

Report on the Summative External Evaluation of the Integrated Health System Strengthening Programme in Ethiopia, Mali, Mozambique, Ghana, Malawi and Niger

Undertaken by the South African Medical Research Council in partnership with the University of the Western Cape and Save the Children



Acknowledgements

Study team

Report writing: Tanya Doherty, Donela Besada, Wanga Zembe, Karen Daniels, Mary Kinney, Kate Kerber, Emmanuelle Daviaud, Sarah Rohde, Nobubelo Ngandu, Debra Jackson

Coverage trend data analysis: Nobubelo Ngandu, Sarah Rohde, Donela Besada, Samuel Manda

LiST analysis: Mary Kinney, Kate Kerber

Report peer reviewer: Jon Rohde

IHSS Evaluation study group: Tanya Doherty, Donela Besada, Karen Daniels, Emmanuelle Daviaud, Debra Jackson, Kate Kerber, Mary Kinney, Natalie Leon, Marian Loveday, Samuel Manda, Nobubelo Ngandu, Duduzile Nsiband, Jon Rohde, Sarah Rohde, Igor Rudan, David Sanders, Wim van Damme, Wanga Zembe (PI first, study group members listed alphabetically)

We would like to thank UNICEF and the Department of Foreign Affairs, Trade and Development Canada for funding this evaluation. We thank the Ministries of Health and the UNICEF country offices in all six countries for supporting the country visits.

A special thanks to the study participants including the Ministries of Health, Development partners, Community Health Workers, mothers and other community members for being so generous with their time and being willing to share their experiences with us.

Copyright

Copyright 2014. All material in this report may be reproduced and copied for non-commercial purposes: citation as to source, however, is required.

This report is disseminated by the South African Medical Research Council, University of the Western Cape and Save the Children.

Suggested citation

Doherty T, Besada D, Zembe W, Daniels K, Kinney M, Kerber K, Daviaud E, Rohde S, Ngandu N, Jackson D for the IHSS Evaluation study group*. Report on the Summative External Evaluation of the Catalytic Initiative (CI)/ Integrated Health Systems Strengthening (IHSS) Programme in Ethiopia, Mali, Mozambique, Ghana, Malawi and Niger. Cape Town: South African Medical Research Council, University of the Western Cape and Save the Children, 2014.

ISBN: 978-1-920618-31-5

***IHSS Evaluation study group:** Tanya Doherty, Donela Besada, Karen Daniels, Emmanuelle Daviaud, Debra Jackson, Kate Kerber, Mary Kinney, Natalie Leon, Marian Loveday, Samuel Manda, Nobubelo Ngandu, Duduzile Nsibande, Jon Rohde, Sarah Rohde, Igor Rudan, David Sanders, Wim van Damme, Wanga Zembe (PI first, study group members listed alphabetically)

Table of Contents

Acknowledgements.....	1
Acronyms	5
Executive summary	7
1. Background	17
2. Purpose and Objectives of the evaluation	20
2.1 Scope of the Evaluation	21
2.2 Intended Audience	22
2.3 Evaluability.....	22
2.4 Evaluation Rationale.....	22
3. Evaluation Questions.....	23
4. Methodology.....	24
4.1 Quantitative data sources and analysis	25
4.2 Qualitative data sources and analysis.....	32
5. Findings.....	34
5.1 Relevance	34
5.2 Effectiveness	47
5.3 Impact	79
5.4 Sustainability.....	86
6. Conclusions	96
7. Strengths and limitations of the evaluation	106
7.1 Strengths and limitations of the quantitative component	106
7.2 Strengths and limitations of the LiST analysis.....	107
7.3 Strengths and limitations of the costing exercise	108
7.4 Strengths and limitations of the qualitative component.....	108
8. Lessons Learnt	110
8.1 Methodological lessons	110
8.2 Programmatic lessons.....	112
9. Recommendations.....	115
9.1 Methodological recommendations – For Researchers and Evaluators.....	115
9.2 Programmatic recommendations	117
10. References	119

11. Appendices..... 121
Appendix A: Table of indicators included in the evaluation 122

Acronyms

ACSD	Accelerated Child Survival and Development
ACT	Artemisinin-based combination therapy
APE	Agente Polivalente Elementares – Mozambique CHW
ASC	Agents de Santé Communautaire - Mali and Niger CHW
CBA	Community-Based Agent – Ghana CHW
CHW	Community Health Worker
CI	Catalytic initiative
DFATD/CIDA	Canadian Department of Foreign Affairs, Trade and Development, formerly called Canadian International Development Association
DHS	Demographic and Health Surveys
DTP	Diphtheria, Tetanus, Pertussis vaccine
EBF	Exclusive breastfeeding
EPI	Expanded Program of Immunisation
FGD	Focus group discussion
GDP	Gross domestic product
HEW	Health Extension Worker – Ethiopia CHW
HSA	Health surveillance assistant – Malawi CHW
iCCM	Integrated community case management of common childhood illnesses
IMCI	Integrated Management of Childhood Illnesses
IHSS	Integrated health systems strengthening
IP	Implementing partner
IPTp	Intermittent preventive treatment of malaria in pregnant women
IRS	Indoor residual spraying
ITN	Insecticide treated net
LiST	Lives saved tool
LLIN	Long-lasting insecticidal net
LQAS	Lot Quality Assurance Survey
MDGs	Millennium Development Goals

MICS	Multiple Indicator Coverage Survey
MIS	Malaria Indicator Survey
MoH	Ministry of Health
M&E	Monitoring and evaluation
NMR	Neonatal mortality rate
ORS	Oral rehydration salts
SEC	Soins Essential Communautaire/iCCM programme
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water, sanitation and hygiene interventions

Executive summary

Background

The Catalytic Initiative to Save a Million Lives (CI) is “an international partnership with the goal of strengthening health systems to accelerate progress on the health-related Millennium Development Goals (MDGs)”¹. To achieve this objective, the CI sought to “strengthen health systems by delivering life-saving health and nutritional services to disadvantaged children and pregnant women to dramatically reduce child and maternal mortality” in Africa and Asia.

As part of the CI, the Canadian Department of Foreign Affairs, Trade and Development (DFATD; formerly called Canadian International Development Agency (CIDA)), through its Master Arrangement with UNICEF 2003-2013, supported the UNICEF Integrated Health Systems Strengthening (IHSS) program in six African countries.

In alignment with the health policies and planning of each government, the overall aim of the IHSS programme was to increase coverage of a limited package of proven, high impact, and low cost maternal and child health interventions in the targeted countries. This report brings together the evaluations undertaken in the six countries and presents the main findings, lessons learnt and recommendations.

Evaluation Purpose and objectives

The purpose of this external evaluation was two-fold:

- To evaluate the effect of the IHSS on coverage of a limited package of proven, high impact, and low cost maternal and child health interventions in Ethiopia, Ghana, Malawi, Mali, Mozambique and Niger.
- To inform programme and policy decisions in Ethiopia, Ghana, Malawi, Mali, Mozambique and Niger and regionally.

The objectives of the evaluation were to assess the effect of the IHSS programme on the following:

- Relevance: In terms of alignment to national priorities and plans, enhanced policy environment, and promotion of gender equity.
- Effectiveness: Effect on strengthening the six (WHO) building blocks of the health system and the capacity of government and/or civil society organizations to train, equip, deploy, and supervise front-line health workers to deliver a limited package of proven, high impact and low cost health interventions.
- Impact: Effect on coverage of selected maternal, newborn and child health and nutrition interventions, particularly integrated Community Case Management (iCCM), which were supported by the IHSS programme; as well as the effect on the number of additional lives saved by the IHSS programme calculated using the Lives Saved Tool (LiST) disaggregated by groups of interventions (e.g. iCCM) and by individual interventions according to the phases of the programme.
- Sustainability: The cost of implementing iCCM and the organisational and financial sustainability of this programme.

Scope of the Evaluation

The scope of the external evaluation was focused on estimating the plausible effect of the IHSS programme on coverage of interventions funded by the IHSS programme, and estimating the additional lives saved by the programme (together with other relevant interventions), using LiST. The evaluation scope was limited to assessing the plausible contribution of the IHSS intervention to observed changes in coverage of selected indicators due to the lack of true comparison

(counterfactual) areas (as similar programmes were being implemented across the countries) and the lack of feasibility of a randomized intervention/control design.

Geographically the scope of the external evaluation includes the following areas:

- Ethiopia – five of ten regions (Amhara, Benshangul, Oromia, SNNPR and Tigray)
- Ghana – the three northern regions and all districts therein;
- Malawi – hard to reach areas in ten districts (however similar programs are operating through the Government of Malawi in all 28 districts)
- Mali – five of eight regions (Kayes, Koulikoro, Mopti, Sikasso, and Ségou)
- Mozambique – thirty-three districts in phase 1 and all 144 districts in phase 2; and
- Niger – all regions of rural Niger (the program is national).

Temporally, the scope of the external evaluation included the period 2000-2006 (secular trend) prior to the start of the IHSS programme, the period 2007 to 2010 known as Phase I of the IHSS programme; and the period 2010 to March 2013 known as Phase II of the IHSS programme.

Intended Audience

The intended audience of this external evaluation includes the Ministries of Health in the six programme countries, DFATD, UNICEF, other UN agencies, and governmental and civil society partners at national, regional, and global levels.

Methodology

This was a mixed method evaluation^{2,3} in that quantitative, qualitative and economic evaluation methods were used. Data sources for the analysis of intervention coverage include the Demographic and Health Surveys (DHS); Multiple Indicator Cluster Surveys (MICS); the Niger Survival and Mortality survey, and for Ghana and Malawi Lot Quality Assurance Surveys (LQAS). For analysis of coverage, trend analysis was performed using a non-parametric test of trend across years for all available surveys. Estimates of intervention coverage at population level from household surveys were used as inputs to model lives saved using the Lives Saved Tool (LiST). Data to assess implementation strength, utilisation and quality of care were taken from routine data collected by UNICEF and where available, specific surveys amongst CHWs. The indicators reported are aligned with the global iCCM indicators of the Expanded Results Framework⁴.

Estimates of intervention coverage at population level from household surveys were used as inputs to model lives saved using the LiST programme. Using baseline mortality values and changes in coverage of newborn and child health interventions from the above mentioned surveys together with the LiST default input data, we used the tool to investigate the extent to which changes in child mortality could be attributed to changes in intervention coverage during the period of IHSS implementation from 2007 to 2012.

The costing component, for the purpose of this evaluation, assessed the *additional* costs incurred by the health services (including donor funding) due to the introduction of the curative interventions by CHWs for the treatment of malaria, diarrhoea and pneumonia in children under 5, if this was done according to country protocols.

The effect of contextual factors was described using data from document reviews and relevant databases. Contextual data to supplement the quantitative coverage data was collected during country field visits in 2012 and 2013. Approximately 7-10 days were spent in each country, both in the capital cities and in outlying districts. Qualitative data were collected through key informant interviews and focus group discussions with national and regional health officials, district personnel, NGOs and other donor partners, clinicians, CHWs and their supervisors, beneficiary groups of village

mothers and key village informants, as well as UNICEF officials. The full list of interviewees is provided in each country report.

Each set of data (household surveys, qualitative, costing and LiST) were analysed and reported on independently. The country analyses and their separate findings are brought together and synthesised in this report.

Findings and Conclusions

Relevance

1. *To what extent did the programme's objectives reflect a health systems strengthening approach, including:*

a. alignment with the health policies, planning and health surveillance of the Government?

- **In many of the countries the IHSS programme was well aligned with national priorities and plans.** In particular are the example of successful efforts in Ethiopia around advocacy and policy engagement. However, in Mozambique aligning partner and sector expectations of the CHW programme was cited as a challenge because of the many partners with different interests involved.
- **In some countries alignment was especially assisted by IHSS capitalising on opportune moments when key national policies and strategies were being formed or implemented** (e.g., in Niger creation of Cases de Santé platform of service delivery; in Ghana the change in the Child Health Policy to allow CHWs to administer antibiotics and zinc) (see Table 6).
- The IHSS was successful and indeed catalytic in strengthening the health system at the level of the community through the provision of drugs and the training of primary care health providers to meet the increase in demand for services.
- While there were challenges in some countries (e.g., Mali and Malawi) due to both geopolitical crises and capacity issues, IHSS made efforts to mitigate and negotiate these challenges through availing funds to facilitate and implement solutions.

b. training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions?

- **UNICEF, through IHSS funds has made a significant contribution, financial and technical, to ensuring the training and deployment of many CHWs and facility-based staff in iCCM.**
- A similar package of community-based interventions was delivered across all 6 countries.

2. *To what extent did the programme's objectives include a focus on women's participation and a gender equality approach?*

- **In each of the countries increasing women's participation and adopting a gender equality approach was an IHSS objective.**
- The IHSS programme made efforts to increase women's participation and achieve gender equality through the training of women as CHWs. Ethiopia had an all female HEW workforce, while in Ghana and Mali women make up approximately half of the CHW workforce, other countries showed lower female ratios in their CHW cadres.

Effectiveness

3. *To what extent were the objectives related to health system strengthening (including policies, planning and health surveillance) and training, equipment, deployment, and supervision of front-line health workers achieved?*

- **The IHSS programme in all of the evaluated countries invested heavily in the training of CHWs for the provision of iCCM, in addition to facility-based staff who were trained in IMCI and iCCM.** In many countries, IMCI training was an early focus of the IHSS programme with support later redirected to training of community based staff in iCCM.

- **The IHSS programme supported the procurement of a substantial proportion of essential drugs** (including ORS, ITNs, Zinc, cotrimoxazole, RDTs, ACTs, amoxicillin, and fansidar) and supplies (boots, bicycles, thermometers, ARTI timers, etc.) for the successful delivery of community based care. While the majority of drugs and equipment were meant for iCCM, the facility level was also supported through drug provisions to some degree.
- The IHSS programme was successful in supporting the development of an innovative drug tracking monitoring system in Malawi for the community level (c-stock). Most countries still rely heavily on UNICEF and donors for the procurement of drugs, with the exception of pneumonia and diarrhoea drugs in Mali which are replenished through user-fees.
- **Many countries reported challenges with their supply chain systems**, and as a result, a parallel drug delivery system was set up in Mali and Niger to ensure a consistent supply to CHWs. While this was essential in the short term to ensure that CHWs were capacitated to provide treatment, this does not address the shortcomings in the supply chain management system of countries, essential for the sustainability of the programme and an integral element of health system strengthening. Other attempts to circumvent the weak supply chain system and the misuse of drugs include the provision of pre-packed drug supplies in Mozambique; this results in significant wastage of drugs and unnecessary costs and threatens the long term sustainability of the programme.
- The IHSS programme invested in training of health facility staff in iCCM and IMCI to equip them with the skills necessary to carry out supervision and observe case management at the community level. While the IHSS programme further invested in the provision of transport to facilities, the maintenance and upkeep of bicycles and motorbikes was reported as a consistent challenge. **The majority of the CHWs did not receive monthly supervision visits as stipulated as policy. Major challenges noted included insufficient transportation and funds for fuel to carry out supervision at the community level, in addition to facility staff being overwhelmed with their various job requirements.** A mentorship system in Malawi was set up to ensure that CHWs could at least receive support at the facility level.

4. *To what extent were the objectives related to women's participation and gender-equality achieved?*

- **The IHSS included a gender equity focus by delivering interventions known to be effective for addressing gender dynamics**, such as making services more accessible to carers of children, interventions promoting accessing households directly through home visits and seeking to mobilize and engage communities for improving child health and nutrition outcomes.
- **There were challenges in meeting some of the IHSS objectives, particularly in reference to women's participation and gender equality as measured by the percentage of women trained as CHWs.** Two of the countries (Mozambique and Malawi), were falling behind in increasing the participation of women in community level care. The findings show that in many of the countries IHSS made efforts to overcome these challenges, but the complex reasons behind the low recruitment of women as CHWs, such as low education levels and cultural issues, require innovation and efforts at both the macro and ground levels to resolve.

