

# Targeted subsidy for malaria control with treated nets using a discount voucher system in Tanzania

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During the last decade insecticide-treated nets have become a key strategy for malaria control. Social marketing is an appealing tool for getting such nets to poor rural African communities who are most afflicted by malaria. This approach usually involves subsidized prices to make nets and insecticide more affordable and help establish a commercial market. We evaluated a voucher system for targeted subsidy of treated nets in young children and pregnant women in two rural districts of southern Tanzania.

Qualitative work involved focus group discussions with community leaders, male and female parents of children under 5 years. In-depth interviews were held with maternal and child health clinic staff and retail agents. Quantitative data were collected through interviewing more than 750 mothers of children under 5 years during a cluster sample survey of child health.

The voucher return rate was extremely high at 97% (7720/8000). However, 2 years after the start of the scheme awareness among target groups was only 43% (45/104), and only 12% of women (12/103; 95% CI 4–48%) had used a voucher towards the cost of a net. We found some evidence of increased voucher use among least poor households, compared with the poorest households. On the basis of these results we renewed our information, education and communication (IEC) campaign about vouchers.

Discount vouchers are a feasible system for targeted subsidies, although a substantial amount of time and effort may be needed to achieve high awareness and uptake – by which we mean the proportion of eligible women who used the vouchers – among those targeted. Within a poor society, vouchers may not necessarily increase health equity unless they cover a high proportion of the total cost: since some cash is needed when using a voucher as part-payment, poorer women among the target group are likely to have lower uptake than richer women. The vouchers have two important additional functions: strengthening the role of public health services in the context of a social marketing programme and forming an IEC tool to demonstrate the group at most risk of severe malaria.

**Key words:** social marketing, malaria, *Falciparum*, prevention, control, Tanzania

## Introduction

Malaria control strategies for Africa are undergoing intense re-examination. In April 2000 African leaders signed the Abuja Declaration, with a commitment to protect 60% of African children with a treated net by the year 2005 (WHO 2000). Malaria is the leading cause of morbidity and mortality in sub-Saharan Africa. Pregnant women and children under 5 years old are most at risk of severe malaria in areas of intense transmission of *Plasmodium falciparum*. Treated mosquito nets have been shown to give substantial protection against malaria and anaemia in these vulnerable groups. A meta-analysis of randomized studies from sub-Saharan Africa has revealed that the use of this tool significantly reduces the risks of morbidity and mortality in childhood (Lengeler 2000). Following the demonstration of the efficacy of this tool, the KINET programme assessed evidence of the effectiveness of treated nets in two districts of southern Tanzania (Armstrong Schellenberg et al. 1999). Nets treated with insecticide were distributed through a social marketing

programme, which led to a rapid and marked reduction in the prevalence of parasitaemia and anaemia in children aged under 2 years, together with a 27% improvement in child survival among users (Abdulla et al. 2001; Armstrong Schellenberg et al. 2001; KINET Project 2001).

Gender and socioeconomic status are two crucial aspects to consider in view of the rapidly expanding use of treated nets in malaria endemic countries. First, ownership and use of nets are influenced by gender relations at the household level. Various studies have reported that purchasing power and decision-making for items such as mosquito nets favour men rather than women, and access is worse for children than adults (Aikins et al. 1993; Makemba et al. 1995; Tanner and Vlassof 1998; Rashed et al. 1999; Minja 2001). In general, women are disadvantaged in terms of income in most African communities. This is particularly worrying in view of the high risk associated with malaria in pregnancy (Steketee et al. 2001). Infants are even more vulnerable: protecting the mother during pregnancy is likely to benefit the child through

improved birth weight and through direct protection as long as the mother sleeps with the young child under a treated net.

Secondly, many of the populations at most risk of malaria are extremely poor. Each illness episode costs a family substantial resources (Hausmann Muela et al. 2000), and additional economic problems arise if malaria affects the men or women in charge of the household. The poverty implications of this disease are therefore enormous, both at the micro and at the macro level (Gallup and Sachs 2001).

