

# Costing of Integrated Community Case Management in Senegal

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May 2013

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Information was gathered from 6 of Senegal's 14 regions at the district, health post, and community levels; this was used to test the model. (See Annex A for the list of districts, posts, and communities sampled.) The following partners and donors were consulted: AFRICARE, Catholic Relief Services, ChildFund International, Environmental Development Action in the Third World (ENDA) Graf Sahel, ENDA Santé, Plan International, UNICEF, and World Vision International (WVI). These partners provide iCCM (integrated community case management) support across the 14 regions in Senegal. Special thanks are due to ChildFund and the other partners who provided most of the information used in this report. Thanks are also due to other people who contributed to the process and who are listed in Annex B.

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## Acronym List

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ACT	artemisinin-combination therapies
ADC	<i>agent de développement communautaire</i> (community development worker)
ARI	acute respiratory infection
ASC	<i>agent de santé communautaire</i> (community health worker)
ASM	<i>Animatrice de Sante Maternelle</i> (maternal community health workers)
BCC	behavior change communication
CFA	Central African francs
CHP	Community Health Program
CHW	community health worker
C-IMCI	Community-Based Integrated Management of Childhood Illness
DANSE	<i>Division d'Alimentation, de la Nutrition, et de la Survie de l'Enfant</i> (Division of Food, Nutrition, and Child Survival)
DSSP	<i>Division de Soins de Santé Primaire</i> (Division of Primary Health Care)
DHO	district health office
DHS	Demographic Health Survey
ENDA	Environmental Development Action in the Third World
GHI	Global Health Initiative
HMIS	Health Management Information System
HP	health post
iCCM	integrated community case management
ICP	<i>infirmier chef de poste</i> (chief nurse)
IMCI	Integrated Management of Childhood Illness
MCHIP	Maternal and Child Health Integrated Program
MDG	Millennium Development Goal
MOHP	Ministry of Health and Prevention
MSH	Management Sciences for Health
MUAC	mid-upper arm circumference
ORS	oral rehydration salts
RDT	rapid diagnostic test

SIS	<i>Système d'information sanitaire</i> (Health Information System)
SNIS	<i>Service National d'Information Sanitaire</i> (National Health Information System)
TB	tuberculosis
TRAction	Translating Research into Action, project funded by USAID
UNICEF	United Nations Children's Fund
URC	University Research Corporation
USAID	US Agency for International Development
WHO	World Health Organization
WVI	World Vision International

## Executive Summary

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Integrated community case management (iCCM) has proven 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.

Through the Translating Research into Action (TRAction) project, funded by the US Agency for International Development (USAID), Management Sciences for Health (MSH) was awarded a subgrant to develop a costing and financing tool for iCCM.<sup>1</sup> Countries considering implementing or expanding iCCM programs will benefit from a comprehensive understanding of costs and financing. This understanding will help them advocate to donors and ministries of finance for necessary funding. It will also help them allocate sufficient resources to appropriate levels of the health system. The grant covers the development of the tool, which includes testing in three countries. The testing was already carried out in Malawi and Rwanda; Senegal is the third and final country.<sup>2</sup>

This report describes the results of the testing in Senegal. The main purpose of this work was to test the tool, and only a small sample of facilities and community health workers (CHWs) was used for that purpose. That sample is too small for the resulting data to be representative of the program as a whole, and the results of the modeling shown in this report should, therefore, be considered as illustrative.<sup>3</sup> Nevertheless, we believe that these results can be useful to the MOPH and its partners, and the figures used in the tool can be updated as desired.

Senegal has a long history of using CHWs to provide services. Community-owned *cases de santé* (community health huts) have been providing treatment for diarrhea and malaria since the 1950s and have been a staple of the Senegalese health system. Senegal's health system is mostly government run and comprises 20 referral hospitals, 77 health centers, 971 health posts, and an estimated 2,300 *cases de santé*.

Senegal's current community health program is heavily supported by the USAID-funded Community Health Program (CHP), led by ChildFund International in partnership with the Ministry of Health and Prevention (MOHP). The MOPH does not provide significant financial support to the community health program, but it works closely with the implementing partners and plans to absorb components of the program in the near future.

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<sup>1</sup> TRAction is managed by the University Research Corporation (URC).

<sup>2</sup> 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.

<sup>3</sup> Generally, the term *tool* should be used to describe the blank, formatted workbook, and the term *model* should be used to describe the completed workbook. They are often, however, used interchangeably.



The iCCM Costing and Financing Tool was used to estimate the costs of Senegal's iCCM program from the baseline year of 2011 and project program costs through 2016, based on a target of increasing the number of districts covered from 65 to 72 and a related increase in the population covered from 1.6 million to 2.0 million (including population growth) by the final year. The 2011 figures were based on actual total number of services provided, whereas the 2012–2016 figures are projections based on illustrative targets set by the authors. The numbers of services for these other years were calculated based on incidence rates of 4.23 episodes per child per year for diarrhea, 0.96 for ARI 4.41 for all fever cases that were administered a rapid diagnostic test (RDT) for malaria, and 0.15 for treatment of confirmed malaria. With the 50% coverage target set for 2016, the total number of services would increase from 72,115 in 2011 to 1.4 million. Table 1 summarizes the findings of the costing of Senegal's iCCM program.

The table also summarizes the actual recurrent costs for 2011 and the costs based on the illustrative targets for the other years. These costs do not include the program development and start-up costs or the annual costs of training and equipping *agents de santé communautaire* (ASCs) who replace other ASCs. It could be argued that these annual training and equipment costs should be included under recurrent costs, but if so, they should be shown separately. It should be noted that these recurrent costs do not include any ASC salaries or stipends, since these are not paid under the program.

**Table 1. Costing of Senegal's iCCM program (USD)<sup>a</sup>**

	Actual services 2011	Projected services 2012	Projected services 2013	Projected services 2014	Projected services 2015	Projected services 2016
<b>Total recurrent cost</b>	541,493	755,306	840,656	967,580	1,105,415	1,254,946
<b>Total number of services</b>	71,050	332,858	500,666	676,656	861,132	1,054,410
<b>Average recurrent cost per service</b>	7.62	2.27	1.68	1.43	1.28	1.19
<b>Average recurrent cost per capita (children 0–59 months)</b>	1.87	2.36	2.56	2.88	3.21	3.55
<b>Average recurrent cost per capita (total population)</b>	0.33	0.42	0.45	0.51	0.57	0.63

<sup>a</sup> Changes in the recurrent cost per service and per capita over the years are partly due to changes in the mix of services, which are shown in Table 7.

The program development and start-up costs were estimated at US\$266,546 in 2011, including the recruiting and equipping of ASCs to cover 65 districts. The recurrent costs for 2011 were estimated at US\$541,493. The cost of engaging new ASCs to scale up from 65 to 72 districts and of replacing ASCs lost through attrition would be about US\$118,073 for the subsequent program years 2012–16. The total recurrent cost of maintaining the program from 2012 through 2016 would amount to roughly US\$4.9 million.

The average recurrent cost for each service in 2011 is estimated at US\$6.52 for treating diarrhea, US\$9.65 for treating ARI, US\$7.51 for testing all fever cases for malaria using RDT, and US\$3.78 for treating confirmed malaria cases. Table 2 shows the cost per service for each program year. If the coverage increases in 2016 to 30% for treating diarrhea and using RDT to diagnose malaria, 35% for treating ARI, and 45% for treating confirmed malaria, the recurrent cost per service would decrease to US\$0.67 for diarrhea, US\$0.86 for ARI, US\$1.79 for RDT for fever cases, and US\$0.92 for confirmed malaria. These decreases in unit costs over the years are due to economies of scale, since the indirect costs of management and supervision are divided over greatly increased numbers of services.

Even with a small sample, it is fairly clear from the analysis that the program would be expensive unless the numbers of services increase or management and supervision costs are reduced. The study also showed that the analysis of costs may need to be accompanied by other studies that could indicate possible constraints to scaling up, such as a review of the impact of user fees and stock-outs.

**Table 2. Average recurrent cost per service (USD)**

	2011 Actual	2012 Projected	2013 Projected	2014 Projected	2015 Projected	2016 Projected
<b>Diarrhea</b>	6.52	1.75	1.17	0.92	0.77	0.67
<b>ARI</b>	9.65	2.49	1.63	1.25	1.02	0.86
<b>RDT (fever cases)</b>	7.51	2.76	2.22	1.99	1.87	1.79
<b>Malaria (confirmed)</b>	3.78	1.40	1.13	1.02	0.96	0.92

Testing of the iCCM Costing and Financing Tool in Senegal indicated some additional factors that may need to be taken into account in some countries. These include using different types of community health workers, such as ASCs and ASC-*matrones* (maternal community health workers), and separating the cost of diagnosing malaria (by testing all fever cases with an RDT) from the cost of treating confirmed malaria cases. The testing also led us to update the tool by adding a new section to account for the running costs of the cases de santé, including electricity and water costs.

## 1. Introduction

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Integrated community case management (iCCM) has proven to be an effective strategy for expanding the treatment of childhood diarrhea, pneumonia, and malaria. It is accepted as a key strategy to meet Millennium Development Goal (MDG) 4 and to achieve the Global Health Initiative (GHI) vision.

Diarrhea, malaria, and pneumonia are the leading causes of child mortality, resulting in nearly 44% of deaths worldwide in children under five years old. 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), the US Agency for International Development (USAID), and the GHI as an effective strategy to deliver lifesaving interventions for these illnesses. Several developing countries have adopted and promoted policies and programs in which CHWs encourage 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 have yet to be implemented or scaled up in some other countries. This lack of implementation is partly due to uncertainty about the costs and financing of iCCM programs. A comprehensive understanding of costs and financing will help countries that are considering implementing or expanding iCCM programs to advocate for the necessary funding from donors and ministries of finance. This understanding will also enable these countries to allocate sufficient resources to the appropriate levels of the health system and to better monitor and control costs, thus ensuring the efficient use of scarce resources.

Unfortunately, in many developing countries, there is a lack of skills necessary to analyze the cost and funding needs of such programs, as well as a lack of simple, user-friendly tools with which to conduct this analysis. Moreover, the absence of a standardized analysis model means that even where cost and financing studies are done, they may not be accurate or complete and are not generally comparable across countries or over time.

The purpose of this project is to develop a simple, user-friendly tool to determine the costs of starting up or scaling up iCCM programs. The work includes visits to three countries to help develop and test the tool, beginning with Malawi and then moving on to Rwanda.<sup>4</sup> This report outlines the results of testing the tool in Senegal, the third and final research country. Testing the tool requires only a small sample of facilities and CHWs. That sample is too small for the resulting data to provide a comprehensive picture of the Senegal program as a whole, and the results of the modeling shown in this report should, therefore, be considered as illustrative. Nevertheless, we believe that these results can be useful to the Ministry of Health and Prevention (MOPH) and its partners, and the assumptions used for testing the tool can be updated as needed so that more complete and accurate results can be produced.

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<sup>4</sup> 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.

## 2. Background and Country Context: Senegal

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Senegal has a population of 12.4 million and is growing at a rate of approximately 2.3% per year. Many of Senegal's health indicators are improving, even though the country seems unlikely to reach any of the MDGs by 2015. Senegal's improvements in child and infant mortality rates are especially notable. The under-five mortality rate has dropped from 121 per 1,000 live births in 2005 to 72 in 2011. The under-one mortality rate has dropped from 61 per 1,000 live births to 47 during the same time frame.<sup>5</sup>

For many years Senegal has been heralded for its community health program, which has often been cited as one of the best-established national iCCM programs in the world.<sup>6</sup> Senegal's program has been a model for the development of community health programs across Africa, including Togo, Madagascar, Democratic Republic of the Congo, Niger, and Rwanda. Senegal's Ministry of Health and Prevention (MOHP) has hosted technical exchanges allowing other countries to learn from its experience.

Senegal has a rich history of community-based treatment of illness. Community-owned *cases de santé* (health huts) have been providing treatment for diarrhea and malaria since the 1950s and are a staple of the Senegalese health system. This health system is mostly government run and consists of 20 referral hospitals, 77 health centers, 971 health posts, and an estimated 2,300 health huts that receive technical assistance from the MOHP.

USAID, UNICEF, and the World Bank have been major supporters of Senegal's community health program over the years. The MOPH has played a key technical function in this program and has stated its intention of taking over the financing in the near future. At the time of this analysis, there was no established community health policy governing the program, but the Division of Primary Care at the MOHP is working to develop one. When the community health program in Senegal began, the health huts were providing the following services: immunization, malaria control, oral rehydration therapy for treatment of acute diarrhea, and growth monitoring and nutrition services. Throughout this early phase, Senegal's community health program received no formal support from the MOHP, and no data were collected on the services that were provided. It was not until 1992 that the MOHP established a legal framework for the development of health committees, thereby formalizing the provision of health care services at the community level.<sup>7</sup>

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<sup>5</sup> Agence Nationale de la Statistique et de la Démographie (ANSD) and MEASURE DHS, ICF International, *Senegal: DHS, 2010–2011* (Dakar, Senegal, and Calverton, MD: ANSD and ICF International, February 2012).

<sup>6</sup> 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).

<sup>7</sup> Maternal and Child Health Integrated Program (MCHIP), *Integrated Community Case Management of Childhood Illness: Documentation of Best Practices and Bottlenecks to Program Implementation in Senegal* (Washington, DC: MCHIP, January 2012).

In 2003, following the success of the pneumonia treatment pilot program in Nepal, Senegal conducted a feasibility study on the ability of its CHWs to diagnose and treat acute respiratory infection (ARI) with antibiotics. The success of this study led to the introduction in 2003 of ARI diagnosis and treatment as services provided by CHWs at the community level.<sup>8</sup> At the same time, health huts began reporting the services they provided as well as formalizing the supply process for medicines and supplies.

Although CHWs in Senegal have long been providing malaria services, there were concerns that artemisinin-combination therapies (ACT) would be too complicated for CHWs, and the provision of these treatments was restricted to doctors and nurses. A feasibility study confirmed that CHWs were in fact capable of providing ACTs, and now the standard services for malaria are diagnosis with a rapid diagnostic test (RDT) and treatment with ACT if the test is positive. This change in protocol has drastically reduced the number of febrile children treated unnecessarily with malaria medications.<sup>9</sup>

The incremental addition of ARI and malaria diagnosis and treatment to the existing treatment of diarrhea has been cited as a key strength of Senegal's iCCM program, together deep community support for the health huts. Both factors have been highlighted as key to the success and sustainability of the iCCM program.

Now that the iCCM package has been finalized in Senegal, the country's community health program is rapidly expanding. Its current lead implementer is the USAID-funded Community Health Program (CHP), which is run by a consortium of NGOs led by ChildFund International and including Africare, Catholic Relief Services, Environmental Development Action in the Third World (ENDA), Plan International, and World Vision International (WVI). CHP now supports community health activities in 76 health districts in all 14 of Senegal's regions.<sup>10</sup> The country has been geographically split among the consortium of NGOs, and each health district has an NGO consortium member that is primarily responsible for that district's community health activities. All the NGOs that are a part of USAID's CHP implement the program across the districts using a similar model. The iCCM program has been operating in 65 of the 76 districts and is being scaled up to 72 districts. The remaining 4 districts are urban and are not considered to require iCCM programs.