5. a. *To what extent did coverage of the selected high impact and low cost interventions in the target populations increase?*

- **The IHSS programme investment has resulted in increased coverage of high impact health interventions with increases in ORS (5 of 6 countries), measles vaccination (4 of 6 countries), ITNs (3 of 6 countries) and malaria treatment (3 of 6 countries) featuring prominently.**
- Shifts in care-seeking behaviour are noted in Malawi and Niger where care-seeking at community level has increased significantly over the period of IHSS implementation.

- Across the six countries EBF, DPT3 and care-seeking for suspected pneumonia have seen less improvement in coverage with only two countries achieving coverage of care-seeking for suspected pneumonia greater than 50% at endline.
- Utilisation of community-based health services was found to be low in several of the IHSS countries; however, qualitative data suggests positive attitudes towards CHWs. More research is needed to understand what influences mothers' choice of place of treatment.

b. What additional coverage is plausibly attributable to the programme?

- The increases seen in coverage of high impact, low cost interventions overall were relatively modest. The reliance on existing surveys to assess these changes, the fact that the endline survey data did not enable sufficient time for changes to occur in 4 out of 6 countries, and lack of a counterfactual for comparison limited the ability of this evaluation to comment on attribution of any changes seen directly to the IHSS programme. Although increases cannot be specifically 'attributed', the results are encouraging particularly in the two countries which had longer time of implementation to endline survey. Malawi and Niger saw substantial increases in a number of interventions which increased (6 out of 13) and statistically significant increases in care-seeking at community level. **Given the resources supplied to this programme, including training, deployment and supplies, and temporality of the changes seen, based on the logic models developed it can be theorised that the IHSS could plausibly have 'contributed' to the improvements seen in the delivery of high impact, low cost interventions. This conclusion is strongest when applied to Malawi and Niger, which both had time for the programme to mature before the evaluation was completed.**

6. What aspects of the IHSS programme worked? Why did these aspects work?

Alignment with policies, planning, and health surveillance of the Government

- Government ownership – Efforts to gain Government ownership worked well. Government was brought on as the central player from the start.
- Harmonization and coordination – Efforts to harmonize and coordinate the technical and financial support of development partners worked well. This was achieved through bilateral agreements established through UNICEF.
- Advocacy – Advocacy efforts on the part of UNICEF and implementing partners for changes to policy and plans worked well. This was due to careful but persistent advocacy efforts on the part of UNICEF and implementing partners which provided the information Government needed to enact changes to policy and plans which in turn enabled successful implementation of the IHSS programme.

Training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions

- Building on what exists – Building on existing systems and delivery platforms worked well when these existed. The IHSS was successful with regard to training large numbers of frontline health workers because it built on an existing service delivery platform that already had full Government support.
- Health systems approach – The health systems strengthening approach largely worked well. This ensured that the IHSS programme activities targeted building blocks underpinning the health system, and rooted the programme in a logic (even if implicit) for how outputs and outcomes were expected to be achieved.
- Planning for scale – Planning for scale worked. The IHSS programme planned for scale and thereby sought out strategies that could be implemented nationally. In doing so, it contributed to the training, equipping, and supervising over 50,000 community health workers across 6 countries in sub-Saharan Africa.
- Phased approach – The phased approach to training worked well. The IHSS programme took a phased approach to training and equipping frontline health workers which was linked to envisioned policy changes.

7. *What aspects of the IHSS programme did not work? Why did these aspects not work?*
- **Demand creation and social mobilization** – The IHSS programme failed to adequately address demand-side barriers that are keeping utilisation of CHWs low. The IHSS programme failed to adequately address these barriers through demand creation, social mobilization and other cross-cutting strategies such as ensuring uninterrupted supplies at CHW level.
 - **Systems strengthening for supply chain management** - The IHSS programme intended to build capacity and strengthen the government supply chain management system as part of its health systems strengthening approach. It failed to do so in all countries, and instead in some cases developed a parallel supply chain system which adequately served the needs of the IHSS programme but that may not be sustained by the Governments without developing partners' assistance.
 - **Supervision** - The majority of the CHWs did not receive monthly supervision visits as stipulated under policy. Major challenges noted included insufficient transportation and funds for fuel to carry out supervision at the community level, in addition to facility staff being overwhelmed with their various job requirements.
8. *What were the major factors influencing the achievement or non-achievement of the IHSS programme objectives?*
- **Country contextual factors** influenced achievement or non-achievement of IHSS programme objectives, but despite these differences common themes for both successes and challenges were found across these contexts.

Impact

9. *Was a reduction in child mortality observed amongst target populations? Based on plausible attribution of coverage, how many lives were saved?*
- **A reduction in child mortality was observed amongst target populations in all countries across the time periods with mortality and coverage data available; however, the reduction varied significantly from 1.1% to 7.3% per year.**
 - The LiST analysis did not accurately capture the factors contributing to mortality declines in the evaluated countries, and the modelled mortality rates did not align with those measured in household surveys. Two potential reasons for this misalignment could be that factors outside of the health sector could have contributed to mortality declines, and/or incorrect assumptions were used for coverage of high impact interventions without empirical data available to run the LiST model.
 - **Given the complex donor environment and shared responsibility for implementation in each of the settings, causal attribution of impact is not possible but the proportion of deaths averted due to interventions to which IHSS contributed where data were available ranged from 63% in Ghana and Malawi to 90% in Mali, demonstrating that the interventions promoted by IHSS were high impact and for the most part showed the greatest increases in coverage.**

Sustainability

10. *What is the additional cost per treatment for each of the three iCCM conditions?*

- The level of additional resources involved in the introduction and running of iCCM for children under 5 varies greatly between the countries studied. These variations are influenced by the length of time the programmes have been functioning, which in turn impacts on level of utilisation, the existence of pre-existing systems which cover CHWs'/supervisors' salaries, and at times bicycles. As such, comparisons can only be used to highlight factors influencing costs.
- **Additional cost per treatment amounts to \$1.4 in Malawi, \$3.3 in Niger, \$7.3 in Ethiopia, \$8 in Mozambique, \$8.8 in Mali, and \$13.2 in Ghana.** Cost of consultation, representing CHW cost, is the main cost driver amounting to 88% of treatment cost in Ethiopia, 93% in Ghana, 79% in Mali, and 90% in Mozambique, whilst standing at 7% and 9% in Malawi and Niger, respectively.
- Besides the impact of pre-existing systems, consultation cost is highly dependent on the number of patient visits per CHW. This costs varies from \$0.1 in Malawi, \$0.3 in Niger, \$6.5 in Ethiopia, \$7.2 in Mozambique, \$7 in Mali, and \$12.3 in Ghana. The weighted (by share of condition) cost of drugs and tests per treatment, established as per country protocols, showed much smaller variation from \$0.9 to \$3.

11. *What is the cost of increased utilisation?*

- Data suggest that a 30% increase in utilisation could be absorbed by the existing CHWs. Cost per treatment decreases with higher utilisation. **With 30% more treatments per CHW, the cost per treatment (consultation + drugs) decreases by around 20% in Ethiopia, Ghana, Mali and Mozambique, and by between 2 and 3% in Malawi and Niger, which have already high utilisation.**
- However the overall cost of the programme increases due to higher utilisation of drugs and tests, from 27%, in Malawi and Niger, down to 1.7% in Ghana.

12. *What is the likelihood that results/benefits continue after CIDA/UNICEF's involvement ends?*

- Implementation of iCCM funded from the Catalytic Initiative, and the 5 years horizon it provided, contributed to the decision of the Global Fund and the RMNCH Trust Fund to scale-up iCCM, highlighting its role as catalytic and ensuring that the impact remains after the end of the project.
- **Scalable policies and programmes (IMCI, iCCM) have been developed and implemented, and the benefits recognised by most governments and other stakeholders, providing a policy environment that supports in most countries continued roll-out and sustainability of the IHSS-supported programme components.**

a. Are committed financial and human resources sufficient to maintain benefits and results?

- Whilst in the medium term, it is likely that government health expenditure will increase with country economic development in Ethiopia, Ghana and Mozambique, no such prediction can be made for Malawi, Mali and in Niger.
- **In the short term donor funding is required to ensure maintenance of the services, and some countries have negotiated support from other funders.** For Mali and Niger increased donor funding is required as government health expenditure is likely to decrease with the pressure to redirect budgets to deal with the countries' security threats.
- The additional costs of the current iCCM services represent a small proportion of the countries' public health expenditure, from 0.05% in Ethiopia, to 0.25% in Ghana, 0.45% in Mali, 0.72% in Mozambique, 1% in Malawi, and 3.2% in Niger.
- The additional cost amounts to 0.15% of the government's own health expenditure in Ethiopia, 0.33% in Ghana, 1.05% in Mali, 2.34% in Mozambique, 3.49% in Malawi, and 6.55%

in Niger. However, share of the government's own health expenditure must be seen in light of the likely trends in the government's own health budget.

- **Regarding human resources, the current coverage can be sustained by existing CHWs, and utilisation could be increased without the need for additional CHWs in the areas covered.** However, expanding iCCM to new districts to reach geographical target coverage will require recruitment of significant numbers of additional CHWs, which will in turn require additional resources representing increased share of public health expenditure.

b. Is the external environment conducive to maintenance of results?

The New Funding Model of the Global Fund which could cover a significant share of the operational costs of iCCM could assist not only the maintenance but the further development of the iCCM programme. In addition, **UNICEF, Global Fund and the RMNCH Trust Fund have committed to expansion of iCCM as a key aspect of IHSS.**

Lessons Learnt and Recommendations

Methodologic Recommendations for Researchers and Evaluators:

In the evaluation of complex health system projects it is important and necessary to examine all aspects of a programme using mixed methods designs. Deaths averted should not be the main outcome measure. Mortality change is difficult and costly to measure in these settings. Tools such as LiST are extremely useful for planning and providing illustrative results, but models are not a substitute for hard data if donors want a true measure of impact. The latter for mortality takes time, large samples and, therefore, additional funding.

Programmatic Recommendations:

Relevance

- For **Programme Managers**, child health initiatives should be aligned with national priorities, along with the development of political will and commitment of governments, and national Ministries of Health in particular.
- For **National Policy Makers**, intersectoral efforts are required to address gender equity amongst CHWs and more broadly in education and economic empowerment.

Effectiveness

- For **National Policy Makers and Programme Managers**, the IHSS programme has provided evidence that large-scale community-based platforms for delivery of MNCH and nutrition interventions are possible, suggesting that these programmes should be considered for national implementation.
- For **Programme Managers**, the community driven selection process of CHWs is recommended as it improves acceptability of selected health workers. However, there is a need for checks and balances to ensure fair opportunities for qualified applicants and a participatory consultative recruitment process.
- For **Programme Managers**, the number of iCCM training days may need to be reviewed to be adapted to the pre-existing level of competency of the CHWs.
- For **Programme Managers**, ensure policies are in place to prioritize women for recruitment and address the barriers to recruitment of women and factors linked to attrition among females.
- For **Programme Managers**, the two tiered community level health cadre system is recommended as it ensures an equitable distribution of tasks between health promotion through home visits and curative service provision. When not in place, sufficient CHW to population ratios must be ensured to allow them to provide these dual roles. Furthermore,

CHWs need to be provided with ongoing transportation maintenance support for adequate population coverage.

- For **Supply Managers**, data revealing levels of drug stock-outs and expired drugs should be in place to identify the need for stock management training and better quantification of drug requirements to avoid unnecessary costs through the mismanagement of drugs.
- For **Programme Managers**, supervision with observation of case-management needs to be improved by ensuring accountability mechanisms are in place. The challenges to adequate supervision can be addressed through innovations including mentorship programmes in health facilities, integrated supervision visits, use of simple objective supervision checklists⁵, and specific budget line allocations for supervision. The requirement could be established that a completed supervision check list is a pre-requisite for payment of per-diems to supervisors.
- For **Researchers**, more research is needed to understand what influences mothers' choices of place of treatment for their ill children.

Impact

- For **National Policy Makers**, immunisations, notably the HiB and pneumococcal vaccines, featured prominently in the lives saved modelling. Given the high impact of these interventions they should be prioritized for scale up, particularly for hard to reach areas.
- For **Researchers and Evaluators**, in order to effectively measure impact and contribution there is a need for continuing efforts to improve the availability of sound, prospective demographic, epidemiological and intervention coverage data at national and sub-national levels.
- For **Researchers and Evaluators**, it should be recognized that care-seeking patterns take time to change significantly. A new sustainability study should be undertaken when iCCM has reached higher maturity, and likely higher utilisation. Patterns of utilisation at health centres and community level would have stabilised and with such stabilisation, health impact could be quantified; new costing should calculate the cost per life saved.

Sustainability

- For **International Development Donors**, continued donor support is required to sustain health system strengthening gains and continue iCCM programmes and drug supply. Such donor support should have a concurrent focus on strengthening the government drug supply systems to promote sustainability of iCCM.
- For **Programme Managers**, catchment areas per CHW must be assessed to combine 2 factors moving at times in different directions: 1) geographic access and 2) size of population covered, to optimize utilisation of CHWs.
- For **Financial Managers**, in countries where CHWs are not based in a health post, bicycles must not be seen as a one-off expenditure, replacement of bicycles (or system to finance parts) must be factored in (Note: this was done in this costing through the annualisation of the capital costs).
- For **Financial Managers**, proper budgeting for transport needs to be made for CHW programmes, in particular to ensure higher supervision: purchase and maintenance of motorbikes and budget for fuel.
- For **National Policy Makers**, countries interested in funds for new or continuing iCCM programmes should include these programmes in their Global Fund/RMNCH Trust Fund proposals.
- For **Researchers and Evaluators**, accompanying later utilisation studies suggested in the impact section above, costing studies should be done of iCCM, but also of visits at health center level for which there is a real paucity of information. The additional costs of iCCM could then be better put in the perspective of other savings at higher level in the health system due to fewer consultations at health centre level, or even hospitalisations. As part of the costing

of iCCM, the studies should identify the percentage of visits which do not translate into treatments.

In summary, funding from the Catalytic Initiative, and the five years horizon it provided, has ensured that it has really been catalytic and that the potential exists for impact to remain after the end of the project.

1. Background

Although there have been major reductions in under-five mortality globally from 90 deaths per 1000 in 1990 to 48 per 1000 in 2012, sub-Saharan Africa remains the region with the least progress on under-five mortality to date, with one in every 10 children born still dying before their fifth birthday⁶. The major causes of under-five deaths in this region are largely preventable -primarily neonatal disorders, diarrhoea, pneumonia and malaria – for which low cost, high impact interventions and effective delivery strategies exist.

Focusing attention and resources on this region is, therefore, critical. Many large scale interventions and initiatives focusing on reducing child mortality have been implemented in countries with a high burden of disease over the past decade, and it remains important to monitor the effect of these health programs on routine health systems⁷⁻¹¹.

The Catalytic Initiative to Save a Million Lives (CI) is “an international partnership with the goal of strengthening health systems to accelerate progress on the health-related Millennium Development Goals (MDGs)”¹. To achieve this objective, the CI sought to “strengthen health systems by delivering life-saving health and nutritional services to disadvantaged children and pregnant women to dramatically reduce child and maternal mortality” in Africa and Asia.

