

## Community Acceptability and Adoption of Integrated Community Case Management in Uganda

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**Abstract.** Integrated community case management (iCCM) is a recommended strategy to curb child mortality. Drawing on diffusion of innovations (DOIs), the acceptability and adoption of iCCM were qualitatively explored. Data from focus group discussions and interviews with community members, community health workers (CHWs), and supervisors conducted in seven communities were analyzed using content analysis. Perceived relative advantage and compatibility of the program with sociocultural beliefs and healthcare expectations of the communities positively affected acceptability and adoption of iCCM. The degree of stringency, quality, and cost of access to healthcare were crucial to adoption. Failure of the health system to secure regular drug supplies, monetary support, and safe referrals globally hindered adoption. Individual CHW characteristics like undesired behavior, demotivation, and lack of reciprocated trust deterred adoption in some areas. Optimal functioning of iCCM programs will require community sensitization and targeted health systems strengthening to enhance observable program benefits like reduced child mortality.

### INTRODUCTION

Integrated community case management (iCCM) of childhood illnesses has been proposed as a strategy to reduce child mortality by improving access to healthcare for sick children in resource-poor settings.<sup>1</sup> It involves the use of community health workers (CHWs) in the treatment of uncomplicated childhood illnesses, including malaria, pneumonia, and diarrhea, as well as referral of complicated cases.<sup>1,2</sup> Although the strategy was officially recommended by the World Health Organization (WHO) as early as 2004,<sup>1</sup> its implementation has been slow, especially with regards to pneumonia and diarrhea in high-child mortality countries.<sup>3,4</sup>

Slow progress in intervention implementation has been attributed to the fact that health interventions are often introduced as complex sets of innovations consisting of technologies and processes into an adopting social system of stakeholders with competing interests.<sup>5</sup> The stakeholders are normally a mix of people at different levels of the system, including health workers, policy makers, and community members. The level of integration and the number of stakeholders involved in the intervention determine its level of complexity.<sup>5,6</sup> The iCCM strategy integrates approaches for three different diseases that all have different sets of case management tools at community and health facility levels, making it a relatively complex strategy.

Various theories explain the process of adoption of interventions.<sup>7–9</sup> The theory of diffusion of innovations (DOIs), which relates to how conditions increase or decrease the possibility that members of social system will adopt an innovation,<sup>7,10</sup> has been one of the most widely used theories in disciplines such as medicine and public health sciences.<sup>10</sup>

Drawing from the theory of DOI in the work by Rogers,<sup>7</sup> an innovation is more likely to be accepted by the adopting system and thus, would be scalable if it has attributes of perceived relative advantage in relation to other options, compatibility with existing values and practices, trialability (which is the degree to which an innovation can be experimented with on a limited basis), perceived simplicity or ease of use, and observability (which is the degree to which the results can be visualized) (Table 1).<sup>7,11,12</sup>

Although the importance of community participation in any health intervention is well-known,<sup>13,14</sup> few studies have identified the community processes and social factors that affect people's acceptability and adoption of community-based programs. Earlier diffusion studies have been criticized for making individuals the unit of analysis, assuming that new innovations are better than old ones and that adoption is more worthy of study than rejection, and using the invariable assumption that research can be transferred to new contexts without adaptation.<sup>15</sup> Despite the existence of a known association between social factors that hinder people from accessing healthcare and program outcomes, most studies report on the factors that lead to failure of community-based systems but not why these factors occur.<sup>16</sup> To improve iCCM program success, it is important to explore how the attributes of the program interact with the social system to either enhance or hinder its adoption by the community.

This study sought to explore the acceptability and adoption of iCCM by Ugandan communities using the theory of DOI. The data were collected as part of the inSCALE project (innovations at scale for community access and lasting effects), which aims to test strategies to improve CHW motivation, retention, and performance in Uganda and Mozambique.

