

# Community-directed interventions for priority health problems in Africa: results of a multicountry study

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**Objective** To determine the extent to which the community-directed approach used in onchocerciasis control in Africa could effectively and efficiently provide integrated delivery of other health interventions.

**Methods** A three-year experimental study was undertaken in 35 health districts from 2005 to 2007 in seven research sites in Cameroon, Nigeria and Uganda. Four trial districts and one comparison district were randomly selected in each site. All districts had established ivermectin treatment programmes, and in the trial districts four other established interventions – vitamin A supplementation, use of insecticide-treated nets, home management of malaria and short-course, directly-observed treatment for tuberculosis patients – were progressively incorporated into a community-directed intervention (CDI) process. At the end of each of the three study years, we performed quantitative evaluations of intervention coverage and provider costs, as well as qualitative assessments of the CDI process.

**Findings** With the CDI strategy, significantly higher coverage was achieved than with other delivery approaches for all interventions except for short-course, directly-observed treatment. The coverage of malaria interventions more than doubled. The district-level costs of delivering all five interventions were lower in the CDI districts, but no cost difference was found at the first-line health facility level. Process evaluation showed that: (i) participatory processes were important; (ii) recurrent problems with the supply of intervention materials were a major constraint to implementation; (iii) the communities and community implementers were deeply committed to the CDI process; (iv) community implementers were more motivated by intangible incentives than by external financial incentives.

**Conclusion** The CDI strategy, which builds upon the core principles of primary health care, is an effective and efficient model for integrated delivery of appropriate health interventions at the community level in Africa.

Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

## Introduction

Ensuring that available health interventions reach the people who most need them is one of the greatest challenges in achieving the Millennium Development Goals.<sup>1</sup> Many simple, affordable and effective disease control measures have had only limited impact on the burden of disease due to their inadequate distribution in poor and remote communities.<sup>2</sup> Although several global health initiatives have improved the delivery of selected health interventions, many priority interventions, such as those directed against malaria, still have unacceptably low coverage, especially in Africa.<sup>3–5</sup> Thus, there is an urgent need for more effective strategies to improve access.<sup>2</sup> The proliferation of health initiatives has also led to further fragmentation of the overall health effort, and there are increasing calls for integration within the primary health care system.<sup>6,7</sup> Greater integration is particularly relevant for the delivery of those community-level interventions in which the community itself participates.<sup>6,8</sup> There is little scientific evidence, however, on how to achieve this integration within the context of primary health care.<sup>9</sup> More research on effective and integrated delivery strategies for community-based interventions is urgently needed.<sup>2,6,10</sup>

The community-directed intervention (CDI) strategy is an approach in which communities themselves direct the planning and implementation of intervention delivery.<sup>11</sup> Adopted by the African Programme for Onchocerciasis Control (APOC) in the mid-1990s, the CDI strategy has helped to ensure and sustain the delivery of annual ivermectin treatment to over 75 million Africans, many living in remote areas.<sup>12,13</sup>

The success of the CDI strategy in onchocerciasis control has sparked widespread interest in applying the strategy and using the established community network for other interventions.<sup>14,15</sup> The board of APOC, on which the health ministries of 19 African countries are represented, asked the Special Programme for Research and Training in Tropical Diseases (TDR), sponsored by the United Nations, The World Bank and the World Health Organization (WHO), to undertake a study on the potential use of the CDI approach to carry out interventions against other diseases. TDR responded to this request by launching a multicountry study in 2005 to determine the extent to which the CDI approach could effectively and efficiently provide integrated delivery of other health interventions of varying complexity. The present article provides a synthesis of the main findings of the study; more detailed results are provided in the TDR study report.<sup>16</sup>

## Methods

### Strategy

A community-directed intervention (CDI) is one that is undertaken at the community level under the direction of the community itself. Initially, local health services and their partners introduce the range of possible interventions in a participatory manner and explain the community-directed approach and how it can ensure community ownership from the outset. Subsequently the community takes charge of the process, usually through a series of community meetings where the roles and responsibilities of the community in the CDI process are discussed and the community decides how, when and where the

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(Submitted: 29 June 2009 – Revised version received: 2 November 2009 – Accepted: 5 November 2009 – Published online: 1 December 2009)

Table 1. Study sites and study population for multicentre experimental study of community-directed intervention (CDI) strategy in three African countries, 2005–2007

Country	Institution	Study region	Study districts/local government areas	Study district population
Cameroon	University of Buea	Western province	Dschang, Foumbot, Bafang, Bangangté and Mbouda	219 865
Cameroon	University of Yaoundé	Littoral province	Yabassi, Nkondjock, Pouma, Ndom and Ngambe	96 855
Nigeria	University of Ibadan 1	Oyo state (north-western)	Iwajowa, Iseyin, Kajola, Ibarapa North and Ibarapa Central	488 759
Nigeria	University of Ibadan 2	Oyo state (north-central)	Oyo East, Saki West, Irepo, Atiba and Atisbo	562 816
Nigeria	Sight Savers International	Kaduna state	Lere, Jemaa, Kachia, Kaura and Kauru	164 681
Nigeria	University of Yola	Taraba state	Pantisawa, Garbachede, Pupule, Bali and Yakoko	556 055
Uganda	Ministry of Health	Western, eastern and northern regions	Arua, Sironko, Kyenjojo, Kanungu and Nebbi	265 663
<b>Total</b>			<b>35 districts</b>	<b>2 354 694</b>

