinic…………..2 Campaign…………3 Others …………….4. |_____________|	Don't know …….0 Private shop ……1 ANC/Clinic…………..2 Campaign…………3 Others …………….4. |_____________|	Don't know …….0 Private shop ……1 ANC/Clinic…………..2 Campaign…………3 Others …………….4. |_____________|	Don't know …….0 Private shop ……1 ANC/Clinic…………..2 Campaign…………3 Others …………….4. |_____________|	Don't know …….0 Private shop ……1 ANC/Clinic…………..2 Campaign…………3 Others …………….4. |_____________|	Don't know …….0 Private shop ……1 ANC/Clinic…………..2 Campaign…………3 Others …………….4. |_____________|	Don't know …….0 Private shop ……1 ANC/Clinic…………..2 Campaign…………3 Others …………….4. |_____________|
50 A-G	For how long have you owned this bed net	Don't know …….0 0-6 months [__] 7-12 months [__] 12-36 months [__] >36 months [__]	Don't know …….0 0-6 months [__] 7-12 months [__] 12-36 months[__] >36 months [__]	Don't know …….0 0-6 months [__] 7-12 months [__] 12-36 months[__] >36 months [__]	Don't know …….0 0-6 months [__] 7-12 months [__] 12-36 months[__] >36 months [__]	Don't know …….0 0-6 months [__] 7-12 months [__] 12-36 months[__] >36 months [__]	Don't know …….0 0-6 months [__] 7-12 months [__] 12-36 months[__] >36 months [__]	Don't know …….0 0-6 months [__] 7-12 months [__] 12-36 months[__] >36 months [__]
51 A-G	Type of the bed net available	Non-treated ……1 LLIN ………………..2	Non-treated ……1 LLIN………………...2	Non-treated ……1 LLIN ………………...2	Non-treated ……1 LLIN ………………..2	Non-treated ……1 ILLO………………...2	Non-treated ……1 LLIN………………...2	Non-treated ……1 LLIN………………...2
52 A-G	Persons who slept under the net last night (check household list for ID)	None……………..0 Mem1 ID|__|__| Mem2 ID|__|__| Mem3 ID|__|__|	None……………..0 Mem1 ID|__|__| Mem2 ID|__|__| Mem3 ID|__|__|	None……………..0 Mem1 ID|__|__| Mem2 ID|__|__| Mem3 ID|__|__|	None……………..0 Mem1 ID|__|__| Mem2 ID|__|__| Mem3 ID|__|__|	None……………..0 Mem1 ID|__|__| Mem2 ID|__|__| Mem3 ID|__|__|	None……………..0 Mem1 ID|__|__| Mem2 ID|__|__| Mem3 ID|__|__|	None……………..0 Mem1 ID|__|__| Mem2 ID|__|__| Mem3 ID|__|__|

BED NETS – KNOWLEDGE, ATTITUDES AND PRACTICES

IF NO BED NETS ARE AVAILABLE IN HOUSEHOLD ASK Q. 53 & 54

53. What is the reason for not having a net in the household

	53.1. Never heard of bed nets	(1) Not mentioned	(2) mentioned
	53.2. Price of bed net is not affordable	(1) Not mentioned	(2) mentioned
	53.3. No one is selling bed nets in the area	(1) Not mentioned	(2) mentioned
	53.4. Mosquito is not a problem in the area	(1) Not mentioned	(2) mentioned
	53.5. Malaria is not a problem in the area	(1) Not mentioned	(2) mentioned
	53.6. Nets don't reduce or eliminate the risk of mosquito bite	(1) Not mentioned	(2) mentioned
	53.7. Nets don't reduce or eliminate the risk of malaria	(1) Not mentioned	(2) mentioned
	53.8. Not practical to sleep under bed net	(1) Not mentioned	(2) mentioned
	53.9. Mosquito still bite even when sleeping under net	(1) Not mentioned	(2) mentioned
	53.10. Not enough space to hang the net	(1) Not mentioned	(2) mentioned
	53.11. Insecticide included is dangerous for health	(1) Not mentioned	(2) mentioned
	53.12. Others |_____|		

