The Cost of Integrated Community Case Management in Nguelemendouka and Doumé Districts, Cameroon

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Contents

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Key collaboration was provided by l'Association Camerounaise pour le Marketing Social (ACMS), a local affiliate of Population Services International (PSI). Information on iCCM program costs was gathered in Yaoundé and interviews with community health workers (ASCs – *agents de santé communautaire*) were conducted by MSH staff in Nguelemendouka and Doumé districts in eastern Cameroon(See Annex A for the list of districts, health centers, and sites sampled.)

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Acronym List

ACMS	Association Camerounaise pour le Marketing Social
ACT	Artemisinin-Based Combination Therapy
ASC	Agent de Santé Communautaire
ALRI	Acute lower respiratory infection
ARI	Acute respiratory infection
CFA	Central African Franc
CHW	Community Health Worker
CIDA	Canadian International Development Agency
CMA	Centre Médicaux d'Arrondissement
COGE	Comité de Gestion
COSADI	Comité de Santé
DHMT	District health management team
DHS	Demographic Health Survey
FBO	Faith-based organization
GHI	Global Health Initiative
iCCM	Integrated Community Case Management
MCHIP	Maternal and Child Health Integrated Program
MDG	Millennium Development Goal
MoPH	Ministry of Health
MoPH	Ministry of Public Health
MSH	Management Sciences for Health
NGO	Non-government organization
ORS	Oral rehydration salt
PHU	Primary Health Unit
PSI	Population Services International
RDT	Rapid Diagnostic Test
TRAction	USAID | Translating Research into Action Project
UNICEF	The United Nations Children's Fund
USAID	United States Agency for International Development
USD	American Dollars
WHO	World Health Organization

Executive Summary

Integrated community case management (iCCM), the delivery of timely and low-cost interventions at the community level by community health workers (CHWs), is an effective strategy for expanding access for 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.[1] Despite the success of this strategy in several low-income countries, iCCM programs in many other countries have yet to be implemented or expanded, partly due to concern or uncertainty about the costs and financing of iCCM programs.

To better understand the costs associated with iCCM programs, Management Sciences for Health (MSH), with funding from the Bill and Melinda Gates Foundation, conducted costing studies in five African countries: Cameroon, Democratic Republic of the Congo (DRC), Sierra Leone, South Sudan, and Zambia. This report describes the results of the costing analysis of an iCCM program in Nguelemendouka and Doumé districts in eastern Cameroon, implemented by *l'Association Camerounaise pour le Marketing Social* (ACMS), a local affiliate of Population Services International (PSI).

To conduct the Cameroon iCCM analysis, MSH used a costing model adapted from the iCCM Costing and Financial Tool, which was developed under the USAID-funded Translating Research into Action (TRAction) project. It was not within the scope of this assignment to compare the costs with the findings of PSI's 2012 Cameroon iCCM endline evaluation but it may be possible for such comparisons to be made by others. In addition, we hope that this study can be useful to the government and/or donors in considering implementing or scaling up iCCM in the country.

With support from the Canadian International Development Agency (CIDA), ACMS began implementing an iCCM program in Nguelemendouka and Doumé districts in 2009 to reduce childhood mortality in remote, hard-to-reach areas.The program focuses on training and supporting volunteer community health workers to provide timely and appropriate treatment to children ages two to 59 months for cases of malaria, diarrhea, and pneumonia free-of-charge.[2]

The costs were estimated for the year 2012, using the actual total number of services provided in that year (Table i). In 2012, only three iCCM services were provided: diarrhea, fever (presumptive malaria treatment), and referrals; pneumonia treatment was introduced in Nguelemendouka district in 2013. We also projected future costs for several years and while, those figures are not reported here, they are available from the authors.

Table i summarizes the actual recurrent costs for 2012, which are split between direct and indirect costs. The iCCM services are provided by *Agents de Sante Communautaire* (ASCs), who are volunteers and receive no salary, and so the only direct costs of iCCM treatments are medicines. Indirect costs comprise management, supervision, meetings, trainings, and program overhead costs.

[1] Black RE, Cousens S. Johnson HL, Lawn JE, Rudan I, Bassani DG, et al. Global, regional, and national causes of child mortality in 2008 : a systemic analysis. Lancet. 2010; 375: 1969-87. Medline: 20466419 doi: 10.1016/S0140-6736(10)60549-1

[2] ACMS began implementation of CCM of childhood pneumonia in 2013 in Nguelemendouka district.

Table i: Summary of Cameroon iCCM Population, Services and Costs, 2012

	Population, services, and costs (2012)
Total population covered under iCCM program	139,520
Target population 2-59 months (18% of total pop)	25,114
Expected cases – diarrhea	82,875
Treated cases – diarrhea	5,984
% cases treated (treated / expected)	7%
Expected cases – fever	70,408
Treated cases – fever (treated as malaria)	10,009
% cases treated (treated / expected)	14%
Total iCCM cases treated	15,993
iCCM cases treated per capita (2-59 months)	0.6
Total recurrent cost	US$ 257,611
Average recurrent cost per capita (2-59 months)	US$ 10.26
Average recurrent cost per capita (total population)	US$ 1.85
Cost per diarrhea treatment	US$ 13.71
Cost per fever treated as malaria	US$ 17.54

The iCCM program in Nguelemendouka and Doumé districts provided a total of 5,984 diarrhea treatments and 10,009 presumptive malaria treatments in 2012 which comes to 0.24 and 0.40 cases treated per child aged 2-59 months, respectively. Based on the assumed incidence rates, this was 10.5% of total episodes - 7% of the episodes of diarrhea and 14% of the episodes of fever presumed to be malaria.

Each ASC had, on average, a catchment population of 60 children aged 2-59 months and saw an average of 0.7 cases per week. The ASC attrition rate was reported to be 7% per year.