Community committees also play an important role in organizing and managing community health services. These committees consist of community volunteers who oversee the functioning of the health huts. Each community committee is responsible for managing the finances of the local health hut and often makes many of its managerial decisions, including playing a key role in selecting the hut's CHWs. The committee is also responsible for collecting user fees from the CHWs and using them to purchase medicines for the health hut. Over time, as the NGOs withdraw their direct support from the CPH, the community committees are expected to assume primary responsibility for managing the health huts.

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<sup>8</sup> Basic Support for Institutionalizing Child Survival (BASICS), *Scaling Up Community-Based Treatment in Senegal* (Washington, DC: BASICS and USAID, 2006).

<sup>9</sup> Ibid.

<sup>10</sup> Four urban areas are excluded from the program because it focuses on hard-to-reach areas.

The health huts are located primarily in areas without easy access to health posts, and many of them have been in existence for a long time. There is no strict rule for where health huts should be located; rather, they have developed organically based on needs expressed by the communities themselves.

There are three main cadres of community health workers in Senegal: *agents de santé communautaire* (ASCs), *matrones*, and *relais*. ASCs are men and women who are selected by community members to receive structured training that then allows them to provide basic curative health care services in health huts. The three key iCCM treatments provided by ASCs are antibiotics for ARI, RDT and ACT for malaria, and oral rehydration salts (ORS) and zinc for diarrhea.

Also chosen by the community, *matrones* are women who focus on maternal and reproductive health, providing assistance to mothers during pregnancy, delivery, and postpartum. Health huts are equipped with the basic equipment needed to facilitate an uncomplicated delivery. *Matrones* are sometimes referred to as *ASC-matrones* because they receive the same training as ASCs and can provide basic curative services, including iCCM, in addition to maternal health care.

*Relais communautaires* (community liaisons) are men and women who provide the critical link between the community and the health huts. Their work on behavior change communication (BCC) activities and community mobilization, as well as health promotion, generates improved health and community development. *Relais* play a critical role even in communities where health huts do not exist, serving as a link to the nearest primary health care unit.

Most of the health huts in Senegal are fully staffed, so currently no large groups of ASCs are being trained. However, training is held on a case-by-case basis to replace departing ASCs or to staff a new health hut. The training for ASCs is a 10-day course that covers diagnosis and treatment of diarrhea, malaria, and ARI, in addition to health promotion activities and other duties. *Matrones* participate in the same 10-day training and then go through an additional 2 days that cover family planning and deliveries. In addition to the course, ASCs and *matrones* participate in on-the-job training with the *infirmier chef de poste* (ICP) (chief nurse) at a health post, treating children under five and (in the case of *matrones*) also delivering babies. The duration of on-the-job training varies, given that the patient caseload at various health posts can be quite different.

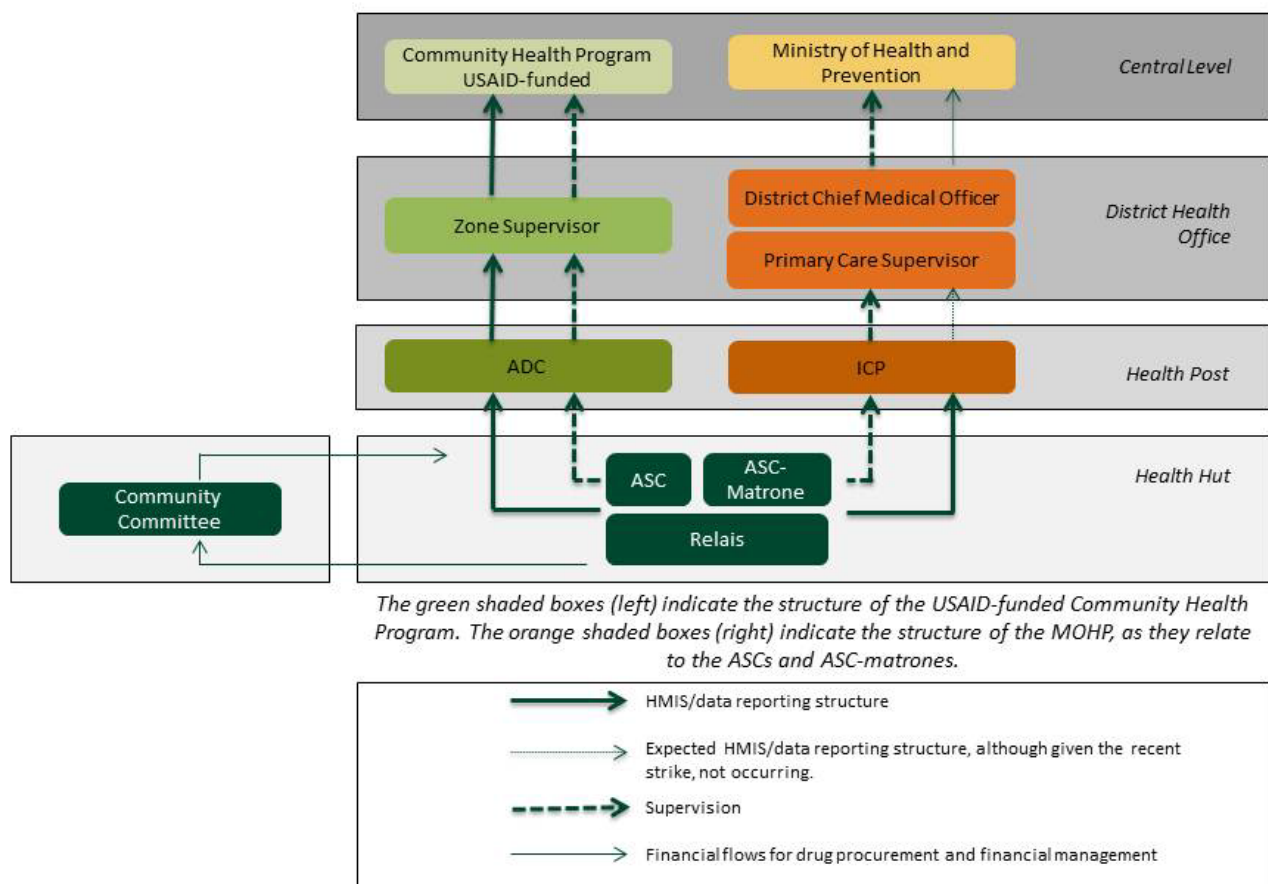
The supervision structure for all ASCs is standardized. There are two channels of supervision: one through the USAID-funded CHP and another through the MOHP. The focus of supervision is split between the two; the CHP provides reporting, data use, and drug management supervision, while the MOHP provides technical supervision. Figure 1 shows the supervisory structure of the community health program, as well as its relationships with the MOHP.

ASCs are supervised by the *agent de développement communautaire* (ADC) (community development agent), a CHP staff member responsible for a number of health huts within the health district. The ADC monitors the work of the ASCs, ensuring that they provide the established basic package of health services at an acceptable quality. ADCs work together to review record keeping and resolve supply-chain issues. ADCs also work with the ASCs to develop outreach plans. The ADC reports to the *responsable de zone* (zone supervisor), who is also a CHP staff member.

The MOHP's ICP works closely with the ADC and ASCs to ensure that they are providing high quality health care services. This supervisory role is more technical in nature than that of the ADC. The ICP travels to the health hut to work with the ASCs, reviewing their treatment protocols and providing outreach services that the ASCs and *matrones* cannot perform.

ASCs complete a monthly health information management system (HMIS) reporting form that covers the number of services that are provided at the health huts. The report includes curative iCCM services, as well as maternal health and family planning services. The ASC and *matrone* working at an individual health hut compile the monthly report jointly. Reports are submitted to the ICP at the health post, where they are compiled and submitted to the district supervisor in charge of primary care. District reports are then compiled and submitted to the national level.

**Figure I. Senegal's Community Health Program**



Source: Authors

The iCCM program in Senegal involves a cost-recovery mechanism. While the ASCs are a volunteer cadre of workers, they charge the patients user fees for services provided, including iCCM services. The ASCs set their own prices for the medicines at the health huts with the approval of the community committee. Among the health huts that were visited, all charged some kind of markup, ranging from 5 to 25%. Most health huts charged a 10% markup, with the average across all huts at 12.7%. The user-fee revenues are used to buy medicines and cover other operating costs, such as patient transportation and cleaning supplies.

The CHP generally funds the initial stock of iCCM medicines, which are intended to serve as the basic stock for service provision. Replacement medicines are supposed to be financed from user-fee revenue.<sup>11</sup> The ASCs, via the community committees or cooperatives, order medicines and supplies from the ICP, who then buys them from the regional pharmacy. ASCs and *matrones* order medicines every month, following a protocol based on their monthly consumption rates. Health huts and health posts routinely face medicine shortages. In particular, anecdotal evidence suggests that in the past, both have had difficulties maintaining their stock of zinc.

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<sup>11</sup> It is not clear if the CHP provides additional medicines to build up the stock of medicines when the program is scaling up. Often with this type of program, user-fee revenue is not sufficient to build up reserves of stock. If the program cannot generate enough revenue from user fees, it can become undercapitalized, resulting in stock-outs. Stock-outs, in turn, generally lead to reduced demand, which can prevent the program from scaling up and can also reduce the cost-effectiveness of its services.



### 3. Methodology

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#### Tool Development

The Senegal iCCM Costing and Financing Tool was developed in Microsoft Excel (Version 2010).<sup>12</sup> It covers all aspects of the vertical program, including 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 Senegal model covers the three key iCCM interventions—diarrhea, ARI, and malaria—and has the capacity to include other interventions, such as treatment of neonatal sepsis. It is largely a bottom-up, activity-based costing tool, in which costs are built up by type of resource (such as medicines) on the basis of actual and targeted numbers of services using the incidence rates. The tool estimates the number of CHWs required as well as anticipated support and supervision staffing needs. It takes into account constraints—for example, the amount of time available for a CHW to provide services. Indirect recurrent costs, such as supervision, are allocated across the iCCM services based on the proportion of time required for treatment of each disease, divided by the total time required for treatments overall.<sup>13</sup> The tool produces the cost per output, as well as aggregate costs for different levels of the health system (e.g., community, district, and national).

The tool contains a need norms section that uses incidence rates to estimate the expected caseload for the specified catchment population. The user can input assumptions into the tool about CHW availability, so that the number of projected services is constrained to the number of available CHW work hours.

The tool then estimates the costs of meeting the total calculated need, in addition to reaching different coverage targets, using standard costs. These are based on national standard treatment protocols, often developed based on WHO standards, and reviewed by an expert group of practitioners in each country. The tool can then be used to compare actual costs with standard costs.

In summary, the tool automatically produces different output costs that can be used to measure cost efficiency and effectiveness. These output costs include costs per capita, per contact, per disease type, and per resource type. More specifically, users of the model will be able to calculate the following:

- total program costs, baseline year and multi-year cost projections;
- costs per capita, per service, per disease type, 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;
- incremental costs for each of the disease areas (diarrhea, malaria, and ARI) with the capability to include other iCCM interventions;
- key drivers of costs and cost categories, as a percent of total costs; and
- five-year projections of financing with sources of funding.

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<sup>12</sup> The use of Microsoft Excel requires a license from Microsoft Corporation. This tool is not a product of Microsoft Corporation and is not guaranteed by that company.

<sup>13</sup> If the iCCM providers receive salaries, these costs can be used instead of hours.

These outputs can be used to:

- advocate for funding from the government or donors;
- develop government or donor budgets;
- measure cost efficiency and effectiveness;
- produce global and country financial iCCM indicators, as developed by the iCCM technical advisory group;
- develop “what-if” scenarios for use by researchers or program managers to help model program sustainability or match reductions in funding.

The tool allows the user to specify the desired coverage levels of the iCCM program, as follows:

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### ***Scenario 1: Purpose of the Tool***

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The user is asked to select between two options: (1) Scale-Up of Existing iCCM Program and (2) Introduction of New iCCM Program. Countries that currently have an iCCM program in place should select the first option; countries that are considering starting up a new program should select the second option. The key difference between the two options for Scenario 1 is the use of baseline data. If a country selects the “Scale-Up of Existing iCCM Program” option, the user is allowed to input baseline data in the “Baseline Data” worksheet of the model. This data can then be used in the subsequent two scenario questions (on geographic and service delivery coverage) to evaluate the current actual iCCM coverage. However, if the user selects the “Introduction of New iCCM Program” option under Scenario 1, the data cannot be used in conjunction with the “Actual” option in Scenarios 2 and 3.

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### ***Scenario 2: Geographic Coverage***

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The user is asked to select among three options: (1) Actual, (2) Full-Scale, and (3) Target Geographic Coverage. Geographic coverage is defined as the number of provinces, districts, and other administrative structures in which the iCCM program is functional.

Selecting the “Actual Geographic Coverage” option allows the user to input the current actual coverage of an existing iCCM program for the baseline year. Selecting the “Full-Scale Geographic Coverage” option results in a scenario with geographic coverage of the entire country for all program years. The user is asked to input the total population and number of each geographic unit (province, district, village, etc.) in the country, and that information then drives the number of iCCM services. Selecting the “Target” option allows the user to input a target coverage (expressed as a percentage of full-scale coverage) of the iCCM program. For example, if the iCCM program is currently in the pilot phase in 5 of 30 districts, the user can specify an increasing number of districts to be covered for each subsequent program year. The user must identify the population covered within the geographic areas for each program year, and that information then drives the number of iCCM services.

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### **Scenario 3: Service Delivery Coverage**

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The user is asked to select among three options: (1) Actual, (2) Full-Scale, and (3) Target Service Delivery Coverage. Service delivery coverage is defined as the number of diarrhea, ARI, and malaria cases treated through iCCM, divided by the total number of expected cases within the designated geographic coverage area.

Selecting the “Actual Service Delivery Coverage” option allows the user to input the actual total number of iCCM treatments provided for baseline year. Selecting the “Full-Scale Service Delivery Coverage” option results in a scenario in which the total population defined within the geographic coverage areas of the iCCM program is assumed to be treated through iCCM. In this scenario the tool calculates the number of treatments by multiplying the total population under age five by the incidence rate for each iCCM condition in the package. Selecting the “Target Service Delivery Coverage” option allows the user to input a target (expressed as a percentage of full need) of iCCM treatments provided to children in iCCM-covered areas. In this scenario the tool calculates the number of treatments based on the incidence rates for each iCCM condition. The methodology is similar to the one used for the “Full-Scale” option; the key difference is the assumption that the target delivery coverage is less than the full need. This target is expressed as a percentage of the total expected caseload.

For each coverage scenario, the tool calculates the cost data using a mix of actual and standard costs (see Table 3). For example, the user inputs actual salaries to determine supervision costs, but the tool uses standard estimates for staff time spent on supervision, to arrive at a total supervision cost. The actual costs for trainings and meetings are applied to the normative number of each occurrence. For example, actual cost inputs for the monthly ASC meetings are determined and multiplied by 12, assuming that all monthly meetings did or will occur as planned.