The facts above taken together make for a compelling argument in favour of (1) overall public sector support for treated nets and (2) special emphasis on protecting pregnant women and young children. One way to provide general support is to lower the cost of treated nets below their current market prices by means of a subsidy, either from the government or from an external donor. The total KINET product subsidy, including start-up costs, the social marketing team, distribution and promotion, was around \$3 per net (Kikumbih 2001), assuming the unsubsidized cost of a treated net is around \$4.50. Other general measures include distribution support, abolishing taxes and tariffs, and generic promotion. The sums involved for even a partial subsidy of treated nets for all residents in malaria-endemic areas are considerable. In addition, such untargeted subsidies have potential to 'crowd out' the private sector and could contribute to the larger problem of unsustainability.

Targeted subsidies are particularly appealing to governments and donors because they represent efficient use of funds to address issues of risk and equity. Beneficiary groups could be socially, biologically or geographically determined, and the targeting process could be demand-led, supply-led or community-led (E Worrall, personal communication). For example, villagers themselves might identify the most needy people within their community, giving a socially determined target group reached through a community-led process. Alternatively, newborn infants or pregnant women might be targeted by the government health services for a specific subsidy, giving a biologically determined target group reached through a supply-led process. Lastly, the population of outlying villages in a particular district could be targeted through a donor subsidy to private sector and NGO transport costs to remote areas, giving a geographically determined target group reached through a supply-led process.

However, targeted subsidies also have pitfalls, among which two problems stand out: the sensitivity and specificity of the targeting and the cost. While the sensitivity and specificity of targeting biologically or geographically is high, the sensitivity and specificity of targeting socially will invariably be much lower. Those who are eligible for receiving the subsidy may not actually receive it (under-coverage or low sensitivity) and those who are not eligible may receive it instead of, or as well as, those who are eligible (leakage or poor specificity). Another social marketing programme in Tanzania found that better-off households benefited disproportionately more from subsidies compared with poorer households (Hanson and Jones 2000). The cost of targeting socially is also likely to be high since any mechanism to identify potential

beneficiaries will be much more complex than for geographic or biological targeting.

Here we report on a targeted subsidy to a biologically determined group within the KINET programme. We present results from an evaluation of a novel scheme for targeting subsidies of treated mosquito nets for young children and pregnant women through maternal and child health (MCH) clinics in a rural area of southern Tanzania.

## Methods

### Study area

The study was carried out in Kilombero and Ulanga districts, southern Tanzania. Most local residents are subsistence farmers living in scattered households growing rice and maize on the flood plain of the Kilombero river. There are many ethnic groups, including Wandamba, Wapogoro, Wabena, Wambunga and Wahehe. Malaria is the foremost health problem and transmission due to *Plasmodium falciparum* is intense and perennial. The public health system in the area has a network of dispensaries, health centres and hospitals: routine vaccination coverage, dispensed through MCH clinics, is over 80%. The area is described in more detail elsewhere (Armstrong Schellenberg et al. 2001). A social marketing programme of treated nets and net treatment, branded as *Zuia Mbu* (prevent mosquitoes), was implemented from May 1997 to June 1999, starting in the 25 villages known as the phase 1 area and expanding to further villages as time progressed (Armstrong Schellenberg et al. 1999). The qualitative fieldwork for the present study was carried out in two villages, each with an MCH clinic, in March–May 1999. One of the villages, Mchombe, was in the area covered by the first phase of the social marketing programme (starting June 1997) and the other village, Itete Minazini, was in the area covered by the second phase starting in early 1998. In each village, two sub-villages were chosen, one very close to the MCH clinic (central sub-village) and the other far away from the clinic (remote sub-village).