Object of Evaluation

As part of the CI, the Canadian International Development Agency (CIDA), through its Master Arrangement with UNICEF 2003-2013, supports the UNICEF Integrated Health Systems Strengthening (IHSS) program. DFATD/CIDA and UNICEF selected six countries in sub-Saharan Africa (Ethiopia, Ghana, Malawi, Mali, Mozambique, and Niger) to target matched funding from CIDA (CND \$105 million) and UNICEF for planning, implementation, monitoring and evaluation of the IHSS program in these countries between 2007 and 2013. From this amount, funding was received by the UNICEF Country Offices in the targeted countries, the UNICEF West and Central Africa Regional Office (WCARO), the UNICEF Eastern and Southern Africa Regional Office (ESARO), and UNICEF Headquarters office to strategically support the scaling-up of IHSS activities and provide specific support to those six countries.

In alignment with the health policies and planning of each government, the overall aim of the IHSS program was to increase coverage of a limited package of proven, high impact, and low cost maternal and child health interventions in these targeted countries. IHSS interventions included maternal tetanus vaccination; PMTCT; exclusive breastfeeding; complementary feeding; ITN use and IPT in pregnancy; DPT, Hib, pneumococcal, and measles vaccines; vitamin A supplementation; vitamin A for measles treatment (vitamin A supplementation used as proxy for coverage); ACTs for malaria; ORS for diarrhoea; zinc for diarrhoea; and case management of pneumonia (care-seeking used as proxy for coverage). PMTCT interventions are not included as IHSS-supported interventions in Malawi, Mali and Mozambique.

Summary of key program activities over the full program period (2007-2013)

Phase I (2007-2010), the first two and half years of the program, started with initial planning and prioritisation of the interventions package for prevention and treatment of child illnesses. During this process, not only was the scientific evidence for most effective interventions at community level used but each of the countries' contexts in terms of health system policies was considered.

It was recognized early in the course of the program that this would require concerted efforts on a number of fronts: first at a policy level to enact the necessary policy changes required for child treatment services at the community level; and then at a process level to train the necessary numbers of front-line health workers, deploy them where they were most needed with sufficient supplies of essential medicines, and ensure adequate monitoring and supervision to maintain quality of the services that were being delivered.

Towards the end of Phase I, the Lives Saved Tool (LiST) analysis was applied across all six program countries and showed that the greatest reductions in U5MR could be realized through strengthening of case management. As a result, and in close consultation with DFATD/CIDA, a decision was made to focus the remainder of the program on support for scale up of integrated community case management (iCCM) of the three main killers of children under-five, namely pneumonia, diarrhoea and malaria-which combined contribute 40% of the total under-five deaths, and in some countries, such as Niger and Mali, as much as 60%.

Phase II (2010-2013), thus, focused on strengthening and expanding the treatment programmes at community level. The process of accelerated scale up of iCCM under IHSS involved three key categories of activities: 1. Formation of policy reforms to allow CHWs to provide treatment at community level (in particular for pneumonia treatment with antibiotics) and alignment of iCCM implementation plans within the existing health systems' health policies and strategies, 2. CCM training for CHWs and their deployment, and 3. Establishment of systems for supplying CHWs with essential commodities, and supervising and monitoring their work.

Although all six IHSS countries carried out the same key activities listed above, the iCCM implementation modalities, duration, and initiation times (see Fig. A which is extracted from the IHSS Final Report web address) differed greatly, based on each of the countries' enabling environments (policies, government's commitment, leadership and ownership, financial support), health system, and local cultural context, as well as other initiatives and partnerships taking place concurrently. These are discussed in more detail in the country reports.

<http://www.mrc.ac.za/healthsystems/publications.htm>

Figure A: Timeline of phasing in of iCCM in each of the six countries in the IHSS.

Timeline of phasing-in of iCCM by country						
Country/Period*	1	2	3	4	5	6
Ethiopia	No iCCM			Full iCCM		
Ghana	iCCM (diarrhea, malaria)			Full iCCM		
Malawi	No iCCM	Full iCCM				
Mali	No iCCM				Full iCCM	
Mozambique	No iCCM			Full iCCM		
Niger	Full iCCM					

*Period 1: November 2007-May 2008; Period 2: June 2008-May 2009; Period 3: June 2009-May 2010; Period 4: June 2010-May 2011; Period 5: June 2011-May 2012; Period 6: June 2012-May 2013

The introduction of focused interventions within an evaluation platform such as the IHSS programme through the CI¹² presents an opportunity to examine these issues using new approaches that take into account the varied pace of scale up and that provide data to inform further programme planning and monitoring.

In addition to programme elements, there are other competing factors that influence impact at scale for newborn and child survival³. The extent of community participation in influencing demand can also affect the uptake of services; inadequate or poor quality support and training of staff, lack of supervision or lack of adequate remuneration and health worker motivation may also affect the care of mothers and their children. Inter- and intra-country conflict and natural disasters as well as equity aspects, both on the supply side, such as health worker-population ratios, and on the demand side, such as gender, maternal education and geographic location, will also have an impact. It is, therefore, important to gather as much data as possible to systematically assess the plausible effect of the IHSS programme on coverage of interventions and the estimated number of lives saved through the programme³. It is within this framework that the Health Systems Research Unit (HSRU) of the South African Medical Research Council (SAMRC) and their collaborators (University of the Western Cape and Save the Children USA) conducted an external evaluation of UNICEF's IHSS program in the selected six African countries. This report presents the overall findings from the six countries highlighting similarities and differences across the settings. Comprehensive individual country reports are also available (<http://www.mrc.ac.za/healthsystems/publications.htm>).

2. Purpose and Objectives of the evaluation

Purpose

The purpose of the external evaluation was two-fold:

1. To evaluate the effect of the IHSS programme on coverage of a limited package of proven, high impact, and low cost maternal and child health interventions in Ethiopia, Ghana, Malawi, Mali, Mozambique, and Niger.
2. To inform programme and policy decisions in Ethiopia, Ghana, Malawi, Mali, Mozambique, and Niger and regionally.

Objectives

To assess the effect of the IHSS programme on the following:

Relevance:

- Contribution to an enhanced policy environment for child survival
- Alignment with national priorities and plans
- A health systems strengthening approach, a focus on women's participation and a gender equality approach.

Effectiveness:

- Strengthening the health system (including all six health system building blocks namely health workforce, service delivery, information, supplies, financing and leadership/governance¹³).
- The capacity of government and/or civil society organizations to train, equip, deploy, and supervise front-line health workers to deliver a limited package of proven, high impact and low cost health interventions.

Impact:

- Coverage of selected maternal, newborn and child health and nutrition interventions (promotion of breastfeeding and vitamin A supplementation), particularly integrated Community Case Management (iCCM) of diarrhoea, malaria and pneumonia, which were supported by the IHSS programme.
- Number of additional lives saved by the IHSS programme calculated using the Lives Saved Tool (LiST) disaggregated by groups of interventions (e.g. iCCM) and by individual interventions according to the phases of the programme.

Sustainability

- Costs of implementing iCCM.
- Financial sustainability of this programme.

2.1 Scope of the Evaluation

The scope of the external evaluation was focused on estimating the plausible effect of the IHSS programme on coverage of interventions funded by the IHSS programme, and estimating the additional lives saved by the programme using LiST, which models mortality from coverage estimates. Any interventions not funded by the IHSS programme but necessary in order to execute the LiST estimation and construct a robust plausibility argument (i.e. to separate plausible effects into those due to the project and those external to the project) were considered to be within the scope of the external evaluation.

Plausibility for this evaluation was defined as “apparently true or reasonable, winning assent, a plausible explanation”¹⁴. As defined by the OECD-DAC attribution represents “the extent to which an observed development effect can be attributed to a specific intervention or to the performance of one or more partners taking account of other interventions, (anticipated or unanticipated) confounding factors, or external shocks”.

The scope of the evaluation was limited to **plausible ‘contribution’** due to the presence of one or more of the following conditions in each of the targeted countries:

- non-existence of true comparison areas (counterfactual) due to the national scale of the programme; and
- the infeasibility of a randomized intervention/control design due to political and ethical considerations.

Geographically the scope of the external evaluation includes the following areas:

- Ethiopia – five of ten regions (Amhara, Benshangul, Oromia, SNNPR and Tigray)
- Ghana – the three northern regions and all districts therein;
- Malawi – hard to reach areas in ten districts (however similar programmes are operating through the Government of Malawi in all 28 districts)
- Mali – five of eight regions (Kayes, Koulikoro, Mopti, Sikasso, and Ségou)
- Mozambique – thirty-three districts in phase 1 and all 144 districts in phase 2; and
- Niger – all regions of rural Niger (the programme is national).

It was not possible to visit all regions involved in the IHSS programme in every country. This should be noted as a potential limitation if marked differences across regions exist. The evaluators relied on UNICEF Country Office staff to assist with selecting visit sites, which were representative but also feasible.

Temporally, the scope of the external evaluation included the period 2000-2007 (secular trend) prior to the start of the IHSS programme, the period 2007 to 2010 known as Phase I of the programme, and the period 2010 to March 2013 known as Phase II of the programme.

2.2 Intended Audience

The intended audience of this external evaluation includes the Ministries of Health in the six programme countries, DFATD, UNICEF, other UN agencies, and governmental and civil society partners at national, regional, and global levels.

2.3 Evaluability

An evaluability exercise prior to the external evaluation was not undertaken because it was not called for in the Request for Proposal of Services (the terms of reference of the external evaluation) and would have been cost prohibitive given the amount of funding for the evaluation. Evaluability exercises are not mandatory under UNEG Norms for Evaluation in the UN System¹⁵.

2.4 Evaluation Rationale

DFATD and UNICEF called for an external evaluation of the IHSS programme to be conducted at the end of the program in "Schedule A for Grant Funding to a UNICEF Program"¹⁶. As the IHSS programme has come to an end, this external evaluation is intended to fulfill this requirement and is pursuant to the terms of the document "Request for Proposal of Services" (the terms of reference for the external evaluation) under purchase order 7054960 signed by DFATD and UNICEF¹⁷.

3. Evaluation Questions

Relevance

1. To what extent did the programme's objectives reflect a health systems strengthening approach, including:
 - a. alignment with the health policies, planning and health surveillance of the Government? and
 - b. training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions?
2. To what extent did the programme's objectives include a focus on women's participation and a gender equality approach?

Effectiveness

3. To what extent were the objectives related to health system strengthening (including policies, planning and health surveillance) and training, equipment, deployment, and supervision of front-line health workers achieved?
4. To what extent were the objectives related to women's participation and gender-equality achieved?
5. To what extent did coverage of the selected high impact and low cost interventions in the target populations increase? What additional coverage is plausibly attributable to the programme?
6. What aspects of the IHSS programme worked? Why did these aspects work?
7. What aspects of the IHSS programme did not work? Why did these aspects not work?
8. What were the major factors influencing the achievement or non-achievement of the IHSS programme objectives?

Impact

9. Was a reduction in child mortality observed amongst target populations? Based on plausible attribution of coverage, how many lives were saved?

Sustainability

10. What is the additional cost per treatment for each of the 3 iCCM conditions?
11. What is the cost of increased utilisation?
12. What is the likelihood that results/benefits continue after CIDA/UNICEF's involvement ends?
 - a. Are committed financial and human resources sufficient to maintain benefits and results?
 - b. Is the external environment conducive to maintenance of results?

4. Methodology

A mixed method approach to this evaluation was used^{2,3} in that quantitative, qualitative and economic evaluation methods were utilised. Baseline data and secular trends in key indicators (in terms of coverage, financial inputs and implementation strength) were all taken into account in the evaluation. The effect of contextual factors (including socioeconomic progress, policy changes, epidemiological changes and complementary and competing interventions by other donors and government) were described using data from document reviews and relevant databases. Contextual data to support the quantitative coverage data were collected during key informant interviews with national stakeholders, key district personnel, CHWs, their supervisors, beneficiaries and where relevant community based structures during visits to each of the six countries.

Collection of qualitative contextual data occurred at national and district levels. Each set of data (household survey, qualitative, costing and LiST) was analysed and reported independently. The analyses from the six countries and their separate findings are brought together and synthesised in this report. The evaluation approach aims to provide data which can be used for future decision-making. It also provides recommendations for improvements to the programmes as they scale up as well as providing lessons for other countries. The limitations of each of the evaluation methods are described in detail in section 7 'Strengths and limitations of the evaluation'.

Each country evaluation framework was based on a preliminary country logic model (see individual country reports <http://www.mrc.ac.za/healthsystems/publications.htm>) which was developed following a desk review. The review highlighted several issues for exploration during the country visits, which may not have previously been explored in-depth, and that would make a unique contribution to documenting lessons learnt from this programme.

4.1 Quantitative data sources and analysis

Coverage trend analysis

A full list of all indicators collected for coverage and Lives Saved Tool (LiST) analysis can be found in Appendix A. Data sources for the coverage and LiST analyses for each of the countries is listed in table 1 below.

Table 1: Survey data sources for coverage trend analysis and LiST by country

Country	Pre-IHSS	Phase I	Phase II
Ethiopia	DHS 2000	DHS 2005 (proxy for phase I baseline) MIS 2007	DHS 2011, MIS 2011, EPI coverage survey 2012
Ghana	DHS 1998, DHS 2003, MICS 2006	DHS 2007 special Maternal Health Survey, MICS supplementary 2007 (3 Northern regions only), DHS 2008, MICS 2011	LQAS 2012 (3 Northern regions only)
Malawi	DHS 2000 (data only available for 4 of 6 CI districts in Central and Northern regions, no data for 4 Southern CI districts), MICS 2006	DHS 2010	2012/13 LQAS (10 CI districts only)
Mali	DHS 2001	DHS 2006, MICS 2010	DHS 2012
Mozambique	DHS 1997, DHS 2003	MICS 2008, MIS 2007	DHS 2011
Niger	DHS 1998, MICS 2000, DHS 2006	2010 Mortality survey	DHS 2012

For the anthropometric data, for surveys prior to 2007, z-scores were re-calculated using the 2006 WHO growth reference standards to be comparable with the later surveys.

The statistical software Stata12 was used in the analysis as it has sample survey analysis capabilities, in particular for computing point estimates and confidence intervals of indicator coverage as well as for trend analysis. Trend analysis was performed using a non-parametric test of trend across years for each country. Trend analysis was performed on data for the CI/IHSS targeted areas, corresponding to the areas of implementation of iCCM through UNICEF/CIDA support (Table 2).

Table 2: Level of analysis for IHSS coverage trend by country

Country	Level of analysis for IHSS coverage trend
Ethiopia	All of rural Ethiopia
Ghana	Three Northern Regions
Malawi	10 IHSS districts
Mali	5 Southern regions
Mozambique	All of rural Mozambique
Niger	All of rural Niger

The complex sampling design of the DHS/MICS surveys such as regional and rural/urban stratification, clustering at enumeration areas and sampling weights (due to non-proportional sampling) were taken into account.

Some adjustments were made to indicators from DHS surveys in order to align them with definitions used in MICS surveys. The following changes were made:

- the denominator and numerator for tetanus vaccination, IPT/Fansidar during pregnancy, early breastfeeding and postnatal care, which had been calculated over a 5-year period in DHS have been restricted to live births in the two years preceding the survey to correspond with MICS surveys;
- intake of ORS has also been allowed in defining exclusive breastfeeding (definition usually breastmilk or prescribed medicines only);
- pharmacy has been excluded from care-seeking providers in both DHS and MICS data for fever and suspected pneumonia.

Some differences remained for the following indicators in the LQAS surveys (Malawi and Ghana) due to the restrictive data collection method used; data for IPT/Fansidar and tetanus toxoid during pregnancy were collected from mothers of 0-5 month old infants yet in the other surveys all mothers with a live birth in the past two years were considered; vitamin A data is available for children aged between 12 and 23 months old in contrast to the other surveys which had all children aged between 6 and 59 months.