For the “Actual” options for the two coverage scenarios, the tool combines the actual number of iCCM services with the standard costs of providing each service, to arrive at a total cost.<sup>14</sup> For this option the tool also uses the actual number of CHWs currently providing iCCM and multiplies this figure by the standard CHW salary allocated to iCCM, if applicable. Costs for the “Target” and “Full-Scale” options for the two coverage scenarios are based on standard costs, using a methodology similar to the one described for the “Actual” option. For these coverage options, the required number of CHWs is driven by demand (utilization).

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<sup>14</sup> 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.

**Table 3. Sources of costs used in the iCCM model**

Element	Source	Comment
<b>ASC and iCCM training</b>	Average of the actual unit costs of training from partners	The actual unit cost was multiplied by the standard number of expected participants to arrive at total cost.
<b>ASC incentives and equipment</b>	Actual unit costs of incentives (e.g., kits, bicycles) for ASC	The actual unit cost was multiplied by the total calculated number of ASCs (assumed that they all received the incentives).
<b>iCCM diagnosis and treatment</b>	Actual unit prices of medicines and supplies	The standard quantities of medicines and supplies were multiplied by standard unit medicines prices.
<b>Health post, district health office (DHO), and central level salaries</b>	Actual 2011–12 salary costs covered by NGO consortium	Actual salaries were multiplied by standard estimates for time spent on supervision to arrive at the total supervision cost.
<b>ASC meetings</b>	Average of the actual unit costs for meetings for partners	The actual unit cost was multiplied by the standard number of expected participants to arrive at total cost.

### Partner and Central Level Data Collection

Partners were interviewed about the support provided for iCCM implementation. We used a standard questionnaire, which we amended to reflect the degree of variation between each partner’s activities.

In the standard questionnaire, partners were asked to provide the following information:

- districts in which partner supports iCCM implementation;
- training data for ASCs and matrones (including the number trained, total costs, and unit costs);
- supervision data (including total spent per year at each level — central to facility, facility to community — and the unit costs for supervision);
- costs and quantities of medicines/supplies provided to ASCs and matrones for iCCM (including transport and storage costs);
- partner iCCM program support costs (including supervision, mentoring, and reporting time provided directly from partner staff to Integrated Management of Childhood Illness (IMCI) unit or districts);
- budget/projections for future spending/commitment on iCCM activities.

To collect this information, the research team met with the iCCM/child health focal staff at the following organizations, projects, and initiatives: ChildFund International, AFRICARE, Catholic Relief Services, Plan International, WVI, ENDA Santé, ENDA Graf Sahel, and UNICEF. Together, these partners provide support for the national iCCM program across 14 regions in Senegal.

The information collected at the central level (NGO partners and MOHP) includes the following:

- names of staff, salaries, and percentage of time spent on the CCM program (including percentage of time spent on supervision, trainings, and meetings);
- national treatment protocols for community case management of diarrhea, malaria, and ARI;
- national IMCI training manual for ASCs;
- national CCM program start-up costs;
- historical program costs;
- caseload for all iCCM services (diarrhea, malaria, and ARI) in each district covered;
- prices for required medicines and supplies that ASCs distribute;
- reporting/supervision, data management, and medicines/commodity flow relationships;
- training requirements for ASCs.

It should be noted that inflation is included in the tool, and all costs presented in this report reflect an annual increase of 2.5%.

## Facility and Village Level Data Collection

The iCCM Costing and Financing Tool described above uses both actual and standard expenditure and utilization data. To test the functionality of the assumptions, norms, and standards in the model, actual costs and revenues were analyzed for a small number of communities. The actual data collected were used to help build a complete picture of the Senegal community health program, recognizing that such a small sample may mean that the results are not fully representative of the whole program.

The sample for this study was taken from six districts selected from six different regions that were supported by key CHP partners, including ChildFund International, Plan International, AFRICARE, WVI, Catholic Relief Services, and local Senegalese NGOs. One health post was selected in each district, two ASCs were interviewed at each health post, and an additional seven *ASC-matrones* were interviewed at some of those health posts (Table 4). The regions and districts were chosen to represent the geographic diversity of the program areas and the different implementing iCCM partners. Within each district the health post was selected if it had a high number of accessible health huts and a high volume of reported iCCM cases. (See Annex A for details of actual facilities sampled.)

The data were collected at the three lower levels of the health system: the district level (district health office), the health post level, and the community level (via ASCs and *ASC-matrones*). At the district health office (DHO), data were collected from the district chief medical officer and the primary care supervisor. At the health posts, the ICP and ADC provided catchment population figures, utilization data, and expenditure figures for these facilities and the communities they serve. At the community level, ASCs and *matrones* provided population and utilization figures for the specific areas covered by their health huts. They also provided detailed information on their time usage, supervision, reporting, and meeting requirements. Each level was asked about the trainings attended and the allowances received.

All data were collected by oral interviews, and information was captured electronically. Where possible, soft copies of documents were collected; if only hard copies existed, photographs were taken for subsequent data entry. A standard questionnaire and data collection checklist were applied at each level (see Annex C for questionnaire templates).

**Table 4. Summary of data collection**

Region visited	Health post visited	# of ASCs interviewed	# of matrones interviewed	Partner organization
<b>Dakar</b>	NIAGUE Health Poste	2	1	ENDA
<b>Diourbel</b>	Dispensaire Privé Catholique Maria Asunta de Ngohe	2	1	Catholic Relief Services
<b>Fatick</b>	SOKONE Health Poste	2	2	ChildFund
<b>Fatick</b>	NDOSS Health Poste	2	0	World Vision International
<b>Kaolack</b>	KEUR-BAKA Health Poste	2	2	ChildFund International
<b>Thies</b>	NOTTO Health Poste	2	1	Plan International
<b>TOTAL</b>	<b>6</b>	<b>12</b>	<b>7</b>	

### Catchment Population

Catchment population figures for the villages were collected at the health huts. The ASCs or matrones provided reports that indicated the following: estimated size of the catchment population, the number of villages and households included, and the estimated proportion of key population segments (pregnant women, children under five years of age, and children under one year of age).

### Medicines

A list of essential medicines and equipment for the health huts in Senegal was obtained from ChildFund. The health huts operate as primary health care units in areas without access to health posts and are therefore fully equipped to provide deliveries and other services. (See Annex E for the full list of medicines and equipment that should be available at health huts.)

### Training

Training for the CCM Program in Senegal is primarily funded and facilitated through the CHP. Led by ChildFund International, members of the consortium of NGOs use the same budget details for their trainings (per diems, facilitator costs, transport costs, etc.) in an effort to standardize costs. These training costs were covered by ChildFund International and cover the variety of trainings that are conducted through the CHP.

## 4. Assumptions and Standard Data Input into the Tool

The following information was obtained through the various data collection methods described above and was input into the iCCM model:

All costs are reported here in US dollars (USD), using an exchange rate of 499 Central African francs (CFA) per 1 USD. Standard annual inflation rates of 2.5% and annual salary increase rates of 3.4% were applied in the modeling exercise.

### Population Figures

Table 5 shows the population and geographic coverage assumptions input into the iCCM tool for Senegal. As noted earlier, health huts in Senegal are meant to serve areas that do not have health posts, and therefore these health huts serve primarily rural and remote areas. In 2011 the CHP covered 65 districts; after the renewal of the project for another five years, 7 districts were added to bring the total to 72. Senegal has a total of 76 health districts, but 4 of them are in highly urbanized areas of Dakar city that do not require health huts.

**Table 5. Population figures (2011)**

<b>Total population of Senegal</b>	12,855,153
<b>Total population under five years of age (14.7%)</b>	1,889,707
<b>Total regions in Senegal</b>	14
<b>Total health districts in Senegal</b>	76
<b>Total health posts in Senegal</b>	1,240
<b>Annual population growth rate</b>	2.5%
<b>Average population size per health hut</b>	750

### ASC Availability and iCCM Service Delivery Assumptions

A total of 12 ASCs and 7 matrones were interviewed for this study. Because ASCs are volunteers in Senegal, and no standardized hours of operation are specified by the iCCM policy, the average actual hours worked were entered into the model. The actual hours per week per ASC were based on a recall of the previous week's activities (see Annex C5 for template). Each health hut is supposed to be staffed by a minimum of one ASC and one ASC-*matrone*, although in some cases, there may be two ASCs and one *matrone*. The ASCs carry out promotional and prevention activities as well as iCCM services, and the ASC-*matrones* are trained to provide curative care as well as maternal health services.

The iCCM costing and financing tool uses the iCCM time available per ASC to calculate the total number of ASCs required to deliver the total number of services in each scenario. However, the user can override this calculation by entering a maximum and minimum number of ASCs per village or community. In the analysis presented in this report, the tool calculates the number of ASCs and ASC-*matrones*, based on the time available and the total burden of services (determined by the incidence rate per service multiplied by the population under five).

## Program and Coverage Assumptions

As described in the background section of this report, Senegal's iCCM program is largely implemented by the USAID-funded CHP, run by ChildFund International and a consortium of NGOs. The five-year program and coverage assumptions inputted into the tool correlate to the lifespan of the CHP.

The iCCM tool defines coverage in two ways: geographic coverage and service delivery coverage. Geographic coverage refers to the physical areas that will be implementing iCCM, such as the number of regions, districts, health posts, and villages. The geographic coverage also requires the total population reached by iCCM to be defined. Within the geographic coverage areas, the service delivery coverage refers to the number of expected cases that will be treated by the program.

Table 6 shows the geographic coverage assumptions that we input into the iCCM tool. The 2011 data served as the baseline for this analysis and reflect the coverage actual coverage achieved by the CHP in that year. The total population and under-five population figures represent the estimated number of people covered by the iCCM program. The total estimated population covered by iCCM services of 1,631,700 and under-five population of 288,811 in 2011 represented 12.7% of Senegal's total population of 12.8 million and the under-five population of 1.8 million.

**Table 6. Geographic coverage assumptions for iCCM program in Senegal, 2011–2016**

	2011 Actual	2012 Target	2013 Target	2014 Target	2015 Target	2016 Target
<b>Regions</b>	13	14	14	14	14	14
<b>Districts</b>	65	72	72	72	72	72
<b>Health posts supervising iCCM</b>	1,061	1,175	1,175	1,175	1,175	1,175
<b>Health huts providing iCCM</b>	1,620	1,794	1,794	1,794	1,794	1,794
<b>Population total covered</b>	1,631,700	1,807,422	1,852,607	1,898,922	1,946,395	1,995,055
<b>Population &lt;5 covered</b>	288,811	319,914	327,911	336,109	344,512	353,125

Table 7 shows the service delivery coverage assumptions that we input into the iCCM tool. Service delivery coverage is expressed as a percentage: total actual iCCM cases treated divided by total expected cases. The total number of expected cases for each intervention is based on the incidence rates (see next section) multiplied by the expected under-five population covered by the iCCM program, as stipulated by the geographic coverage assumptions.

The 2011 data are based on the actual number of iCCM treatments for each intervention area, as reported by ChildFund. Because RDTs are conducted for any suspected malaria case, these tests are considered a separate service, with a different incidence rate than confirmed malaria.



In some cases the actual numbers of services provided in 2011 were low compared with the expected numbers of cases. Actual diarrhea treatments in 2011 were only 1.5% of the total expected need, RDTs were 2.4%, ARI treatments were 10.3%, and malaria treatments were 22.9%. These gaps in treatment may stem from stock-outs of medicines and supplies, from potential patients' inability to pay user fees, or from their lack of trust in the ASCs. These may, in turn, result in care seeking at other facilities (e.g., health posts or traditional healers), treatment at home, or no treatment at all.<sup>15</sup>

The service delivery coverage targets for year 2012-2016 are illustrative and were set by the authors to reflect increases from the baseline figures at an incremental rate, all increasing at 5% per year from the initial baseline.

**Table 7. Service delivery coverage assumptions for the iCCM program, 2011–2016**

	2011 Number of actual iCCM Treatments	2012 Projected	2013 Projected	2014 Projected	2015 Projected	2016 Projected
<b>Diarrhea</b>	15,302	10%	15%	20%	25%	30%
<b>ARI</b>	23,387	15%	20%	25%	30%	35%
<b>RDT (fever cases)</b>	25,096	10%	15%	20%	25%	30%
<b>Malaria (confirmed)</b>	7,265	25%	30%	35%	40%	45%

### Incidence Rates for the iCCM Interventions

Incidence rates for each intervention were calculated based on the prevalence rates reported in the 2010 Demographic Health Survey (DHS) for Senegal. These incidence rates are national averages for the country and relate to each of the three intervention areas overall.<sup>16</sup> Thus, if 21% of children were reported to have diarrhea, these cases could be treated through iCCM or other means, such as at a health post. For each disease the DHS reports the percentage of children who had symptoms in the two weeks prior to the survey. To convert from prevalence to incidence rates, we took the two-week prevalence figure and annualized it based on the average duration of each disease. For example, 21% of children were reported to have had diarrhea in the two weeks prior to the DHS survey. A meta-analysis of zinc treatment for diarrhea shows that the average duration of an episode is 4.07 days.<sup>17</sup> To adjust to an annual figure, we divided 52 weeks by 2.6 (the number of two-week periods including the duration of the episode) to arrive at 20.15. This figure is then multiplied by the 21% prevalence rate to arrive at an incidence rate of 4.23 episodes per year.

<sup>15</sup> It is important to conduct research to determine if user fees contribute to this low utilization of services. If they are, then the fact that the poorest patients do not have economic access to treatment could be a constraint on the scaling up of services. Research should also be conducted to see if stock-outs are common and if they are also a factor in low utilization.

<sup>16</sup> Incidence rates for hard-to-reach areas were not available but could be higher than the national averages.

<sup>17</sup> Marek Lukacik, 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>.

Using this methodology, we calculated the incidence rate for each intervention area (see Table 8). We used the same rate for each program year, although this figure can be adjusted if new information becomes available.

**Table 8. Calculation of Incidence Rates**

	Prevalence (DHS)	Average duration (days)	Adjustment factor to annual figure	Incidence (episodes per year)
<b>Diarrhea</b>	21%	4.07	20.15	4.23
<b>ARI</b>	5%	5.00	19.16	0.96
<b>RDT (fever cases)</b>	23%	5.00	19.16	4.41
<b>Malaria (confirmed)</b>	1%	3.00	21.41	0.15

## Standard Treatment Guidelines

The model focuses on the three key iCCM interventions provided by Senegal's ASCs: for diarrhea, malaria (RDT for fever cases and treatment of confirmed malaria), and ARI. We determined the standard costs associated with treating these illnesses by consulting the iCCM clinical guidelines. These costs include those associated with treating illnesses (such as medicines costs and salary costs on time spent per service) and do not include the costs associated with the preventive services. ASCs tend to focus on curative services only when sought out by caregivers, and the time they spend on general preventive services is assumed to take place outside of the time allocated specifically to iCCM services. The diagnostic and treatment time spent by ASCs is the time accounted for in the model; calculating the costs associated with preventive activities (such as encouraging breastfeeding to prevent diarrhea and providing bed nets to prevent malaria) is beyond the current scope of the model.

