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Maternal and Child Survival Program

Alternative training models for strengthening health worker capacity to implement the Integrated Management of Newborn and Childhood Illness (IMNCI) strategy in Uganda

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The Maternal and Child Survival Program (MCSP) is a global, $560 million, 5-year cooperative agreement funded by the United States Agency for International Development (USAID) to introduce and support scale-up of high-impact health interventions among USAID's 25 maternal and child health priority countries, as well as other countries. The Program is focused on ensuring that all women, newborns and children most in need have equitable access to quality health care services to save lives. MCSP supports programming in maternal, newborn and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment.

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Acronyms and Abbreviations

ADHO	Assistant District Health Officer
DHS	Demographic and Health Survey
DL	distance learning
DT	dispersible tablets
EC	East Central region
ECHP	essential child health package
HC	Health Center
HMIS	Health Management Information System
HW	health worker
ICCM	Integrated Community Case Management
IMCI	Integrated Management of Childhood Illness
IMNCI	Integrated Management of Newborn and Childhood Illness
JSI	John Snow, Inc.
MCH	maternal and child health
MCSP	USAID's Maternal and Child Survival Program
MOH	Uganda's Ministry of Health
ORS	oral rehydration salts
ORT	oral rehydration therapy
RHITES	Regional Health Integration to Enhance Services
RMNCAH	Reproductive, Maternal, Newborn, Child and Adolescent Health
SIC	short-interrupted course
SW	South West region
TA	technical assistance
TOT	training of trainers
U5	under five years of age
USAID	United States Agency for International Development
USD	United States Dollar
WHO	World Health Organization
WHO AFRO	World Health Organization Regional Office for Africa

Executive Summary

The United States Agency for International Development's (USAID) flagship Maternal and Child Survival Program (MCSP) is a USAID cooperative agreement to introduce and support scale-up high-impact health interventions among USAID's 25 maternal and child health priority countries, as well as other countries, with the ultimate goal of preventing child and maternal deaths. In Uganda, MCSP has provided technical assistance to USAID/Uganda's Regional Health Integration to Enhance Services (RHITES) South Western and East Central projects to support the Government of Uganda with implementation of the Uganda Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCAH) Sharpened Plan, which includes a package of low cost, high impact, evidence-based child health interventions that can be applied at different levels of the health system to reduce child mortality. Since January 2017, MCSP and RHITES have worked together with the Ministry of Health (MOH) in four prioritized demonstration districts — Kaliro and Luuka in the East Central region and Ntungamo and Sheema in the South Western region — to implement the essential child health package (ECHP).

In October 2017, MCSP, alongside the RHITES partners, collaborated with the World Health Organization (WHO) and the MOH to pilot two alternative training approaches for implementation of the Integrated Management of Newborn and Childhood Illness (IMNCI) strategy — the distance learning model developed by WHO and the short-interrupted course model developed by the MOH — to roll out the essential child health care package. While the distance learning model had been successfully implemented in Tanzania, the MOH required a proof of concept pilot to demonstrate the feasibility and acceptability of the model in Uganda. The short-interrupted course model was developed in Uganda to address previously experienced bottlenecks to IMNCI scale-up but had not yet been tested. The overall purpose of the pilot of the two models was to generate learning to inform the model that will be used for the roll-out of IMNCI, a prioritized intervention for the Uganda RMNCAH Sharpened Plan. For each approach the pilot aimed to determine: feasibility and acceptability; specific costs involved; and effectiveness in improving health worker IMNCI knowledge and skills. This document reports the results, lessons learned, and recommendations to Uganda's MOH from piloting of the two alternative approaches. The MCSP Uganda report, *Costing of an Essential Child Health Package in Uganda*[1], details the costs involved in implementation of the two approaches.

Overview of the Pilot

Between October 2017 and April 2018, MCSP provided technical assistance for piloting of the two alternative IMNCI training models in a total of four districts, two districts in the East Central region and two districts in the South Western region. During the pilot, one district in each region was purposefully assigned to the WHO distance learning model, while the other district was assigned to the short-interrupted course model. The distance learning model consists of three one-day, face-to-face, facilitator-led learning sessions, with four weeks of on-the-job self-led study in between the face-to-face sessions. The short-interrupted course model consists of two face-to-face, facilitator-led sessions of two and a half days initially, and later one and a half days; with two weeks of on-the-job self-led study in between the face-to-face sessions. In both models the self-study period was augmented with onsite support and mentorship by district Training of Trainers teams established with MCSP technical support. MCSP also provided technical assistance to the MOH at the national level and RHITES at the regional level to ensure that essential drugs needed for implementation of IMNCI were available at the district and health facility levels.

The IMNCI-related knowledge and skills of all enrolled health workers were assessed during the face-to-face sessions using - 1) pre-session, mid-session, and post-session tests; and 2) direct observation of case management practices during onsite mentorship visits using a standardized tool.

[1] Ben P., Meredith L. 2019. *Costing of an Essential Child Health Package in Uganda: analysis of costs to roll-out and deliver the package at public primary health care facilities*. https://www.mcsprogram.org/resource/costing-of-an-essential-child-health-package-in-uganda/. Accessed March 27, 2019

In addition to examining HW knowledge and skills, data from the quarterly health facility assessments from baseline (July-September 2017) and endline (July -September 2018) were analyzed to assess the performance of health facilities in all four districts on - 1) case management of common illnesses; and 2) health facilities' readiness to implement IMNCI services.

Findings

407 health workers were enrolled across the two models, with a higher proportion of health workers enrolled in the distance learning model (58%) compared to the short-interrupted course model (42%). 90% of health workers enrolled in the distance learning model and 95% of those enrolled in the short-interrupted course model completed the training course. At the end of the pilot, the overall average increase in scores of knowledge and skills for using IMNCI to assess, classify, identify treatment and treat sick children, was 31. The increment in knowledge and skills scores was almost similar for the two models (31 for distance learning and 30 for short-interrupted course).

Changes in the rates of adherence to IMNCI guidelines varied between the two pilot regions and by disease classification. Adherence rates to IMNCI fever case management guidelines were high at baseline and remained high until the end of the trainings across all four demonstration districts. Marked improvements were observed in adherence rates to IMNCI pneumonia case management guidelines in the East Central region. While in the South Western region, adherence to IMNCI pneumonia case management guidelines was found to be very high at baseline and stayed high until end of the training. Rates of adherence to IMNCI diarrhea case management guidelines were less consistent across the four districts, wherein case management practices were found to be largely influenced by other factors, such as stock outs of essential IMNCI drugs, as well as patient and community expectations.

Lessons Learned

Each training model had its own strengths and weaknesses that met the needs of the districts and cadres in varying ways. The short-interrupted course model was found to have the advantage of taking a shorter time for health workers to complete, and it was found by trainers to be more effective for training of lower level cadres. The distance learning model had the advantage of enrolling more participants over the same time period, and markedly reduced time spent away from the workplace, which is a factor that was highly appreciated by district leadership. The distance learning model cost less on per trainee and per health facility basis. The short-interrupted course model costs were higher per trainee and per health facility, driven by the longer duration of the face-to-face sessions. Additionally, the timeline for self-study was found to be too short for participants to complete the assignments allocated to them. Whereas, the time allocated for face-to-face sessions in the distance learning model was insufficient to be considered an adequate amount of supervised clinical practice sessions, and did not allow for timely identification and therefore, timely provision of support to slow learners.

Leadership provided by district level trainers and health facility managers was crucial for successful implementation of the two models. The district leadership at all levels facilitated rapid roll out of the trainings, successful follow up with trainees to ensure completion of the course, and proper time management and effective participation of HWs during the training sessions, holding health workers accountable for application of their learning in their day-to-day work.

A cost-effective approach for supportive supervision was the use of resident district trainers partnered with one to two national trainers. The costs associated with the use of district trainers that resided within the district was lower than the cost associated with the use of trainers brought from outside the district.

Case management observation and records review were needed to ensure that the knowledge gained during training translated into an improved use of IMNCI for case management. Continuous assessment through case management observation and records review was found to be a useful mechanism for identifying and addressing IMNCI skills gaps and challenges to appropriate case management practices.

Health worker case management practices were largely influenced by factors other than training. Factors that greatly influenced treatment practices at the facility level included, the availability of essential drugs and basic equipment, as well as community expectations such as receiving prescribed medications for every illness. Patient education through community leaders improved the understanding and acceptability of the IMNCI treatment standards.

Health systems at national and district level needed to be aligned and strengthened to support implementation of IMNCI: The stock outs of essential drugs for case management, and the lack of the updated IMNCI disease classifications in the existing Health Management Information Systems (HMIS) were major barriers to improving health worker case management practices. MCSP engaged with national level actors to improve the supply of IMNCI commodities to the districts. Technical support was also provided during the review of the national HMIS to integrate the updated IMNCI classifications.

The cost of the short-interrupted course model was higher than cost of the distance learning model, but both models showed comparable IMNCI competency improvements: The cost to implement the distance learning model on a per trainee and per health facility basis, was lower than for the short-interrupted course model. The cost drivers of the short-interrupted course model included the duration of the face-to-face sessions and the participants' accommodation and meals.

Conclusions/Recommendations

MCSP in collaboration with the WHO country office and the MOH field tested two alternative training models for IMNCI in Uganda. The WHO distance learning model had been implemented elsewhere but not in Uganda, while this was the first time for field testing the short interrupted course model. The pilot demonstrated the feasibility of implementing both models in the Uganda context. The pilot also found comparable improvements in the knowledge and skills of health workers trained under the two models. Overall, both models were appreciated and acceptable to health workers, trainers, district health managers and implementing partners, with each having strengths appealing to the needs of different audiences. However, both models also had challenges that would need to be taken into consideration before decisions are made related to scale up.

MCSP has the following recommendations for the MOH and other implementing partners based on lessons learned from program implementation:

1. Both models piloted by MCSP are recommended as feasible, alternative cost-saving options for strengthening the capacity of health workers to implement IMNCI in Uganda. However, further modifications to the models should be considered to improve their use in the Ugandan context.
    - For the short-interrupted course model, reduce the cost of face-to-face training sessions by holding the sessions closer to trainees workplaces therefore, reducing the need for costs to cover participants accommodation; and increase the duration of the self-study period to at least four weeks.
    - For the distance learning model, assess trainees to identify slow learners during the first face-to-face session, and allocate more time to the slow learners during onsite mentorships.
2. MOH should take into consideration the following key lessons learned, looking beyond the cost implications of the models when they make decisions related to scale up.
    - The distant learning model should be the preferred option as it is cheaper, especially for districts with limited external support and when the aim is to maintain and update skills for IMNCI implementation amongst health workers who already have the basic training and to orient new staff coming onboard. In this setting, targeted health workers can leverage existing capacity amongst colleagues to get support during the self-study period.
    - The short-interrupted course model offers a quick turnaround time for completion of the course; allows for more supervised practice and therefore, a faster acquisition of IMNCI skills.

The model has less reading/self-study requirements, an aspect of the DL model health workers cited as a challenge of the DL models. When starting from a point of low capacity, rapidly scaling up skills for IMNCI implementation is desired, the majority of the intended target health workers are mid to low level cadres, and if resources are available, this option should be considered.