54 If a bed net is provided will you use it?

	(1) Not at all	(2) Yes some nights	(3) Yes every night

IF BED NETS ARE AVAILABLE IN THE HOUSEHOLD ASK Q 55 TO 57

55. What is the main reason for using bed net

	(1) Protection from mosquito/insect bite (2) Preventing malaria (3) Both
	(4) others (specify) |_____|

56. Advantages of sleeping under bed net * (tick as many as mentioned) (0) Has no advantage

	56.1. Avoid the painful bite of mosquito/other insects	(1) Not mentioned	(2) mentioned
	56.2. Minimize/eliminate the risk of Malaria	(1) Not mentioned	(2) mentioned
	56.3. Sleep better when sleeping under net	(1) Not mentioned	(2) mentioned
	56.4. Others |_____|		

57. Disadvantages of sleeping under bed net* (0) Has no disadvantage

	57.1. Sleeping place get too warm /hot	(1) Not mentioned	(2) mentioned
	57.2. Feel that there is no enough air	(1) Not mentioned	(2) mentioned
	57.3. Mosquito still bite	(1) Not mentioned	(2) mentioned
	57.4. Takes time to tuck it in every night	(1) Not mentioned	(2) mentioned
	57.5. Difficult when getting up in the night	(1) Not mentioned	(2) mentioned
	57.6. Itch or allergic	(1) Not mentioned	(2) mentioned
	57.7. Others |_____|		

58. Malaria in the household (for all participants)

	58.1. Any member of the household ever had malaria	(0) No	(1) Yes
	58.2. Any member of household had malaria in last 3 months	(0) No	(1) Yes
	58.3. Any member of the household died from malaria in the last 12 months	(0) No	(2) Yes

END HOUSEHOLD INTERVIEW AND PROCEED WITH INDIVIDUAL INTERVIEW

THE FIRST MALARIA INDICATORS SURVEY – SOMALIA, 2013

INDIVIDUAL QUESTIONNAIRE (FORM – B)

INTERVIEWER NAME_____

1. **Member unique ID |___|___| |___|___| |___|___| |___|___||___|___|**
   Region District Cluster Household Member
2. **Member Name _____**

Information on malaria morbidity and health seeking behavior among ALL AGES

To be filled at the end of interview		
3.	**Rapid Diagnostic Test**	(1) REFUSE BLOOD TEST (2) TEST DONE
4.	**Blood film**	(1) REFUSED BLOOD TEST (2) TEST DONE
5.	**Filter Paper**	(1) REFUSED BLOOD TEST (2) TEST DONE

6. Age |__|__| Years completed [0] if < 1 year

7. Age |__|__| Months completed [0] if < 1 month

8. Sex (1) Male (2) Female IF FEMALE 15-49 YEARS

9. Marital Status (1) Married (2) Divorced (3) Widowed (4) Unmarried **IF FEMALE 15-49 YEARS AND MARRIED, DIVORCED OR WIDOWED PLEASE REMEMBER TO FILL FORM C**

11. Are you able to read and write
(1) read (2) read & write (3) neither (0) Below education age [under 6 year]

12. Educational attainment (completed)
(0) Never been to school (1) Madrasa (2) Koranic school (3) Primary incomplete (4) Primary complete (5) Secondary incomplete (6) Secondary complete (7) Diploma (8) Degree

13. Are you still studying (0) No (1) Yes (2) Below education age

14. Are you employed or self-employed job (0) No (1) Yes

15. If Yes what is the type of job (mention)
|_____|

16. Paid in (1) Cash (2) Food or other (3) Not employed

Sleeping under bed net (this question can also be a check for net roster table)

17. Did you sleep under a bed net every night last month
(0) No (1) Yes (2) Don't have a net

18. Did you sleep under bed net last night (0) don't have bed net (1) No (2) yes

19. If yes; which type of bed net (1) Untreated (2) LLIN

Fever at the time of the survey

20. Do you have fever now (0) No (1) Yes

21. Recorded temperature **[___|___|. [___| ^{0} C** (0) Refused taking temperature

Fever in the two weeks prior to the survey

22. Did you have fever in the 2 weeks prior to the survey
(0) No **If [NO] _____ GO TO QUESTION 45**
(1) Yes **If [YES] _____ PROCEED TO QUESTION 23**

23. When did the fever start (day/month)? |___|___|.|___|___|

24. Has the fever resolved? (0) No (1) Yes

[ ] 25. When has the fever resolved (day/month)? |___|___|.|___|___|

Please - Recheck with participant and provide a summary of fever in the previous two weeks

