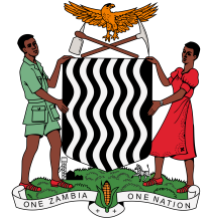


J.C. FLOWERS
FOUNDATION



Assessing malaria-related knowledge, attitudes, and practices among community members within the program areas of the Isdell:Flowers Cross Border Malaria Initiative

**Results from KAP Survey within the program areas of the
Anglican Diocese of Lusaka's
Isdell:Flowers Cross Border Malaria Initiative
Data collected between April – July 2024**

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Abbreviations

CHW	community health worker
HFCA	health facility catchment area
IFCBMI	Isdell:Flowers Cross Border Malaria Initiative
IPTp	intermittent preventive treatment of malaria in pregnancy
IRS	indoor residual spraying
ITN	insecticide treated net
KAP	knowledge, attitudes, and practices
MCA	malaria control agent
MOH	Ministry of Health
NHC	neighborhood health committee
NHRA	National Health Research Authority
NMEC	National Malaria Elimination Centre
UNZABREC	University of Zambia Biomedical Research Ethics Committee

Section 1. Executive Summary

Through the Isdell:Flowers Cross Border Malaria Initiative (IFCBMI), the Anglican Diocese of Lusaka facilitates community engagement for malaria elimination in select communities in Southern and Western Provinces, in partnership with the Ministry of Health (MOH) of Zambia and the J.C. Flowers Foundation. IFCBMI conducted this study to understand malaria-related knowledge, attitudes, and practices (“KAP”) of program areas through a yearly cross-sectional survey. The overall goal is to inform programmatic decisions based on local and recently collected data. The study’s main areas of inquiry are: use of and access to insecticide treated nets (ITNs); indoor residual spraying (IRS) coverage within 12 months prior to the survey; uptake of 3+ doses of intermittent preventive treatment of malaria in pregnancy (IPTp) among women who gave birth in the previous 12 months; patterns of care-seeking behaviour among children under five years with fever in the previous two weeks; knowledge of malaria symptoms and cause; and attitudes towards ITNs, IRS, and IPTp. This report presents key findings from the 2024 KAP Survey and select results from the 2020-2023 KAP Surveys for comparison. Results are representative of IFCBMI program areas and cannot be directly extrapolated to the district, provincial, or national level. A full listing of IFCBMI Zambia program areas included in the sampling frame can be found in Appendix 1. Below is a summary of the key 2024 KAP Survey Results:

Insecticide treated nets (ITNs)

Almost households owned at least one ITN and many people slept under an ITN the night before the survey, However, there are still many households that did not own enough ITNs to cover everyone in the household, assuming each ITN covers two people.

Across all program areas, 98% of households owned at least one ITN, but only 61% owned at least one ITN for every two people who slept in the household the previous night. 90% of people in households (on average) slept under an ITN the previous night. 87% of people in households had access to an ITN within their own household (assuming each ITN covers two people).

In general, pregnant women and children <5 years of age used an ITN the previous night at high levels, and, in most areas, at equivalent or higher levels than the general population, suggesting that these higher-risk groups are correctly being prioritized for ITN use. Among all surveyed households in Zambia, 92% of pregnant women and 94% of children <5 slept under an ITN the previous night (compared to 90% of the general population).

Indoor residual spraying (IRS)

Past 12-month household IRS coverage was very low among IFCBMI program areas (0%-30% among program areas at the district level). This likely reflects a change in government IRS targeting and vector control strategy in general, compared to previous years, and thus results should be interpreted within that context.

Care-seeking behavior for children under age five (<5) with fever

Many children <5 with fever in the two weeks prior to the survey sought care from a health facility or CHW within 24 hours of the start of the fever, and most children who were seen by a health facility or CHW for a fever received a malaria test, though there is still room for improvement. Across all Zambia program areas, 81% of children <5 with fever in the previous two weeks sought care from a health facility or CHW within 24 hours of the start of the fever. Among children who sought care from a health facility or CHW, 89% received a blood test for malaria. Among children who tested positive for malaria, 99% received Coartem for malaria treatment.

Intermittent preventive treatment of malaria in pregnancy (IPTp)

Many respondents took three or more (3+) doses of IPTp during their pregnancy, though this result ranges somewhat among program areas at the district level. Across all Zambia program areas, 89% of respondents who gave birth in the previous 12 months reported taking 3+ doses of IPTp during their pregnancy (at the level of program areas by district, reported IPTp 3+ uptake ranged from 76%-98%).

Knowledge and attitudes

Malaria knowledge was high, and the majority of respondents believed that key malaria elimination activities (ITNs, IRS, and IPTp) do help to prevent malaria. Across all Zambia program areas, 98% of respondents correctly identified “fever” or “chills” as a symptom of malaria, while 95% correctly identified the mosquito as the cause of malaria transmission (and listed nothing else incorrect). Almost all respondents believed that ITNs, IRS, and IPTp help “a lot” to prevent malaria (97%, 93%, and 96%, respectively).

Section 2. Background

Through the Isdell:Flowers Cross Border Malaria Initiative (IFCBMI), the Anglican Diocese of Lusaka facilitates community engagement for malaria elimination in select communities in Southern and Western Provinces, in partnership with the Ministry of Health (MOH) of Zambia's National Malaria Elimination Centre (NMEC) and the J.C. Flowers Foundation. IFCBMI operates on the principle that malaria can be eliminated only if those most affected have the knowledge, skills, and resources to prevent and treat the disease and to advocate for its elimination.

The Anglican Diocese of Lusaka supports a network of approximately 400 Community Health Workers (CHWs) and malaria control agents (MCAs) who conduct community-based testing and treatment for malaria, where policy allows, and deliver malaria education and prevention services within their communities. Each MCA and CHW supports between 45-200 households, depending on their location. Religious leaders, teachers, and other influential community members support the efforts of this cadre and help to deliver malaria education within churches, schools, and the community as a whole.

IFCBMI received approval from the University of Zambia Biomedical Research Ethics Committee (UNZABREC) and the National Health Research Authority (NHRA) of Zambia to conduct a study to gain a better understanding of malaria-related knowledge, attitudes, and practices ("KAP") among community members living within IFCBMI Zambia program areas. This study has three main areas of inquiry:

- 1) Knowledge: assess knowledge of the cause of malaria and its symptoms
- 2) Attitudes: understand attitudes toward ITNs, IRS, and IPTp
- 3) Practices: measure the reported use of and access to insecticide treated nets (ITNs); reported household indoor residual spraying (IRS) coverage within the previous 12 months; reported uptake of intermittent treatment of malaria in pregnancy (IPTp) among women who gave birth in the previous 12 months; and the reported trajectory of care for children under five years with fever in the previous two weeks

The KAP study collects data through a cross-sectional survey that is conducted yearly from 2020-2024, in order to understand change in the main areas of inquiry over time. The overall goal of this study is to improve programmatic decision-making and strategic action based on local and recently collected data. Data collected in the KAP study will also highlight opportunities to collaborate across borders with IFCBMI program areas in Angola, Namibia, and Zimbabwe. Study findings will also be shared with the National Malaria Elimination Centre (NMEC) of the Ministry of Health of Zambia and the academic community to contribute to the body of knowledge on malaria in these communities in Zambia.

