

The Alliance for Malaria Prevention

Sudan LLINs tracking system

Background information and description



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1: Background information

During the last 10 years, insecticide-treated net (ITN) use has contributed to significant reductions in malaria morbidity and mortality rates worldwide. Sustaining high coverage and ensuring consistent use of long-lasting ITNs (LLINs) have become main goals of most National Malaria Control Programmes (NMCP). The challenge is to increase net ownership and use and to sustain universal coverage, which the World Health Organization (WHO) defines as one net for every two people at risk of malaria. In general, this can be achieved with a combined programme of regular mass net distributions and continuous distribution of nets at health facilities during antenatal visits, child immunization visits and mother child clinics and through other channels, as well as educating populations on malaria prevention and treatment and the proper use and care of nets.

Achieving universal coverage is one challenge: *sustaining* it is a different issue that must be addressed by every country distributing LLINs through channels that are accessible to populations on a continuous basis such as through routine services like the Expanded Programme on Immunization (EPI) and antenatal care (ANC). The durability of a LLIN is now generally accepted to be around three years, depending on country circumstances, such as climate and operational conditions¹. Replacing worn out nets therefore has to be done on a regular basis and mass distribution campaigns are typically planned for every three years in line with modelled projections on LLIN durability. In 2014 alone, with support from the Alliance for Malaria Prevention (AMP), over 53 million nets were successfully distributed through campaign and continuous distribution.

Mass LLIN distributions are costly operations, both in terms of finance and other resources. In this context, the main donors of nets for mass distributions, as well as the governments and the malaria programme of the countries concerned, require confirmation that investments have been and are being put to good use. That requires accountability on the part of those requesting funding for the acquisition of nets, as well as adequate monitoring of the supply chain management and the logistics activities in order to show that the right number of nets is reaching the targeted beneficiaries in the most efficient, cost-effective and transparent way. All this requires meticulous planning and good coordination between NMCP staff, concerned ministries (e.g. Health, Education, Fisheries, Agriculture, Environment, etc.) and other stakeholders and partners.

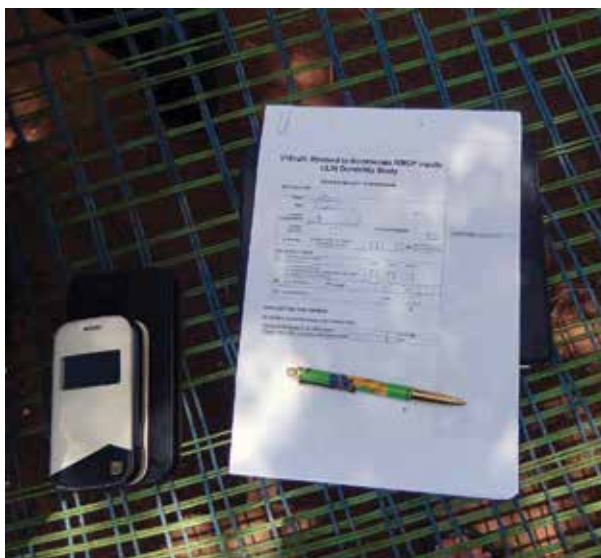
1. Research is continuing on LLIN durability and more country-specific data are now becoming available to tailor LLIN distribution approaches using contextual data.

2: Sudan LLINs tracking system

It is in view of this requirement that in 2015, with the support of WHO, The Global Fund and UNICEF, and with technical assistance from AMP, one country began to develop and undertake a systematic programme of LLIN overview and tracking. Over a period of several years, Sudan has undertaken a series of mass distributions in 12 targeted states. The programme strives to replace used LLINs with new nets every three years, in line with the WHO recommendations for countries that do not have country-specific data on net durability and the longevity of net ownership in households.

The LLIN tracking system that Sudan has developed will be used to:

- Improve the planning and implementation of LLIN mass campaign distribution
- Improve the planning, implementation and assessment of effectiveness of the continuous distribution of LLINs through the primary health care services (e.g. antenatal care, Expanded Programme on Immunization)
- Adjust LLIN mass distributions through improved planning for the timing of replacement nets in the field



- Measure coverage post-campaign
- Identify geographic areas where added effort is needed to increase LLIN ownership, utilization, care and repair
- Generate knowledge about the serviceable life of bed nets under the operational conditions of the country, as well as questions for follow-up regarding behavioural and other aspects of bed net degradation in the field.