3. For both models, there should be engagement and empowerment of focal staff at the district health management team and the health facility in-charges to provide leadership and oversight for the roll out, and to ensure that learning acquired contributes to the transformation of health worker practices in the day-to-day management of children.
4. District-based TOT teams supported by 1-2 national trainers for quality supervision should be used rather than only trainers from outside the district.
5. The MOH, districts and implementing partners should ensure the availability of essential commodities needed for IMNCI implementation, as lack of these negatively affects translation of acquired knowledge and skills during the training into practice.
6. Post-training mentorship and support should include case management observation and review of case records of children managed by health workers to ensure health workers routinely apply knowledge acquired in their day-to-day management of children.
7. IMNCI scale up should be supported with patient education and community sensitization to create awareness and increase acceptability of the IMNCI treatment options that do not require the prescription of medication.
8. Adequate financial resources should be made available from domestic sources and/or partners to implement either chosen methods.

Introduction

Uganda is among many low resourced countries that achieved significant reductions in mortality rates for children under five years of age (U5) over the last fifteen years, from 151 deaths per 1,000 live births in 1990 to 56 in 2016.[2] However, the rate of decline in U5 mortality in recent years was not sufficient for the country to meet its Millennium Development Goals (MDGs) target that called for a two-thirds reduction in U5 mortality before the end of 2015. In addition, with a population growth rate of 3.5%, Uganda is one of the fastest growing populations in the world. The country is among the few where the U5 population is expected to rise substantially, and with it the number of U5 deaths. More than 70% of deaths among children U5 in Uganda are due to common preventable childhood illnesses (pneumonia, diarrhea, malaria) and neonatal conditions (prematurity, asphyxia, and neonatal infections).[3] Inadequate coverage of known low-cost, high impact interventions to address these common childhood illnesses remains one of the major barriers to eliminating these avoidable deaths. The 2016 national Demographic and Health Survey[2] (DHS) showed that one in five (19%) children suffering from diarrhea did not receive any treatment, while only a third of those who received care were given the appropriate treatment of oral rehydration salts (ORS) and zinc tablets. Only four in 10 (39%) children with signs of acute respiratory infection were taken for treatment on the same day, and only half (55%) of children aged 12-23 months were fully vaccinated.

To address the slow progress in reduction of child mortality and move toward universal access to high-impact child health interventions, Uganda's Ministry of Health (MOH) in 2016 launched a national Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCAH) Sharpened Plan. The plan articulated five key strategic shifts that the country intended to undertake over a five-year period. The MOH, in this Sharpened Plan, identified the Integrated Management of Newborn and Childhood Illness (IMNCI) as the main approach to strengthen health workers' capacity for delivering the essential child health package (ECHP) of low cost, high impact, evidence-based interventions.

History of IMNCI in Uganda

IMNCI was developed in 1994 by the World Health Organization (WHO) in collaboration with UNICEF, and has been shown to have contributed to a 15% reduction in infant and child mortality when properly implemented.[4] Uganda adopted IMNCI as a strategy to reduce child mortality and improve child health and development in 1996. Since then, health workers (HW) have been trained using the nationally adapted IMNCI guidelines. Uganda has also integrated IMNCI into pre-service training programs for doctors, paramedical personnel (clinical officers), nurses, and midwives. The trainings resulted in more than 75% national coverage of IMNCI trained HWs, which created a consistent trend toward improved quality of care, and improved performance of HWs.[5] However, training and implementation of IMNCI in the country stagnated over the last 15 years, with high costs associated with the long duration of the traditional 11-day IMNCI training course identified as one of the major contributing factors.

In 2002, the MOH introduced a shorter course training of six days, and later an even shorter, interrupted version comprised of two three-day, face-to-face sessions that are held two weeks apart called the "short interrupted course" (SIC). However, funding to pilot test the SIC never materialized and the SIC was therefore, never initiated in Uganda. In 2014, with UNICEF's support, Uganda introduced the Integrated Management of Childhood Illnesses (IMCI) Computerized Adaptation and Training Tool (ICATT)

[2] Uganda Bureau of Statistics (UBOS) and ICF. 2018. *Uganda Demographic and Health Survey 2016*. Kampala, Uganda and Rockville, Maryland, USA: UBOS and ICF.
[3] Ministry of Health. Annual Sector Performance Report-Financial Year 2017/2018. Kampala Uganda.
[4] Gera T, Shah D, Garner P, Richardson M, Sachdev HS. 2016. Integrated management of childhood illnesses (IMCI) strategy for children under five. Cochrane Database of Systematic Reviews 2016, Issue 6. Art. No.: CD010123. DOI: 10.1002/14651858.CD010123.pub2.
[5] Pariyo G., Gouws E., Bryce J., Burnham G. 2005. Improving facility-based care for sick children in Uganda: training is not enough, Health Policy and Planning, 20 (1): i58–i68. https://doi.org/10.1093/heapol/czi051.

eLearning tool. However, this course was never scaled up due to the absence of a clear national strategy for rollout and the shortage of computers and power at lower level health facilities, which is the key audience for the course. Other issues affecting scale up and quality implementation of IMNCI in Uganda have included:

- Poor quality of the IMNCI training within the districts, which were a result of inadequately trained training of trainer (TOT) teams and the decrease in clinical practice time after training was decentralized from being led and managed centrally by the MOH to the district level;
- Inadequate numbers of trained HWs to manage sick children, and inadequate provision of key tools and supplies to support implementation of IMNCI, such as job aids and basic equipment;
- A limited focus on key aspects of the health system that are needed to support implementation of IMNCI including Health Management Information Systems (HMIS), drugs, supplies, capacity at the district level to provide leadership, and quality supportive supervision; and a system at both national and district levels to regularly monitor the implementation and outputs of IMNCI beyond training;

Poor quality of training in pre service training institutions where IMNCI has been incorporated as a result of inadequate technical updates of the training curriculum and guidelines, high tutor to student ratios and inadequate allocation of time for clinical practice of IMNCI skills MCSP, alongside USAID's Regional Health Integration to Enhance Services (RHITES) project, the WHO Uganda country office, and other partners collaborated with the MOH's plan to strengthen the IMNCI approach for delivery of the ECHP. The collaboration focused on field testing two IMNCI training models developed as part of a technical assistance (TA) program to address the challenges affecting scale up and quality of IMNCI implementation as outlined above.

The key objectives of the collaboration were to:

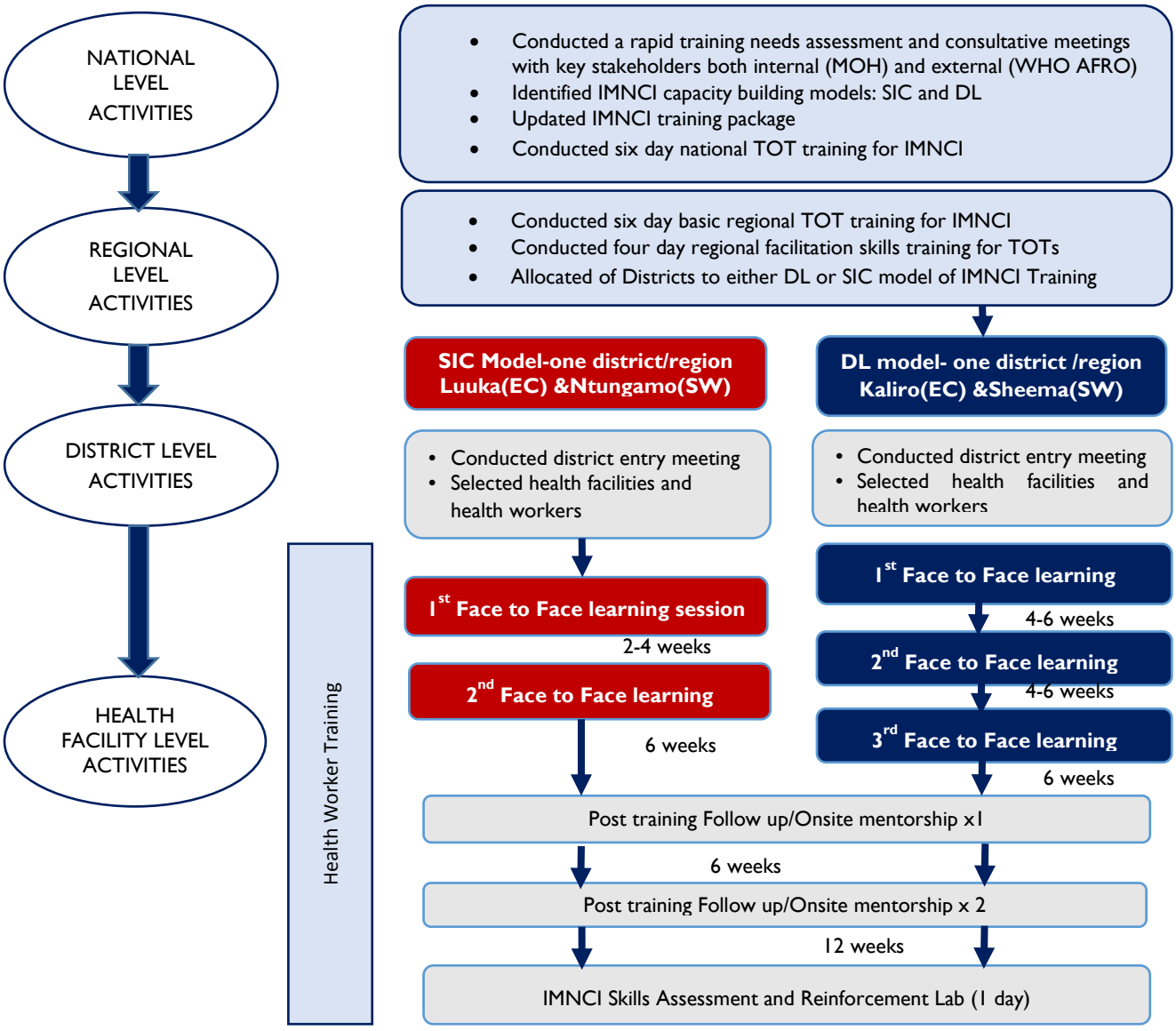
- Identify appropriate IMNCI training models to address previously experienced bottlenecks to scale up IMNCI at district level (high cost, duration of training, time commitment, disruption of service delivery, poor quality, and inadequate coverage).
- Demonstrate and document the feasibility and effectiveness of implementing alternative models for IMNCI training, while building the IMNCI capacity of the RHITES partners and district HWs.
- Determine the cost of rolling out the alternative training models.

This report presents the experience and results of implementing the two IMNCI training approaches in four MCSP demonstration districts. The costs involved in implementation of the two approaches are reported in MCSP's *Costing of an Essential Child Health Package in Uganda*.

Overview of the pilot

Implementation of the two alternative IMNCI training models was conducted in four demonstration districts, two districts (Kaliro and Luuka) in the East Central (EC) region and two districts (Sheema and Ntungamo) in the South West (SW) region, between October 2017 and April 2018. Figure 1 outlines the process of piloting the two models.