### METHODS

**Setting.** Implementation of iCCM in Uganda commenced in July of 2010 when the national strategy was launched by the Vice President. The study was conducted in eight districts in midwestern Uganda (Buliisa, Masindi, Kibaale, Kyegegwa, Kyankwazi, Kiryandongo, Kiboga, and Hoima), where iCCM implementation has been supported by the Malaria Consortium since August of 2010. The districts have an estimated 1.8 million

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TABLE 1  
Diffusion of innovation model and examples of how it was used in data collection

Program attribute	Definition (Rogers <sup>7</sup> )	Examples of questions
Relative advantage	The degree to which an innovation is perceived as being better than preceding ideas. <sup>7</sup>	Where do you take your children when they suffer from (name disease) and why? Thinking about the VHT services, could you tell me what you like or dislike about them? If you were to choose between going to a VHT and (a) a health center or (b) alternative healthcare, tell me which one you would choose and why?
Compatibility	The degree to which an innovation is perceived as being consistent with values, needs, and experiences of an adopting society. <sup>7</sup>	What are the healthcare needs of children in your community, and how are they normally obtained? Of all the ways of obtaining healthcare that you have mentioned, which ones do you consider most valuable and why?
Complexity	The degree to which an innovation is perceived as being difficult to use and understand. <sup>7</sup>	Thinking about any of the occasions you took your child to a VHT, please describe what you thought about the process of taking your child to the VHT, the information given to you by the VHT, the way that your child was handled by the VHT, and anything else you would like to discuss.
Trialability	The degree to which an innovation may be experimented with on a limited basis. <sup>7</sup>	Why would you be happy or unhappy to visit a VHT from another community or village? What would you gain or lose by visiting a VHT? Why would you consider it important or not to visit a VHT before you can decide to always take your children to the VHT whenever they get (name disease)?
Observability	The degree to which the results of the innovation are visible to others. <sup>7</sup>	What makes you think that children get effective treatment or not when they visit a VHT? What differences, if any, have you noticed in the health of children since the iCCM program was started? Describe what would make you go back to a VHT if your child fell sick. Could you tell me why you would or would not recommend this program to other caregivers?

people, with 20% being children under 5 years of age. The districts each contain 160 to 1,000 villages, approximately totaling to 4,000 villages in the study area. They constitute people of different tribes and cultural practices, including nomadic cattle herders, fishing community members, and peasant farmers. In the area, approximately 13,500 CHWs—locally known as village health team members (VHTs)—are operating, where 5,700 have been trained to deliver iCCM. They diagnose, refer, and treat children between 2 months and 5 years for malaria, pneumonia, and diarrhea using rapid diagnostic tests for malaria (RDTs, Standard Diagnostics Inc., Hagal-dong Giheung-Ku, Yongin-si Kyonggi-do, Korea), simple respiratory timers for pneumonia, artemether/lumefantrine (Coartem, Novartis Pharma Services Inc., Basel Switzerland), amoxicillin (Imrs b.v Larsserpoortweg, Lelystad, The Netherlands), oral rehydration therapy (ORS, Medipharm Industries Ltd., Kampala, Uganda), and zinc (Nutraset S.A.S., Malaunay, France). They also carry out regular home visits for health promotion and disease prevention, and they do active case detection and referral of sick newborns. Children with severe malaria are given pre-referral rectal artesunate (Mepha AG, Aesch BI, Switzerland) or Coartem, whereas children with severe pneumonia are given amoxicillin before referral. Each village has an average of two iCCM-trained VHTs who, on average, see 20 children every 1 month when drugs are available. The VHTs are supervised by staff from the health facilities (VHT supervisors). Each village is governed by a local council chairperson (LC1).

**Study design and data collection.** A qualitative study design with an explanatory approach was used to identify factors that influence uptake of iCCM.<sup>17</sup> During July of 2011, A.N. and three experienced research assistants conducted homogenous focus group discussions (FGDs) with female caregivers ( $N = 6$ ) and male caregivers ( $N = 1$ ) of children under 5 years residing in seven communities. Interviews were held with female ( $N = 1$ ) and male ( $N = 6$ ) resident primary caregivers of chil-

dren. Female FGDs consisted of 8–10 participants who were principally mothers, aunts, or grandmothers responsible for the children. The FGD with males consisted of only fathers. Key informant interviews were held with VHTs ( $N = 7$ ), VHT supervisors ( $N = 7$ ), and LC1s ( $N = 6$ ). Interviews and FGDs were conducted in a convenient and private place within the village. Key informant interviews were held at the respondent's home for VHTs and LC1s and in a private setting at the health facility premises for VHT supervisors.