The task force from Sudan NMCP, while planning the tracking system, was well aware that attention had to be paid to a number of different operational and resource areas. Skilled and well-trained staff are required, partnerships with other health areas such as immunization, reproductive health and health communications, UN agencies and with international and country NGOs must be developed and nurtured, funding must be secured and indicators developed that will measure the process and progress of the system. All these areas needed to be in place, or well-planned, for the tracking system to be fully functional and most effective.

The LLIN tracking system developed by Sudan has seven major elements:

1. Macro-quantification of LLINs
2. Procurement and supply chain management – tracking the process
3. Process assessment of the campaign
4. LLIN periodic assessment survey
5. Bio-efficacy testing

6. Monitoring the continuous distribution of LLINs through Primary Health Care services
7. Monitoring behaviour change communication

The elements of the system work together to ensure that LLINs reach the right households, at the right time, in the right amounts, and that universal coverage will be achieved and sustained. The elements also allow for periodic assessments of net ownership and use, as well as durability and survival, giving planners a reliable database to assess the situation and make informed decisions/take action if needed.

Ownership and use of nets are key measures to assess programme performance, and while the Malaria Indicator Survey (MIS) generates data on these questions, the MIS surveys are typically held only every three years. Durability is based on an assumption that the median serviceable life of a LLIN is three years, but this assumption needs to be questioned. Durability may depend on the operational conditions of the country, or on behavioural factors, for example. It is important to find out the reasons for attrition of nets. Knowledge about durability is needed in order to estimate the rate of replacement through continuous distribution systems, establish the appropriate time between mass campaigns, and plan appropriate sustained communication and social mobilization strategies and methodologies to address the key challenges identified.

Durability

The WHO Guidelines for monitoring the durability of LLINs under operational settings describe three components to be measured: (1) survivorship and attrition, (2) physical integrity and (3) insecticidal activity:

Survivorship is the proportion of distributed nets still available for use as intended in the households to which they were given after a defined period of time. The inverse, **attrition**, is the proportion of nets no longer in use as intended after a defined period of time (due to decay, destruction, absence, or used for other purposes).

Physical integrity refers to the number, location and size of holes on examination. Each net is categorized as being in good or serviceable condition, or “torn” if its protective efficacy is in doubt.

Insecticidal activity is the degree of knockdown, mortality or inhibition of blood feeding in a susceptible strain of mosquitoes using standard assays. Assays should be supplemented by chemical analyses to determine insecticidal content, or the amount of insecticide remaining on the net.

3: Elements of the tracking system

3.1 Macro-quantification

Key information needs for this element were determined as follows:

- Number of LLINs needed to achieve universal coverage
- Information on previous campaigns, number of nets distributed and which brands were used
- Timing of replacement campaigns when previously distributed nets are three years old
- Any coverage gaps

Estimating how many LLINs are required to achieve universal coverage involves calculating the number of LLINs needed by the population and the number needed on the basis of the implementation strategy (e.g. mass distribution followed by continuous distribution). LLINs are procured from an out-country source, and the estimates need to be done very early in the planning process.

To estimate the number of LLINs needed, a number of factors have to be taken into consideration:

- Chosen intervention strategy
- Desired coverage rates
- LLINs per household to achieve universal coverage
- Household size (average)
- Starting population size
- Growth rate
- At-risk populations
- Time interval between mass campaigns based on serviceable life of nets

The Sudanese NMCP developed a number of LLIN tracking spreadsheets that are used as a main tool to record the timing and number of LLINs distributed in the past, and determine the number needed for the future. A gap analysis is also undertaken to decide how many LLINs are

currently available, and what, if any, is the gap. Periodically, maps of operational coverage (the percentage of LLINs that have been distributed so that universal coverage is attained) are prepared. A variety of different outputs and reports can be produced to meet specific information needs.