Table 9 shows the standard time an ASC needs to provide each service and also the average medicine and supply cost for each service, as estimated by staff at ChildFund. These standard times may vary from the actual times reported by the ASCs, as described earlier in the report. However, the standard times are used in this exercise. Annex E provides a list of all equipment and medicines that should be on hand at every health hut.

**Table 9. Standard Treatment Guidelines**

	Standard time to treat one patient (minutes)	Medicines/supplies needed	Average medicine cost per episode (USD)
<b>Diarrhea &lt; 5</b>	20	ORS (4 sachets) Zinc (10 or 20 mg)	0.09
<b>ARI &lt; 5</b>	30	Co-trimoxazole (120 mg)	0.04
<b>RDT (fever cases) &lt; 5</b>	20	RDT	1.09
<b>Malaria (confirmed) &lt; 5</b>	10	Artesunate + amodiaquine (50 + 135 or 25 + 65.5 mg)	0.56

## Management, Supervision, and Meetings

The CHP funds the bulk of management, supervision, and meeting costs for Senegal's iCCM program. CHP staff conducts much of the management and supervision at the district, health post, and village level—in particular, the zone coordinators at the regional level, the zone supervisors at the district level, and ADCs at the health post and village level. At the central level, two divisions within the MOHP are involved in overseeing the iCCM program: *Division de l'Alimentation, de la Nutrition, et de la Survie de l'Enfant (DANSE)* and *Division de Soins de Santé Primaire (DSSP)*. The directors of each division are involved in the community health program, so a portion of their salary is allocated to iCCM management costs. Management costs for both the CHP and MOHP staff are included at each level.

## 5. Analysis

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### Summary of Findings from ASCs Interviewed

A total of 19 ASCs and ASC-*matrones* were interviewed for this sample. Twelve of the interviewees were ASCs and 7 were ASC-*matrones*. Of the 7 ASC-*matrones*, only 1 of them provides any iCCM-specific services. The remaining 6 ASC-*matrones*, provide only maternity services to the catchment population, despite having received iCCM training.

The following information about time spent on activities was reported for both ASCs and ASC-*matrones*, unless otherwise noted.

ASCs carry out health activities an average of 5.7 days per week. They work between 2 and 7 hours per day, averaging about 4.8 hours per day. Only 9 of the 12 ASCs interviewed could estimate how many hours per day they provide iCCM services; those 9 estimated spending on average 2 of their 4.8 daily work hours, or roughly 42%, on those services.<sup>18</sup> We used this percentage allocation of 42% throughout the model to determine the portion of general community health program costs to attribute to the iCCM program. For example, the tool calculates the total cost of regular supervisory meetings for all ASC activities and then multiplied this figure by 42% to determine the portion that should be allocated to the iCCM program cost.

ASCs and ASC-*matrones* receive supervision by meeting at their health hut with the ICP and ADC for their district. Of the 19 ASCs and ASC-*matrones* interviewed, 13 reported that they receive supervision from their ICP. The ICP travels to every health hut once per month, and visits last 5.4 hours on average. The ADC visits the health huts more frequently, although with less consistency. All 19 ASCs and ASC-*matrones* indicated receiving this supervision; 10 ASCs reported visits once a month, 5 reported visits twice per month, and 4 reported visits at least once per week. These supervisory ADC visits last anywhere from 1 to 8 hours, averaging 4.5 hours.

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 post has 1 ICP; those interviewed estimated that of their total time supervising ASCs and ASC-*matrones*, they devote approximately 10% to iCCM-specific activities. This estimate led us to allocate 4% of the ICP's overall time (10% multiplied by 42% iCCM percentage allocation) to ICP supervision in the tool. Each district also has 1 ADC; because ADCs reported that they spend the bulk of their time supervising community activities, we applied the full 42% iCCM percentage allocation to ADC supervision.

Reporting at the ASC level is done by both the ASC and the ASC-*matrone*, with varying levels of responsibility. In some health huts, they sit and complete the report together, while in others only 1 person is responsible for the entire report. (This variation accounts for some of the zeros in the reporting.) The 19 interviewees reported spending 0–3 hours per month completing their reports, with an average of 1 hour per month.

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<sup>18</sup> Because our interviews revealed that ASC-*matrones* provide few or no iCCM services, these figures do not include any time that *matrones* may have been spent on iCCM.

Time spent per type of case (diarrhea, malaria, ARI, and referral) was fairly consistent across all respondents. A total of 14 ASCs were able to provide information on the amount of time spent per case. For diarrhea cases ASCs spend approximately 25 minutes per case (minimum 5 minutes, maximum 60 minutes, median 15 minutes). For ARI cases they spend slightly longer, with an average of 26 minutes per case (minimum 5 minutes, maximum 60 minutes, median 30 minutes). We separated malaria cases into RDT positive and RDT negative cases. For RDT negative cases, ASCs spend an average of 22 minutes (minimum 3 minutes, maximum 60 minutes, median 15 minutes); for RDT positive cases, they spend an average of 23 minutes (minimum 2 minutes, maximum 60 minutes, median 15 minutes). Referral cases take an average of 32 minutes (minimum 2 minutes, maximum 120 minutes, median 20 minutes).<sup>19</sup> These figures are illustrative of the actual time spent by ASCs but are not used in the model; instead, we used the standard estimates provided by ChildFund International (see Table 9). The standard estimates were used in order to provide and demonstrate what the program costs with the MOPH guidelines.

Four of the six health huts sampled reported having to pay for water each month, with costs ranging from 1 USD to 5 USD and an average of 2.25 USD per month. Three of the six health huts reported paying for electricity, with costs of 1 USD, 1.20 USD, and 2.50 USD per month. All ASCs reported collecting user fees in the previous month, with an average total amount collected of 38.25 USD (minimum 2.00 USD, maximum 98 USD). Operating costs are included in the modeling for this analysis, under the heading “Other iCCM Program Costs.”

## Utilization

The utilization figures are based on the geographic coverage and service delivery coverage targets set by the authors, as previously described in Tables 6 and 7. Table 10 shows the actual figures for 2011 and the targets that were entered into the iCCM costing and financing model for the four iCCM interventions for the remaining years. Based on these illustrative targets, in combination with the incidence rates and the population covered, the total number of cases is estimated for each program year. The model assumes that both ASCs and *ASC-matrones* will provide these services in 2012–2016.<sup>20</sup> Table 10 shows the number of services treated per year by intervention area, as well as the total services per capita (for children under 5). These figures are driven by the changes in coverage rates shown in Table 7.

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<sup>19</sup> This analysis does not currently include referral cases as part of the iCCM services package, mainly because referrals are not reliably tracked. As a result, utilization numbers were not available and could not be estimated for projections. This omission can be modified in the future as better data become available.

<sup>20</sup> At the time of the interviews, *ASC-matrones* provided few or no iCCM services.

**Table 10. Number of iCCM services and services per capita, 2011–2106**

	2011 Actual	2012 Target	2013 Target	2014 Target	2015 Target	2016 Target
<b>Total number of iCCM cases</b>						
Diarrhea	15,302	135,355	208,109	284,415	364,407	448,221
ARI	23,387	45,967	62,821	80,489	99,002	118,390
RDT (fever cases)	25,096	140,964	216,732	296,201	379,507	466,794
Malaria (confirmed)	7,265	10,572	13,004	15,551	18,216	21,006
<b>Number of iCCM cases per capita (children &lt;5)</b>						
Diarrhea	0.1	0.4	0.6	0.8	1.1	1.3
ARI	0.1	0.1	0.2	0.2	0.3	0.3
RDT (fever cases)	0.1	0.4	0.7	0.9	1.1	1.3
Malaria (confirmed)	0	0	0	0	0.1	0.1

As noted earlier, there are typically two ASCs per village or health hut, one of whom is a more specialized ASC-*matrone* who also provides the same types of curative care as a regular ASC. In this report we collectively refer to both as “ASCs” unless stated otherwise. For this analysis we calculated the required number of ASCs based on their availability to provide iCCM services and the total time needed to provide those services each year. The tool calculates the services per year by multiplying the incidence rate per service by the target population per service (i.e., children under five) by the target service delivery coverage. Because it is impossible for one ASC to provide services to two different communities, we assume that the calculated number of ASCs should always be rounded up to the next whole number. For example, if the tool calculates that 0.75 of an ASC is required to provide the iCCM services to an average size health hut catchment area, the tool rounds that figure up to 1 ASC.

Table 11 below shows the total number of ASCs required in the program, based on this calculation; as well as the average numbers of services per ASC and the ratio of ASCs to population. The 2011 figures, as stated above, are based on the actual numbers of treatments provided by ASCs. With 71,050 cases treated, the tool calculated one ASC required per health hut. The average number of curative iCCM services provided per ASC per week would still be less than 1 using this calculation, suggesting there is significant additional time to scale up ASC service provision. The last row in Table 9 shows the true number of ASCs that would be required, prior to rounding up to the next whole number. Even increasing the targets to 30-45% would still result in one ASC required per health hut in 2016. By the final projection year, ASCs would be providing over 11 iCCM services per week, and at almost maximum efficiency (90% of the ASC’s time available for iCCM would actually be used on iCCM service provision). These calculations suggest that the ASC-*matrones* would not be required to provide iCCM services and could focus on maternal services, based on the coverage targets input in the tool. As the iCCM coverage increases, the ASC-*matrones* could also be required to provide services in addition to the ASCs.

**Table 11. iCCM and ASC figures, 2011–2016**

	2011 Actual Cases Treated	2012 Target Service Delivery	2013 Target Service Delivery	2014 Target Service Delivery	2015 Target Service Delivery	2016 Target Service Delivery
<b>Total # ASCs</b>	1,620	1,794	1,794	1,794	1,794	1,794
<b>Total # of iCCM cases</b>	71,050	332,858	500,666	676,656	861,132	1,054,410
<b># annual iCCM services per ASC</b>	44	186	279	377	480	588
<b># weekly iCCM services per ASC</b>	0.86	3.64	5.47	7.40	9.41	11.52
<b>ASC/1,000 pop (&lt;5)</b>	1.0	1.0	1.0	0.9	0.9	0.9
<b>ASC per health hut (actual calculated figure)</b>	0.09	0.29	0.43	0.58	0.74	0.90
<b>ASC per health hut (rounded-up figure)</b>	1.0	1.0	1.0	1.0	1.0	1.0

## Costs

Total 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 ASCs 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.<sup>21</sup>

### Start-Up and ASC Training Costs

Start-up costs are divided between two types: (1) program preparation costs, such as workshops, capacity building, and policy development; and (2) initial ASC training and equipment costs. These start-up costs are shown in Table 12 and are not included as part of the unit recurrent costs per service. In reality, the majority of start-up costs were incurred before 2011, but for simplicity we included the total in the 2011 column. Thus, we assumed that in 2011 the initial batch of 1,620 ASCs (1 per health hut) would need to be trained. In the 2012 cost projections, we included training costs for scaling up from 65 to 72 districts, a program expansion that would require an additional 255 ASCs. The remaining program years also have start-up costs, since replacement ASCs will be needed to compensate for losses from attrition. Based on estimates from the director of DANSE, the average yearly attrition rate of ASCs is 5%. As a result, an additional 90 ASCs must be trained and equipped on a yearly basis, even though the number of health huts remains constant after 2012.

<sup>21</sup> The costs of training and equipping replacement ASCs could also be included under recurrent costs. Wherever they are categorized, they should be shown separately for analytical purposes.

Based on these calculations and the number of health huts, Table 12 shows the total number of ASCs required, as well as the additional number of ASCs each year who will need training due to job attrition. We estimated the program preparation and initial start-up costs at US\$266,546 in 2011.<sup>22</sup> Between 2011 and 2012, the CHP projected an increase from 1,620 health huts to 1,794 health huts; the ASCs required to be trained for this additional coverage would need US\$39,773 for equipment and training. After 2012, the number of health huts covered by the program remains stable, but there is an additional annual replacement cost of around US\$12,000–13,000 for ASCs lost to attrition. The table shows the start-up activity costs as incurred in 2011 and 2012 because we assumed that not all activities could be completed in the first program year. Finally, the table shows the start-up cost per ASC—the cost of training and equipping a new ASC. Because the inputs for these costs are based on standards, the cost per ASC increases from year to year only due to inflation, starting at US\$153 per ASC in 2011 and increasing to US\$172 per ASC by 2016.

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<sup>22</sup> Because the previous CHP was operational for years prior to the current project, the actual start-up costs shown were incurred several years before the baseline year of 2011. However, based on the training assumptions provided, the tool demonstrates what these costs would have been if they had been incurred in 2010.



**Table 12. Start-up and replacement ASC costs for Senegal's iCCM program (USD)**

	2011	2012	2013	2014	2015	2016
<b>Number of ASCs required</b>						
Number of health huts operational	1,620	1,794	1,794	1,794	1,794	1,794
Total number of ASCs required	1,620	1,794	1,794	1,794	1,794	1,794
Number additional ASCs to be trained and equipped from previous year	1,620	255	90	90	90	90
<b>Start-up costs</b>						
ASC training	25,585	4,029	1,454	1,491	1,528	1,566
ASC equipment	221,539	35,744	12,888	13,210	13,540	13,879
Start-up activities (workshops, policy development, etc.)	19,422	18,744	0	0	0	0
TOTAL start-up costs	266,546	58,518	14,342	14,701	15,068	15,445
Start-up cost per ASC	153	156	160	164	168	172

### Recurrent Costs

Table 13 shows the total recurrent costs for the iCCM program, based on the actual numbers of services provided in 2011 and the coverage targets and assumptions for the other years, as described earlier. Starting at approximately US\$0.54 million in 2011, the annual program cost would increase to US\$1.25 million by 2016. These increases are due to the growth in the percentage of the population covered and are also influenced by changes in the mix of services shown in Table 7. Additionally, increases stem from a 2.5% annual inflation rate and annual salary increases of 3.4%. Overall, medicine costs constitute the majority of iCCM program expenditure, at an average of 37% of the total recurrent costs over the six years. The second highest costs are management costs, at an average of 31% of the total recurrent costs over the six years. Due to the flat number of health huts and ASCs per year, most recurrent costs do not change significantly—medicines are the only costs that increase steadily from one year to the next, because of increased numbers of services. Medicine costs made up only 7% of the total recurrent costs in 2011, but this percentage increases to 51% by 2016. Medicine costs are calculated based on the standard medicines required per iCCM service multiplied by the total number of each iCCM service. (See Table 7 for the average medicine cost per service.)

ASCs are volunteers, so there are no salary costs for them. The remaining recurrent costs are all indirect costs, as described below. These costs are allocated across the services to arrive at an average cost per service for each intervention in the iCCM package.

