The Cost of Integrated Community Case Management in Sud-Ubangi District, Democratic Republic of the Congo

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Contents

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Photo Credit: Warren Zelman

Acronym List

ARI	Acute respiratory infection
ASF	Association de Santé Familiale
CHW	Community Health Worker
CIDA	Canadian International Development Agency
DRC	Democratic Republic of the Congo
FBO	Faith-based organization
GHI	Global Health Initiative
GTZ	German Technical Cooperation
HZ	Health Zone
iCCM	Integrated Community Case Management
IRC	International Rescue Committee
IT	*Infirmier titulaire* (nurse in-charge)
MCHIP	Maternal and Child Health Integrated Program
MDG	Millennium Development Goal
MoPH	Ministry of Public Health
MSH	Management Sciences for Health
NGO	Non-government organization
PSI	Population Services International
RECO	*Relais Communautaire Dispensaire des Soins* (Community Service Provider Relay)
REPRO	*Relais Promotionnel* (Community Promotional Relay)
UNICEF	The United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Integrated community case management (iCCM) is considered to be an effective strategy for expanding the treatment of diarrhea, pneumonia, and malaria, which are the leading causes of child mortality and result in nearly 44% of deaths worldwide in children under five years old. Despite the success of this strategy in several low-income countries, iCCM programs in many other countries have yet to be implemented or expanded. This is partly due to concern or uncertainty about the costs and financing of iCCM programs.

In order to better understand the costs of iCCM programs, Management Sciences for Health (MSH), with support from the Bill and Melinda Gates Foundation, conducted costing studies of NGO-run iCCM projects in several African countries - Cameroon, Democratic Republic of Congo, Sierra Leone, South Sudan and Zambia. This report describes the results of the costing analysis in the Democratic Republic of the Congo of an iCCM program implemented by PSI's local affiliate, ASF, in Sud-Ubangi district. In addition to the costing of 2012 services, at ASF's request we included cost projections for the years 2013-2017. The results of this study can be compared with the findings of any impact study carried out for the same period. The model and results can also be useful to the government and donors planning to implement or scale up iCCM.

The iCCM program in Sud-Ubangi, started in 2009 and covered 9 of 16 health zones in the district in 2012. Although CIDA funding of this program ended in June 2013, we projected the costs for 2013, as if it would continue, and then estimated the costs of scaling up the program in 2014 to cover all 16 health zones in the district and the costs of continuing the program through 2017.

The target population of children in 2012 was 138,100 and is projected to increase to 256,319 by 2017 if the program is maintained and can expand to cover all the health zones (Table i). The iCCM package comprised diarrhea, pneumonia, malaria, cough, malnutrition and referrals. A total of 298,942 iCCM services was, reportedly, provided in 2012, and this was projected to increase to 1,202,413 by 2017, due to the geographical expansion and projected increases in utilization targets of 5% of need each year. This 2012 total translates to 2.2 services per capita (child 2-59 months), which was about 21% of the estimated need. This is projected to increase to 4.7 cases seen by 2017, which would be about 53% of the total estimated need.

The services were well utilized, with an average of 7.1 cases seen by a RECO per week in 2012. With increased population and utilization targets this is projected to rise to 15 cases per week. However, the reported RECO attrition rate of 40% per year is a concern, as this level of turnover can impede the quality, maintenance and expansion of services.

We estimated the actual total recurrent costs of implementing the iCCM program in Sud-Ubangi in 2012 as US$759,784, including medicines, management, supervision, meetings, refresher training and ASF running costs. With the expansion of the program to cover the whole district in 2014 plus increases in population and utilization targets, the recurrent costs in that year would increase to US$1,280,092 (excluding inflation). With further increases in population and utilization the total recurrent cost is projected to reach US$1,485,728 in 2017.

The average recurrent cost per capita (2-59 months) was estimated at US$5.50 in 2012 and, based on the assumptions, would rise to approximately US$5.80 in 2017. This rise is due to the projected increase in utilization. The total recurrent cost per service in 2012 was US$3.55 for pneumonia, US$2.70 for diarrhea and US$2.17 for malaria and these costs are projected to fall to US$1.49, US$1.43 and US$1.16 by 2017, mainly due to economies in scale as the high fixed costs are spread across more services.

It is important to note that these are standard costs – i.e., the costs that should be incurred for providing the services. They are not the actual expenditures, with possible exception of some of the overhead costs. In the case of medicines, for example, the cost shown here is the cost of providing the medicines needed for the numbers of services provided. It is not the actual expenditure on medicines. As a result it does not take into account shortages or stock-outs of medicines. This is especially important if the costs are used to compare with impact results, such as in cost per death prevented. In addition, we did not conduct any analysis of bottlenecks and do not know, for example, if there were medicine stock-outs during the year and we assumed that they would not occur in the projected years.

Table i. Summary of key figures (costs in US$)

	ACTUAL	PROJECTION				
	2012	2013	2014	2015	2016	2017
Catchment population 2-59 months	138,100	139,522	248,560	251,120	253,706	256,319
Total number of iCCM services	298,942	372,518	789,236	924,250	1,061,962	1,202,413
iCCM services per capita (2-59 mos)	2.2	2.7	3.2	3.7	4.2	4.7
Total recurrent cost	759,784	809,769	1,280,092	1,346,773	1,415,299	1,485,728
Average recurrent cost per capita (2-59 months)	5.50	5.80	5.15	5.36	5.58	5.80
Average recurrent cost per capita (total population)	0.82	0.86	0.77	0.80	0.83	0.86
Cost per diarrhea treatment	2.70	2.35	1.81	1.65	1.53	1.43
Cost per pneumonia treatment	3.55	2.97	2.10	1.84	1.65	1.49
Cost per malaria (fever) treatment	2.17	1.89	1.46	1.33	1.24	1.16
Cost per cough case	2.08	1.73	1.21	1.05	0.93	0.84
Cost per malnutrition case	2.08	1.73	1.21	1.05	0.93	0.84
Cost per referral	1.10	0.91	0.64	0.56	0.49	0.44

The main start-up costs were incurred before 2012 since the project started in 2009. The estimated total start-up costs for training and equipping the original 805 RECOs would have been US$162,610 (using 2012 prices). Based on the estimated attrition rate of 40% it would have been necessary to train and equip 322 replacement RECOs in 2012, which would have cost US$65,044. This figure is not

included in the recurrent costs. If the program expanded from 9 to 16 zones in 2014 the cost of adding 739 RECOs and replacing RECOs lost to attrition in that year would be US$128,842.

The majority of the costs are fixed – supervision, management and ASF overhead costs coming to 80% of total recurrent costs in 2012. While these are projected to fall to 63% by 2017, this is still a significant element of the costs. Most donor-funded pilot projects have high management and supervision costs – this is part of the investment in developing a viable program. If the program is taken over by the government these costs would be expected to fall significantly, for example with supervisors sharing the costs of visits across more community health activities.

The high RECO attrition rate of 40% adds a significant cost to the program, with the annual cost of training and equipping new RECOs projected to be as much as US$75,030 after 2014. This is additional to the recurrent costs described above and would remain a burden for the government if the services are taken over. It will be important to analyze the causes of this problem and develop a viable solution.

Introduction

Integrated community case management (iCCM) has proven to be an effective strategy for expanding the provision of diarrhea, pneumonia, and malaria services and is accepted by international donors and developing countries as a key strategy to meet Millennium Development Goal 4 on reducing child mortality.

Diarrhea, malaria and pneumonia are leading causes of child mortality and cause nearly 44% of deaths in children under five years old. iCCM, the delivery of timely and low-cost interventions at the community level by community health workers (CHWs) is promoted by the World Health Organization (WHO), The United Nations Children's Fund (UNICEF), United States Agency for International Development (USAID), and Global Health Initiative as an effective strategy to deliver lifesaving interventions for these illnesses. Several developing countries have adopted and promoted policies and programs in which CHWs promote timely care by treating uncomplicated cases of diarrhea, pneumonia, and malaria and referring severe cases to health facilities.

Despite the success of this strategy in several low-income countries, iCCM programs in many other countries have yet to be implemented or expanded. This is partly due to concern or uncertainty about the costs and financing of iCCM programs as well as the quantitative health outcomes that will result from the investment. A comprehensive understanding of costs and financing as they relate to results will help countries who are considering implementing or expanding iCCM programs to advocate for donors and ministries of finance to allocate sufficient funds to appropriate levels of the health system to achieve improved health outcomes. It will also allow for costs to be better monitored and controlled, thus ensuring sufficient use of scarce resources.

The Bill and Melinda Gates Foundation funded MSH to conduct cost analysis of iCCM programs in several African countries – Cameroon, Democratic Republic of Congo, Sierra Leone, South Sudan and

Zambia.[1] The results of these analyses can be compared with impact evaluations of these same programs to get an idea of the cost of achieving the impact and can serve as a set of baseline studies for future analyses. This report describes the results of the costing analysis in DRC of an iCCM program implemented by Population Services International (PSI) in Sud-Ubangi district.

Background and Country Context

The health system in the DRC is divided into three distinct hierarchical levels. The central level is led by the Office of the Minister of Public Health and its 13 directorates and 52 specialized programs. At the intermediate level there are 11 provincial inspections which are then divided down to 65 geographic health districts. At the peripheral level within the health districts, there are a total of 515 health zones, 393 general reference hospitals, and 8,266 health centers. With only Over half of all the health zones in DRC are supported by either faith-based organizations (FBOs) or non-governmental organizations (NGOs). While the overall structure remains in the public system with the FBO and NGO support, the MoPH often will only pay government staff salaries and certain bonuses known as *primes*. FBOs and NGOs often take on much of the administrative financial burden to support the operations of the health zones including training, medication, salary, equipment, and additional *primes* costs.

