

# Continuous LLIN Distribution

Logistics, Logistics, Logistics

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National malaria control programmes and their partners are faced with many decisions when designing or re-designing the continuous distribution of long-lasting insecticidal nets (LLINs). One decision is how to manage the complex logistics involved—everything from materials planning to procurement, product warehousing, packaging, distribution, stock control, monitoring, supervision, and reporting. Getting the logistics right is crucial to long-term success.



Villagers gather to treat their nets using insecticide kits.

Doreen Ali, Malawi's Deputy Director of Preventive In the late 1990s Malawi's young National Malaria Control Programme (NMCP) and its partners were hard at work trying to determine the best way to reach those most vulnerable to malaria with a somewhat new technology, insecticide-treated mosquito nets (ITNs). They were conducting research, testing distribution models, and holding lively debates on how to proceed. Decisions were made based on the evidence available and the country context at the time. Given the success that Malawi has had with its national continuous net distribution programme since its start in 2002, it appears that the leaders of the NMCP got a lot of things right!

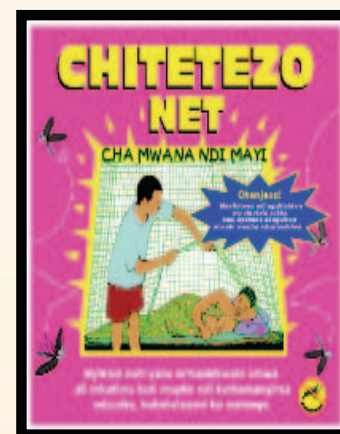
## EARLY CHOICES—GETTING OFF ON THE RIGHT FOOT

Nearly all of Malawi's 13 million people are at risk of malaria. In the mid-1990s Malawi's Ministry of Health, through the newly established NMCP, decided to focus on prevention as the cornerstone of its efforts to protect citizens from malaria, and on insecticide-treated mosquito nets as its principal vector control tool.



Given funding levels for malaria control at the time, Universal Coverage objectives were out of the question. Priority was placed on reaching pregnant women and children under five with ITNs. Several distribution models were pilot-tested. The then-recent success of the country's fledgling condom social marketing programme prompted decision-makers to try similar approaches to rapidly increase the availability and use of ITNs. While the branding of nets and related communication materials led to increased demand, it was quickly determined that commercial retail outlets were not effective at reaching the NMCP's key target groups. In light of this and based on the consistently high attendance rates at antenatal care (ANC) clinics, the NMCP and its partners decided to differentiate their public-sector nets by colour, shape, and packaging and to sell these 'Chitetezo brand green nets' at highly subsidized prices to pregnant women and caregivers of children under five at ANC and under-five clinics nationwide. Having defined the programme's target groups and distribution channels, the NMCP and its partners then had to decide how to ensure the consistent availability of nets at participating clinics, all year round. This distribution model was pilot-tested for nearly two years before being scaled up nationally.

NMCPs have many options for managing the complex logistics associated with continuous LLIN distribution. On a broad level they can choose to: (1) invest in and use government-owned



Malawi's early 'Chitetezo' packaging for its green public-sector nets. 'Chitetezo' means 'protection' in Chichewa, the national language.



and managed infrastructure, (2) leverage the existing infrastructure of implementing partners already working with the Ministry, (3) use existing commercial goods distribution infrastructure, or (4) use some combination of the above. Each of these options has pluses and minuses.

## MAKING CONTINUOUS DISTRIBUTION WORK IN MALAWI

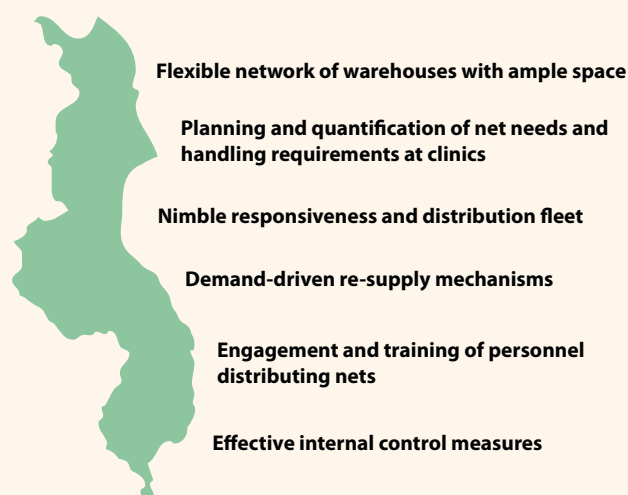
The Malawi NMCP, in close consultation with its stakeholders, developed an approach that uses a mix of existing governmental and partner-managed infrastructure. Government health workers at these clinics were trained to provide one-on-one counselling and education to pregnant women and new mothers to promote consistent net use. Nurses were responsible for managing the storage, handling, and distribution of nets at the clinic level. PSI/Malawi, the locally registered affiliate of Population Services International (PSI), was selected to manage the centralized handling and warehousing of the government's ITNs and their delivery to participating clinics. PSI brought to the partnership essential warehousing and distribution capacity and expertise as well as proven systems for documenting and tracking product distribution. Technical expertise and support from partners such as WHO, DfID, UNICEF, USAID, the Malawi Malaria Alert Centre, and the US CDC helped to assure programme quality and effective monitoring.<sup>1</sup> Certain logistical aspects of Malawi's continuous net distribution programme have been central to its success (see Figure 2).