Figure 1: Overview of the process for pilot implementation of the two IMNCI models



Identification of potential alternative IMNCI training models

MCSP and the WHO Uganda country office, on the request of the MOH, conducted a rapid training needs assessment in the four districts and initiated a series of consultations with in-country stakeholders on a potential model for building capacity for IMNCI. Consultations also involved the WHO Tanzania country office through the WHO Regional Office for Africa (AFRO) in Brazzaville to learn from the country's experience of implementing the WHO distance learning (DL) model.

Following the consultations, MCSP and WHO made a decision to pilot two IMNCI training models to inform how the country will revitalize and roll out IMNCI in Uganda. The two selected models were 1) the standard WHO DL model, comprised of three one-day, face-to-face, sessions with four weeks in between the face-to-face sessions for self-study and work-based experiential learning; and 2) the SIC model, which is an adaption of Uganda's six-day abridged course, comprised of two face-to-face, facilitator-led sessions. The first face-to-face session was two and a half days long and the second, one and a half days, with two weeks of on-the-job self-led study in between the sessions (see Figures 2 and 3 for additional details on the proposed training models).

Figure 2: WHO DL model structure

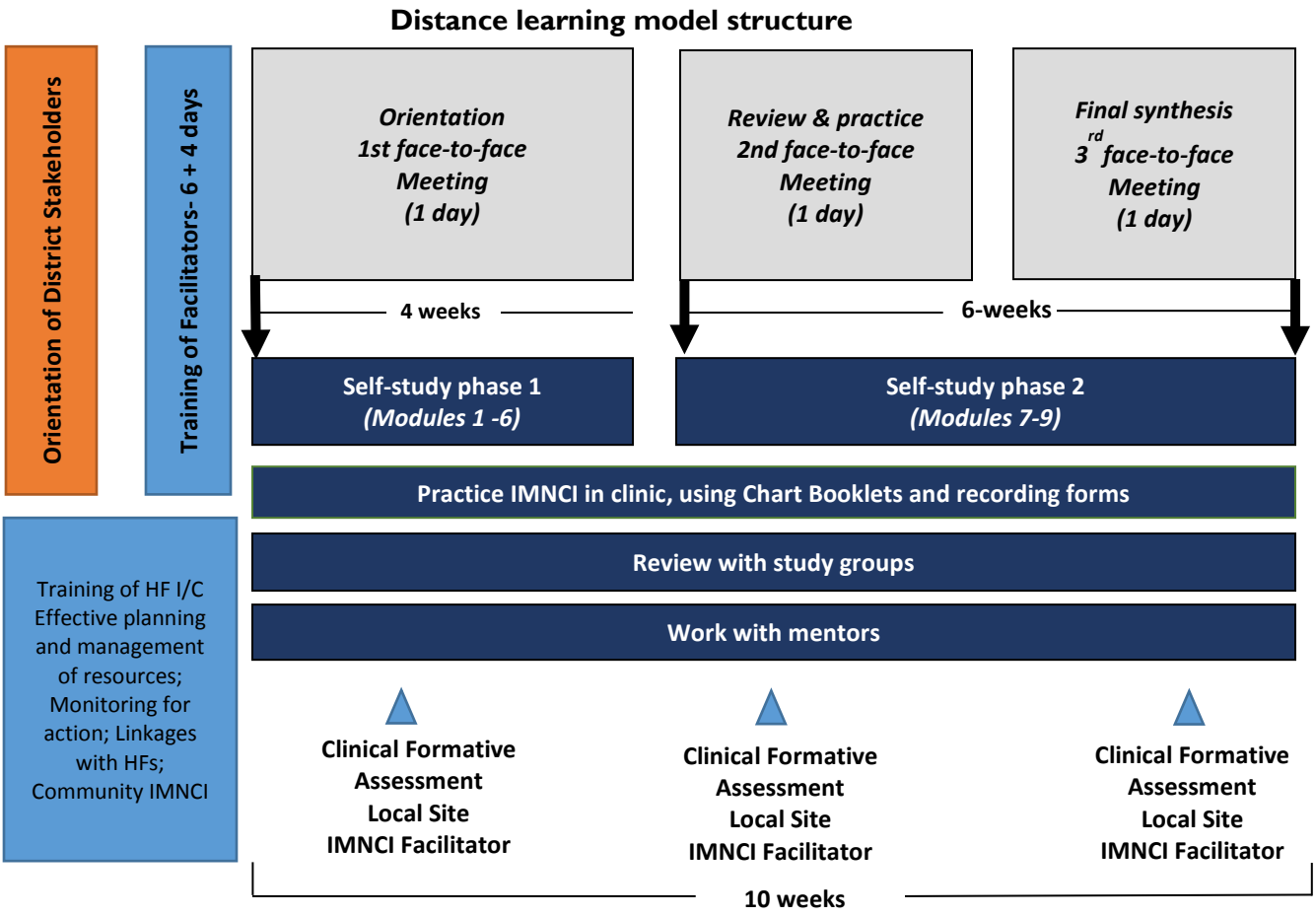
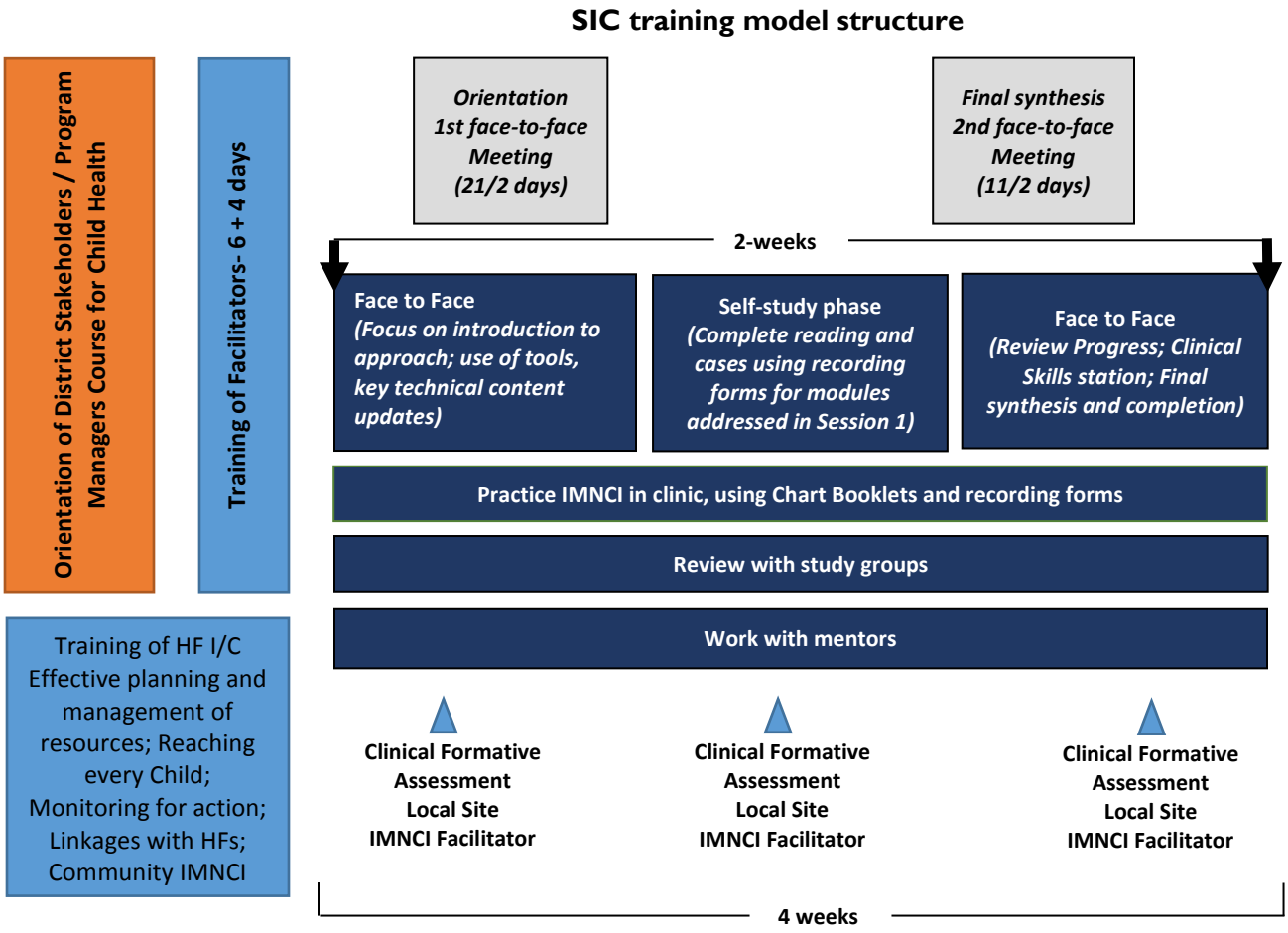


Figure 3: SIC training model structure



REC adaptation support: In addition to these cascade training and mentorship approaches, MCSP and the RHITES supported subnational adaptation of the REC approach for immunization to broader child health based on MCSP's experience supporting the REC immunization approach in Uganda. The child health adaptation focused on catchment-area based resource planning (i.e., micro-mapping and planning) and management to better align resources to child health needs within specific catchment areas. This approach included identifying and focusing on underserved community members and implementing child health service delivery strategies to better reach them (e.g., integrated outreaches, VHT registration of households with children U5), including engaging communities to identify locally appropriate interventions. MCSP also supported quarterly supportive supervision and quarterly reviews among facility and VHTs, which included data monitoring to refine community-based approaches and linkages to facilities for child health. Implementation of the approach varied slightly in each district, hence costed activities differ by district.

Data Sources and Data Collection

Given the prospective nature of the ECHP roll-out costing, the analysis team collected data directly from MCSP, RHITES-EC and RHITES-SW (Table 1). Data collection frequencies and methodologies differed for each program team to maximize the accuracy of each dataset. Raw expenditure data for MCSP was available monthly while RHITES data cleaned and aggregated their data prior to sharing with the analysis team.

Table 1: Data sources for ECHP roll-out strategies costing

Data type	Data source
MCSP direct activity costs	Monthly voucher review of all individual program expenditures
MCSP level of effort by activity	Monthly time tracking sheet submitted by each member of the child health team with detailed activity descriptions
RHITES direct activity costs	Direct cost summary aggregated by ECHP roll-out activity and cost category totals (sent monthly)
RHITES level of effort by activity	Total technical and oversight LOE by ECHP roll-out activity (sent monthly)
Salary estimates	Ministry of Public Service FY2018-19 public salary schedule, including pension and gratuity as outlined by Ministry of Public Service formulae, Program budget estimates by level, including pension and benefits
Program output: Number of participants trained	MCSP training database

Data Analysis

The analysis team cleaned and analyzed data on a rolling basis using Excel models to consolidate program and activity data. This process included coding and aggregating data by activity area, geography, and cost category for analysis. The team then calculated the average cost per activity type and average cost per person trained by activity. The team then adjusted these activity-based unit costs from the programmatic perspective to a government perspective (i.e., what it would cost the Ugandan Government to implement the same set of activities. All calculations used Uganda Shillings (UGX); any converted figure into United States Dollar (USD) assumed an exchange rate of 1 USD to 3,705 UGX.