Despite progress and increased investment in recent years to address extremely high infant- and under-five mortality rates in DRC, challenges continue to remain and the country has the fifth highest under-five mortality rates in the world. In 2007, the infant mortality rate was 92 per 1,000 live births and the under-five mortality rate was 148 per 1,000 live births.[2] To specifically target these high rates among children under five, DRC has implemented a national iCCM program.

Training and pilot implementation of the national iCCM program in the DRC began in 2005 under the leadership of the Ministry of Public Health (MoPH). Building on the lessons learned through inter-country exchanges from iCCM implementation in Senegal, the MoPH collaborated with the German Technical Cooperation (GTZ), the International Rescue Committee (IRC), and UNICEF, to finance the launch of iCCM programs in three targeted pilot health zones (HZs); Kenge HZ in Bandundu Province, Demba HZ in Kasaï Occidental, and Mont Ngafula HZ in Kinshasa. With initial trainings of trainers and CHWs from 2005-2007, the DRC national iCCM program began to scale-up and by 2009 ten out of the eleven provinces in DRC had active iCCM work reaching 78 of the 515 HZs[3].

In 2010 the services provided under iCCM were modified and expanded with family planning services (including contraceptive distribution) launching in 6 HZs led by the National Reproductive Health Program (NRHP) and the National Diarrheic Diseases Control Plan (NDDCP) in collaboration with USAID-funded projects AXxes and Maternal and Child Health Integrated Program (MCHIP). Additionally the MoPH mandated that malaria treatment be integrated at community sites with

[1] The reports can be found at http://www.msh.org/our-work/health-systems/health-care-financing/costing-of-health-services

[2] Based on Demographic Health Survey of 2007; results for 2013 DHS are not yet available.

[3] Maternal and Child Health Integrated Program (MCHIP). Integrated Community Case Management of Childhood Illness: Documentation of Best Practices and Bottlenecks to Program Implementation in the Democratic Republic of the Congo. January 2012.

pneumonia and diarrhea treatment services. The integration of this comprehensive package of services under iCCM was implemented in Sud-Ubangi District, Equateur Province, in 2009 with Canadian International Development Agency (CIDA) funds by the local affiliate of Populations Services International (PSI), Association de Santé Familiale (ASF). The ASF project supports 9 of the 16 HZs of in the district and is the focus of this iCCM program costing analysis.

The iCCM program in DRC relies on the voluntary unpaid work of CHWs, or community relays. There are currently two types of community relays in DRC. The first subset is the *Relais de Site* (RS – or more commonly known as RECO for *relais communautaire dispensaire des soins*) who are formally trained in treating and managing pneumonia, malaria, and diarrhea cases at the community level. The second subset of community relay is the *Relais Promotionnel* (RP – or more commonly REPRO) who do not directly provide treatment, but support awareness campaigns through community mobilization and information, education and communication activities at the village level. This costing analysis will focus on all costs associated with RECOs only, as they are the providers of iCCM services.

RECOs are selected by the local population as volunteers to bring health services directly to the families at the community level for the provision of a basic integrated care package and the referral of complicated cases to the nearest health center as necessary. It is expected that these volunteers will dedicate an adequate amount of time to fulfilling this role on a regular basis. Many continue to work in the fields or a shop to maintain a living by other means outside of their health work and indeed, among the criteria required for the selection of a RECO is the consideration of steady income sources outside of their unpaid community health work.

National norms in DRC dictate that a RECO should cover 10-15 families and that two RECOs provide services to a grouping referred to as a *site de santé*[4], or a health site. It is expected that the two appointed RECOs would divide their hours such that one is available at any given time for the health site while either conducting house visits in the community or remaining available in their own home for visits.

RECOs attend a week-long orientation training session at the health center at the start of their work to develop their capacity to identify and treat uncomplicated cases of pneumonia, malaria, and diarrhea. Trainings are led by trainers from a provincial or district-level pool of trainers. In addition to orientation trainings, semi-annual refresher or specialized training sessions are expected to be held at the health center to ensure the continuing education of the RECOs and the dissemination of improved techniques or treatment norms.

The essential link between the RECOs and primary health services is the *infirmier titulair*e (IT, or nurse in-charge) at the health center. The ITs are trained in iCCM and provide supportive supervision to the RECOs on a regular monthly basis. In addition, the RECOs attend monthly meetings at the health center to validate their data and monthly reports with the ITs, and to stock up on medications.

Supervision structures for RECOs are in place from the central and district level on a quarterly basis, with monthly supervision conducted from the zone level. In the Sud-Ubangi district of the Equateur

[4] This is sometimes also referred to as an *aire de santé* and refers to a defined geographical area of a given number of villages or communities that benefit from combined services.

province, ASF works with 9 of the 16 health zones supporting the iCCM program through trainings and supervision sessions. Under this program central-level supervision visits were conducted by ASF staff from Kinshasa, while district and zone supervision is provided by government staff from their respective levels accompanied by a team from ASF.

Methodology

Tool Design

The DRC iCCM costing model was adapted from the generic iCCM Costing and Financing Tool developed by under the USAID-funded Translating Research into Action (TRAction) project.[5] It covers all aspects of the vertical program, comprising start-up costs, service delivery costs at the community level, and support, supervision, and management costs at all levels of the health system. Additionally, the tool has a financing element that can be used to show and project financing sources. The tool covers the three key iCCM interventions (diarrhea, pneumonia, and malaria). At the service delivery level, it is a bottom-up activity-based costing tool, in which costs are built up by type of resource (such as medications) based on an estimated number of services. Other costs, such as supervision and training, are allocated using a top-down methodology. The tool uses standard treatment protocols as the base for the standard costs. DRC uses national protocols adapted from the WHO guidelines on iCCM which ASF has implemented as well.

The tool contains a need norms section that uses incidence rates to estimate the expected caseload for the population targeted by the iCCM program. The user can also input the actual number of iCCM cases treated in the baseline year, and then estimate the costs of providing these services based on the standard cost assumptions.

The user also inputs assumptions into the tool about CHW availability, so that the number of projected services can be constrained by the number of available CHW work hours. Therefore, the tool can estimate the number of CHWs required based on their availability and the disease burden; alternatively, the number of CHWs can be inputted manually by the user or calculated based on a per population or a per village basis. For the present analysis in DRC, only RECOs were considered as CHWs as REPROs focus on awareness campaigns and do not provide treatment or direct health services.

Costs were calculated using a mix of actual and standard data. For example, actual salaries were collected to determine supervision costs, but standard estimates for staff time spent on supervision were used to arrive at the total supervision cost. For trainings and meetings, the actual costs of each were applied to the normative number of each occurrence. For example, actual cost inputs for the monthly RECO data verification meetings were determined and multiplied by 12, assuming that all monthly meetings occur as planned. For medications and supplies, we assumed that all iCCM cases will

[5] See http://tractionproject.org/content/integrated-community-case-management-costing-financing-tool or http://www.msh.org/resources/integrated-community-case-management-costing-financing-tool

be treated according to protocol, and the costs of medicines were calculated accordingly.[6]

Data Collection

Data for this analysis were collected at two levels: first, at the central level, from relevant iCCM implementing agencies and Ministry of Health departments; and second, at the health center and village level, through questionnaires administered to CHWs and their supervisors. Please note that CHWs providing iCCM services will be referred to as "RECOs" throughout the remainder of this document.

Central and Partner Level Data Collection

The main purpose of the data collection at central and partner level was to gather assumptions on the standard costs of implementing the iCCM program. All standards, norms, and protocols were collected from ASF and, where relevant, from the Ministry of Health.

The scope of this costing study focused on the iCCM program being implemented by Association de Santé Familiale (ASF)[7] in Sud-Ubangi district. Data were collected from ASF's headquarters in Kinshasa, with the participation of staff based in the Sud-Ubangi field office in Gemena. Data collected from ASF included iCCM program information, standard treatment protocols, population coverage, prices of equipment and medicines, and management, supervision, meeting and training costs. While the scope of this study was limited to the areas covered by ASF's program, we attempted to include all relevant costs of the program, including costs that were not directly incurred by ASF. For example, part of the supervision of RECOs is performed by the ITs of health centers; the salaries for these staff are paid by the government of DRC and we included these staff costs in the costing.

All program costs funded directly by ASF were input into the tool and any relevant ASF policies were followed. For example, per diems may vary by region and by donor, but we limited our assumptions to the per diems paid by ASF. Finally, ASF management costs are also taken into account. This can include management and administrative staff costs, drivers, and office overhead costs.

Facility and Village Clinic Data Collection

The purpose of the data collection at the facility and village level was twofold: first, to serve as a 'reality check' that will provide on-the-ground context for the costing study; and second, to provide additional information on the RECOs' time, availability, and activities, which are not standardized.[8] See Annex C for the RECO questionnaires.

Due to logistical constraints and security concerns, data collection at the community level was not conducted by MSH staff, but rather by ASF staff. To capitalize on the capacity building opportunity with the ASF partners, a 5-day training and working session was conducted in Kinshasa for three field staff

[6] As a result, drug stock-outs are not taken into consideration in the iCCM Costing and Financing Tool.
[7] ASF is the local affiliate of Population Services International (PSI) in DRC.
[8] Since RECOs are volunteer health workers, they are not expected to adhere to standardized working hours, for example.

from ASF working on the iCCM program in the Sud-Ubangi District of Equateur Province. During these training sessions the ASF team was introduced to the iCCM Costing and Financing tool and methodology. During working sessions with the ASF teams, the tool and questionnaires were adapted to the specific context of the ASF project and the component of the iCCM program it supports.