Source: UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.<sup>16</sup>

intervention will be implemented and by whom; how implementation will be monitored, and what support (financial or otherwise), if any, will be provided to implementers. The community then collectively selects the implementers. Health workers train and monitor the latter, but the community directs the intervention process.<sup>16</sup>

### Study design

From 2005 to 2007 we conducted a three-year multicentre experimental study of delivery strategies for established community-based interventions in various health districts. The study was designed to evaluate the effectiveness, cost and process of progressively adding four established health interventions of different complexity to the CDI process already used for the delivery of ivermectin. The four additional interventions selected for the study were the following:

- Vitamin A supplementation (vit A)
- Distribution and retreatment of insecticide-treated nets (ITNs)

- Detection and referral of tuberculosis cases and short-course, directly-observed treatment (DOT).
- Home management of malaria (HMM).

The five interventions were hypothetically ranked in terms of complexity, with reference to the effort and skill needed for delivery, as follows (from lowest to highest):

Ivermectin < vit A < ITNs < DOT  
~HMM

The study involved multi-disciplinary research teams from seven sites in three African countries (Table 1). The sites were selected by an independent expert committee on the basis of the scientific merit and relevance of the proposals received from 32 research teams from 12 African countries. Each selected research site encompassed five health districts. All districts had been practising community-directed treatment with

ivermectin for several years and had been delivering the other four interventions through regular health system channels. In each site, four of the health districts were randomly designated as trial districts for CDI implementation and one was randomly designated as a comparison district where the four additional interventions would continue to be delivered in the conventional way.

To assess the overall effort needed to apply the CDI strategy for the combined delivery of interventions, the research was undertaken in three one-year phases (Table 2). In year 1 (2005), one intervention in addition to ivermectin treatment was delivered through the CDI strategy in each trial district. In year 2 (2006), one more intervention was added to the CDI approach, and in year 3 (2007) the remaining two interventions were added.

### Evaluation

We used quantitative survey methods to evaluate effectiveness and cost, and qualitative methods to evaluate processes.

Table 2. Design of three-year experimental study of community-directed intervention (CDI) strategy implementation in seven study sites in Cameroon, Nigeria and Uganda, 2005–2007

Study phase	Interventions delivered through the CDI process				Comparison district
	district 1	district 2	district 3	district 4	
Year 1 (2005)	CDTi + vit A	CDTi + DOT	CDTi + ITN	CDTi + HMM	Conventional, non-integrated delivery of the five interventions
Year 2 (2006)	CDTi + vit A + ITN	CDTi + DOT + HMM	CDTi + ITN + vit A	CDTi + HMM + DOT	Conventional, non-integrated delivery of the five interventions
Year 3 (2007)	CDTi + vit A + ITN + DOT + HMM	CDTi + DOT + HMM + ITN + vit A	CDTi + ITN + vit A + DOT + HMM	CDTi + HMM + DOT + ITN + vit A	Conventional, non-integrated delivery of the five interventions

CDI, community-directed intervention; CDTi, community-directed intervention with ivermectin; DOT, short-course, directly-observed treatment; HMM, home management of malaria; ITN, insecticide-treated net; vit A, vitamin A.

**Box 1. Indicators to assess the effectiveness of the community-directed intervention (CDI) process****Vitamin A supplementation:**

- Percentage of children aged 6 to 59 months who received vitamin A during the last treatment round

**Insecticide-treated nets:**

- Percentage of households having at least one insecticide-treated net
- Percentage of children less than 5 years of age who slept under an insecticide-treated net the night before the study interview
- Percentage of pregnant women who slept under an insecticide-treated net the night before the study interview

**Home management of malaria:**

- Percentage of children less than 5 years of age who had had fever sometime during the prior 2 weeks and who had received appropriate treatment (i.e. treatment with a nationally-recommended antimalarial drug, at the correct dosage schedule, within 24 hours of the onset of fever)

**Short-course, directly-observed treatment:**

- Treatment completion rate, i.e. the percentage of patients registered between 6 and 18 months before the survey who had completed treatment according to their treatment card. (All tuberculosis patients from the study communities who were registered in a health facility serving their district between 6 and 18 months before the evaluation were followed up to determine their treatment status from their treatment card.)

**Ivermectin distribution:**

- Percentage of the total population treated with ivermectin during the previous year.

**Effectiveness**

For evaluation purposes, 10 villages were randomly selected in each district. Five households were randomly selected from each community, so that each study site had a total of 50 evaluation villages and 250 evaluation households. We assessed the effectiveness of the CDI process for delivering the different interventions to the target populations using the standard coverage indicators listed in **Box 1**. For each indicator, all persons concerned in the selected households (or the caretakers of children aged less than 5 years) were interviewed using a standard questionnaire.

**Provider costs**

The cost of delivering the five interventions was assessed through the collection of provider cost data at the district level, the first-line health facility level and the community level. At the district level, programme officers responsible for the delivery of each of the five interventions were interviewed regarding eight cost items: staff salaries; allowances for volunteers; consultant fees; training; mobilization; transportation; maintenance and utilities; and supervision and monitoring. Where resources were shared, the interviewee was requested to allocate a percentage of the total costs of each individual (recurrent and capital) input to the study interventions.

At the first-line health facility level, information for seven of the same cost items was obtained from the officer in charge of the facility (consultant fees were not considered relevant at this level). Whenever possible, cost estimates were checked against records, but these were rarely available.

