



# Ready to Eliminate Malaria: Experiences in Reaching and Engaging Communities during IRS Campaign in Siavonga and Sinazongwe Districts of Zambia

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## Abstract

**Background:** Zambia has engaged itself and communities towards malaria elimination that is feasible but very challenging. Community engagement and collaborating are cornerstones of the efforts to improve IRS for impact. The study assessed factors that lead to low levels of IRS coverages in the hot spot areas of the two districts.

**Methodology:** This was an operational study conducted during IRS implementation with cluster sampling technique used for selected groups of the clusters. The two districts were purposely selected while applying sampling techniques. The clusters were listed and the numbers of households in the districts were determined.

**Results:** Out of the 201 population interviewed 56.3% had between 3-5 roomed houses and 67% indicated having their houses sprayed. Thirty-seven percent (37%) attested that the spray teams did not visit their households for spraying and 88.1% attested that IRS controls malaria. Fifty-eight percent (58%) associated IRS to killing of mosquitoes, 25% indicated that IRS helps reduce malaria. Thirteen percent (13%) indicated negative reaction and 80% had not experienced bad or negative reaction to IRS and 75.6% did not know the chemicals used for IRS. Further, 82% associated spraying to reducing mosquito bites inside houses. Sixty-six percent (66%) indicated attending meetings organized by traditional leaders. Forty-three percent (43%) rejected IRS as an effective intervention due to bad smell and 4.5% suffocation and 3.5% getting skin irritation and inconveniences by IRS processes. Forty-one percent (41%) believed that sensitization and community ownership through decentralization of the intervention and community education about IRS were very important. Ninety-two percent (92%) indicated mosquitoes as the main vector for malaria. Sleeping under mosquito nets became a major intervention known (84.1%) and 63.7% (IRS) and a few (26.4%) use repellents and 7.5% cleaning the surrounding.

**Conclusion:** The outstanding method of approach to IRS remains good social mobilization, massive community sensitization and education. Community engagement and sensitization prior to IRS addresses knowledge gaps and poor perceptions about IRS. Lack of knowledge has been one of the factors leading to low coverages on IRS. Community involvement and decentralized IRS model including the use of community action cycle empowers the community for universal coverage of targeted households.

**Keywords:** Eliminate; Experiences; Engagement; IRS; Districts; Zambia

## Introduction

Global malaria control strategy stresses the selective use of preventive measures, in targeting the use of different vector

control methods alone or in combination to reduce human vector contact [1]. The World Health Organization has also widely promoted the use of Long Lasting Insecticide Treated Bed nets (LLINs) on top of IRS as a means of reducing human–vector contact and consequently controlling malaria transmission [2]. However, LLINs may also face setbacks such as nets not being fitted well, getting torn because of excessive use, thus giving mosquito’s easy access to a blood host [3-5]. In Zambia, the government is committed to eliminate malaria infection through various interventions such as LLINs, IRS and Environmental Management through community engagement and empowerment. Communities feel that they own the IRS program when they are actively involved and consulted at the onset.

This study establishes the factors leading to low IRS coverage in Siavonga and Sinazongwe districts of Southern province of Zambia and determine a different approach method for implementing Indoor Residual Spraying.

### Objectives

1. To assess factors that lead to low level of IRS coverage among the targeted communities.
2. To determine the relationship between IRS knowledge and willingness to have houses sprayed.
3. To determine the extent of community involvement in Indoor Residual Spraying.
4. To establish whether a different approach method of IRS must be determined that will help with universal IRS coverage among the targeted households and communities.

### Methodology

#### Study area

This study was carried out during the 2018 IRS campaign that was implemented in hotspots areas for malaria in Siavonga and Sinazongwe districts in Southern province of Zambia. The study sites, each had two health centres catchment areas where IRS was being conducted including one General hospital and several health posts. The area sometimes receives an average rainfall of 1,200 mm per year with long rains starting at the end of January and end in March. Most of the years the districts remain dry. The short rains start at the end of October and end in December. A dry season is usually in August to October [6-10].

#### Data collection procedure

The interviewer scheduled questionnaire was divided into four parts; part one collected data on the socio–demographic information; part two consisted of questions relating to the community attitude towards IRS as a malaria control tool; while part three related to the community involvement in IRS activities;

and part four collected data on community knowledge on malaria. Data collectors were recruited from the study areas and these were trained Environmental Health Technologists that administered the questionnaires. Completed questionnaires were checked for consistency and completeness by the supervisor.