### Discount voucher scheme

In order to promote equitable access to *Zuia Mbu* treated nets, the social marketing project distributed discount vouchers (Figure 1) through 80 out of 81 mission and government MCH clinics in Ulanga and Kilombero. The goal of the scheme was to increase use of treated nets in those most at risk of severe disease, i.e. pregnant women and young children. The aims were (1) to reduce the price of a treated net for pregnant women and those with young children, (2) to draw attention to the group most at risk of severe disease, and (3) to promote increased equity among pregnant women and young children. Vouchers were intended to be given to all pregnant women and mothers with children under 5 years when they came to the clinics for vaccinations or antenatal care. MCH staff wrote the date, name and contact details of the woman both on the part of the voucher given to the woman and on the stub that was returned to the project team. A mark was then made on the health card of the mother or the child to indicate that the voucher had been

<p>N<sup>o</sup> 4941</p> <p>VOCHA YA PUNGUZO LA BEI SHS. 500/=</p> <p>Tarehe: .....</p> <p>Jina: .....</p> <p>Balozi: .....</p> <p>Kitongoji: .....</p> <p>Kijiji: .....</p>	<p>N<sup>o</sup> 4941</p> <p style="text-align: center;">CHANDARUA CHENYE DAWA</p> <p style="text-align: center;"><b>Z</b></p> <p style="text-align: center;">VOCHA YA PUNGUZO LA BEI SHS. 500/=</p> <p style="text-align: center;">ZUIA MBU</p> <p>Mjamzito <input type="checkbox"/> Mtoto Mchanga <input type="checkbox"/></p> <p style="text-align: center;">USINGIZI MTAMU bila wasiwasi</p>
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**Figure 1.** Discount voucher

The left-hand side is retained by MCH staff and later returned to the project, and reads 'Discount voucher worth TSh500'. There is space for MCH staff to record the date, name and contact details of the woman who receives the voucher. The right-hand side is given to the woman, and has check boxes to show whether the voucher is for a pregnant woman or a child.

received. No attempt was made to stop a woman receiving two vouchers for each live birth: one while she was pregnant, and another after the baby was delivered. Figure 2 illustrates the scheme.

Each voucher could be used as part-payment of 500 Tanzanian shillings (TSh500 = approx \$0.8 in 1997, \$0.7 in 1999) towards the cost of a *Zuia Mbu* treated mosquito net. The full price of these nets was TSh3000 (\$4.9 in 1997, \$4.2 in 1999). The voucher therefore gave a 17% subsidy for a treated net. *Zuia Mbu* nets were available through a network of private and public sector retail agents in the area, including shopkeepers, health workers and village leaders: these agents were given a credit of TSh550 (TSh500 plus a TSh50 handling charge) for each voucher by the wholesaler or by the project when they next purchased nets. The network of wholesale agents was started in 1998, with approximately one wholesale agent for each division (one-fifth of a district): wholesalers purchased nets directly from the project and were given a credit of TSh600 for each voucher returned to the project (TSh500 plus the retailer's TSh50 handling charge plus a wholesaler's TSh50 handling charge).

The discount voucher scheme was an integral part of the information, education and communication (IEC) campaign of the social marketing project since it offered an excellent opportunity for targeted promotion. In addition to the financial value, the vouchers gave a focus for MCH staff in their antenatal and postnatal health education on malaria prevention with treated nets.

#### Qualitative data collection

The study involved 22 focus group discussions (FGDs) with community leaders, male and female parents of children under 5 years, unmarried and married women, for those living close to MCH clinics and those living further away from the clinics. In addition, four in-depth interviews were held with MCH staff and retail agents. FGD and interview guides were prepared focusing on knowledge of vouchers

using locally probed terminology, availability, eligibility, use and misuse of vouchers by mothers and MCH staff, and on how the scheme could be improved.