### Flexible warehousing with ample space

Malawi's continuous net distribution programme has delivered as many as 1.5 million nets annually through more than 600 ANC and under-five clinics nationwide, with monthly distribution figures peaking at over 200,000 nets during the rainy season. To support the delivery of nets in these quantities on an ongoing basis, the NMCP and PSI/Malawi established a network of four warehouses: a main warehouse in the south of the country designed to receive all incoming nets, a central region warehouse, a northern region warehouse, and a depot warehouse located in the high-demand areas along the shores of Lake Malawi. The main warehouse has a dedicated area that can receive and hold up

to 600,000 baled LLINs as well as a separate, highly secure caged area designed to hold an additional 140,000 packaged nets (nets are bundled in bags of ten to simplify handling and storage at the clinic; see more information on this below). The three regional warehouses can hold a total of 160,000 additional LLINs. This warehouse network allows the NMCP to hold four to six months of stock for continuous distribution in-country at any time. If needed, the NMCP has easy access to additional temporary warehouse space. Each warehouse is fully insured and has a dedicated warehouse manager responsible for the security of the product.

**Figure 2: The Nuts & Bolts of Making It Work – Logistics, Logistics, Logistics**



### Planning and quantification of net needs and clinic handling requirements

To simplify planning and logistics, the NMCP establishes a maximum stock quantity for each participating clinic. These pre-set limits are based on the clinic's catchment area population. The net distribution teams make regular and frequent visits to each clinic, during which they verify the clinic's distribution records and remaining stock levels. They are empowered to 'top up' the clinic's stock level to this pre-set maximum if needed. Setting maximum supply levels for each clinic also allows the NMCP, working with local clinic staff, to identify a secure storage location for that volume of nets. Early experience showed that working with bales of 50 to 100 nets is difficult for clinic personnel. To facilitate net handling and storage at the clinics, the NMCP and PSI deliver nets

<sup>1</sup> In 2009 Malawi's NMCP made important changes in its net distribution system in order to achieve Universal Coverage targets. Most importantly, a second distribution partner was engaged to help distribute the increased number of nets required. This new partner, Mulli Brothers (a commercial distributor operating nationally), began distributing some of the country's LLINs in 2010. As this experience is quite recent, details on its operations are not presented here; the focus here is on programme operations from 2002 to 2009.



in strong plastic “baler bags” that hold 10 nets each. This requires additional packaging and handling at the main warehouse, but the benefits are numerous. In addition to simplifying logistics at the clinics, this practice enhances stock security and control. Breaking down and counting incoming bales at the main warehouse helps to document any shortages or receipt of damaged goods from the supplier. Putting the LLINs in baler bags of 10 each, which are light and easy to handle, also facilitates monthly stock counts and stock verifications during regular net delivery visits and supervision visits to the clinics.

## Nimble and responsive distribution fleet

To reach each of the more than 600 participating public health facilities across Malawi’s 28 districts once or twice per month, the NMCP and PSI use a fleet of six dedicated Land Cruisers and three bulk delivery transports. This distribution fleet configuration is highly flexible and responsive. Each Land Cruiser can carry 1,000 LLINs and is used to visit the more remote clinics. The three bulk delivery vehicles, with loading capacities from 7,000 to 12,000 LLINs each, are assigned to regions to deliver to

high-volume facilities and those on tarmac roads, and to act as mobile warehouses for the smaller Land Cruisers. In addition to being nimble and responsive, this fleet configuration was developed to minimize the risk of theft or loss. Distribution teams are able to request and load no more than 1,000 nets at a time, which they must fully



Warehouse staff bundle LLINs into “baler bags” of 10 nets each.

reconcile before requisitioning additional nets. These teams can then reload their vehicles either at a regional warehouse or from one of the mobile warehouses at a coordinated meeting point in the area. All of Malawi’s LLIN delivery transports are equipped with vehicle tracking and monitoring devices to help ensure efficient and secure fleet operations.

## Demand-driven re-supply

The NMCP decision to define maximum LLIN delivery quantities for each clinic has created a responsive and demand-driven resupply system, even though the nets are now distributed for free. By setting maximum net

re-supply quantities for each clinic and clear procedures for verifying stock movements and records, the NMCP empowers clinic staff and distribution teams to make decisions and take actions to ensure continuous net distribution and availability.