Within the DHS survey, definitions have changed over time. Symptoms for suspected ARI in early surveys stipulate cough and difficulty breathing while recent surveys have added the criteria of whether these were chest-related problems¹⁸. Similarly, the questions regarding access to postnatal care for mothers included only women who had delivered outside a facility where the later surveys include all women, regardless of where they delivered.

Graphical presentations of the derived results in the form of line graphs and bar charts with confidence limits were generated in Excel. An assessment of whether there was a significant difference in the

average annual rate of change in coverage of pertinent indicators when comparing 95% Confidence Intervals from the trend over time, in addition to a comparison of the annual rate of change between the pre-IHSS period (2000-2006) and during IHSS implementation (2006-2013), was carried out. Linear rate of change was assumed and calculated by subtracting the endline point estimate from the baseline point estimate, divided by the total number of years within the time period of analysis. Using the statistical formulae for variance and confidence intervals for proportions, these were calculated for rate of change in order to assess whether the annual rates of change within the relevant time periods were significantly different from each other.

Contextual factors, such as implementation strength (extent of drug stock outs, supervision), and relevant data from qualitative interviews were considered. Where the contribution of IHSS is not clear this has been stated.

Data to assess implementation strength, utilisation and quality of care were taken from routine programme data collected by UNICEF as well as surveys undertaken by other implementing partners in each of the countries. While it is recognised that routine data may suffer from poor data quality issues, as this was a retrospective evaluation, the team was restricted to routine data or data from other available surveys conducted during the project period. This limitation should be kept in mind for interpretation of findings.

Lives Saved analysis

Using household survey data as described above, the Lives Saved Tool (LiST) was used to investigate the extent to which changes in child mortality could be attributed to increases in intervention coverage. On the basis of measured baseline mortality values and changes in coverage, child mortality was forecasted over two time periods:

- Prior to the start of the programme (secular trend): Under-five lives saved from the year 2000 to the start of IHSS implementation, roughly 2000-2007
- After the start of the programme: Under-five lives saved from the start of IHSS implementation from roughly 2007 to latest available endline coverage data

LiST is a free and widely used module in a demographic software package called Spectrum, which allows the user to compare the effects of different interventions on the numbers of maternal, neonatal and child deaths and stillbirths, as well as stunting and wasting¹⁹. *LiST* uses country-specific or region-specific baseline information on mortality rates and causes of death as well as background variables fertility, exposure to *Plasmodium falciparum*, stunting rates and current coverage of more than 60 interventions and their associated effectiveness values relative to specific causes of death and risk factors to estimate the deaths averted, overall and by specific interventions. The modelling methods have been widely published including discussion of the limitations, which are particularly related to the lack of coverage data for many of the specific interventions²⁰⁻²². The analysis was done with Spectrum version 5.04.

All data was extracted from official national, regional and district-level sources, and UNICEF and partner databases and compiled into a pre-formatted excel spread sheet. Coverage data for key indicators, representing the scope of the IHSS programme as well as broader health system indicators,

was extracted from all of the available household surveys and other datasets for each time point available and entered into the projections (see Appendix A).

The analyses differed by country due to the data available and the scope of implementation in the country. For more detailed information, please see the individual country reports. Where possible, the baseline year was set at 2000, projecting forward to 2007 using all available data on changes in intervention coverage and nutritional status. For the analysis of the IHSS implementation, we used 2007 as the baseline year, i.e. the first year of intervention as 2007 using new empirical mortality data and coverage data (i.e. not the projection results from the previous phase), and projected forward to the endline year for which data is available (Ethiopia 2010; Ghana 2013; Malawi 2013; Mali 2012; Mozambique 2010; and Niger 2012). The results are presented as cumulative lives saved in reference to the baseline year for each projection period. The under-five mortality rates generated from LIST were compared with those produced by the household surveys to gauge how effectively the model predicted measured mortality change.

Costing

The costing component, for the purpose of this evaluation, addresses the following question: *What are the additional costs incurred by the health services (including donor funding) due to the introduction of the curative interventions by CHWs for the treatment of malaria, diarrhoea and pneumonia in children under 5?* This does not represent the full costs of iCCM, or the actual costs of the IHSS programme. The design of the financial system in the public health sector does not allow identification of amounts spent on specific programmes nor on specific levels of care such as the health post level, and it is therefore not possible to ascertain the full cost of iCCM. The costing component also assessed the financial sustainability in relation to current utilisation and anticipated increased future levels of utilisation.

iCCM for the purpose of the costing will refer to iCCM in children under 5 for the three conditions: malaria, diarrhoea and pneumonia (iCCM).

Costs are incurred in 2 phases, at times overlapping:

- Design phase. This phase covers formative research, meetings and workshops for the design of the intervention, design of the training curriculum, and design of materials. This phase is a 'one-off', not repeated as the iCCM is rolled out to new districts. These costs can be very significant, but they are not included in the costing because they will not take place again, as such they would artificially inflate the cost of scaling up iCCM and distort calculations on its sustainability.
- Implementation/running phase: this is the focus of this costing.

The implementation of iCCM takes place in the context of existing health services with pre-existing funding. As the context is different across countries, the table below shows which costs are included for each country. The focus on additional costs is to ensure that costs are not double-counted when put in the perspective of the existing health budgets and assessment of sustainability (Table 3).

Table 3: Costs included in this costing exercise

System	Ethiopia	Ghana	Mali	Malawi	Moz	Niger
Pre-Existing system	X			X		X
CHW Paid / Volunteer	P	V	P	P	P	P
Costs included	Ethiopia	Ghana	Mali	Malawi	Moz	Niger
CHWs						
Training iCCM CHWs	X	X	X	X	X	X
Kit	X	X	X	X	X	X
Bicycle CHWs		X	X	X	X	
Salaries CHWs			X		X	
CHWs allowances for Supervision meetings	X					
Supervision & Management						
Training iCCM Supervisors/District coordinators	X	X	X	X	X	X
Bicycles for supervisors		X				
Allowances Supervisors			X			
Quarterly Review meetings Supervisors	X					
Percentage overheads (5%)	X	X	X	X	X	X
Drugs and Tests						
Malaria Tests - RDT	X	X	X	X	X	X
Drugs	X	X	X	X	X	X

Costs were collected and analysed in the following way:

Fixed Costs per CHW: (independent from the number of treatments)

These costs are annualised to assist with future planning and sustainability analysis. Training and replacement of equipment needs to take place over time if the programme is to be institutionalised and last beyond the time of the CI project. These expenditures will take place in different years across the country. Annualising costs, thus, allows assessing the average financial implications across the years. Capital costs for building of new health posts are paid by the community and, thus, not included.

- CHWs:
 1. iCCM training cost per CHW. Initial training has been allocated 10 life years in countries where refresher training or mentorship sessions took place, and 5 years in countries without refresher training. An annual attrition rate was applied, this rate varied between countries.
 2. Equipment including bicycles: different numbers of life years apply to different pieces of equipment.
 3. Where relevant, salaries/subsidies and allowances for meetings.
- Supervision and management. These costs included:
 1. iCCM training for CHWs' direct supervisors and district/zonal supervisors. Life years of training was defined in the same way as for CHWs. An annual attrition rate was applied.
 2. Where relevant, allowances for supervision and meetings.
 3. Where relevant, bicycle or share of motorbike cost.
 4. Overheads of 5% of the annualised costs, to cover administration and distribution costs.

The annualised fixed costs per CHW are then divided by the number of treatments per CHW in 2012/13. That year was chosen because it represented the highest level of activity and the highest number of CHWs trained.

Variable Costs (dependent on the number of iCCM treatments)

- Drug and tests (RDT) costs for each of the three treatment conditions. For malaria, the number of RDTs per treatment is weighted by the positivity rate in each country.

Cost per treatment per condition = Share of CHW Fixed cost per Treatment + Variable costs specific to each condition

iCCM Additional Costs 2012/13 = Cost per treatment for each condition * number of treatments in 2012/13

Two costing outcomes will be presented.

1. Additional cost of iCCM (Basic)- : the minimum costs associated with the introduction of iCCM
2. Additional cost of iCCM Plus (iCCM+) – this factors in a portion of the costs associated with those required for health systems strengthening interventions necessary to allow for the implementation of iCCM, e.g., some IMCI training, some logistics set-up. An arbitrary 15% increase in iCCM costs was modelled to give the cost of iCCM+. This percentage is clearly much higher at the beginning of the programme but decreases annually over the implementation of the programme.

In order to assess whether a higher number of treatments per CHW was possible in terms of workload, the time spent on iCCM was calculated with the following assumptions:

- The length of a visit was set at 30 minutes, time extracted from Costing of Integrated Community Case Management in Malawi by Management Sciences for Health²³.
- Travel time between visits was added in countries where iCCM was based on home visits in comparison to those where it took place in a health post.
- Besides the number of treatments, an estimated additional 20% of visits were made, reflecting visits which did not end up in treatment. Knowing that some visits do not translate into treatment (for example Malaria negative tests) whilst still requiring CHW time, it was assumed that 20% of visits did not translate into treatment (such an assumption will need to be tested in the recommended evaluation at longer programme maturity).
- Additional time was modelled in to reflect share of supervision or community meetings and visits to the health facility for refilling of kits.
- A CHW worked an average of 46 weeks per year.

Increase in the number of treatments per existing CHW per year: increases of 15% and 30% were modelled to assess the impact of increased utilisation and population growth.

Cost of the current programme was calculated by applying utilisation per CHW and cost per treatment to the country's number of iCCM-trained CHWs. Where relevant, modelling was undertaken to assess the number of CHWs required and the cost of expanding the programme to all children under 5, applying the current ratio of CHWs to children under 5. Two levels of utilisation per CHW are modelled: current level and 30% increase in level of utilisation.

Financial sustainability of the programme is calculated by expressing the additional costs of the programme, current size and modelled expansion to the whole country, as a percentage of current public health expenditure and the government's own health expenditure. Data on health expenditure was extracted from the World Databank.

The number of CHWs deployed and number of children treated per CHW were extracted from UNICEF 2013 CI Report Main Tables (Master) (July 2013). Training costs, subsidies, allowances, treatment protocols, kits, test and drugs unit costs were supplied by UNICEF country offices, and, where relevant, confirmed through interviews with stakeholders.

A cost per life saved was not calculated, for several reasons. 1. The methodology for assessing lives saved using the Lives Saved Tool (LiST) is based on modelled estimates, not measured outcomes linked to specific interventions; 2. The lives saved analysis reflects inputs across the entire health system resulting in coverage change which include, but are not limited to, IHSS inputs; 3. The coverage change and lives saved identified in the LiST analysis cannot be allocated to different levels of the health care system (e.g. community level) in a reliable way; and 4. The calculation of additional cost per additional death averted by the programme could, even if it would have been possible, provide potentially misleading results. In most countries the programme has been implemented at scale too recently to reach its real potential, with the consequent still low demand level and, hence, impact. With fewer number of deaths averted through the programme, the cost per death averted would be at this stage artificially high which could lead policy makers to make potentially misguided conclusions.

Data Limitations

Utilisation data was extracted from the reports on number of treatments. It was not possible to have data on the number of visits which did not translate into treatments; an arbitrary ratio had to be used, this ratio, however, did not affect the additional cost per treatment, only the calculation of time spent on the programme. Actual cost of the programme could not be established in the time available, due to the number of stakeholders: government, partners, and due to the fact that breakdown of information in government financial systems does not allow for such an analysis. However, information from government officials was also inputted in the model.

4.2 Qualitative data sources and analysis

The country visits took place between October 2012 and October 2013, and each visit lasted approximately 7-10 working days (Table 4). In each country individual interviews and focus group discussions were held with UNICEF staff and other partners, Ministry of Health staff, CHW supervisors, nurses in health facilities, CHWs and beneficiary mothers. The teams visited the capital as well as made field trips to distant districts (Table 4). The list of potential interviewees in each country was discussed in advance with the UNICEF country team, who assisted with pre-scheduling appointments.

Table 4: Country evaluation visits

Country	Dates of country visit	Districts visited outside of the capital
Ethiopia	October 2012	Gojam and Gondor districts in the Amhara region, Shewa district in Addis Ababa
Ghana	May 2013	Saboba district, Tolon district, Savelugu district
Malawi	August 2013	Lilongwe rural district, Mzimba south district, Kasungu district
Mali	October 2013	Kita, Diolila, Bougouni
Mozambique	July 2013	Maputo, Gaza and Inhambane provinces (6 districts visited)
Niger	April 2013	Maradi Region (Maradi and Madarounfa)

In compiling the interview lists consideration was given to gaining as wide a range of opinion as possible so as to ensure a fair representation of how CI/IHSS was experienced in each country. Each interview was conducted by one or more members of the country field team. Where necessary (in

interviews with mothers, CHWs and CHW supervisors), the services of an interpreter were used. All interviews took place either at the offices of the interviewees, at a district office or health centre, or in the communities. Interviews were audio recorded, after gaining assent from interviewees, and the researchers took field notes. Primarily the Ministry, partner organisations and district interviews were 1-3 people in attendance. The CHWs' varied from 1 person key informant interviews if interviewed in their health post, to focus groups if interviewed in clinics. Beneficiaries' interviews were all completed in focus groups.

The analysis of interview data from the country visits was based on typed interview notes or audiotape transcriptions and observations from the field. Two persons from each country team reviewed the notes/transcriptions independently for analysis. The analysis was conducted both deductively and inductively. Deductively, the team sought to find answers to predefined questions (e.g. how did this intervention fit within the policy environment? or, what evidence was there of health systems strengthening on the ground?). Inductively, the team tried to understand what new information and insights could be gleaned from the interviews and observations. Both approaches used a content-theme analysis, where themes were identified across the range of interviews and focus groups for that country. For this multi-country report the themes as reflected in the individual country reports were then also reviewed and summarised. Based on this analysis the data were grouped into categories, the results of which are reported in narrative form in this report.

5. Findings

5.1 Relevance

The six countries included in this evaluation represent a range of contexts including countries in East and West Africa with all except one (Ghana) classified as low income. The GDP per capita is highest in Ghana (\$1604) and lowest in Malawi (\$268). With regard to human resources for health, all six countries have ratios of nurses and midwives to the population of less than 1 per 1000 people with the lowest in Niger (0.1). Maternal mortality is high across all six countries with less progress made compared to under-5 mortality. Niger and Mali have the highest rates of maternal mortality (590 and 540 respectively), whilst Ethiopia and Ghana have the lowest of the six countries (350). Estimates of neonatal mortality for 2012 show Mali having the highest rate at 42 and Malawi the lowest at 24 per 1000 live births (Table 5).

The health system and economic situations of these countries make them relevant places for the interventions delivered through IHSS, particularly the community-based health worker training and deployment with associated increases in access to care.

Table 5: Contextual background to the IHSS countries

Country	Neonatal mortality rate (deaths per 1000 live births) 2012 ⁶	Maternal mortality ratio (deaths per 100,000 live births), 2010 ²⁴	Density of nurses and midwives per 1000 population, 2010	GDP per capita, 2012
Ethiopia	29	350	0.2	\$453
Ghana	28	350	0.9	\$1604
Malawi	24	460	0.2	\$268
Mali	42	540	0.4	\$699
Mozambique	30	490	0.3	\$565
Niger	28	590	0.1	\$394

1. To what extent did the programme's objectives reflect a health systems strengthening approach, including alignment with the health policies, planning and health surveillance of the Government?

In many of the countries the inception of IHSS was preceded (pre-2007) by child survival policies that created a strong foundation and policy environment for the IHSS support to thrive. As such in all countries some policy process was followed- either endorsing child survival or specifically to allow for treatment at community level (Table 6). The IHSS capitalised on and/or advocated for many of the

(2007-2013) policies and programmes outlined in table 6 to facilitate IHSS delivery of high impact, low cost MNCH interventions.