#### Quantitative data collection

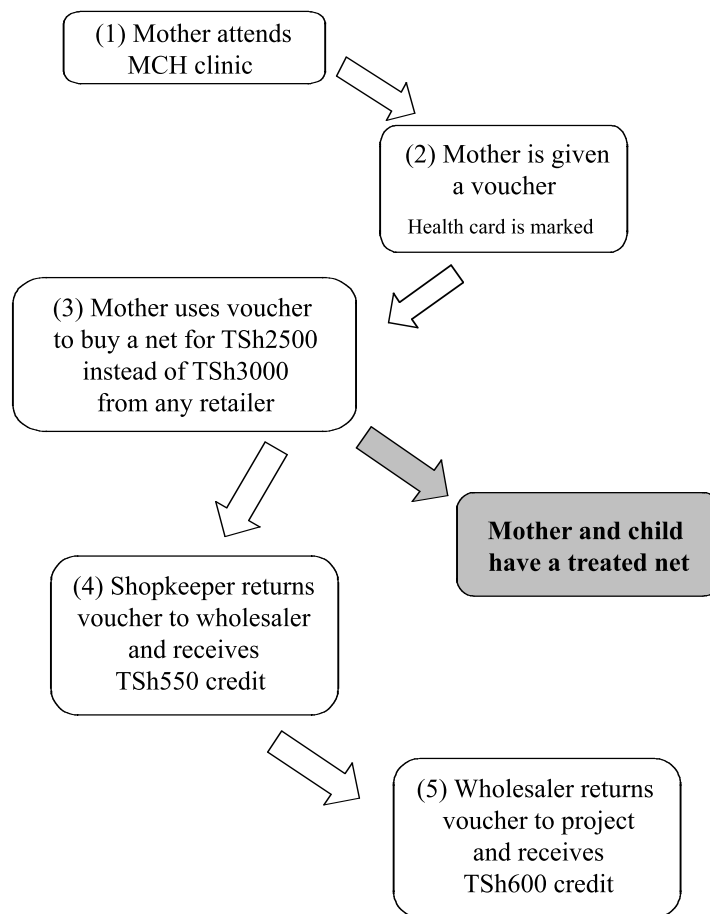
A household-level cluster sample survey of child health in Kilombero and Ulanga was carried out in July–August 1999. Further details are given elsewhere (Armstrong Schellenberg et al. 2001). Briefly, 30 clusters of 20 households were chosen from Ulanga District and 35 clusters of 20 households from Kilombero District. Villages were chosen with probability proportional to estimated population size, and 20 households were sampled using a modified EPI-type scheme. Mothers of children under 5 years were asked whether they had heard of the voucher scheme, who was eligible for a voucher and whether they had used a voucher themselves (i.e. uptake). The survey also included net ownership at household level and net use by each child. Nine household-level proxy markers of socioeconomic status were also assessed: ownership of a bicycle, a radio, a tin roof, animals and chickens or ducks, whether the house was rented or owner-occupied, whether the household head and the mother/carer had an income apart from farming, and the educational level of the household head.

#### In-depth analysis of treated nets in pregnancy

Information on the voucher scheme was also collected during a separate study in part of the phase 1 area on the health impact of treated nets in pregnancy (Marchant et al. 2002). For completeness the relevant data are reported here to complement the picture on the voucher scheme, especially with regard to voucher uptake and misuse.

#### Analytical methods

Analysis of qualitative data started with preparation of debriefing notes after each FGD and interview session. Textbase alpha software (Qualitative Research Management, CA,