This document presents key results from the 2024 KAP Survey, with select results from the 2020-2023 KAP Surveys for comparison over time. Results are representative of IFCBMI program areas and cannot be directly extrapolated to the district, provincial, or national level. A full listing of the IFCBMI Zambia program areas included in the sampling frame can be found in Appendix 1.

Additional information about methodology, statistical analysis, and additional indicators are available upon request, including all KAP Survey indicator results at the level of the Health Facility Catchment Area.

Section 3. Methodology

Sampling frame and sample size

The sampling frame for the 2024 KAP Survey was all IFCBMI program areas in Zambia (Appendix 1). The 2024 sample size was determined to be a minimum of 2200 households, based on power calculations intending to achieve at least 80% power to detect annual incremental improvements in the following primary outcome measures: the proportion of households that had one unused ITN and also at least one uncovered person the night before the survey, the proportion of women who gave birth in the previous 12 months that took 3+ doses of IPTp during their pregnancy, and the proportion of children <5 with fever in the prior two weeks who sought care from a health facility or CHW and did so within 24 hours of fever onset. Sample sizes for KAP Surveys of previous years were calculated in the same manner. Table 1 shows sample sizes from 2020-2024 KAP Surveys and Table 2 shows dates of data collection.

Table 1. Zambia KAP Survey sample sizes (2020-2024 KAP Surveys)

Province	Program areas within Districts	2020	2021	2022	2023	2024
Southern	Kazungula	322	314	302	387	356
	Livingstone	673	559	446	543	458
Western	Kalabo	175	251	169	214	205
	Mongu	127	115	85	113	103
	Mulobezi	183	150	107	159	131
	Senanga	103	120	68	91	76
	Sesheke	541	404	336	424	378
	Shangombo	353	392	279	355	352
	Sikongo	248	236	190	267	302
TOTAL		2725	2541	1982	2553	2361
Response rate		97.5%	97.1%	95.8%	96.0%	99.7%

Table 2. Dates of KAP Survey data collection (2020-2024 KAP Surveys)

Year	Dates of data collection
2020	6 July – 22 August
2021	10 May – 16 June
2022	12 April – 23 May
2023	12 April – 29 June
2024	16 April – 11 July

Survey respondents

All survey participants were required to be female, 18 years old or older, and provide verbal consent. If a household selected for the survey included more than one eligible woman, preference was given to the mother or caregiver of the youngest child in the household. Women were surveyed because they are typically the main caregivers of children under five (<5) and therefore are most likely to answer questions about care-seeking behaviour for their children accurately. They also are most likely to answer questions about their own IPTp history accurately.

Household selection

Households were sampled by systematic random sampling. A “skip pattern” was calculated such that for a sampling frame of H households comprising IFCBMI Zambia program areas, of which X are to be sampled, each ‘(H/X)-1’ household was surveyed until X households were reached. The first household surveyed in every village was selected randomly by drawing a number ‘N’ ranging from 1-10 and surveying the household that was ‘N’ households away from the starting point, which was always the headman’s household.

Data analysis

Descriptive statistics were calculated for all indicators. Descriptive statistics weighted each household to account for its inverse probability of being included in the sample. Statistical tests were conducted to compare findings between sequential survey years. Differences in outcomes that are dichotomous at the individual household level were tested for significance using a regression of the outcome on an indicator for survey year. Differences in outcomes expressed as continuous percentages at the individual household level were tested with a linear regression of the outcome on an indicator for the survey year. The significance threshold was set at .05. Data was analyzed in STATA v 14.2.

Section 4. Results

Results are representative of IFCBMI program areas only and cannot be directly extrapolated to the district, provincial, or national level. In graphical depictions of results, statistically significant results of a given year compared to the prior survey year are denoted by bold typeface. In tables, statistically significant results are denoted by green shading (indicating a statistically significant increase compared to the previous survey year) and red shading (indicating a statistically significant decrease compared to the previous survey year).

Table 3. Background characteristics, all Zambia program areas (2024)

Background characteristic	
Average age of respondent (n)	33.4
Households with at least one child under 5 who slept there the previous night (%)	72%
Average number of children <5 in household the previous night, among households with at least one child <5 (n)	1.3
Households with at least one pregnant woman who slept there the previous night (%)	23%
Average number of people who slept in the household the prior night (n)	5
Average number of sleeping spaces (n)	3
Households with surrounding standing water, per visual observation of data collector (%)	8%

Table 4. Respondent education level, all Zambia program areas (2024)

Education level	%
Never attended school	10%
Attended some primary school	23%
Completed primary school	19%
Attended some secondary school	25%
Completed secondary school	19%
Higher than secondary school	4%
Not sure	0%

Insecticide treated nets (ITNs)

All participants were asked about their household ITN ownership and household member use of ITNs the previous night. Figure 1. shows the proportion of households that own at least one ITN, the proportion of households that own at least one ITN for every two people who slept in the household the previous night, the proportion of people who used an ITN the previous night, and the proportion of people with access to an ITN within their own household (assuming each ITN covers two people) from 2020-2024. Bolded results indicate a statistically significant change (p-value of <0.05) from the previous year.

Across all Zambia program areas, household ownership of ITNs, access to ITNs, and use of ITNs follow the same pattern from 2020-2024: there were significant increases (p=<0.05) in all of these indicators from 2020-2021, followed by significant decreases from 2021-2022. Between 2022-2023, there were again significant decreases in all indicators, except for ITN use which showed a non-significant decrease. In 2024, ITN ownership, ITN access, and ITN use increased significantly and drastically from 2023. As of 2024, most households within program areas owned at least one ITN (98%). Fewer households, however, owned at least one ITN for every two people who slept in the household last night (61%). 87% of people had access to an ITN in their own household (assuming each ITN covers two people) and 90% of people slept under an ITN the night before the survey.

Figure 1. ITN access, use, and ownership (%), all Zambia program areas (2020-2024)