**Sample selection and recruitment of participants.** During sampling, a community was operationally defined as a village served by one or more VHTs trained on iCCM. Participants were purposively sampled from seven communities in mid-western Uganda that were believed to possess rich information on barriers and facilitators for iCCM adoption. Only resident primary caregivers of children under 5 years of age were identified with the help of the LC1 chairpersons of the selected villages. The study team contacted the VHTs as well as the supervisors responsible for the selected communities. The sampling method sought to achieve maximum variation within the sample<sup>18</sup> in terms of attributes theoretically known to influence use of health services, such as age and geographical location.<sup>19,20</sup> Participants with varied age and gender from different geographical areas believed to have low or high uptake of iCCM were recruited into the study. Given the close relationship between adoption and uptake,<sup>21</sup> it was deemed appropriate to sample participants from communities with varying uptake levels as defined by the VHT supervisor and confirmed by VHT activity records. During the study period, communities were classified as high-uptake areas if the VHT supervisor reported high VHT attendance and if VHT records confirmed that at least 10 sick children had been seen in the previous 2 weeks (on average, 10–20 cases are treated in each village). Communities were presumed to be low-uptake areas if the supervisor reported low VHT

attendance levels and if the VHT records showed less than five sick children seen by the VHT in last 2 weeks, despite high case attendance at the affiliated health facility. Table 2 shows the sampling matrix for the participants.

**The FGDs and interviews.** An exploratory research strategy probing for attributes of iCCM that could either foster or hinder its uptake within communities was used during FGDs and interviews. The FGDs sought to explore the general trends in the communities with respect to iCCM, whereas the interviews explored individual experiences. The concept of DOI was used to frame thematic semistructured FGD and interview guides. The guide themes broadly captured attributes of iCCM (Table 1), with probes on how the attributes could affect acceptability and use of services. The guides were pre-tested and modified. Interviews and FGDs were digitally recorded with the informed consent of each participant and ranged from 60 to 120 minutes. Group and individual interviews were conducted in native languages among community members, VHTs, and LC1s. Interviews with VHT supervisors were conducted in English.

**Analysis.** The audio recordings from all interviews were transcribed into English by the research team and cross-checked by A.N. In the analysis, acceptability was defined as the degree to which a service is sufficiently tolerable to its users as reflected not only in uptake but also in perceived quality. Adoption was characterized as use of health services provided by VHTs. The software Nvivo version 9 (QSR International Pty Ltd., Doncaster, Victoria, Australia) was used to aid the process of coding, organization, and searching for descriptive sections from each interview. It also allowed for sections about themes across a range of interviews to be compared and linked for a logical analysis. Two independent raters, including A.N., read the text and identified meaning units; the meaning units were labeled to make codes, and the codes were grouped into subcategories and pre-defined categories within the theory of DOI using a directed content analysis approach (Table 1).<sup>22</sup> The analysis was cyclical (i.e., moving among literature review, data collection, transcription, preliminary analysis, and scrutiny by the authors). The analysis sought explanations for health-seeking behavior for malaria, pneumonia, and diarrhea, initial choice of healthcare provider, and factors affecting program adoption in communities.

**Ethical considerations.** Written informed consent was obtained from all study participants. Approval was obtained from the Institutional Review Board at Makerere University School of Public Health and the Uganda National Council of Science and Technology (HS 958) (Table 2).

TABLE 2  
Summary of the sampling framework

District	Rural	Periurban	Hard to reach	Low uptake	High uptake
Buliisa	x		x	x	
Hoima	x		x		x
Kiboga		x			x
Kibaale	x			x	
Kyankwanzi	x		x	x	
Kyegegwa	x			x	
Masindi		x			x

Low-uptake area is an area listed as one with low attendance by the supervisor and fewer than five children were recorded to have seen a VHT in the past two weeks. High-uptake area is an area listed as one with high attendance by the supervisor and more than 10 children were recorded to have seen a VHT in the past two weeks.

## RESULTS

**The informants.** Characteristics of interviewees and FGD participants are summarized in Table 3. Of the key informants, six were male LC1s with at least primary level education; seven were VHTs, and seven were VHT supervisors. Of the supervisors, three of seven were female, four of seven were in charge of the health facility, two of seven were health assistants, and one of seven was a health educator.

**Program compatibility with social-cultural beliefs and healthcare expectations.** In the area of compatibility, two subcategories emerged describing the programs compatibility with community expectations, cultural beliefs, and lived experiences. The subcategory “cultural construction of disease” described the influence of local perception of illness on treatment-seeking behavior, whereas “program compatibility with healthcare expectations” described how met or unmet expectations of healthcare affected health provider choice. Overall, treatment options varied from care at home with local herbs and drug leftovers to care outside the home from traditional healers, VHTs, and the health facility.

