A system to improve Value for Money in LLIN procurement through market competition based on cost per year of effective coverage

Concept Note

Summary

The world spends more than $500m on long-lasting Insecticidal nets (LLINs) every year; it is the largest single item in the global malaria control budget. A number of agencies have recently expressed interest in exploring how value-for-money in this market could be improved. The WHO Global Malaria Programme has therefore developed a system for reducing the cost-per-year of LLIN coverage. The proposed system focuses on the cost per year, rather than unit price, because the scope for savings is much greater, for technical and economic reasons, if variation in LLIN durability is taken into account. There are indications that LLINs can be made substantially more durable for a small increase in unit price, and manufacturers have already made efforts to compete on this basis. Rapid technological evolution may be possible, if there are appropriate market incentives.

In order to create these incentives, there is a need for (a) more and better data on the relative durability of alternative LLIN products in local settings, and (b) adjustment in current procurement practice to allow such data to be taken into account.

The proposed WHO system has two standardized elements: methods for monitoring the relative durability of LLIN products in the field, and methods for using these data to inform procurement decisions. The former document has now been published. It describes methods for measuring durability that are designed to be simple (no specialized expertise required), transparent and auditable. It was developed by technical experts in consultation with industry, donors and RBM working groups. The latter document, describing standard methods for the use of such data in procurement, is the next step.

The cost of running the proposed system is expected to be between 1% and 2% of current LLIN commodity costs. It is expected to produce savings of 10-30% within 2 or 3 years, by allowing country programmes to select, from the existing range of products, the one that is most durable in the local setting. If the system is adopted by the agencies that fund the bulk of the LLIN market, the resulting competition is likely to stimulate development of more durable products. This technological evolution could be rapid, producing substantially greater savings in the medium term.
Background

The annual cost of LLINs for malaria control is more than $0.5bn; it is the largest commodity category in the global malaria control budget. A number of agencies have recently expressed interest in possible ways to improve value-for-money in this market. Since 2009, the WHO Global Malaria Programme has been considering two questions that are linked to each other and to the issue of value-for-money: how country-level procurement can take into account data on LLIN durability, and how to create effective incentives for technological innovation in the LLIN market.

The current policy of the Global Fund (and of most donor agencies funding LLIN procurement) is that all WHOPES-recommended nets must be treated as technically identical, so that procurement product choice must be decided on the basis of unit price, rather than any other index of value-for-money. So far, competition on this basis has produced only limited and disappointing reductions in unit price.

On the other hand, some manufacturers have already made explicit efforts to develop nets that (they claim) are substantially more durable and hence better value for money. To date, however, there is no formal or standardized international system by which procurement agencies can preferentially select such products for purchase.

The WHO Pesticide Evaluation Scheme (WHOPES) assesses LLINs in a series of standard tests, comparing each individual product with a set of minimum performance criteria, and recommending those that meet or exceed the criteria. However, by recommending two products, WHOPES does not imply that they are identical, it only implies that they both meet the performance criteria. Indeed, the test results for each product are published in WHOPES reports\(^1\), and clear differences between products can often be seen in this data. It is therefore incorrect to assume, as some major donors do, that the WHOPES scheme is equivalent to drug pre-qualification.

Given its importance for the financing of modern malaria control, surprisingly little effort has been made to monitor LLIN durability in the field. However, there is accumulating evidence that in some settings, the lifespan of LLINs is much more variable than previously expected, both among locations and among products. The limited data available from longitudinal studies suggests that (a) many nets are lost from use because their owners consider them too worn and torn to be effective, and (b) the factors causing wear and tear (snagging, washing, rats, burns) vary in relative importance from place to place. Furthermore, it seems that the relative durability of different products also varies from one place to another, that is, product X and product Y can have similar mean life-spans in one setting, but elsewhere, X tends to last much longer than Y, or vice versa. This is presumably because the products themselves differ in their vulnerability to the various causes of wear and tear. In other words, we must expect that the question “which product is the most durable?” will have different answers in different settings or regions.

Therefore, more data on LLIN durability is urgently needed. Although the collection of these data should be longitudinal, no special methods or skills are needed. Highly intensive studies giving detailed data-in-depth from a few places would be helpful, but the primary need is for a large volume of simple data from many places, in order to reveal patterns of geographic variation.

\(^1\) http://www.who.int/whopes/recommendations/wgm/en/
**Aims**

*Goal:* to improve the efficiency and public health impact of international expenditure on LLINs, by giving buyers a means to buy better-value-for-money products, and manufacturers confidence that such products will gain market share.

*Purpose:* to reduce the cost-per-unit coverage of LLINs, first by enabling country-level buyers to select the best value-for-money LLIN for the local situation, and then by fostering the development of new products which are cheaper per year of effective life in their target setting.