The estimated start-up costs for training and equipment incurred before 2012 plus the cost of training and equipping 29 replacement ASCs in 2012 came to US$133,157 (US$318 per ASC). These costs are not included in the recurrent cost figures.

The total estimated recurrent costs of the program in 2012 was $257,611, which came to an average of US$10.26 per capita (child aged 2-59 months); and an average of US$13.71 per diarrhea case treated and US$17.54 for malaria case treated. The majority of the costs are formed by management (42%), ACMS overhead costs (28%) and supervision costs (11%). Medicines were 5% of the total costs.

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 cost per death prevented. In addition, we did not conduct any systematic analysis of bottlenecks.

The unit costs of the program were quite high due to the low utilization of services in relation to ACMS overhead and management costs. With utilization at 10.5% of estimated need, increases in utilization could perhaps be achieved, depending on logistics, security, and care-seeking behavior. It is not clear if it would be feasible to reduce the ACMS management and overhead costs, although one way to do that would be to scale up geographically and/or expand the range of interventions. ACMS paid iCCM supervision costs to the Chef de l'Aire de Santé and to the district medical officer. Additional project support was carried out by ACMS *animateurs*.

Most donor-funded pilot iCCM projects have high overhead, management and supervision costs – this is part of the investment in developing a viable program. If the program is completely taken over by the government these costs would be expected to fall significantly, for example with much-reduced overhead costs and by supervisors sharing the costs of visits across more community health activities. That may, however, require a strengthened health system, particularly at the primary care level.

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 ASCs promote timely care by treating uncomplicated cases of diarrhea, pneumonia, and malaria in hard-to-reach communities 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 efficient use of scarce resources.

To better understand the costs of iCCM programs, the Bill and Melinda Gates Foundation funded MSH to conducted costing analyses of NGO-run iCCM projects in five African countries – Cameroon, Democratic Republic of the Congo, Sierra Leone, South Sudan, and Zambia.[3] The results of these analyses can be compared with the findings of impact evaluations of these same programs to estimate the cost of achieving the impact (for example, in terms of cost per life saved). They can also serve as baseline data for future studies. This report describes the results of the costing analysis of an iCCM program in Nguelemendouka and Doumé districts in eastern Cameroon, implemented by Population Services International (PSI) through a local affiliate, the Cameroonian Association for Social Marketing (ACMS). We hope that this study can be useful to the government and/or donors in evaluating, implementing or scaling up iCCM in the country.

Background and Country Context: Cameroon

Cameroon's health system is divided into three distinct hierarchical levels: central level, intermediate level, and periphery level. The Ministry of Public Health (MoPH) leads the central level and is responsible

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

for the overall coordination and regulation of the health system and developing national health policies. At the intermediate level there are 10 regional health delegations that provide technical support to179 districts in implementing MoPH national health strategies. Together, the central and intermediate levels support the peripheral level which is led by District health offices which play the role of operational geographic units responsible for delivering basic health services to the population and the administrative management of health centers including human resources and personnel, finances, equipment, supply of medicines, logistics, and construction and maintenance of health centers.

Each of Cameroon's 179 districts serve between 50,000 to 300,000 people and are subdivided into 1,673 aires de santé (health zones) which implement health programs at district hospitals, clinics, and CMAs with the support of community participation including district health committees (COSADI – *Comité de Santé* and COGE – *Comité de Gestion*). Of the functional health centers, 79 percent are public and 21 percent are private non-profit.[4]

Efforts to decentralize management responsibilities to the peripheral levels and improve the delivery and accessibility of health services have helped the country reduce its under-five mortality rate in the last decade from148 deaths per 1,000 births in 2003[5] to 62 deaths per 1,000 births in 2011.[6] Despite these recent achievements, Cameroon is still struggling to meet its MDG 4 goal of reducing childhood mortality in the face of high rates of preventable illnesses such as malaria, pneumonia, and diarrhea. In addition, Cameroon faces significant challenges relating to health human resource development and limited access to health services, particularly for those living in rural, hard-to-reach areas.

To reduce childhood mortality in remote, hard-to-reach areas, PSI's local affiliate, ACMS, began implementing an iCCM program in Nguelemendouka and Doumé districts in 2009 with support from the Canadian International Development Agency (CIDA). The program focuses on training and supporting volunteer community health workers to provide timely and appropriate free treatment to children ages two to 59 months for cases of malaria, diarrhea, and pneumonia.[7]The common term for a community health worker in Cameroon is *Agent de Santé Communautair*e (ASC) – which will be used throughout this report. While ASCs are unpaid, ACMS provides a standard motivation package, which includes a T-shirt, certificates/awards, job aids for identifying danger signs, standard ASC materials and equipment, and per diem for attending trainings. In 2012, there were 2,825 ASCs enrolled in the program serving 2,130,589 persons in 20 districts throughout the country. In Nguelemendouka and Doumé there were a total of 404 ASCs serving a population of 139,520.

ASCs represent an accessible point of entry to the formal health system, providing health center referrals to children with severe symptoms. As per ACMS' policy, one ASC is selected by members of each village, serving a population of 500-800 people. However, in Nguelemendouka and Doumé districts where the program was piloted, ACMS trained two ASCs per village with one ASC serving as the principal point of contact and providing iCCM services while the second ASC only providing services when the other is absent from their village.

[4] Africa Health Workforce Observatory (AHWO). Profil en Ressources Humaines pour la Sant du Cameroun. March 2009.
[5]UNICEF. 2003.
[6]Cameroon Demographic Health Survey. 2011.
[7] ACMS began implementation of CCM of childhood pneumonia in 2013 in Nguelemendouka district.