Following the training sessions in Kinshasa, the ASF team returned to the Sud-Ubangi District and conducted interviews with 33 RECOs from four of the HZs (Libenge, Mawuya, Mbaya, and Ndage). In all but the Libenge HZ, HZ information was gathered from 4 *aires de santé* (see Annex A for detailed list of areas sampled). The sample size was determined based on the feasibility and convenience of the locations for rapid implementation and within budget constraints. Nevertheless it was deemed sufficient for the purpose.

Assumptions and Standard Data Input into the DRC Model

Period of Analysis

For this analysis, we used actual data for 2012 and the projection assumptions for 2013-2017 were largely based on input from ASF staff.

Data for 2012 were used because that was the most recent complete year at the time the data collection visit took place in June 2013.

iCCM Package of Services

RECOs are trained to identify and treat non-severe cases of diarrhea, pneumonia, and malaria. In addition, they can assess and provide counseling for cough and malnutrition. In the event of any danger signs, the RECOs should refer the patient to the nearest health center. Table 1 below shows a summary of the treatment protocols and treatment times for each intervention in the iCCM package. Suspected pneumonia cases were assessed for rapid breathing using a timer; positive cases were given antibiotics, and negative cases were designated as 'cough' and provided counseling on better feeding practices. Suspected malaria cases – all children with fever – were treated presumptively with ACTs. Rapid diagnostic tests were not being used.

Table 1: Treatment protocols and costs for diarrhea, pneumonia, and malaria (US$)

	Standard time to treat one patient (minutes)	Medicines/supplies needed	Average medicine cost per episode (US$)
Diarrhea	20	ORS, Zinc	0.58
Pneumonia	33	Co-trimoxazole (480 mg)	0.10
Malaria	16	ASAQ/ACT	0.47

Unit costs of medicines were provided by ASF.

Population and Geographic Coverage Targets

The total population of Sud-Ubangi District in 2012 was 2,542,965, comprising a total of 16 zones. ASF's CIDA-funded iCCM program covers 9 of these zones, which have a total population of 1,412,871. The iCCM program targeted remote areas which were estimated to include 65.5% of the population, or 926,843. See Table 2 below for a detailed break-down of population and geographic coverage figures for 2012-17. If ASF receives additional funding to continue and scale up the iCCM program, it will cover all 16 zones by 2014. The population living in remote areas covered by iCCM in all 16 zones would be 1,668,185.

Children between 2 and 59 months are estimated to make up 14.9% of the total population; on that basis, the iCCM program covered 138,100 children in 2012 and hoped to cover 248,560 children in 2014. An annual population growth rate of 1.03% was used for this analysis.

The geographic areas where RECOs work are called sites, each of which typically includes several villages or communities with limited access to health facilities. Most sites have 2 RECOs that either work together or alternate their duties daily or weekly. In 2012, there were 805 RECOs working in 396 sites; following the norm of 2 RECOs per site ratio closely. ASF estimates that, for the 721 sites in the 16 zones of Sud-Ubangi, 1544 RECOs would be needed.

The average population of a site in 2012 was 2,341, which amounts to 349 children between 2 and 59 months.[9]

Table 2. Population and Coverage Assumptions, Sud-Ubangi District, 2012-2017

	ACTUAL	PROJECTION				
	2012	2013	2014	2015	2016	2017
Number of Zones with iCCM coverage	9	9	16	16	16	16
Number of Health Centers supervising iCCM	126	126	236	236	236	236
Number of Sites providing iCCM	396	396	721	721	721	721
Target population covered by iCCM (all ages)	926,843	936,390	1,668,185	1,685,367	1,702,727	1,720,265
Target population covered by iCCM (2-59 months)	138,100	139,522	248,560	251,120	253,706	256,319
Total Number of RECOs	805	805	1,544	1,544	1,544	1,544

[9] Average population per site calculated by dividing population covered (926,843) by number of sites (396) in 2012

Incidence Rates

Incidence rates are entered in the iCCM Costing and Financing Tool as the number of episodes per child per year. The following rates were provided by ASF as their standard assumptions: 6 episodes of diarrhea per child per year; 8 episodes of pneumonia; and 4 episodes of malaria[10]. ASF could not provide estimates for cough or malnutrition, or the proportion of cases that were referred so we based the figures on the actual numbers of service provided.

The rates for diarrhea and pneumonia reported by ASF were significantly higher than recent regional estimates,[11] and so we opted instead to use incidence rates estimated from prevalence rates reported in the DHS 2007.[12] Considering the large variation in incidence rates across the country, we used figures reported for Equateur Province, in which Sud-Ubangi District is located.

Incidence rates were calculated from prevalence based on the total number of episodes that could occur in a year based on the prevalence in the 2-week period prior to the DHS survey. Therefore, these incidence rates should be considered high-end estimates, and are likely lower in reality. For malaria, incidence rates varied significantly by source. The WHO World Malaria Report 2008 indicated 0.98 episodes of fever suspected as being malaria in children under five. Based on the calculation used for estimating incidence rates from prevalence, children could have up to 5.48 episodes of fever per year. For now we have maintained the ASF estimate for 4 episodes of fever per year; since fever cases are treated presumptively as malaria, this estimate appeared to be the most reasonable based on current data available.

Table 3 shows the summary of incidence rates use in the tool. These may be modified as other data are made available. The tool also allows different incidence rates to be input for each year of the iCCM program – for example, if malaria incidence was expected to decline due to preventive activities, this could be reflected in the tool. However, in this case the incidence rates have been kept constant.

[10] Malaria and fever are used interchangeably by ASF since all fever cases are presumptively treated with ACTs as malaria cases. Therefore the 4 episodes of malaria per child per year are more correctly 4 episodes of fever.
[11] Rudan et al. estimate average incidence of pneumonia in Sub-Saharan Africa is 0.33 episodes per child-year; and Fischer Walker et al. estimate 3.3 episodes of diarrhea per child-year for children under 5 in the WHO Africa region
[12] Demographic and Health Survey, Congo 2007.

Table 3. Incidence Rates for diarrhea, pneumonia, and malaria (episodes per child year)

	Incidence rate used in tool	Source
Diarrhea	2.84	DHS: 14% of children with symptoms of diarrhea in previous 2 weeks
Pneumonia	2.03	DHS: 11% of children with symptoms of pneumonia in previous 2 weeks
Malaria	4.00	ASF estimate
Cough	0.55	No incidence rate available; used proportion of actual cases of cough to total cases treated
Malnutrition	0.05	No incidence rate available; used proportion of actual cases of malnutrition to total cases treated
Referral	0.74	No incidence rate available; used proportion of referrals to total cases treated

Caseload and Service Delivery Targets

Actual caseload data for 2012, were provided by ASF (see Table 4 below). For the projection years, we used percentage targets for the number of episodes of each illness that would be covered by the iCCM program. For example, the 31% service delivery target for diarrhea in 2015 means that 23% of all diarrhea cases that are expected for children in the iCCM program coverage areas would be treated. These targets were determined with the ASF team, based on the current actual performance of the program and what would be feasible in the future.

Table 4. Actual 2012 caseloads and service delivery targets for 2013-17

	ACTUAL	PROJECTIONS				
	2012	2013	2014	2015	2016	2017
Diarrhea	62,155	21%	26%	31%	36%	41%
Pneumonia	72,647	31%	36%	41%	46%	51%
Malaria	124,234	27%	32%	37%	42%	47%
Cough	19,650	31%	36%	41%	46%	51%
Malnutrition	1,369	26%	31%	36%	41%	46%
Referral	18,887	26%	31%	36%	41%	46%

The targets were used in conjunction with the population covered under geographic coverage assumptions, and the incidence rates for each disease, to calculate the expected number of cases treated through the iCCM program each year. For example, 31% service delivery coverage of pneumonia in 2013 would result in 133,941 cases treated using the following calculation: 31% * (2.03 episodes of pneumonia per year) * (139,522 children covered by iCCM in 2013) = 87,562 cases.

We calculated the percentage of iCCM coverage achieved in 2012 year by dividing total iCCM cases treated in 2012 by the expected number of cases for the same year. This resulted in 16% for diarrhea;

26% pneumonia; 22% malaria; 26% cough; 21% malnutrition; and 21% referrals. This means that in 2012 only 16% of the expected diarrhea cases – calculated based on the incidence rates and population covered – were actually treated through the iCCM program. Therefore, a significant proportion of children are still not being reached by the iCCM program, which could be a result of seeking care elsewhere or simply not seeking care.

RECO Availability & iCCM Service Delivery Assumptions

Since RECOs are unpaid volunteer health workers, they are not expected to work a standard number of hours per day or days per year. As mentioned previously, most sites have 2 RECOs working either together or alternating their time so that they can be available anytime upon request. We input the actual number of RECOs currently working in ASF's iCCM program and also the estimated number that would be needed to scale up to all 16 zones in the district. It should be noted that ASF staff estimate an annual attrition rate of 40% for RECOs. This figure is extremely high in comparison to other countries, and as a result, the costs of training replacement RECOs are high.

Based on our questionnaires, RECOs were available to work an average of 53 hours per week on various activities as a community health worker; of these hours, an average of 49 hours per week could be spent specifically on iCCM activities.[13] This amounts to 92% of the time as a RECO spent on iCCM. RECOs unanimously described themselves as available at all times of the day, and all days in the year, since patients are typically brought to their houses for treatment as needed. The iCCM tool uses the 92% figure as a factor to allocate indirect costs, such as for supervision and management, to the iCCM program.

