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Monitoring ivermectin distributors involved in integrated health care services through community-directed interventions - a comparison of Cameroon and Uganda experiences over a period of three years (2004-2006).

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Abstract

Objectives: To assess and compare the effectiveness of ivermectin distributors in attaining 90% treatment coverage of the eligible population with each additional health activity they take up.

Methods: Random sampling was applied every year to select distributors for interviews in community-directed treatment with ivermectin (CDTI) areas of Cameroon and Uganda. A total of 288 in 2004, 357 in 2005, and 348 in 2006 distributors were interviewed in Cameroon, and 706, 618, and 789 in Uganda respectively. The questions included: treatment coverage, involvement in additional activities, where and for how long these activities were provided, and whether they were supervised, to mention a few.

Results: At least 70% of the distributors in Cameroon and Uganda during the study period were involved in CDTI and additional health activities. More of the distributors involved in CDTI alone attain 90% treatment coverage in comparison to those who had CDTI with additional health activities. The more additional activities, the less likely the distributors attained 90% treatment coverage. In Uganda, distributors were more likely to attain 90% coverage ($p<0.001$): if they worked within a kilometer from their homesteads, were selected by community members, worked among their kindred, and were responsible for less than 20 households.

Conclusion: Additional activities could potentially undermine the performance of distributors. However, being selected by their community members, working largely among kindred, and serving fewer households improved their effectiveness.

Introduction

Community-directed interventions (CDI) is an approach where the community is given adequate information to get involved in decision-making, organization, and mobilization of resources to tackle any challenges that affect its health. This approach has been utilized in some community health programs such as control of malaria, lymphatic filariasis and schistosomiasis, eye care, maternal and child health, nutrition and immunization (Winch et al, 2002; Ndyomugenyi and Kabatereine, 2003; Richards et al, 2006; and Ford et al, 2005). The concept of integration of health care is about harmonising different, but interdependent services using same delivery system in order to achieve multiple objectives. It is also about changes in operations in health care systems, which bring together inputs, delivery, management and organization of particular service functions. World Health Organisation (WHO) encourages countries to develop sustainable health infrastructure that can provide health care in an integrated fashion in order to achieve desired health goals (WHO Report, 2003).

CDI approach presents, at all stages of its implementation, opportunities for promoting purposeful integration of health care activities as long as there is adequate funding within the primary health care system. Community-directed treatment with ivermectin (CDTI) is a model of CDI that was adopted in Africa by the African Programme for Onchocerciasis Control (APOC) for the control of onchocerciasis. This was after the multi-country study conducted by WHO/TDR indicated that community-designed ivermectin programmes for control of onchocerciasis performed better than programme designed ones (WHO Report, 1996; Homeida et al, 2002; and Amazigo et al, 2002). Some studies have shown that ivermectin distributors in CDTI can be involved in additional health and development activities without adversely affecting the distribution of ivermectin for onchocerciasis control (Ndyomugenyi and Kabatereine, 2003; Okeibunor et al, 2004; and Katabarwa et al, 2005). These studies however, considered overall situations without examining what happens to individual ivermectin distributor's performance in CDTI with each additional health activity. The objective of the present study was to assess and compare effectiveness of ivermectin distributors in attaining 90% treatment coverage of the eligible population with each additional activity, and establish factors affecting their performance.

Methods

Study areas

Monitoring was carried out in the Carter Center-assisted CDTI areas of Cameroon (West and North provinces) and Uganda covering 11 districts (Adjumani, Apac, Gulu, Kabale, Kanungu, Kasese, Kisoro, Mbale, Moyo, Nebbi and Sironko). These onchocerciasis endemic areas had also received financial support from the African Programme for Onchocerciasis Control (APOC). The study area covered a population of 1.56 million people in Uganda, and 2.1 million in Cameroon mainly composed of rural dwellers who were practicing subsistence agriculture. These communities were made up of either scattered or clusters of homesteads. Communities from Uganda had been receiving annual mass treatment with ivermectin since 1993, and in Cameroon, 1996. During the study period onchocerciasis endemicity in both programmes had reduced to $\leq 20\%$ nodule, and $\leq 40\%$ microfilaridermia rates (WHO 1991; Katabarwa et al, 2008).