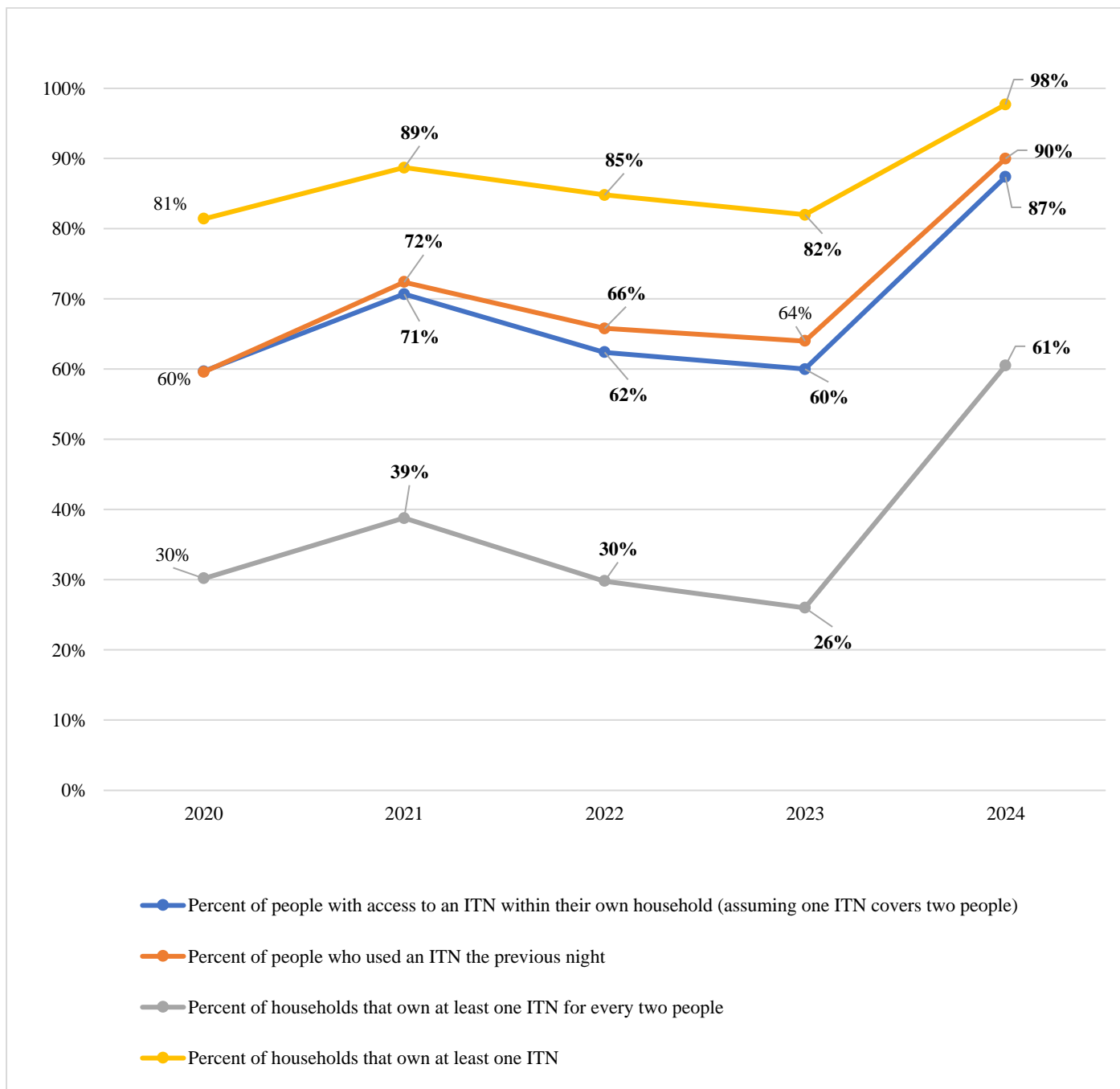


Figure 2. shows levels of household ITN ownership in 2024. All program areas by district follow the same pattern of ITN ownership: the majority of households owned at least one ITN and at least one ITN in good condition (defined as not having any holes larger than a thumb). Much fewer households, however, owned at least one ITN for every two people in the household and even fewer owned at least one good condition ITN for every two people in the household. Ownership of good condition ITNs was lowest in Sesheke District program areas where 46% of households owned at least one good condition ITN for every two people in the household, and the highest in Mongu program areas where 72% owned at least one good condition ITN for every two people in the household.

Figure 2. Household ownership of ITNs (%), program areas by district (2024)

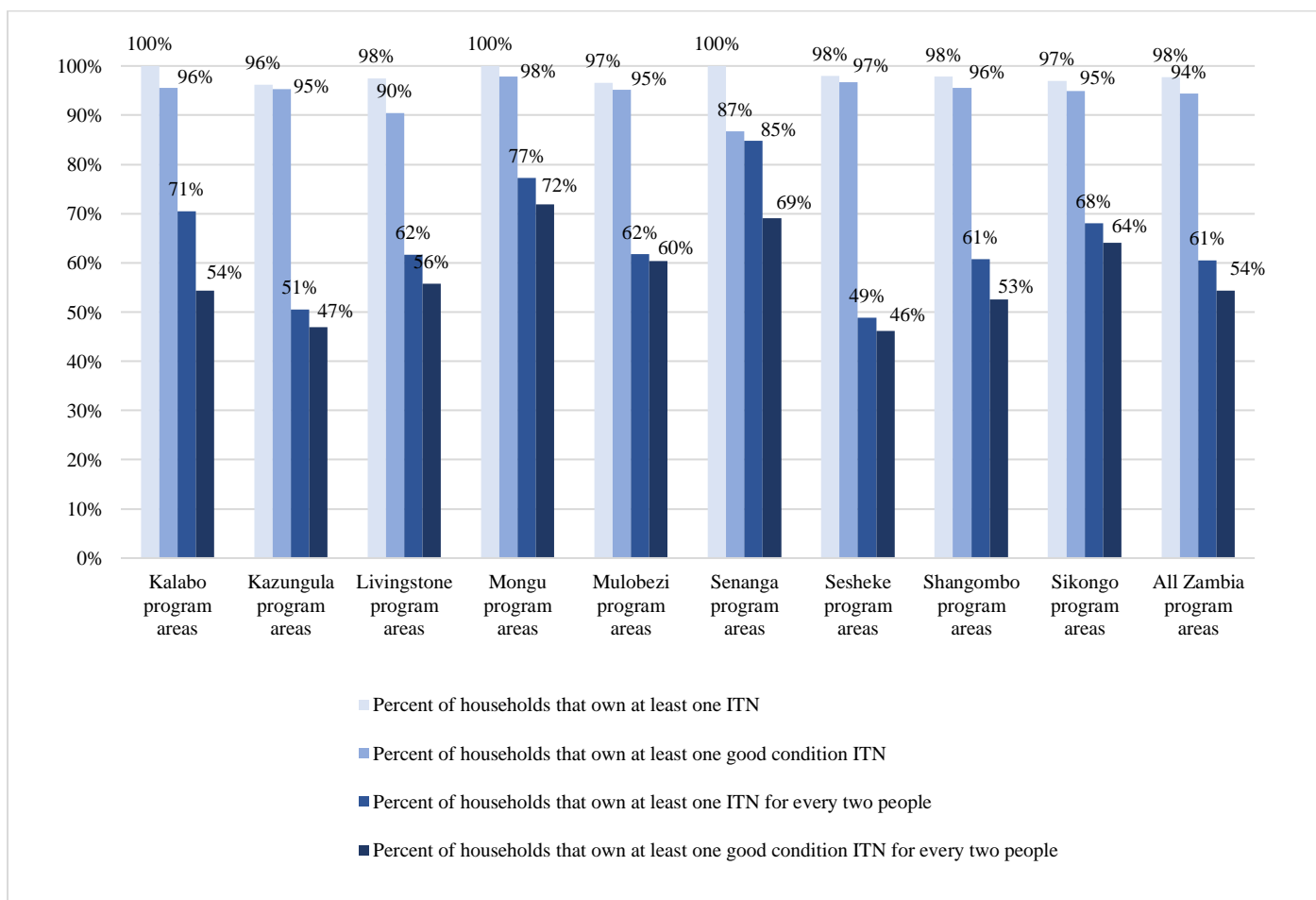
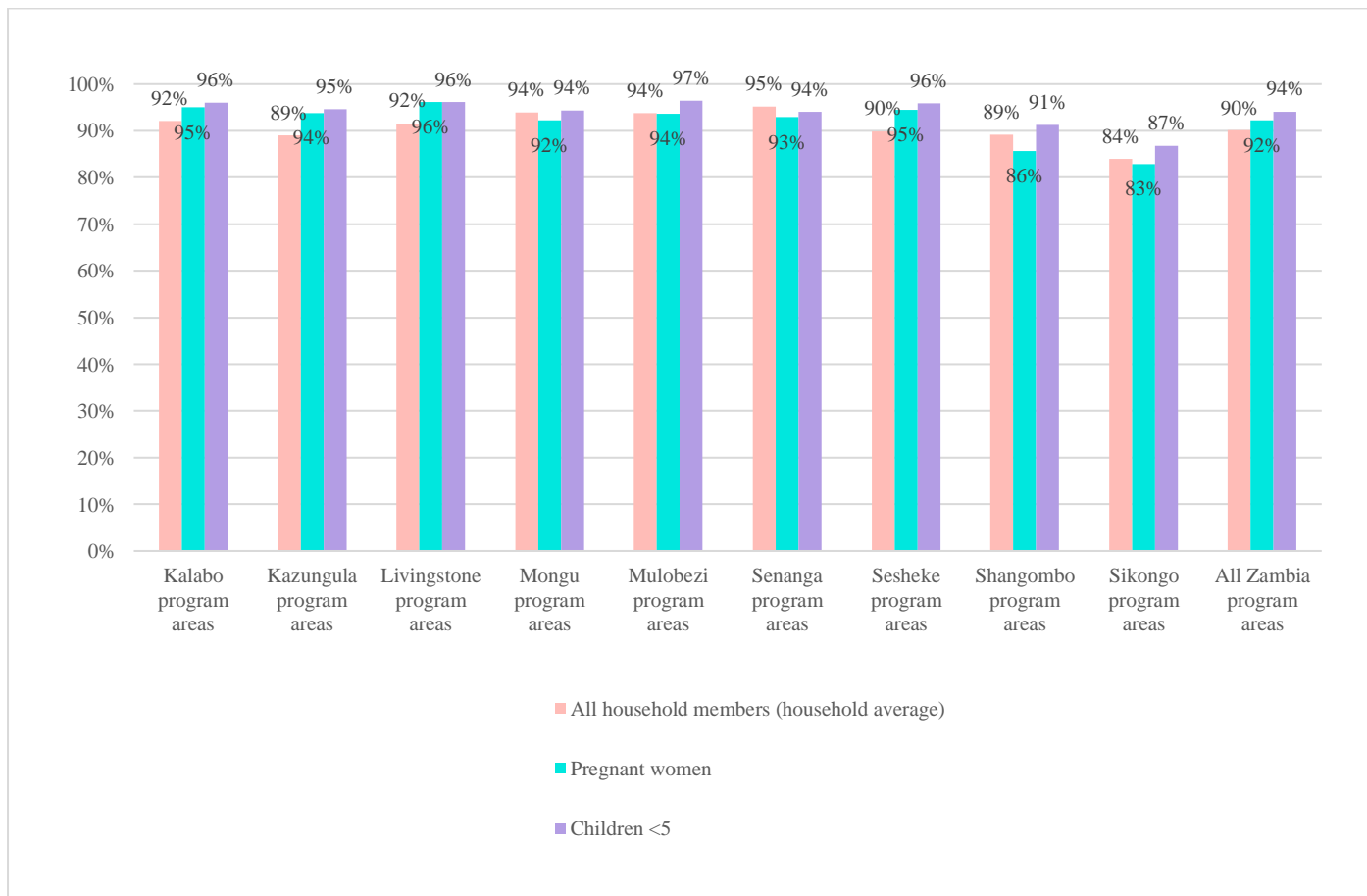