Assumptions and Limitations

The analysis team identified the following assumption and limitation in the interpretation of the results:

Integrated nature of programmatic activities: Given the integrated nature in which MCSP and RHITES implemented the programmatic activities, the analysis team could not always easily estimate direct costs for ECHP roll-out activities as separate from other program areas (e.g., HIV services, immunization, and particularly mentoring). As necessary, the analysis team worked closely with program staff to make refined estimates or assumptions to allocate ECHP roll-out costs.

Strategy for pilot: While the WHO DL model has been successfully implemented in Tanzania, the MOH in Uganda was hesitant to adopt this model outright due to concerns about the potential risk of high dropout rates and challenges of implementing the one-day, face-to-face sessions given the delays routinely observed in start times of training. The SIC model, though developed in Uganda, had not yet been tested. It was, therefore, agreed to pilot both models in the MCSP demonstration districts and use the learning to inform the model to be used nationally.

Selection and preparation of district mentors

A TOT team was created in each district comprised of the Assistant District Health Officer (ADHO) in-charge of maternal and child health (MCH) as the team lead, and clinical staff, such as practicing senior medical officers, clinical officers, or nursing officers who met the criteria for being a trainee and had already demonstrated good leadership skills at their health facilities. MCSP and RHITES provided guidance on and supported the ADHO in selecting the TOT team. The district TOT team received a six-day basic IMNCI training, followed by a four-day IMNCI facilitation skills course. The basic course focused on equipping

TOTs with skills in IMNCI (assessment, classification, and treatment) with a strong focus on identification and recognition of signs of illness in children. The facilitation skills course prepared the TOT team for delivering the IMNCI training with a strong focus on facilitating trainees to identify and recognize signs of illness in children, as well as helping trainees apply the IMNCI approach for holistic management of children. Five trainers who met most of the criteria for district trainers were selected to participate in the facilitation skills course in each district. The district TOT teams received support from the national IMNCI TOT teams for enhancement of their skills during implementation of the models.

Selection of the demonstration districts and health facilities

The districts in each region were already selected as demonstration districts for MCSP's TA program to USAID's RHITES in the EC and SW regions. One district in each region (Kaliro in the EC region and Sheema in the SW region) was assigned to the standard WHO DL model, while the other district was assigned to the SIC model. The district perceived to have stronger district health leadership was assigned to the DL model, as this was a critical factor needed to ensure proper running of the one-day, face-to-face sessions of the DL model. Two of the districts selected (Sheema and Ntungamo) already had ongoing external support beyond RHITES for implementation of Integrated Community Case Management (iCCM). A total of 134 health facilities including hospitals, and level IV to level II health facilities across the four districts were included in the pilot. The health facilities included were comprised of all public health facilities in the four districts and high volume private, not-for-profit health facilities run by faith-based institutions. The list of health facilities to be included was compiled and agreed on with the guidance of the district health office.

Selection of health workers to be trained

In each district, the ADHO, with guidance from MCSP, selected HWs from each of the health facilities to participate in the pilot training programs. The target was HWs who were mainly responsible for clinical management of U5 in outpatient clinics or in the pediatric wards. Priority was given to medical doctors, clinical officers, and/or nurses and midwives. In health facilities where these cadres did not exist, nursing assistants, who were auxiliary HWs with at least two to four years of post-primary education and on-the-job training, were enrolled in the training. The number of HWs targeted at each health facility varied by level of care and was determined based on what was considered the minimum number needed to achieve approximately 60% coverage of all HWs managing children at each level of care (see text box). In addition, IMNCI capacity building targeted all managers (also referred to as "in-charges") of the health facilities included in the pilot.

Training of health workers using DL and SIC models

The district TOT teams spearheaded the trainings and mentorship of the HWs.

Fostering leadership for implementation of IMNCI at the health facility: In both the models, the first cohort of trainings in each district targeted the health facility managers. Managers revisited their expected roles in supporting implementation of IMNCI at their health facilities. All participants reviewed and received clarification on other components of IMNCI such as equipment, drugs, supplies, and proper documentation that are essential for IMNCI implementation. Leadership for IMNCI was further developed through review of individual health facility performance against select IMNCI indicators, including availability at the health facility of key components needed to support IMNCI implementation. Well performing health facility managers were recognized during quarterly district performance review meetings and asked to share their promising local solutions to common challenges affecting implementation of IMNCI in other health facilities.

Number of HWs targeted for IMNCI by level of care

- Hospital and Health Center (HC) IVs: 10-12
- HCIII: 4
- HCII: 2

Organization of the training sessions: Trainings of HWs were scheduled to achieve rapid scale-up while minimizing service disruption. A series of consecutive face-to-face sessions were conducted over a two-week period in each district. Each session was organized to have no more than one HW from any one health facility and a maximum of 24 HWs. By design, 144 HWs (with at least two and a maximum of eight HWs per health facility) with the DL model; and up to 96 HWs (with at least two and a maximum of four HWs per health facility) with the SIC model would be trained over a two week period.

***DL model training sessions*:** Implementation of the DL model consisted of three one-day, face-to-face, facilitator-led learning sessions, with four weeks of on-the-job self-led study between the face-to-face sessions. During the face-to-face sessions, HWs were introduced to the self-study materials and also provided a high level overview of the IMNCI training content. In the second and third face-to-face sessions the HWs also had an additional session to reflect on the self-study period.

SIC model training sessions: The SIC model consisted of two face-to-face facilitator-led sessions, the first of which was two and a half days long, and the second which was one and a half day long. The face-to-face sessions comprised of facilitator-led learning covering all IMNCI content, including practicing the recognition of clinical signs. IMNCI content covered during the face to face sessions was presented in a set of 6 modules including; an introduction and glossary, four modules each addressing each of the steps in integrated management of the sick child age 2 months up to 5 years (Assess and Classify, Identify treatment, Treat the Child, and Counsel and Follow up) and one module on management of the Sick young infant aged 0 to 2 months..

***DL model self-study period sessions*:** The self-study period in the DL model was for self-directed learning to complete modules introduced in the face-to-face sessions. Each participant received a set of 9 modules each covering assessment and classification, identification of treatment, treatment, counselling and follow up for each of the following common childhood illnesses: cough, diarrhea, fever, ear problems, malnutrition and anemia, HIV, TB, and growth and development and management of the sick young infant. In addition, the participants were also provided a log book to record cases seen for each module covered; check learning using exercise, and track clinical signs observed while at the work place. The duration of the self-study period for the DL model varied was designed to be 4 weeks but was extended to 6 weeks across the four districts, and was determined by readiness and availability of the district trainers and leadership to conduct the follow on face to face sessions.

SIC model self-study period sessions: In the SIC model, the self-study period focused on practicing of knowledge and skills acquired during the face-to-face sessions. Just like for participants trained using the DL model, participants attending the SIC model were provided with a log book to record cases seen for each module covered; check learning using exercise and track clinical signs observed while at the work place. The duration of the self-study period for the SIC model was designed to last 2 weeks. However, it was realized during the field testing of the model that more time was needed. The period was therefore extended to last 4 weeks

***Onsite support and mentorship*:** The self-study period in both models was augmented with onsite support and mentorship. With support from a national trainer, district mentors visited each health facility for a day once during the self-study period. During the visit to each health facility, the district mentors reviewed progress made by the health workers on the study materials, assessed case management skills through observation of HWs while managing child patients and review of records, and used review and assessment findings to provide targeted support for the individual HWs and the health facility as a whole.

DL model onsite mentorship sessions: In the DL model, a total of 4 onsite mentorship sessions were held: one in between each of the face to face learning sessions and two after the end of the last face to face learning session.

SIC model onsite mentorship sessions: In the SIC model, a total of 3 onsite mentorship sessions were held: one in between the two face to face learning sessions and two after the end of the last face to face learning session.

Study groups: In addition to the onsite support and mentorship, support during the self-study period was provided by peers in study groups, which were set up after the first face-to-face session, at each health facility. Study groups of all health workers enrolled in each district and the district trainers and mentors were set up using the mobile WhatsApp application. The WhatsApp platform was administered by the District MCH focal person and was used by the trainers and districts to send reminder messages to the health workers as well as t share pictures and videos of key child hood illnesses. The health workers used the WhatsApp group to ask questions and seek clarification about what they were studying and on cases seen at the work place, and also to alert the district about some of the challenges they were facing such as stock outs of essential commodities for IMNCI.

Additional support for health system components needed for implementation of IMNCI at all levels of care*:* The MOH and implementing districts received TA to update the national HMIS with revised IMNCI disease classifications. Support was also provided to the HWs to improve the quality of documentation and reporting on patient treatment data. Frequent stock outs of essential IMNCI drugs, such as amoxicillin dispersible tablets (DT), were identified as a key factor that would affect implementation of the pilot. Therefore, the program engaged with key stakeholders and implementing partners to support the National Medical Stores' and districts' medicine procurement processes to ensure availability of key IMNCI drugs. Furthermore, the program provided support to strengthen district and health facility leadership and ownership for IMNCI implementation in the four program districts. The district MCH focal persons and health facility managers were trained on basic IMNCI, IMNCI health worker supportive supervision, how to use service delivery data collected through routine HIMS tools to track health worker practices and quality of care, and how to identify and address gaps in IMNCI implementation at the health facility. Performance of individual health facilities in terms of case management practices was reviewed during district quarterly performance review meetings which were attended by all health facility managers. The meetings provided an opportunity for the health facility managers to review their child case management performance in comparison to other health facilities; discuss challenges faced in improving case management, and share for adoption by other health facility managers promising local solutions for improving child case management.

Methods for assessment of the pilot

The assessment of the two IMNCI training models applied the following methods:

1. Direct assessment of the training

- HWs' attendance and completion of the training, including participation in the "onsite mentorship sessions" were recorded.
- Coverage achieved using numbers of health workers trained in IMNCI per health facility; and proportion of available health workers at each health facility who had been trained in IMNCI in the last two years comparing baseline figures(before start of intervention) and endline (after implementation of the program) was also tracked

2. Assessment of health worker knowledge and skills

- HWs' knowledge and skills for both models were assessed at three points in time during the face-to-face sessions: pre-test (before the first face to face session), mid test (before second

face-to-face sessions); and final test (at the end of the last face-to-face session). HWs were assessed using a written multi choice exam on knowledge using the IMNCI approach to assess, classify, identify treatment and treat common child hood illnesses including cough, diarrhea, fever, ear problems, malnutrition and anemia, HIV, TB and growth and development. The same assessment tool was used at the three time points. In addition, health workers as part of the written examination, underwent a skills assessment using WHO'DL skills station tool comprising of photo, videos and case study exercises on identifying signs, classification of disease and identification of appropriate treatment.

