Optimized insecticide-treated net (ITN) distribution solutions for scaling up malaria control

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Objectives

As national programs scale up malaria interventions, timely distribution of commodities is critical. Modern transport systems, when applied to insecticide-treated net (ITN) distribution, offer new opportunities for efficient delivery. We describe nationwide scale-up of ITNs in Zambia to achieve an average of 3 ITNs per household and compare different methods and results, in terms of costs and time required, for two mass ITN distribution models.

Background

Preventing malaria is a national priority in Zambia. In recent years, resources available to fight malaria have increased dramatically, as have donor attention and global awareness. This renewed attention is driving efforts to increase the impact of antimalarial interventions at a reduced cost.

In Zambia, malaria is the leading cause of mortality and morbidity, each year taking its toll on the most vulnerable, mainly children and pregnant women. In 2005, the Zambian government committed to aggressively scale up the nationwide coverage of antimalarial interventions and set the ambitious goal of reducing malaria incidence by 75% come 2011. A partnership was created among all the organizations involved to ensure effective and efficient resource use, under one national plan, one coordination mechanism, and one monitoring and evaluation system, an approach advocated by the Roll Back Malaria Partnership.

The government of Zambia and its partners are working to provide each household with at least 3 ITNs to ensure that 80% of the population is sleeping under an ITN by 2008. Between 2005 and 2007, Zambia and its partners distributed approximately 4.5 million ITNs through various methods, including a standard method of ordering, receipt, and storage in central locations and an updated method of distribution to districts for delivery using local channels.

Methods

Planning needs, in-country receipt, storage and distribution costs, and timeliness of delivery were compared for two delivery models. The first was a centralized model involved delivering ITNs to a central location (Lusaka) and subsequently dispatching them to district and health centres in the interior (Northwestern and Western Provinces). In 2005 – 2006, 526,500 ITNs were distributed using this model. The second method, using a decentralized model, involved containers being shipped directly to target distribution points to the lowest practical link, avoiding the central level altogether. In 2006 – 2007, 200,000 ITNs were distributed and, later in 2007, 1,460,000 were distributed, providing two opportunities to examine this model. The centralized and decentralized models are compared here for timeliness of protection and for efficient use of resources.

Results

The total information and system needs for the two methods were generally similar and included population, population growth rates, average household size, number of ITNs needed per household, coverage targets, rural/urban population variations, existing net stocks, age of existing net stocks, partnership maps, transport capabilities, local storage capability, local education and communication needs, and local staff and responsibilities mapping. However, more up-front quantification and planning were needed for the updated centralized method to optimize efficient distribution patterns. Modern container shipment technologies allowed secure distribution directly to district levels with reduced cost and quicker availability. Largely because of reduced need for central receipt and redistribution costs to districts, the updated method showed a per-net distribution cost savings of 38% or US$0.49 per ITN distributed. The amount of time required for nets to be available for use in homes following arrival in country was reduced by 75%, from an average of 8 weeks using the centralized model to a maximum of 2 weeks using the decentralized model.

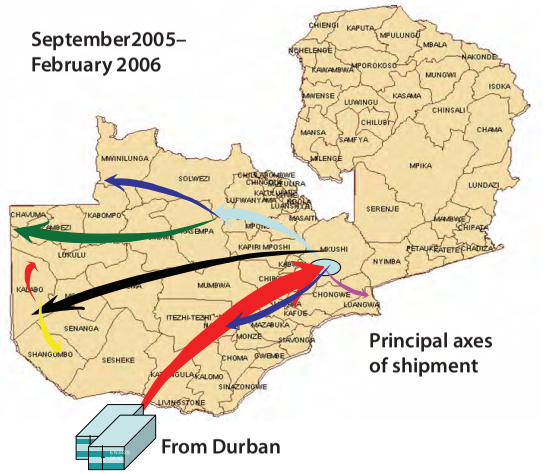
Conclusions and Recommendations

- Optimizing distribution channels using population-based and qualitative data combined with modern container shipping technologies can increase efficiency of malaria control scale-up efforts with ITNs.
- The decentralized method resulted in a 75% reduction in time for in-country delivery, improving timeliness of access.
- Direct shipment resulted in shipment cost savings of 37% on each net, potentially increasing quantities available.
- Decentralized distribution requires earlier planning and more consistent tracking than the centralized model.
- Use of decentralized distribution mechanisms can significantly contribute to scale-up by improving timeliness of access to ITNs while reducing the cost of ITN interventions.