Some countries faced geo-political crises around the time of the IHSS (Mali, Malawi). In Malawi, the main crisis occurred in 2011 when bilateral and multi-lateral development partners withdrew funding resulting in major shortages of fuel and currency, and these in turn affected the availability of supplies and medicines and outreach and supervision activities.²⁵ Mali experienced even greater instability throughout the IHSS period with several spates of droughts from 2005-2012, civil war and the subsequent suspension of foreign aid in 2010 and 2012. IHSS programmes were supported through these crises in coordination with government and other strategic partners. Data in the next section on implementation effectiveness indicates gains were steady throughout the project period despite these threats.

In every one of the six countries a period of preparation had to be engaged in either to convince policy makers or health workers on the ground of the need for a change in policy and practice with regard to community-based services. The greatest resistance across the settings came from formal health cadres regarding the competence of CHWs to provide curative services having received little training. This process of buy-in was very important to ensuring ownership and alignment with national programmes.

“It took 2 years for Mali to start implementing SEC (iCCM programme). UNICEF wanted a clear understanding and buy in from the MOH. If they did not understand what was meant by SEC, it would be difficult to have a successful programme. They took enough time to discuss the issues with MOH to come up with an agreement and a national policy and strategy on SEC. As a result, SEC is in line with government policy, an essential strategy for care at the community level”-Development Partner

Although findings from the fieldwork showed that UNICEF engaged in an intense process of lobbying in each country, Ethiopia stands out as an example where the most intensive work was carried out to convince policy makers. The team’s fieldwork in Ethiopia suggested that a number of factors eventually led to approval of the policy in 2009:

- UNICEF coordinated and funded intense and sustained advocacy which resulted in the emergence of a critical mass of supporters among federal and regional policy-makers and amongst programme managers from the Ethiopian Paediatric Society, UN agencies and other international partners.
- Experiences of Save the Children in Liben Woreda, Oromiya State between 1997-2006 where iCCM was implemented and evaluated showing high quality, demand and use of iCCM²⁶. These findings were presented at the 10th Annual Ethiopian Paediatric Society meeting in 2008.
- The government felt pressure to meet MDG 4 and the FMOH realised that introduction of iCCM pneumonia would help Ethiopia reach this goal (*The Federal Ministry of Health, Ethiopia. May 2010*).
- A new director of Health Promotion and Disease Prevention, who was not as influenced by the previous history of antibiotic abuse by CHWs, was appointed in the second half of 2009.

Table 6: Key events in the policy formulation process

Country	Period of child health policy development	Key events	Major negative socio-political events (wars/droughts etc.)
Ghana	2003 - 2012	2003- National health insurance scheme Act passed 2007 - MoH programme of work 2007-2011 includes “High Impact, Rapid Delivery (HIRD)” strategy. 2009 - New child health policy allowing CBAs to provide antibiotics for pneumonia and zinc treatment for diarrhoea. 2010 - All three northern regions started formal treated of ARI by CBAs 2012 - Pneumococcal and Rotavirus vaccines introduced into EPI	2007- Flooding disaster in Northern Regions including IHSS districts
Ethiopia	2004 - 2013	2004 – Health Extension Programme began 2005 – Health Sector Development Programme and National Child Survival Strategy developed 2009 – Policy change allowing HEWs to administer antibiotics in the community 2011 – Training of HEWs in iCCM 2011 - Introduction of Pneumococcal vaccination 2013- Introduction of community-based newborn care (including sepsis management)	
Mozambique	1998 - 2012	1998: MoH adopted the health package “Integrated Management of Childhood Illnesses” (IMCI) 2002: MoH signs <i>Declaration of Millennium Development Goals</i>	1992 – UN negotiated peace

		<p>2003: The PROSAUDE health common fund is established</p> <p>2004: National Strategy for Community Involvement emphasizes that the APEs role includes treatment of illness at the community level, among other responsibilities</p> <p>2004: Adoption of ACT for treatment of malaria.</p> <p>2006 July: removal of user fees for childcare, antenatal care, caesarean section operations and family planning.</p> <p>2007: MOH adopts RED policy</p> <p>2008: Initiation of first bi-annual National Child Health Weeks (March/ October)</p> <p>2010: strategic plan for the revitalization of the Community Health Worker (APE) programme approved by the MOH, with CCM for malaria, pneumonia and diarrhea, and payment of subsidies to APE as two major innovations</p> <p>2010 March: APE pilot program starts</p> <p>2011: RED adopted as national platform 2011 Jan: Approved Amoxicillin for APEs in place of Penicillin</p> <p>2012: 50 districts implementing APE programme</p>	<p>agreement to end the civil war</p> <p>2004 – President Joaquim Chissano steps down after 18 years in office</p>
Malawi	2005 - 2013	<p>2005 – RED strategy introduced</p> <p>2006 – National policy to accelerate child survival and development (ACSD) using IMCI</p> <p>2007 – ACSD communication strategy developed</p> <p>2007 – 5971 new HSAs recruited (total 11,000)</p> <p>2008 – UNICEF entered into partnership with 7 international NGOs to strengthen community level implementation of ACSD</p> <p>2009 – iCCM started</p>	<p>2011 – Withdrawal of aid by multiple development partners. Major shortages in foreign currency and fuel.</p>

		<p>2010 – Government introduced option B for PMTCT</p> <p>2012 – rotavirus vaccine introduced</p> <p>2013 – PCV vaccine introduced</p>	
Mali		<p>2004-Essential Family Practice component of child survival strategy adopted</p> <p>2005-Free caesarean policy adopted</p> <p>2007-Free malaria treatment for children under 5</p> <p>2009-16,000 relais operational</p> <p>2009-MoH holds national forum to examine extension of essential services to community level and forms Steering Committee</p> <p>2010-Low Osmolarity ORS and zinc included in relais kits</p> <p>2010-SEC strategy adopted, training tools finalized, and start of training</p> <p>2011-Pentavalent vaccine adopted</p>	<p>2005, 2008, 2010, 2012 Sahel Droughts</p> <p>2010-Global Fund suspension of Funding</p> <p>2012-Military Coup and Suspension of Foreign Aid</p>
Niger		<p>1999-Law establishes Case de sante structures and first community health post build in 2000.</p> <p>2005-Malaria policy revision (Artemisinin combination therapy)</p> <p>2006-Free health care for children and pregnant women</p> <p>2006-Short pilot test of iCCM in two districts and development of training guides</p> <p>2007-Training of ASCs in iCCM began</p> <p>2008-Paid ASCs authorized to provide treatment</p>	<p>2005, 2008, 2010, 2012 Sahel Droughts</p>

		2008-Malaria & Diarrhoea policy-RDTS for fever, low osmolarity OR, salts and zinc 2008-Introduction of Hib Vaccine 2009-Total of 1444 IMCI trained health workers 2010-Community Care for mothers and newborns in 24 pilot centers 2012-Minimum package of services extended for health posts	
--	--	---	--

Ethiopia was also the only country in which the lobbying by UNICEF culminated in a sponsored visit to India by 25 key role players in the FMOH and IPs (including Saving Newborn Lives and USAID) in December 2009. Many of those in the visit delegation were responsible for deciding on, and developing, health policies, including heads of regional health bureaus, representatives of the FMOH, the General Director of Health Promotion and Disease Prevention Department and non-governmental organisations. At the Society of Education, Action and Research in Community Health (SEARCH) site in Gachiroli, the Ethiopian delegation was able to observe the home-based newborn care programme and the community based sepsis management programme that was being implemented. On return, a debriefing meeting was held with the Minister of the Regional Health Bureau and the management committee. Discussions at the meeting led to the government agreeing to the community-based management of pneumonia as part of the HEP activity. According to UNICEF, this was a great breakthrough for the country, partners and professional associations who had been advocating for this for years.

In other countries such as Mozambique, it helped greatly that the plan that UNICEF was suggesting, fitted within the pre-existing government plans to revitalize primary health care.

“The first thing was a political decision to make Maternal and Child Health priority. It’s been 10 years since that decision was made” [Mozambican Health Ministry informant].

But it was also suggested that a health ministry which was open to the idea of community level care helped:

“The ministry has changed, with new leadership, they believe that the APEs (CHWs) are important” [Mozambican health ministry informant].

“The country is embarking on their new strategic plan (2013-2018). This strategic plan identifies APEs as a key component of the system. So we now again, in MISAU (Ministry of Health), agree that the APE programme is key to increase the coverage of health services and as a result, we need to support them” [Mozambican health ministry informant].

It is important to note though, that it was not only at a ministerial and policy maker level that advocacy was required. Both health workers and other development partners needed to be convinced that the approach of using CHWs to offer treatment on the ground was advisable:

“Community and health professionals were hesitant and sceptical about the introduction of pneumonia case management. There was fear of drug misuse in the community and also doubts about the capacity of HEWs to treat pneumonia ... whether CHWs can assess breathing and classify properly” (Development partner, Ethiopia)

“Even employers of IRC implementing partner (“such as myself”) was sceptical about the skill of HEWs and did not immediately think the iCCM would work as a national programme. It was only after observing the training and supervision involved that I realised it will have positive results” (Development partner, Ethiopia)

1b. To what extent did the programme’s objectives reflect a health systems strengthening approach, including training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions?

Table 7 shows CHW programmes across the six countries. In some countries the programmes are national (Ethiopia, Niger, Malawi) whilst in others they are limited to certain geographic regions (Ghana) or are not yet at scale (Mozambique). Nevertheless in nearly all the IHSS supported districts, the number of under-5s residing in those areas is more than a million, with Ethiopia having the most under-5s in IHSS areas (4.5 million children) receiving full IHSS support. In many of the countries, it has only been since 2012 that 80% of CHWs in IHSS areas were trained in iCCM (Ghana, Ethiopia, Mozambique, Malawi).

Ethiopia has the largest number (27,116) of CHWs trained in iCCM with IHSS funds, followed by Ghana (16,812), while Mozambique has the least number of CHWs (905).

Table 7: CHW programmes across the six countries

	Areas covered	Estimated number of children under age 5 years in IHSS supported districts	No of CHWs trained in iCCM with IHSS funds	Year iCCM began	Year when 80% of CHWs in IHSS areas were trained in iCCM
Ghana	3 Northern regions (Northern, Upper East and Upper West) and central region	1,210,691	16,812	2010	2012
Ethiopia	239 woredas in 26 zones in the Tigray, Amhara, SNNP, Oromia and Benishangul-Gumuz regions (full-CI areas). 32 zones and 340 woredas of Oromia, Tigray, Amhara, SNNP, Afar and Gambella (partial CI areas).	4,598,961 children under 5 in rural areas covered by full CI support; 5,631,489 under 5's in rural areas with partial CI support.	27,116	2010	2012
Mozambique	8 districts in the first year reaching 42 by 2012. Projected coverage to 120 by end of 2013, and 140 by end of 2014.	Unknown but estimated to be 1250 under 5's per APE	905	2010	2012
Malawi	Hard to reach areas in Karonga, Mzimba, Kasungu, Lilongwe, Dedza, Ntcheu, Balaka, Chiradzulu, Phalombe, Nsanje (10 of 28 districts. Similar programs are operating in all 28 districts)	1,429,817; of which 643,418 live in hard to reach areas	1018	2009	2011

Mali	All districts in Kayes, Sikasso, Mopti, Koulikoro and Ségou (5 of 8 regions)	2,192,474 (total) 1,071,921 (>5km from health center)	2052	2011	2011
Niger	All regions of rural Niger	3,164,696	2560	2007	2009

The content of the package of interventions delivered at community level is similar across the countries supported by IHSS, with some few unique aspects in some countries. For instance, all 6 countries provide the same treatment for uncomplicated diarrhoea (ORS plus zinc), malaria (ACTs) and pneumonia. All the IHSS countries have a newborn component (home visits in the first week) except for Mozambique and Malawi (the CBMNC package is being scaled up). Ethiopia is the only country which provides antibiotics for the treatment of newborn sepsis as part of the iCCM package since 2013 (Table 8).

Table 8: Content of community-based package of interventions across countries

	Ghana	Ethiopia	Mozambique	Malawi	Mali	Niger
Treatment of uncomplicated diarrhoea with low osmolarity ORS and zinc	✓	✓	✓	✓	✓	✓
Treatment of uncomplicated malaria with ACTs	✓	✓	✓	✓	✓	✓
Treatment of uncomplicated pneumonia with antibiotics	✓	✓	✓	✓	✓	✓
Home visits for newborns in the first week of life	✓ from 2013	✓ From 2013	X	X currently being scaled up	✓	✓
Any treatment of newborn sepsis with antibiotics	x	✓ From 2013	x	X	X	x
Geographically targeted	Three northern regions and central region	All of rural Ethiopia with a focus on hard to reach areas	All of rural Mozambique projected by end of 2014	Hard to reach areas >5km from health centre	Hard to reach areas >5km from health centre	All of rural Niger

A range of other child survival activities and interventions are provided by CHWS in these 6 countries. All countries provide Vitamin A supplementation and immunisations as part of the Child Health Days (CHDs) or other campaigns or outreach and all countries include counselling for infant and young child feeding and WASH. Ethiopia, Mozambique and Malawi are the only countries providing treatment for red-eye, while pre-referral suppository treatment for acute malaria is only provided in Mozambique, with Malawi currently piloting this treatment. All countries, except for Ghana and Mozambique provide treatment for severe and acute malnutrition (Table 9).

Table 9: Other services for child health provided by CHWs alongside iCCM

	Ghana	Ethiopia	Mozambique	Malawi	Mali	Niger
Provision of Paracetamol	X	✓	✓	✓	✓	✓
Provision of Vitamin A	During campaigns or CHDs	During campaigns or CHDs	During campaigns or CHDs	During campaigns or CHDs	During campaigns or CHDs	During campaigns or CHDs
Provision of immunisation	Provision of support to outreach services	✓	During campaigns or CHDs	During campaigns or CHDs	During campaigns or CHDs	✓
Pre-referral dose of Artesunate suppository for severe malaria	X	X	✓	✓ currently being piloted	x	x
Treatment of red eye	X	✓	✓	✓	x	x
Treatment of severe and acute malnutrition	✓	✓	x	✓	✓	✓
Promotion of breastfeeding and IYCF	✓	✓	✓	✓	✓	✓
WASH education	✓	✓	✓	✓	✓	✓

2. To what extent did the programme's objectives include a focus on women's participation and a gender equality approach?

The IHSS had two components intended to address women's participation and gender equality. These included increasing access to child and nutrition services for women in communities and addressing gender equality in community based worker programmes.

The IHSS has included a gender equality focus by delivering interventions known to be effective for addressing gender dynamics. These included making MNCH services more accessible to carers of children, who are primarily women, and seeking to mobilise and engage communities for improving child health and nutrition outcomes.²⁷ These activities promoted engagement of women in the communities to participate in MNCH care.

However, the picture of women's participation and gender equality within the CHW cadres differs across the countries. In Ethiopia all the CHWs are women, compared to Malawi's nearly-all-male CHW cadre (women are only 28% of the CHW workforce), and Mozambique where women only make up 30% of CHWs trained with IHSS funds but where the ratio greatly differs between districts. Ghana and

Mali are two of the six countries that have achieved a close to equal CHW male to female ratio, albeit with an all-male CHW supervisor cadre in Ghana. Countries such as Mali and Niger who were initially able to recruit a larger proportion of female ASCs, found that their ratios returned back to favour men towards the end of the programme due to higher levels of attrition among women. A range of challenges have been reported in countries with low participation of women as CHWs, and these include low education levels of women (Mozambique, Niger, Mali), and cultural issues which limit married women from working outside the home (or area) (Mozambique, Mali, Malawi). The latter challenge has been especially reported in Malawi and some parts of Mozambique where informants reflected that:

“when you have female HSAs and they get married, they have to move in order to follow the husband either in the other area or indeed in the other districts” [Malawi Senior Official]

“[It] depends on the provinces, there are cultural differences between provinces, in the North it is very hard to have women working outside the house, even for domestic activities. In the North only men do that work, in the South women do that work. In the Central Region it is more common to see women riding the bicycle, in the South it’s very hard to see. So there are some differences.” [Mozambique MISAU informant]

Box 1: Key points under relevance theme

1. To what extent did the programme’s objectives reflect a health systems strengthening approach, including:

a. alignment with the health policies, planning and health surveillance of the Government?