Cameroon had maintained the cost recovery policy in which individuals contributed money towards the services provided during mass treatment or clinic-based services. It was thought that cost recovery could improve coverage and promote sustainability of service delivery (Godin, 1998; Amazigo et al 1998). However, the study in south eastern Nigeria showed that cost recovery may not necessarily produce the expected results (Uzochukwu and Onwujekwe, 2005). Although treatment coverage with ivermectin in APOC-assisted countries was generally high, in Cameroon it was persistently low, and blamed on the cost-recovery policy. Pressure from World Health Organization/APOC, resulted in Cameroon government exempting individual community members in 2002, from cost recovery fees. However, it was believed that without cost recovery funds to pay distributors, their attrition rate would increase.

Faced with this problem, the Carter Center-assisted programme at the provincial, health district, health area and community levels in 2004 made adjustments in the strategy. The focus shifted to engaging communities and succeeded in getting more willing distributors that were selected through the traditional kinship structure and trained by health workers. Kinship is the successive relations between parents and their children. Although it refers to mainly an extended family of blood related individuals, women are included in kinships by marriage (Keesing and Strathern, 1998). In rural sub Saharan Africa, this group of related persons

referred too as a kinship may own and occupy land in a specific geographical area within a community. The Carter Center and APOC financed training of this type of distributors as they served their kindred without expecting monetary incentives. Therefore, Cameroon was undergoing a major transition during the study period. In Uganda the kinship approach had been implemented since 2000. Therefore, selection and training of distributors in Uganda was based at the kinship level within a community, while in Cameroon it was not yet the case in every community. That is why there were more distributors in selected communities in Uganda than in Cameroon.

Study design and Sampling

Random sampling in lists of districts and communities was done using the random number table, with at least 30% of each of them being selected. Based on the population of individual selected district, communities were randomly selected from a list of communities at 95% confidence level for homogeneous population annually (Salant & Dilman, 1994). Each year, 8 of 23 districts in Cameroon and 5 of 11 in Uganda would be randomly selected. At least 95% of the distributors in selected communities every year in each country program would be interviewed. Only distributors from randomly selected districts and communities of Cameroon, 288 (in 2004), 357 (in 2005), and 348 (in 2006), and Uganda, 703 (in 2004), 611 (in 2005) and 789 (in 2006) were interviewed. The number of communities and distributors, as well as total population in each selected sample, every year in each program were computed. The population figures were computed from community households registers. It is from this information that distributors per community, and population per distributor were calculated.

Ivermectin distributors' Face to face Interviews: A semi structured questionnaire was used in interviewing distributors, and where appropriate, probing questions asked in order to ascertain the knowledge of, and involvement in CDTI activities. The questionnaire elicited information such as whether the distributor: (i) distributed ivermectin or not; (ii) worked only in his or her kinship; (iii) served outside his or her community; (iv); was involved in other health activities; and if yes, how many other health activities the CDD was involved in; (v) was supervised; and (vi) would distribute ivermectin during the following year. Other factors considered were: (i) who selected the distributor; (ii) from where was the distributor selected; (iii) treatment coverage; (iv) whether the distributor treated kindred (family members) or not, (v) how long it took to complete the distribution exercise; and (vii) whether community members helped in mobilising other community members during treatment exercise.

The interviews were organised and executed by the Carter Center personnel and ministry of health (MOH) staff at various levels of the health system. The monitoring team included an epidemiologist, social scientists, and various categories of health workers. Where possible, 3 research assistants who were university students assisted in training interviewers, helped distributors and their supervisors to tally community registers from selected communities, and ensured proper recording of responses in the questionnaires by trained interviewers. Trained interviewers were mainly teachers and retired civil servants who resided outside the communities where they carried out interviews in order to avoid biased responses. Two interviewers had three days to interview all the distributors within their respective resident communities.

Mass treatment data: Data on treatment coverage attained by distributors was determined by tallying population information and treatment records in community household registers (CHRs) provided by respective programmes in each community. These CHRs were updated every year by the respective distributors and with assistance from health workers. Total eligible population is defined as total population minus children below 5 years of age who are excluded from treatment. Treatment coverage as a proportion of the number of persons treated divided by the eligible population was applied to answer the question on treatment coverage in every distributor's questionnaire.