- Continuous progress assessment in skills acquisition
  Using the national IMNCI case observation tool administered by the district mentors during the onsite mentorship visits. The tool assessed whether or not health worker correctly applied expected steps, and skills in the management of children. The skills assessments were conducted twice (during the first and second mentorship visits) for participants on the SIC model, and three times (during the first, second and third mentorship visits) for participants on the DL model.

3. Assessment of health workers' perception about the training

- HWs' perceptions about the training were collected using a structured questionnaire with some open-ended questions at the end of the second face-to-face session for the SIC model, and the end of the third face-to-face session for the DL model. The perceptions of the trainers and district managers about the two capacity building approaches were collected through quarterly reflection meetings to share experiences and lessons learned from implementing the two capacity building models.

4. Key informant interviews and record reviews during quarterly facility assessments.

MCSP conducted five quarterly assessments, including a baseline (period July to September 2017)[6] and endline (July to September 2018)[7] of districts and health facilities that collected both qualitative and quantitative data through key informant interviews and record reviews. These assessments provided the following information to complement the training assessment:

- Health facilities' readiness to support IMNCI implementation, which included availability of human resources and the number of HWs trained in IMNCI, as well as the availability of basic equipment and job aids for IMNCI.
- Case load and management of pneumonia, diarrhea, and malaria were extracted from the health facility outpatient's registers.
- Stock outs of drugs that are essential for treating pneumonia, diarrhea, and malaria.

5. Costing of IMNCI training models

MCSP conducted a comprehensive costing of the IMNCI training models as well as the service costs related to providing the essential child health package at primary health care facilities. This report includes a subset of the findings related to the training model costs. The costing of IMNCI training models to roll out the ECHP focused on direct costs associated with training and building the competencies of health workers; the analysis did not include indirect costs. The analysis team used

[6] Maternal and Child Survival Program (MCSP) Uganda Child Health Baseline Report. 2019. https://www.mcsprogram.org/resource/mcsp-uganda-child-health-baseline-report/. Accessed March 27, 2019.
[7] MCSP Uganda Endline Report forthcoming.

prospective data collection to gather and analyze programmatic and financial data as MCSP and RHITES implemented activities over the course of the analysis period. These activities included cascade training activities and mentorship visits. For a full overview of the analysis, please refer to MCSP's *Costing of an Essential Child Health Package in Uganda.*

Findings

Enrollment and Completion Rates for Two IMNCI Models

Figures 4a and 4b present the findings from the enrollment and completion of training using the two IMNCI models. A total of 407 HWs were enrolled in the two models and of these 374 (92%) completed the course. Of the 407 enrolled, 235 (58%) were enrolled in the DL model and 172 (42%) in the SIC model. The DL course reached 35% more HWs than the SIC course over the same period of time. Of those enrolled, 90% in the DL model and 95% in the SIC model completed the course. The dropout rates from the courses were higher among medical doctors and midwives compared to other cadres.

Figure 4a: IMNCI course enrollment and completion rate by cadre.

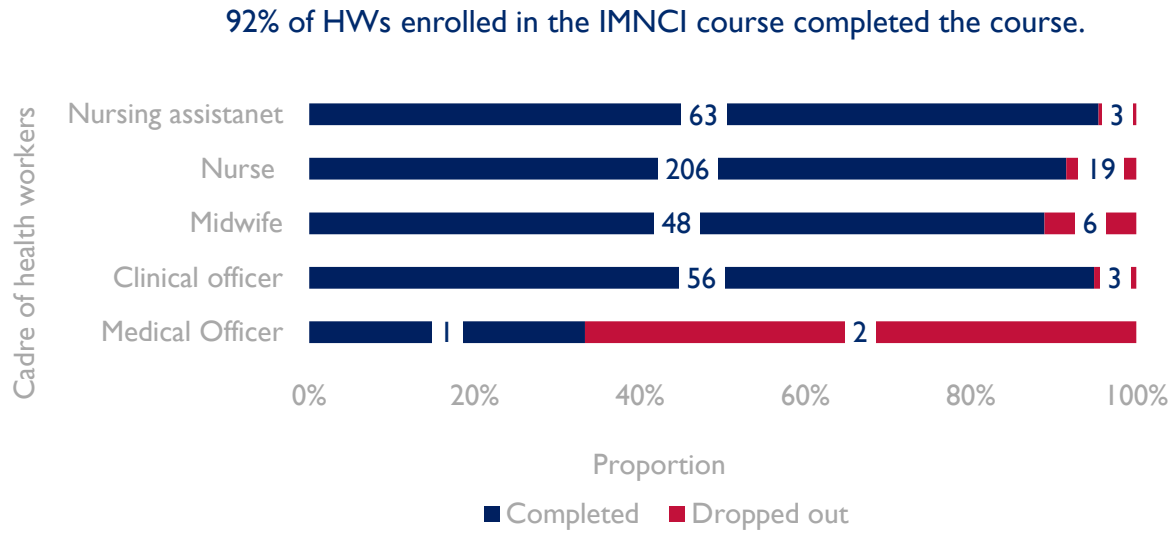
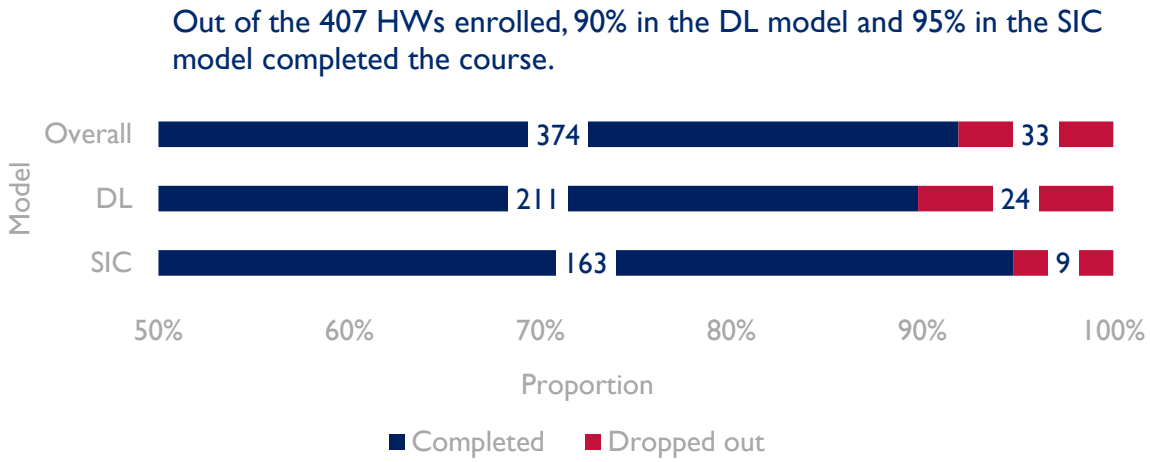


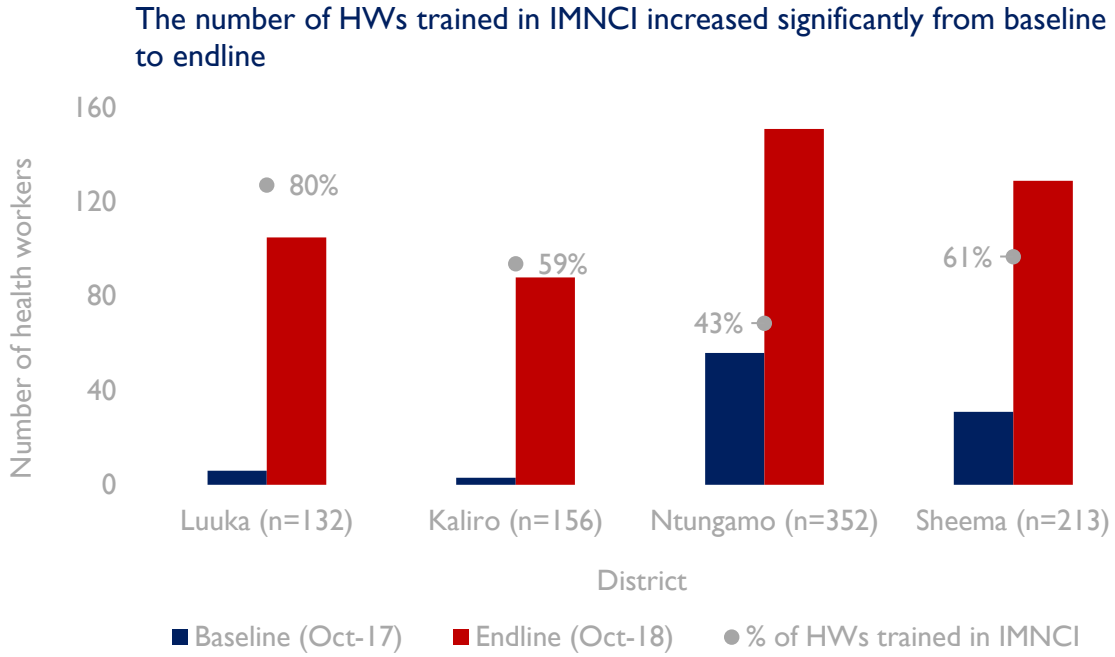
Figure 4b. IMNCI course enrollment and completion rates by training model.



Health facilities and health workers covered using the two models

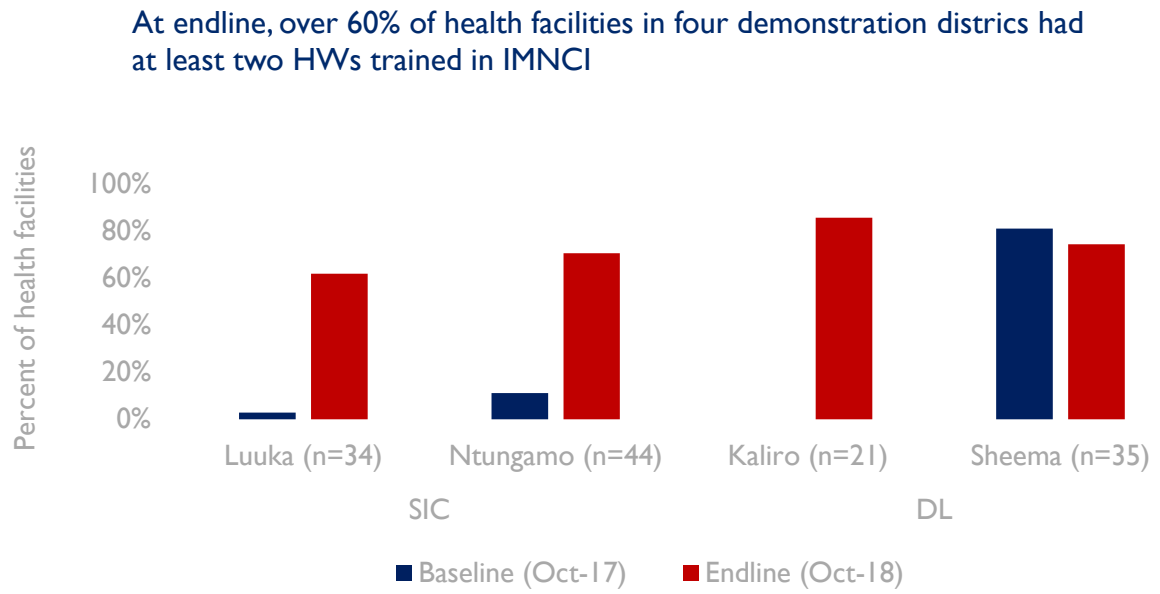
Figure 5 below shows the number of available HWs trained in IMNCI in each district at the beginning of the program prior to MCSP's implementation of the training models. This information was collected as part of the program baseline assessment in October 2017. By the end of the program, as a result of DL and SIC training, the number of HWs trained in IMNCI increased substantially in all four demonstration districts. The number of available IMNCI trained HWs was also assessed against the total eligible HWs in the district. In Luuka, the number of HWs trained in IMNCI increased from six at baseline to 105 at endline, which is 80% of the total HWs in the district. In Kaliro, 88 trained HWs were available at endline compared to only three at baseline, representing nearly 59% of the total number of HWs in the district. In Ntungamo, the number of HWs trained in IMNCI increased from 56 at baseline to 151 at endline, which was 43% of the total HWs in the district. Lastly, in Sheema, IMNCI trained HWs increased from 31 at baseline to 129 at endline, representing 61% of the total HWs in the district.