Following selection, ASCs attended a three-day basic training session at the district level to identify and treat uncomplicated cases of malaria and diarrhea. Trainings are led by district-level trainers and ACMS staff and are designed to prepare ASCs to identify signs of diarrhea and malaria among children under five, identify danger signs in children under five, determine referrals, provide treatment for malaria and diarrhea, and follow-up on the child's illness with the caregiver. In addition to the basic training, ASCs also participate in annual one-day refresher training focused on continuing education and dissemination of improved techniques or treatment norms such as trainings on Rapid Diagnostic Tests or providing treatment for cases of pneumonia.[8]

In addition to training, ASC supervision structures are in place to maintain correct performance, motivate ASCs, and ensure they have an adequate supply of essential medicines and materials. ASCs receive direct supervision from the *Chef de l'Aire de Santé* – the head of the health center – who typically supervises an average of 15 ASCs and is responsible for conducting monthly supervision visits to the ASC's home in which they follow a standardized supervisory checklist to ensure the ASC is correctly treating his or her patients and has a full stock of medicines. In addition, the *Chef de l'Aire* is responsible for validating ASC monthly reports and sending the reports to ACMS in Yaoundé. The *Chef de l'Aire* also participates in district-level site supervision visits which occur once every month or trimester depending on the district. ASCs also receive direct support from ACMS through its network of 17 *animateurs* (on average one per district) who are responsible for transporting medicines to the health facility and monitoring medicine stock levels.

Impact Evaluation

A cross-sectional survey was conducted in September and October 2012 in two CCM intervention districts, Nguelemendouka and Doumé, and a comparison district, Abong-Mbang, which received the current national standard of care for the treatment of childhood illnesses (i.e. public facility-based care). The findings were released in September 2013 and provided partial evidence to the effectiveness of CCM in reducing all-cause childhood mortality (1-59 months).[9] In Nguelemendouka District, the mortality rate dropped during the period of the intervention (86.7 per 1,000 live births) compared to the mortality rate in the three years preceding the intervention (96.8 per 1,000 live births). In Doumé District, the mortality rate before the intervention was 103.8 per 1,000 live births compared with 118.4 per 1,000 live births. The mortality rates in the comparison district remained relatively unchanged during the three year period before the intervention (77.3/1,000 live births) and the three year period of the intervention (77.6/1,000 live births). The reasons for this disparity or lack of impact were could not be identified but may depend on contextual factors including, but not limited to, climate events (e.g. heavy rains or flooding) which could have impacted the delivery of iCCM or disease transmission.

[8] This training was carried out in 2010 and 2012 but not in 2011.
[9] ACMS/PSI. Cameroon CCM Endline Evaluation 2012: Outcomes & Impact in Doumé and Nguelemendouka Districts after Three Years of Program Implementation. September 2013.

Methodology

Tool Design

The Cameroon 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.[10] 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 standard costs are built up by type of resource (such as medications) based on an estimated numbers of services[11]. 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. Cameroon uses national protocols adapted from the WHO guidelines on iCCM which ACMS 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 ASC availability, so that the number of projected services can be constrained by the number of available ASC work hours. Therefore, the tool can estimate the number of ASCs required based on their availability and the disease burden; alternatively, the number of ASCs can be entered manually by the user or calculated based on a per population or a per village basis.

The tool estimates the cost of support and supervision staffing needs, trainings, and other recurrent program costs based on assumptions entered by the user. The tool then estimates the unit cost per service, as well as the aggregate costs for different levels of the health system (i.e., community, district, and national) and the total costs.

The tool automatically produces the following outputs:

- Total program costs, baseline year and five-year cost projections;
- Costs per capita, per contact, per disease type, per ASC and per resource type;
- Incremental costs and incremental financing of the iCCM programs (start-up and recurrent) as a whole and for each level (national, regional, district, facility and community) over time;
- Costs per treatment area (pneumonia, diarrhea, malaria, etc.), with the capability to include other iCCM interventions;
- Key drivers of costs and cost categories as a percent of total costs; and

[10] 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

[11] Standard costs of a service (treatment) are determined by calculating the cost of medicines, supplies, staff time and other resources required according to standard treatment guidelines.

- Five-year projections of financing with sources of funding and based on adapted target population.[12]

These outputs can be used to:

- Advocate for funding from the government or donors;
- Develop government or donor budgets;
- Measure cost efficiency and effectiveness of iCCM programs as complemented by the anticipated impact evaluation of the program;
- Develop "what-if" scenarios for researchers or program managers to develop and cost follow-on activities to ensure the sustainability of the program and identify funding requirements for specific outcomes.

Data Collection

Data for this analysis were collected at two levels: first, from the MoPH regional and district offices (i.e. the central level); and second, at the health center and village level, through questionnaires administered to ASCs and their supervisors who serve as the *Chef de l'Aire de Santé* or head of the geographic health area.

Central and Partner Level Data Collection

The main purpose of the data collection at the central and health center levels was to gather assumptions on the standard costs of implementing the iCCM program. All standards, norms, and protocols were collected from ACMS.

The scope of this costing study focused on the iCCM program being implemented by ACMS in Nguelemendouka and Doumé districts. Data were collected from the ACMS office in Yaoundé which 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 aforementioned two districts, we attempted to include all relevant costs of the program, including costs that were not directly incurred by ACMS. For example, part of the supervision of ASCs is performed by the *Chef de l'Aire de Santé* in addition to District-level staff; the salaries for these staff are paid by the government of Cameroon and we included these staff costs in the analysis. Supervision costs which were payed by ACMS were taken into account including incentives payed to the *Chef de l'Aire de Santé* (20,000 CFA per quarter) and district medical officers (30,000 CFA per quarter).

All program costs funded directly by ACMS were input into the tool and any relevant ACMS 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 ACMS. Finally, ACMS management costs are also taken into account. This can include management and administrative staff costs, drivers, and office overhead costs.

[12] We used the tool to project costs over several years. We did not show the projections in this report but they are available on request.

Facility and Village Clinic Data Collection

The purpose of the data collection at the health facility and village level is 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 ASCs' time, availability, and activities, which are not standardized.[13]The data collected was used to help better understand how the program functions in Nguelemendouka and Doumé districts while recognizing that the relatively small sample size may limit the extent to which the results reflect the entire iCCM program.