Data analysis

The responses from questionnaires were entered in coded record files and analysed with EPI-INFO (Versions 6.04 and Window), statistical software from the USA Centers for Disease Control (CDC), Atlanta GA. Data from yes or no questions was analysed statistically using simple Chi-square test and graphic illustrations generated in MS Excel. The analysis focused on attainment of 90% treatment coverage of eligible population. The effect of additional activities on treatment coverage attained by individual distributors, their willingness to continue dispensing ivermectin in future, and other factors that could enhance or hinder their performance were considered.

A multivariate regression model with treatment coverage and a number of independent variables mentioned above was performed using STATA 8.0 for Windows (StataCorp LP in Texas USA) in order to find out true predictors of 90% treatment coverage with additional health activities. The eight covariates (independent variables) which were included in the model were that a distributor worked: (i), outside his or her community, (ii) within 1 km from his/her homestead, (iii) among kindred, (iv) was responsible for less than 20 households, (v) completed distribution within a week, (vi) was selected by community members (vii) was

supervised, (viii) was willing to distribute ivermectin next year. The dependent variable was the average percent of distributors that attained 90% in every year for each program.

Results

Attainment of 90% of treatment coverage of Eligible population

The results in Table1 show that a significant proportion of distributors in Uganda (62%, 2004; 63.2%, 2005; and 61.2%, 2006) compared to Cameroon (32.6%, 22.7% and 21.2% respectively) attained 90% treatment coverage ($p < 0.001$).

Ivermectin distributors' involvement in additional health care activities

Responses of distributors from Cameroon showed that 84.2% of 284 in 2004, 74.0% of 331 in 2005, and 72.3% of 328 in 2006 were involved in additional health care activities and in Uganda, 82.6% of 708, 77.8% of 611 and 73.1% of 784 respectively. Individual distributors were involved in CDTI alone or CDTI with 1 to 4 additional health care activities in both programmes throughout the study period (Figure 1). However, more distributors were involved in CDTI plus one health activity than those involved in CDTI alone, CDTI plus two, CDTI plus three, and CDTI plus four. Additional health activities in which distributors were involved include control of schistosomiasis, lymphatic filariasis, HIV/AIDS, malaria, and tuberculosis as well as vitamin A distribution, family planning, expanded program for immunization (EPI), and water and sanitation (Figure 2).

In Cameroon, at least 23% of distributors were involved in vitamin A distribution, HIV/AIDs control and expanded program for immunization (EPI) every year. Involvement in malaria control increased from 3.6% in 2005 to 48.8% in 2006. There was a general increase from 2004 to 2006 in expanded program for immunization (EPI), vitamin A distribution, and malaria control. The proportion of distributors' involvement in schistosomiasis and lymphatic filariasis as well as family planning decreased during the study period. In Uganda, there was no substantial change in expanded program for immunization (EPI), vitamin A, schistosomiasis and tuberculosis control. However, there was an increase in lymphatic filariasis, malaria and HIV/AIDs control, with generally no substantial change family planning. Their involvement in water and sanitation was 62% in 2004, 73% in 2005, and this drastically decreased to 23.8%.

Effect of additional health care activities on performance of ivermectin distributors

A high percentage of distributors who were involved in CDTI alone in both programmes attained at least 90% treatment coverage compared to those who were involved in additional health activities. The distributors in Cameroon who were involved in CDTI only, 45.5% in 2004, 36%, in 2005, and 40% in 2006, and in Uganda, 70.1%, 100%, and 75% respectively attained 90% treatment coverage. Attainment of 90% treatment coverage every year in both programmes tended to decline with every additional health activity (Figure 3).

Ratio of ivermectin distributors to community and population

The results show that there were fewer distributors per community in Cameroon than in Uganda throughout the study period. Also a distributor in Cameroon was responsible for many people or households compared to his or her counterpart in Uganda (Table 2).