**Figure 2.** Distribution of discount vouchers

USA) was used to analyze the pre-coded transcripts in specific themes. Household survey data were summarized using two-way tables and proportions, with confidence intervals and significance tests adjusting for the clustered nature of the data using STATA (STATA version 6, TX, USA). Analysis was done separately for the phase 1 area, where vouchers had been available for 2 years by the time of the survey, and for the phase 2 and 3 areas, where vouchers had been available for 6 to 18 months. The remaining areas of Kilombero and Ulanga had only started the voucher system a few weeks before the survey and have been omitted from the relevant parts of the analysis. Using principal components analysis (Filmer and Pritchett 2001), a relative index of household socioeconomic status was developed for households in the phase 1, 2 and 3 area using weighted scores of information on income sources, education of the household head and household assets. The first principal component gave greatest weight to the household head having an income apart from farming (0.46): further details are shown in Table 1. The first three eigenvalues were 2.10, 1.29 and 1.11 and explained 23%, 14% and 12% of the variation, respectively. Socioeconomic status was classified by dividing the first principal component into quintiles, so that each household was classified as most poor, very poor, poor, less poor, or least poor in terms of socioeconomic status: Table 1 shows the mean score and the

percentage of households with each type of asset in each quintile.

## Results

Overall, 23% of 65 111 socially marketed mosquito nets sold between May 1997 and June 2000 were partly exchanged for discount vouchers. Voucher return rates were extremely high, with nearly all vouchers issued being returned in part exchange for a net. A total of 8000 vouchers were issued in the phase 1 area between September 1997 and August 2000, and of these 7720 (97%) were actually used (Marchant et al. 2002). In the household survey, we sampled 1235 households, for 60 of which (5%) no interviewee could be found on the day of the survey and a further 5 (0.4%) refused to take part. Of the remaining 1170, 766 (65%) had one or more children under 5 years and 762 (65%) had complete data which could be analyzed. Of these, 104 households (with 157 children under five) were in the phase 1 area, 204 (312 children) in the phase 2 area, and 134 (198 children) in the phase 3 area.

## Knowledge of the scheme

In all focus groups there was some awareness of the discount voucher scheme: local terms used included *kikaratasi*

**Table 1.** Asset ownership for households in each socioeconomic status quintile (n = 407)

Socioeconomic status quintile	No. of households	Mean SES score	Household 'assets' (Loading on first principal component)									
			Household head income other than farming (0.46)	Radio (0.40)	Tin roof (0.39)	Bicycle (0.37)	Rent the house they occupy (0.35)	Mother income other than farming (0.34)	Household head completed primary education (0.21)	Animals (0.13)	Chickens/ducks (0.19)	
Most poor	56	-1.59	0%	0%	0%	0%	0%	0%	0%	0%	0%	16%
Very poor	77	-1.17	0%	1%	0%	1%	0%	0%	0%	0%	68%	29%
Poor	105	-0.52	12%	26%	10%	18%	1%	1%	1%	1%	66%	49%
Less poor	85	0.49	15%	67%	25%	52%	2%	4%	7%	68%	68%	73%
Least poor	84	2.29	79%	68%	50%	67%	20%	36%	13%	81%	81%	64%

*maalum cha Zuia Mbu* (Zuia Mbu special paper), *kirisiti* (a small *Zuia Mbu* receipt), *kibali* (permit), *kikadi* (a small card) and *kitambulisho* (an identity card). Although many FGD participants said they knew that pregnant women were entitled to a voucher, there was much confusion about exactly which group of children under five were eligible. The details of the scheme itself were clear to some participants, but not all:

*You must go to the nurse and get a small piece of paper.*  
(unmarried women, central sub-village, phase 1 area)

*Where could we get nets for Tshs2500?* (married women, remote sub-village, phase 2 area)

Relatively low awareness of the scheme was also suggested by the results of the household survey. Two years after the discount voucher scheme started in the phase 1 area, less than half (43%, 95% CI 30–58) of 104 women with children under five had heard of the scheme. Of these 104 women, 35% (95% CI 25–46%) were aware that pregnant women were eligible and 38% (95% CI 26–52%) were aware that children under five were eligible.