The sample size for this costing exercise was selected based on 2012 iCCM impact evaluation which assessed the impact of all-cause under-five mortality and other key health indicators in Nguelemendouka and Doumé districts. ACMS' impact evaluation included a sample size of 10,288 households in the intervention districts and 7,889 households in the comparison district. For the purpose of this costing exercise, the health facilities were chosen to obtain a diversified and representative sample based on proximity to the District capital, population/catchment area size, number of ASCs, and vehicle accessibility during rainy season. A total of 10 health facilities were selected from the sampling and between 2 and 4 ASCs were interviewed at each facility (see Annex A for detailed list of health facilities and sites sampled).

The Chef de l'Aire (Head Nurse) was interviewed at each health facility and asked a series of questions on his/her monthly salary, amount and percent of time spent on iCCM program supervision and reporting, and expenditures on iCCM trainings and meetings. All data were collected through oral interviews and information was captured both electronically and through a paper-based questionnaire. A standard questionnaire was utilized for these interviews (see Annex D for the full questionnaire).

Assumptions and Standard Data

Period of Analysis

The iCCM Costing and Financing Tool can calculate the cost of six iCCM program years: one baseline year and five projection years. Actual data, in terms of numbers of iCCM cases treated, can be input for the baseline program year. The caseloads for remaining projection years are estimated based on the incidence rate and the target population for each disease.

For this analysis, we calculated the costs for 2012 based on the actual iCCM caseload data and actual numbers of ASCs for that year. We selected 2012 to be in line with the impact evaluation, which was conducted at the end of that year.

The data collection visit and ASC interviews took place in June, 2013.

[13] Since ASCs are volunteer health workers, they are not expected to adhere to standardized working hours, for example.

iCCM Package of Services

Since the inception of ACMS's iCCM program, the standard package of services provided by ASCs has evolved. ASCs initially only addressed malaria and diarrhea, since national policy did not permit community workers to distribute antibiotics. However, this policy changed in mid-2012, and so in 2013, ACMS piloted pneumonia treatment to its iCCM program in Nguelemendouka. Suspected pneumonia cases are assessed for rapid breathing using an ARI timer; positive cases are treated with amoxicillin, and any severe cases are referred. The pilot served as an opportunity to learn key lessons for future implementation and potential scale-up. During the time of the iCCM impact evaluation, pneumonia had yet to be implemented, so the impact of providing this additional service has yet to be measured.

Treatment of malaria has also evolved since the program's beginning in 2009. At that time presumptive treatment was the national policy to ensure that children at risk of severe disease and death due to malaria were treated promptly. The government of Cameroon changed this policy in 2013, then requiring the confirmation of malaria in fever cases through the use of rapid diagnostic tests (RDTs). At the time of our data collection visit, the use of RDTs was still in the process of being rolled out, and only a number of ASCs were using RDTs; furthermore, the impact evaluation does not reflect the use of RDTs[14]. It is expected that, in the next year (2014), the use of RDTs will be rolled out nationwide.

Table 1 below shows a summary of the treatment protocols and treatment times for each intervention in the iCCM package that was provided in 2012 (see Annex D for full details on the standard treatment protocols). Because pneumonia treatment and RDTs were rolled out after 2012, we include only the figures for diarrhea and fever treatment in this report.

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

iCCM Service	Average time to treat one patient (minutes)	Medicines/supplies needed	Average medicine cost per episode (USD)
Diarrhea	81	ORS, Zinc	$0.59
Fever (presumptive treatment)	106	ACT	$0.38

Referrals are also provided by ASCs, but no initial treatments are provided for these cases.

Population and Geographic Coverage Targets

The total population covered by ACMS's iCCM program in Nguelemendouka and Doumé districts in 2012 was 56,302 and 83,128, respectively; arriving at a total of 139,520 (Table 2). ACMS estimates that children under five comprise approximately 18% of this population, resulting in 25,114 children targeted

[14] At the time of the impact evaluation, ASCs were not using RDTs to confirm malaria infection, and the extent to which the fevers that they were treating were malaria infections was not known.

by the iCCM program in 2012. In the two districts, there was a total of 20 aires de santé and 213 villages providing iCCM services. The average population of a village in 2012 was 1,297, which amounted to approximately 233 children between 2 and 59 months.

Table 2. Population and Coverage Assumptions, Nguelemendouka and Doumé Districts, 2012

	2012
Number of Districts	2
Number of Aires de Santé	20
Number of Villages providing iCCM	213
Target population covered by iCCM (all ages)	139,520
Target population covered by iCCM (2-59 months)	25,114
Total Number of ASCs	419

Incidence Rates

Incidence rates were input into the iCCM Costing and Financing Tool as the number of episodes per child per year. Due to the difficulty in obtaining country-specific incidence rates, we consulted the literature to find the best approximations for Cameroon.

A study by Fischer Walker et al. estimated diarrhea incidence for Sub-Saharan Africa at 3.30 episodes per child per year in 2010.[15]Pneumonia incidence was estimated for Cameroon by dividing total ALRI cases in children under five (790,160) by the population of children (3,054,802), as reported by Rudan et al.[16] Incidence rates for fever and malaria were obtained from the WHO World Malaria Report 2008; although a more up-to-date study is available for 2012, the estimated cases of "fever suspected of being malaria" were not reported, and malaria cases were not broken down by age group.[17] We used the Cameroon-specific caseload data from the 2008 report to determine the incidence rate of both fever and malaria cases.

Table 3 shows the summary of incidence rates input into the tool. These may be modified as other data are made available.