Management, Supervision, Meetings and Trainings

Costs of management, supervision, meetings and trainings were all provided by ASF. Management costs primarily comprise salary costs for any staff involvement in the management or the administration of the iCCM program. Although ASF receives support through PSI's international regional and home offices, we limited the analysis to include only salary costs for staff based in DRC. The salary of each relevant staff member was input into the iCCM tool, together with the percentage of time spent on the iCCM program.

Supervision costs were input into the tool in two ways: first, the salary costs for all staff involved in supervision were considered; and second, the costs of supervision visits were input into the tool. The supervision visit costs included vehicle rental or fuel costs, per diems, lodging costs, etc.

Currently, ASF have 6 zone coordinators based in Sud-Ubangi district that provide supervision across the 9 zones. There are also two M&E officers that manage data and supervise the RECOs' data validation. In addition, the health center IT or nurse in-charge, and occasionally the deputy in-charge, also provide direct supervision to the RECOs. Supervision visits are made monthly and can involve both the ITs and the ASF staff. Some supervision is also provided by Ministry of Health staff based at the district and zonal health offices, and quarterly visits are made by central level ASF staff.

[13] Given that the RECOs are unpaid and have other occupations this estimate seems high.

Meetings are held monthly at the zonal and health centers levels, to validate data from the RECOs and also so that the RECOs can stock up on drugs. RECOs submit monthly reports to the health centers, which are then compiled and sent up to the zone level. The meeting costs are typically relating to per diems and transport reimbursements given to RECOs and their supervisors.

Training costs in the iCCM tool are split between start-up trainings and refresher trainings. Start-up trainings are assumed to occur a single time for each new RECO hired, whereas refresher trainings would be applied to the entire pool of RECOs that are working in a given year. For start-up trainings, we included a training of trainer workshop and the subsequent training of ITs at the health centers, as well as the training of the RECOs to provide iCCM services. Although ASF had planned to conduct refresher trainings for RECOs every six months, in reality this refresher training only occurred a single time, in 2011. We did not, therefore, include these costs for 2012 but we included them for 2013 and onwards, assuming they would be provided.

Analysis

Summary of findings from RECOs interviewed

A total of 33 RECOs were interviewed representing four health zones in the Sud-Ubangi district. Each RECO came from an individual site and represented 16 *aires de santé* (See Annex A). No REPROs were included in this sampling as they do not provide iCCM services, and all RECOs provide exclusively iCCM services.

RECOs spent an average of 6.6 days providing health services per week, working an average of 8.9 hours per day. However, as RECOs are volunteers with no minimum hours per day or days per week for their services, responses varied widely from 5 hours a day for two days a week, to 14+ hours per day for 7 days a week. As previously reported, all RECOs indicated that they were available in their homes and communities to provide services at all times.

All RECOs reported that monthly data verification meetings were held at the health centers, and a majority of them traveled to the health centers twice a month to stock up on medication. In addition to supervision and verification of data, 23 RECOs confirmed that they had received a supervision visit within the past month as expected, while the supervision visits of the remaining 10 RECOs had been conducted 2-4 months prior. This data was confirmed in the RECO supervision logs.

In evaluating the system of referrals and counter-referrals, the team found that 23 RECOs referred cases to the health center if there were any risk factors or warning signs, and all 33 RECOs documented referrals to the health centers. Only 11 RECOs, however, indicated that they ever received counter-referrals from the health centers.

Of the 23 RECOs providing referrals, 18 were able to estimate their time spent on referral cases with an average of 10 minutes. All respondents provided fairly consistent estimates for the time spent by type of case for diarrhea, pneumonia, and malaria. Diarrhea treatment averaged 20 minutes per case (minimum 5 minutes, maximum 30 minutes, median 20 minutes). Pneumonia cases took slightly longer and with a greater variance among respondents with an average 32 minutes per case (minimum 15

minutes, maximum 45 minutes, median 30 minutes). Malaria cases were very consistent with an average treatment time per case of 16 minutes (minimum 10 minutes, maximum 20 minutes, median 15 minutes).

As previously noted, the current standard in DRC is that RECOs are unpaid volunteers; although one RECO interviewed stated that payment in kind (such as a chicken) was occasionally provided by a patient's family.

Utilization

Table 5 shows the utilization figures entered into the iCCM Costing and Financing Tool for this analysis. The actual figures from 2012 were provided by ASF's M&E officer. The projected utilization figures were based on incidence rates, geographic coverage targets, and service delivery coverage targets, as previously described in Tables 2, 3 and 4. There is a significant increase in the catchment population (potential coverage) between 2013 and 2014 due to the estimated scale-up from 9 to 16 zones; as a result, the population of children 2-59 months increases almost two-fold and the projected caseloads increased accordingly.

Table 5. Summary of actual and projected iCCM caseloads and cases per capita, 2012-17

	ACTUAL	PROJECTION				
	2012	2013	2014	2015	2016	2017
Population 2-59 months	138,100	139,522	248,560	251,120	253,706	256,319
Total number of iCCM cases seen						
Diarrhea	62,155	82,613	182,482	220,031	258,334	297,402
Pneumonia	72,647	87,562	181,230	208,595	236,504	264,965
Malaria	124,234	153,418	323,027	376,578	431,198	486,904
Cough	19,650	23,684	49,019	56,421	63,970	71,668
Malnutrition	1,369	1,706	3,615	4,233	4,864	5,507
Referral	18,887	23,535	49,862	58,392	67,093	75,966
Total cases	298,942	372,518	789,236	924,250	1,061,962	1,202,413
Number of iCCM cases seen per capita (children 2-59 months)						
Diarrhea	0.45	0.59	0.73	0.88	1.02	1.16
Pneumonia	0.53	0.63	0.73	0.83	0.93	1.03
Malaria	0.90	1.10	1.30	1.50	1.70	1.90
Cough	0.14	0.17	0.20	0.22	0.25	0.28
Malnutrition	0.01	0.01	0.01	0.02	0.02	0.02
Referral	0.14	0.17	0.20	0.23	0.26	0.30
Total cases per capita	2.16	2.67	3.18	3.68	4.19	4.69

Table 5 also shows the average numbers cases per capita (child 2-59 months). The total was 2.16 in 2012 and, based on the assumptions, is projected to increase to 4.69 in 2017. Of those 2.16 cases per capita in 2012, the figures for diarrhea, pneumonia and malaria were 0.45, 0.53 and 0.90, respectively, with a total of 1.88 cases for the three diseases. According to the incidence rates input into the tool, the total expected episodes of diarrhea, malaria, and pneumonia would be 8.9 cases per child per year. Thus, 21% of the expected episodes of diarrhea, pneumonia and malaria were treated by RECOs in 2012. According to the projections, by 2017 this figure would increase to 53%.

The number of RECOs and cases treated per RECO are shown in Table 6. Based on ASF records, there are currently 805 RECOs covering 396 sites in 9 zones. If the iCCM program is scaled up to cover all 16 zones in Sud-Ubangi, ASF estimates that a total of 1,544 RECOs would be required. At the current level of utilization, RECOs treated an average of 7 cases per week. Increasing the utilization rate based on the targets detailed earlier would result in an increased caseload for the RECOs to approximately 15 cases per week by 2017.

Table 6. Number of RECOs and cases treated per RECO, 2012-17

	ACTUAL	PROJECTION				
	2012	2013	2014	2015	2016	2017
Total Number of RECOs	805	805	1,544	1,544	1,544	1,544
Total Number of iCCM Services	298,942	372,518	789,236	924,250	1,061,962	1,202,413
Average Number of iCCM Cases per RECO (year)	371	463	511	599	688	779
Average Number of iCCM Cases per RECO (week)	7.1	8.9	9.8	11.5	13.2	15.0
RECO Per 1,000 Population	0.9	0.9	0.9	0.9	0.9	0.9
RECO per Site	2.0	2.0	2.1	2.1	2.1	2.1

Costs

The iCCM program costs are divided between start-up costs and recurrent costs. Start-up costs are generally incurred at the beginning of the program but may also continue throughout the life of the program—for example, the cost of expanding the program or training new RECOs in iCCM to replace those lost to attrition. Recurrent costs are regularly incurred as part of the running of the iCCM program, such as the cost of medicines, supervision, and management. The costs include government salaries for supervision.

All costs were input into the iCCM Costing and Financing Tool in Congolese Francs (CF). For costs that were provided in US$, these were converted into CF using an exchange rate of 920 CF to 1 US$. No inflation was included and the same exchange rate was assumed throughout. Annual salary increases of 5% were included.

Startup and RECO Training Costs

Start-up costs in this exercise comprise the training and equipping of RECOs. Start-up costs can occur throughout the program as additional RECOs are trained, either due to scaling up the program or to replace those lost to attrition. With the 40% estimated attrition rate for RECOs, this figure will be a significant factor in driving the startup costs of the iCCM program. The start-up costs are shown in Table 7 and are not included as part of the unit recurrent costs per service. In reality, the majority of start-up costs were incurred before 2012, but for simplicity we included the total in the 2012 column. Thus, we assumed that in 2012 the initial batch of 805 RECOs would need to be trained. In the remaining years' cost projections, we included training costs for scaling up from 9 to 16 zones, a program expansion that would require an additional 739 RECOs.