Summary of fever in the two weeks prior to the survey

[ ] 26. Fever in the previous two weeks (1) Had a fever and resolved
(2) Had a fever and still continuous

[ ] 27. Duration of the fever |___|___| Days (write 01 if the fever resolved in the same day)
(Even if not resolved)

[ ] 28. Was the fever associated with other symptoms? (0) No (1) Yes

29. **If Q28 is YES**, what were these symptoms

[ ]	29.1. Headache & malaise	(0) No	(1) yes
[ ]	29.2. Sweating and /or chills	(0) No	(1) yes
[ ]	29.3. Muscle/body/joints aches	(0) No	(1) yes
[ ]	29.4. Nausea/vomiting	(0) No	(1) yes
[ ]	29.5. Diarrhea / loose stool	(0) No	(1) yes
[ ]	29.6. Abdominal pain	(0) No	(1) yes
[ ]	29.7. Running nose	(0) No	(1) yes
[ ]	29.8. Sore throat	(0) No	(1) yes
[ ]	29.9. Cough	(0) No	(1) yes
[ ]	29.10. Difficulty breathing	(0) No	(1) yes
[ ]	29.11. Convulsions	(0) No	(1) yes
[ ]	29.12. Others (mention)	(0) No	(1) yes |_____|

[ ] 30. Did you take any action to treat the **FEVER?**

(0) No **If [NO] _____ go to Q 44 & ask why no action was taken**
(1) Yes **If [YES] _____ proceed to Q 31**

Health seeking behaviour for fever **(0) No action taken**

[ ] **31. What did you do to treat the fever *(select all actions taken to treat the fever and indicate whether first action, second, third etc)**

Source	**Order of visit,** i.e. First, Second etc…
(1) Consulted a Sheikh	_____
(2) Decided self-management	_____
(3) Private Clinic	_____
(4) Consulted traditional healer	_____
(5) Visited a drug store	_____
(6) Visited health care facility	_____
(7) Others, specify |_____|	_____

If pharmacy/drug store or health facility were visited complete Q. 32 to 38

32. Time of the action taken
(1) ≤ 24 hrs (2) >24 –≤48 hrs
(3) >48 – ≤72 hrs (4) > 72 hrs

33. Medications received
(9) Don't know (3) Antipyretics
(1) No medication (4) Antibiotics
(2) Herbs/traditional medicine (5) **Anti-malarial**
(6) Others mention |_____|

If anti-malaria drugs were received complete Q. 38 to 40

34. Outcome of treatment
(1) Cure (2) Improvement
(3) No improvement (4) Worsen

Information on health facility **(0) Health facility or drug store not visited**

35. Type of health facility
Public sector (1) Health post (2)MCH (3) Health care
(4) Hospital

Private sector (5) Private clinic (6) Private hospital (7) Pharmacy/Drug store

36. Travel time from home to facility |__|__|__| minutes
37. Waiting time at facility |__|__|__| minutes
38. Blood tested for malaria (1) No ; Yes and results were (2) Negative (3) Positive (9) Don't know
39. Cost of medical consultation (not including medications) |__|__|__| USD
40. Cost of blood test (999) if not tested|__|__|__| USD

Information on anti-malaria drugs **(0 Anti-malaria drugs not received**

41. Type of antimalarial drugs
(1) AS + SP (ACT) (5) Cotexcin
(2) SP/Fansidar (6) Primaquine
(3) Chloroquine (7) Quinine
(4) Coartem (AL) (9) Don't know
(8) Others mention |_____|

42. Source of antimalarial drugs
Public sector (1) Health post (2) MCH (3) Health Centre
(4) Hospital

Private sector (9) Private clinic (10) Private hospital (11) Pharmacy/Drug store

43. Cost of antimalarial drugs |__|__|__| USD

IF PARTICIPANT HAD FEVER IN THE TWO WEEKS PRIOR TO SURVEY ASK WHY THEY DID NOT TAKE ANY

ACTION BY COMPLETING QUESTION 44 A TO E

44. A. Disease related reasons for not taking action

	44A1 Fever was mild	(1) Not mentioned (2) Mentioned
	44A2 Fever will resolve spontaneously	(1) Not mentioned (2) Mentioned
	44A3 Fever was not attributed to malaria	(1) Not mentioned (2) Mentioned

