Residual house spraying against malaria must be done correctly to be effective

To the Editor: Residual indoor spraying with DDT or one of the (semi) pyrethroids is a well-established method of malaria control. It is still the main preventive means used in malaria control programmes worldwide.[1] Considerable successes have been booked in the southern African region with programmes depending largely on residual indoor spraying.[2] However, for this method to be effective a number of conditions have to be met.[3] Among these are factors relating to the implementation method, timing, spraying technique, supervision, etc.

In Zimbabwe annual spraying has become a routine. However, its effectiveness has not been firmly established. Repeated prevalence surveys in otherwise comparable sprayed and unsprayed areas in Mt Darwin district, Zimbabwe, showed non-significant marginal effects in favour of spraying, namely 15% and 19% in April (peak season), and no difference in prevalence in September (10% in both areas) (unpublished report presented at the National Malaria Review Meeting, Victoria Falls, 1995).

In an attempt to appraise possible effects of spraying as it is routinely carried out (in our case with α-cypermethrine[4]), we conducted a longitudinal case-controlled study in the same area in Mt Darwin District in Mashonaland Central Province. We followed up 400 schoolchildren (mean age 12 years) through repeat blood slide examinations, a proven method to estimate malaria morbidity incidence rates.[5]

In the group of children from sprayed villages there were 120 new episodes from a total of 23.129 days' observation, leading to an incidence rate (IR) of 0.623 per person season. The figure for the unsprayed villages was 148 infections, 19.882 days and an IR of 0.893 respectively. This difference, although slight, is significant ($p = 0.04$).

With regard to frequency of malaria, the number of episodes per child per season was calculated and compared according to spray status of the area. Differences were found to be pronounced. Of the 200 children in the schools in sprayed villages, 102 (51%) had malaria once or more as opposed to 109 (54%) in the group from the unsprayed villages. In other words, 49% and 45.5% of children in sprayed and unsprayed areas respectively remained malaria free ($p = 0.62$).

However, children in unsprayed areas had more repeat incidents of malaria infection; 34% versus 10% had two or more episodes, and 9.5% versus 1% had three or more episodes (Table I).

These findings suggest that the spraying provided some protection against repeat infections, but did not protect against an initial malaria infection.

The abovementioned findings and observations made in the field during the spraying campaign lead us to make the following recommendations:

Table I. Number of schoolchildren showing frequency of infection by area

Severity (number of malaria episodes)	Spray status		
	Yes	No	Total
None	98	91	189
One	82	41	123
Two	11	38	49
Three	8	19	27
More than three	1	11	12
Total	200	200	400

Chi-square = 20.8, $p = 0.00035$

1. When considering such costly programmes, each of the possible arguments for residual house spraying should be weighed. Any national malaria vector control programme needs sustained and authoritative input from expert entomologists.

2. All monitoring tools available should be integrated in a spraying programme, without which the activity should not be embarked upon. This strict quality control routine should not be compromised. It implies certain organisational conditions that would lead to increased 'verticalisation', a situation that carries its own disadvantages.

3. When choosing a control strategy the cost of spraying (with 'in-built' quality monitoring) has to be set against the cost of other preventive measures.

4. Recent widely tested alternative methods of vector control[6,7] are more cost effective than an insufficiently supervised spraying campaign.[8]

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