Table 7 shows the total number of RECOs required each year, as well as the additional number of RECOs each year needed to replace those lost to attrition. These figures take into account the policy of having 2 RECOs per site. We estimated the cost of training and equipping the initial 805 RECOs would be $162,382 which is shown in the column headed "2012 and Prior". We also included the estimated cost of replacing 322 RECOs in 2012. The projected scale-up from 9 to 16 zones (396 to 721 sites) as assumed to take place in 2014. This would require an additional 739 RECOs as well as 618 RECOs to replace those lost to attrition, making a total of 1,061 RECOs to be trained and equipped in that year.[14] For the remaining program years, even holding the number of sites and zones constant, an estimated 618 RECOs would need to be trained and equipped each year due to the high loss from attrition.[15]

The average start-up cost per RECO is calculated by dividing the total training and equipment cost by the number of RECOs for each year. This figure begins at $202 per RECO in 2012 and would reduce to US$121 per RECO from 2013 onwards.[16]

[14] It was assumed that the CHW attrition applies even in the same year that CHWs are initially trained, which may not be the case.
[15] It is also likely to have an impact on quality of care and service coverage since experience would be lost.
[16] The cost of training RECOs prior to 2012 included training of trainers, which should not be necessary in subsequent years.

Table 7. Number of RECOs and start-up iCCM Program Costs, 2012-17 (US$) (without inflation)

	ACTUAL	PROJECTION				
	2012 and Prior	2013	2014	2015	2016	2017
Number of RECOs						
Total number of RECOs required	805	805	1,544	1,544	1,544	1,544
Number of replacement RECOs required	322	322	618	618	618	618
Number of RECOs to be trained and equipped	805	322	1,061	618	618	618
Start-up costs						
RECO training	115,815	35,270	116,275	67,710	67,710	67,710
RECO equipment	46,567	3,814	12,567	7,320	7,320	7,320
TOTAL start-up costs	162,382	39,084	128,842	75,030	75,030	75,030
Start-up cost per RECO	202	121	121	121	121	121

Recurrent Costs

Table 8 shows the total recurrent costs for the iCCM program, based on the actual numbers of services provided in 2012 and the coverage targets and other assumptions for the other years, as described earlier. Recurrent costs are split between direct and indirect costs. Since RECOs are volunteers and receive no salary, the only direct costs of iCCM treatments are medicines. Indirect costs comprise management, supervision, meetings, trainings, and program overhead costs. Starting at approximately US$759 thousand in 2012, the annual recurrent program cost would increase to US$1.5 million by 2017. These increases are due to the geographical scale-up, population growth and increases in utilization targets, as well as annual salary increases of 5.0%.

In 2012, supervision cost was the highest cost element, at 47% of total recurrent costs. This would remain the highest element each year but would fall to 45% by 2017. PSI/ASF's operating costs were the second highest element in 2012 at 22% but this would fall over the years as these fixed costs would be spread across more services. The third highest cost element was medicines, at 13% in 2012, but this would rise to 29% by 2017 with the increase in the number of cases treated. Medicine costs are calculated based on the standard medicines required per iCCM service multiplied by the total number of each iCCM service. (See Table 1 for the average medicine cost per service.)

Table 8. Recurrent iCCM program costs, 2012-2017 (US$) (without inflation)

	ACTUAL	PROJECTION				
	2012	2013	2014	2015	2016	2017
Medicines	101,650	128,704	275,619	325,267	375,908	427,558
% of total cost	13%	16%	22%	24%	27%	29%
Management	85,138	89,395	93,864	98,558	103,485	108,660
% of total cost	11%	11%	7%	7%	7%	7%
Supervision	355,017	361,812	623,670	636,010	648,967	662,571
% of total cost	47%	45%	49%	47%	46%	45%
Meetings	52,196	52,196	99,002	99,002	99,002	99,002
% of total cost	7%	6%	8%	7%	7%	7%
Refresher trainings	-	11,879	22,154	22,154	22,154	22,154
% of total cost	0%	1%	2%	2%	2%	1%
Overhead costs	165,784	165,784	165,784	165,784	165,784	165,784
% of total cost	22%	20%	13%	12%	12%	11%
TOTAL	759,784	809,769	1,280,092	1,346,773	1,415,299	1,485,728

Management costs are generally defined as central level or partner organization salary costs for staff involved in managing the iCCM program. This staff does not directly supervise RECOs, but rather provides support to the iCCM program, such as organizing trainings, attending technical working group meetings, or providing administrative support. These costs are calculated by applying a percentage of time spent on iCCM management to the total salary for each staff member. We were informed that five ASF staff were full time on the project and several others spent part of their time on it.

Supervision costs are the costs of staff based in health centers and zone and district health offices who directly supervise RECOs. At the health center level, supervision is done by ITs as well as the zone coordinators. We also included a small amount of time for the MOH staff at the zone and district level who participate in occasional supervision meetings. Based on information provided by ASF, we assumed that three supervisors spent 100% of their time only on iCCM, while several other spent part of their time. It should be noted that this supervision forms a major cost of the program and would be reduced if the supervisors are involved in other activities when the go to the communities. This would be likely if the program is taken over by the government.

Meeting and training costs are based on standard costs of per diems, transportation reimbursements, lodging, training materials, and other related costs. These costs were provided by ASF based on their training budgets. Since no refresher trainings were provided in 2012, there was no recurrent training cost in that year; but we have assumed in the remaining years that trainings will be provided according to the standard.

Overhead costs include the costs of reproducing materials for iCCM (registers, data management tools, etc.); communications costs; related office costs; and vehicle maintenance and fuel costs.

Table 9 shows the average annual recurrent cost per capita and per RECO by program year. The average cost per capita is calculated by dividing total recurrent costs by total population—expressed as both per capita for children 2-59 months and per capita for the entire population within the target coverage areas. The cost per child aged 2-59 months starts at US$5.50 in 2012 and increases to US$5.80 by 2017. This increase in under-five cost per capita occurs because we assumed that the child will receive a greater average number of services each subsequent year. As shown in Table 5, the child receives an average of 2.2 services per year in 2012, this figure increases to 4.7 services per year in 2017. The high rate of inflation used is also a factor. For the entire population, the average per capita cost starts at US$0.82 in 2012 and increases to US$0.86 by 2017.

The recurrent cost per RECO, calculated by dividing the total recurrent cost by the total number of RECOs each year, begins at US$944 in 2012 and increases to $962 by 2017. Supervision cost per RECO is also shown, and this is calculated by dividing the total costs related to supervision (supervisor salaries and supervisory visits) by the total number of RECOs per year. The supervision would begin at US$441 in 2012 and fall to US$429 by 2017.

Table 9. Recurrent cost per service, per capita, and per RECO, 2012-2017 (US$) (without inflation)

	ACTUAL	PROJECTION				
	2012	2013	2014	2015	2016	2017
Total recurrent cost	759,784	909,709	1,633,253	1,954,035	2,343,960	2,817,969
Average cost per capita (2–59 months)	5.50	5.80	5.15	5.36	5.58	5.80
Average cost per capita (total population)	0.82	0.86	0.77	0.80	0.83	0.86
Average supervision cost per RECO	441	449	404	412	420	429
Average recurrent cost per RECO	944	1,006	829	872	917	962

Table 10 shows the recurrent cost per individual service in the iCCM package. As mentioned previously, direct variable costs, comprising medicine costs, increase with each additional service provided. Fixed costs, such as management and supervision, do not vary with the volume of services provided, but may vary as a result of adding more RECOs or scaling up to additional districts. Thus, although cough, malnutrition and referral are not treated with medicines and have no medicine cost, there is still a cost per service due to the fixed costs being allocated across all services. Fixed costs are allocated on the basis of each service's total treatment time (the time to treat one case multiplied by the volume of cases).

In 2012, the most costly service was pneumonia, at US$3.55 per service, followed by diarrhea at US$2.70 per service, malaria at US$2.17 per service, cough at US$2.08 per service, malnutrition at US$2.08 per service, at referrals at US$1.10 per service. These figures decrease steadily between 2012 and 2017 due to economies of scale.

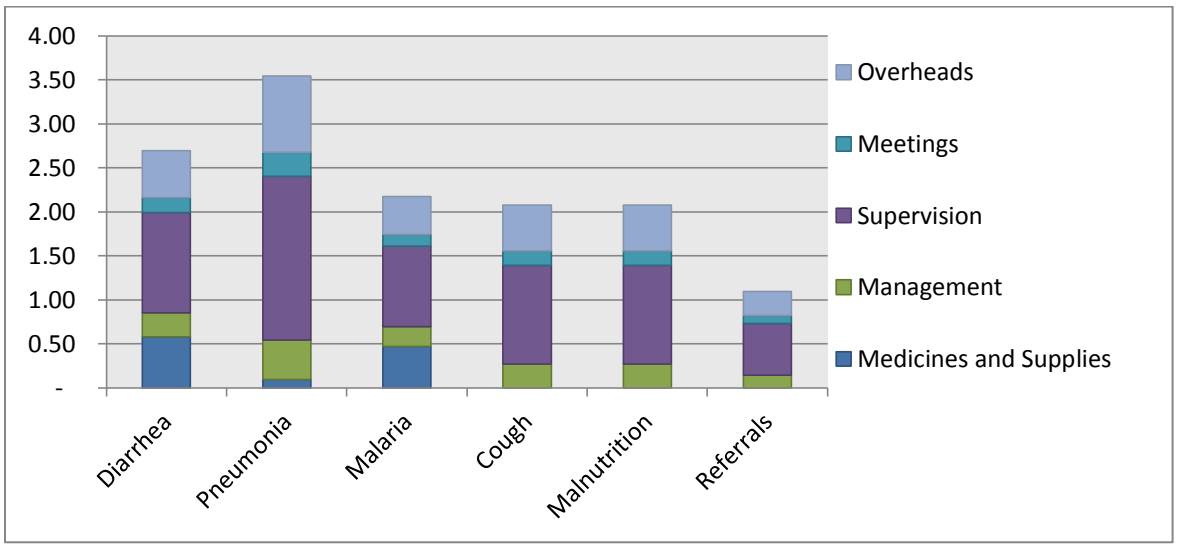
Table 10. Recurrent cost per iCCM service, 2012-2017 (US$) (without inflation)