**Cultural construction of disease.** *Local perception of disease severity.* This perception varied among communities and shaped treatment choices. In two of the selected villages, diarrhea and pneumonia were believed to be very severe diseases from the start with rapid progression to death, requiring immediate attention at a health facility (Table 4).

*Local perception of disease cause.* In some communities, it was often believed that pneumonia was caused by non-biomedical causes; thus, it required non-Western medical treatment options (Table 4).

TABLE 3  
Summary of characteristics of respondents

Characteristics of interviewees	Focus group discussions (%)	Interviews with community members (%)	Interviews with VHTs (%)
Sex	N = 60	N = 7	N = 7
Female	90	14	29
Male	10	86	71
Age (years)	N = 60	N = 7	N = 7
18–27	47	0	0
28–37	35	29	14
38–47	17	29	29
47+	2	44	57
Education level	N = 60	N = 7	N = 7
None	23	14	0
Primary 1–7	62	57	29
Senior 1–4	15	29	57
Senior 4–6			14
Employment status	N = 60	N = 7	N = 7
Petty business	8	0	0
Housewife	12	0	0
Bar attendant	2	0	0
Farmer or pastoralist	70	14	43
Fish trading	7	85	14
Teacher	2	0	14
Tailor	0	0	14
Church leader	0	0	14
District	N = 60	N = 7	N = 7
Buliisa	18	14	14
Hoima	17	14	14
Kibaale	20	14	14
Kyegegwa	13	14	14
Kyankwanzi	8	14	14
Kiboga	10	14	14
Masindi	13	14	14

TABLE 4  
Categories, subcategories, and examples of citations

Core category	Subcategories	Examples of codes	Citations showing category
Compatibility	Cultural construction of disease	-Disease is severe	"The caregivers rush (pneumonia cases) to health workers, because it is a feared disease. It is a serious disease. No one tampers with it; 10 out of 10 caregivers rush to the health worker, because pneumonia previously killed many children. Caregivers don't go for local herbs to cure pneumonia."—male VHT
Compatibility	Cultural construction of disease	-Disease is caused by non-biomedical causes	"Caretakers also have false beliefs of millet extraction obulo, and when a child develops pneumonia, they relate it to false millet in the chest that is stopping the child from breathing well, so they put cuts on the child's chest to extract it. . . ."—male supervisor
Compatibility	Compatibility with expectations of healthcare	-Services are easily accessible -Adequate supply of the right drugs -Good quality of services -Training of CHW	"I expect VHTs to check and test children before giving them drugs so that they know exactly what they are treating and to advise on how and when to administer these drugs. . . For pneumonia, I expect her to give me drugs that suit my child's age."—participant, female FGD
Relative advantage	Financial benefits and non-financial benefits	-Services are free -Waiting time is shorter -Facility is nearer	"She makes follow-ups on the children she has treated yet she does all that free of charge. Some caregivers use a motorcycle to get to her place but sometimes we call her and she comes to our homes if we can't make it to her place."—female caregiver
Simplicity		-Services are easy to access -VHTs give information in simple terms	
Trialability		-If the services are free -If a significant other recommends it	
Observability		-Reduced morbidity -Reduced mortality -Quick treatment -Quick recovery -Health facility decongestion	"Before the VHTs were selected and trained, it was very difficult to have young children treated as sometimes, one had no money, and once a child fell sick, we could resort to the use of traditional herbs as we look for the money to go to the health facility or drug shop, and this delay led to the death of many children. So with the coming of the VHT during the time when they had the drugs, all that had changed, as we could quickly run to the VHT in case of an illness."—male caregiver
Complexity		-Program is not always functional -VHT possesses bad characteristics	"I didn't have drugs, so I referred her to the health center. After 4 days, she came back with another child, and I told her the same story. Now last week, she came back, and I still didn't have drugs; this time she asked me a question. What are you people doing if all the time you don't have drugs; then we shouldn't bother coming here, because you just hold titles of musawo, yet in the actual sense, you are not helping us."—female VHT

Malaria was widely treated at both the community (by VHTs) and health facility levels. However, local herbs such as mululuza and mukungulanya were often used as initial therapy in a number of areas. Fevers manifesting with severe symptoms were at times attributed to witchcraft and therefore, were not treated with Western medicines.