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 ASCs, but rather provides support to the iCCM program, such as organizing trainings, attending technical working group meetings, or overseeing medicine supply chains. These costs are calculated by applying a percentage of time spent on iCCM management to the total salary for each staff member. The percentage of time spent on iCCM was based on each person's own estimate; in some cases, when this data were not available, we used the 42% iCCM percentage allocation instead. Management costs are significant in Senegal's iCCM program (31% of the total) because high NGO support costs are included at the central level. This NGO support includes a large number of staff, both technical and administrative, who are part of the CHP. In addition, a portion of the costs of MOHP staff, such as the directors of DSSP and DANSE, are included (the MOHP contact provided the estimates for their involvement). Management costs increase annually, and a 3.4% salary increase assumption is input into the model.

Supervision costs are the costs of staff based in health posts and district hospitals who directly supervise ASCs. At the health post level, the majority of supervision is done by ADCs, who are employed through the CHP. Because these visits are meant to supervise community health in general, we applied the 42% iCCM allocation to the ADC salaries. Additional supervision is provided at the district level by the zone supervisor, with the same iCCM percentage allocation applied to their salaries. Based on the NGO consortium budgets, each region would have one regional officer, one zone coordinator, and one program officer. Each district would have one zone supervisor, an average of two ADCs, and two community liaisons. Also, time for MOHP staff is included: the ICP, the district chief medical officer, and the supervisor of primary health care. We received an estimate of the amount of time each category of staff member spent supervising general community health activities plus the amount of time spent supervising iCCM-specific activities. Where the staff could not provide an estimate for the time spent specifically on iCCM, we applied the 42% iCCM percentage allocation figure. Like management costs, supervision costs increase annually, and a salary increase assumption is input into the model. Supervision costs are also directly tied to the number of districts, health posts, and health huts covered each year, so as coverage increases, supervision costs increase as well.

We estimated meeting and training costs based on the average cost per ASC participant, plus other associated costs, from previous trainings and meetings supported by ChildFund and the NGO consortium. Each meeting or training session was specified as being either iCCM-specific or general to ASCs. For the former, we included the full costs of the meeting or training session; for the latter, we applied the 42% iCCM percentage allocation. All training costs include facilitator and supervisor costs.

Note that infrastructure costs—building and supplying the health huts—are not included in the iCCM tool; however, running costs such as water and electricity are included.

**Table 13. Recurrent costs, 2011–2016 (USD)**

	Actual Services 2011	Target services 2012	Target services 2013	Target services 2014	Target services 2015	Target services 2016
<b>Direct Costs</b>						
Medicines	33,075	176,270	275,742	384,835	504,266	634,804
% of total cost	6%	23%	33%	40%	46%	51%
<b>Indirect Costs</b>						
Management	259,080	295,682	273,267	282,558	292,165	302,099
% of total cost	48%	39%	33%	29%	26%	24%
Supervision	117,997	134,256	138,820	143,540	148,421	153,467
% of total cost	22%	18%	17%	15%	13%	12%
Meetings	89,358	101,444	103,980	106,580	109,244	111,975
% of total cost	17%	13%	12%	11%	10%	9%
ASC refresher training	10,800	12,259	12,565	12,880	13,202	13,532
% of total cost	2%	2%	1%	1%	1%	1%
Health hut running costs	31,183	35,395	36,280	37,187	38,117	39,070
% of total cost	6%	5%	4%	4%	3%	3%
<b>TOTAL</b>	<b>541,493</b>	<b>755,306</b>	<b>840,656</b>	<b>967,580</b>	<b>1,105,415</b>	<b>1,254,946</b>

Table 14 shows the average annual recurrent cost per service and per capita by program year. Dividing the total recurrent cost by the number of services provided each year yields the average cost per service, which starts at US\$7.62 in 2011 and decreases to US\$1.19 by 2016. The cost per service is an average cost across all four 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. The large decrease in the average cost per service results from economies of scale. As the iCCM program expands its reach and provides more services to children within the coverage areas, many of the fixed indirect costs will be divided among more services, resulting in a lower average cost per service and greater efficiency.<sup>23</sup>

The average cost per capita is calculated by dividing total recurrent costs by total population—expressed as both per capita for children under five and per capita for the entire population within the coverage areas. The cost per child under five starts at US\$1.87 in 2011 and increases to US\$3.55 by 2016. 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; whereas the child receives an average of 0.3 services per year in 2011, this figure increases to 3.0 services per year in 2016. For the entire population, the average per capita cost starts at US\$0.33 in 2011 and increases to US\$0.63 by 2016.

<sup>23</sup> Fixed costs are allocated across services based on the total number of services and the total amount of time required to provide the service.

**Table 14. Recurrent iCCM program costs, 2011–2016 (USD)**

	Actual Services 2011	Target services 2012	Target services 2013	Target services 2014	Target services 2015	Target services 2016
<b>Total recurrent cost</b>	541,493	755,306	840,656	967,580	1,105,415	1,254,946
<b>Total number of services</b>	71,050	332,858	500,666	676,656	861,132	1,054,410
<b>Average cost per service<sup>a</sup></b>	7.62	2.27	1.68	1.43	1.28	1.19
<b>Average cost per capita (0–59 months)<sup>b</sup></b>	1.87	2.36	2.56	2.88	3.21	3.55
<b>Average cost per capita (total population)</b>	0.33	0.42	0.45	0.51	0.57	0.63

<sup>a</sup> The big change in the average cost per service over the years is partly due to changes in the mix of services shown in Table 7.

<sup>b</sup> The increases in the average cost per capita are due to the increases in coverage shown in Table 7.

Figure 2 shows the total recurrent costs broken down by the administrative level at which they are incurred (central, region, district, health post, and health hut). As expected, the highest percentage of costs are spent at the health hut level, constituting an average of 39% of the total costs across the program years. This high percentage was mostly because health hut costs include the cost of medicines. Central level costs were the next highest at 33% of total, mostly due to NGO management costs.

**Figure 2. Total recurrent iCCM program costs by administrative level, 2011–2016 (USD)**

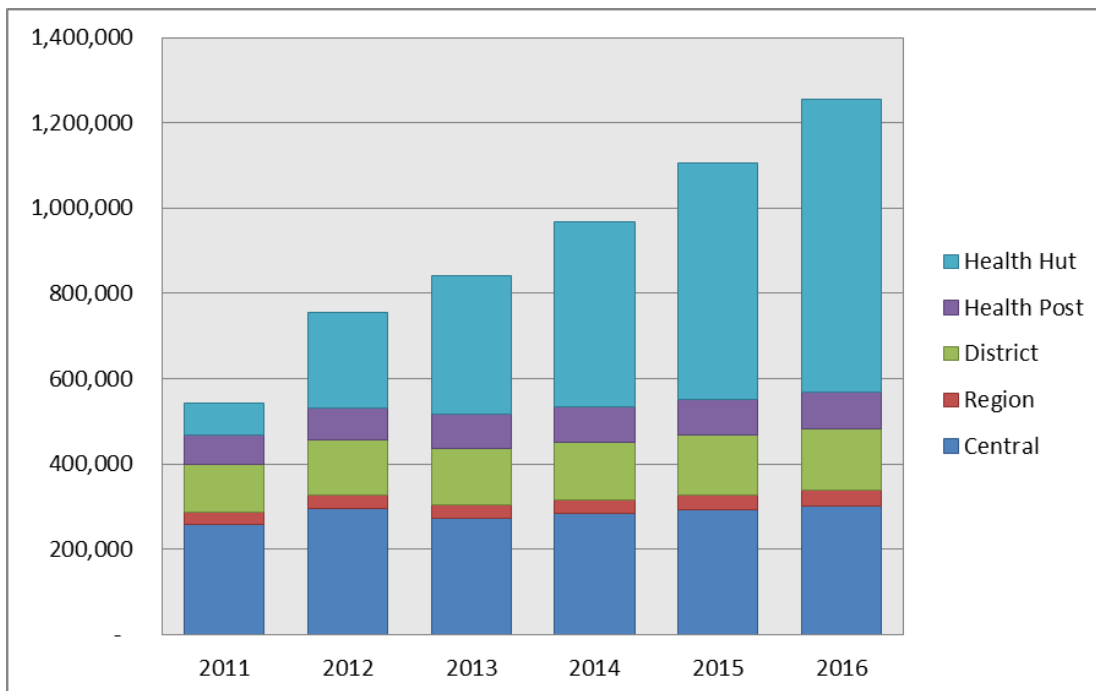


Figure 3 shows the total recurrent costs broken down by each of the four iCCM interventions for Senegal’s iCCM program. Indirect recurrent costs were allocated to diarrhea, ARI, RDTs, and confirmed malaria treatment based on the proportion of time required for each service. In total, RDT testing is the most expensive intervention over the life of the program, costing US\$3.1 million over six years. This figure is based on the assumption that the testing will steadily increase in volume over the years, based on the service delivery coverage targets that we used into the tool. The second most expensive intervention overall is diarrhea treatment, at US\$1.4 million in total over the life of the program. ARI treatment is next most expensive at US\$0.74 million, followed by treatment of confirmed malaria at US\$0.11 million. The cost of this treatment is so low because the RDT ensures that false positives are not treated for malaria with ACTs.

Spending on ARI decreases each year until 2016 because the direct cost of treating the disease is low, whereas the time needed to treat it (30 minutes) is more than for any other service. (See Figure 4 for the cost-per-service breakdown for ARI treatment.) As a result, ARI receives a large proportion of the indirect recurrent costs. However, as other services increase in volume, they also receive larger portions of the indirect costs, resulting in less money spent on ARI treatment from one year to the next.

**Figure 3. Total recurrent costs attributed by iCCM treatment areas, 2011–2016 (USD)**

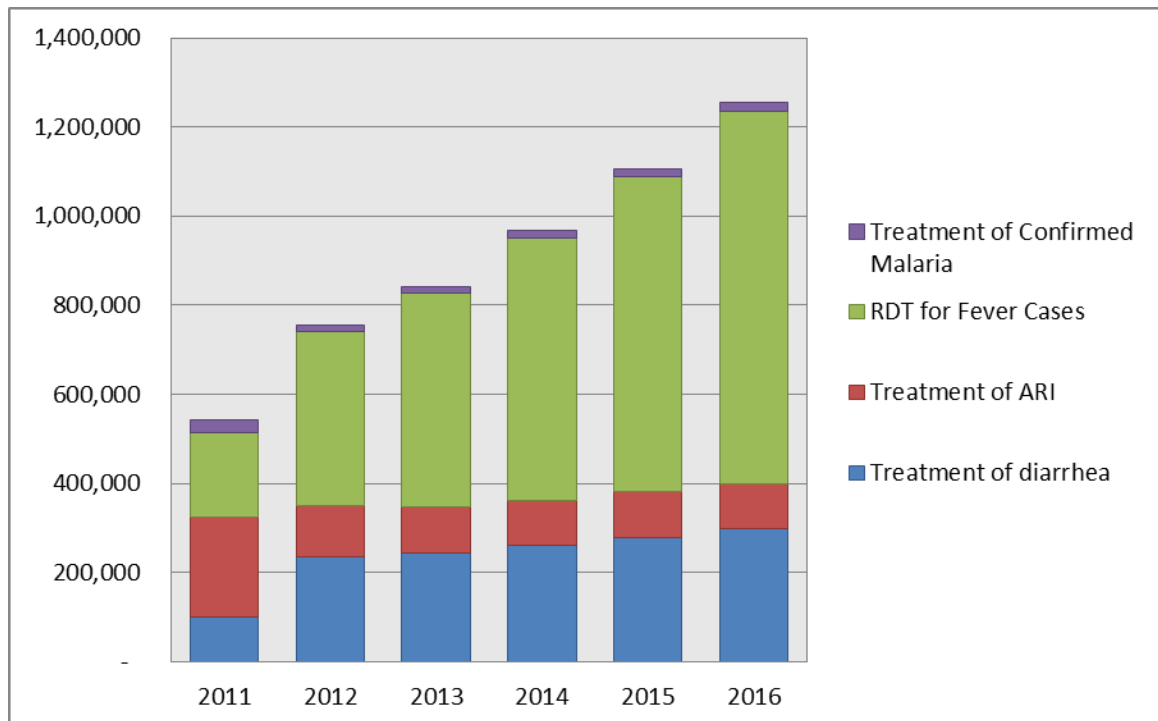


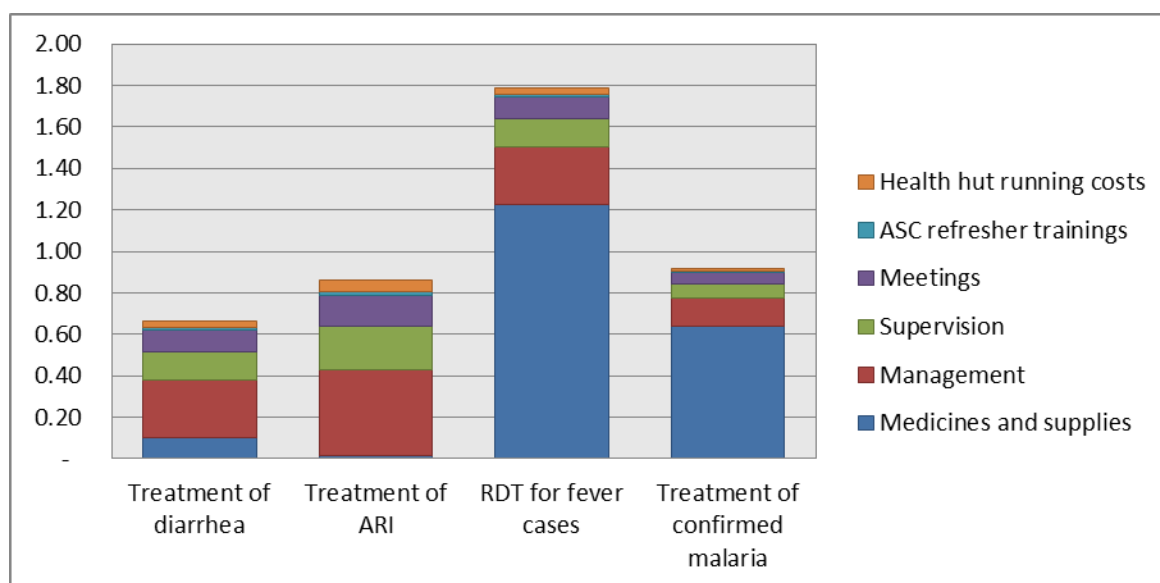
Table 15 shows the average recurrent cost per service, by treatment area, for the iCCM program. As previously noted, the cost per service decreases with each subsequent program year because of economies of scale.