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

iCCM Service	Incidence rate used in tool	Source
Diarrhea	3.30	Fischer Walker et al, 2012
Fever (presumptive treatment)	2.80	World Malaria Report 2008

[15] Fischer Walker et al. Diarrhea incidence in low- and middle-income countries in 1990 and 2010: a systematic review. BMC Public Health 2012, 12:220. Accessed at: http://www.biomedcentral.com/1471-2458/12/220
[16]Rudan et al. Epidemiology and etiology of childhood pneumonia in 2010: estimates of incidence, severe morbidity, mortality, underlying risk factors and causative pathogens for 192 countries. J Glob Health. 2013 June; 3(1): 010401. Accessed at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3700032/
[17] WHO World Malaria Report 2008.

As a comparison, the 2011 DHS conducted in Cameroon reports prevalence rates of 15.4% for diarrhea and 10.5% for malaria.[18]

Caseloads

Actual caseload data for the baseline year, 2012, were provided by ACMS and input into the tool (see Table 4 below). As described earlier, in 2012, pneumonia treatments had not yet begun, and all fevers were still being treated presumptively for malaria.

Table 4. Actual 2012 caseloads

	2012
Diarrhea	5,984 (7%)
Fever (presumptive malaria treatment)	10,009 (14%)

ASC Availability & iCCM Service Delivery Assumptions

Since ASCs 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 villages in the two intervention districts have 2 ASCs working either together or alternating their time so that they can be available anytime upon request. We input the actual number of ASCs (419) that worked in Nguelemendouka and Doumé in 2012.

The endline survey conducted by ACMS suggests a good level of retention was maintained for the ASCs in the iCCM program. From the 426 ASCs that were trained in 2009, a total of 29 had left their posts after a year, equivalent to a 7% attrition rate.

Based on our questionnaires, ASCs worked an average of 36 hours per week on various activities as a community health worker; of these hours, an average of 19 hours per week (54%) was spent specifically on iCCM activities[19]. Although there are no standardized working hours, ASCs 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 used the 54% figure as a factor to allocate indirect costs, such as for management and supervision, to the iCCM program

Management, Supervision, Meetings and Trainings

Costs of management, supervision, meetings and trainings were all provided by ACMS. Management costs primarily comprise salary costs for any staff involvement in the management or the administration of the iCCM program. Although ACMS receives support through PSI's international regional and home

[18] Cameroon DHS 2011. Accessed at: http://www.measuredhs.com/pubs/pdf/FR260/FR260.pdf
[19] Given the overall average of 38 cases treated per ASC per year, it would appear that there was some over-estimation of workload or these ASCs see many more cases than average.

offices, we limited the analysis to include only salary costs for staff based in Cameroon. Details of each relevant staff person were entered into the iCCM tool, together with the total annual salary and percentage of time spent on the iCCM program. At the writing of this report, some salaries and management costs were not available and were not included.

Supervision provided by one nurse at each of the 20 health facilities, and there are three high level supervisors, two who are paidby the MOPH and one by PSI. 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. Supervision of ASCs is primarily conducted by the Chef de l'Aire; based on their interviews, approximately 20% of their time is spent supervising the community health program. ACMS also deploy their own staff, known as *animateurs* or *animatrices*, to provide additional support, promote the ASC program, and assist with interpersonal communication campaigns. Typically there is one animateur for each district. Supervision visits are made once or twice per month and can involve both the *Chef de l'Aire* and the ACMS staff. Additional supervisory support is provided by MoPH staff at the district level.

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

Training costs in the iCCM tool were split between start-up trainings and refresher trainings. Start-up trainings are assumed to occur a single time for each new ASC hired, whereas annual refresher trainings would be applied to the entire pool of ASCs that are working in a given year. ASCs receive a 3-day start up training for iCCM, and subsequently are given quarterly refresher sessions.

Analysis

Summary of Findings from ASCs Interviewed

A total of 34 ASCs were interviewed for this sample. Based on their responses, ASCs carry out health activities an average of 7 days per week, between 1 and 9 hours per day, averaging 5.19 hours per day. Those interviewed estimated they spend an average of 54 percent of their ASC time on providing iCCM services. ASCs received direct supervision from the *Chef de l'Aire de Santé* who conducts an average of two supervision visits per month. During the supervision visits, the *Chef de l'Aire* followed a standardized supervisory checklist to ensure the ASC is regularly filling out his or her reports and has a full stock of medicines. In addition, the *Chef de l'Aire* provided refresher trainings on the iCCM treatment guidelines to ensure the ASC is correctly following treatment protocols. The *Chef de l'Aire* also participated in District-level site supervision visits which occur every 1-3 months and last an average of 6.5 days, depending on the district. ASCs also received direct support from ACMS through its network of 17 *animateurs* (on average one per district) who are responsible for delivering medicines to the health facility and monitoring medicine stock levels.

To calculate supervision time in the tool, we interviewed supervisors to determine how much of their total time they spend on iCCM supervision. Each health facility has a *Chef de l'Aire de Santé*; those interviewed estimated that of their total time supervising ASCs, they devote approximately 21.9% to iCCM-specific activities. Each district also has one *Chef du District*; of the two district heads interviewed, one reported spending 5% of their time supervising the ASCs, and the other 50%. Since we did not consider the 50% to be a realistic estimate, we used the 5% figure for both districts.

The reported time spent per type of case (diarrhea, malaria, pneumonia, and referral) was fairly consistent across all respondents. The ASCs reported spending an average of 81 minutes on a diarrhea case, 112 minutes on a pneumonia case, 106 minutes on a presumptive malaria case and 65 minutes on a referral case.

Medicine stock-outs were identified as an issue by some of the persons interviewed. Of the 34 ASCs interviewed, five reported having experienced a stock-out of medicines in the previous last three months. ASCs reported a stock-out of ACT2, zinc, and amoxicillin in Nguelemendouka district. The 2012 project evaluation indicated, however, that medicines were usually available despite the logistical challenges.

Utilization

Table 5 shows the utilization figures used for this analysis. The figures from were provided by ACMS's M&E officer.