"Those who are perceived to be having awola (witchcraft) are taken to a traditional healer . . . Witchcraft in children comes like fever, and for children who are suspected to be bewitched, they are taken to traditional healers who remove some black things from the child's stomach, and it is believed that if such a child is treated with Western medicine, he/she will die instantly."—male VHT.

*Program compatibility with healthcare expectations.* In all communities, caregivers would normally opt for health services that meet their usual expectations of healthcare. Services were likely to be perceived as compatible if they were easily accessible in terms of distance from the home, if the facility had an adequate supply of the right drugs and diagnostic tools, if the services were perceived as prompt and

good quality, and if professionalism or good customer care was observed. Participants also mentioned community sensitization, sanitation and hygiene, net distribution, school education, and coverage of a wide range of diseases in both adults and children as key components of what they perceive as a normal community healthcare package. Members of the VHT were well-accepted if they were perceived to give easily accessible healthcare with good quality, examining children tenderly and prescribing free drugs only after conducting investigations (Table 4).

Community members also expected VHTs to be equipped with a minimum level of training, diagnostic tools, and experience in managing children. In some communities, VHTs were at times criticized by caregivers who felt that VHTs had been trained for too short a time to have enough knowledge for treating children (Table 4).

Some communities had defined what should be an ideal service from an ideal VHT. When this expectation was not met, aggression to the VHTs often arose. This aggression was fueled by the assumption that VHTs are salaried workers; the

refusal of drugs after negative malaria tests; the refusal to treat children older than 5 years; and the refusal of more drugs that are demanded by community members. Community members were also likely to shun VHTs who they did not trust because of undesired behaviors like heavy drinking and suspected practicing of witchcraft.

“Most community members think that VHTs are paid and want to hold them accountable; like when caregivers go to the VHT’s home and they don’t find them there, they confront the VHTs and accuse them of wanting to behave like other government employees who don’t want to offer services for which they are employed; this annoys the VHTs a lot.”—male supervisor.

Conversely, in all communities, healthcare at the health facilities, although perceived to be driven by health workers with high technical expertise, was often disappointing for many of the respondents. They often expressed unmet healthcare expectations and opted for drug shops and private clinics with regular drug supplies, despite high drug cost and fee for service.

“I don’t want to go to the health facility and line up or when I am asked by the health worker from the government facility to go and look for some of the drugs which he has prescribed for me that are out of stock. So, I will not have anywhere to buy such drugs other than the drug shop.”—male caregiver.

Two villages had established a policy where community members were first required to visit VHTs before progressing to the health facility. In such areas, caregivers were more likely to go to the VHTs before going to the health center.

“The fact that health workers at the health centre ask for a referral form from the VHT is a clear indication that health workers trust what VHTs do, which means that the program is effective.”—female FGD.

**Relative advantages of the program.** The perceived relative advantages of services offered by VHTs included both financial and non-financial benefits. Financial benefits included reduced expenditure on transportation to the health facility and drugs. Non-financial benefits included improved proximity and convenient access to services, because there were less official procedures in obtaining healthcare, with shorter waiting times and convenient opening hours.

“There are so many people at the health centre, yet at the VHT’s home, they are few or none. There is no queue; you don’t waste time, as it can take approximately only 20 minutes to be seen.”—male caregiver.

The program was flexible, allowing for the possibility of making appointments with VHTs over the phone and treatment at home. It also provided for follow-up visits, counseling services, and routine health promotion visits, which were believed to have reduced disease prevalence. Caregivers with children who were referred by VHTs were prioritized at the health facility.

**Program simplicity and complexity and access to healthcare.** In communities where the iCCM program was well-accepted, it was perceived as difficult to neither understand nor use by community members. Caregivers often mentioned that, when fully functional, the program provided quick and easily accessible services with minimal inconvenience. The process of approaching VHTs was easy, and there was room for fixing quick appointments. The VHT members also provided useful information with simple explanations and practical demonstrations.

“I was content with the information she gave me, because she even mixed for me the drugs using boiled water and gave the child the first dose while I was watching and even educated me on how to mix the drugs. I learnt a lot during that process.”—male caregiver.

Complexity in communities where iCCM attendance is low was related to weaknesses within the program, such as frequent and frustrating drug stock outs, inappropriate selection of VHT candidates, and inadequate performance of VHTs. It was characterized by limitation in access to healthcare because of periodic migration of VHTs without prior notice to the supervisor or community and distrust and personal wrangles between VHTs and community members. Distrust aggravated program rejection if individual VHTs were believed to practice witchcraft and could, thus, pass on negative energies to community members.