44. B. Cost of care reasons for not taking action

	44B Cannot afford the cost of consultation/medications	(1) Not mentioned (2) Mentioned

44C. Health facility reasons for not taking action

	44C1 Health facility is far (long travel distance)	(1) Not mentioned (2) Mentioned
	44C2 Long waiting time at the facility	(1) Not mentioned (2) Mentioned

44 D. Quality of health service reasons for not taking action

	44D1 Care at the health facility is poor/inadequate	(1) Not mentioned (2) Mentioned
	44D2 Shortage of drugs at the health facility	(1) Not mentioned (2) Mentioned
	44D3 Workers at the health facility are not efficient	(1) Not mentioned (2) Mentioned
	44D4 Workers behavior at the health facility was not good	(1) Not mentioned (2) Mentioned
	44D5 Workers at the health facility are not available	(1) Not mentioned (2) Mentioned

	44 E. Other reasons for not taking action |_____|

MALARIA RELATED HEALTH KNOWLEDGE (Unprompted then prompted)
Applicable to household members aged 12 years and above (99) Below the age of 12 years

	45. Is malaria a risk in your area?	(0) Don't know (1) No risk at all (2) Low risk (3) High risk
	46. Malaria is manifested * as	(0) Don't know (1) Fever (2) feeling cold/chills (3) Sweating (4) Diarrhea (5) body pain (6) Others |_____|
	47. Malaria is transmitted by	(0) Don't know (1) contaminated food and drinks (2) Contact with infected person (3) Mosquito bite (4) Bite of other insects other than mosquito (5) Air borne and droplet from infected persons (6) Contact with birds (7) Others [_____]
	48. Best measure(s) to prevent malaria is	(0) Don't know (1) Keep the surroundings clean (2) Use of mosquito nets (3) use of mosquito repellant (4) Use of coils (5) screening windows (6) Spraying insecticides indoor & outdoor (7) Taking anti-malaria drugs in the transmission season

(8) Filling up water puddles

	49. Have you ever been exposed to health education about malaria (0) No (1) Yes
	50. If yes what was the source of malaria message * (tick all that apply) (1) Radio /Television (2) Newspapers (3) Health facility (4) work place (5) School (6) Mosque (7) Family/friends (8) Educational materials (posters/notice) (9) Community meetings
	51. If received malaria messages which of the following was addressed * (tick all that apply) (1) Transmission methods (2) Prevention (3) Treatment
	52. Have you ever had malariayourself? (0) No (1) Yes
	53. Did a household member have malariain the past? (0) No (1) Yes
	54. Do you know someone in your village who died from malaria in the past? (0) No (1) Yes

TRAVEL HISTORY SECTION

	55. Have you travelled inside or outside the country in the last two months? IF NO PROCEED TO QUESTION 62 (0) No (1) Yes
	56. If inside the country where did you travel? Write name of place …… …… ……
	57. Which month did you travel? |__|__|/|__||__|
	58. How long did you stay (days) |__|__|__|
	59. If outside the country where did you travel? …… …… ……
	60. Which month did you travel? |__|__|/|__||__|
	61. How long did you stay (days)? |__|__|__|

RDT RESULTS

	62. What was the result of the RDT? 1. Positive; 2. Negative; 3. Invalid
	63. If Positive which parasite specie? 1. Falciparum; 2. Vivax; 3. Mixed

THANK YOU FOR PARTICIPATION IN THIS SURVEY

THE FIRST MALARIA INDICATORS SURVEY – SOMALIA, 2013

WOMEN 15-49 YEARS QUESTIONNAIRE (FORM – C)

W1. Woman's unique ID |___|___| |___|___| |___|___| |___|___||___|___|
Region District Cluster Household Member

W2. Woman's Name _____

	W3. Have you been pregnant at any time during the last 12 months? (0) No (1) Yes
	W4. During your last pregnancy, did you see anyone for antenatal care? (0) No (1) Yes
	W5. If yes, who did you see? (1) Doctor (2) Nurse/Midwife (3) Auxiliary Midwife (4) Traditional Birth Attendant (5) Other [_____]
	W6. During your last pregnancy did you breastfeed your child? (0) No (1) Yes
	W7. If Yes, When did you start breastfeeding your child? Within: (1) one hour (2) one day (3) one week (4) more than one week.
	W8. For how long did you breastfeed? (1) less than six months (2) six months (3) more than six months.
	W9. If six months or less did you breastfeed exclusively? (0) No (1) Yes