	BASELINE	PROJECTION				
	2012	2013	2014	2015	2016	2017
Diarrhea	2.70	2.35	1.81	1.65	1.53	1.43
Pneumonia	3.55	2.97	2.10	1.84	1.65	1.49
Malaria	2.17	1.89	1.46	1.33	1.24	1.16
Cough	2.08	1.73	1.21	1.05	0.93	0.84
Malnutrition	2.08	1.73	1.21	1.05	0.93	0.84
Referral	1.10	0.91	0.64	0.56	0.49	0.44

Figure 1 below shows the cost per service for 2012 in more detail, splitting between direct variable costs (medicines) and fixed costs (management, supervision, training, and overheads).. Fixed costs contribute significantly to the cost per service. For all services, supervision was the main driver of cost per service, comprising well over half the total cost. Direct variable costs of diarrhea and malaria were each approximately US$0.50, whereas pneumonia had a much lower direct cost due to the relatively inexpensive treatment used (co-trimoxazole). Cough, malnutrition, and referrals had no medicines cost but as discussed earlier, the fixed costs of training, supervision, management, and overheads are spread across all services provided by the RECOs.

Pneumonia had the highest cost per service because, although the medicines cost was relatively low, the time required to diagnose and treat pneumonia was much higher than that of malaria and diarrhea. Since we allocated the fixed cost per service as a function of the amount of time required to manage each case type, a greater amount of fixed cost was allocated to pneumonia than to the other services. The justification for this result would be that training and supervising a RECO to diagnose and treat pneumonia would require more time and effort than in the other cases.

Figure 1. Cost per service by input, 2012 (US$)



Conclusions

The iCCM program in Sud-Ubangi, implemented by PSI's local affiliate, ASF, covered 9 of 16 health zones in the district in 2012. Although CIDA funding of this program ended in June 2013, we projected the costs for 2013, as if it would continue, and then estimated the costs of scaling up the program in 2014 to cover all 16 health zones in the district and the costs of continuing the program through 2017. The target population of children was 138,100 and is projected to increase to 256,319 by 2017 if the program is maintained and can expand to cover all the health zones. The number of iCCM services per capita was 2.2 in 2012 and is projected to increase to 4.7 by 2017. The services were well utilized, with an average of 7.1 cases seen by a RECO per week in 2012. With increased population and utilization targets this is projected to rise to 15 cases per week. However, the reported RECO attrition rate of 40% per year is a concern, as this level of turnover can impede the quality, maintenance and expansion of services.

The total recurrent cost in 2012 was estimated at US$759 thousand and would increase to US$1.5 million by 2017 (excluding inflation) due to the geographical expansion, increases in utilization targets and population growth. The cost per capita in 2012 was US$5.50 for children between 2 and 59 months and US$0.82 for the total population and these figures are projected to increase to US$5.80 and US$0.86 by 2017. The cost per service in 2012 was US$3.55 for pneumonia, US$2.70 for diarrhea, and US$2.17 for malaria and these costs are projected to fall to US$1.49, US$1.43 and US$1.16, respectively, by 2017. The reductions in costs are mainly due to economies in scale as the high fixed costs are spread across more services.

It is important to note that these are standard costs – i.e., the costs that should be incurred for providing the services. They are not the actual expenditures, with possible exception of some of the overhead costs. In the case of medicines, for example, the cost shown here is the cost of providing the medicines needed for the numbers of services provided. It is not the actual expenditure on medicines. As a result it does not take into account shortages or stock-outs of medicines. This is especially important if the costs are used to compare with impact results, such as in cost per death prevented. In addition, we did not conduct any analysis of bottlenecks and do not know, for example, if there were medicine stock-outs during the year and we assumed that would not occur in the projected years.

The majority of the costs are fixed – supervision, management and ASF overhead costs coming to 80% of total recurrent costs in 2012. While these are projected to fall to 63% by 2017, this is still a significant element of the costs. Most donor-funded pilot projects have high management and supervision costs – this is part of the investment in developing a viable program. If the program is taken over by the government these costs would be expected to fall significantly, for example with supervisors sharing the costs of visits across more community health activities.

The high RECO attrition rate of 40% adds a significant cost to the program, with the annual cost of training and equipping new RECOs projected to be as much as US$75,030 after 2014. This is additional to the recurrent costs described above and would remain a burden for the government if the services are taken over. It will be important to analyze the causes of this problem and develop a viable solution.

References

Basic Support for Institutionalizing Child Survival (BASICS). *Scaling Up Community-Based Treatment in Senegal.* Washington, DC: BASICS and USAID, 2006.

Childhood Diarrhea in Sub-Saharan Africa: Child Health Research Project Special Report. Volume 2, Number 1, April 1998. Accessed from: http://www.harpnet.org/doc/spec2.pdf.

CORE Group, Save the Children, BASICS, and MCHIP. *Community Case Management Essentials: Treating Common Childhood Illnesses in the Community. A Guide for Program Managers.* Washington, DC: CORE Group, 2010.

Enquête Démographique et de Santé, République Démocratique du Congo, 2007. Ministère du Plan avec la collaboration du Ministère de la Santé Kinshasa, République Démocratique du Congo.
Macro International Inc. Calverton, Maryland, USA. August 2008

Fischer Walker, Christa, Jamie Perin, Martin J Aryee, Cynthia Boschi-Pinto, and Robert Black. "Diarrhea incidence in low- and middle-income countries in 1990 and 2010: a systematic review." *BMC Public Health* (March 2012) 12:220. http://www.biomedcentral.com/1471-2458/12/220.

Integrated community case management of childhood illness: Documentation of Best Practices and Bottlenecks to Program Implementation in the Democratic Republic of Congo (DRC). USAID/MCHIP. January 2012.

International Drug Price Indicator Guide, accessed from: http://erc.msh.org/mainpage.cfm?file=1.0.htm&id=6119&temptitle=Introduction&module=dmp&language=English

Jarrah, Z., Lee, A., Wright, K., Schulkers K, and D. Collins 2013. *Costing of Integrated Community Case Management in Rwanda.* Submitted to USAID by the TRAction Project: Management Sciences for Health.

Jarrah, Z., Lee, A., Wright, K., Schulkers K, and D. Collins 2013. *Costing of Integrated Community Case Management: Malawi.* Submitted to USAID by the TRAction Project: Management Sciences for Health.

Jarrah, Z., Wright, K., C. Suraratdecha, and D. Collins 2013. *Costing of Integrated Community Case Management: Senegal.* Submitted to USAID by the TRAction Project: Management Sciences for Health.

Lukacik, Marek, Ronald L. Thomas, and Jacob V. Aranda, "A Meta-analysis of the Effects of Oral Zinc in the Treatment of Acute and Persistent Diarrhea." *Pediatrics* 121 (Feb. 2008): 326–36. http://www.pediatrics.org/cgi/doi/10.1542/peds.2007-0921.

Morel, C., Ngo Duc Thang, Nguyen Xuan Xa, Le Xuan Hung, Le Khan Thuan, Pham Van Ky, Annette Erhart, Anne J Mills and Umberto D'Alessandro. "The economic burden of malaria

on the household in south-central Vietnam." *Malaria Journal* 2008, 7:166

One Million Community Health Workers: Technical Task Force Report. New York: The Earth Institute, Columbia University, 2011.

Prise en charge intégrée des maladies de l'enfant. Sites des soins communautaires : Guide de mise en œuvre. République Démocratique du Congo, Ministère de la Sante, Secrèterait General; 2007.

Rudan, Igor, Cynthia Boschi-Pinto, Zrinka Biloglav, Kim Mulholland, and Harry Campbell. "Epidemiology and Etiology of Childhood Pneumonia." *Bulletin of the World Health Organization* 86 (May 2008): 321–416.

Rudan, Igor, Katherine L. O'Brien, Harish Nair, Li Liu, Evropi Theodoratou, Shamim Qazi, Ivana Lukšić, Christina L. Fischer Walker, Robert E. Black, and Harry Campbell. "Epidemiology and etiology of childhood pneumonia in 2010: estimates of incidence, severe morbidity, mortality, underlying risk factors, and causative pathogens for 192 countries." *Journal of Global Health* 3(1) (June 2013): 010401. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3700032/.