“People in this community have complained about one VHT whose home is characterized by witchcraft, and caregivers sometimes fear to take their children for treatment.”—female supervisor.

**Trialability.** Overall, trialability was not a problematic attribute of the program. Caregivers were often open to trying out iCCM services even within new communities and were attracted by the free access to effective drugs and the fact that the program was officially recommended by health workers. The caregivers who had tried the services were even willing to recommend them to others. Trialability was more likely to be influenced by recommendation of a significant other and was limited to only disease conditions perceived as non-severe to avoid delay in accessing care from professional health workers.

“When you visit the VHT, because the child might be very ill, and the caregiver wastes time going to the VHT, yet he/she would use that time to get to the hospital on time. But because of that delay, sometimes children die along the way.”—LC1 chairman.

There was a common belief in the communities that drips, injections, and syrups were stronger than tablets. The few medicine formulations provided by VHTs under iCCM limited trialability in some communities.

**Observability.** The iCCM program, when fully functional, was associated with highly visible or quick tangible rewards that were observable at the community and health facility levels of the healthcare system in all communities. Key observed results mentioned by the caregivers included quick treatment of children by VHTs, quick recovery, reduced frequency of disease episodes, reduced child mortality, and reduced health expenditure (Table 4). Health workers observed reduced patient traffic and workload at the health facility.

**Perceived program use barriers.** Despite tangible observed results, participants often cited a number of obstacles to program adoption. From the caregivers’ point of view, key program challenges included frequent stock outs of drugs and diagnostic tools, the guilt of keeping VHTs away from their regular income-generating activities, and work overload for the VHTs. Occasional absence of VHTs from their work posts and lack of community sensitization after VHTs received new stocks of drugs were also mentioned as program constraining factors.

“Many people because of that [drug stock-out] have started saying that the VHT problems are like those at the health facility, because when you visit the VHT and there are no

drugs, she just refers you to the health facility and while at the health facility, a medical prescription is just written down for you and then you are sent to the drug shops and clinics to buy; hence, the last point is the clinic and that is where some people resort to go directly instead of wasting time and getting only referrals.”—LC1 chairman.

The existing community constitution and beliefs were cited as potential barriers to service use by one LC1 chairperson. Migratory communities and sociocultural beliefs were believed to affect program adoption.

“The program is being hindered by the nature of the people on the landing sites [at the lake] . . . there are many tribes and foreigners in the area who have different practices and beliefs that they spread to other people. That is why some people have still failed to embrace the program.”—LC1 chairman.

At the VHT level, program impediments included lack of supervision and feedback; lack of monetary facilitation, transport refunds, fuel for lighting, soap for hand washing, and clean water; frequent drug stock outs; and hostility from the communities. Lack of drugs, supervision, and feedback often resulted in lack of continuous practice, forgetfulness, and hence, poor performance and demotivation.

“Sometimes caregivers bring sick children requiring administration of the first dose of tablets from my place, yet sometimes I don’t have boiled water. I would want to provide the water, but it is scarce in our area and I have to boil it. All this is costly yet important.”—female VHT.

From the supervisors’ perspective, major obstacles to program use were inherently associated with lack of facilitation, and they included demotivation, lack of financial support for supervision and communication, work overload, and considerable attrition among VHTs, which necessitates fresh and costly training.

“[We] supervisors have no air time to communicate with the VHTs, yet they keep beeping us. I have a motorcycle, but I have no fuel, so I can’t visit all the VHTs. Some supervisors have lost morale. Only three of the six are active. Personally, I am not as active as I was before.”—male supervisor.

## DISCUSSION

Despite the existence of a mounting body of literature on the association between prevailing conditions and adoption of innovation, there is limited evidence on how complex innovations can successfully be implemented.<sup>5,7,15</sup> The findings from this study qualitatively confirm an association between the attributes of iCCM and its adoption in the communities, and they describe why variation occurs in uptake of the program among communities. Although iCCM is seen as an effective intervention, its acceptability and adoption are driven by context-specific factors. At the community level, disease construction and illness classification together with expectations of standard healthcare determine health provider choice. There was disconnection between the community’s classification of the cause and severity of disease and the biomedical classification, which poses a challenge for program adoption. In some communities, the disease etiology for potentially severe pneumonia and malaria cases was witchcraft. Such phenomena have been described by earlier studies that have highlighted the importance of understanding perceived etiological factors as well as non-biomedical perceptions of disease symptoms and illness in African settings.<sup>2,3–25</sup>