**Table 15. Recurrent costs per service, 2011– 2016 (USD)**

	2011	2012	2013	2014	2015	2016
<b>Diarrhea</b>						
Medicines	0.09	0.09	0.09	0.09	0.09	0.09
Management	3.27	0.84	0.52	0.40	0.32	0.27
Supervision	1.49	0.38	0.26	0.20	0.16	0.14
Meetings	1.13	0.29	0.20	0.15	0.12	0.10
Training	0.14	0.03	0.02	0.02	0.01	0.01
Running costs	0.39	0.10	0.07	0.05	0.04	0.04
<b>Total cost per service</b>	<b>6.52</b>	<b>1.75</b>	<b>1.17</b>	<b>0.92</b>	<b>0.77</b>	<b>0.67</b>
<b>ARI</b>						
Medicines	0.04	0.04	0.04	0.04	0.04	0.04
Management	4.91	1.27	0.78	0.60	0.49	0.41
Supervision	2.24	0.57	0.40	0.30	0.25	0.21
Meetings	1.69	0.43	0.30	0.23	0.18	0.15
Training	0.20	0.05	0.04	0.03	0.02	0.02
Running costs	0.59	0.15	0.10	0.08	0.06	0.05
<b>Total cost per service</b>	<b>9.65</b>	<b>2.49</b>	<b>1.63</b>	<b>1.25</b>	<b>1.02</b>	<b>0.86</b>
<b>RDT (fever cases)</b>						
Medicines	1.09	1.09	1.09	1.09	1.09	1.09
Management	3.27	0.84	0.52	0.40	0.32	0.27
Supervision	1.49	0.38	0.26	0.20	0.16	0.14
Meetings	1.13	0.29	0.20	0.15	0.12	0.10
Training	0.14	0.03	0.02	0.02	0.01	0.01
Running costs	0.39	0.10	0.07	0.05	0.04	0.04
<b>Total cost per service</b>	<b>7.51</b>	<b>2.76</b>	<b>2.22</b>	<b>1.99</b>	<b>1.87</b>	<b>1.79</b>
<b>Malaria (confirmed)</b>						
Medicines	0.56	0.56	0.56	0.56	0.56	0.56
Management	1.64	0.42	0.26	0.20	0.16	0.14
Supervision	0.75	0.19	0.13	0.10	0.08	0.07
Meetings	0.56	0.14	0.10	0.08	0.06	0.05
Training	0.07	0.02	0.01	0.01	0.01	0.01
Running costs	0.20	0.05	0.03	0.03	0.02	0.02
<b>Total cost per service</b>	<b>3.78</b>	<b>1.40</b>	<b>1.13</b>	<b>1.02</b>	<b>0.96</b>	<b>0.92</b>

The recurrent cost per service for diarrhea was US\$6.52 in 2011 but decreases to US\$0.67 in 2016. The cost per service for ARI was US\$9.65 in 2011 but decreases to US\$0.86 in 2016. The cost per service for testing fever cases for malaria with an RDT was US\$7.51 in 2011 and decreases to US\$1.79 by 2016. The cost per service for treating confirmed malaria cost US\$3.78 in 2011 but US\$0.92 in 2016. The costs per service are high in 2011 because the costs of management and supervision are spread over a relatively small number of services. The only direct cost for treatment is the cost of medicines, which increases with each additional service provided; in contrast, indirect cost per service decreases as the volume of services increases. Figure 4 shows the costs per service for each intervention in the final iCCM program year, 2016. Once again, a large portion of each intervention's cost per service is management and supervision costs, which are allocated based on the percentage of time that ASCs are supposed to spend on each service. The highest medicine and supply costs are for RDTs for fever cases, followed by medicine costs for confirmed malaria. In contrast, medicine costs for diarrhea and ARI are relatively low.

**Figure 4. Cost per service, by iCCM intervention, 2016 (USD)**



### Total Costs and Financing

As stated earlier, the main purpose of this project was to test the tool, and only a small sample of facilities and CHWs is needed for that purpose. This sample is too small for the resulting data to be representative of the program as a whole, and the results of the modeling shown in this report should, therefore, be considered as illustrative. Nevertheless, we believe that these results can be useful to the MOPH and its partners, and the figures in the tool can be updated as desired.

The total program costs, including both start-up and recurrent costs, are shown in Table 16 and Figure 5. The costs amount to US\$808,039 in 2011 and increase to US\$1.3 million by 2016. These costs are based on the actual figures for 2011 and the target geographic and service delivery coverage figures for 2012 to 2016. The total cost of expanding and maintaining the program from 2012 through 2016 would amount to roughly US\$5.0 million.

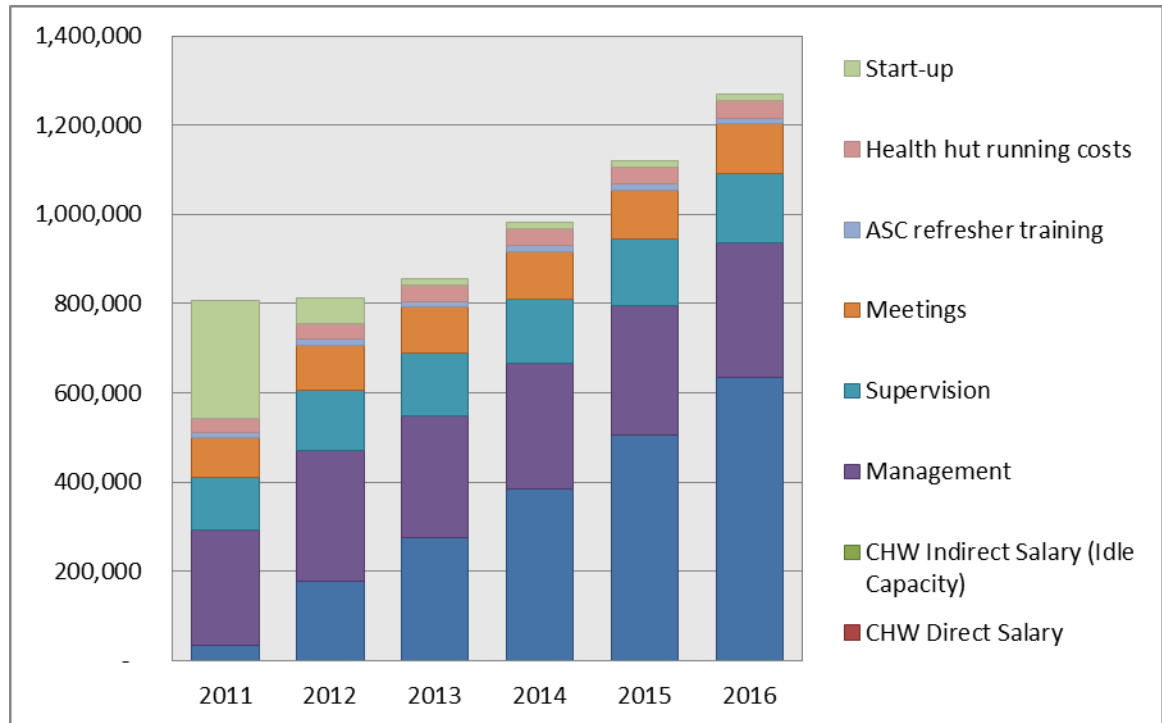
As described earlier, medicine costs constitute the majority of the iCCM program costs on a yearly basis. Costs of medicines increase with each program year, in line with the increases in the numbers of iCCM services. Other costs, such as supervision and management, remain stable over the life of the program, on the assumption that there is no need to increase the numbers of managers and supervisors, or their time spent, as the numbers of services increases. Since ASCs are volunteers, there are no salary costs related to them (direct or indirect). Other salaries, such as for central and district level staff, are categorized under management and supervision costs in the Table 16 and Figure 5.

**Table 16. Total iCCM program costs, 2011–2016 (USD)**

	2011	2012	2013	2014	2015	2016
<b>Recurrent Costs</b>						
Medicines and supplies	33,075	176,270	275,742	384,835	504,266	634,804
Management	259,080	295,682	273,267	282,558	292,165	302,099
Supervision	117,997	134,256	138,820	143,540	148,421	153,467
Meetings	89,358	101,444	103,980	106,580	109,244	111,975
ASC refresher training	10,800	12,259	12,565	12,880	13,202	13,532
Health hut running costs	31,183	35,395	36,280	37,187	38,117	39,070
<b>Start-up Costs</b>						
ASC start-up training	25,585	4,029	1,454	1,491	1,528	1,566
ASC start-up equipment	221,539	35,744	12,888	13,210	13,540	13,879
iCCM program start-up activities	19,422	18,744	0	0	0	0
<b>TOTAL</b>	<b>808,039</b>	<b>813,824</b>	<b>854,998</b>	<b>982,280</b>	<b>1,120,483</b>	<b>1,270,391</b>



**Figure 5. Total iCCM program costs, 2011–2016 (USD)**

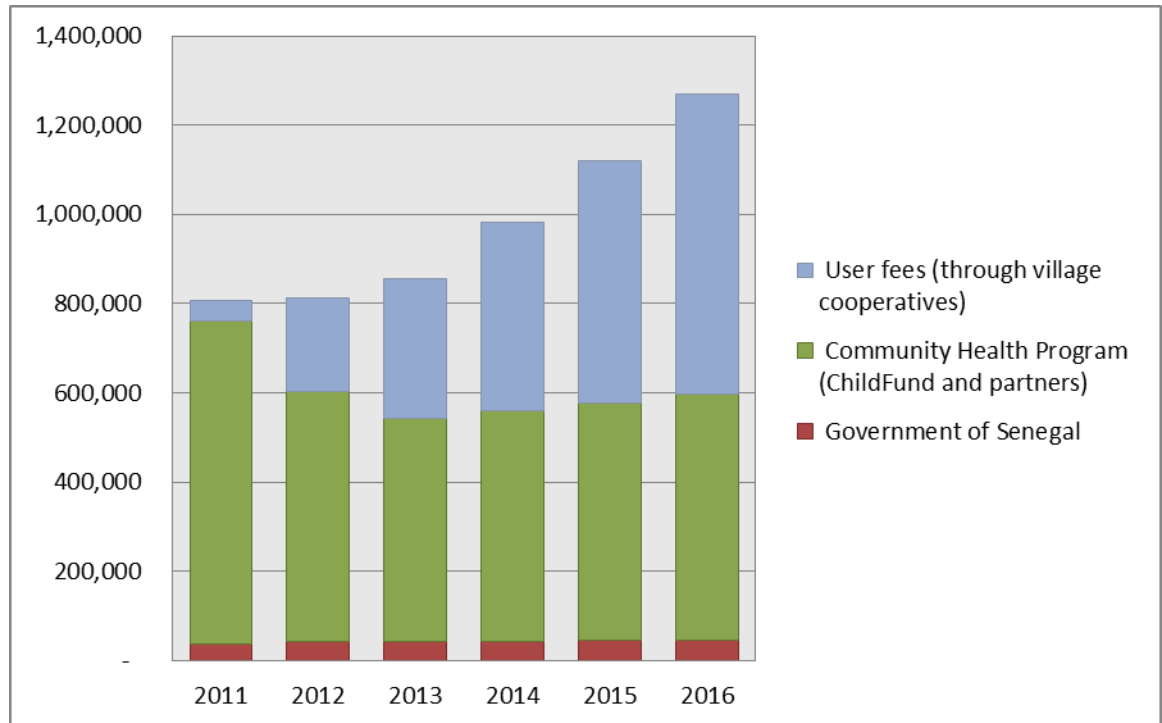


As previously mentioned, the USAID-funded CHP provides a large proportion of the funding for Senegal’s iCCM program. The MOHP contributes to supervision and management in the form of salaries for staff in the DANSE and DSSP. ASCs also charge user fees to cover the cost of their medicines, and the money is managed by village cooperatives. The CHP is expected to purchase the initial six-month supply of medicines, and then the ASCs are expected to recover their costs and purchase replacement medicines through the village cooperatives. Thus, the three main funding sources for the iCCM program are the ChildFund-led NGO consortium that forms the CHP; the MOPH; and user-fee revenues (managed by the village cooperatives).

Figure 6 shows the funding sources for the iCCM program. We assumed that in 2011 the CHP program funded 50% of all medicine costs to cover the first six months and that user fees funded the other 50%. For the remaining years, we assumed that user fees would fund the entire cost of medicines, which ASCs would purchase through village cooperatives. We also assumed that ChildFund and the CHP would fund all training, meeting, and start-up costs for the duration of the project; that the CHP would fund about 90% of management and supervision costs; and that the MOHP would fund the remaining 10%.

In total, over the start-up and six-year period of the program, ChildFund and the NGO consortium would fund US\$3.4 million, amounting to 58% of the total costs. Village cooperatives would fund US\$2.2 million from user-fee revenues, or 38% of the total costs. Finally, the MOHP would fund US\$0.25 million, or 4% of the total costs.

**Figure 6. Funding sources for iCCM program, 2011–2016 (USD)**



As mentioned earlier, part of the mandate of the USAID-funded CHP is to hand over much of the responsibility and oversight of the project to the MOHP by the end of the six-year period. When that transfer occurs, the village cooperatives and their user-fee revenues will be the main source of financing. The MOHP will need to consider which elements of the CHP to carry forward. For example, as described in this report, iCCM management costs are high, mainly because each NGO in the consortium makes significant contributions at the central level. The MOPH would be unlikely to continue these expenditures, and as a result, the staff that oversees the program would decrease considerably. However, these are policy decisions that the MOHP and NGO consortium should discuss so that they can establish a plan to phase out NGO support. These new assumptions could then be input into the iCCM costing and financing tool to project a more accurate calculation of the MOPH's funding requirements to run the program.

## 6. Conclusion

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The iCCM Costing and Financing Tool is intended to be simple and user-friendly, so that it does not require technical assistance or training to implement, yet sufficiently detailed so that it shows the costs and financing requirements for the program with reasonable accuracy.

In the three test countries—and particularly in Senegal, which is the last of the three—it has been important to carefully define each service that is available in the iCCM program. This level of definition is especially relevant for malaria because some countries now use RDTs to confirm malaria cases, while others use presumptive treatments, in which any fever or suspicion of malaria is treated. In Senegal any fever and suspected malaria cases are given an RDT, and only confirmed cases are treated with ACT. However, because fever may be caused by other illnesses (including ARI), the incidence of fever is generally much higher than that of confirmed malaria. As a result, we presented RDT for fever cases as a separate intervention from malaria treatment. This separation allowed us to input a higher incidence rate for RDT and a lower one for malaria, more accurately reflecting the true costs of diagnosis and treatment.

Another lesson learned is that we may need to consider multiple types of CHWs that can provide iCCM and other services—as is the case with *ASC-matrones* in Senegal. In Malawi and Rwanda, iCCM was provided by one specific cadre of CHWs (HSAs in Malawi, and *ASC-binômes* in Rwanda). In Senegal the *ASC-matrones* is a specialized type of CHW who is able to perform deliveries and provide other maternal health services in addition to regular ASC duties. The iCCM tool should therefore be able to accommodate a number of different types of CHWs, who might have varying availability to provide iCCM services.

In the Senegal testing, we also realized that we needed to add a section to the tool to account for the running costs of the *cases de santé*, including electricity and water costs. Significant updates were also made with regard to the tool outputs, based on the experience in Senegal and subsequent feedback from other stakeholders. We organized key outputs into a single “dashboard” page and added a summary tables page to provide a quick overview of program costs and other results. We also revised the financing section of the tool to facilitate data entry for financing sources and the types of program costs they would be funding.