3.2 Procurement and supply chain management – tracking the process

The objective of this element is to ensure efficient and timely delivery of LLINs to the final distribution point, and ultimately to the beneficiaries. Once LLINs arrive in country, the focus is on the logistics operations. Every movement of the LLINs during every stage of the supply chain needs to be tracked. If monitoring is weak during transport or storage, leakage of nets can occur. The logistics operation itself is extremely complex, and the proper use of supply chain tools, such as waybills, inventories, tally sheets and stock sheets is crucial.

Requirements are for a strong, well trained logistics team at all levels. Close communication between partners and stakeholders and members of the logistics teams at each level is essential. LLINs will need to be securely stored at various points from arrival to final destination and detailed planning and communication of plans is vital. The tracking of LLINs left over at distribution points following mass distribution to ensure that there is supply chain documentation right up to their final destination (e.g. to health facilities for continuous distribution or back to district or state warehouses) is an important part of the logistics operation to be managed by the logistics team.

Meticulous documentation is the key in this element. Sudan uses a number of different forms: dispatch/release orders; bin or custody cards; waybill receipts; LLIN distribution forms; and goods received notes. These equate to waybills, stock sheets, tally sheets and inventory forms used in most supply chain management operations:

- The waybill is a tool to ensure that LLINs stay in the supply chain during *transport*. It is used to control the movement of nets from point A to point B. The waybill is issued by the sender and indicates the nature and quantity of goods being shipped.
- The stock sheet, which might also be called a “warehouse register” is a tool to ensure that LLINs stay in the supply chain during *storage*. It records the quantities of nets received at the warehouse or store as well as the quantities shipped out of the warehouse or store. The stock sheet also maintains a constant inventory of LLIN stocks in the warehouse or store. A stock sheet is used at every location and level at which LLINs are stored.
- The tally sheet is a tool to ensure that LLINs stay in the supply chain during *distribution* and that they reach the intended beneficiaries. It is both a logistics and a distribution tool. It is used by the distribution teams during the distribution period to keep track of the number of LLINs given out to beneficiaries. The number of nets received each day from the distribution point store must be recorded, as well as the number of nets returned to the store at the end of the day. One tally sheet should be used on each distribution day.
- The inventory, which is a physical count of the stock in the storage location, is an activity that is designed to ensure there is no leakage of LLINs during *transport and storage*. It must be done on a regular basis throughout the operation, as well as at the end of the operation. The inventory report should be compared with the stock sheet and the waybills.

Indicators that can be used to track the procurement and supply chain management process are:

- Written procurement procedures prepared
- Transport plan prepared
- Storage sites reporting
- Adequate security measures for storage
- Sufficient and adequately trained staff to operate warehouse and stores

- Standard inventory control procedures
- Warehouse and stores forms available at all levels
- Proper use of tracking documents
- Proper filing of tracking documents (for later audit)
- Reports on LLIN distribution and reconciliation of LLINs remaining (reverse logistics)

3.3 Process assessment of the campaign

This element of the system tracks whether the distribution campaign is progressing as planned during its implementation and assesses the standard and quality of the work being undertaken. Monitoring needs to be done for activities pre-campaign, during the campaign distribution to households, and after the campaign. Key areas for tracking are planning, social mobilization, communications, advocacy, training, registration of households and supervision of the distribution team. Lessons learned from the assessment should feed back into future campaigns.

Standard procedures have been developed that should take place during the registration of households and distribution activities which are undertaken by trained volunteers. Activities include giving out key information about malaria and prevention measures. At distribution sites during the campaign, various communication activities take place about the importance of hanging correctly and using LLINs.

Supervision is important, with corrective action taken as needed to improve the quality of the implementation.

Following the campaign, meetings are held to review the campaign experience, and a report is prepared. Different post-campaign communication activities are also carried out, using media such as radio. Volunteers help to spread key messages about hanging and using nets correctly.