The purpose of iCCM is to ensure that life-saving interventions, such as pre-referral rectal artesunate, are brought closer to the children who need them<sup>1–3</sup>; caregivers who perceived their children as having severe disease were more likely to take the children directly to the health facility. In terms of tailored interventions, such a move could deprive and cause a delay in access to life-saving treatment of children with severe malaria and pneumonia who require pre-referral treatment. This information should be scrutinized in the light of a Tanzanian study, which showed caregivers’ reluctance in referral completion after improvement in the child’s status after administration of rectal artesunate.<sup>26,27</sup> In relation to program simplicity, caregivers often found the health services provided by the program easy to use. Health system-related factors such as drug stock outs and non-fruitful referrals affected adoption in all areas. Conversely, societal and individual CHW factors, such as reciprocated trust between the communities and the CHWs, interpersonal relationships, demotivation, and undesired CHW’s behavior predominantly affected acceptability in specific areas. Trialability was generally good, and participants believed that the iCCM package was attractive. However, the community’s perception of what constitutes strong and effective medicine was negatively associated with iCCM medicines. Such patterns of hierarchical classifications (medicine formulations with drips being perceived as better than injections and injections being perceived as better than syrups) have been described elsewhere.<sup>28</sup>

It is known from previous studies on community case management of malaria that, although an intervention may be acceptable to communities, its acceptability is only as good as against what it is competing.<sup>29</sup> Although iCCM was generally well received in most communities based on its relative advantage and highly observable results compared with the status quo, the study shows that more is needed to make it the best alternative for healthcare at the community level. Given its sole dependence on voluntary CHWs, the program must further be scrutinized within the light of the problems that CHWs face in their day to day life as lay people in healthcare.<sup>30,31</sup> The problems do not only stem from the community but also from the health system, which sometimes fails to supervise and deliver the drugs and supplies to VHTs on a timely basis, thus exposing VHTs to similar solutions of referring patients to drug shops as is the practice at the health facility when drugs are out of stock.

The study was conducted within the framework of DOI model. The model has been commended for its substantial contribution to understanding behavioral change and thus, facilitating adaption of innovations to cultural needs and norms.<sup>15,32</sup> Identifying strengths and weaknesses of innovations using the attributes of the theory of DOI is central to effective health education and promotion in public health interventions.<sup>32</sup> Limitations of the theory include individual rather than system blame, recall bias because of dependency of the diffusion process on time, and a proinnovation bias.<sup>15,32</sup> Nonetheless, the study highlights important system challenges as well as positive and negative attitudes to iCCM.

Other study limitations included participant inhibition in FGDs, inability of interviews to produce data on how people act outside the interview context, and inability of the study to establish patterns in adoption overtime. However, the triangulation of participants, interviews, and FGDs as well as the

use of maximum variation sampling ensured that varied experiences were examined.

Although the aim of the iCCM strategy is to target the poorest families and efforts to scale it up are underway,<sup>1,33</sup> there is a need for holistic health systems strengthening to improve barriers for access to healthcare.<sup>34,35</sup> This strengthening will require operational drug supply chains, facilitation and reward (not exclusively monetary), operating supervision systems, and establishment of functional referral systems.<sup>36–38</sup> It is crucial to carry out systematic program sensitization using behavioral change communication (BCC) strategies adapted to the local context and local belief systems to improve adoption.<sup>5,39,40</sup> The BCC messages should clearly define what causes disease and what constitutes severe illness, and they should discourage irrational beliefs surrounding hierarchical classifications of medicines. This information will limit unnecessary self-referrals to the health facilities, while giving communities guidelines on when to seek healthcare from a VHT. At the community level, systems to ensure that selected CHWs are people who have the right mix of characteristics acceptable to both individual society groups and health workers in the formal sector will be required. Interventions ensuring CHW motivation, realistic remuneration, and performance will also be required.<sup>30,31</sup>

Received December 7, 2011. Accepted for publication February 18, 2012.

Acknowledgments: We wish to extend our thanks to the research assistants who collected the data and the inSCALE team Uganda, particularly Stella Setumba and Edmond Kertho.

Financial support: Funding for this research was provided by The Bill and Melinda Gates Foundation through a grant to Malaria Consortium for the inSCALE project (<http://www.malariaconsortium.org/inSCALE/>).

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