The situation in Senegal is unique because of the largely project-driven nature of the iCCM and the community health program. The main USAID-funded program, CHP, is responsible in large part for implementing, overseeing, and funding Senegal’s community health program. Run by ChildFund International and a consortium of NGOs, the project covers the entire country and applies similar methods and standards in each district. The iCCM tool can be used to show the ramifications of a large program phasing out its support toward the end of the project, and it can help the MOHP determine how much of the funding it would need to cover as a result. In particular, the high NGO management costs may not necessarily be continued as the government takes on more responsibility for the iCCM program. Part of the CHP’s mandate is to increase government ownership of the program by the end of the project in 2016; a key step is to clarify the amount of funding provided by the CHP and the essential elements that will need to be supported once the CHP is no longer involved.

An analysis of the iCCM testing shows that even though the sample was small, it is clear that the program will be expensive unless the numbers of services increase or management and supervision costs decrease.

Finally, conducting such a costing study can provide important information about the resource needs for a successful iCCM program. Additional studies are often needed, however, to detect issues that may prevent a program from being successful. For example, such studies might assess the reasons for lower-than-expected utilization of services—reasons that can include medicine shortages and unaffordable user fees.

## References

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- 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>
- Agence Nationale de la Statistique et de la Démographie (ANSD) and MEASURE DHS, ICF International, *Senegal: Demographic Health Survey, 2010–2011*. Dakar, Senegal, and Calverton, MD: ANSD and ICF International, February 2012.
- 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.
- 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.
- Korenromp, Eline, Arantxa Roca-Feltrer, and Ilona Carneiro, *Malaria Incidence Estimates at Country Level for the Year 2004*. Geneva: World Health Organization, Roll Back Malaria, March 2005. Korenromp E., Roca-Feltré A., Carneiro I. Malaria incidence estimates at country level for the year 2004. World Health Organization, Roll Back Malaria; Geneva, Switzerland. March 2005. Accessed from: [http://www.rollbackmalaria.org/docs/incidence\\_estimations2.pdf](http://www.rollbackmalaria.org/docs/incidence_estimations2.pdf).
- 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>.
- Maternal and Child Health Integrated Program (MCHIP). *Integrated Community Case Management of Childhood Illness: Documentation of Best Practices and Bottlenecks to Program Implementation in Senegal*. Washington, DC: MCHIP, January 2012.
- One Million Community Health Workers: Technical Task Force Report*. New York: The Earth Institute, Columbia University, 2011.

Rohde, Jon. "Community Health in Malawi: – Lessons from the MSH Experience and Suggestions for the Future Evolution of Community Primary Health Care in Malawi." Unpublished report. Cambridge, MA: Management Sciences for Health, August 2011.

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.

The Earth Institute. *Agence Nationale de la Statistique et de la Démographie (ANSD), Dakar, Sénégal and MEASURE DHS, ICF International, Calverton, Maryland, US. Senegal Demographic and Health Survey 2010-11.*

## Annexes

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- Annex A. Health Posts and Villages Sampled
- Annex B. People Contacted
- Annex C. Questionnaire Templates for Central, District, Health Facility, And Community Level
  - Annex C1. Central Level Questionnaire
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- Annex F. Standard Treatment Guidelines
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- Annex H. Glossary

## Annex A. Districts and Health Centers Sampled

District	Health District	Health post (HP)	HP catchment	# of cases in HP catchment area	Average population per case surveyed (range)	Average # of house-holds per case	Average # of hours per day ASC works (range)	Average # of days per week ASC works (range)
Dakar	Rufisque	Niague	9,644	3	2,772	308	4-7	5-7
Diourbel	Diourbel	Ngohe	27,652	7	3,452	0	7	7
Fatick	Niakhar	Ndoss	7,900	2	600-800	42	3-7	7
Fatick	Sokone	Nioro Alasuntel	15,790	5	1,000-1,050	0	5-6	5-7
Kaolack	Ndoffane	Keur-Baka	15,790	5	997-1,000	0	3-6	5-7
Thies	Thies	Notto	13,671	10	200-450	48-70	2-3	3-4
<b>TOTAL AVERAGE</b>			<b>15,443</b>	<b>5.3</b>	<b>1,232</b>	<b>117</b>	<b>4.8</b>	<b>5.7</b>
<b>RANGE</b>			<b>7,900-27,652</b>	<b>2-10</b>	<b>200-3,452</b>	<b>42-308</b>	<b>2-7</b>	<b>3-7</b>



## Annex B. People Contacted

Name	Title, Organization
<b>Mariame Sylla</b>	Regional Community Health Specialist, UNICEF Regional Office for West and Central Africa
<b>Dr. Mariam Sylla Diene</b>	Health Specialist, UNICEF Senegal
<b>Xavier Crespin</b>	Chief of Health, Young Child Survival, and Development, UNICEF Senegal
<b>Dr. Mame Marie Mbayame Gueye Dione</b>	Chef de Division d'Alimentation, de la Nutrition, et de la Survie de l'Enfant (DANSE), Ministry of Health and Prevention, Senegal
<b>Dr. Samba Cor SARR</b>	Permanent Secretary, Ministry of Health and Prevention, Senegal
<b>Dr. El Hadji Amadou Mbow-Baye</b>	Maternal and Child Health/Family Planning, USAID Senegal
<b>Dr. Moussa</b>	Monitoring and Evaluation, USAID Senegal
<b>Mamadou Diagne</b>	Directeur des Programmes Santé, ChildFund Sénégal Chief of Party Projet Santé Communautaire
<b>Abdou Diouf</b>	Coordinateur de Zone, PSSC Environmental Development Action in the Third World (ENDA) Graf Sahel
<b>Gorgui Sene Diallo</b>	Senior Program Officer, AFRICARE
<b>Ousmane Wade</b>	Coordinateur National PSSC, PLAN International
<b>Dr. Mountaga E. Dia</b>	Technical Coordinator, ENDA Santé
<b>Mamadou Mbaye</b>	National Coordinator, ChildFund
<b>Mamadou Souleymane Sy</b>	Monitoring and Evaluation, ChildFund
<b>Noah Zahrobsky</b>	Charge de Programmes, Catholic Relief Services
<b>Dr. Augousto Gomis</b>	National Office Health and HIV/AIDS Coordinator, World Vision
<b>Hentirette Diatta</b>	Finance Officer, ChildFund
<b>Cecile Constance Tine</b>	Responsable de Zone, ENDA Graf Sahel
<b>Malick Ndome</b>	Health Program Coordinator
<b>Emmanuel Senyi Ndione</b>	Executive Secretary, ENDA Graf Sahel
<b>Sene Doudou</b>	Director, Service National d'Information Sanitaire (SNIS)

## **Annex C. Questionnaire Templates for District, Health Facility, and Community Level**

## Annex CI. Central Level Questionnaire

Before you start your interview, confirm that the HC has been selected and the In-Charge will be available to meet with you.

**Give background:** "The purpose of this study is to determine the costs and financing for iCCM in Senegal. Your answers will also contribute to development of a model for cost and finance of CCM that can be used by countries globally. We are collecting cost/financing information at each level: Central, District, Health Center, Village, and Partners. These costs include: relevant medicines, salary, staff time, and trainings/meetings/supervision." Review consent form and obtain signature.

<b>DISTRICT QUESTIONNAIRE (Primary Care Supervisor)</b>		
<b>Date of interview</b>		
<b>Name of interviewer</b>		
<b>Location of interview</b>		
<b>Name of district</b>		
<b>Name of person interviewed</b>		
<b>Title</b>		
<b>Contact information</b>	<b>Phone Number</b>	
	<b>Email</b>	
<b>Health Post</b>		
<b>Health Post Contact information</b>	<b>Phone Number</b>	
	<b>Email</b>	
<b>What time did the interviewer begin this interview?</b>		
<b>Period of Analysis</b>	<b>Start Date (MM/YY)</b>	
	<b>End Date (MM/YY)</b>	

<b>District Information</b>		
1)	Location of district (rural, urban)	
2)	Catchment population	
3)	How many Health Posts report to this District Health Office?	
4)	How many health huts report to this District Health Office?	
5)	What partners support CCM at this District Health Office?	

<b>Staff background information</b>	
1)	Who at the District Health Office is involved in the community health program? (iCCM)
1a)	If staff is not working full time on community health, estimate days per week working on CCM (inclusive of supervision, reporting, trainings / meetings related to health huts).
2)	What grade are each of the above-named staff?
3)	What is the source of funding for the staff salary?
4)	What is the total monthly salary (inc. allowances, PBF prime, etc) of the above staff?

<b>Training/Meetings **These are meetings that the DISTRICT HOLDS**</b>	
1)	List (on the template) the community health training or meeting sessions that were held by the district health office in the past year. (This is NOT trainings that they attended, but trainings they HELD)
2)	Complete the Training_Meeting template for each relevant training (C-IMCI).

<b>Supervision</b>	
1)	Title of staff who conduct supervision for CCM?
2)	Confirm if supervision is only for CCM or for broader community services (i.e. maternal, HIV, TB --- health huts).
3)	Where do the supervision visits take place? District Health Office, HP, or Village?
4)	How often are supervision meetings?
5)	How many hours does each supervision visit last (including travel, if applicable)?

<b>Reporting</b>	
1)	Who completes the reporting for CCM?
2)	How much time do the staff spend on reporting per month?

<b>Expenditure</b>	
1)	Does this district hospital provide any other financial support for CCM? (yes or no) — (i.e. ASC appreciation day, t-shirts)
2)	If so, what support and in what amounts?
3)	What was the source of the financial support? (Partners, MOHP, hospital's own revenue)

<b>Report Collection</b>	
1)	Collect the HMIS reports from 2011 or the 1st quarter of 2012. *Can be at the district level, interested in getting the disaggregation of the facility based vs. community based treatments.

<b>What time did the interviewer conclude the interview?</b>	
<b>How long (minutes/hours) was this interview?</b>	

## Annex C2. Health Center Questionnaire

Before you start your interview, confirm that:

1) 4 ASCs have been selected and notified. The 4 ASCs should include the CHW Coordinator.

2 ASCs and 2 matrones have been selected

2) Each ASC needs to bring their records for Calendar Year 2011, and the first quarter of 2012

**Give background:** "The purpose of this study is to determine the costs and financing for C-IMCI in Senegal. Your answers will also contribute to development of a model for cost and finance of CCM that can be used by countries globally. We are collecting cost/financing information at each level: Central, District, Health Center, Village, and Partners. These costs include: relevant medicines, salary, staff time, and trainings/meetings/supervision." Review consent form and obtain signature.

HEALTH CENTER QUESTIONNAIRE (ICP @ Health Post)		
Date of interview		
Name of interviewer		
Location of interview		
Name of medical region		
Name of district		
Name of community		
Name of health post		
Name of person interviewed		
Title		
Contact information	Phone Number	
	Email	
Health Post		
Health Post Contact information	Phone Number	
	Email	
What time did the interviewer begin this interview?		
Period of Analysis	Start Date (MM/YY)	
	End Date (MM/YY)	

<b>Health post information</b>		
1)	What partners support CCM at this health post?	
2)	Location of Health post (rural, urban)	
3)	Catchment Population of this Health Post	
4)	Number of health huts that report to this Health Post	
5)	What is the catchment population of the health hut? (is the HP catchment population INCLUSIVE of the health hut?)	

<b>Staff background information</b>		
1)	List of staff that supervise ASCs	
2)	In addition to CCM, what other activities do you participate in at the HP?	
3)	Estimate what percentage of your time do you spend on CCM? (days per week)	
4)	Does the secondary supervisor provide supervision related to CCM? (ONLY if yes, continue with all below questions for that staff.)	
5)	What is the total monthly salary (inc. allowances) of the above staff?	
6)	What is the grade of the above-named staff?	

<b>Training/meetings</b>		
1)	How many ASC/CCM (general) training sessions held by the health post in the past year?	
2)	For each training, please refer to the Training_Meeting template and ask to see training records kept at HC.	

<b>Supervision</b>		
1)	If two staff provide supervision, do both participate in all supervisions at HP and health huts? (yes/no)	
2)	How often do ASCs come to the Health Post for supervision?	
3)	How many hours does each supervision visit at the Health Post last?	
4)	How often do staff go to the health huts for supervision visits?	
5)	How many hours does each supervision visit in the health huts last, (separate out the meeting itself and the travel time)?	

<b>Reporting</b>		
1)	Who completes the CCM reporting at this Health Post?	
2)	How many hours per month is spent compiling reports from ASCs in all villages?	
3)	When the report is completed, where is it submitted?	
4)	Are outreach services included in the monthly reports at the case level? [outreach services would include: consultations performed by the ICP at the health huts — specifically services for CCM]	

<b>Expenditure</b>	
1)	Does this health post provide any other financial support for CCM?
2)	If so, what support and in what amounts?
3)	What is the source of this financial support? (Partners, MOHP, or HP generated revenue)

<b>User Fees</b>	
1)	Does this health center receive user fees from ASCs for treatment in the community?
2)	If yes, how often were these user fees collected?
3)	How much was collected per month? Per quarter?
4)	How does the health center use these user fees?

<b>What time did the interviewer conclude the interview?</b>	
<b>How long (minutes/hours) was this interview?</b>	



### Annex C3. Community Level Questionnaire

**Give background:** "The purpose of this study is to determine the costs and financing for C-IMCI in Senegal. Your answers will help the GoS improve the C-IMCI program. Review consent form and obtain signature.

Confirm that ASC and Matrone already have their reports from 2011 and Q1 2012.

COMMUNITY LEVEL QUESTIONNAIRE (ASC #1)		
Date of interview		
Name of interviewer		
Location of interview		
Name of person interviewed		
Sex (M/F)		
Name of medical region		
Name of district		
Name of community		
Name of health hut		
Supervising Health Post		
Month/Year when ASC began providing iCCM services		
What time did the interviewer begin this interview?		
Period of Analysis	Start Date (MM/YY)	
	End Date (MM/YY)	

A) Catchment area served		
1)	Catchment Population (Zone de Rayonnement) of the health hut	
2)	Do the matrone and the ASC split the village population?	
2a)	IF yes: Catchment Population (Zone de Rayonnement) - per ASC	
3)	Total number of households - village	
3a)	IF SPLIT: Total number of households — per asc	
3b)	What is the number of households covered by this ASC?	

<b>B) Time availability and contacts</b>		
1)	How many hours per day do you spend working as an ASC?	
1a)	Are these hours fixed hours when you are present at the Case? Or is it that you are out and about and are called in for services?	
2)	How many days per week?	
3)	How many days are you sick and not work, or away from the health hut?	
4)	What activities in your job as an ASC require you to travel from the Health Hut?	
	For each activity, where do you travel to?	
	For each activity, how long does it take you to travel there?	
	For each activity, is it related to your general activities as an ASC? Or specifically related to CCM?	
5)	Fill out ASC time template	

<b>C) Supervision</b>		
1)	With what frequency do you travel to the HP for supervision visits and picking up medicines?	
2)	How long does it take you to travel to the HP?	
3)	Do you spend the entire day on the supervision and travel?	

<b>D) Training/Meetings</b>		
1)	Refer to Training_Meeting template, but only complete the first four columns.	