Analysis of distributors who attained 90% of treatment coverage

In Cameroon, the proportion of distributors who were working within a kilometer from their homesteads increased from 15.7% in 2004 to 21.3% in 2005, and to 31.4% in 2006 (Table 3). Less than 36.4 % distributors worked among their kindred while also less than 20% of them were responsible for not more than 20 households throughout the study period. Only 30.3% of the distributors in 2004, 15% in 2005, and 19.7% in 2006 completed mass treatment within a week. Interestingly, a high percentage of 72.4% of the distributors in 2004, 55.6% in 2005, and 69.7% in 2006 had been selected by community members. Further analysis of the distributors selected by community members as indicated in Table 3, showed that 73.9% in 2004, 77.9% in 2005 and 86.7% in 2006 had been supervised.

In Uganda, 88.7% of the distributors in 2004, 85.1% in 2005, and 81.3% in 2006 worked within a kilometer of their homesteads, and over 70% throughout the study period worked among kindred (Table 2). Those responsible for less than 20 households decreased from 56.7% in 2004 to 51.5% in 2005, and 43.5% in 2006, but a significant percentage of 68.7%, 52.5%, and 81.3% completed mass treatment within a week. Over 80% of the distributors were selected by their community members throughout the study period. Over 73.9% of the distributors were supervised, and at least 86.7% of them willing to continue serving their respective communities.

The results from Uganda showed that a significantly higher percentage of distributors compared to that of Cameroon: (a) worked within a kilometer from their homesteads ($p<0.001$); (b) were selected by community members ($p<0.016$); (c) worked among their kindred ($p<0.001$); (d) completed mass treatment within a week ($p<0.001$); and (e) were responsible for less than 20 households ($p<0.001$) (Table 3). The likelihood for attrition of distributors was insignificant and their reasons did not show disappointment with CDTI

activities. The reasons given indicated that those not continuing were: young females getting married outside their communities, individuals seeking jobs outside their communities, and some were too old or ill to continue. The multivariate regression did not yield significance of the coefficients as the average percent of distributors that attained 90% were few since the data analysed had only 3 years for each program.

Discussions

The results show that a significant number of ivermectin distributors in Cameroon and Uganda were involved in additional health care activities, but those in Uganda were more likely to attain 90% treatment coverage than their counterparts from Cameroon. The distributors who were involved in CDTI alone achieved 90% treatment coverage than those with additional health activities. There was a tendency for attainment of 90% treatment coverage by individual distributors to decline with each additional activity. Treatment coverage tended to improve when distributors were: selected by their community members; served fewer households, especially those among kindred; were supervised; and worked within a radius of 1 km of their homesteads. Their attrition rate in both programmes was not significant.

Other peer reviewed studies had shown that involvement of distributors in additional health care activities does not pose a threat to sustainability of ivermectin distribution for onchocerciasis control (Okebounor et al, 2004; Ndyomugenyi & Kabatereine, 2003; Katabarwa et al, 2005). The present study showed that additional health activities could compromise the effectiveness of individual distributors. In situations where integration is beneficial, measures such as being selected by their community members, serving fewer households, and working mainly among kindred within a specific geographic area close to the distributors' homesteads could maintain their effectiveness. Involvement in additional health activities is challenging as it calls for innovative ways of selecting, training, supervising, and reducing their workloads. The substantial reduction of involvement of distributors from Uganda in water and sanitation from 2005 and 2006 was puzzling, but was not investigated. Therefore, we recommend that future studies investigate such striking variations. In spite of the challenges, integration within community-directed interventions offers a lot of benefits to communities with limited or no access to services from the traditional government health care delivery systems.

In Cameroon, about three quarters of distributors, who had worked more than a kilometer from their homesteads, and outside their communities, may have found it difficult to connect, and associate themselves with community members. It took them more than a week to

complete ivermectin distribution in their own communities, and attain 90% treatment coverage. It is possible that distributors who treated community members outside their communities had a tougher job in mobilizing, educating and treating individuals than those who worked within their respective communities. Their workload also may have been heavy and unmanageable. In the case of Uganda, over three quarters of the distributors during the study period worked within a kilometer from their individual homesteads. It seemed that their sheer numbers, within their respective kinship/neighborhood areas, ensured a low workload for each one of them, and reduced considerably time spent on health care activities. Working close to one's homestead implied that individual distributors served people that knew and trusted them. Usually, when people connect to one another, they tap knowledge, skills, and resources from each other, and institutions involved in the activities they do (Mack et al, 2006). This may explain why a higher percentage of distributors in Uganda attained 90% treatment coverage than their counterparts in Cameroon even with each additional health activity. However, the present paper did not consider the situation where distributors in Cameroon and Uganda worked outside their kinship areas, but within their respective resident communities, and its impact on coverage. Therefore, we recommend future studies consider this occurrence and its impact on coverage. It may also be true that inadequate training, lack of confidence of some distributors, and conflict in timing different health care activities could explain the failure to attain the desired treatment coverage with every additional health activity. We recommend that monitoring continues annually in order to have long term, and adequate data for comprehensive analysis including multivariate regression analysis in order to identify factors that influence attainment of 90% treatment coverage with every additional health activity.