**Objectives:**

i. A system for measuring the relative durability of alternative LLIN products in local settings, using methods that are simple, standardized and auditable. [These methods have been published](#); plans for implementation support are under development.

ii. A process by which the data from (i) can be verified and then used to inform decisions about product choice in country-level procurement.

iii. A market that gives manufacturers a clear incentive to develop new products with better practical performance.

**Activities**

i. **Guidelines on monitoring LLIN durability in field setting.**

   This WHO document was drafted by a group of experts in consultation with manufacturers, and is now on the WHO website[3]. It gives detailed protocols for comparing the durability of several LLIN products, emphasizing the advantages of longitudinal studies and the inevitable limitations of retrospective data. It suggests that the basic study should be implemented as a routine part of good procurement practice in all large procurements.

   The aim of this basic study is to establish whether the LLIN product procured by a country for large-scale distribution is indeed the best for that particular local setting, and should be purchased again, or whether a different product would give better value for money in the next round of procurement. It involves comparing up to 6 different products, including the one or more products that are already in large-scale use in that setting, together with some selected alternatives (e.g. some of those that bid for the last tender but were not selected). If there is a new product which seems especially promising according to preliminary data, but which is still being tested and is not yet recommended by WHOPES, then this product could also be included in the comparative durability studies, as long as it has the necessary registration (e.g. for experimental purposes) from the national pesticide regulator.

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The study is initiated when these selected products are put together, in exactly equal numbers, into a sentinel site, with random allocation to households. As they get older, loss and wear and tear is monitored at 6 to 12-monthly intervals, recording the proportion of each type that has survived, and the condition of the surviving nets. These observations need no special skills and can be witnessed by the local public (including the media) and independently verified by external independent experts. The emphasis is on measuring simple presence and absence, and on counting holes, because nets that are no longer present in the community are obviously no longer able to protect the community, whatever their condition.

ii. Methods for using durability data to inform procurement decisions

There are various ways in which data of this kind could be considered in procurement. One of the simplest would be to calculate, using a standard method of interpolation from the recorded data on net survival, the median lifespan for each product (i.e an estimate of the date on which exactly 50% had been lost). This could then be divided into the quoted offer price for each product in a tender. The result would represent a direct and standardized estimate of the cost-per-year of effective coverage. In this way, price can be considered in the tender process as ‘per year of expected coverage’ rather than ‘per net’, while the other tender criteria (such as delivery conditions) can retain their respective weightings relative to price.

A critical condition, in order for such data to be considered in procurement, is that the results must be verifiable and free of external influence of any kind. Thus, an independent audit by WHO or another trusted external agency would presumably be necessary.

A formal system of guidance will be needed to specify:

- minimum quality criteria that datasets must meet in order to be considered in procurement decisions;
- how to include, and what weighting to give to, datasets from other places;
- an appeal system, for cases where the quality and/or relevance of the data will sometimes come into dispute.

It will also be important to avoid the risk of bias towards older products for which a lot of data is available, and against newer products for which the data is much more limited. This can be partly dealt with by positive efforts to include promising new products in local durability studies, before the WHOPES recommendation process is completed (see above). Intervention may sometimes be needed to intervene to ensure that data on a promising new product is obtained in this way as soon as possible.

It may be appropriate to set up a small group of experts (perhaps comparable to the Global Fund’s Expert Review Panel) to deal with these issues and to assure independent oversight and direction.
iii.  Interim measures while the system is being set-up

The system described here would take time to begin to yield data. However, this lag period does not have to be much more than a year or two. It will be preferable, in terms of data quality, to wait until at least 50% of nets have been lost, but useful comparative information can be obtained at any time. Instead of 50%, other loss thresholds, such as 40% or 30%, could be used. The main constraints would be (a) sample size and the need for statistical significance, and (b) there may be a rapid rate of loss in the first few months for reasons that do not reflect the longer-term durability of nets; thus estimates from less than one year of monitoring should probably be avoided.

An alternative, which is currently being explored, is to search for settings in which it may be possible to use retrospective data. In general, preference should always be given to prospective data, but there are a few conditions in which retrospective data could be regarded as sufficiently reliable for use in procurement when there is no alternative. These conditions include:
(a) two or more LLIN products have been distributed at the same time, in the same location or in adjacent locations that are culturally and ecologically similar,
(b) the nets distributed at that time were marked, or can otherwise be distinguished from any others that may have been distributed or purchased since then, and
(c) there is a reliable database of households and nets recording exactly how many nets of each type were given to each house, so that it is possible to sample individual nets at random from the database, re-trace the household to which each net was given.

Partners in UNICEF are currently trying to identify locations in which these conditions may be met.

iv. How the system may evolve in the medium-term future

As explained above, the limited data available now suggests that the relative durability of different products is likely to vary between locations; hence the need for local studies. WHO will, as far as possible, compile and publish the results of these studies. However, when a good number of datasets have been collected, it is likely that some geographic patterns will emerge when the ranked results from different locations are compared. It is not possible, at this stage, to predict the scale or nature of these patterns, and it is possible that the observed geographical variation my be much more local. It is possible, however, that the results from Sahelian locations all tend to show one consistent pattern of product rankings, while a different pattern is seen in the humid lowlands of East Africa. In this case, there would be less need for numerous local studies, and appropriate adjustments can be made in the guidance on where and when durability studies should be carried out as part of procurement.