The indicators that are used to assess the campaign process include:

Planning

- Number and proportion of areas with a functioning campaign coordination mechanism in place
- Number and type of advocacy events
- Number and quality of communication activities
- Number of adequately trained supervisors
- Community and social mobilization plans prepared
- Plan for waste disposal available

Registration

- Degree to which planned mobilization took place
- Number of community volunteers adequately trained
- Degree of completeness of registration process
- Number of LLINs needed for each distribution point (DP)

Distribution

- Quality of services at DP
- Number of LLINs delivered to target population
- Proportion of households that collected or received LLINs
- Proportion of households that received the correct number of LLINs

Post-campaign

- Administrative coverage
- Number of household visits or community meetings held to reinforce key messages
- Number of review meetings held
- External assessment reports (supervision)

The tools used to monitor the campaign include:

- Supervision checklists
- LLIN registration and distribution forms
- Rapid market surveys (to check if LLINs have leaked)
- Interviews with key personnel
- Training report
- Inventory of materials and supplies
- Post-campaign review meetings
- Standardized campaign report

3.4 LLIN periodic assessment survey

This element of the tracking system is designed to provide an accurate picture of what happens to the LLINs that are distributed to households. The element includes monitoring for survival or attrition, physical integrity and continuing bio-efficacy. Key information needs are:

- Ownership and use of LLINs in the household soon after a mass LLIN distribution
- Ownership and use of LLINs in the household at specified periods after a mass distribution
- Factors that affect ownership and use
- Physical condition of nets over time
- Net survivorship and attrition
- Effectiveness of key communication messages about net use, care and repair

Some of this information is provided by the three-year MIS, but the Sudan NMCP wanted more frequent data in order to get an accurate picture of what happens to the distributed LLINs. Therefore, a periodic assessment survey is planned after every mass distribution, at four points in time: three months post-distribution, 12 months, 24 months and 36 months. In particular, the survey is designed to elicit information on LLIN durability, major behavioural aspects of net care and repair and their impact on LLIN



use and physical durability, and to identify major determinants of the performance of LLINs under field conditions, comparing different regions.

A cluster sampling method is used, in order to achieve a sample size of 300 households in each domain/region (four regions in Sudan eastern, central, Greater Kordofan and Greater Darfur). A questionnaire adapted from the PMI Monitoring LLIN Durability Monitoring Toolkit (PMI, 2015) collects data on bed net ownership and use, campaign nets lost from the household, campaign and other nets owned by the household, behaviour change communication (BCC), knowledge and attitudes about malaria, and net care and repair attitudes and behaviour.

The findings from each survey round will be reviewed and management actions taken as needed, such as intensification of the BCC messages or distribution of nets if the data show that coverage has dropped significantly. The findings at the end of the three-year period will contribute to a national system demonstrating LLIN bio-efficacy and physical durability by geographical region, which will also provide

guidance for decision-making on the timing of net replacement.

3.5 Bio-efficacy testing

This part of the tracking system aims to check on the bio-efficacy (insecticidal effectiveness) of the LLINs before distribution to households, and then to recheck bio-efficacy over time under field conditions. This should help to determine the appropriate time interval between mass distribution campaigns and replacement of the nets distributed, as well as contribute to better monitoring of the performance of LLINs in the field to allow changes to procurement if current insecticides show reduced efficacy.

Pre-distribution bio-assay testing, following WHO standard cone bio-assay procedures, is undertaken to obtain mortality rates and killing effects of LLINs. Five LLINs per batch are sampled at random. Following distribution, in order to assess the degradation of insecticides on LLIN fabric over time under field conditions, LLINs are sampled at four time points: three months, 12 months, 24 months and 36 months.

The testing assesses household practices that affect the killing effect of LLINs over time. A random selection of households that take part in the periodic assessment survey provide their LLINs for testing, with all LLINs collected in a household replaced by new LLINs. Information required is date of receipt of the LLIN, number of times washed, type of washing and drying, etc. The physical integrity of each net, in terms of size and location of holes, is observed and recorded during interviews at the selected households. The collected LLINs are tested using standard WHO cone bio-assay testing using a susceptible mosquito colony in Sennar Malaria Research and Training Centre.

After each survey round, a report is prepared. At the end of the 36-month monitoring period, a final report will be produced. It is expected to include recommendations regarding future net selection policies, schedules to replace old nets and information on communicating care and repair of LLINs.