Figure 5: The number and proportion of HWs trained in IMNCI from baseline to endline (October 2017-2018).



Similarly, Figure 6 below presents the proportion of health facilities with at least two HWs trained in IMNCI at baseline and at endline. The proportion of health facilities with two or more HWs trained in IMNCI increased significantly from baseline to endline in all four districts. The results show that a higher proportion of health facilities with at least two HWs trained in IMNCI were in districts that received the DL model training (Kaliro and Sheema), compared to districts that were trained using the SIC model (Luuka and Ntungamo).

Figure 6. Proportion of health facilities with availability of at least two IMNCI trained HWs from baseline to endline.



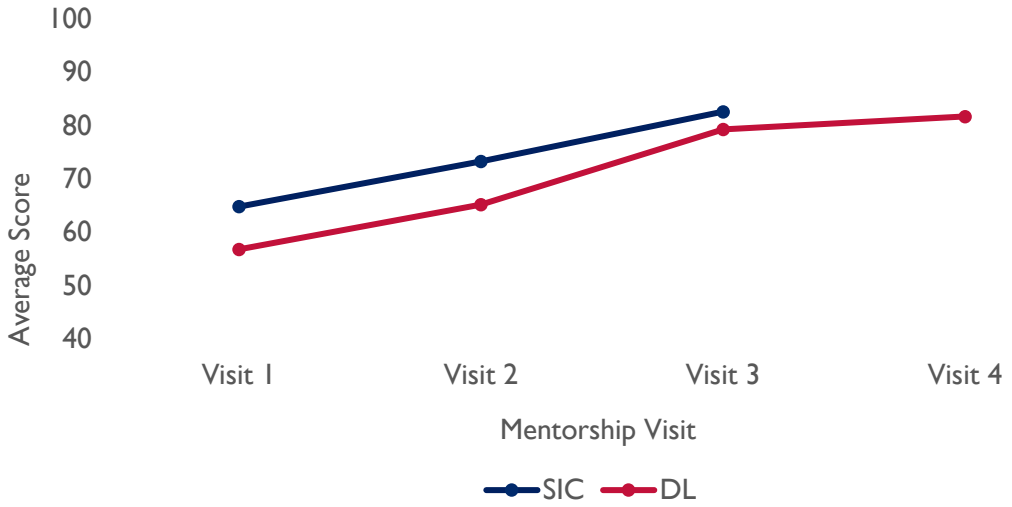
Duration of IMNCI training using the SIC and DL model

Face-to-face sessions for the SIC model lasted three days for the first session, and two days for the second session, compared to the planned two and one-half days for the first session and one and one-half days for the second session. The self-study period lasted between nine and thirteen weeks instead of the expected two weeks. The face-to-face sessions in the DL model lasted one day as planned. The first self-study period lasted between 10 and 11 weeks, while the second lasted five weeks, instead of the expected four weeks. Factors that contributed to the longer than planned self-study period included the long Christmas break and competing activities that needed the participation of the HWs or the district TOT team. The average duration for completion of the course using the SIC model was 13 weeks, and 17.5 weeks using the DL model.

Health workers' participation in onsite mentorship sessions

Onsite mentorship sessions were held three times for the SIC model (one in between the face-to-face sessions and two after the second face-to-face session). For the DL model, onsite mentorship sessions were held four times (one in between the face-to-face sessions and two after the last face-to-face session). Of the 407 HWs enrolled in the two models, 302 (74%) participated in at least one mentorship session. Those who participated in the onsite mentorship for both models attended an average of two sessions.

Figure 7: The average scores from the continous progress in skills acquisition assessments using observed clinical case management by model



Health worker clinical management, knowledge and skills on IMNCI

Figure 7 shows an increase in the average scores for continuous progress assessment for clinical skills acquisition administered during the onsite mentorship visits for each of the two models. After the first face to face session the average scores for observed clinical case management during the mentorship visits were higher for the SIC model. Average scores for observed clinical case management started off lower for the DL model, but eventually moved closer to average scores for the SIC model at the end of the last face to face session.

Figures 8a and 8b show an overall improvement in IMNCI knowledge and skills of approximately 30 percentage points comparing scores from the pre-test written examination and final written examination. The mean change in assessment scores before and after the course was approximately 30 points for the SIC course compared to 31 for the DL course. The mean change in assessment scores for HWs who participated in the DL model and the mean change in assessment scores for HWs who participated in the SIC model were thus almost similar.

Figure 8a. Knowledge and skills of HWs by cadre at pre, mid, and final tests for both models combined. (n=number of participants)

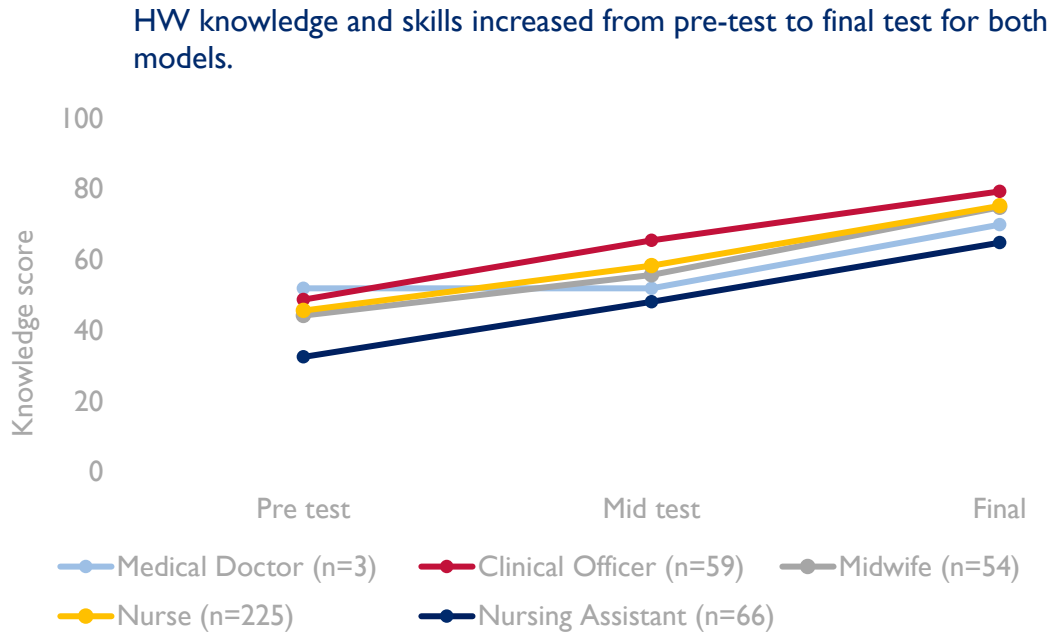
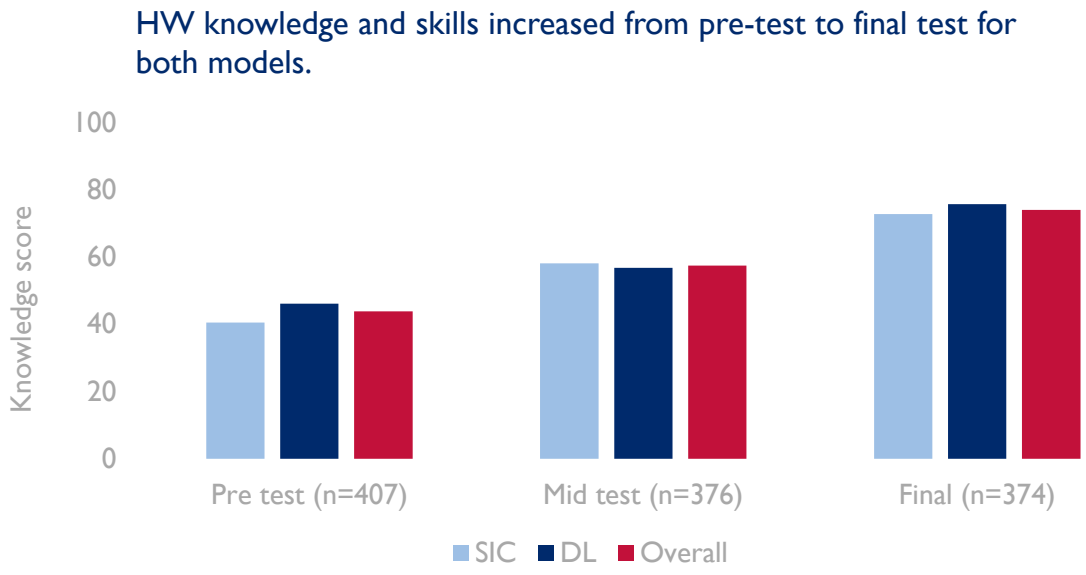


Figure 8b. Knowledge and skills of HWs by model at pre, mid, and final tests. (n=number of participants)



Perceptions of health workers and trainers about the two models

Tables 2 and 3 summarize the feedback on the SIC and DL models as shared by trainers and HWs who participated in the training. The HWs could only provide feedback about the model they had experienced, while the national and district facilitators had an opportunity to support both models. The national trainers also had the advantage of previous experience of supporting the standard IMNCI 11-day and Uganda revised six-day trainings. Overall, the HWs appreciated the phased learning and the opportunity to refresh their technical skills.

Table 2: Feedback on the DL and SIC training models from national and district TOT teams.

Model	Strengths	Limitations
DL	• Model allows for more numbers of HWs to be enrolled per unit time. • The longer self-study period with support from the mentors provides HWs with an opportunity to better articulate their learning needs and also understand the contextual issues affecting implementation before completing the course. • HWs spent less time away from the health facility (only one day).	• Creating understanding of concepts and content within the one-day face-to-face sessions is quite challenging. • Longer period of time was needed to complete a course. • Lower-level cadres struggled to internalize content on their own. • There was less supervised clinical practice. • Because of limited contact time with trainers during the face-to-face sessions, slow learners were not identified early enough.
SIC	• Provides more time for HWs to grasp basic concepts. • Allows for early identification and therefore, timely intervention for slow learners. • More supervised clinical practice. • Shorter period of time was needed to complete course.	• Fewer numbers were enrolled per unit time. • It was challenging to organize mentorship and support for all HWs within the two-week self-study period, which was considered to be short.