CHILD MORTALITY SECTION		**CM**
This module is to be administered to all ever-married women *All questions refer only to LIVE births.*		
CM1. NOW I WOULD LIKE TO ASK ABOUT ALL THE BIRTHS YOU HAVE HAD DURING YOUR LIFE. HAVE YOU EVER GIVEN BIRTH?	Yes .....1 No 2	2⇨CM8
CM4. DO YOU HAVE ANY SONS OR DAUGHTERS TO WHOM YOU HAVE GIVEN BIRTH WHO ARE NOW LIVING WITH YOU?	Yes .....1 No 2	2⇨CM6
CM5. HOW MANY SONS LIVE WITH YOU? HOW MANY DAUGHTERS LIVE WITH YOU? *If none, record '00'*.	Sons at home.....__ __ Daughters at home.....__ __	
CM6. DO YOU HAVE ANY SONS OR DAUGHTERS TO WHOM YOU HAVE GIVEN BIRTH WHO ARE ALIVE BUT DO NOT LIVE WITH YOU?	Yes .....1 No 2	2⇨CM8
CM7. HOW MANY SONS ARE ALIVE BUT DO NOT LIVE WITH YOU? HOW MANY DAUGHTERS ARE ALIVE BUT DO NOT LIVE WITH YOU? *If none, record '00'*.	Sons elsewhere.....__ __ Daughters elsewhere .....__ __	
CM8. HAVE YOU EVER GIVEN BIRTH TO A BOY OR GIRL WHO WAS BORN ALIVE BUT LATER DIED? *If "No" probe by asking:* I MEAN, TO A CHILD WHO EVER BREATHED OR CRIED OR SHOWED OTHER SIGNS OF LIFE – EVEN IF HE OR SHE LIVED ONLY A FEW MINUTES OR HOURS?	Yes .....1 No 2	2⇨CM10
CM9. HOW MANY BOYS HAVE DIED? HOW MANY GIRLS HAVE DIED? *If none, record '00'*.	Boys dead .....__ __ Girls dead .....__ __	
CM10.*Sum answers to CM5, CM7, and CM9.*	Sum.....__ __	

CM11. JUST TO MAKE SURE THAT I HAVE THIS RIGHT, YOU HAVE HAD IN TOTAL (*total number in CM10*) LIVE BIRTHS DURING YOUR LIFE. IS THIS CORRECT?

☐*Yes. Check below:*

☐*No live births ⇨ Go to ILLNESS SYMPTOMS Module*

☐*One or more live births ⇨ Continue with the BIRTH HISTORY module*

☐*No ⇨ Check responses to CM1-CM10 and make corrections as necessary before proceeding to the BIRTH HISTORY Module or ILLNESS SYMPTOMS Module*

BIRTH HISTORY — BH

NOW I WOULD LIKE TO RECORD THE NAMES OF ALL OF YOUR BIRTHS, WHETHER STILL ALIVE OR NOT, STARTING WITH THE FIRST ONE YOU HAD.
Record names of all of the births in BH1. Record twins and triplets on separate line. If there are more than 14 births, use an additional questionnaire.