Some experts on LLIN durability are currently working to improve the usefulness of different physical tests and indicators of LLIN strength, as predictors of eventual durability in domestic use. Their work will be helped by the availability of more standardized data on observed durability performance, and it may produce more or less reliable methods of predicting observed variation in the durability of different products, between locations and between products. This will not obviate the need for prospective durability studies, but it should mean that fewer such studies are needed.

The role of such predictors in procurement cannot be anticipated at this stage, but they may be especially useful for new and promising products, for which prospective durability data is not yet available.
Expected Costs and Benefits

If one $100,000 durability study is implemented as part of every one-million-net procurement, the system is expected to cost less than 1% of total commodity costs\(^4\). This is similar to RDTs, where global expenditure on evaluation to guide procurement is also about 1% of commodity costs.

The expected savings, measured as cost per person-year of coverage, would almost certainly be many times larger, although these savings would inevitably take about 2 years to be realized. By selecting, from the current product range, those that have proved to be longer-lasting in local settings, country-level programmes are likely to extend the duration of effective coverage by at least 5 to 10%, and perhaps by as much as 15-30%. Since longer-lasting nets have to be replaced less often, there would also be savings in operational costs; if these are included, overall savings of 50% would not be surprising.

The savings to be gained in the long-term, through the introduction of new more durable products, are even larger: nets lasting six or more years are probably technically feasible (imagine a net made of a Kevlar-like material).

Justification

It is worth noting why this particular approach is recommended, rather than some of the more obvious alternatives.

One alternative would be a focus on unit cost. However, the degree to which unit cost can be reduced is constrained by WHOPES minimum standards and by the per-kilogram cost of the raw materials. By contrast, there is much greater scope to reduce the cost per-year-of-effective-life, perhaps even by 2-fold, by making more durable nets. The operational costs of delivery are often as large as the cost of the net, so extending the interval between deliveries would provide further substantial savings.

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\(^4\) This works out at much less than “1 study per 1.5 million nets procured” because most procurements are considerably smaller or larger than 1.5 million. In order to estimate how many such studies are implied by this recommendation, we used data collected by the Net-Tracking Project. According to this data, in Africa over the 4 year period 2007-10, but disaggregating by country and by year, we see there were only 60 occasions (15 per year on average) when a country procured more than 1.5 million nets in a given year. These 60 procurements involved a total of 283 million nets worth about $1.1bn. If a durability study costing $180,000 had been carried out in all 60 cases, the total additional cost would have been $10.8m, or about 4 cents per net procured or about 1% of the value of the nets. If we assume a more realistic rate of implementation (e.g. that only 60% of such large procurements follow WHO good practice and carry out a durability study), but the same overall rate and pattern of procurement, then we expect only about 10 new studies to be commissioned every year. This is considered the minimum necessary, given the high degree of geographic variation suggested by current data.
Another alternative would be for WHO to conduct or commission a series of its own trials, comparing the durability of specific LLIN products, and then aggregate the results into a combined global ranking, which would then serve as a kind of WHO “best buy” list. This is superficially attractive, especially from the point of view of non-technical institutional buyers, but it has a number of critical disadvantages.

- First, such a list would make it difficult for procurement agents to buy any WHOPES-recommended product not at the top of this list; this could reduce the diversity of supply.

- Second, it would make the market unstable and excessively dependent on the timeliness of comparative reports released by WHO: each time a new “best buy list” were published, there would be a sudden and dramatic shift in market shares, followed by a long interval of stasis until another new list appears. With the proposed system, by contrast, market shares would evolve gradually and incrementally as data accumulates and as new products are introduced.

- Last but not least, there is evidence that such a unified aggregate global list would be technically misleading, because the most durable product in one setting will not necessarily be the most durable in another. In order to maximize the effective life of LLINs, it may be necessary to introduce different technical innovations in different places (e.g. a stronger hem if snagging on the bed is important; additives that taste bitter to rats if rodent-damage is important, fire-retardants if burning is important). With a global best-buy list, it would obviously be impossible for manufacturers to consider making specialized nets that are specifically adapted to be longer-lasting for a given setting. The system proposed here would encourage this kind of specialization.

Finally it should be noted that local monitoring of durability may have a valuable additional benefit. A number of countries in Africa have observed unexpected gaps in coverage in target populations, and these gaps are thought to be largely due to higher-than-expected rates of net loss through wear and tear. In order to fill these gaps and to prevent them reappearing, countries are now considering how to adjust their national LLIN distribution plans, including procurement quantification. Information on actual observed net loss rates in the local conditions is essential for this planning.