At the community level, provider costs were defined as the monetary value of the time the community implementers spent delivering the interventions (opportunity costs). To calculate opportunity costs we used the national minimum wage and assumed an 8-hour working day. Finally, we used the 2005 official exchange rate between the national currency and the United States dollar (US\$) to convert all costs to US\$ after correcting for inflation using each country's national consumer price index.

**Process**

At the beginning of the project, we hypothesized a conceptual framework to describe qualitatively which components of the CDI process would affect the successful implementation of CDIs.<sup>16</sup> Qualitative social science research instruments to evaluate these factors were subsequently developed and pretested. The instruments included in-depth interviews with community implementers (584 interviews in year 3) and health workers (371); focus group discussions with community

groups (278); key informant interviews with nongovernmental organization (NGO) partners (147); focused discussions during stakeholder briefings and structured observation using checklists (445). We processed all qualitative data using Atlas.Ti 5.2 software (Atlas.ti Scientific Software Development GmbH, Berlin, Germany). We coded textual data using a cross-site code list developed on the basis of the conceptual framework. We merged single site data into a cross-site database. At the final analysis workshop, research teams produced detailed reports of the CDI process in their study area, drawing from the evaluation data collected. Through collective brainstorming, sharing of site reports and in-depth analysis of the cross-site database, team members then identified the factors that they felt had positively or negatively affected programme implementation. Factors affecting the outcome of each component of the process were then rated according to their importance to outcomes.

**Research ethics**

The common study protocol, including the informed consent forms, was approved by WHO's Research Ethics Review Committee and by the participating country's national ethical review committee or appropriate institutional review board. Informed consent was obtained from all persons who voluntarily agreed to be interviewed.

**Results****Effectiveness**

During the first year of the study major shortages of intervention materials kept interventions from being implemented in several districts, so complete coverage evaluations were only undertaken in years 2 and 3. In both years the coverage for vitamin A supplementation, insecticide-treated nets and home management of malaria was significantly higher when delivered through the CDI process (**Table 3**). The increased coverage was particularly striking for the antimalaria interventions. While very low in the comparison districts, it nearly doubled when delivered through CDI.

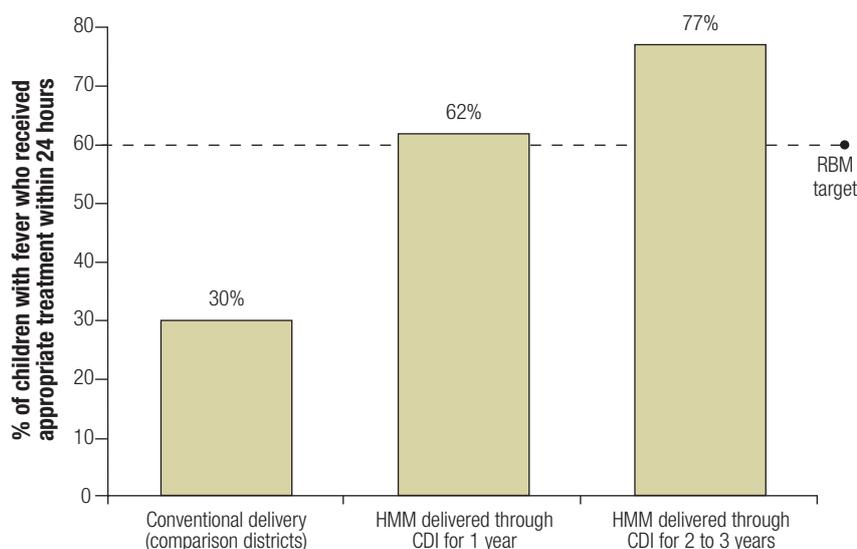
These averages, however, still do not reflect the full potential for providing home management of malaria within the context of the CDI strategy. During the study period Cameroon set forth a new malaria treatment policy stipulating

Table 3. Intervention coverage evaluation for years 2 and 3 in districts with conventional delivery versus districts that had applied the community-directed intervention (CDI) strategy for one or two years, Cameroon, Nigeria and Uganda, 2005–2007

Intervention	Evaluation results for year 2			Evaluation results for year 3			P-value ( $\chi^2$ test)
	Comparison districts (conventional delivery only)	CDI districts with conventional delivery in year 2	CDI districts with delivery through CDI in year 2	Comparison districts (conventional delivery only)	CDI districts with conventional delivery in year 3	CDI districts with delivery through CDI in years 2 and 3	
<b>Vitamin A supplementation</b>							
Total no. of children	618	1274	1659	620	1330	1414	
No. treated (%)	536 (86.7)	1103 (86.6)	1513 (91.2)	502 (81.0)	1178 (88.6)	1274 (90.1)	<0.001
<b>Households with ITNs</b>							
Total no. of households	280	577	598	343	652	643	
No. with at least 1 ITN (%)	44 (15.7)	135 (23.4)	49.5 (50.0)	105 (30.6)	339 (52.0)	363 (56.5)	<0.001
<b>Children sleeping under ITNs</b>							
Total no. of children	452	892	979	506	1088	944	
No. that slept under ITN previous night (%)	41 (9.1)	95 (10.7)	343 (35.0)	82 (16.2)	390 (35.8)	315 (33.4)	<0.001
<b>Pregnant women sleeping under ITNs</b>							
Total no. of pregnant women	63	135	163	60	115	138	
No. that slept under ITN previous night (%)	5 (7.9)	6 (4.4)	61 (37.4)	20 (33.3)	65 (56.5)	67 (48.6)	0.014
<b>Home management of malaria</b>							
Total no. of febrile children	230	485	420	231	477	435	
No. appropriately treated (%)	49 (21.3)	135 (27.8)	200 (47.6)	66 (28.6)	262 (54.9)	302 (69.4)	<0.001
<b>DOT</b>							
Total no. of tuberculosis patients on register	43	179	70	40	145	96	
No. that completed treatment (%)	35 (81.4)	146 (81.6)	58 (82.9)	36 (90.0)	127 (87.6)	88 (91.7)	0.59