Supervising ivermectin distributors had a positive and significant impact on attainment of the desired treatment coverage in Cameroon and Uganda. Our experience agrees with other studies that health workers in government health units have not been able to provide this service to a significant number of distributors in affected communities (Decosas, 1990; Harper, 1993). The studies observed that supervisors do update information, facilitate improvement of skills, and confidence of distributors. That is why the programmes considered in the present paper have pursued a policy of facilitating communities to select educated and experienced community members to train, mentor and provide adequate supervision to the distributors. This category of community workers who were trained by the health workers are referred to as community supervisors. Community supervisors also work within their respective communities, liaise with the health workers from the nearest health units, and provide health information to their communities. By doing this, they provided a

link that had been missing between the health care system and the beneficiaries in affected communities.

The present study demonstrated that community selected distributors are likely to have a low attrition rate, that those not selected by their communities. Even the few who were not continuing in that role had a positive attitude towards CDTI (Katabarwa and Richards, 2001). The reasons for not continuing CDTI activities were the expected positive societal values such as getting a job, being married outside ones community, and weakness due to old age or illness. That is why every community should have a mechanism for selecting and training new distributors every year in order to replace the ones that may not continue serving them.

In conclusion, additional health activities could potentially undermine the performance of distributors. However, maintaining fewer households per distributor and possibly among kindred, and close supervision may improve their effectiveness. In order to attain this, regular monitoring of public health programmes that depend on community involvement is necessary to verify performance and assess indicators of efficiency. Integration has become a "buzz" word yet there is still a lot not yet known about it. The present study is a step towards understanding factors and measures of effectiveness that influence positively or negatively the distributors as regards their involvement in integration of health activities.

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Legends

Figure 1: Ivermectin distributors (IDs) involved in CDTI alone and those in CDTI with additional health care activities in Cameroon (2004, n=288; 2005, n=357; and 2006, n=347) and Uganda (2004, n=708; 2005, n=611; and 2006, n=784).

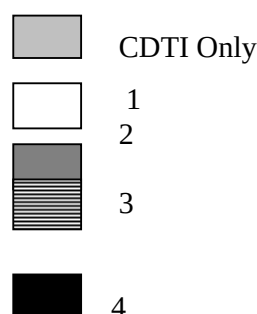
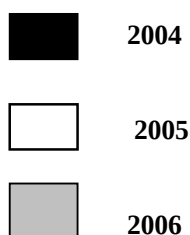


Figure 2: Ivermectin distributors who were involved in additional health care activities in Cameroon (2004, n=242; 2005, n=264; and 2006, n=250) and Uganda (2004, n=585; 2005, n=475; and 2006, n=573).



Abbreviations: Schisto- Schistosomiasis; LF- Lymphatic Filariasis; TB-Tuberculosis; Vit A, Vitamin A, FamPlan- Family planning; EPI- Expanded Program for Immunisation; Watsan- Water and Sanitation.

Figure 3: Trend in attaining 90% of treatment coverage when distributors are involved in CDTI alone and every additional health activity in Cameroon (2004, n=288; 2005, n=357; and 2006, n=347) and Uganda (2004, n=708; 2005, n=611; and 2006, n=784).