3.6 Monitoring the continuous distribution of LLINs through Primary Health Care services

This element of the tracking system is designed to check on the quality of the implementation of LLIN distribution through antenatal care and immunization services. Providing the country has a good record of antenatal visits and the immunization coverage is high, distribution through these services provides a good opportunity to increase uptake of LLINs by pregnant women and infants and young children that attend immunization clinics.

The NMCP needs to work closely with appropriate colleagues in the Ministry of Health (e.g. those in the antenatal care, reproductive health, immunization and communications department). Stocks of LLINs at health facilities will need to be assured, and health workers must understand the importance of using LLINs to prevent malaria, and be able to convey the key

malaria messages when they are communicating with pregnant women and mothers attending immunization clinics.

Indicators for monitoring the continuous distribution of LLINs include:

- Number of health service providers adequately trained for LLIN continuous distribution
- Number of LLINs distributed through antenatal and immunization services
- Proportion of Primary Health Care centres that have established the LLIN continuous distribution through their antenatal and immunization services
- Proportion of women who received one LLIN during an antenatal visit in their last pregnancy
- Proportion of children under one year of age who received one LLIN at the first immunization visit
- Proportion of facilities with stock-outs of LLINs
- Proportion of women who receive malaria BCC messages from the health care worker
- Proportion of centres that report LLIN distribution in the monthly facility report

Tools for tracking these indicators include:

- Minutes of Ministry of Health cross-unit planning meetings
- Training reports
- Inventory of IEC materials
- Stock sheets for LLINs
- Monthly health facility reports

3.7 Monitoring behaviour change communication (BCC)

This element is designed to check on BCC activities to find out how well they are being carried out. It is important to check that communications planning and activities are on track with respect to any mass distribution campaign, and that the planned communications activities are taking place when delivering LLINs on a continuous basis through antenatal and immunization services.

BCC is an essential component of mass distribution campaigns to scale up LLIN coverage, but BCC interventions must also take place throughout the year. At health centres, pregnant women and mothers must receive clear and consistent messages about the hanging, use and care of LLINs.

A broad range of communications activities is essential at all levels. The key messages and communications can be tailored to specific audiences, using a variety of different communications channels. Channels might include:

- Radio
- Television
- Newspapers
- Print media
- Advocacy meetings
- Partnership meetings
- Celebrity spokespersons
- Mass distribution campaign launch event
- Community meetings and discussions
- Public address system
- Household visits
- Mobile theatres
- Workshops
- Demonstrations

A broad range of partners can be involved in advocacy at different levels. At high level, government officials and the media can be encouraged to assist and influential people such as sports or media personalities can be engaged.

For community outreach, local opinion leaders can be engaged, NGOs can bring their expertise, and teachers and students can be encouraged to share messages.

Indicators, which can be measured before, during and after a mass distribution campaign might include, among others:

- Number of IEC materials printed and distributed
- Number of radio spots
- Number of television spots
- Number of mobile theatre events held
- Number of schools, teachers and students involved
- Number and type of health personnel engaged
- Number of community volunteers trained
- Number of household visits made by community volunteers

For continuous distribution, indicators might include:

- Number of trained supervisory personnel
- Number of staff trained with BCC messages
- Number of educational materials available at the health centre

Tracking tools to be used include standardized reporting forms, inventories of materials, supervisory checklists, reports from training activities, reports from volunteers and exit interviews with beneficiaries as they leave distribution posts or health facilities.

4: Sustainability

NMCP and other malaria programmes that distribute bed nets via mass distribution campaigns and via continuous distribution are encouraged to contribute to the sustainability of universal coverage by developing and using a LLIN tracking system similar to that of Sudan. Tracking the planning and implementation of campaigns and of continuous distribution is vital, as is knowledge about the durability of LLINs and the various BCC communications to the target audiences if improvements are to be made and malaria control targets are to be met.

A full report on the Sudan LLIN tracking system (English version), containing detailed information and appendices with examples of forms, questionnaires, IEC materials and so on is available on the AMP website (www.allianceformalariaprevention.com) for download. From the website, follow the Country Support tab, scroll down to Sudan. The full report is entitled LLIN Tracking System – 2015. The report has been endorsed by the Sudan Ministry of Health.

Further information can be sought from: allianceformalariaprevention@gmail.com



Householders receiving LLINs at a distribution point in Sudan

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