CDI, community-directed intervention; DOT, short-course, directly-observed treatment; ITN, insecticide-treated net. Source: UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.<sup>16</sup>

Fig. 1. Appropriate treatment of fever in year 3 of three-year experimental study of community-directed intervention (CDI) strategy, Nigeria and Uganda, 2005–2007



CDI, community-directed intervention; HMM, home management of malaria; RBM, Roll Back Malaria. Source: UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.<sup>16</sup>

that Coartem® be prescribed only after a patient had been positively diagnosed with malaria. This made it impossible to incorporate the home management of malaria into the CDI process in Cameroon. However, in Nigeria and Uganda, where no such policy restrictions were in place, the percentage of children receiving appropriate antimalarial treatment in year 3 in the CDI study districts was 77% (Fig. 1) – two and a half times more than in the comparison districts and far in excess of the Roll Back Malaria target of 60% for 2005.<sup>17</sup>

Contrary to the findings for the other interventions, the completion rate for the short-course, directly-observed treatment was not higher in the CDI study districts than in the comparison districts. Such treatment was the intervention that the health system most reluctantly included in the CDI approach, since most district tuberculosis control officers felt community members could not be entrusted with the handling of the drugs. Hence, short-course, directly-observed treatment was fully implemented through the CDI approach in only one of the seven study sites.

In response to concerns raised by APOC’s board, the evaluation also considered how including other interventions in the CDI process would affect annual ivermectin treatment rates. The results indicate that the effect had been positive and that ivermectin treatment coverage was 10% higher in districts where mul-

tiples interventions were delivered through the CDI approach.

### Costs

At the district level, cost analysis suggests that delivering health care interventions through the CDI process is relatively cost-efficient (Fig. 2). In the CDI districts, the median cost per district of implementing and delivering the five study interventions was a little above US\$ 15 000, while in

the comparison districts it was about US\$ 30 000. There was little difference in the relative allocation of costs between CDI trial sites and comparison districts. In both cases staff salaries comprised the major cost (51.2% versus 48.6%, respectively). Maintenance, training and social mobilization each accounted for 10–17% of costs in both groups of districts. The cost of transport comprised less than 3% in the CDI districts and about 8% in the comparison districts.

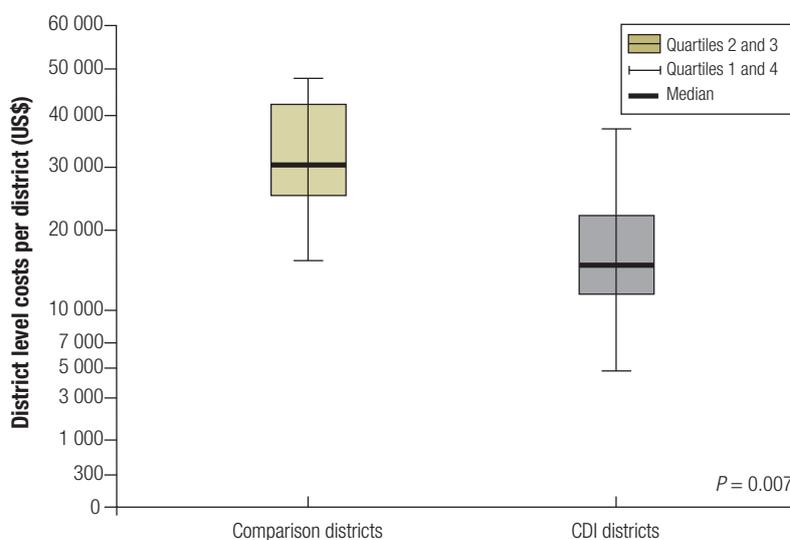
At the first-line health facility level, the CDI strategy did not result in significant cost savings (Fig. 3). While costs were slightly lower in the CDI districts (median: US\$ 1025) than in the comparison districts (median: US\$ 1170), the difference was not statistically significant. In this case as well staff salaries were the costliest component.

The median opportunity cost for community implementers per community was US\$ 65 in trial communities and US\$ 44 in comparison communities, where implementers were only involved in distributing ivermectin. However, opportunity cost estimates varied widely per community (Fig. 4) and did not differ significantly between CDI and comparison districts.

### Critical process factors

Implementing the CDI strategy involved five major processes at different levels of

Fig. 2. District-level annual provider costs of delivering five interventions in experimental study of the community-directed intervention (CDI) strategy in Cameroon, Nigeria and Uganda, 2005–2007



CDI, community-directed intervention; US\$, United States dollar.

<sup>a</sup> P-value applies to the difference between comparison and CDI districts (Mann–Whitney U-test).