Annexes

Annex A. Zones, Health Centers and Sites Sampled

Annex B. People Contacted

Annex C. RECO Questionnaire

Annex D. Monthly RECO Reporting Form

Annex E. iCCM Guidelines for RECOs

Annex A. Zones, Health Centers and Sites sampled for RECO Questionnaires

Health Zone	*Aire de santé*	Community Health Sites
Libenge	Bomutu	Bogilazo Bomanga Bodala
	Cecu	Mbetou Libenge Kete Bosonzimbelo
	Boyabu	Kpagwa Gbokozo Boduko
Mawuya	Lebo	Motombi Malongo
	Libanda	Mongomba Balamo
	Tipo	Mabu-Tao Wasa Ambumawuli
	Kwala	Yamuya Lisingo
Mbaya	Gwi	Mbeti Kuma Sumba
	CS Pilote Mbaya	Baguma
	Kpokor	Mala Bango
	Mbele	Ngbulutu Konyo Gibi
Ndage	Banda	Timbangi Ngwele Ngabo II Lingu
	Likimi	Keto
	Urungbu	Kwado Gbuku II
	Katara	Sengabo Boimili I

Annex B. People Contacted

Name	Title, Organization
Yves Cyaka	PSI
Chrestien Yameni	Malaria Program Manager, ASF
Ricky Ilunga	Monitoring and Evaluation Officer, ASF
Dominique Mukala	iCCM Field Supervisor ZS Libenge, ASF
Papy Bondjembo	iCCM Field Supervisor ZS Ndage, ASF
Jane Miller	PSI
Ashley Kowal	PSI
Lekangeko Marie Anne	RECO, Ndage - Gbuku II
Saba Bamolona	RECO, Ndage – Keto
Penze Nzaba	RECO, Ndage – Sengabo
Ngoya Lato	RECO, Ndage – Boimili I
Mbela Mbolo	RECO, Ndage – Timbangi
Twasele Nyoka	RECO, Ndage – Ngwelengabo II
Silamba Yeda	RECO, Ndage – Kwado
Mbaso Yako	RECO, Ndage – Lingu
Alesongoni Mathieu	RECO, Mbaya – Kumasumba
Atimbima Seraphine	RECO, Mbaya – Mbeti
Ahonzie Bosco	RECO, Mbaya – Baguma
Basoki Mokondo	RECO, Mbaya – Ngbulutu
Azuda Kosanya	RECO, Mbaya – Mala Bango
Likwa Awolo	RECO, Mbaya – Gibi
Leseba Celestin	RECO, Mbaya – Konyo
Gelewi Tombo	RECO, Libenge – Bomanga
Wedia Gaspard	RECO, Libenge – Bodala
Elie Kpalafio	RECO, Libenge – Bogilazo
Freddy Batonyongo	RECO, Libenge – Mbetou
Momi Tehobalth	RECO, Libenge – Bosonzimbelo
Kwagidi Papy	RECO, Libenge – Libenge-Kete
Pascal Monzo	RECO, Libenge – Kpagwa
Lembongo Kitoko	RECO, Libenge – Gbokozo
Sengbio Pascal	RECO, Libenge – Boduko
Metshumba	RECO, Mawuya – Malongo
Dayo	RECO, Mawuya – Motombi
Ndawasa	RECO, Mawuya – Wasa

Matumba	RECO, Mawuya – Ambunawuli
Nwagbanda	RECO, Mawuya – Mabu Tao
Liyabo	RECO, Mawuya – Lisingo
Wokpebuma	RECO, Mawuya – Yamuya
Yesua	RECO, Mawuya – Mongomba
Ango	RECO, Mawuya - Balamo

Annex C. RECO Questionnaire

QUESTIONNAIRE POUR LE RELAIS COMMUNAUTAIRE (RECO)

Date de l'entretien:
Nom de la personne qui administre le questionnaire:
Lieu de l'entretien:
Nom de la personne interrogée:
Sexe (M/F):
Nom de la zone:
Nom du district:
Nom de la communauté / du site:
Centre de santé de supervision:
Mois/année à la quelle le RECO a commencé a fournir des services iCCM:
A quelle heure l'entretien a-t-il démarré?
Période d'analyse:
Date de début (MM/YY)
Date de début (MM/YY)

A) Zone desservie	
1)	Population desservie (zone de rayonnement) du RECO
2)	S'il y a plus qu'un RECO, les RECO se partagent-ils la population?
2a)	SI OUI: population desservie (zone de rayonnement) - PAR RECO
3)	Nombre total de foyers - VILLAGE
3a)	S'IL Y A PARTAGE: nombre total de foyers - PAR RECO
3b)	Quel est le nombre de foyers couverts par cet RECO?

B) Disponibilité du temps et contacts	
1)	Combien d'heures par jour travaillez-vous comme RECO?
1a)	Est-ce que vous rester tout ce temps au site ou bien vous effectuez des visites de suivi?
2)	Combien de jours par semaine?
3)	Comment est-ce que vous alternez avec l'autre RECO?
4)	Quelles sont les activités qui vous font sortir du site dans le cadre de votre travail?
	Pour chaque activité, où vous rendez-vous?
	Pour chaque activité, combien de temps vous prend le déplacement à faire?

	Pour chaque activité, le déplacement est-il lié à vos activités générales en tant qu'RECO? Ou est-il lié au CCM?
5)	Remplir le modèle de répartition du temps du RECO

C) Supervision	
1)	A quelle fréquence vous rendez-vous au centre de santé pour la validation des données?
2)	A quelle fréquence vous rendez-vous au centre de santé pour vous approvisionner des médicaments?
3)	Combien de temps vous prend pour aller au centre de santé?
4)	Consacrez-vous toute la journée au voyage?
5)	Quand était la dernière fois que vous avez reçu une visite de supervision? (voir cahier de supervision)

D) Formation/réunions

1) Se référer au modèle de formation/réunion et le remplir

E) Reportage	
1)	Evaluer le nombre de jours par mois que vous consacrez à la compilation de votre rapport mensuel?
2)	Lorsqu'un patient est référé au centre de santé, est-ce que vous l'enregistrez?
	SI OUI: Comment procédez-vous pour l'entregistrement? (Rapport mensuel, fiche de référence, fiche prise en charge, etc.)
	Est-ce que vous recevez les contres références quand vous referez un patient au centre de sante?
3)	Comment enregistrez-vous la visite d'un enfant malade dont le diagnostique a montré qu'il a la Diarrhée, le paludisme, ou la pneumonie?

F)Durée du IMCI par service	
	Lister les types de services fournis et le temps approximatif passé dans chaque cas
1)	CCM - Diarrhée (min)
2)	CCM - Pneumonie (min)
3)	CCM - Paludisme (min)
4)	Orientation de patient au centre de santé :
	A quel moment un cas est-il référé au centre de santé, comment procédez-vous? *[Les accompagnez-vous au centre de santé? Patientez-vous avec le patient?]* *[Enregistrez-vous ces patients de manière différente dans certains cas?]* *[Dispensez-vous un traitement particulier avant de le référer?]*
	Offrez-vous un traitement de base à un cas qui est renvoyée au centre de sante? *[paracétamol, etc.]*

	Combien de temps passez-vous avec un cas qui est référé?

G) Activités périodiques des RECO	
1)	Participez-vous à des évènements périodiques supplémentaires, tels que les campagnes de vaccination, distributions de moustiquaires, etc.?
2)	Lister chaque évènement, durée, fréquence, etc.

H) Médicaments, fournitures et équipements	
1)	Pour les médicaments suivants, avez-vous reçu le médicament tous les mois au cours du dernier trimestre, et avez-vous eu une rupture de stock?
a	Kit Vert
b	Kit Orange
c	Cotrimoxazole 1
e	Cotrimoxazole 2
e	Cotrimoxazole 3
f	ACT 1
g	ACT 2

2)	Avez-vous reçu ces fournitures lorsque vous avez commencé à travaillé en tant que RECO?
a	Caisse a médicaments
b	Minuteur
c	Lampe torches + piles
d	Cahier RUMER
e	Cahier Regsitre
f	Stylo
g	Autre?

I) Motivations	
2)	Recevez-vous des motivations "en nature"?
2a)	Si oui, quel sorte de motivations en nature?
2b)	Si oui, de qui?

LISTE DE CONTRÔLE DU NIVEAU COMMUNAUTAIRE pour les collecteurs de données
Registres des malades, cahiers recettes d'utilisation des médicaments, bon d'entrée/sortie des médicaments, fiche individuel de prise en charge, bons de référence
Vérifier les rapports d'activités mensuelles

A quelle heure la personne qui a administré le questionnaire a-t-elle conclus l'entretien?
Quelle a été la durée (minutes/heures) de l'entretien?

Annex D. Monthly RECO Reporting Form

RAPPORT MENSUEL D'ACTIVITES DU SITE DE SOINS COMMUNAUTAIRES

MOIS…… **ANNEE**……

ZONE DE SANTE de …… **AIRE DE SANTE de**……

SITE DE SOINS de …… **Villages du Site**……

Population totale du Site :…… **habitants.**

Activités	Nombre	Décès au site
Nouveaux Cas- NC TOTAL reçu au cours du mois		
Nbre TOTAL d'enfants reçu au cours du mois		
Nbre d'ancien cas du mois		
Nbre de référés		
Nbre de Contre- référés		
Statut Nutritionnel		
Poids Vert (V)		
Jaune (J)		
Rouge (R)		
….. **CPS** (OUI)		
….. **Vit A** (OUI)		
….. **PEV** (OUI)		
Nombre de supervisions reçues de l'Infirmier titulaire		
Nombre de supervisions reçues du Bureau Central de la ZS		
Nombre de réunions tenues avec le comité local/Cogesite		
Nombre de visites à domiciles réalisées		
Nombre de décès d'enfants de 0-5 ans déclarés par la Communauté dans l'Aire du Site.		