Birth Order (From first to last)	BH1. WHAT NAME WAS GIVEN TO YOUR (*first/next*) BABY?	BH2. WERE ANY OF THESE BIRTHS TWINS? 1 Single 2 Multiple	BH3. IS (*name*) A BOY OR A GIRL? 1 Boy 2 Girl	BH4. IN WHAT MONTH AND YEAR WAS (*name*) BORN? *Probe*: WHAT IS HIS/HER BIRTHDAY?		BH5. IS (*name*) STILL ALIVE? 1 Yes 2 No	BH6. HOW OLD WAS (*name*) AT HIS/HER LAST BIRTHDAY? *Record age in completed years.*	BH7. IS (*name*) LIVING WITH YOU? 1 Yes 2 No	BH8. *Record household and child line number (from Household list)* *Record "00" if child is not listed.*	BH9. *If dead:* HOW OLD WAS (*name*) WHEN HE/SHE DIED? *If "1 year", probe:* HOW MANY MONTHS OLD WAS (*name*)? *Record days if less than 1 month; record months if less than 2 years; or years*		BH10. WERE THERE ANY OTHER LIVE BIRTHS BETWEEN (*name of previous birth*) AND (*name*), INCLUDING ANY CHILDREN WHO DIED AFTER BIRTH? 1 Yes 2 No
Line	Name	S M	B G	Month	Year	Y N	Age	Y N	Line No	Unit	Number	Y N
01		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ___ ___ ⇨Next Line	Days 1 Months.....2 Years3	___ ___	
02		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ___ ___ ⇨BH10	Days 1 Months.....2 Years3	___ ___	1 Add Birth 2 Next Birth
03		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ___ ___ ⇨BH10	Days 1 Months.....2 Years3	___ ___	1 Add Birth 2 Next Birth
04		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ___ ___ ⇨BH10	Days 1 Months.....2 Years3	___ ___	1 Add Birth 2 Next Birth
05		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ___ ___ ⇨BH10	Days 1 Months.....2 Years3	___ ___	1 Add Birth 2 Next Birth
06		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ___ ___ ⇨BH10	Days 1 Months.....2 Years3	___ ___	1 Add Birth 2 Next Birth
07		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ___ ___ ⇨BH10	Days 1 Months.....2 Years3	___ ___	1 Add Birth 2 Next Birth

Birth Order (From first to last)	BH1. WHAT NAME WAS GIVEN TO YOUR (*first/next*) BABY?	BH2. WERE ANY OF THESE BIRTHS TWINS? 1 Single 2 Multiple	BH3. IS (*name*) A BOY OR A GIRL? 1 Boy 2 Girl	BH4. IN WHAT MONTH AND YEAR WAS (*name*) BORN? *Probe*: WHAT IS HIS/HER BIRTHDAY?		BH5. IS (*name*) STILL ALIVE? 1 Yes 2 No	BH6. HOW OLD WAS (*name*) AT HIS/HER LAST BIRTHDAY? *Record age in completed years.*	BH7. IS (*name*) LIVING WITH YOU? 1 Yes 2 No	BH8. *Record household and child line number (from Household list)* *Record "00" if child is not listed.*	BH9. *If dead:* HOW OLD WAS (*name*) WHEN HE/SHE DIED? *If "1 year", probe:* HOW MANY MONTHS OLD WAS (*name*)? *Record days if less than 1 month; record months if less than 2 years; or years*		BH10. WERE THERE ANY OTHER LIVE BIRTHS BETWEEN (*name of previous birth*) AND (*name*), INCLUDING ANY CHILDREN WHO DIED AFTER BIRTH? 1 Yes 2 No
Line	Name	S M	B G	Month	Year	Y N	Age	Y N	Line No	Unit	Number	Y N
08		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ⇨BH10	Days 1 Months..... 2 Years3	___ ___	1 Add Birth 2 Next Birth
09		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ⇨BH10	Days 1 Months..... 2 Years3	___ ___	1 Add Birth 2 Next Birth
10		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ⇨BH10	Days 1 Months..... 2 Years3	___ ___	1 Add Birth 2 Next Birth
11		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ⇨BH10	Days 1 Months..... 2 Years3	___ ___	1 Add Birth 2 Next Birth
12		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ⇨BH10	Days 1 Months..... 2 Years3	___ ___	1 Add Birth 2 Next Birth
13		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ⇨BH10	Days 1 Months..... 2 Years3	___ ___	1 Add Birth 2 Next Birth
14		1 2	1 2	___ ___	___ ___ ___ ___	1 2 ⇨ BH9	___ ___	1 2	___ ___ ⇨BH10	Days 1 Months..... 2 Years3	___ ___	1 Add Birth 2 Next Birth

BH11. HAVE YOU HAD ANY LIVE BIRTHS SINCE THE BIRTH OF (*name of last birth in Birth History*)?	Yes ..... 1 No 2	1⇨Record Birth(s) in Birth History