#### Uptake of discount vouchers (proportion of eligible women who used a voucher)

Both the household survey and FGDs suggested that voucher uptake was relatively slow. In the phase 1 area only 12% of women (12/103, 95% CI 4–28%) said they had used a voucher by July 1999. Of the 40 women in this area who stated correctly who was eligible for a voucher, 12 said they had actually used one (30%, 95% CI 12–56%), and 40% of these women reported that their child was using an ever-treated net (16/40, 95% CI 27–54%). In the phase 2 and 3 areas, uptake was significantly lower than in the phase 1 area, at just 2% and 4%, respectively (95% CI 1–6% and 1–14%; n = 201 and 132, respectively; F-test adjusting for clustering, p = 0.05).

In the study by Marchant et al. (2002), which was done over the 1-year period preceding July 1999 in part of the phase 1 area, only 28% (141/505) of women said they had heard of the scheme. Only 10 women (2% of all women, 7% of those who had heard about the system) said that they had been given a discount voucher. Of these 10, eight had already used the voucher at the time of interview.

#### Constraints to using a discount voucher

Several FGD participants mentioned that they already owned nets and therefore had no need to use the scheme. As one old man commented:

*We had another type of net before this system was introduced, and my wife has used the same while she was pregnant and is now using it with our 6-month-old baby.*  
(men, central sub-village, phase 2 areas)

Confusion about eligibility had also limited utilization of the vouchers, as shown by one female FGD participant:

*My child is 3 years old while the nets are only for children below 6 months so I can't think of buying those cheaper nets any more.* (married women, remote sub-village, phase 2 area)

The confusion may have arisen partly because eligibility was extended to mothers of children under 5 years during the study period. However, there was general agreement in the FGDs that many eligible women had not used the vouchers because of a lack of cash, partly due to the poor harvests in three consecutive years. As one community leader lamented:

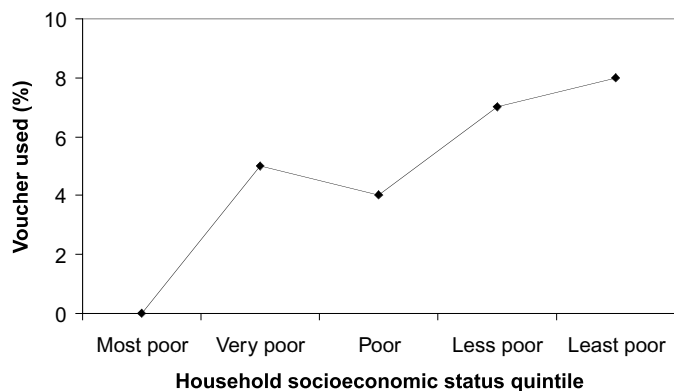
*There is famine and there are mosquitoes. What can I do then while there is no money?* (community leaders, phase 1 area)

In all FGDs there was a perception that married women had benefited more from the discounted nets than the unmarried women, because they were thought to have better access to cash. Other reasons for poor response to the voucher scheme included breaks in net supply:

*Even if you get that voucher the nets are not available when we have money.* (unmarried women, remote sub-village, phase 2 area)

In the study by Marchant et al. (2002), 131 (of 505; 26%) women had heard about the voucher system but had not been given one. Of these, 83 (63%) said they did not want one because they could not afford the discounted price, and 32 (24%) said they didn't need a treated net (of whom 29 were currently using a treated net). Only 5% (8/141) of those who had heard about it said they had not understood how to use a voucher.

There was also evidence from the household survey that vouchers were used more often by households with better socioeconomic status than those with poorer status. None of the mothers from the poorest households had used a voucher, whereas 8% of mothers from the least poor households had used one (Figure 3; F-test for trend,  $p = 0.02$ ). The same trend was seen when the analysis was restricted to the phase 1 area alone, but did not reach statistical significance, possibly because of the small sample size (data not shown).