Table 3: HW feedback on the DL and SIC training models.

Model	What they liked	What they found challenging
DL	• Learning in a phased manner allowed them to grasp, practice and internalize one topic at a time before moving on to the next, compared to the routine way of training, which involves compressing learning into three to five days with limited time to practice and internalize content. • Clinical skills practice and assessments built HWs' confidence as health professionals.	• Finding time for self-study. • Sharing study materials. • There were few days of training therefore, less Per Diem cost. • For the lower level cadres (such as nursing assistants and enrolled nurses) studying on their own was a challenge. Yet the face-to-face sessions were too short to get enough time for one-to-one support from the trainers.
SIC	• Learning in a phased manner allowed them to grasp, practice and internalize one topic at a time before moving on to the next, compared to the routine way of training, which involves compressing learning into three to five days with limited time to practice and internalize content. • Clinical skills practice and assessments built HWs' confidence as health professionals.	• The two-week self-study **period was not adequate for some HWs to complete** expected revisions and practice.

Case management of common childhood illnesses at the health facilities

Case management data that corresponded with the training period were extracted from health facility surveys to explore if the training of HWs on IMNCI is reflected in service delivery practice. During the training period, there was an increase in the proportion of pneumonia cases treated with amoxicillin DT. Diarrhea case management with ORS and zinc also improved after the training. Implementation of the proper approach for testing fever cases for malaria with a rapid diagnostic test and/or microscopy was very high at the beginning of the program and remained high going forward. Figure 9 below shows the proportion of cases appropriately treated during the training period.

As per IMNCI guidelines, availability of a functional oral rehydration therapy (ORT) corner was checked during the health facility assessments (Figure 10). Before the IMNCI training, only about 13% of the health facilities had a functional ORT corner, which increased to about 84% at the endline assessment.

Figure 9. The proportion of pneumonia, diarrhea, and malaria cases managed appropriately during the training period in the four demonstration districts.

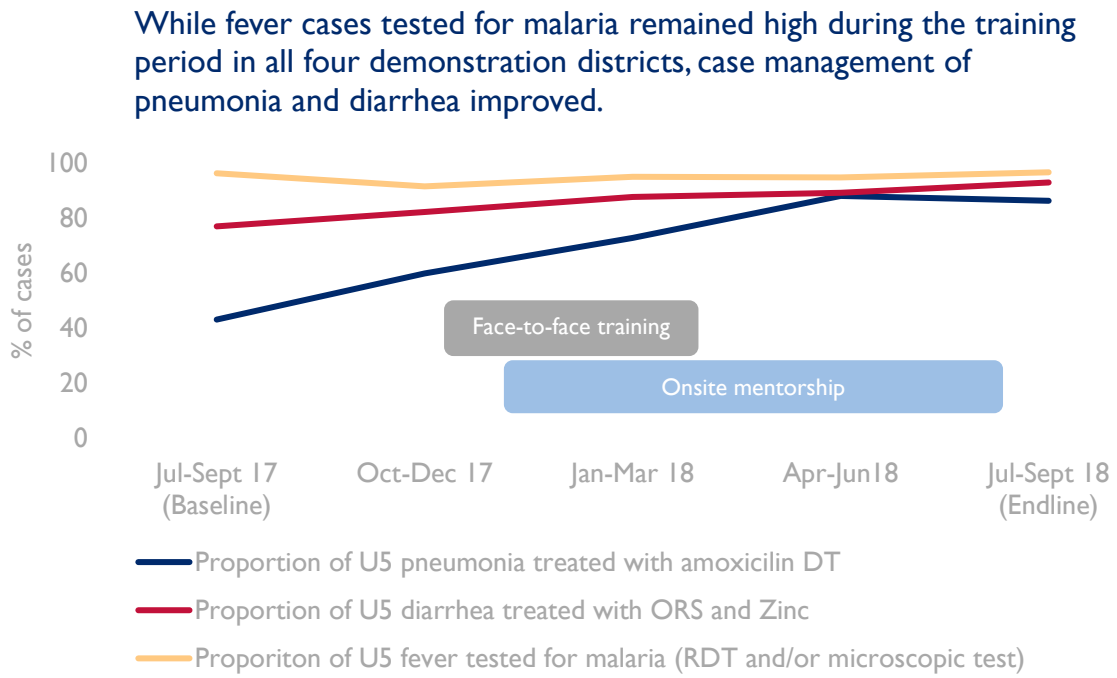
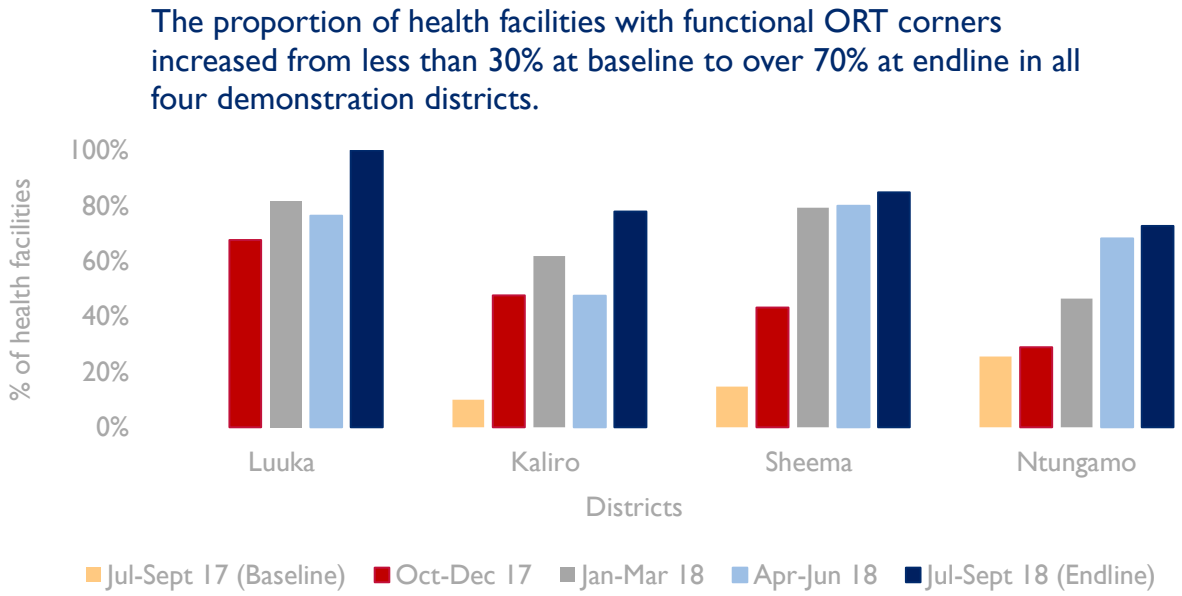


Figure 10: The number of health facilities with functional ORT corners in the four demonstration districts from baseline to endline.



Costs of IMNCI training models

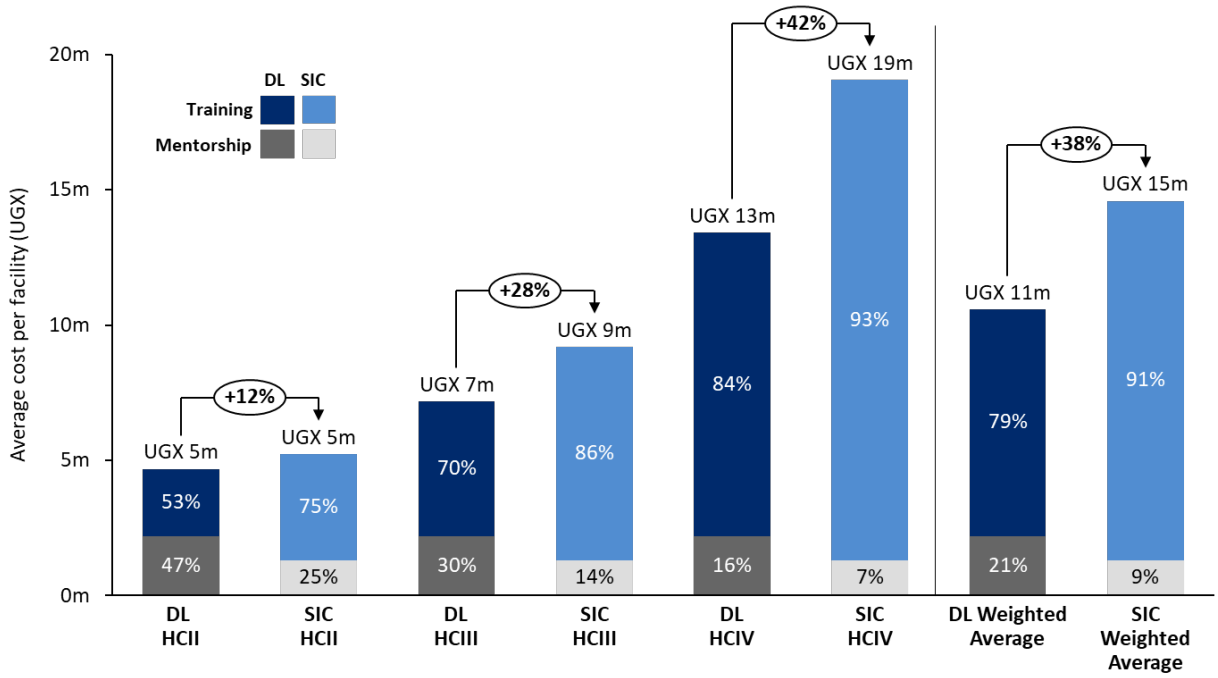
Table 4 details the combined training and mentorship average costs to roll out the SIC and DL methodology at each facility level. These unit costs are based on the average number of participants by facility type, average unit cost per facility staff trained, and average mentoring cost per facility. All costs are converted into United States Dollar (USD) assume an exchange rate of 1 USD to 3,705 UGX.

Table 4: Average facility training and mentorship rollout costs, by training methodology and facility level

	Distance Learning (4 mentoring visits)	Short-interrupted course (3 mentoring visits)
HCII (2 persons trained)	UGX 4,679,231/ USD 1,263	UGX 5,242,151/ USD 1,415
HCIII (4 persons trained)	UGX 7,176,483/ USD 1,937	UGX 9,190,838/ USD 2,481
HCIV (9 persons trained)	UGX 13,419,615/ USD 3,622	UGX 19,062,555/ USD 5,145

Using a weighted average cost for each methodology, the average cost to fully train and mentor a facility using the SIC methodology was approximately 1.5 times more than the DL average (Figure1). Across facility levels, mentoring costs became a smaller proportion of total facility costs from HCIIs to HCIVs as the mentoring costs are relatively fixed regardless of the facility level. However, training costs became a larger proportion of total facility costs as the average number of facility staff trained increases from HCIIs to HCIVs regardless of the training methodology.