Based on records from ACMS, a total of 10,009 fever treatments and 5,984 diarrhea treatments were provided in Nguelemendouka and Doumé in 2012. These two services were the only iCCM treatments provided by ASCs in that year, arriving at a total of 15,993 cases treated. We were unable to obtain figures for referrals for 2012.

The total number of cases treated per capita amounted to 0.64 for children 2-59 months (Table 5). Based on the incidence rates used in this modeling exercise, the total expected cases treated per child in 2012 for diarrhea and malaria would be 6.1. Dividing the actual cases per capita, 0.64, by the expected cases per capita, 6.1, indicates that 10.5% of total expected cases were actually treated in 2012.

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

	2012
Population 2-59 months	25,114
Diarrhea treatments	5,984
Fever (presumptive malaria) treatments	10,009
Total iCCM treatments	15,993
Diarrhea treatment per capita (2-59 months)	0.24
Fever treatment per capita (2-59 months)	0.40
Total cases per capita	0.64

The number of ASCs and cases treated per ASC are shown in Table 6. Based on ACMS records, there were 419 ASCs working in the two intervention districts. At the current level of utilization, each ASC treated, on average, less than one iCCM case per week.

Table 6. Number of ASCs and cases treated per ASC, 2012

	2012
Total Number of ASCs	419
Total Number of iCCM cases treated	15,993
Average Number of iCCM Cases per ASC (year)	38
Average Number of iCCM Cases per ASC (week)	0.7
ASC Per 1,000 Population	3.0
ASC per Village	2.0

Costs

Total iCCM program costs were 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 ASCs in iCCM to replace those lost to attrition.[20] Recurrent costs are regularly incurred as part of the running of the iCCM program, such as the cost of medicines, supervision, and management.

[20] We chose not to include the costs of training and equipping replacement ASCs in recurrent costs but it would have been equally reasonable to do so.

All costs were entered into the iCCM Costing and Financing Tool in Central African CFA Francs. Results in the report are shown in USD, and were converted using an exchange rate of 491 CFA to 1 USD.

Startup and ASC Training Costs 2012.

The start-up costs comprised the training and equipping of ASCs (Table 7). These start-up costs are not included as part of the unit recurrent costs per service. These costs would have been incurred prior to 2012.

Table 7 shows the costs that would have been incurred for training and equipping the 419 ASCs in Nguelemendouka and Doumé, which comes to US$103,031 (using 2012 prices).The average start-up cost of US$318 per ASC was calculated by dividing the total training and equipment cost by the number of ASCs trained. Based on the estimated attrition rate of 7%, it would have been necessary to train and equip 29 replacement ASCs in 2012, which would have cost US$9,222. This figure is not included in the recurrent costs.

Table 7. Number of ASCs and start-up iCCM Program Costs, pre-2012 (US$)

	Pre-2012
Total number of ASCs	419
ASC training cost	103,031
ASC equipment cost	30,126
Total start-up costs	133,157
Start-up cost per ASC	318

Recurrent Costs

Table 8 shows the total recurrent costs for the iCCM program, based on the actual numbers of services provided in 2012. Recurrent costs are split between direct and indirect costs. Since ASCs are volunteers and receive no salary, the only direct variable costs of iCCM treatments are medicines. The remaining costs are fixed – such as management, supervision, meetings, trainings, and program overhead costs. The annual recurrent program cost was estimated at US$0.26 million in 2012.

Management costs constituted the majority of iCCM program expenditure, at 42% of the total recurrent costs; whereas the cost of medicines was only 5% of the total costs. If the number of iCCM treatments were to increase, the medicines costs would also increase as a proportion of the total cost.

Table 8. Recurrent iCCM program costs, 2012 (US$)

	2012
Medicines	7,306
% of total cost	5%
Management	109,175
% of total cost	42%
Supervision	29,405
% of total cost	11%
Meetings	21,097
% of total cost	8%
Refresher trainings	18,904
% of total cost	7%
Overhead costs	71,725
% of total cost	28%
TOTAL	257,611

Management costs are generally defined as central level or partner organization salary costs for staff involved in managing the iCCM program. These relate to staff who do not directly supervise ASCs, but rather provide support to the iCCM program, such as organizing trainings, attending technical working group meetings, or overseeing medicine supply chains. These costs were calculated by applying a percentage of time spent on iCCM management to the total salary for each staff member.

Supervision costs were the costs of staff based in health centers and district health offices who directly supervise ASCs. At the health center level, supervision is done mainly by the Chef de l'Aire. In addition, supervision is provided by ACMS staff, known as '*animateurs*', who support the ASCs and *Chef de l'Aire* while promoting the iCCM program.

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 ACMS based on their training budgets.

Table 9 shows the average recurrent cost per service for 2012. Dividing the total recurrent cost by the number of services provided each year yields the average cost per service, which was US$16.11. The cost per service is an average cost across all the iCCM services that the ASCs provide, and it reflects both this mix of services (based on incidence rate and population data) and medicine cost assumptions. Since the iCCM utilization in the baseline year was not very high – on average, less than one iCCM treatment was provided per child in the year – the average cost per service is very high. The cost per service for each iCCM treatment is shown in Table 10 below.

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 coverage areas. The average cost per child aged 2-59 months was US$10.26.

In addition to the start-up cost per ASC, reported in Table 7 above, we calculated the average program recurrent cost per ASC, and the average supervision cost per ASC. The supervision cost is part of the total recurrent cost, and was pulled out to highlight the amount that would be spent directly supervising the community workers, since supportive supervision tends to be an important indicator of the success of iCCM programs. The average supervision cost per ASC is calculated by dividing the total supervision cost, which entails the supervision visits in the field as well as the salaries of all staff involved in supervision, by the total number of ASCs. This amounted to approximately US$70 in 2012.

The recurrent iCCM program cost per ASC is calculated by dividing the total recurrent cost by the total number of ASCs each year; this was US$615 in 2012.