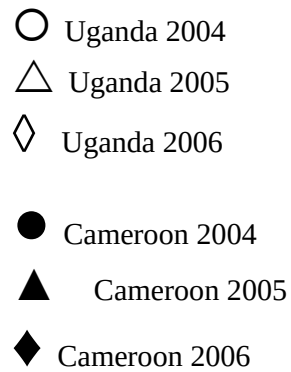


Figure 1

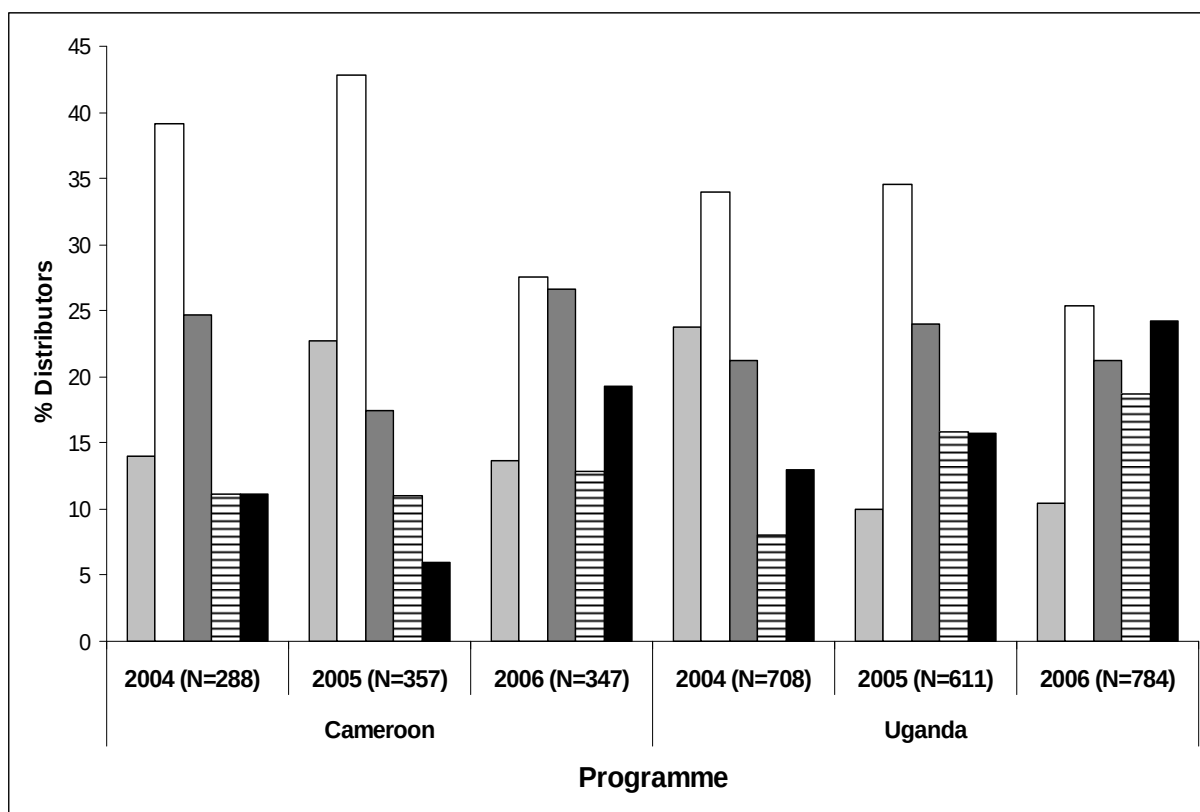


Figure 2

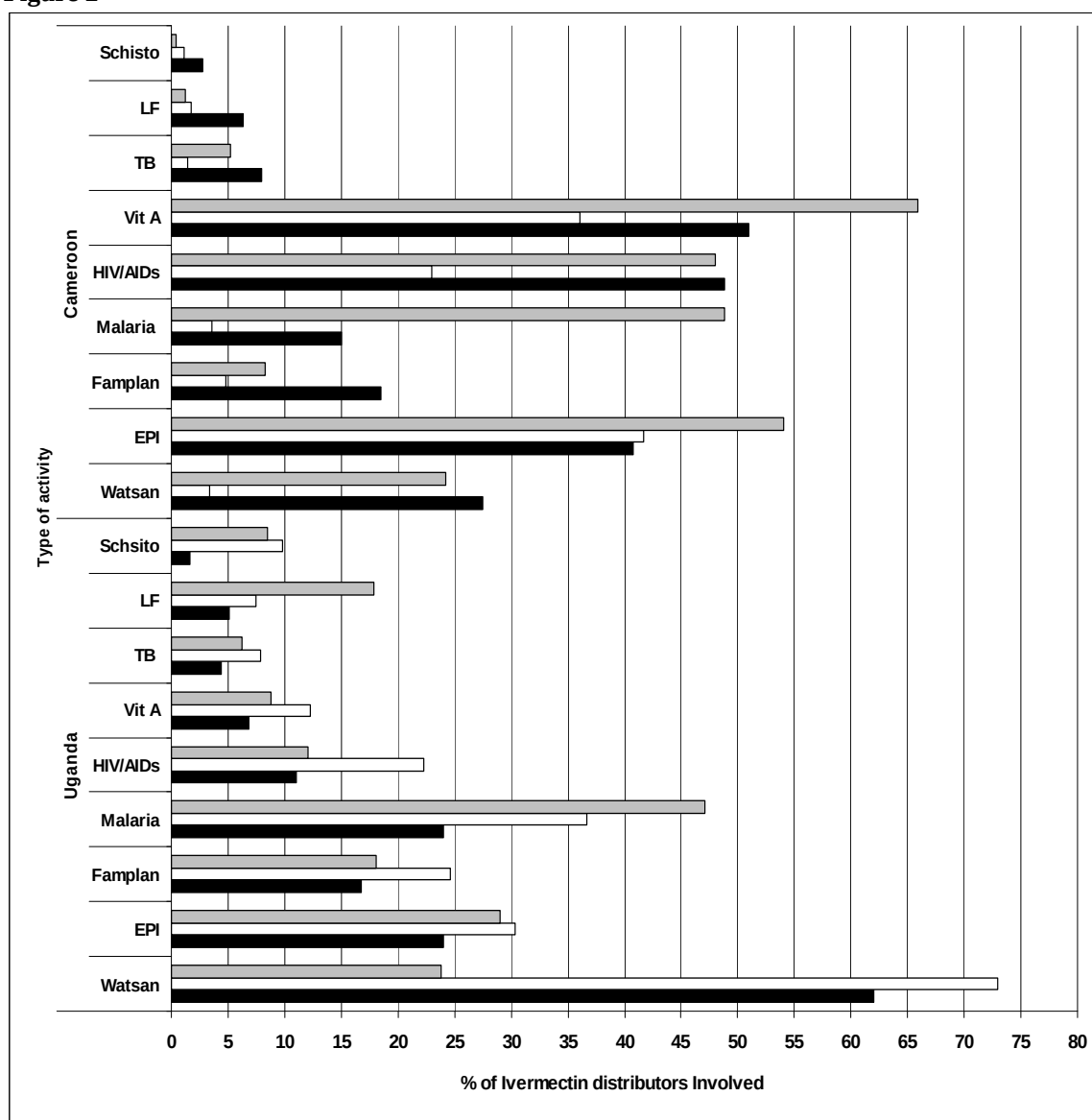


Figure 3

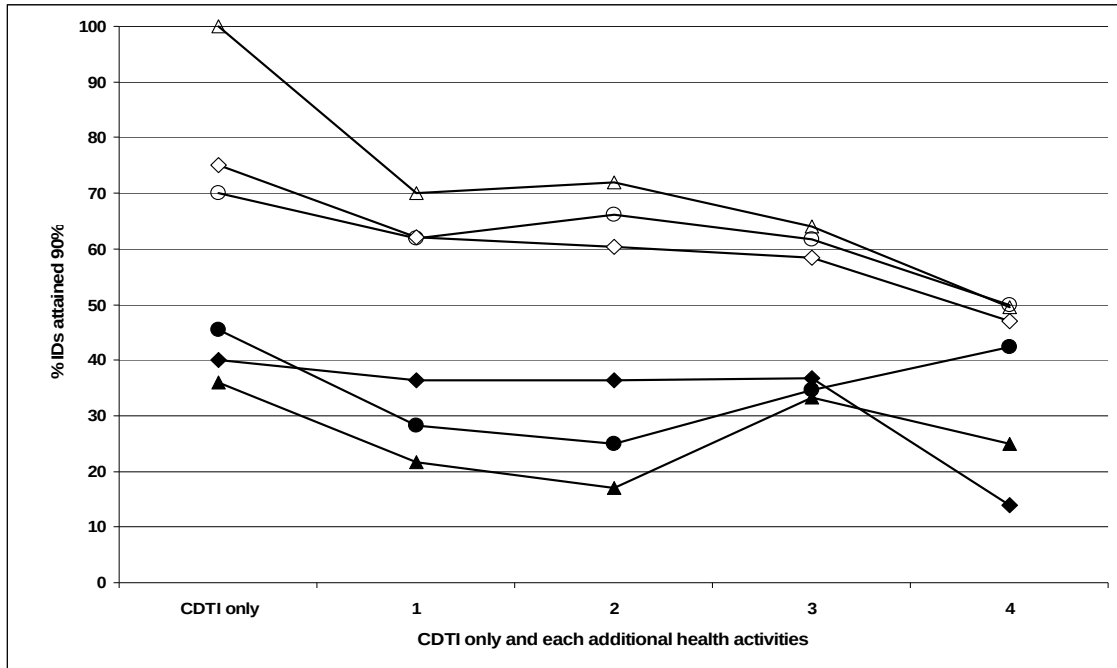


Table 1: Comparing the performance of ivermectin distributors in Cameroon and Uganda who attained 90% treatment coverage of the eligible population every year from 2004 to 2006.

	Uganda		Cameroon		
	Attained 90% treatment coverage	Total	Attained 90% treatment coverage	Total	P-value for the chi- square test of association
2004	62.0%	708	32.6 %	288	<0.001
2005	63.2%	611	22.7 %	357	<0.001
2006	61.2%	784	21.2 %	347	<0.001

Table 2: Number of sample communities, their population, and distributors who were interviewed in Cameroon and Uganda programs every year from 2004 to 2006.

Program	Year	No. of Communities	Total Population	No. of Distributors interviewed	Distributors per community	Population (households- hhs) per distributor