- In many of the countries the IHSS programme was well aligned with national priorities and plans. In particular are the example of successful efforts in Ethiopia around advocacy and policy engagement. However, in Mozambique aligning partner and sector expectations of the CHW programme was cited as a challenge because of the many partners with different interests involved.
- In some countries alignment was especially assisted by IHSS capitalising on opportune moments when key national policies and strategies were being formed or implemented (e.g., Niger creation of Cases de Santé platform of service delivery; in Ghana the change in the Child Health Policy to allow CHWs to administer antibiotics and zinc) (see Table 6).
- The IHSS was successful and indeed catalytic in strengthening the health system at the level of the community through the provision of drugs and the training of primary care health providers to meet the increase in demand for services.
- While there were challenges in some countries (e.g., Mali and Malawi) due to both geo-political crises and capacity issues, IHSS made efforts to mitigate and negotiate these challenges through availing funds to facilitate and implement solutions.

b. training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions?

- UNICEF, through IHSS funds has made a significant contribution, financial and technical, to ensuring the training and deployment of many CHWs and facility-based staff in iCCM.
- A similar package of community-based interventions was delivered across all 6 countries.

2. To what extent did the programme’s objectives include a focus on women’s participation and a gender equality approach?

- In each of the countries increasing women’s participation and adopting a gender equality approach was an IHSS objective. This was successful in Ghana where women make up approximately half of the CHW workforce.
- The IHSS programme made efforts to increase women’s participation and achieve gender equality through the training of women as CHWs

5.2 Effectiveness

3. To what extent were the objectives related to health system strengthening (including policies, planning and health surveillance) and training, equipment, deployment, and supervision of front-line health workers achieved?

Human resources – recruitment, training and deployment

Table 10 below highlights the different recruitment policies, salary profiles and organizational structures of the CHWs recruited across the six IHSS implementation countries for the provision of iCCM. There was some variation in the level of prerequisite training required for the recruitment of CHWs across the countries; however, in an aim to task shift community level service delivery down to a less trained health cadre, none of the countries required educational levels beyond high school. Malawi had the highest educational requirements for CHWs, with a minimum prerequisite of 12 years of schooling, while the majority of the countries (Ethiopia, Mozambique, Mali and Niger) required an educational level of secondary school, corresponding to 7-9 years of schooling. Despite a similar educational requirement to Niger and Ethiopia, anecdotally many CHWs in Mali had previously been matrons and, therefore, had prior health backgrounds; as a result, CHWs in Mali demonstrated a high level of competency during field visits. The CHWs in Ghana were mostly illiterate, however, with a very low educational requirement stipulated for the position and much more subjective recruitment standards based on familiarity in the community.

The length of the basic and iCCM training varied across countries, further contributing to the competencies of the CHWs to provide curative services at the community level. Ghana and Mali

provided the shortest training period for their CHWs; with Ghana providing 5 days of basic training and a further 3 days for iCCM, while CHWS in Mali received 2 weeks of theoretical training and a further 25 days of practical training that covered both basic and iCCM training. Ethiopia, Malawi and Niger all provided 6 days for iCCM training, although Malawi provided 3 months of basic training, while Niger and Ethiopia provided 9 months and 12 months of basic training, respectively. CHWs in Mozambique received 4 months of basic training and a further 4-5 weeks of iCCM training.

All of the countries, with the exception of Ghana, provided a monthly salary or stipend to their CHWs. Once again, significant discrepancies were noted with regards to the salary amounts provided, with Mozambique and Ethiopia providing the lowest salaries, corresponding to \$40 per month. Mali, Niger, and Malawi provided incrementally larger salaries, corresponding to \$80, \$100, and \$110 per month, respectively. CHWs in Ghana, on the other hand, work as volunteers, with the exception of campaigns, child health days, and the sale of medicines through which they are able to receive some stipends. All of the CHWs, with the exception of Ghana and Niger are part of the civil service, although in Mozambique, they are exclusively donor supported. While they are not yet part of the formal civil service in Niger, CHWs are paid by the municipalities via a grant system from the state.

In the majority of the countries, with the exception of Mozambique and Ghana, CHWs work out of a fixed health structure or homes that have often been built by the communities that they serve. CHWs in Ghana and Mozambique are expected to deliver care by conducting home visits and identifying children in need of care. In practice, however, CHWs in Mozambique have also noted that it is often difficult to identify children during the critical 24-hour period, and many caretakers bring their children directly to CHWs' homes. In-country interviews revealed that CHWs' homes in Mozambique serve as informal health structures, with hours of operation even put up for community members.

Countries such as Niger, Mali and Ethiopia are able to make use of a volunteer level cadre to complement the activities of the CHWs. The volunteers conduct home visits and provide health promotion and preventative services to the community including promotion of 'key family practices' or in the case of Ethiopia 'model families'. While Mozambique also has a volunteer level cadre, they are used informally by a variety of NGOs for specific programme activities in education, agriculture and health. The CHW programme in Mozambique does not aim to integrate these volunteer cadres, however, and as a result, CHWs and these volunteers do not always work in a systematic and complimentary fashion. Malawi makes use of village health committees who provide oversight for the CHWs and support community outreach and health promotion activities. These village committees are selected by the community, but do not have systematic formal linkages to the health sector for the provision of health services, with the exception of iCCM drug management by keeping one set of keys to the drug box.

Table 10: Community Health Worker Models Across Six Countries

	Ghana	Ethiopia	Mozambique	Malawi	Mali	Niger
Title	Community-based agent	Health Extension Worker	Agente Polivalente Elementares	Health Surveillance Assistant	Agents de Santé Communautaire	Agents de Santé Communautaire
Existing prior to IHSS	Yes	Yes	Yes	Yes	No	Yes
Educational background required	Very low. Most are illiterate.	Grade 8-10	Yes (at least 7 years of schooling)	12 years of schooling	Minimum DEF level of education (9 th grade); hold a certificate as a caretaker or matron; must be fluent in the language of the area they are placed; experience in social mobilization is desirable.	Secondary School
Gender	Roughly 50% female	All females	Either but preference for females	28% of HSAs are female	No Gender policy	No Gender Policy
Length of basic training	5 days	12 months	4 months	12 weeks	15 days theory, 25 days practical in health facility	6 months (3 months theory, 3 months practical training in health facility)
Length of iCCM training	3 days	6 days	4-5 weeks	6 days	Included in the above	6 days
Salary	Voluntary with stipends given during campaigns/ CHDs	USD 40/ month	USD 40/ month	USD 110/ month (44 000 Malawi Kwacha)	\$80 (40,000 CFA)	\$100 (50,000CFA)

Based in community or health post	Community	Health post	Community	Village health clinics and community	Homes/clinic room built next to home	Health post (cases de santé)
Presence of a volunteer level below the CHW	No	Yes Health development Army	Yes	No, only village health committee	Yes- Relais Communautaire	Yes – Relais Comunautaire
Part of civil service	No	Yes	Yes but paid through donor funds	Yes	Yes	No, but they are paid by the municipalities via a grant from the state.

Qualitative findings on community health worker models

Typically, except in the case of Ghana, iCCM was delivered by a combination of paid CHWs and unpaid volunteers. Although as the table above suggests, the educational level of the paid CHWs differed widely, they all delivered iCCM treatment at a community level. By comparison, volunteers were called upon to do health promotion, outreach and community mobilisation. In the case of Malawi, volunteers in the village health committee also provided an oversight function, ensuring for example accountability in the dispensing of drugs by holding one key to the drug box. A member of one village health committee explained:

“the village health committee is strong because they are all ten members, they come and they assist the issues here at the clinic.....the committee has ten [members], 5 are women, 5 are men. Normally they divide [visits to the village clinics] amongst themselves, two people come. For the week, two members of the community, the other week another two members, because they want to make sure that the HSA is around....[the VHC member] first he makes sure during the clinic day that they [VHC members] are there to see how the HSA is doingand interact with the community to tell them the goodness of taking their [HSA advice]”

(Village health committee member, Malawi)

Even in instances where the CHWs were paid, this did not mean that they were always regarded as civil servants who were part of the formal health system. Thus, while in Malawi HSAs were typically centrally selected and paid from central government funds, in Niger by comparison, the ASCs were not regarded as part of the formal system and were paid by municipalities via a grant from the national government. Payment systems were also not uniform across the countries. While some were given a salary, others such as in Mozambique received a subsidy and various levels of incentives. These subsidies and incentives were, however, not always consistently disbursed, leading to frustration and a lack of motivation. In other instances, such as in Mali there was the expectation, built on the Bamako Initiative experience, that there would be some form of cost recovery from the community. Even where the community was not required to pay for the CHW, they were in some instances required to assist with their overall upkeep, such as in Malawi, where the community was requested to build a home and treatment area for the health surveillance assistant with the help of district funds.

The case of Ghana was particularly different from the other countries. Here, CBAs who are unpaid volunteers, selected at village level, delivered iCCM. These volunteers were not integrated into the formal health system and as such their services were not covered by the national health insurance scheme. However, they were allowed to charge a token fee for medication they dispensed. Though, during the evaluation team’s field visits conflicting stories were heard of some CBAs collecting this token directly from clients, while others were reimbursed from the insurance scheme through a system worked out at the health centre where they collected their drugs. This lack of clear salary or incentive for these volunteers was seen as problematic.

“Volunteers are everywhere but they are not being recognized. They have no official place in the GHS.” (UNICEF informant, Ghana)

“People may not trust them because they are not paid.” (Village chief, Ghana)

“CBAs are complaining about needing to be paid. There is no refund to the CBAs when they use their own phones. When I have something in my bag I give them.” (District director, Ghana)

Despite these difficulties, the unpaid volunteers were still perceived as necessary because of the difficulty of retaining the more highly educated community health nurses and community health officers in the rural areas, especially if they did not originally come from a village nearby:

“People became obsessed with this idea of building a CHPS¹ compound, and then the CHPS compound became a stumbling block because it is quite expensive, so if you were to have a CHPS compound you can’t have a nurse. The community would think “Ah we are getting a big hospital”. And they would go and get a parcel of land in the middle of nowhere, and the CHPS compound would be put up there, it is so isolated nobody wants to work there. So CHPS has had problems with scale up. It’s a national policy, but it has had problems with scale up.” (University Researcher, Ghana)

“There is supposed to be one CHPS compound for every zone. Where there is no compound the CHOs can’t live there because there is no accommodation. They have to travel in and out.” (Zonal Co-ordinator, Ghana)

“In the northern region there are 325 CHPS zones – most zones have no compounds. CHOs move from the centre to their zones to deliver services.” (Regional director, Ghana)

In Mozambique the integration of CHWs into the national health system was perceived as more managerially efficient:

“We had in the past a vast number of community volunteers all over the country in different areas, nutrition, malaria, diarrhoeal disease, many areas. ... They still exist but we say that we want to have APEs instead of the volunteers because volunteers are directed only for the one specific group (or problem) and APEs can provide a more integrated approach, so APEs will be more appreciated than volunteers. And the plan is to reduce the number of volunteers because now we have almost 30 or 40 types of volunteers. You may get closer to the people that way, but to supervise and control different groups is very difficult and the control was only done by NGOs, the government was not involved in that control [in terms of] supervision and we didn’t know what the volunteers [were doing].” [Ministry of Health, Mozambique]

“Other volunteers are supported through external initiatives, the APE programme is a government owned programme so everything is stream lined and has to be approved by MISAU....One of the challenges of the programme was that it was not decided how APEs would work with other CHWs, this is a huge problem.” [International partner, Mozambique]

¹ CHPS is an abbreviation for Community- Based Health Planning and Services which are staffed by community health nurses (CHNs) and community health officers (CHOs). CHPS compounds combine a health post with accommodation for the CHO/CHN. Communities are meant to build or contribute to the building of CHPS compounds.

Across the settings the questions being grappled with when making the choice as to the best model were:

- How to get the services as close to the community as possible?
- How affordable and sustainable would a particular model be?
- What are the existing in-country models or otherwise what historical models exist?
- What contribution can/should communities be making to the upkeep of the CHW?
- How can the services best be retained at a community level, i.e., what is required for motivation and what will prevent attrition?
- What would be most acceptable to the community?

Supervision

All of the countries implementing iCCM as part of the larger IHSS strategy have adapted different models of supervision for CHWs to ensure that the health services provided at the village level reflect a successful extension of health care delivery and adhere to national standards and protocols. In general, countries stipulate at least one visit every three months to the CHWs in their villages by their direct supervisors, who are often based at the health facility level, to ensure that the CHWs feel adequately supported and are equipped to provide a consistently high standard of care. Further supervision sometimes occurs at the health facilities themselves, when CHWs are either expected to come in to collect drugs, support health facility staff (in the case of Malawi), or to submit their monthly reports.

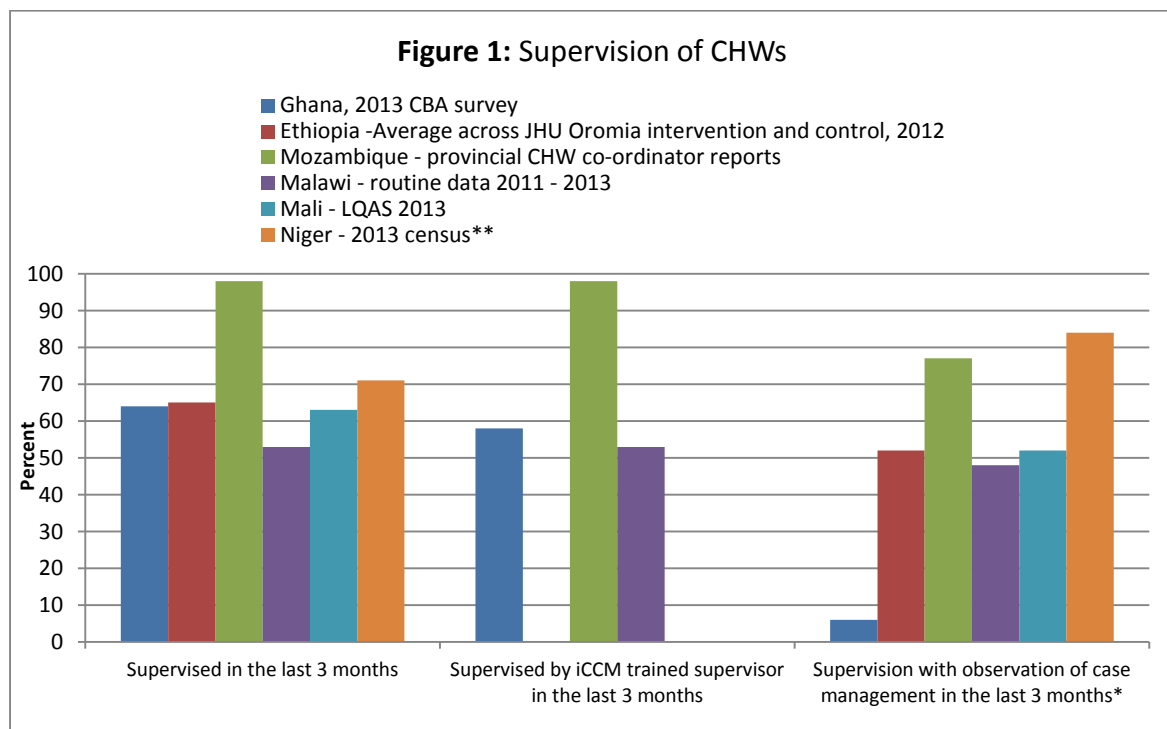
Some of the countries have implemented innovative models of supervision that differ from the standard practice based on visits to the villages where the CHWs are placed. Ethiopia, for instance, has implemented a performance review and clinical mentoring meeting model in which HEWs come together 3-4 months after training, along with their supervisors, for a 2 day meeting. These meetings include a review of registers by supervisors and a discussion thereafter of challenges linked to data quality, in addition to a self-assessment conducted by each HEW. The next day includes clinical mentoring at the health facility level in which HEWs are observed whilst providing care to children. These meetings are meant to be repeated every 3-4 months. Other countries such as Ghana and Malawi have a two-tiered supervision model. In Ghana, CBAs are supervised by a volunteer cadre known as zonal coordinators who are specifically recruited to carry out supervision activities on a monthly basis during outreach visits, while CBAs receive additional supervision by community health officers and nurses, who are trained in iCCM. Malawi also runs a dual model of supervision in which HSAs receive monthly visits in the villages by senior HSAs in addition to participating in a mentorship programme in which they visit the health centre regularly and are supervised by medical staff who observe case management of children.