Table 9. Recurrent cost per service, per capita, and per ASC for 2012, (US$)

	2012
Total recurrent cost	257,611
Total iCCM cases treated	15,993
Average cost per iCCM service	16.11
Average cost per capita (2–59 months)	10.26
Average cost per capita (total population)	1.85
Supervision cost per ASC	70
Recurrent cost per ASC	615

Table 10 shows the recurrent cost per individual service in the iCCM package. As mentioned previously, 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 ASCs or scaling up to additional districts. Fixed indirect 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, only two types of iCCM service were provided: diarrhea and fever (presumptive malaria treatment). As discussed earlier, the average cost per service in 2012 was high due to the relatively low volume of services that were provided in that year. As a result, the cost per service is high for diarrhea and fever, at US$13.71 and US$17.54, respectively.

Table 10. Recurrent cost per iCCM service (US$)

	2012
Diarrhea	13.71
Fever (presumptive malaria treatment)	17.54

Conclusions

The iCCM program in Nguelemendouka and Doumé districts provided a total of 5,984 diarrhea treatments and 10,009 presumptive malaria treatments in 2012 which comes to 0.24 and 0.40 cases treated per child aged 2-59 months. Based on the assumed incidence rates, this was 10.5% of total episodes - 7% of the episodes of diarrhea and 14% of the episodes of fever presumed to be malaria.

Each ASC had, on average, a catchment population of 60 children aged 2-59 months and saw an average of 0.7 cases per week. The ASC attrition rate was reported to be 7% per year.

The estimated start-up costs for training and equipment incurred before 2012 plus the cost of training and equipping 29 replacement ASCs in 2012 came to US$133,157 (US$318 per ASC). These costs are not included in the recurrent cost figures.

The total estimated recurrent costs of the program in 2012 was $257,611, which came to an average of US$10.26 per capita (child aged 2-59 months); and an average of US$13.71 per diarrhea case treated and US$17.54 for malaria case treated. The majority of the costs are formed by management (42%), ACMS overhead costs (28%) and supervision costs (11%). Medicines were 5% of the total costs. These are total costs which include some government salaries.

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 although stock-outs of medicines were identified as an issue in the interviews.

Since the ASCs are unpaid and the cost of medicines is relatively low, the main cost drivers of the iCCM program are supervision, ACMS overhead and management, which come to 81% of total recurrent costs. These costs are attributed to iCCM services based on the proportion of time that the supervisors and managers say they spend on iCCM activities. In Cameroon the ASC supervisors reported spending 22% of their time on iCCM activities, the ACMS *animateurs* reported spending 100% of their time on iCCM activities and other district level staff reported spending between 1% and 8% of their time on iCCM activities. The amount of supervision and management is spread equally across the number of ASCs which means that the services provided by each ASC bear the full share of supervision and management costs even if they provide few services. The only way to lower the cost is, therefore, to reduce the cost of supervision and management or increase the number of cases treated.

With utilization at 10.5% of estimated need, increases in utilization could perhaps be achieved, depending on logistics, security and care-seeking behavior. It is not clear if it would be feasible to reduce

the ACMS management and overhead costs, although one way to do that would be to scale up geographically and/or expand the range of interventions. Supervision costs were considerable as ACMS paid iCCM supervision incentives to the *Chef de l'Aire de Santé* and to the district medical officers on a quarterly basis.

Most donor-funded pilot iCCM projects have high overhead, management and supervision costs – this is part of the investment in developing a viable program. If the program is completely taken over by the government these costs would be expected to fall significantly, for example with much-reduced overhead costs and by supervisors sharing the costs of visits across more community health activities. That may, however, require a strengthened health system, particularly at the primary care level.

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Annexes

Annex A. Districts, Health Centers and Sites sampled for ASC Questionnaires

Annex B. ASC Questionnaire

Annex C. Standard Treatment Guidelines

Annex A. Districts, Health Centers and Sites sampled for ASC Questionnaires

District	*Health Center*	*Community Health Sites*
Doumé	Ngoumbergeron	Loumbou, Menon Mekoul, Ngoumbergerom, Ayat (4)
	Nkoum	Bent, Nkoum, Boumial, Djaglassi (4)
	Motcheboum	Afia, Ambaka, Manpang Carrefour, Grande Bonando (4)
	Bayong III	Bayong III, Bayong IV, Bayong VI, Bayong II (4)
	Ndomdouma I	Menyangoua, Ngomodouma II (2)
	Ngandame	Ngandame, Bakoumbiam I (2)
Nguelemendouka	Bika	Kap, Oueyn, Mbang II, Bika (4)
	Ngoap	Mbame II, Nkaoule, Bengond, Ngoap (4)
	Azomekout	Mekok, Ademegola, Azomekout, Ngoundg (4)
	Mvanda	Mvanda II, Koum-Koum (2)

Annex B. ASC Questionnaire

QUESTIONNAIRE POUR LES AGENTS DE SANTE COMMUNAUTAIRES (ASC)		
	ASC #	
	Date de l'entretien:	
	Nom de la personne qui administre le questionnaire:	
	Lieu de l'entretien:	
	A quelle heure l'entretien a-t-il démarré?	
	Nom de la personne interrogée:	
	Sexe (M/F):	
	Nom de la communauté / du village:	
	Centre de santé de supervision:	
	Aire de santé:	
	District:	
	Region:	
	Mois/année à la quelle le ASC a commencé a fournir des services iCCM:	
	Période d'analyse:	
	Date de début (MM/YY)	Jan-12
	Date de début (MM/YY)	Dec-12
A) Population desservie		
1)	Quelle est la population totale du village de l'ASC?	
2)	Combien de menages au village?	
3)	Y at-il plus qu'un ASC dans le village?	
3)	S'il y a plus qu'un ASC:	
3a)	Est-ce que vous divisez la population desservie par ASC, ou est-ce que vous alternez?	
3a)	Quelle est la population totale desservie par l'ASC?	
3b)	Quel est le nombre de menages couverts par l'ASC?	
B) Temps de l'ASC		
1)	En général, combien d'heures par jour travaillez-vous comme ASC?	
2)	En général, combien de jours par semaine travaillez-vous commet ASC?	
3)	En général, vous travaillez en tant qu'ASC toute l'année?	
Remplir l'*Annexe 3: Temps ASC* en posant les questions suivantes		
1)	Énumérer toutes les activités que vous faites en tant qu'ASC?	
2)	La semaine dernière a été une semaine typique pour vous en tant qu'ASC?	
	Si non, pensez a une semaine typique pour les questions suivants:	
3)	Enumerer les activites que vous avez fait en tant qu'ASC la semaine	