### Conceptual Frame Work (Figure 1)

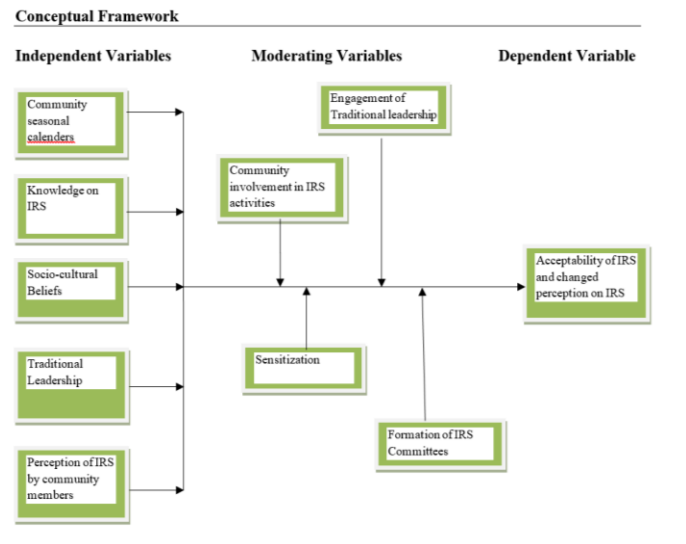


Figure 1: Conceptual Frame work Showing Study Variables.

### Results

A total of 201 people were interviewed and the majority being men of about 58.7%, (n=118) and women 41.3% (n=83%). Most (73.1%) of the households were headed by men. The level of education was more of primary (43.1%) and (43.3%) secondary education and residents per household ranged between 1-11 people and many were married.

#### Community house ownership and attitudes towards indoor residual spraying

The majority 56.3% of the respondents had each between 3 - 5 roomed houses, while between 1 and 2 rooms accounted for 22.1% and 21.6% of the respondents had 6 and above. Sixty-seven percent (n=135) of the interviewees indicated having had their houses sprayed, while 31.3% (n = 63) indicated that they did not have their houses sprayed during the previous IRS. Those who had their houses sprayed were further asked to mention who conducted the spraying. Most respondents (22.8%) indicated the activity was coordinated by public health officers from the Ministry of Health and Hospitals. Coordinated by spray men response accounted for (19.1%) of the responses. Eight percent (8%) of the respondents usually did not know, while 50.7% of the respondents gave no response (Figure 2).

### Last time communities participated in indoor residual spraying campaign

About 68.7% of the respondents indicated 1 to 12 months, was the last time they participated in IRS while 12.2% of the respondents indicated 1 to 3 weeks, 9.2% had their houses sprayed less than a week ago and 2 years respectively. Only 0.8% did not know the exact date. When asked the reason for not spraying their houses, 37% of the respondents attested to spray team not coming to their households or area, while 11% associated it with allergies, asthma and other diseases, 32% were not around at the time of spraying, 6.5% of the respondents refused to have their households sprayed and 12.9% cited other personal reasons. Only 1.6% gave no response [11-15].

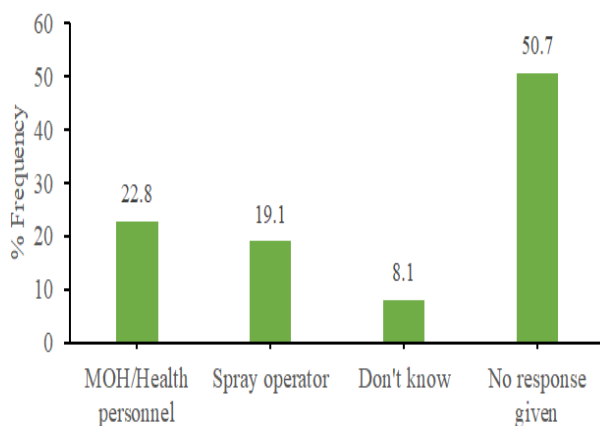


Figure 2: Showing levels on knowledge of coordinators for indoor residual spraying campaign.

### Community's perception on acceptability and benefits of the use of indoor residual spraying

Of the 201 respondents, 88.1% (n = 177) attested that IRS is acceptable for use as a way of controlling malaria in their community, 9.0% (n = 18) did not believe that IRS could be effective to control malaria. The remaining 3.0% (n = 6) did not respond. Further responses on benefits of IRS were elicited among those who readily accepted IRS as a control tool for malaria transmission. The perceived benefits of using IRS were 58% (n = 102) of the respondents that associated it with reduction or killing of mosquitoes inside their houses, 31.2% (n = 55) indicated that it helps to prevent and reduce malaria, 7.4% (n = 13) associated IRS with reduction in number of cockroaches. Only 1.7% (n = 3) of the respondents did not want to die or get sick of malaria. Among those who did not readily accept to use IRS had also varied reasons for their choices (Figure 3).