Source: UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.<sup>16</sup>

the health system. These processes were extensively evaluated and the main findings are summarized in Box 2.

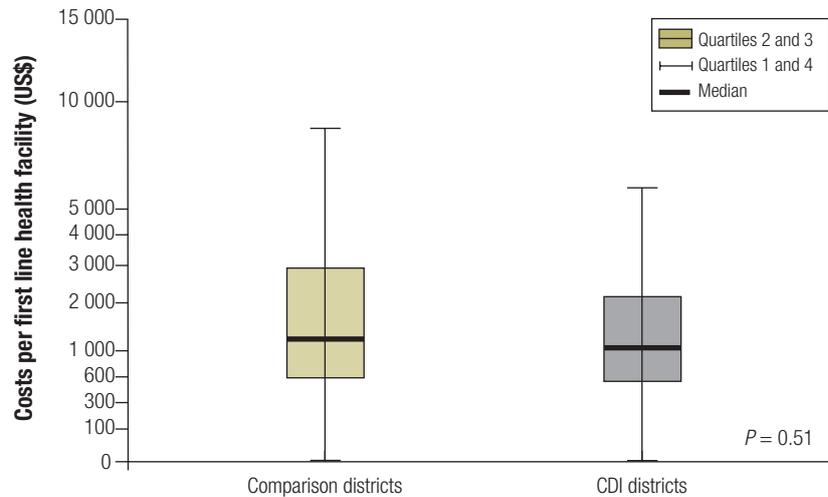
Stakeholder consultation and mobilization were among the factors most critical to the success of the CDI process. Because the interventions being addressed by the CDI strategy had never been carried out in an integrated manner before, many stakeholders had vested interests in or a strong sense of ownership of particular delivery approaches that they perceived as meeting their own programme targets. These views had to be harmonized at different levels.

The case of vitamin A supplementation provided a vivid example of the challenges involved. Vitamin A distribution was linked to national immunization day campaigns, in which considerable sums are invested, and thus provided local health staff and politicians with an opportunity to “buy” political capital. Despite national decisions to include vitamin A supplementation in the study, at first it was difficult to persuade district health staff and NGO stakeholders to incorporate vitamin A into CDI delivery or to relinquish vitamin A supplies. For this reason, during the first year of the study vitamin A could not be delivered through the CDI process in several study sites. In the second year, national health system levels were targeted as an issue-specific advocacy effort that emphasized the potential value of the CDI strategy in the light of the eventual phasing out of national immunization day campaigns. The result was a clear policy directive to deliver vitamin A through the CDI process in the study areas, at least for the term of the study, and this resolved the problems.

The CDI process is embedded in the health system and is therefore subject to health system constraints. A major challenge, especially during the first year of the CDI study, concerned the health system's procurement of needed intervention materials to support the increased demand generated by the CDI strategy's integrated approach. The most common procurement problem was a shortage of insecticide-treated nets and antimalarials. Recurrent shortages created problems for community implementers: “I had difficulties, people who would not get nets due to shortage of nets accused me of keeping their nets” [community implementer, Kaduna].

A key step in the CDI process was the selection of community implementers

Fig. 3. First line health facility level annual provider costs of delivering five interventions in experimental study of the community-directed intervention (CDI) strategy in Cameroon, Nigeria and Uganda, 2005–2007



CDI, community-directed intervention; US\$, United States dollar.

<sup>a</sup> *P*-value applies to the difference between comparison and CDI districts (Mann–Whitney U-test).

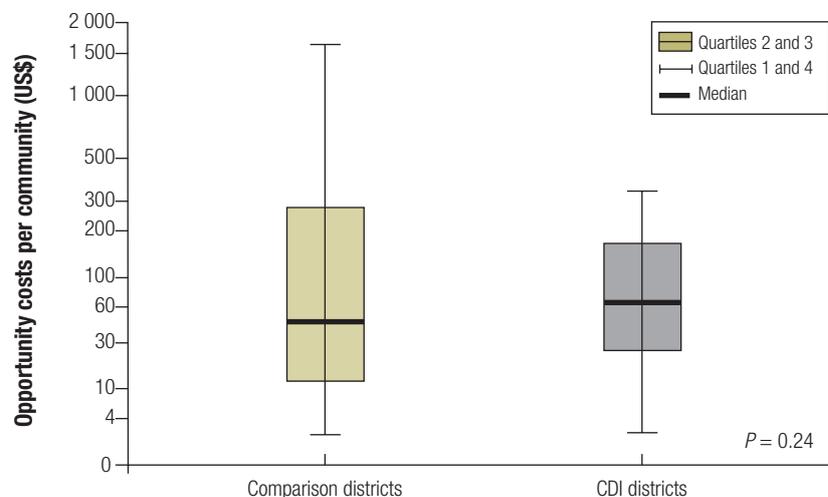
Source: UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.<sup>16</sup>

by the community in a manner that best suited its interests. All research teams observed that when the whole community participated in the selection process and in defining the implementers' tasks, they subsequently also gave greater support for the volunteers to implement the CDI strategy. The implementers thus selected also tended to be more appropriate and motivated for the task.