Most countries evaluated described recurrent challenges with supervision stemming from a range of issues including insufficient funding for supervisors and CHWs to support their travel costs, lack of transportation or fuel, and overwhelmed human resource capacity to carry out supervision activities amongst a range of other work demands. As a result, overall monthly supervision frequency is low in the majority of the countries. Approximately 55-65% of CHWs in four of the six countries, including Ghana, Ethiopia, Malawi, and Mali, report having received a supervision visit during the last 3 months (Figure 1). Niger reports a slightly higher supervision frequency, with 71% of CHWs reporting having

received quarterly supervision visits. It is important to highlight that while the data for quarterly supervision visits are being collected and reported above, the frequency of monthly visits, as stipulated by country policies, is often much lower. Mozambique, on the other hand, reports extremely high frequencies of supervision, with 98% of APEs reporting having received a visit in the last 3 months. It is important to note, however, that data collection methodology for supervision visits in Mozambique differs from others in that instead of using routine data or surveys sampling CHWs, data regarding supervision visits in Mozambique were collected via telephone interviews with district supervisors. As a result, data may be affected by reporting bias, as discussions with APEs themselves reflect much lower frequencies of supervision visits.

Countries reported a much lower frequency of observed case management during supervision visits. Malawi, Mali, and Ethiopia report a frequency of approximately 50% of observed case management during supervision visits. This frequency is much lower in Ghana, with only 6% of CBAs having reported observed case management. Mozambique and Niger report higher frequencies, with 77% and 84% of supervision visits having included observed case management. In Niger this refers to observation of case management in the previous 12 months and not 3 months as with the other 5 countries.

In these countries supervisors undergo the same iCCM training as the CHWs, and are then provided with additional training in their specific supervisory roles. However, not all of the countries collect information on the training received by supervisors. According to the data from Ghana and Malawi, over 40% of supervisors did not receive iCCM training. Mozambique on the other hand reports that nearly all (98%) of supervisors received iCCM training. Given that IMCI training is not incorporated into the formal training curriculum in many of these countries, and that funding by development partners in IMCI training is being rerouted to the community level, a lack of training in iCCM for supervisors incapacitates them from providing appropriate advice and mentoring to CHWs who might therefore be better trained.



** in Ethiopia case management includes observation of a consultation or register review ** Refers to 4 supervision visits in the last 12 months and any observation of case management in the last 12 months*

Box 2 below contains illustrative quotes in relation to supervision gathered during key informant interviews.

Box 2: Views expressed in relation to supervision from key informant interviews

Quality of supervision

“Presence of the nurse solves the problem of supervision and quality of care.” (Clinician, Niger)

“Supervision is not yet where it should be - we have some who don’t do registers and data, we need to insist on monitoring, and it needs to be local. We need more training and incentives to do regular supervision. I think it is normal in the initial phase that things falter, but we are following it. It must be local and depending on the provincial level. (International partner, Mozambique)

“Mainly I do go to their communities; firstly, I will look on the specific maybe activity that is cut out, or what they are doing that day also, if that HSA may be conducting a CCM is trained on CCM. I do also even supervise during the clinic so I can see maybe how he is conducting a case management on the child or even if the treatment is the right treatment he is giving to the child. Sometimes I do also see the register if it is well recorded.” (senior HSA supervisor, Malawi)

Transport as a major challenge to supervision

“Because of transport, we don’t always have fuel to supervise. We look at the registers and talk to them to correct things.” (APE supervisor, Mozambique)

“the DHO gave me a motorbike so for this facility....the DHO give us fuel though it is not enough because they only give me 2000 kwacha (approx. 5US\$) per month..... so sometimes, I use the little fuel that I buy from that 2000 to make some activities to go in the field.” (HSA supervisor, Malawi)

The challenges of Ghana’s unpaid supervisors

“The zonal co-ordinators used to get allowances (20 cedi a month) when they were doing guinea worm surveillance. Now, they don’t really get anything regularly.” (UNICEF informant, Ghana)

“Quarterly meetings are a motivation for zonal coordinators. They receive 20 Ghana cedi for lunch, in cash, which they can use for whatever they like (not necessarily to buy lunch with). When there are other programmes then they are involved in the campaigns and get paid for that.” (District director, Ghana)

“we need motivation – allowances, motorbikes, uniforms, identification badges, baskets to carry drugs in (wooden boxes are too heavy for the bicycles), rain coats and boots for the rainy season”. (Zonal Co-ordinator, Ghana).

“We also need boots, rain coats, torch and bicycles for the zonal coordinators. These have only been given once in 2007 when the programme started.” (District director, Ghana)

“At the end of each month we gather at the health centre. We were given bicycles to use. All of them are now broken. We now use our own personal bicycles.” (Zonal Co-ordinator, Ghana)

Role of political leadership and health systems organization in facilitating supervision

“In practice, supervision does not happen once a month as stipulated by policy. If politically, there is buy in to ensure health services at the community level, then funding has to be provided there to ensure proper functioning,” (Development partner, Mali)

“If you have a vertical programme that asks for specific supervision, it is a waste of resources; it is better to have integrated programmes. Integrated supervision is lacking because of poor organisational planning and coordination. You need strengthened leadership for integrated supervision.” (Development Partner, Mali)

Equipment, Supplies and Commodities

UNICEF has been responsible for a substantial procurement of drugs and supplies to support preventive as well as curative (iCCM) services being implemented across the six countries. While different countries are implementing different supply chain management techniques, UNICEF has attempted to work within national systems for drug delivery, and when not possible, set up parallel delivery mechanisms to ensure consistent supply to the community while simultaneously attempting to address weaknesses in the system for long term sustainability.

In Ghana, UNICEF procured all of the iCCM drugs at the onset of the programme, including ACTs, once policy allowed for it. By the end of the programme, responsibility for the procurement of the large majority of drugs had been handed over to Ministry, and in the case of ACTs to the Global Fund. Drugs procured by UNICEF are supplied to the Regional Medical Stores who then distribute them out to the districts. Districts are then responsible for coming to collect them from the Regional Medical Stores, or in the case of one region, door to door deliveries to health facilities are scheduled. CBAs then come into the CHPS (health centre) to get their supply.

In Ethiopia, while UNICEF procures most of the drug requirements for iCCM, including ORS and Cotrimoxazole through CIDA funding, distribution responsibility falls under the Ministry of Health through the Pharmaceutical Fund Supply Agency (PFSA). In time, the PFSA is also expected to take over all of the responsibility for drug and supply provisions. Ethiopia’s supply chain system is challenged by a lack of a logistics information system that is able to estimate supply needs, coupled with limited road infrastructure for transportation. As a result, HEWs were provided with a 6 month supply of drugs to sustain them and limit the need to travel for drug replenishment. UNICEF has provided support to the PFSA by delivering drugs to the Woredas where they are distributed further to health posts as required.

In Mozambique, APEs receive monthly medicine supplies in the form of two pre-packaged “kits”, one for malaria testing and treatment (contents cost \$200) and one with all other expendable supplies (costing \$100). These kits are delivered pre-packed from the regional and district levels to ensure that drugs allocated to the community level are not used elsewhere. However, challenges with the supply chain system in Mozambique result from a lack of appropriate quantification of need depending on

catchment population, utilisation and burden of disease. This push system, coupled with the absence of appropriate quantification results in large wastage of drugs and a costly unsustainable system. APEs come into the facility each month to get a new kit; while they are expected to bring back any unused drugs as well, a limited system in place to monitor drug consumption against patient records leaves room for significant mismanagement of stock.

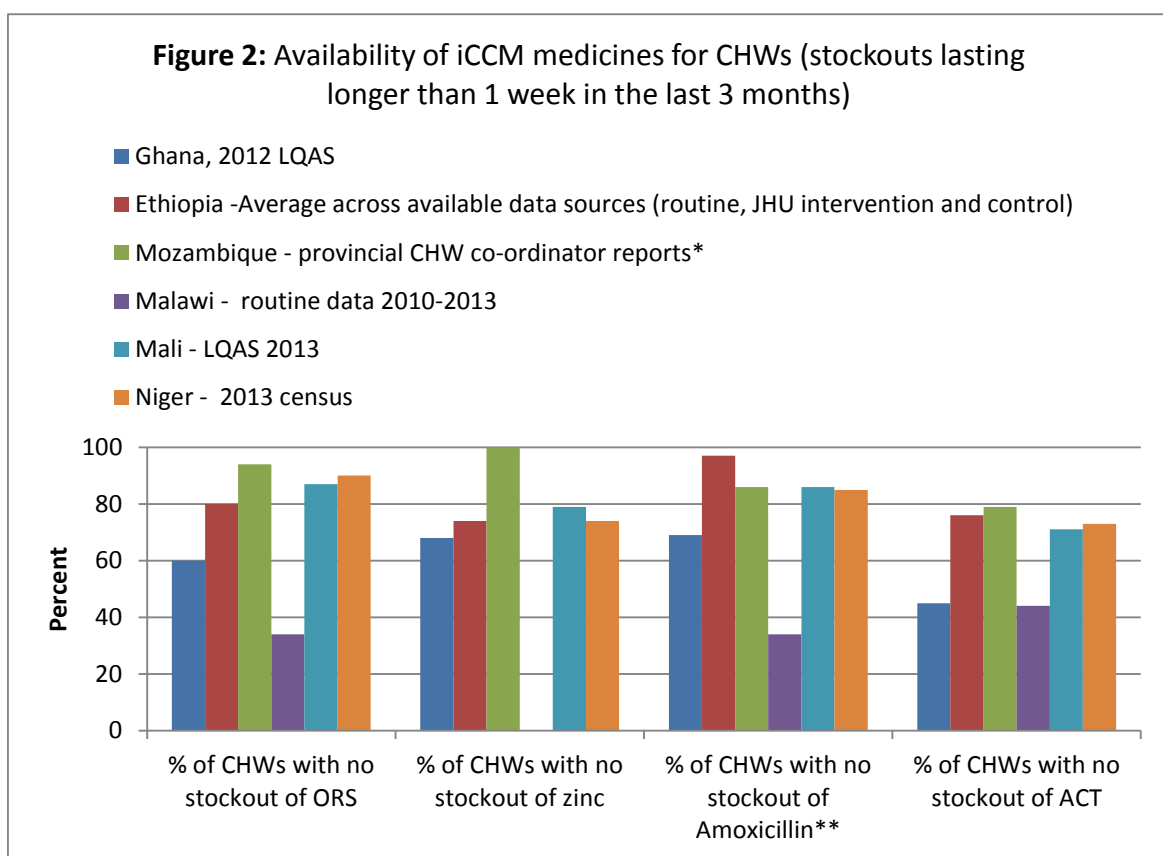
In Malawi, drugs are delivered from the central level right down to health centers which are then expected to distribute them to HSAs according to consumption. The Central Medical Store in Malawi has been challenged with a wide range of issues including delays in the tendering process, lack of technical competence for handling supplies, and mismanaged stock control from the central level down to the regional and district levels. As the central medical stores were not fully operational and understocked, many partners bypassed the national system and delivered supplies directly to health centres. To address some of the stock challenges in the country, the central medical store was transformed to a trust, in the hopes that it would be more accountable and would function independently of government. Furthermore, an innovative model of stock management is being piloted in the country (c-stock), in which HSAs text in their drug needs to the health centre who respond back to HSAs according to drug availability; this attempts to limit travel times for HSAs should stock not be available at the health centre level and push for a buffer stock for community level drugs to be kept at the health centres and district hospitals. Stock management in Malawi is challenged by a range of factors including insufficient funding allocations for antimalarial drugs, limited participation by the district in the process of drug forecasting at the community level according to burden of disease, and limited stock replenishment to the village clinics due to transportation inadequacies.

In Niger, iCCM drugs are purchased largely by UNICEF with procurement and delivery running parallel to the MoH supply chain system due to challenges with the central pharmaceutical depot including poor infrastructure, and limited administrative, storage and transport capacity.

In Mali, while UNICEF funds initial procurement of drug supplies and kits, replenishment of medication is the responsibility of the government, with the exception of malaria diagnostics and treatment, entirely funded by the Global Fund. Due to a cost recovery mechanism put in place through the sale of medication and consultation fees, the government has generally been able to sustain drug supply in the country. However, stock supply at the community level, while less vulnerable to funding shortages, is challenged with a large dependence on supervision visits to the community for the replenishment of stock.

While each country attempts a different drug and supply delivery model according to their individual health system structures, as well as financial and geographical limitations, it is clear that challenges with supply chain management is a recurrent issue across countries. Malawi has had the most significant challenges with stable stock supply, with an alarming 34% of HSAs reporting consistent stock of ORS and amoxicillin in the previous 3 months, with stock supply for ACT only doing marginally better (Figure 2). What is important to note is that, in addition to the recurrent system weaknesses highlighted above, the period for which stock availability was reported for Malawi included a severe shortage of fuel and foreign currency, compounded by a withdrawal of significant donor funding. While DFATD/CIDA funding went towards providing emergency support to procure medicines for the village clinics, the financial crisis of the period resulted in amplified shortages of drugs. Ghana reports the second highest number of stock-outs, with between 60% to 70% of CHWs reporting no stock-outs

of amoxicillin, zinc and ORS. ACT stock-outs appear to be more frequent, with only 45% of CBAs reporting consistent stock within the last 3 months. Ethiopia, Mozambique, Mali, and Niger are better performing, and are generally comparable with regards to stock availability. In Ethiopia, an average of 76% and 74% of HEWs report no stock-outs of ACT respectively, while 80% of HEWs report consistent stock of ORS. Very limited stock outs for amoxicillin occurred in Ethiopia, with almost all (97%) of CHWs reporting consistent stock. Data from Mali and Niger are extremely similar with 87% and 90% of CHWS reporting no stock outs of ORS, 79% and 74% reporting no stock outs of zinc, 86% and 85% reporting no stock outs of amoxicillin, and 71% and 73% reporting no stock-outs of ACT, respectively. Mozambique is overall the best performing, with 94% of APEs reporting no stock-outs of ORS, 86% reporting no stock-outs of amoxicillin, 79% reporting no stock outs of ACT, and all APEs reporting consistent supplies for zinc (Figure 2).



*Data for Mozambique is for no stockout (any duration) during the period.

** refers to cotrimoxazole for Ethiopia, Malawi

Box 3 below contains illustrative quotes in relation to supplies and commodities gathered during key informant interviews.