**Figure 3.** Socioeconomic differentials in voucher use

### Information flow

FGD participants had heard about the scheme through local employers, MCH clinic staff and the *Zuia Mbu* sales and treatment agents in the villages. *Zuia Mbu* IEC campaigns during a sponsored football tournament had also played a role, as mentioned by one of the FGD participants:

*That is where most of us would like to go after coming from the shamba (farm) . . . and especially if you don't want to follow beer at local drinking places.* (males, central sub-village, phase 1 area)

### Satisfaction

FGD participants were very satisfied with colour, shape and size, and prices of *Zuia Mbu* nets. The discount of TSh500 per net was seen as very positive additional benefit:

*That card is like a gift which you get as an incentive to buy a commodity which is already cheap.* (community leaders, phase 1 area)

### Misuse of vouchers

Focus group participants were asked whether the vouchers were ever used by people who were not eligible. There was a general feeling that such 'misuse' does occur, but rarely, and based on mutual agreement, for example between female friends. Participants were unwilling to discuss the issue despite probing and it was therefore decided that it was not possible to investigate this directly in the household survey:

*You can't know (about voucher misuse) unless you have seen or been involved (yourself).* (married women, remote sub-village, phase 1 area)

We sought indirect quantitative information on misuse of vouchers through comparing the number of households in the phase 1 area with the number of women who said they had used a voucher by July 1999. By this date, 3363 vouchers had been exchanged for nets in this area.<sup>1</sup> There are approximately 12 000 households in the area, of which 65%, i.e. approximately 7800, have a child under five. According to our survey, 12% of these 7800 eligible households with a child aged under five reported having used at least one voucher by July 1999, which suggests that just 937 households had used a voucher.

### Discussion

We have shown the feasibility of targeted subsidies for treated nets using discount vouchers in a rural area of southern Tanzania. Awareness and uptake increased with time but were still relatively low 2 years after launching the scheme, despite an exceptionally high return rate among those who had been given a voucher. Our data suggest that a substantial amount of time – several years – is needed for people to understand and use the scheme, even with a substantial promotional campaign in support. For those

planning other voucher schemes, we would recommend that multiple communication channels (e.g. mass media, point-of-sale advertising, promotion within health facilities and through other channels such as sports sponsorship) should be carefully considered and that the scheme should not expect to achieve reasonable uptake before at least the third year. Very close monitoring – designed in the light of our evidence that people are not generally very willing to discuss voucher use freely – would be necessary from the start so that barriers to uptake can be understood and appropriate action taken. It should also be added that given the extremely high household net ownership (72% of households with children under 5 years in the phase 1 area in 1999: data not shown), the majority of householders can clearly afford a non-discounted net and it could be questioned whether the scheme is necessary at all.

However, the discount voucher scheme served as a strong physical link between the public health system and private sales agents, optimizing the skills of each of these partners to increase coverage of treated nets. Another positive feature of the vouchers was that they served as a promotional tool to demonstrate to family members, community leaders and MCH staff the priority that should be given to the group most at risk of severe malaria. The recent realization of the enormous burden of malaria in the first year of life has re-focused emphasis on infants (Kitua et al. 1997; Smith et al. 2001). Together with evidence of the beneficial impact of treated nets in pregnancy, which was also demonstrated in our area (Marchant et al. 2002), it seems increasingly that pregnant women are a highly appropriate target group for subsidies. Pregnant women are easy to identify and to reach, and their protection will extend to their newborn children, who usually sleep under the same net.

Such a voucher scheme is likely to prove better suited to target specific risk groups on a large scale than the selling of cheap nets through health services, since the nets are still distributed and sold through ordinary retailers. The scheme should therefore help to strengthen the commercial market for treated nets, which is likely to be the main future source of these products (Malaria Consortium 1999), rather than weaken it by providing unfair competition.