Cameroon	2004	196	173,376	288	1	602 (100hhs)
	2005	240	214,914	357	1	602 (100hhs)
	2006	70	57,420	348	5	165 (27hhs)
Uganda	2004	54	37,259	703	13	53 (8hhs)
	2005	41	25,111	611	15	41 (6hhs)
	2006	53	32,349	789	15	41(6hhs)

Table 3: Comparing ivermectin distributors in Cameroon 2004 (N= 94); 2005, (N= 81); and 2006, (N=77) and Uganda in 2004, (N=439); 2005, (N=386); 2006, (N= 480) who attained 90% treatment coverage on factors that enhanced or hindered their effectiveness.

Program	2004				2005				2006				P-value for the chi-square test of association		
	Cameroon	Total	Uganda	Total	Cameroon	Total	Uganda	Total	Cameroon	Total	Uganda	Total	2004/ 2005	2005/ 2006	2004/ 2006
1.IDs worked outside their communities	41.3%	92	32.6%	365	34.6%	78	44.6%	314	36%	75	19.7%	406	NS	NS	0.002
2.IDs worked within a km from their homesteads	15.7%	89	88.7%	363	21.3%	80	85.1%	315	31.6%	76	81.3%	406	<0.001	<0.001	<0.001
3. IDs worked among their relatives.	34.1%	88	75.4%	362	36.4%	77	70.4%	311	31.4%	70	76.8%	405	<0.001	<0.001	<0.001
4. IDs responsible for less than 20 households	15.1%	86	56.7%	356	13.9%	79	51.5%	305	18.4%	76	43.5%	405	<0.001	<0.001	<0.001
5. IDs distribution completed within a week	30.3%	89	68.7%	364	15%	80	52.5%	314	19.7%	76	81.3%	406	<0.001	<0.001	<0.001
6. IDs were selected by community members	72.4%	76	83.8%	438	55.6%	81	89.1%	386	69.7%	76	82.9%	480	0.016	<0.001	<0.001
7 IDs were supervised	73.9%	88	88.9%	406	77.9%	77	90.3%	339	86.7%	75	80.1%	457	<0.001	<0.001	0.044
8. IDs is willing distribute ivermectin next year	96.8%	94	89.7%	436	86.7%	75	88.5%	381	96.1%	77	93.8%	480	0.029	0.003	0.042

IDs = Ivermectin distributors

NS implies not significant ($p > 0.05$), and responses do not always add to n as some respondent did not respond to some questions.