In the CDI process, no external provision is made for giving material

incentives to implementers. Instead, communities decide what incentives to provide. Community volunteers expected monetary incentives, since these were commonly offered for other health efforts, but as observed in previous studies,<sup>18,19</sup> they seldom valued them as highly as non-material incentives. The latter – namely community recognition, status, the feeling of making a contribution, pride in the services provided, knowledge gained and positive feedback from individual

Fig. 4. Community-level annual provider costs of delivering five interventions in experimental study of the community-directed intervention (CDI) strategy in Cameroon, Nigeria and Uganda, 2005–2007



CDI, community-directed intervention; US\$, United States dollar.

<sup>a</sup> *P*-value applies to the difference between comparison and CDI districts (Mann–Whitney U-test).

Source: UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.<sup>16</sup>

### Box 2. Evaluation of the community-directed intervention (CDI) process: main findings from multicentre experimental study in three African countries, 2005–2007

#### Stakeholder processes

- Stakeholder identification and consultation at all levels of the health system was critically important for the success of the CDI strategy.
- By the final year of the study, stakeholder consensus regarding inclusion of additional interventions within the CDI process was achieved at the national, subnational, district and community levels.
- The degree of consensus increased over time as the CDI process matured.
- Seeing results reinforced the commitment of stakeholders to the CDI process.

#### Health system dynamics

- Year 1: The CDI approach was generally appreciated in the context of the positive experience with ivermectin treatment. Availability, procurement, supply and distribution of intervention materials proved difficult for most interventions.
- Year 2: The participatory consultation and sensitization process and the improved availability of intervention materials led to an increased commitment of the health system to the CDI process at all levels in all seven sites. Training for health staff at first-line health facilities played a crucial role. It takes more than one year to properly set up a CDI process.
- Year 3: Health systems in all sites were beginning to provide an enabling environment for CDI processes to occur. The supply of malaria-related intervention materials has greatly improved in most sites but some logistical problems have persisted.

#### Engaging and empowering communities

- Participatory, consensus-building approaches to community mobilization are critically important.
- The high perceived value of malaria interventions, especially HMM with ACTs, facilitates CDI.
- Communities value implementers residing in the community.
- Information and training increased awareness and ability to participate.
- Community selection of implementers is important to enhance ownership and continuity. Where not selected by the community, lack of commitment emerged over time.
- Continued participatory approaches remain necessary.

#### Engaging community implementers

- Selection of community implementers by communities is critical.
- Community implementers are committed to serving their communities.
- Community implementers are generally motivated by intrinsic incentives.
- Community implementers expressed a desire for extrinsic financial incentives; however the lack of financial incentives has not significantly affected their willingness to serve.

#### Broader systems effects were noted

- Communities became increasingly aware of public health issues, health commodities and their rights to access to health care.
- Women became more outspoken, participated more actively, and demanded that responsibilities be assigned to them.
- Community-based organizations, including women's groups, became more involved. Interest in community development was observed to expand to other development efforts.

ACT, artemisinin-based combination therapy; CDI, community-directed intervention; HMM, home management of malaria.

Source: UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.<sup>16</sup>

community members – remained a powerful driver in the CDI process. A key motivational factor for implementers was the community's confidence: "I cannot let down my community since they chose with trust" [community implementer, Uganda].

The true embedding of the CDI process in communities led to broader "systems" effects or changes in the ways communities and health services related

to each other. As a result of the CDI process, communities became increasingly aware of public health issues, health commodities and their rights to access services, and this awareness, in turn, reinforced their commitment to the process and to other health measures. Once aware of the extent of their rights and responsibilities, they were more assertive about demanding adequate services from the health authorities.

Over the course of the study, an increasing number of women attended meetings, spoke out and were selected as community implementers, particularly as a result of growing awareness of their potential role in malaria treatment. Over time, women became more outspoken, participated more actively, and demanded to be assigned responsibilities. Community-based organizations, including women's groups, became more involved in the CDI process. For instance, in one Nigerian site, the market women's association now plays an active role in CDI activities. Interest in community development, stimulated initially by the CDI strategy, was observed to expand gradually to other development efforts. Health workers became more engaged in outreach activities as a result of CDI. They came to view community implementers as partners and involved them in additional outreach activities, such as the prevention of sexually transmitted infections. Health workers also reported that they enjoyed training and monitoring community implementers.

## Discussion

The ultimate aim of the CDI strategy is to improve the delivery of public health interventions and to ensure that they reach the populations that need them. The ultimate test of the effectiveness of the strategy is, therefore, improved and sustained coverage of the target populations with specific interventions over time. During the study years, the CDI approach was shown to be much more effective than the other delivery approaches then in use for all studied interventions except short-course, directly-observed treatment. The effect of CDI delivery was especially dramatic for malaria interventions: coverage with insecticide-treated nets and the percentage of febrile children appropriately treated for malaria more than doubled. Annual ivermectin treatment coverage also improved, possibly because of greater community commitment to the total CDI package.

In terms of costs to the health system, the CDI strategy also appeared more efficient than conventional delivery systems. It achieved greater coverage of health interventions of varying complexity with cost savings at the district level and no increase in implementation costs at the first-line health facility level.

When given the necessary training and support, community implementers

demonstrated that they could effectively implement each of the five study interventions, regardless of their level of complexity, and were eager to apply the strategy and sustain it over a period of time. Although they expressed a desire for financial incentives, community implementers perceived intrinsic incentives as being more decisive in the delivery of the CDI approach. The major observed constraints were due to social factors (e.g. the acceptability and appropriateness of the intervention) and health system factors (e.g. shortage of supplies, reluctance to abandon vertical delivery, reluctance of health workers to empower community implementers for administration of short-course, directly-observed treatment and, in a few isolated cases, health policies restricting the distribution of antimalarials by anyone other than certified health services staff).