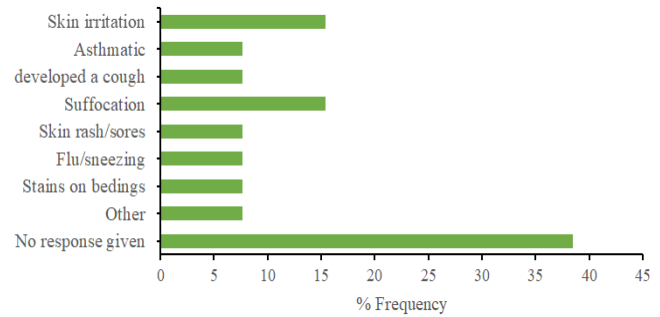


Figure 3: Showing reasons for not accepting the use of Indoor Residual Spraying.

Thirty percent (n = 7) of the respondents rejected IRS as an effective malaria control intervention because of skin irritation, bad smell 35% (n = 8) and 21% (n = 5) because of experienced poisoning of domestic animals. Others (13%) did not accept IRS because it stains walls or wastes time during usage [16-19].

### Reasons for not accepting the use of indoor residual spraying

Thirteen percent (n = 26) of the interviewees indicated having had bad or negative reaction after having their homes sprayed, while 80.1% (n = 161) indicated that no one experienced bad or negative reaction. Those who had bad and negative experience were further asked to explain what happened. Only 17 answered the question; of which 15.4% attested to skin irritation and suffocation, while 7.7% had asthma, skin rash, body sore, flu and sneezing, developed a cough, stains on beddings, and others respectively [20] (Figure 3).

### Knowledge on the type of chemical used for indoor residual spraying campaign

About 75.6% of the respondents did not know the chemical used, while 15.9% attested to knowing the chemical used in spraying. Further a question was asked to those attested to know the chemical. The majority 84.8% mentioned actellic as a chemical, while 3% thermic, a chemical that did not exist. Eight two percent (n = 165) of the respondents associated spraying with reduction of mosquito bites inside houses, 9% (n = 18) indicated that helps to reduce number of cockroaches and believed that IRS had no benefit at all towards mosquito killing. Only 9% (n = 18) associated IRS with prevention of malaria transmission [21-26].

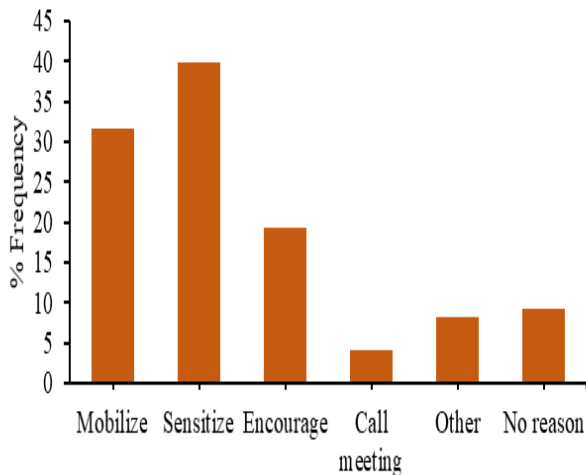
### Community involvement in indoor residual spraying

Sixty-six percent (n = 134) of the interviewees indicated having had attended any meeting that was aimed at involving the community in IRS, while 32.3% (n = 65) indicated that had not attended the meeting. Only 1.1% (n = 2) of the respondents gave

no response to whether they attended or not. Those who attended that meeting were further asked about who conducted the meeting. About 21% of the respondents who attended the meeting attested that the meeting was conducted by the traditional leaders and spray operators, respectively. Coordination by the health personnel from the District Health Office accounted for 11% and 15% of the response, respectively. Four percent of the respondents usually consulted with the Ministry of Health.

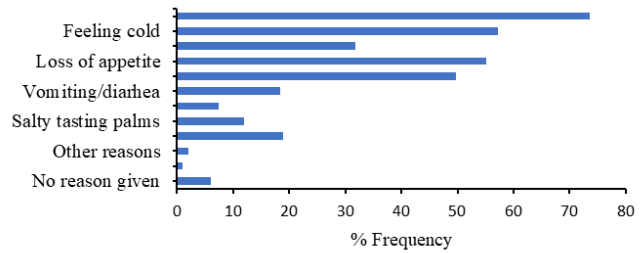
**Coordination of indoor residual spraying motivating meetings in the community**

Further, we sought to know if the village meetings motivated the community to participate in the IRS as a malaria control tool. Of the 201 respondents, 30.8% (n = 62) attested that Indoor Residual Spraying meetings were motivating, while 12.4% (n = 25) indicated the meetings were not motivating for them to participate in the IRS Campaign. The remaining 56.7% (n = 114) did not give any response to the question. Among those who did not attend the meetings also had various reasons for their choices (Figure 4).