Figure 3. shows ITN use, defined as the percent of people who slept under an ITN the previous night, among the general population (all household members), among pregnant women, and among children <5 in 2024. Use of ITNs among the general population, among pregnant women, and among children was very high (>90%) in all district level program areas except for Shangombo and Sikongo which were slightly lower. However, in some areas pregnant women slept under an ITN the previous night less than the general population, showing a need to prioritize this higher risk group for sleeping under ITNs when there aren't enough to cover everyone in the household.

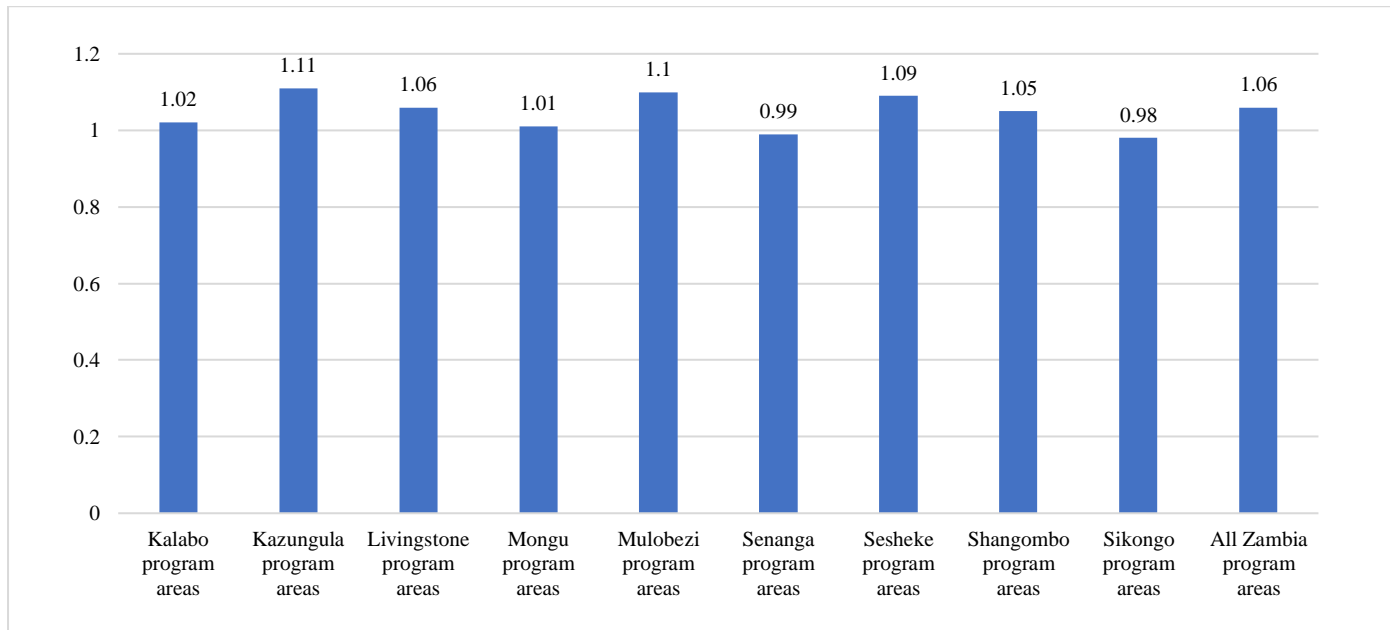
Figure 3. Percent of people (household average), percent of pregnant women, and percent of children <5 who slept under an ITN the previous night, program areas by district (2024)



The ITN Use:Access Ratio (Koenker and Kilian 2014) is a recommended indicator to better understand whether low ITN use (proportion of people who slept under an ITN the previous night) is due to a lack of the desired behavior of sleeping under an ITN that the household already owns, or due to lack of access to an ITN within the household. Ratios of ITN use to ITN access above 1.0 indicate that more than two people are sharing a net, on average. Ratios above 0.80 indicate that there is likely only a small amount of room for improvement in the behavior of sleeping under an ITN.