Figure 11: Average facility training and mentorship combined costs, by training methodology and facility level



Discussion

This section summarizes the key lessons learned about the two IMNCI training models during implementation of the pilot and from the results of the pilot. Strengths, challenges, and unexpected results from implementing the two models are included, as well as limitations of the pilot.

Advantages of each model

The SIC model was found to have the advantage of requiring a shorter time for HWs to complete the course. The SIC model also provided more contact time between the HWs and the trainers, enabling them to identify and support slower learners in a timely manner. For HWs not comfortable or who had challenges learning on their own, the SIC model provided a better option for facilitator-guided learning. Furthermore, the SIC model with longer face-to-face sessions provided more time for supervised clinical practice.

The DL model had the advantage of allowing for more enrolled participants over the same time period and the least number of days (three days compared to five days) spent away from the workplace. The DL model also catered for a longer self-study period with support from mentors, which provided HWs with an opportunity to better articulate their learning needs and understand the contextual issues affecting implementation before they complete the course.

Challenges of each model

The expected self-study period for the SIC model was not sufficient for some HWs to complete the assignments given. At the same time, this time period also did not allow enough time for the trainers to prepare for the following session. The number of HWs enrolled per time period was less with the SIC model.

The one-day, face-to-face sessions for the DL model did not allow enough time for trainer supervised clinical practice sessions. The trainers found the one-day, face-to-face sessions under the DL model to be

too short to identify slow learners and provide them with timely support. For lower level cadres, such as the nursing assistants, it was a challenge to understand the concepts discussed. The DL model did not foresee sufficient time to provide the extra support to these nursing assistants during the onsite mentorships which made it difficult for them to catch up.

Lessons learned from the process of implementing the training models

1. Implementation of both SIC and DL models was feasible in the context of Uganda.

The phased approach to learning used in both models was appreciated by HWs. One participant noted, "It enables you to learn, practice, and fully understand a concept before moving on to the next concept." The face-to-face sessions for the DL model were implemented as planned but more time had to be allocated for the face-to-face sessions for the SIC model. Though reservations were expressed during the stakeholder consultation about the acceptability of the DL model among HWs, the model was well appreciated by the district trainers and mentors because of the reduced time it required for HWs to be away from the facility. In both models, it was not feasible to adhere to the time planned for self-study. Completion of activities and preparation for the subsequent sessions required the self-study period to be extended to four weeks.

2. Leadership provided by district level trainers and health facility managers was crucial for successful implementation of the two models.

Training and support for district MCH focal persons and all health facility managers from across the 134 health facilities to enable them to fulfill their leadership roles and take ownership for implementation of IMNCI was a key factor for the successful roll out of the training at all levels for both models. To do this the MCH focal persons, trainers, and health facility managers received basic training and support on using the IMNCI approach to assess, classify and treat children, conducting supportive supervision for IMNCI implementation, and using service delivery data to track practices and identify solutions to common IMNCI implementation challenges.

In both models, follow up and reminder calls to the HWs conducted by the district MCH focal persons were critical in ensuring that HWs arrived on time for the training sessions, and therefore ensured adequate time for coverage of content in the one-day face-to-face sessions. Follow up provided by the district MCH focal person also ensured that HWs selected to participate in the training, attended all face to face sessions and completed the course.

3. Use of district-resident trainers with one to two national trainers for supportive supervision was advantageous.

The transportation, per diem, and accommodation costs for trainers within a given district were much lower than for trainers coming from outside the district.

4. The two models were associated with marked improvement in health worker IMNCI knowledge and skills.

The two models of training improved the IMNCI knowledge and skills of the HWs. There was no difference between changes in knowledge and skills observed for the DL model as compared to the SIC model. This pilot being the first time in which the SIC model was implemented, indicates that the SIC model as a potential model for IMNCI training, however the model could benefit from some modifications to the duration of the face to face sessions and period for self-study to allow for enough time to cover learning content.

5. Continuous assessment and support through case management observation and records review are needed to ensure that content knowledge gains translate into improved implementation of IMNCI for case management skills.

Improvement in HW IMNCI knowledge does not necessarily translate into the routine practice of IMNCI for appropriate assessment, classification and treatment of ill children. Assessing and supporting HWs to improve their IMNCI skills by observing and reviewing records of their management of cases during face-to-face training sessions and onsite mentorship was found to be helpful in identifying and addressing the gap between knowledge acquired, and the actual practice of what was learned to properly use the IMNCI approach in the care of sick children.

6. While the training contributed to improvement in case management, health workers' case management practices are also largely influenced by other factors

Besides HWs' knowledge and skills, other key factors were found to influence treatment practices at the health facility. These included availability of essential commodities including drugs and basic equipment, the culture among patients of expecting medicine for every kind of illness, and HWs' fears of a negative response from authorities and communities when patients are not prescribed medication to treat their illnesses. For example, a HW would rather prescribe an antibiotic that is in stock — though not recommended for a condition — than prescribe the recommended treatment that is out of stock, requiring patients to purchase it outside the health facility. Success stories shared by HWs show that patient education and awareness creation through community leaders is helpful in improving the understanding and acceptability of IMNCI treatment options that do not require prescription medication.

7. Health systems at national and district level need to be aligned to support implementation of IMNCI.

Availability of essential drugs for case management was a major factor that influenced HW case management practices. Engagement with and support to MOH, the national medical stores, and the district health offices through collaboration with implementing partners was required and provided to ensure that key drugs needed for implementation of IMNCI were made available in the districts that were not implementing iCCM. Continuous collection and sharing of data on patient treatment practices was essential for understanding gaps and challenges faced by HWs in implementing IMNCI, for holding HWs accountable for translating learning into practice, and for identifying positive outliers who acted as sources of information on promising practices. However, using data for this purpose required support to update the national HMIS to reflect revised IMNCI classifications, and also support for patient information management processes at the health facility to ensure collection, compilation and reporting of quality patient treatment data.

8. Costs of implementing SIC methods were higher than the DL methods

The cost for implementing the SIC model on per trainee and per facility basis was much higher than that of the DL model. The key cost drivers for the SIC model was the duration of the face to face sessions, and costs associated with accommodation and meals to cater for participants to stay close to the training site. Bringing the training closer to the participants' work places could help cut back costs for the SIC model. While the cost for the onsite mentorship was higher for the DL model (driven by number of onsite mentorship sessions provided), overall costs of the DL model were lower per trainee and per facility.

Limitations of the assessment

This pilot implemented the two models in a pragmatic way to reflect the reality of what it would take for others to roll out the two models. However, there are important limitations which need to be taken into account. The numbers of health workers enrolled were not purposefully determined to represent all health workers in the district, though the target of reaching at least 60% of all available health workers in the district compensates for this and the number reached could therefore be considered representative of health workers in the district. In addition, the participation of cadres in both models was not representative of all cadres available at the health facilities that are eligible for the IMNCI training. It is important to note that very few doctors participated in the training and therefore the findings especially on acceptability of these two models may not be applicable to medical doctors. It is also not possible to rule out bias from the national and district mentors in the knowledge and skills assessment outcomes, since they were also involved in the implementation of the program. Furthermore, the districts were not randomly assigned to either of the two models and several factors not equitably distributed between the districts could have influenced the outcomes observed. The pilot was implemented in 4 districts under USAID's RHITES programs and may not necessarily represent the different diverse context in other districts or regions of the country. Also, some of the interventions under these RHITES programs could also have contributed to the findings observed. Lastly, because of time, it was not possible to design, capture in detail and analyze project data to account for factors that were likely to influence the service delivery practice such as availability of essential medicines.

Conclusion and policy recommendations

MCSP in collaboration with the WHO country office and the Ministry of Health field tested two alternative training models for IMNCI in Uganda. The DL model has been implemented elsewhere but not in Uganda, while this was the first time for field testing the SIC model. The pilot demonstrated the feasibility of implementing both the SIC and DL model in the Uganda context. The pilot also showed that the outcomes of both training models on the knowledge and skills of HW were comparable. While both models were appreciated and acceptable to health workers, trainers, district health managers and implementing partners, the duration allocated for self-study in the SIC model was found to be insufficient for completion of training assignments and content. In addition, the one day face to face sessions in the DL model limited time for supervised clinical practice, and timely identification and provision of support to slow learners. For the DL model, the studying on your own was presented as a challenge found by lower level cadres. The cost for the model on per trainee and per health facility basis were found to be lower for the DL model than the SIC model, despite the DL model having higher costs for onsite mentorship. The key costs drivers for the SIC model were, duration of the face to face sessions and costs for accommodation and meals. The following recommendations are therefore, made to the MOH and implementing partners:

1. The two models the WHO Distance Learning and Uganda's Short Interrupted Course, piloted by MCSP are recommended as feasible alternate cost saving options that can be used for building capacity for IMNCI implementation in Uganda. However, further modification using learning from the MCSP pilot should be done to improve for use in the Uganda context the two models for using.
    - Proposed modification to the Short Interrupted Course include; reducing cost of face to face training sessions by holding the sessions closer to the trainees workplaces and therefore reducing the need for costs to cover participants accommodation; and increasing duration of the self-study period to at least four weeks.

- Modifications to the WHO Distance Learning model should include using a quick assessment to identify slow learners during the first face to face session; and allocation of more time to identified slow learners during the onsite mentorships.

2. MOH should take into consideration other key lessons learned beyond cost implications in the selection of which of the two models should be scaled up.
   - The distant learning model should be the preferred option as it is cheaper, especially for districts with limited external support and when the aim is to maintain and update skills for IMNCI implementation amongst health workers who already have the basic training and to orient new staff coming onboard. In this setting, targeted health workers can leverage existing capacity amongst colleagues to get support during the self-study period.
   - The short-interrupted course model offers a quick turnaround time for completion of the course; allows for more supervised practice and therefore, a faster acquisition of IMNCI skills. The model has less reading/self-study requirements, an aspect of the DL model health workers cited as a challenge of the DL models. When starting from a point of low capacity, rapidly scaling up skills for IMNCI implementation is desired, the majority of the intended target health workers are mid to low level cadres, and if resources are available, this option should be considered.
3. For both models, there should be engagement and empowerment of focal staff at the district health management team and the health facility in-charges to provide leadership and oversight for the roll out, and to ensure that learning acquired contributes to the transformation of health worker practices in the day-to-day management of children.
4. District-based TOT teams supported by 1-2 national trainers for quality supervision should be used rather than only trainers from outside the district.
5. The MOH, districts and implementing partners should ensure the availability of essential commodities needed for IMNCI implementation, as lack of these negatively affects translation of acquired knowledge and skills during the training into practice.
6. Post-training mentorship and support should include case management observation and review of case records of children managed by health workers to ensure health workers routinely apply knowledge acquired in their day-to-day management of children.
7. IMNCI scale up should be supported with patient education and community sensitization to create awareness and increase acceptability of the IMNCI treatment options that do not require the prescription of medication.
8. Adequate financial resources should be made available from domestic sources and/or partners to implement either chosen methods