*Figure 4: Showing community's perception on involving traditional leaders to motivate and encourage people to have their houses sprayed.*

Twenty-five percent (25%) of the respondents never heard of the meetings, no meetings 12.8% and 10.6% never had the chance. To attend the meetings. Other 2.1% did not attend because the husband attended the meetings. The local communities were asked whether traditional leaders are involved in mobilization of IRS (Figure 5).



*Figure 5: Common main methods of mosquito control and elimination.*

Further, of the 201 respondents, 48.3% (n = 97) attested that traditional leaders are involved in the mobilization of IRS, while 43.8% (n = 88) believed that traditional leaders are not involved in the mobilization of the IRS. Eight percent (8%) of the respondents did not answer the question. Those who said that traditional leaders are involved in IRS mobilization were further asked what role they play. About 39.8% attested to sensitization of the community by traditional leaders, while 31.6% mobilizing the community and 19.4% believe traditional leaders encourage the people to have their houses sprayed. Of the 201 respondents, 84.1% (n = 169) attested that traditional leaders motivate and encourage their people to participate in the IRS, while 7.0% (n = 14) indicated that traditional leaders would not motivate and encourage the people to have their households sprayed. The remaining 9.0% (n = 18) did not give any response. A question was asked to determine the reason why some people choose not to have their houses sprayed. Forty-three percent (43%) of the respondents rejected IRS as an effective malaria control intervention because of lack of knowledge about the benefits, bad smell 6% and 4.5% because of suffocation and fear of getting sick, respectively. Other 3.5% did not accept IRS because of skin irritation and inconveniences [27-31].

**How best could indoor residual spraying be implemented in order to have a wider IRS coverage?**

The community was asked how best IRS could be implemented in order to have a large coverage in their community. Forty-one percent (41%) of the respondents believed that proper decentralization, strong sensitization and education about IRS, 9% attested to conduct the IRS in summer or dry season, 5% of the respondents indicated they should change the chemical used, 4.5% spray all households, 1.5% spray regularly and allocate more time to IRS. Only 3% of the respondents believed engaged community would make improvements towards the implementation of IRS in their community (Table 1).

*Table 1: Responses on how best IRS can be implemented to have a wider IRS coverage.*

Variable	Number	Percent
Sensitize/educate	83	41.3
Community engagement	6	3.0

Change the chemical	10	5.0
Regular spraying	3	1.5
Conduct IRS in summer	18	9.0
Spray all households	9	4.5
Allocate more time to IRS	3	1.5
Involve traditional/community leader	15	7.5
Proper mobilization	10	5.0
Strong encouragement	3	1.5
Other	18	9.0
No response given	46	22.9

### Knowledge about malaria and its symptoms in the community

Ninety two percent (n = 185) of the respondents stated they have heard about malaria and over 91.0% (n = 183) of the respondents identified mosquitoes as the main vector of malaria, while the rest mentioned rain 10.7% (n = 20), eating cold nshima 2.0% (n = 10), drinking dirty water 5.5% (n = 11) and eating immature sugarcane 6% (n = 12) as a source of malaria infection and the majority (73.6%; n = 148) of the respondents reported fever as the primary indicator of malaria illness, while 18.4.2% (n = 115) of the local community felt that the signs of malaria can either be vomiting and diarrhoea, and 7.5% (n = 15) cited headache and high body temperature. However, more than 2% believed that there are other symptoms [32-35].

### Common main methods of mosquito control and elimination

Among the methods, community responses indicated that sleeping under a mosquito net 84.1 % (n = 169) and IRS 63.7% (n = 128) emerged as the most common responses. A few respondents mentioned using mosquito repellent 26.4% (n = 53) and cleaning the surrounding 7.5% (n = 15) [36-38].

### Discussion

There has been little control and oversight, that there is need to inform the community about morbidity, mortality and socio-cultural and religious beliefs to determine how society perceives, interprets, and responds to malaria-related interventions. In addition, it is quite rightly noted that, it is very important that monitoring, evaluating and providing feedback to the community together will help determine the success and know what impact Indoor Residual Spraying Campaign performance evaluators have had.

### Conclusion

Among the many factors; knowledge about malaria existed in the community that included knowledge on several control methods. Further, for better malaria elimination results to be achieved, the

community advocated for strengthened massive community sensitization, decentralized ownership and education through engagement of their community leaders. Increased Indoor Residual Spraying community acceptance, performance efficiency, effectiveness and timely and detail-oriented community empowerment remains cardinal for the intervention impact.

### Declaration

### Ethics approval and consent to participants

Not Applicable

### Consent of publication

Not Applicable

### Availability of Data and Material

The data sets generated during the analysis period are available from the Corresponding Author Dr Emmanuel Hakwia Kooma on reasonable request

### Competing Interest

There are no financial or other competing interests and the Authors declare that they have no competing interests whatsoever.

### Authors Contribution

All the Authors read and approved the abstract and the final manuscript

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