Figure 4 shows the ITN Use:Access Ratio from the 2024 KAP Survey. Across all Zambia program areas, the ITN Use:Access Ratio was 1.06, indicating that all available ITN spaces were being used (assuming that each ITN covers two people) and, in many cases, more than two people were sleeping under an ITN. This suggests that desired ITN use behavior is high and most people will use ITNs if they have access to them.

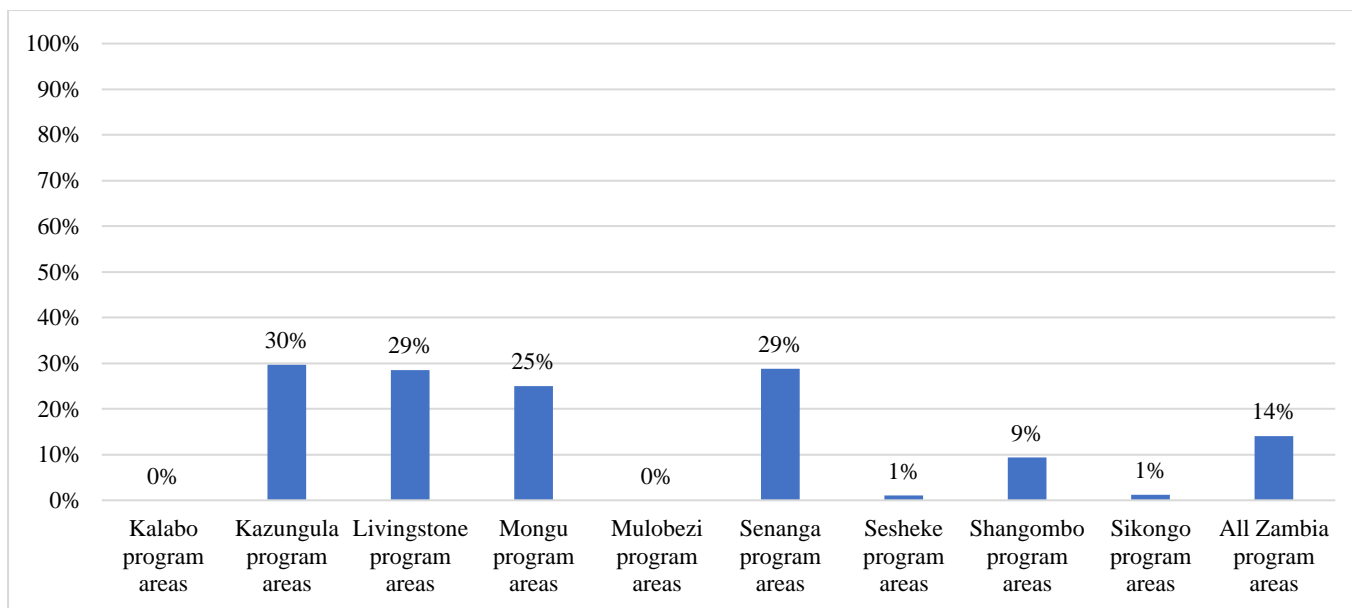
Figure 4. The ITN Use:Access Ratio, program areas by district (2024)



Indoor residual spraying (IRS)

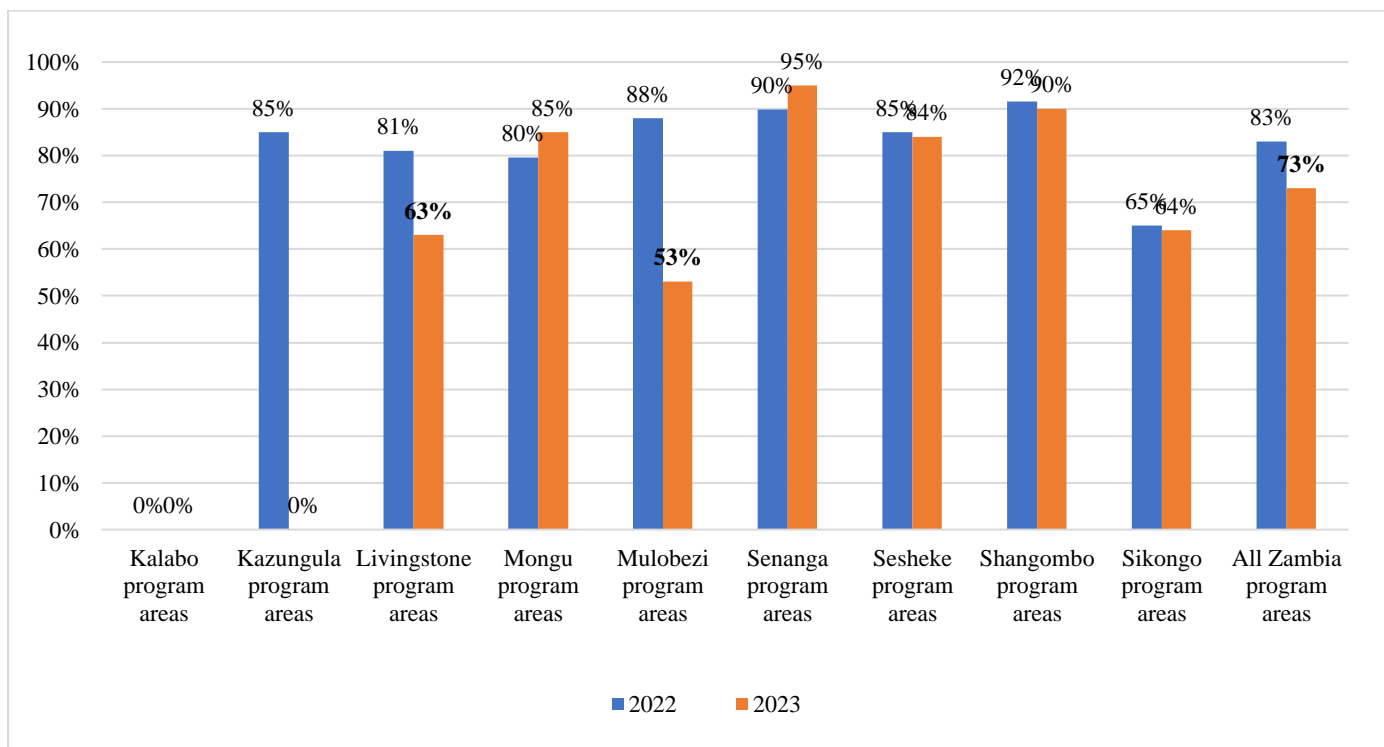
Figure 5 shows the proportions of households that reported receiving IRS within 12 months prior to the 2024 KAP Survey, among all surveyed households. Household IRS coverage is low within all district program areas as IFCBMI program areas were not targeted for a mass IRS campaign within 12 months prior to the 2024 KAP Survey. Therefore, these results should be interpreted with the context of government IRS targeting within IFCBMI program areas within the 12 months prior to the 2024 KAP Survey. A listing of IFCBMI program areas can be found in Appendix 1.