Integrated delivery of different interventions through the CDI strategy proved feasible and cost-effective where adequate supplies of drugs and other intervention materials were made available. Communities, health workers, policy-makers and other stakeholders were quite supportive and their buy-in to the CDI approach increased significantly over time. Since intervention coverage also increased as more interventions were gradually included in CDI delivery, the results of the study are promising in terms of the sustainability of the CDI approach.

Based on the findings of the study, the board of APOC has recommended that CDI approaches be adopted for integrated, community-level delivery of appropriate health interventions in the 16 African countries with experience in community-directed treatment for onchocerciasis control.<sup>20</sup> This may comprise

the interventions tested in this study, especially for malaria, or other intervention packages chosen on the basis of the lessons learnt. This APOC endorsement represents significant potential for extending CDI programmes elsewhere, since programmes for community-directed treatment with ivermectin cover some 75 million people to date and are projected to cover 100 million by 2010.<sup>13,21,22</sup> The evidence from our large scale study shows that the CDI process provides an effective platform for integrated delivery of health interventions in a model that builds upon core principles of primary health care, namely active community participation in the organization and delivery of interventions and a structured and systematic partnership of communities and health systems. ■

### Acknowledgements

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AI Aiyede, N Afolabi, OO Kale (University of Ibadan); E ElHassan, S Isyaku, S Sanda, FNC Enwezor, O Adekeye, F Agbo, MK Ogungbemi, D Lawong, F Folurunsho, F Ibrahim, A Gwom (Sight Savers International, Kaduna); O Akogun, JA Badaki, DO Echeta, AO Adesina, S Njobdi, J Manabete, K Shitta, U Ahmed (University of Yola), J Okeibunor (University of Nigeria, Nsukka); *Sudan*: M Homeida (Academy of Medical Sciences and Technology, Khartoum); *Uganda*: R Ndyomugenyi, AT Kabali, B Kiberu, Z Mugaba (Ministry of Health, Kampala); *Switzerland*: J Sommerfeld, JHF Remme (retired) (WHO/TDR, Geneva); *United States of America*: W Brieger (John Hopkins Bloomberg School of Public Health, Baltimore), S Zimicki (Academy for Educational Development, Washington).

We thank the Joint Action Forum of APOC for commissioning the present study; APOC for having established a solid foundation of community empowerment; the governments of Cameroon, Nigeria and Uganda for active support of the study; national ministries of health, health workers and NGO stakeholders for their active collaboration in the study; communities for their enthusiasm and active participation, and community volunteers for their demonstrated commitment to improving the health of their communities. EM Fletcher, TDR editor, provided editorial assistance with the writing of the article.

**Funding:** The study was funded through the APOC, the Bill & Melinda Gates Foundation, The World Bank and TDR.

**Competing interests:** None declared.

### ملخص

#### التدخلات الموجهة للمجتمع لمواجهة المشاكل الصحية ذات الأولوية في أفريقيا: نتائج دراسة عديدة البلدان

دراسة استمرت ثلاث سنوات، أُجريت البحوثون تقييماً كمياً للتغطية بالتدخل والتكاليف المقدمة، وكذلك تقييماً نوعياً لعملية التدخل الموجهة للمجتمع. النتائج حققت استراتيجيات التدخل الموجهة للمجتمع تغطية أعلى مقارنة بأساليب تقديم التدخلات الأخرى باستثناء المعالجة القصيرة الأمد تحت الإشراف المباشر. وازدادت التغطية بتدخلات الملاريا إلى أكثر من الضعف. وكانت تكاليف تقديم التدخلات الخمسة على مستوى المنطقة أقل في المناطق التي طبقت التدخل الموجه للمجتمع، ولكن لم يُكتشف فرق في التكلفة على مستوى المرفق الصحي في الخط الأول. وأظهرت عملية التقييم أن: (1) عملية المشاركة كانت مهمة؛ (2) المشاكل المتكررة الخاصة بإمداد مواد التدخل كانت هي العقبة الكبرى أمام التنفيذ؛ (3) المجتمعات والقائمين بالتنفيذ من المجتمع كانوا ملتزمين التزاماً قوياً بعملية التدخل الموجهة

الغرض تحديد مدى فعالية ونجاعة تأثير الأسلوب الموجه للمجتمع المستخدم في مكافحة العمى النهري في أفريقيا في التقديم المتكامل للتدخلات الصحية الأخرى.

**الطريقة** أجريت دراسة استمرت ثلاث سنوات في 35 منطقة صحية من عام 2005 حتى 2007 في سبعة مواقع بحثية في الكاميرون، ونيجيريا، وأوغندا. واختبرت عشوائياً أربع مناطق للتجربة ومنطقة واحدة للمقارنة في كل موقع. وقد أنشأت جميع المناطق برنامج معالجة بدواء إيفرمكتين ivermectin، وفي المناطق التي تخضع للتجربة تأسست تدخلات أخرى - هي: تعزيز فيتامين أ، واستخدام الناموسيات المعالجة بالمبيدات، والتدبير العلاجي المنزلي للملاريا، والمعالجة قصيرة الأمد تحت الإشراف المباشر للسلس- وتدرجياً دُمجت هذه الأنشطة في عملية التدخل الموجه للمجتمع. وفي نهاية كل

الاستنتاج إن استراتيجية التدخل الموجه للمجتمع، والتي تستند على المبادئ الأساسية للرعاية الصحية الأولية، نموذج فعال وناجح للتقديم المتكامل للتدخلات الصحية الملائمة على الصعيد المجتمعي في أفريقيا.