<b>E) Reporting</b>		
1)	Estimate the number of days per month you spend compiling your monthly report?	
2)	When a patient is referred to the health post, how do you record that visit in the HMIS?	
3)	How do you record a visit from a sick child who is not diagnosed with Diarrhea, Malaria, or ARI?	

<b>F) IMCI time per service</b>		
<b>List each type of service provided and approximate time spent per case</b>		
1)	CCM — Diarrhea	
2)	CCM — ARI	
3)	CCM — Malaria	
	When treating a patient for Malaria, do you use RDT?	
	If yes: If the RDT is POSITIVE, how do you proceed to treat the patient?	
	What is the amount of time to treat this case?	
	How is this case recorded on the HMIS form?	
	If yes: If the RDT is NEGATIVE, how do you proceed to treat the patient?	
	What is the amount of time to treat this case?	
	How is this case recorded on the HMIS form?	
4)	Health Hut Referral	
	When a case is referred to the HP, how do you proceed? <i>[Do you travel with them to the HP? Then wait with the patient?]</i> <i>[Do you record these patients differently in some way on the HMIS?]</i> <i>[Do you provide any kind of treatment prior to the referral?]</i>	
	Do you provide any basic treatment to a case that is referred to the HP? [paracetamol, etc]	
	How long do you spend with a case that is referred?	
	How do you record a referral in the HMIS?	

<b>G) Periodic ASC activities</b>		
1)	Do you participate in additional periodic events, such as vaccination campaigns, bednet distributions, etc?	
2)	List each event, length of time, frequency, etc.	

<b>H) Medicines, supplies and equipment</b>			
<b>1)</b>	<b>For the following drugs, did you receive the drug each month of the last quarter, and did you have any stockouts?</b>	<b>Received (yes/no)</b>	<b>Stockouts (yes/no)</b>
a)	Zinc		
b)	SRO Satchet		
c)	Cotrimoxazole		
d)	RDT		
e)	ACT		

2)	Did you receive these supplies when you began your work as an ASC?	Received (yes/no)
a)	Drug box	
b)	Timer	
c)	MUAC tape	
d)	Scale	
e)	Other?	

I) Fees for service ** Senegal is a cost recovery system for medicines, and so we'll want to make sure we note if the prices are FEE FOR SERVICE, or DRUG PRICE. For services that require more than one "drug" (ORS & Zinc, RDT & ACT) what the individual prices are.		
1)	Do you collect fees for service?	
2)	What do the fees that you collect cover (medicine / supplies or actual service)	
	Do fees vary depending on the services (medicine) that is provided?	
3)	For each below service, what was standard fee collected? [confirm the price of the USER FEE and the price of the DRUGS DISPENSED]	
a)	Malaria	
b)	Diarrhea	
c)	ARI	
	Is there a margin (mark up) on the price of the drug from what is given at the PNA?	
4)	Who is the final recipient of the fee (ASC, HC, Committee etc)?	
5)	What are the user fees used for? What is the breakdown in percentage of the line items that user fees cover? [purchase of drugs, operating costs, staff incentives]	
6)	What is the average total amount collected from user fees monthly?	
7)	Can you estimate the monthly operating costs of the health hut? [water, electricity, others. Be as specific as possible]	

<b>J) Pay</b>	
1)	Do you receive any payment for your work as an ASC?
1a)	If yes: From who?
1b)	If yes: How much?
2)	Do you receive any "in-kind" incentives?
2a)	If yes, what kinds of in-kind incentives?
2b)	If yes, from whom?

<b>COMMUNITY LEVEL CHECKLIST FOR DATA COLLECTORS</b>	
Take one photo of:	
Price List for User Fees & Medicines	
Montly reports for all of 2011	
Monthly report for January, February, March 2012	

<b>What time did the interviewer conclude the interview?</b>	
<b>How long (minutes/hours) was this interview?</b>	

### Annex C4. ASC Time Template

Ask ASC how many hours he or she spent on each of the activities below for every day in the past week.

Suggested format for asking about the activities below:

1) “Think about the activities that you do as an ASC.”

3) “How many hours did you spend on each activity?”

2) “What did you do on Monday? Tuesday? ”

\*Note: Total hours should be between 14 and 19.

ASC Name:		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1)	Supervision meetings							
2)	All other meetings (i.e., at co-op, etc.)							
3)	Household visits—health promotion							
4)	Travel to and from households							
6)	Family planning							
7a)	Household							
7b)	CHW point of service							
8)	Nutrition							
8a)	household							
8b)	CHW point of service							
9)	CCM							
9a)	household							
9b)	CHW point of service							
10)	Reporting							
11)	Patient follow-up for C-IMCI							
12)	Other health activity (i.e., HIV, TB, nonofficial HC visit, etc.)							
13)	Other work/activity (non-ASC work)							

## Annex C5. Training/Meeting Template

To Collect Information about Each of the Training Sessions Held at All Levels of the Health System That Binômes Are Expected to Attend

		Description of training or meeting	Source of funding	Frequency of training or meeting	Length of session (days)	# supervisors per session	# trainers per session	# trainees (ASCs) per session	Total # participants per session	Per diem, etc. for supervisor	Per diem, etc. for trainer	Per diem, etc. for trainees	Rental cost per session	Other costs per participant	Other fixed costs	TOTAL SESSION COSTS	Actual expenditure on training session
START-UP TRAINING*	1																
	2																
	3																
	4																
	5																
	6																
	7																
	8																
RECURRENT/REFRESHER TRAINING**	9																
	10																
	11																
	12																
	13																
	14																
	15																
MEETINGS***	16																
	17																
	18																
	19																
	20																
	21																
22																	

\* Start-up training is considered to be any initial training required to prepare a volunteer for work as an ASC who performs IMCI. These trainings should be a “one-off” for each individual.

\*\* Recurrent/refresher training is considered to be any subsequent training provided to an ASC providing IMCI. If these trainings are periodic (i.e., yearly), this should be noted. Also note that these trainings should be directly related to provision of IMCI—for example, training on TB-DOTS should NOT be included.

\*\*\* Note that all meetings should pertain to general supervision of ASCs and to IMCI in particular.

## Annex D. Sample ASC Reporting Form

**RAPPORT D'ACTIVITES TRIMESTRIEL**

Période : Janvier – Février- Mars 2012

CASE DE SANTE: MBARASSANE

Offre de services:

a). Prise en charge du Paludisme avec les ACT :

Informations collectées	Janvier	Février	Mars	Total
cas de fièvre vus	00	01	01	02
Total TDR Utilisé	00	01	01	02
TDR+	00	01	00	01
TDR-	00	01	01	02
TDR invalides	00	00	00	00
TDR+ chez les 0 – 5 ans traités avec ACT	00	00	00	00
TDR+ chez les 5 ans et plus traités avec ACT	00	00	00	00
Cas référés pour rupture ACT	00	00	00	00
Cas graves référés	00	00	00	00
Cas référés pour absence d'amélioration	00	00	00	00
Cas contre référés	00	00	00	00
Contre référés suivis	00	00	00	00
Cas de décès	00	00	00	00

b). Prise en charge de la diarrhée avec le SRO/Zinc :

Informations collectées	Janvier	Février	Mars	Total
cas vus pour diarrhée	00	09	01	10
cas classé diarrhée simple	00	09	00	09
diarrhée simple traités avec du SRO seulement	00	00	00	00
diarrhée simple traités avec du SRO/Zinc	00	09	00	09
cas référés pour absence d'amélioration	00	00	00	00
cas référés pour classification grave	00	00	01	01
cas traités à la case et déclarés guéris	00	09	00	09
cas contre référés	00	00	01	01
contre référés et suivi	00	00	01	01
cas de décès déclaré	00	00	00	00

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## Annex E. Medicines and Equipment List for Health Huts

**Note:** The general health hut equipment and infrastructure costs are not included in iCCM program costs.

I. Mobilier case de santé	II. Matériel de soins	II. Matériel de soins	III. Matériel SPC / démonstration culinaire	IV. Médicaments essentiels et antiseptiques	V. Matériel et produits SPNN
Table / lit d'accouchement	Ciseaux droits	Thermomètre médical	Balance Salter avec 2 culottes	Mbendazole bte/600	Petite table matelassée
Table bureau	Ciseaux courbes	Torche	Marmite 15 litres	SRO sachet	Clamp de barre
Meuble de rangement	Pinces avec griffes	Toile cirée 5m	Bol en plastic 1 litre	Mbendazole sirop flacon	Aspirateur manuel
Chaises	Pinces sans griffes	Ruban mètre	Cuillère à soupe	Vitamine A 1000000UI	Savon liquide Litre
Tabouret	Poire	Boite à instruments métalliques	Cuillère à café	Vitamine A 2000000UI	Eau de javel litre
Banc châssis long	Haricot	Bassin de lit	Pot de 1 litre	Vitamine C 500mg	VIII. Outils de gestion
Natte	Plateau rectangulaire	Seau Poubelle	Pot de ¼ litre	Hextril collutoire flacon	Cahier 200 pages
Portemanteau	Réchaud à gaz	Bassine	Ecumoire	Auréomycine 1% pde	Cahier 100 pages
Tableau d'affichage 1m2	Lampe à gaz	Bouilloire	Louche	Auréomycine 3% pde	Fiches de croissance
	Stéthoscope obstétrical	Pèse bébé	Balai	Argyrol 2% collyre	Tableaux gain de poids
		Brosse à ongles	Bol à servir 15 litres	Mercurochrome litres	Fiches de stock
		Porte savon		Alcool 90° litres	
		Marmite 5 litres		Bétadine gynécologique flacon	IX. Supports IEC
				Coton hydrophile kg	Carte Conseils SPNN
				Bande de gaze paquet/10	Carte conseils SPC
				Sparadrap bte/5X 10	Carte conseils PF
					Carte conseils SE

## Annex F. Standard Treatment Guidelines

The following standard treatment guidelines were developed in consultation with MSH SPS Senior Program Associate Mbombo Wathum.

Drug	Number of times/day	Number of days	% of cases treated	Units per dose
<b>Diarrhea (20 minutes per treatment)</b>				
Oral rehydration salts (ORS) sachet	1	4	100.0%	0.25
Zinc (10 mg)	1	10	20.0%	0.50
Zinc (20 mg)	1	10	80.0%	1.00
<b>ARI (30 minutes per treatment)</b>				
Cotrimoxazole comp (100 mg + 20 mg)	2	5	20.0%	0.50
Cotrimoxazole comp (100 mg + 20 mg)	2	5	80.0%	1.00
<b>Fever (20 minutes per diagnosis)</b>				
Rapid Diagnostic Test (RDT)	1	1	100.0%	1.00
<b>Confirmed malaria (10 minutes per treatment)</b>				
Artesunate + Amodiaquine (50 mg + 135 mg), 3 fixed-dose tabs	1	1	80.0%	1.00
Artesunate + Amodiaquine (25 mg + 65.5 mg), 3 fixed-dose tabs	1	1	20.0%	1.00

## Annex G. Total Costs of iCCM Program in Central African Francs (CFA)

	2011	2012	2013	2014	2015	2016
<b>Total recurrent cost</b>	248,287,892	321,947,855	401,930,659	485,753,863	573,560,072	666,415,451
<b>Total population (all)</b>	1,631,700	1,807,422	1,852,607	1,898,922	1,946,395	1,995,055
<b>Total population (&lt;5)</b>	239,860	265,691	272,333	279,142	286,120	293,273
<b>Cost per capita (all)</b>	152.17	178.13	216.95	255.81	294.68	334.03
<b>Cost per capita (&lt;5)</b>	1,035.14	1,211.74	1,475.88	1,740.17	2,004.61	2,272.34

## Annex H. Glossary

<b>Capital expenditure:</b>	the cost for resources that last more than one year, such as building, vehicles, computers, pre-service training. Sometime a price ceiling is also defined (usually \$US100), below which costs are considered as recurrent. The cost of capital equipment is net of depreciation. Also called investment or non-recurrent cost/expenditure. (World Health Organization - Health Systems Strengthening Glossary: <a href="http://www.who.int/healthsystems/Glossary_January2011.pdf">http://www.who.int/healthsystems/Glossary_January2011.pdf</a> )
<b>Cost benefit analysis:</b>	a comparison of costs and achieved benefits, where both costs and benefits are expressed in monetary terms. (ibid)
<b>Cost effectiveness analysis:</b>	a form of economic evaluation where costs are expressed in money terms but consequences are expressed in physical units. It is used to compare different ways of achieving the same objective. (ibid)
<b>Costing:</b>	(i) the estimation of a specific strategy or intervention, or of an overall national policy, strategy or plan. (ii) the estimation of the cost of different scenarios, corresponding to different priorities or strategies, in the short, medium or long term. (ibid)
<b>Direct cost:</b>	(i) internal cost of an activity or decision including cost of labor, other goods and services, capital (usually considered as a rental value) and consumables. Direct cost excludes external costs, productivity costs, uncompensated forgone earnings and elements of cost that may be undervalued by market prices. <sup>42</sup> (ii) all the goods, services and other resources that are consumed in the provision of a particular service or area (e.g. hospital supplies), including medical costs (e.g. payments to providers, material) and non-medical costs (e.g. transportation to hospital). (ibid)
<b>Depreciation:</b>	the reduction in value of a capital asset through wear and tear. (ibid)
<b>Economies of Scale:</b>	the decline in average cost of each unit produced as output increases, due to the distribution of production costs and other fixed costs across a higher number of units. (ibid)
<b>Fixed cost:</b>	A cost that does not change with variations in output. For example, the rent of a clinic building does not change with the number of patients treated (until the capacity of the clinic is reached).
<b>Indirect costs:</b>	total sum of morbidity costs (goods and services not produced by the patient because of the illness), mortality costs (goods and services the person could have produced had the illness not been incurred and the person not died prematurely), and productivity cost (related to lost productivity incurred by an employee who leaves work to provide care for the patient). (World Health Organization - Health Systems Strengthening Glossary: <a href="http://www.who.int/healthsystems/Glossary_January2011.pdf">http://www.who.int/healthsystems/Glossary_January2011.pdf</a> )

<b>Marginal cost:</b>	the change in total cost that results from a unit increase in output. (ibid)
<b>Opportunity cost:</b>	"the value of the next best alternative forgone as a result of the decision made." (ibid)
<b>Recurrent expenditures – costs:</b>	costs that refer to inputs which last less than one year and are regularly purchased for continuing an activity, such as salaries, drugs and supplies, repair maintenance, and others. (ibid)
<b>Variable cost:</b>	A cost that is directly proportional to the number of outputs produced. For example, in a clinic the cost of drugs can be regarded as varying directly with the number of patients treated.
<b>Semi-Variable Cost:</b>	A cost which has a fixed element and a variable element and which varies to some degree with the volume of outputs produced. An example would be the cost of a training course which has a fixed element (the rent of the room) and a variable element (materials for the students).
<b>Step-variable cost:</b>	A cost which is fixed up to a certain volume of outputs. An example would be a nurse at a clinic who can see up to 30 patients per day. Her salary is a fixed cost when the volume is up to 30 patients. When there are 31 patients another nurse has to be hired and the salary cost increases to that of two nurses. Presented graphically these costs look like steps.