We found some evidence of lower uptake among those with lower socioeconomic status, thought to include many unmarried women. This is in keeping with the implementation of targeted subsidies in another social marketing project in Tanzania (Hanson and Jones 2000), and is not surprising since women using vouchers still needed to have TSh2500 (approximately \$4.1 in 1997, \$3.5 in 1999) in cash in order to benefit. With any new health intervention it is likely that inequities will increase at first as the least poor are most able to take up the new intervention and the poorest may only benefit at a later stage (Victora et al. 2000). Equity might be increased by waiting for a longer period of time – until net coverage has reached saturation in the least poor households, for example – or by increasing the value of the voucher. In setting the value of such vouchers there is a trade-off between the value of the voucher and the rate of misuse: we attempted to set the value at a level which would increase

coverage and yet keep misuse to a minimum. Our qualitative data suggest that those who had heard of the scheme were satisfied as non-subsidized prices were already perceived to be good value.

Our study was designed to start with initial qualitative work and later to follow up specific issues in a quantitative survey in the entire two-district area. In the qualitative work we found that the issue of voucher transfer – where vouchers were issued to eligible women but redeemed by someone else – was not easy to investigate despite individual interviews and substantial probing. We therefore decided that this area could not reliably be investigated in a large-scale household survey and we were not able to set up an alternative monitoring system. We were unable to find out how many of the discounted nets were used by eligible people because of the practical difficulties of tracing individual nets. As noted by Marchant et al. (2002), there was a general reluctance in the community to discuss the voucher system and this may have contributed to the low use reported.

There was, however, indirect quantitative evidence of voucher misuse: over 3000 vouchers were used in the phase 1 area by July 1999, compared with an estimate of under 1000 households where women said they had used a voucher. Since each woman is eligible for a voucher in pregnancy as well as for a child, some of the difference may be due to multiple vouchers used by individual women. However, it is also likely some vouchers were used by householders from other areas and by non-eligible household members within the area. This misuse will have contributed to increased coverage of treated nets in men and in older children.

The implications of the study for local policy were clear, in that awareness of the voucher scheme was not adequate among family members, community leaders, MCH staff or net distribution agents. An intensive campaign was therefore launched to raise awareness of the system in late 1999 and 2000. Further research is planned to assess awareness and uptake in 2002 and 2003, and if uptake has increased it will be possible to investigate voucher uptake and equity in more depth, as well as exploring in more depth the reasons for not using a voucher among those eligible. Follow-up of a sample of voucher users might also reveal the extent to which these subsidies reach the targeted populations.

Tanzania has recently started a process of 'going to scale' with treated nets and insecticide in all districts. The discount voucher scheme described here is a potential strategy for encouraging uptake among poorer women, as well as being a promotional tool that strengthens the role of MCH staff in IEC campaigns. Keeping misuse of the system to a minimum might be more difficult within the context of a national programme than in only two districts as described in this study. However, locally active non-governmental organizations (NGOs) – such as mission hospitals with community outreach – might find it attractive in any setting with high attendance at MCH clinics, although long-term implementation may be needed before adequate awareness is achieved in scattered rural households. In the context of health sector reform, district health management teams might also choose

to strengthen their role in promotion of treated nets through such a scheme. Supporting IEC materials should aim at both fathers and mothers since decisions involving cash often depend largely on the father.

## Conclusions

Discount vouchers are a feasible system for targeted subsidies, although a substantial amount of time may be needed to achieve high awareness and uptake. Pregnant women are likely to be an ideal group for such targeting. Within a poor society, vouchers may not necessarily increase health equity, at least at first, since some cash is needed when using a voucher as part-payment. The vouchers have two important additional functions: strengthening the role of public health services in the context of a social marketing programme and forming an IEC tool to demonstrate the group at most risk of severe malaria. Finally, vouchers rather than cheap nets sold through health services will help to build and strengthen the commercial market for treated nets.

## Endnotes

<sup>1</sup> The difference between the number of vouchers used between September 1997 and August 2000 and the number of vouchers used between September 1997 and July 1999 reflects the number of vouchers used between August 1999 and August 2000, i.e. 7720–3363 = 4357 vouchers were used between August 1999 and August 2000.

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