للمجتمع؛ (4) القائمين على التنفيذ من المجتمع كانوا أكثر حماساً بالحوافز المعنوية مقارنة بالحوافز المالية الخارجية.

## Résumé

### Interventions sous directives communautaires pour répondre aux problèmes sanitaires prioritaires en Afrique : résultats d'une étude multipays

**Objectif** Déterminer dans quelle mesure les approches sous la direction des communautés appliquées dans la lutte contre l'onchocercose en Afrique pourraient efficacement intégrer d'autres interventions sanitaires qu'elles délivreraient ensemble.

**Méthodes** Une étude expérimentale sur trois ans a été entreprise de 2005 à 2007 dans 35 districts sanitaires répartis dans sept sites de recherche au Cameroun, au Nigeria et en Ouganda. Sur chaque site, nous avons sélectionné au hasard quatre districts d'étude et un district témoin. Tous les districts disposaient de programmes établis de traitement par l'ivermectine et dans les districts d'étude, quatre interventions – supplémentation en vitamine A, utilisation de moustiquaires imprégnées d'insecticide, prise en charge à domicile du paludisme et traitement de courte durée sous surveillance directe pour les patients tuberculeux – ont été progressivement intégrées au processus d'intervention sous directives communautaires (CDI). A la fin de chacune des trois années d'étude, nous avons réalisé des évaluations quantitatives de la couverture par les interventions et des coûts de délivrance, ainsi que des évaluations qualitatives du processus CDI.

**Résultats** La couverture obtenue avec la stratégie CDI était significativement plus étendue que celle atteinte avec les autres stratégies de délivrance

des interventions, et ceci pour l'ensemble des interventions à l'exception du traitement de courte durée sous surveillance directe. La couverture par les interventions visant le paludisme avait plus que doublé. Les coûts de délivrance des cinq interventions au niveau du district étaient plus bas dans les districts bénéficiant de la CDI, mais aucune différence de coût n'a été relevée au niveau de l'établissement de soins de première ligne. L'évaluation du processus a fait apparaître que : (i) la nature participative des processus était importante ; (ii) des problèmes récurrents d'approvisionnement en matériel d'intervention constituaient un obstacle majeur à la mise en œuvre des interventions ; (iii) les communautés et leurs membres chargés de mettre en œuvre les interventions étaient profondément impliqués dans le processus CDI ; (iv) les membres des communautés chargés de cette mise en œuvre étaient davantage motivés par des incitations non matérielles que par des incitations financières externes.

**Conclusion** La stratégie CDI, qui repose sur les principes de base des soins de santé primaire, représente un modèle efficace pour la délivrance intégrée d'interventions sanitaires appropriées au niveau communautaire, en Afrique.

## Resumen

### Intervenciones dirigidas por la comunidad para problemas sanitarios prioritarios en África: resultados de un estudio multipaís

**Objetivo** Determinar en qué medida el enfoque de dirección por la comunidad utilizado para combatir la oncocercosis en África podría aprovecharse para implantar efectiva y eficientemente la prestación integrada de otras intervenciones sanitarias.

**Métodos** Se llevó a cabo un estudio experimental de tres años en 35 distritos de salud entre 2005 y 2007 en siete lugares del Camerún, Nigeria y Uganda. En cada sitio se seleccionaron al azar cuatro distritos de ensayo y un distrito de comparación. Todos los distritos habían establecido programas de tratamiento con ivermectina, y en los distritos de ensayo se incorporaron progresivamente otras cuatro intervenciones de reconocida eficacia -suplementos de vitamina A, uso de mosquiteros tratados con insecticida, tratamiento domiciliario de la malaria y tratamiento breve bajo observación directa de los pacientes con tuberculosis- en un proceso de intervenciones dirigido por la comunidad (IDC). Al final de cada uno de los tres años de estudio se realizaron evaluaciones cuantitativas de la cobertura de las intervenciones y los costos relacionados con los proveedores, así como evaluaciones cualitativas del proceso de IDC.

**Resultados** Mediante la estrategia de IDC se logró una cobertura significativamente mayor que con otras fórmulas de prestación de servicios en todas las intervenciones a excepción del tratamiento breve bajo observación directa. La cobertura de las intervenciones contra la malaria se más que duplicó. Los costos a nivel distrital de la aplicación de las cinco intervenciones fueron inferiores en los distritos de IDC, pero no se hallaron diferencias de costos en el nivel de los servicios de salud de primera línea. La evaluación del proceso reveló que: (i) el aspecto participativo era importante, (ii) los problemas que afectaron reiteradamente al suministro de material de intervención fueron un gran obstáculo para la aplicación; (iii) las comunidades y los ejecutores de cada comunidad mostraron un firme compromiso con el proceso de IDC; y (iv) los ejecutores de las comunidades estaban más motivados por incentivos intangibles que por incentivos financieros externos.

**Conclusión** La estrategia de IDC, basada en los principios básicos de la atención primaria, es un modelo eficaz y eficiente para la prestación integrada de determinadas intervenciones sanitarias a nivel comunitario en África.

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