Classifications des cas :	Nombre total du mois
1. Signe de danger ou d'alerte / cas référés	
2. Fièvre / Paludisme	
3. Diarrhée	
4. Toux ou Rhume	
5. Pneumonie	
6. Malnutrition	
TOTAL	

Gestion des médicaments et recettes.					
N°	**Médicaments**	**Nbre de jours de rupture de stock**	**Quantité au début du mois plus les**	**Quantité consommée**	**Quantité à la fin du mois**

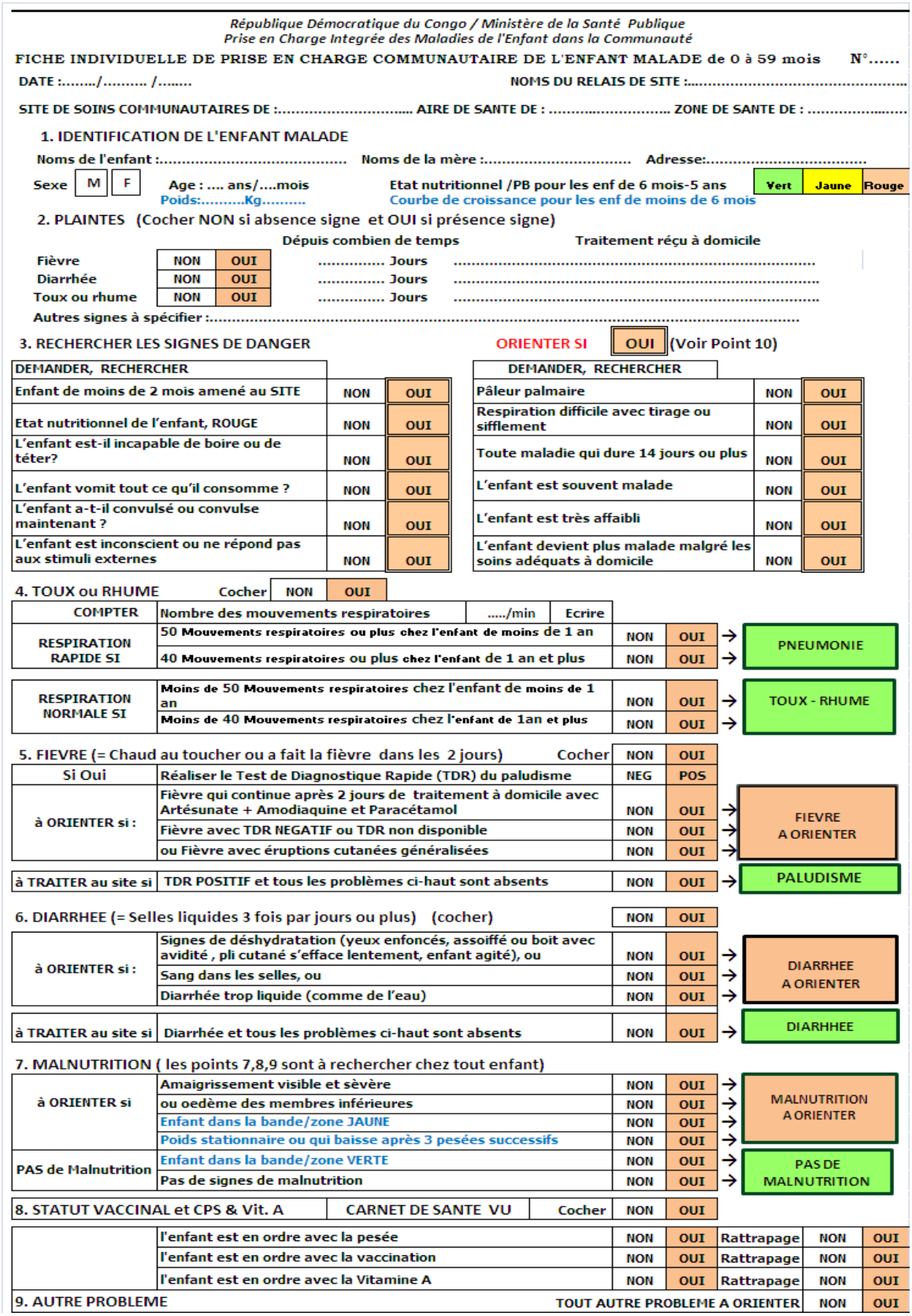
			entrées du mois		
1	ASAQ **25mg/67,5mg**				
2	ASAQ **50mg /135mg**				
3	Kit SRO ZINC ® (**2s+5cès**)				
4	Kit SRO ZINC ®(**2s+10cès**)				
5	Cotrimoxazole 400/80mg (**sachet de 3cès**)				
6	Cotrimoxazole 400/80mg (**plaquette de 5cès**)				
7	Cotrimoxazole 400/80mg (**plaquette de 10cès**)				

Date : **Noms et signature du relais de site :**

Noms et signature du membre de Cogesite

Noms et signature de l'infirmier titulaire de l'aire de santé

Annex E. iCCM Guidelines for RECOs



République Démocratique du Congo / Ministère de la Santé Publique
Prise en Charge Integrée des Maladies de l'Enfant dans la Communauté

FICHE INDIVIDUELLE DE PRISE EN CHARGE COMMUNAUTAIRE DE L'ENFANT MALADE de 0 à 59 mois N°.....

DATE :...../..... /..... NOMS DU RELAIS DE SITE :.....

SITE DE SOINS COMMUNAUTAIRES DE :..... AIRE DE SANTE DE : ..... ZONE DE SANTE DE : .....

1. IDENTIFICATION DE L'ENFANT MALADE

Noms de l'enfant :..... Noms de la mère :..... Adresse:.....

Sexe M F Age : .... ans/....mois Poids:.....Kg..... Etat nutritionnel /PB pour les enf de 6 mois-5 ans | Vert | Jaune | Rouge | Courbe de croissance pour les enf de moins de 6 mois

2. PLAINTES (Cocher NON si absence signe et OUI si présence signe)

			Depuis combien de temps	Traitement réçu à domicile
Fièvre	NON	OUI	..... Jours	.....
Diarrhée	NON	OUI	..... Jours	.....
Toux ou rhume	NON	OUI	..... Jours	.....

Autres signes à spécifier :.....

3. RECHERCHER LES SIGNES DE DANGER ORIENTER SI OUI (Voir Point 10)

DEMANDER, RECHERCHER			DEMANDER, RECHERCHER		
Enfant de moins de 2 mois amené au SITE	NON	OUI	Pâleur palmaire	NON	OUI
Etat nutritionnel de l'enfant, ROUGE	NON	OUI	Respiration difficile avec tirage ou sifflement	NON	OUI
L'enfant est-il incapable de boire ou de téter?	NON	OUI	Toute maladie qui dure 14 jours ou plus	NON	OUI
L'enfant vomit tout ce qu'il consomme ?	NON	OUI	L'enfant est souvent malade	NON	OUI
L'enfant a-t-il convulsé ou convulse maintenant ?	NON	OUI	L'enfant est très affaibli	NON	OUI
L'enfant est inconscient ou ne répond pas aux stimuli externes	NON	OUI	L'enfant devient plus malade malgré les soins adéquats à domicile	NON	OUI

4. TOUX ou RHUME Cocher NON OUI

COMPTER	Nombre des mouvements respiratoires	...../min	Ecrire		
RESPIRATION RAPIDE SI	50 Mouvements respiratoires ou plus chez l'enfant de moins de 1 an	NON	OUI →	PNEUMONIE	
	40 Mouvements respiratoires ou plus chez l'enfant de 1 an et plus	NON	OUI →		
RESPIRATION NORMALE SI	Moins de 50 Mouvements respiratoires chez l'enfant de moins de 1 an	NON	OUI →	TOUX - RHUME	
	Moins de 40 Mouvements respiratoires chez l'enfant de 1an et plus	NON	OUI →		

5. FIEVRE (= Chaud au toucher ou a fait la fièvre dans les 2 jours) Cocher NON OUI

Si Oui	Réaliser le Test de Diagnostique Rapide (TDR) du paludisme	NEG	POS	
à ORIENTER si :	Fièvre qui continue après 2 jours de traitement à domicile avec Artésunate + Amodiaquine et Paracétamol	NON	OUI →	FIEVRE A ORIENTER
	Fièvre avec TDR NEGATIF ou TDR non disponible	NON	OUI →	
	ou Fièvre avec éruptions cutanées généralisées	NON	OUI →	
à TRAITER au site si	TDR POSITIF et tous les problèmes ci-haut sont absents	NON	OUI →	PALUDISME

6. DIARRHEE (= Selles liquides 3 fois par jours ou plus) (cocher) NON OUI

à ORIENTER si :	Signes de déshydratation (yeux enfoncés, assoiffé ou boit avec avidité , pli cutané s'efface lentement, enfant agité), ou	NON	OUI →	DIARRHEE A ORIENTER
	Sang dans les selles, ou	NON	OUI →	
	Diarrhée trop liquide (comme de l'eau)	NON	OUI →	
à TRAITER au site si	Diarrhée et tous les problèmes ci-haut sont absents	NON	OUI →	DIARHHEE

7. MALNUTRITION (les points 7,8,9 sont à rechercher chez tout enfant)

à ORIENTER si	Amaigrissement visible et sèvère	NON	OUI →	MALNUTRITION A ORIENTER
	ou oedème des membres inférieures	NON	OUI →	
	Enfant dans la bande/zone JAUNE	NON	OUI →	
	Poids stationnaire ou qui baisse après 3 pesées successifs	NON	OUI →	
PAS de Malnutrition	Enfant dans la bande/zone VERTE	NON	OUI →	PAS DE MALNUTRITION
	Pas de signes de malnutrition	NON	OUI →	

8. STATUT VACCINAL et CPS & Vit. A CARNET DE SANTE VU Cocher NON OUI

	l'enfant est en ordre avec la pesée	NON	OUI	Rattrapage	NON	OUI
	l'enfant est en ordre avec la vaccination	NON	OUI	Rattrapage	NON	OUI
	l'enfant est en ordre avec la Vitamine A	NON	OUI	Rattrapage	NON	OUI

9. AUTRE PROBLEME TOUT AUTRE PROBLEME A ORIENTER NON OUI