Figure 5. Percent of households that received IRS within 12 months prior to the survey, among all surveyed households (2024)



For context on household IRS coverage in previous years, Figure 6. shows the proportion of households that reported receiving IRS within 12 months prior to the 2022 and 2023 KAP Surveys, among only those surveyed households that were located in areas that were targeted to receive IRS within those timeframes. For mass IRS campaigns, the World Health Organization indicates that at least 85% of households within a targeted area must receive IRS in order for IRS to be most effective.

Figure 6. Percent of households that received IRS within 12 months prior to the survey, among only households located in areas that were targeted to receive IRS within 12 months prior to the survey (2022-2023)



Care-seeking behaviour

There are several key steps in the ideal trajectory of care for children under five years (<5) with fever:

- go to a health facility or community health worker (CHW) within 24 hours of fever onset
- receive a malaria test
- receive treatment if positive for malaria
- take the full course of the medication

Each step in the trajectory of care presents an opportunity for children to be “missed” and, therefore, for possible malaria infections to be left undiagnosed and/or untreated. The steps in the trajectory of care depend on both individual behavior and availability of health services. The trajectory of care cascade (Figure 7) helps to visualize the gaps within the care-seeking trajectory of children <5 with fever.

If respondents indicated that they were a mother or caregiver of a child <5, they were asked if their child had a fever within the previous two weeks and, if yes, about their child’s trajectory of care for that fever. In 2024, the largest gap in the trajectory of care was seeking care within 24 hours of the start of the fever; among respondents whose child <5 had a fever in the previous two weeks, 432/542 (81%) sought care from a health facility or CHW within 24 hours of the fever onset. The second largest gap in the trajectory of care was receiving a malaria test; among respondents who sought care from a health facility or CHW within 24 hours of fever onset, 386/495 (78%) received a malaria test.

Figure 7. Trajectory of care cascade (number) for children <5 with fever within the two weeks prior to the survey, all Zambia program areas (2024)

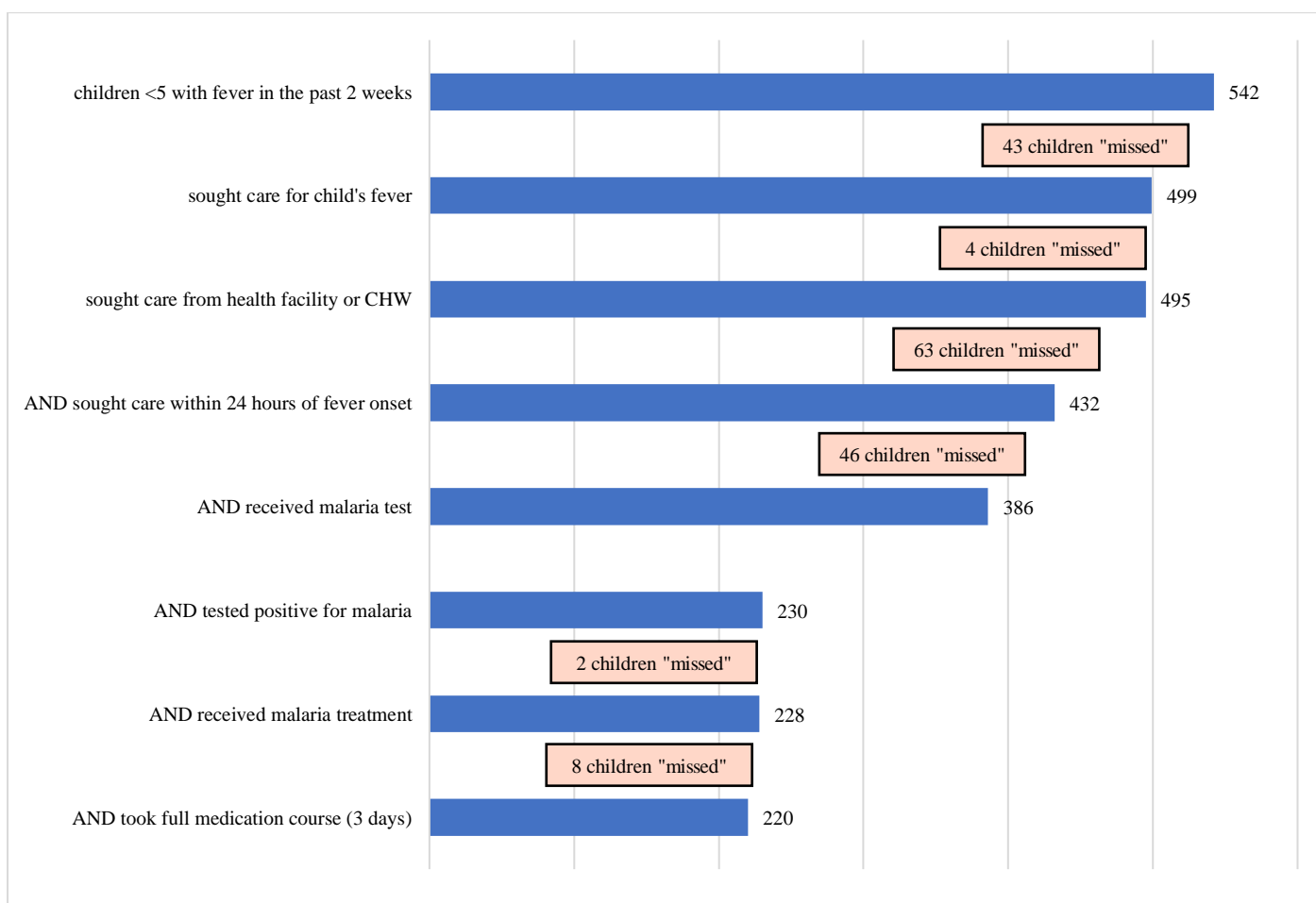


Table 5. shows the three key indicators of the trajectory of care for children <5 with fever across all Zambia program areas from 2021-2024:

1. the proportion of children <5 with fever who sought care within 24 hours of fever onset
2. the proportion who received a malaria test, among those who sought care from a health facility or CHW (any time)
3. the proportion who received malaria treatment (among those who tested positive).

Green shading indicates a statistically significant increase from the previous year, and red shading a statistically significant decrease. Across all Zambia program areas, the proportion of children <5 with fever in the two weeks prior to the survey who sought care from a health facility of CHW within 24 hours of the start of the fever increased significantly from 65% in 2022 to 76% in 2023 ($p<0.001$) and significantly increased further to 81% in 2024 ($p=0.021$). The proportion of children <5 with fever in the past two weeks that received a malaria test, among those sought care from a health facility or CHW, also increased significantly from 88% in 2022 to 95% in 2023 ($p<0.001$), but decreased significantly to 89% in 2024 ($p<0.001$). The proportion of children who received Coartem for treatment of malaria, among those who reportedly tested positive for malaria, decreased significantly from 95% in 2022 to 79% in 2023 ($p<0.001$) but then increased significantly to 99% ($p<0.001$) in 2024.