One of Malawi’s three ‘mobile warehouses’

## Engagement and training of clinic staff responsible for net distribution

Malawi’s ANC nurses have played a vital part in the success of the continuous net distribution programme. From the programme’s inception, the NMCP recognized the critical role of one-on-one health education and counselling on malaria and proper net use to create a culture of net use among the target group. Nurses received specially designed training on malaria, malaria transmission, and prevention, ITNs, and ITN use, as well as on stock management, storage, inventory control, and effective behavior change communication. During the first four years of the programme, when nets were sold at a highly subsidized price, the nurses also received a small financial incentive: Nets sold for approximately US\$0.50, with the clinic retaining approximately \$0.10. Several stakeholders interviewed said this incentive proved vital to ensuring that clinic staff gave attention to promoting nets at a time when demand for them was extremely low. This incentive was dropped in 2006 when Malawi switched to free net distribution.

## Effective internal controls measures

LLINs are high-value, easily portable commodities (when no longer in large bales). Distributing them on a continuous basis requires rigorous internal controls to protect against loss or theft. The Malawi NMCP and PSI/ Malawi have put in place control measures to minimize such risks at all levels. (SEE TABLE 1)





**Table 1. Aspects of Continuous Net Distribution Defined in Malawi's National ITN Guidelines**

<b>A. During warehousing:</b>	<b>B. During transportation:</b>	<b>C. At participating clinics:</b>
<ul style="list-style-type: none"> <li>• As noted, incoming bales of LLINs are opened and counted to verify if there are any shortages or damaged nets in each delivery (as part of repackaging to put nets in easy-to-handle baler bags of 10 nets each).</li> <li>• Monthly physical stock counts of all nets are conducted in all of the PSI/Malawi warehouses.</li> <li>• The results of these audited monthly physical stock counts are used as part of a complete monthly reconciliation process that ensures distribution figures in the Management Information System (MIS) match inventory records and that these figures reconcile fully with the physical stock count's month-end stock balance.</li> </ul>	<ul style="list-style-type: none"> <li>• Loading of any vehicle with nets is done in the presence of both the warehouse clerk and the vehicle driver. The driver and the clerk must sign off to show mutual agreement on the quantity loaded as well as the transfer of responsibility from the clerk to the driver.</li> <li>• When nets are loaded in the large 'mobile warehouse' delivery vehicles, a serialized security seal is placed on the cargo door of the transport once it has been closed and locked. When the truck arrives at its destination, this seal must be verified as intact and unbroken.</li> <li>• The LLIN distribution teams serving remote clinics are allowed to request no more than 1,000 LLINs at a time. Teams are required to fully reconcile each requisition of 1,000 nets before they can requisition more.</li> </ul>	<ul style="list-style-type: none"> <li>• Upon arriving at a clinic, net delivery teams are required to physically verify the level of remaining stock and ensure that it matches the stock bin card maintained by the nursing staff.</li> <li>• Distribution teams use serialized delivery notes to record each delivery. Nurses must also record the transaction with serialized 'good received' notes. Both the PSI distribution agent and the nurse sign the forms. Deliveries are also recorded on the clinic's stock bin cards, with the entry for the incoming stock signed by both parties.</li> <li>• When distributing the nets to the beneficiaries, nurses are required to document the issuance of the net in a serialized LLIN client register booklet. For each net issued, nurses record the name and physical address of the recipient and indicate the net issue on the patient's health passport.</li> </ul>

## KEY LESSONS AND FUTURE CHALLENGES

Malawi's continuous net distribution programme is built upon broad and accountable partnership. The logistical challenges associated with delivering LLINs nationwide on a continuous basis are enormous and often beyond the ability of any one entity to handle. Malawi's NMCP has worked with its stakeholders to create an effective distribution model that brings the resources of government and key partners together to ensure success. By working with partners to help manage certain aspects of net storage and handling, the Malawi NMCP is able to ensure a 'separation of duties' within the distribution chain to help improve the control and monitoring of LLIN supplies.

Malawi's experience also highlights the importance of defining clear guidelines and procedures that allow, distribution teams, and clinic staff to make the decisions and take the actions needed to ensure that nets are



A nurse at the Zingwangwa Health Center, near Blantyre, verifies LLIN distribution.

delivered on an ongoing basis and that the availability of nets remains relatively constant. Empowering local distribution teams and health workers to act and establishing mechanisms that ensure a responsive, demand-driven resupply of nets at the delivery end-points in the distribution chain have been crucial elements in Malawi's success.

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The RBM Partnership  
Secretariat hosted at WHO  
20, Avenue Appia  
1211 Geneva 27  
Switzerland  
Phone: +41.22.791.4318  
Fax: +41.22.791.1587  
Web: <http://www.rollbackmalaria.org>



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