CM12. *Compare number in CM10 with number of births in the Birth History above and check:* ☐*Numbers are same ⇨ Continue with CM13* ☐*Numbers are different ⇨ Probe and reconcile*
CM13. *Check BH4 in BIRTH HISTORY: Last birth occurred within the last 2 years, that is, since (day and month of interview) in 2009* ☐ *No live birth in last 2 years. ⇨ Go to ILLNESS SYMPTOMS Module.* ☐*One or more live births in last 2 years. ⇨ Record name of last born child and continue with next module* *Name of child*_____ *If child has died, take special care when referring to this child by name in the following modules.*

10.Annex 2 Consent forms

INFORMED CONSENT FORM FOR INTERVIEW OF HOUSEHOLD HEAD AND OTHER HOUSEHOLD MEMBERS

1. **All adults (≥18 years) shall provide their own consent**
2. **For all children (<18year) parent or caretaker to provide consent**
3. **For children 13 to <18 years must also provide verbal assent**

INFORMED CONSENT FORM FOR INDIVIDUALS

INFORMED CONSENT

Hello. My name is _____ and I am working with (NAME OF ORGANIZATION). We are conducting a national survey about malaria. We would very much appreciate your participation in this survey. The information you provide will help the government to plan malaria services. The survey usually takes between 10 and 20 minutes to complete. Whatever information you provide will be kept strictly confidential and will not be shown to other persons.

Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. However, we hope that you will participate in this survey since your views are important.

At this time, do you want to ask me anything about the survey?
May I begin the interview now?

Signature of interviewee: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED ..... 1 ↓ RESPONDENT DOES NOT AGREE TO BE INTERVIEWED ..... 2 —▯END

1. **All adults (≥18 years) shall provide their own consent**
2. **For all children (<18year) parent or caretaker to provide consent**
3. **For children 13 to <18 years must also provide verbal assent**

INFORMED CONSENT (HOUSEHOLD MEMBER 1)

Hello. My name is _____ and I am working with National Malaria Control Programme, Ministry of Health. We are conducting a national survey about malaria. We would very much appreciate your participation in this survey. The information you provide will help the government to plan malaria services. The survey usually takes between 10 and 20 minutes to complete. Whatever information you provide will be kept strictly confidential and will not be shown to other persons. As part of this survey, we are studying malaria among all persons. Malaria is a serious health problem that results from the bite of an infected mosquito. This survey will assist the government to develop programs to prevent and treat this important health problem.

Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. However, we hope that you will participate in this survey since your views are important.

We request that everyone in the household give a few drops of blood from a finger for malaria testing. The test uses disposable sterile instruments that are clean and completely safe. The blood will be analyzed with new equipment and the results of the test will be given to you right after the blood is taken. The results will be kept confidential. Anyone found to have malaria will be treated straight away by with nationally recommended medicines.

May I now ask that (NAME OF PERSON]) participate in the malaria test. However, if you decide not to have you or your child tested, it is your right and we will respect your decision.

At this time, do you want to ask me anything about the survey?
May I begin the interview now and then do the blood test afterwards?

Signature of interviewee: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED .....1 ↓ RESPONDENT DOES NOT AGREE TO BE INTERVIEWED .....2 —END

11. Annex 2 Field Work summary sheets

SOMALIA MALARIA INDICATOR SURVEYS (MIS) 2013 FOR INTERVIEWER 2

HOUSEHOLD ID [___ ___] [___ ___] [___ ___] [___ ___]
Region District Cluster Household

LINE NUMBER OF PERSON	NAME OF HOUSEHOLD MEMNER
[___|___]	
[___|___]	
[___|___]	
[___|___]	
[___|___]	
[___|___]	
[___|___]	
[___|___]	
[___|___]	
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[___|___]	
[___|___]	
[___|___]	
[___|___]	
[___|___]	
[___|___]	

SOMALIA MALARIA INDICATOR SURVEYS (MIS) 2013 MALARIA TESTING FORM

HOUSEHOLD ID [___ ___] [___ ___] [___ ___] [___ ___]
Region District Cluster Household

LINE	NAME OF HOUSEHOLD	TEST DONE?	RDT RESULT	SLIDE DONE	FILTER PAPER

NUMBER OF PERSON	MEMNER	NO = 0, YES = 1	0= NEGATIVE; 1= PF POSITIVE; 2 = PV POSITIVE; 3= MIXED;	NO= 0; YES= 1	DONE NO= 0; YES= 1; Not Applicable = 2
[___|___]					
[___|___]					
[___|___]					
[___|___]					
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