Distribution models

Centralized model

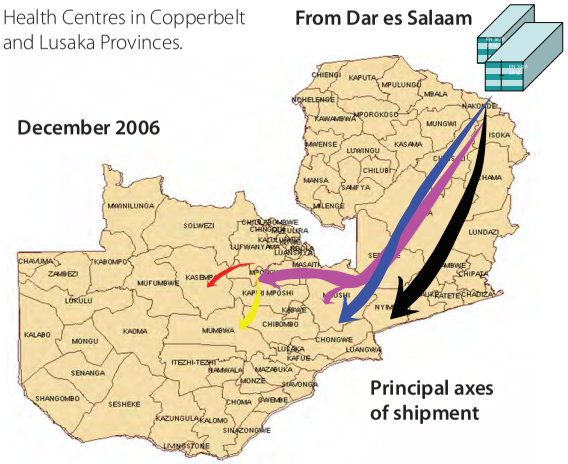
ITNs are delivered to a central location (Lusaka) and subsequently dispatched to Districts and Health Centres in the 'interior' (Northwestern and Western Provinces). This model was used for the distribution of **526,500 ITNs** in 2005 – 2006.



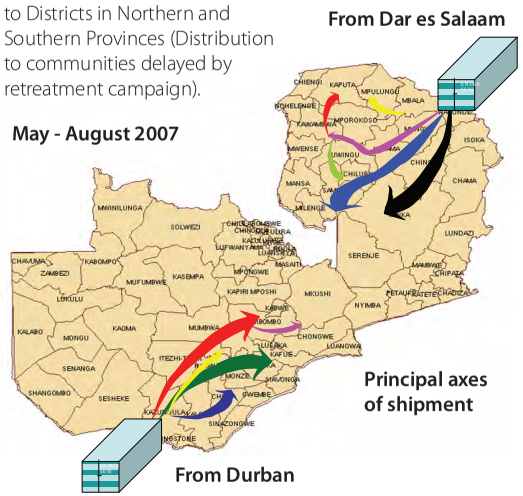
Decentralized model

200,000 ITNs were distributed in 2006 – 2007 and 1,460,0000 in 2007 following this distribution model: containers are shipped directly to target distribution points, avoiding the central level altogether.

Decentralized I: Direct distribution to Districts and Health Centres in Copperbelt and Lusaka Provinces.

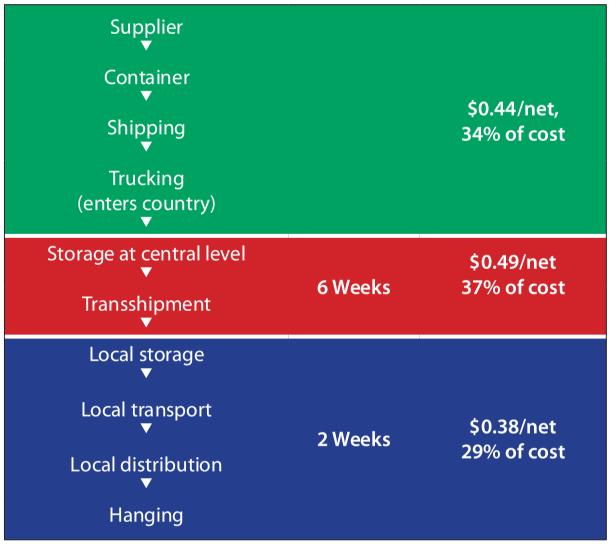


Decentralized II: Direct distribution to Districts in Northern and Southern Provinces (Distribution to communities delayed by retreatment campaign).



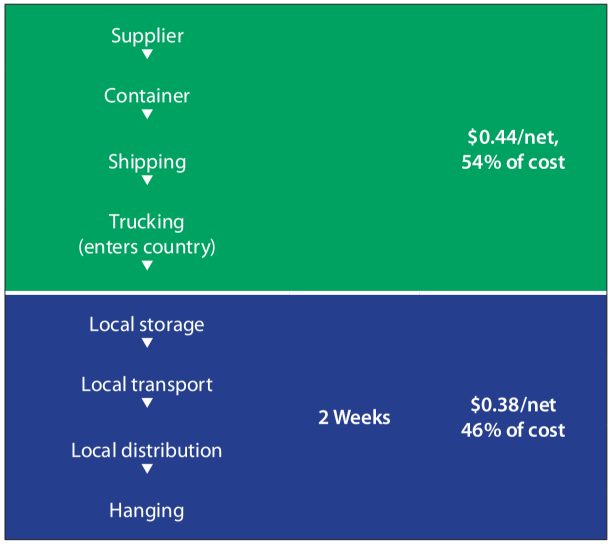
Centralized Supply Chain

TOTAL TIME: Shipping to country + 2 months



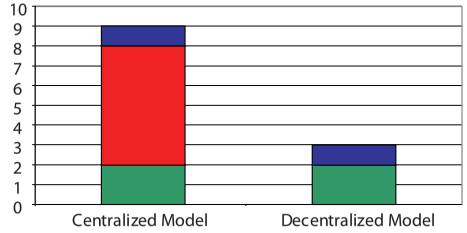
Decentralized Supply Chain

TOTAL TIME: Shipping to country + 2 weeks



The two approaches are compared here for timeliness to protection and for efficient use of resources.

Time (weeks)



Cost (US$)