	passe:	
3a)	Combien d'heures avez-vous consacré à chaque activité?	
3b)	Pour chaque activité, où vous rendez-vous?	
3c)	Pour chaque activité, combien de temps vous prend le déplacement à faire?	
3d)	Pour chaque activité, le déplacement est-il lié à vos activités générales en tant qu'ASC? Ou est-il lié a la PCIME-C specifiquement?	
C) Supervision et Reportage		
1)	A quelle fréquence vous rendez-vous au centre de santé pour la validation des données?	
2)	A quelle frequence vous remplissez-vous les rapports de vos activites PCIME-C?	
3)	Evaluer le nombre de jours par mois que vous consacrez à la compilation de votre rapport mensuel?	
4)	A quelle fréquence vous rendez-vous au centre de santé pour vous approvisionner des médicaments?	
5)	Combien de temps vous prend pour aller au centre de santé?	
6)	Consacrez-vous toute la journée au voyage?	
7)	Quand était la dernière fois que vous avez reçu une visite de supervision?	
D) Formation/réunions		
	Se référer au modèle de formation/réunion et le remplir	
E)	**Services de la PCIME-C**	
1)	Énumérer les traitements que vous offrez: diarrhee, pneumonie, paludisme?	
2)	Est-ce que vous avez offert les memes traitements en 2012?	
2)	Pour chaque traitement, estimer le temps total nécessaire (minutes) pour le traitement et le suivi:	
2a)	La diarrhee	
	Traitment (+ transport, le cas echeant)	
	Suivi + transport	
2b)	La pneumonie	
	Traitment (+ transport, le cas echeant)	
	Suivi + transport	
2c)	Le paludisme	
	Traitment (+ transport, le cas echeant)	
	Suivi + transport	
3c)	References	
	Traitment (+ transport, le cas echeant)	

	Suivi + transport	
4)	Lorsqu'un patient est référé au centre de santé, est-ce que vous l'enregistrez?	
5)	Est-ce que vous recevez les contres références quand vous referez un patient au centre de sante?	
6)	Est-ce que vous accompagnez les patients au centre de sante?	
7)	Est-ce que vous donnez un traitment initiale avant de le referer?	
8)	Donnez-vous les Tests de Diagnostique Rapide (TDR) pour les fievres?	
8a)	Si le test est negatif, que faites-vous?	
8b)	Si le test est negatif, comment l'enregistrez-vous?	
9)	Traitez-vous les cas de pneumonie? (respiration rapide, etc.)	
9a)	Si le test est negatif, que faites-vous?	
9b)	Si le test est negatif, comment l'enregistrez-vous?	
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.	
G) Médicaments, fournitures et équipements		Reçu (oui/non) Rupture (oui/non)
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	SRO	
b	Zinc	
c	Amoxycillin	
e	ACT 1	
e	ACT 2	
f		
g		
2)	Avez-vous reçu ces fournitures lorsque vous avez commencé à travaillé en tant que ASC?	
a	Caisse a médicaments	
b	Minuteur	
c	Collier	
d	Cahier d'enregistrement d'enfant malade (algorithme PCIME-C)	
e	Cahier Regsitre	
f	La planche PCIME	
g	Boite a images	
H) Motivations		
1)	Recevez-vous des motivations "en nature"?	

1a)	Si oui, quel sorte de motivations en nature, et de qui?	
	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 C. Standard Treatment Guidelines and Medicine Costs (USD)

The following standard treatment guidelines were developed in consultation with PSI/ACMS staff in Cameroon. The estimated time per consultation and treatment is an average based on responses from ASCs interviewed.

Drug	Numberoftimes/day	Numberofdays	%ofcasestreated	Unitsperdose	Total units	Unit cost	Total cost
Diarrhea (81minutes per consultation, treatment and follow-up)							
ORS	1	2	100.0%	1.00	2.00	0.20	0.41
Zinc (20mg)	1	10	20.0%	0.50	1.00	0.02	0.02
Zinc (20mg)	1	10	80.0%	1.00	8.00	0.02	0.16
Pneumonia (112 minutes per consultation, treatment and follow-up)							
Cotrimoxazole (480mg)	2	5	20.0%	0.25	0.50	0.06	0.03
Cotrimoxazole (480mg)	2	5	45.0%	0.50	2.25	0.06	0.14
Cotrimoxazole (480mg)	2	5	35.0%	1.00	3.50	0.06	0.22
Fever (presumptive treatment) (106 minutes per consultation, treatment and follow-up)							
ACT (25mg \ 67.5mg)	1	3	30.0%	0.33	0.30	0.31	0.09
ACT (50mg \135mg)	1	3	70.0%	0.33	0.70	0.41	0.29
Fever (RDT) (45 minutes per consultation and test)							

RDT	1	1	100.0%	1.00	1.00	0.66	0.66
Malaria (106 minutes per consultation, treatment and follow-up)							
ACT (25mg \ 67.5mg)	1	3	30.0%	0.33	0.30	0.31	0.09
ACT (50mg \135mg)	1	3	70.0%	0.33	0.70	0.41	0.29