Table 5. Key indicators in the trajectory of care for children <5 with fever in the prior two weeks (%), all Zambia program areas (2021-2024)

	2021	2022	2023	2024
Sought care from a health facility or CHW within 24 hours of fever onset, among all children <5 with fever in the prior two weeks	66%	65%	76%↑	81%↑
Received a malaria test, among children <5 with fever in the past two weeks who sought care from a health facility or CHW	86%	88%	95%↑	89%↓
Received malaria treatment, among those children <5 with fever in the past two weeks who tested positive for malaria	88%	95%↑	79%↓	99%↑

Table 6. shows the same three indicators as Figure 7, but among program areas at the district level for 2024. Raw numbers are also included to provide additional context given smaller subsample sizes at the district level of children <5 with fever in the previous two weeks. The proportion of children <5 with fever in the past two weeks who sought care from a health facility of CHW within 24 hours of fever onset was lowest in Kazungula District program areas (66%) and highest in Kalabo District program areas (88%). The proportion of children who received a malaria test, among those who sought care from a health facility or CHW (any time), was lowest in Livingstone District program areas (76%) and highest in Mulobezi District program areas (98%). The proportion of children <5 with fever in the past two weeks who tested positive and received malaria treatment was very high ($\geq 97\%$) in all program areas.

Table 6. Children <5 with fever who sought care from a health facility or CHW within 24 hours of the start of the fever, program areas by district (2024)

Program areas within districts	Sought care from a health facility or CHW within 24 hours of fever onset, among all children <5 with fever in the prior two weeks	Received a malaria test, among children <5 with fever in the past two weeks who sought care from a health facility or CHW (any time)	Received malaria treatment, among those children <5 with fever in the past two weeks who tested positive for malaria
Kalabo	88% (84/96)	79% (73/92)	97% (60/62)
Kazungula	66% (32/48)	90% (33/37)	100% (6/6)
Livingstone	79% (49/62)	76% (43/57)	100% (10/10)
Mongu	89% (31/38)	96% (36/38)	97% (23/24)
Mulobezi	91% (34/38)	98% (36/37)	100% (24/24)
Senanga	86% (34/40)	95% (34/36)	100% (12/12)
Sesheke	80% (62/78)	96% (66/69)	100% (35/35)
Shangombo	83% (39/49)	86% (40/46)	100% (15/15)
Sikongo	75% (65/93)	93% (77/83)	100% (72/72)
All Zambia program areas	81% (432/542)	89% (438/495)	99% (257/260)

Intermittent preventive treatment of malaria in pregnancy (IPTp)

Table 7. shows the proportion of women that reported taking three or more (3+) doses of IPTp during their pregnancy, among those who gave birth within 12 months prior to the survey in 2023 and 2024. Raw numbers are also included to provide additional context given smaller subsample sizes at the district level of respondents who gave birth within 12 months prior to the KAP Surveys. In 2024, IPTp 3+ uptake increased significantly in Livingstone (p=0.038), Mongu (p=0.03), and Sesheke program areas (p=0/020), as well as across all Zambia program areas combined (p=0.001). There was also a large increase between 2023-2024 IPTp 3+ uptake within Sikongo program areas, though the increase was just outside of statistical significance (p=0.059). IPTp 3+ uptake decreased significantly in 2024 in Shangombo program areas (p=0.033).

Table 7. Women who took 3+ doses of IPTp during their pregnancy among those who gave birth in the 12 months prior to the survey, program areas by district (2023-2024)

Program areas within districts	Took 3+ doses of IPTp during pregnancy, among respondents who gave birth in the 12 months prior to the survey	
	2023	2024
Kalabo	87% (28/32)	85% (48/56)
Kazungula	89% (78/88)	93% (84/91)
Livingstone	88% (93/105)	98% (77/79) ↑
Mongu	52% (19/38)	91% (35/38) ↑
Mulobezi	85% (42/48)	95% (55/58)
Senanga	100% (20/20)	90% (27/30)
Sesheke	84% (92/108)	96% (91/95) ↑
Shangombo	88% (96/109)	76% (69/90) ↓
Sikongo	54% (38/70)	71% (47/66)
All Zambia program areas	82% (506/618)	89% (533/603) ↑

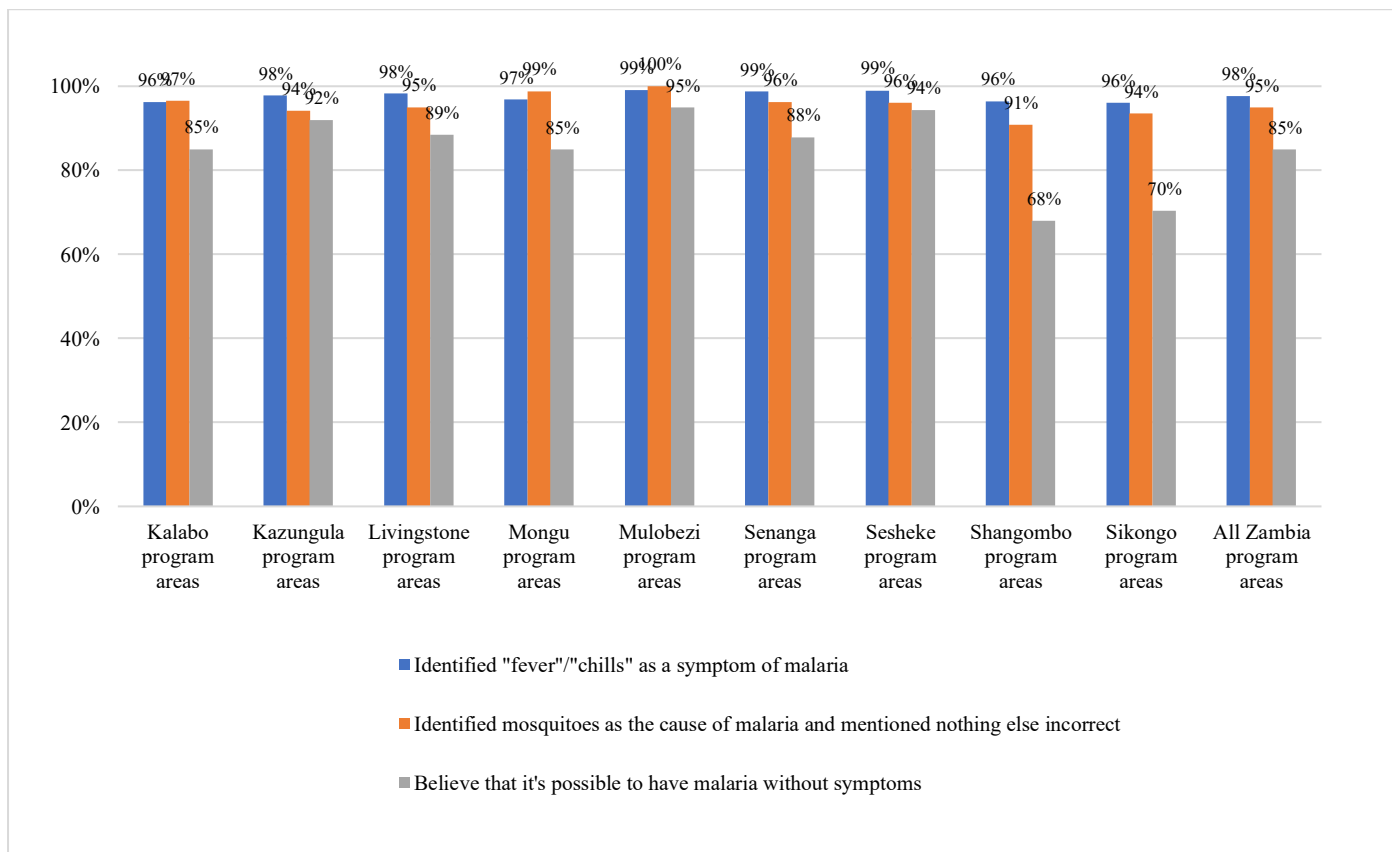
Knowledge and attitudes

Respondents were asked questions pertaining to their knowledge of malaria symptoms and cause. Figure 8. displays three key knowledge indicators from the 2024 survey:

1. the proportion of respondents who identified “fever/chills” as a symptom of malaria
2. the proportion of respondents who identified the mosquito as the cause of malaria, and mentioned nothing else incorrect (such as eating unripe fruit or getting soaked in the rain)
3. the proportion of respondents who believed it is possible to have malaria without symptoms.

Across all Zambia program areas, most respondents correctly identified “fever” (or “chills”) as a symptom of malaria (98%) and correctly identified the mosquito as the cause of malaria transmission (95%). Fewer respondents, but still the majority believed it is possible to have malaria without symptoms (85%).

Figure 8. Percent of respondents who: identified “fever”/ “chills” as a symptom of malaria; identified mosquitoes as the cause of malaria; believe that asymptomatic malaria infections are possible (2024)



Respondents were asked whether they believed that ITNs, IRS, and IPTp “helps a lot,” “helps a little,” or “does not help” to prevent malaria. Table 8. shows these results from 2020-2024; results in green denote a significant increase from the prior year and results in red denote a significant decrease from the prior year. The proportion of respondents who believed that these interventions “help a lot” to prevent malaria have increased each year from 2020-2022. In 2023, the proportion who believed that IRS “helps a lot” to prevent malaria decreased significantly ($p=0.034$), but then increased significantly to 93% ($p<0.001$) in 2024. The proportion of respondents who believed ITNs and IPTp “help a lot” to prevent malaria have remained high (97% and 96% in 2024, respectively).

Table 8. Percent of respondents that believe that ITNs, IRS, and IPTp “help a lot” to prevent malaria, all Zambia program areas (2020-2024)

Indicator	2020	2021	2022	2023	2024
Think that ITNs “help a lot” to prevent malaria	94%	97% ↑	98% ↑	97%	97%
Think that IRS “helps a lot” to prevent malaria	70%	76% ↑	86% ↑	83% ↓	93% ↑
Think that IPTp “helps a lot” to prevent consequences of malaria in pregnancy	93%	93%	97% ↑	96%	96%

Appendix 1. 2024 KAP Survey sampling frame (IFCBMI Zambia program areas)

Province	District	Health Facility Catchment Area (HFCA)	Neighborhood Health Committee (NHC)
Southern	Livingstone	Libuyu	Zone A
			Zone B
			Zone C
			Zone D
			Nyanzabili A
			Nyanzabili B
			Chaba
			Tusole
			Nkotuli
		Nakatindi	Libes
			Kashitu
			Indeco
			Nakatindi
			Morelite
	Kazungula	Kazungula	Mwanga A
			Mwanga B
			Kazungula A
			Kazungula B
			Kapanda
			Lumbo
			Mwiya
			Sikombwa
			Katoya
			Kazala
		Sing'ombe	
		Mambova	Namapande A
			Namapande B
			Kazuni
			Kapolota
			Machenje
Ngweeze			
Kabala			
Lupani			
Mambova Central			
Western	Sesheke	Zambezi	Zambezi Zone 1
			Katongozone 2
			Maondo Zone 3
			Tahalima
		Mkusi	Mkusi Central
			Mwanomai
			Lusu
	Maziba		

Province	District	Health Facility Catchment Area (HFCA)	Neighborhood Health Committee (NHC)
		Mulimambango	Manyekanga
			Mulimambango Central
			Kasisi
			Lilonga
			Namatwi
			Rice
		Silumbu	Kapua
			Nshwa
			Kapeya
			Lyomboko
			Namikuta
			Kaale
			Nayanda
			Silumbu Static
	Mulobezi	Mulobezi	Mulobezi Central
			Kashitu
			Nalwama
			Situmpa
			Lonze 1
			Kariba
			Machile
			Kasima Central
			Inyambo
			Lonze 2
	Tower		
	Shangombo	Shangombo	Liyuwayuwa
			Mboiwa
			Katukule
			Lihonge
			Shalitata
			Musa
			Kambungu
			Make
Shandambi			
Likwangelui			
Kasima			
Namatanda			
Shangombo Central			
Sipuma		Lyamaya	
		Lilondo	
		Sibuku	
		Sipuma Central	
		Shalimba	
		Manwi	

Province	District	Health Facility Catchment Area (HFCA)	Neighborhood Health Committee (NHC)		
			Camp 8		
			Nombwe		
			Fuo		
			Sipuma West		
	Senanga	Lui River		Lipuwe	
				Liko	
				Lui Mweemba	
				Liongo	
				Naliongo	
				Namuotndo	
				Sinanda	
				Siyombo	
	Mongu	Simulumbe		Ituku East	
				Ituku West	
				Kaongeta	
				Loongo	
				Miluwe	
				Mulumba	
				Simulima	
				Simulumbe	
	Kalabo	Sishekano		Lwamutu	
				Mwabata	
				Silinsi	
				Lushi	
				Sishekanu	
		Kuuli			Kashenaba
					Kuuli static
					Liuwa
					Lunde
					Sibemi
					Munde
		Lukoko			Libunga
Sitoya					
Mabula					
Samvu					
Lumei				Lumei Central	
				Masima	
				Nakashinde	
Mishulundu				Kanyika	
				Maoma	
	Munyanya				
	Mutembo				
	Muyeye				

Province	District	Health Facility Catchment Area (HFCA)	Neighborhood Health Committee (NHC)		
		Mulinga	Siliya		
			Kashimba		
			Liwina		
			Mulinga		
			Sikenge		
			Nan'ole		
			Simangu		
	Sikongo	Sikongo Central		Malondo	
				Muwelo	
				Nene	
				Lyasimu	
				Sibuo	
				Luwe	
				Muweshi	
				Sishosho	
				Ngulumani	
				Utokota	
				Sikongo Central	
				Sipwechia	
				Liundu	
		Lounde			
		Katongo			
		Nangulwe			
		Sambao			
		Nesha			
		Situlu			Kaenyi
					Nomai
Kaale					
Sishwanga					
Liolelo					
N'anda					

Appendix 2. References

Koenker, Hannah, and Albert Kilian. 2014. "Recalculating the Net Use Gap: A Multi-Country Comparison of ITN Use versus ITN Access." *PLoS One* 9(5): e97496.