Box 3: Qualitative quotes relating to supplies and commodities

“It is discouraging when drugs and supplies are out of stock because clients now have to go long distances to health centres.” (HEW, Ethiopia)

“The supply (of ACT) is erratic; procurement is a problem.” (Government official, Ghana)

“ACTs are currently out of stock for one and a half months. 80% of districts are out of stock of ACTs currently.” (Nurse, Ghana)

“I hardly ever run out of stock but today I have only 3 doses of ACTs left. 2 weeks ago I got new stock of ACTs but now I have only 3 doses left. I have no ORS sachets. I ran out a week ago. I get supplies from the health centre. A man in the community calls the health centre. They will send the supplies with someone to me. I don’t pay the man to use his phone.” (CBA, Ghana).

Difficulties when stocks run out in the context of poor transport infrastructure

“If the CBA runs out of drugs we go to the health centre- it is 2 hours away and we walk.” (Mother, Ghana)

“When the CBA runs out of stock they have to travel far to get stock on foot. CBAs were given bicycles, not good quality, now they are broken down. They need cars or motorbikes.” (Village chief, Ghana)

“There are sometimes delays [in the receipt of the kits]. For July we did not get them yet. Normally it comes from the health centre, hopefully if it is the week of the mobile brigade so the car brings it to there. I then have to go and fetch it. It takes about 2.5 hours to get there, but the kit is too big to carry, so I ask my child to help, or sometimes her father goes by bicycle to get it. There is no car from that road to here.” [APE, Mozambique]

C-stock, a positive initiative to ensure adequate supply of drugs in Malawi

“When c-stock and distribution of drugs are linked the situation is improved and HSAs are motivated to report on drug stock.” (Key informant, Malawi)

4. To what extent were the objectives related to women's participation and gender-equality achieved?

Malawi, Mali and Niger did not have an explicit gender recruitment policy; as a result, due to gender disparities in access to education and cultural constraints, the majority of the trained CHWs across these countries were male. In Ethiopia, Ghana, and Mozambique, preference was given to hire female CHWs. While Ethiopia was successful in recruiting an exclusively female cadre, only 30% of recruited CHWs in Mozambique were female due to challenges in the recruitment of women.

Women were empowered through the IHSS programme through increased access to health services, by addressing challenges linked to long travel times and costs through the provision of services closer to the community. Furthermore, women participated in community dialogue linked to the recruitment and placement of CHWS, as well as the formation of women's groups such as in Mali, who participate in income generating activities to support access to health services provided by the CHWs, and participation in Village Health Committees in Malawi.

5a. To what extent did coverage of the selected high impact and low cost interventions in the target populations increase?

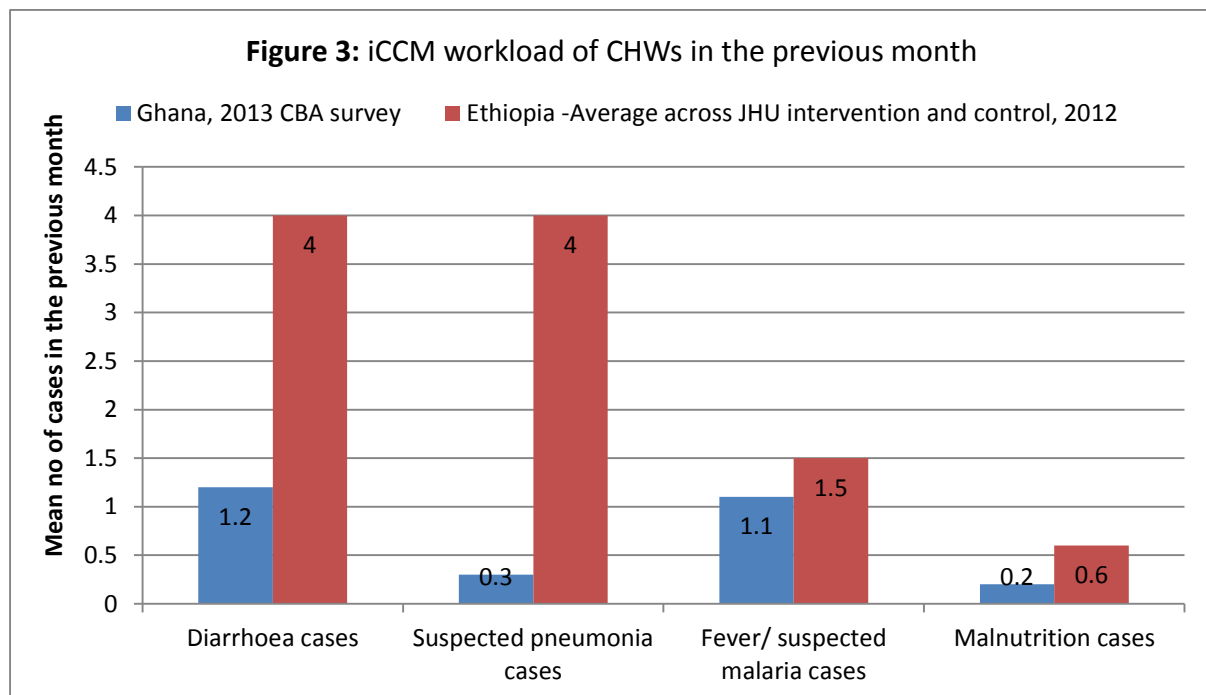
Utilisation

Data describing the utilisation of community health services across the six countries have been retrieved through a range of different surveys. Outside of CHW surveys routine data does not appropriately capture this level of information, as community treatment data is generally not disaggregated from facility data in the district making it difficult to differentiate community versus facility treatments. This highlights a significant data gap in many countries and requires the development of Monitoring and Evaluation (M&E) systems to be able to effectively monitor CHW workload.

Data on CHW workload in Ghana has been retrieved from the recent 2013 survey of CBAs. Despite the widespread distribution and availability of CBAs in northern Ghana, with almost 75% of mothers and care givers reporting having access to a CBA, utilisation of their services is very low. According to the 2013 survey, CBAs see on average 1 case of diarrhoea and fever per month, while far fewer children with pneumonia and malnutrition are seen, corresponding to a work load of 0.3 and 0.2 average cases per month (Figure 3). This low CBA work load is against a backdrop of relatively high overall care seeking. According to the 2012 LQAS, 72% and 65% of mothers reported to have taken their child with suspected pneumonia and diarrhoea to an appropriate provider, respectively, while 25% of mothers reported to have sought care from an appropriate provider for fever. Low CBA workload is partly reflected in the low consumption of UNICEF and DFATD/CIDA procured drugs for the IHSS programme in Ghana. Approximately 14% of ORS sachets were used, with just under 60% of antimalarials used. Many more children were treated with antibiotics for suspected pneumonia than the numbers procured, however, which may be partly linked to over reporting of cases treated.

Utilisation in Ethiopia, while higher than Ghana, still corresponds to very low workloads for the newly trained HEWs. Reasons given for low service utilisation involve limited care seeking at the community level, stock-outs of drugs and supplies, as well as variable availability of the HEWs as they are involved

in other non-health related activities, and health posts were not always open every day. According to data from a randomized trial in Oromia²⁸, HEWs see on average 4 cases of pneumonia and diarrhoea per month, 1.5 cases of malaria, and less than one case of malnutrition per month (Figure 3). Once again, low service utilisation at the community level is reflected in low consumption of UNICEF procured drugs, with less than 10% of ORS, antibiotics and antimalarials having been used to treat children by HEWs. A lack of care seeking at the community level is not the only reason, however, with possible leakage of drugs down the supply chain system likely to be occurring.



Data on care seeking from APEs at the village level in Mozambique is based on a study conducted by Save the Children in Nampula province²⁹, one of the provinces where the programme is being implemented. Data indicates that in areas where a CHW is available, caregivers are more likely to seek care at the community level. According to the data, 87% of children were taken to an APE for fever symptoms, 83% sought care for suspected pneumonia from an APE, while 86% of children with symptoms of diarrhoea were taken to an APE for diarrhoea treatment.

The shift to care seeking from an APE for iCCM can also be seen in data reported from an evaluation conducted by the Malaria Consortium in Inhambane Province which shows that from 2010 to 2012, the percentage of children with fever, suspected pneumonia or diarrhoea who did not seek any care decreased from 42% (95% CI: 30.5%- 57%) to 28% (95% CI: 22%- 34%). There was also a doubling in the proportion of children who sought assistance from an APE, rising from 8% to 21%.³⁰ This was achieved despite the fact that coverage of APEs in the province is far below the desired ratio of 1-2000 population.

Monthly reports from the Mozambique routine APE information system show a rising number of iCCM consultations, with an average of 46 annual iCCM cases per APE (about one per week) reported in phase 5 compared to 142 cases (three per week) in phase 6. The average number of children seen and treated with iCCM per month varies widely with a national average of about 15/month through phase

6, though this varies widely from less than ten to over 60 per APE/month.

While care-seeking at the community level in Mozambique is still low, it is important to recognise that the programme is still in the very early stages of implementation, and given that APEs are being distributed equally in the districts, regardless of catchment population and geographical size, access is not equal among the population. It is important to note that there is a discrepancy between the case loads that APEs in Mozambique report and medicine consumption from the monthly kits provided, with drug availability in the kits several fold higher than the cases seen per APE each month. This speaks to a need to adjust drug quantities in the kits to reflect real usage in order to limit drug wastage and mismanagement of stock.

Limited quantitative data on HSA workloads in Malawi exists. The only available information is derived from routine UNICEF data which indicates that the newly trained HSAs saw on average 39 children per month over the four year period of implementation. The only other available data is based on a survey undertaken in 2011 in Balaka district³¹; the survey is limited in that it sampled only 35 HSAs and assessed their work load for the 7 days prior to the survey, and thus, is likely much more subject to temporal changes in care-seeking behaviour. The survey found that the median number of children seen by HSAs in the previous 7 days was 1.

Data on care seeking at the community level in Niger is much more promising, and speaks to a high level of utilisation of services provided by the ASCs working out of the health posts. According to the latest conducted 2013 census, ASCs see on average 72 children per month for all three diseases, with the largest number of cases being for malaria. Furthermore, care seeking at the community level represents close to 30% of the total number of visits for the three diseases at the primary health care level in 2013. From the total drugs purchased using UNICEF and DFATD/CIDA funds for the IHSS project, 36% of Zinc, 24% of ORS sachets, 31% of antibiotics, and 20% of antimalarials and RDTs were used by ASCs to treat children under-five. Given the fact that iCCM in Niger has been running for several years and that health care utilisation at the community level is relatively high, this low level of drug consumption is surprising. Factors that may partly explain this include the fact that some of the drugs procured were intended for use at the health center level, stock that had been procured was not intended for use within one year, and thus carries over, and potential leakage to the private sector. The most likely reason, however, is due to poor management of stock as evidenced by a large proportion of expired drugs noted in the 2013 Census survey (almost 50% for ORS, zinc and ACT).

In Mali, data on utilisation is retrieved from the recently conducted 2013 LQAS. According to the survey, 32% of children with diarrhoea, 24% of children with ARI and 33% of children with fever sought care from an ASC. While care seeking at the community level is still relatively low, it represents between 15% and 30% of all public sector treatments. It is important to take into consideration that the programme is in its very early stages of implementation, and as a result, has great potential for expanding health care utilisation at this level. The LQAS does reveal ongoing challenges with health care access in Mali, not unique to the community level, linked to the population's ability to afford user fees. According to the LQAS, 65% of the families cited financial obstacles as one of the main reasons for not accessing care for malaria, despite the fact that antimalarials are the only of the three drugs provided free of charge. Furthermore, the LQAS demonstrated a high correlation between user fees and the use of informal providers who were less strict with regards to payments for health consultations. With regards to utilisation of commodities purchased with UNICEF and DFATD/CIDA

funds during the IHSS programme to treat children under five, approximately 7% of Zinc tablets, 4% of antimalarials, 3% of RDTs, 1% of ORS sachets, and 6% of antibiotics were consumed. Reasons behind the low consumption of drugs link to limited ASC utilisation, both as a result of geographical access and financial obstacles, challenges with the deployment of all the newly trained ASCs due to the political crisis, and utilisation of the purchased drugs at the health centre level rather than by the ASCs. In light of the incredible challenges Mali has faced during the period of IHSS implementation, the level of utilisation of the newly created cadre of ASCs at the village level has future potential for health access expansion.

Qualitative aspects of utilisation

From our qualitative interviews it was clear that the initial hesitance shown in some countries, such as Ghana and Mali, about the acceptability of CHWs had been proved wrong. In the communities visited as part of this evaluation, CHWs were generally well accepted and their proximity to communities was highly appreciated. While there were complaints about distance (especially when having to collect drugs), CHWs rarely themselves complained about workload. Instead workload seemed to have been more of a problem for those meant to be supervising CHWs. The quotes below (Box 4) attest to some of the positive experiences shared with us. While these positive quotes do not necessarily match the reported low utilisation in some of the countries, they do speak to potential of the programme as reservations regarding CHW treatment of childhood conditions were not voiced.

Box 4: Qualitative findings related to utilisation

Competing tasks

“Because of some competing tasks in the system when we wanted to conduct training for HEWs we would be told they are busy and we had to postpone to the next month. The competing of activities caused delays in the programme.” (Development partner, Ethiopia)

Community demand, acceptance and utilisation

“There is a huge demand for iCCM services at community level....people actually trust the HSAs, they have confidence in the HSAs.”(Development partner, Malawi)

“A demand for health was created. The SEC strategy helped improved access to health, and created a new layer of care. Health care should not stop at the health facility layer.” (District Health Meeting, Mali)

“Advocacy took place at all levels-including the community level, so that everyone could understand the impact of the strategy. The ASACO and the municipality, they are working with FENASCOM, the national association for community health. These together are really the two entities working at community level. They are looking at SEC as their baby.” (Development partner, Mali)

“We don't have to go all the way to the CSCOM when our children are sick, and we don't have to ask our husbands for permission... the ASC is near and can treat our children.” (Mother, Mali)

“Yes, they do... accept the advice. People used to use traditional medicine for malaria and now they do not, they did not understand malaria, and they have stopped using traditional medicine.”
(Mother, Mozambique)

“they provide a good quality service. They are saving mothers from having to travel. Mothers didn’t know enough about CBAs and didn’t trust their skills. They did the last refresher training in the community so people could see them and see their training. They are people saving their own people.” (Nurse, Ghana)


Trends in coverage of selected maternal and child health interventions

This section includes analysis of coverage for selected maternal and child health interventions from the start of IHSS (baseline) to as near to the programme endpoint as possible.

Table 11 below shows the years with available surveys for the pre-IHSS period, IHSS baseline, the year when iCCM was implemented and the endline survey year. It is important to note that for none of the countries is there baseline survey data in the year in which iCCM was started. The closest is for Niger where the baseline survey data is two years prior to the start of iCCM. In Ethiopia and Mali there is a five year gap between the available baseline survey data and the start of iCCM which means that changes which occurred prior to the start of iCCM will be captured in the analysis. Furthermore, for three countries (Ethiopia, Mozambique and Mali) the endline survey occurred 12 months or less following the implementation of iCCM. Since patterns of care-seeking take time to change it is unlikely that in these countries any impact due to community-based treatment can be seen; however, impact could be assessed due to the preventive interventions which started earlier in the grant period.

Table 11: Dates of programme implementation and survey years

	<i>Pre-IHSS survey year</i>	<i>IHSS baseline survey year</i>	<i>Full iCCM implementation start year</i>	<i>IHSS endline survey year</i>
Ghana	2003	2007	2010	2012
Ethiopia	2000	2005	2010	2011
Mozambique	2003	2008	2011	2011
Malawi	2000	2006	2009	2012
Mali	2001	2006	2011	2012
Niger	1998	2006	2008	2012

 = 12 months or less between start of iCCM and endline survey

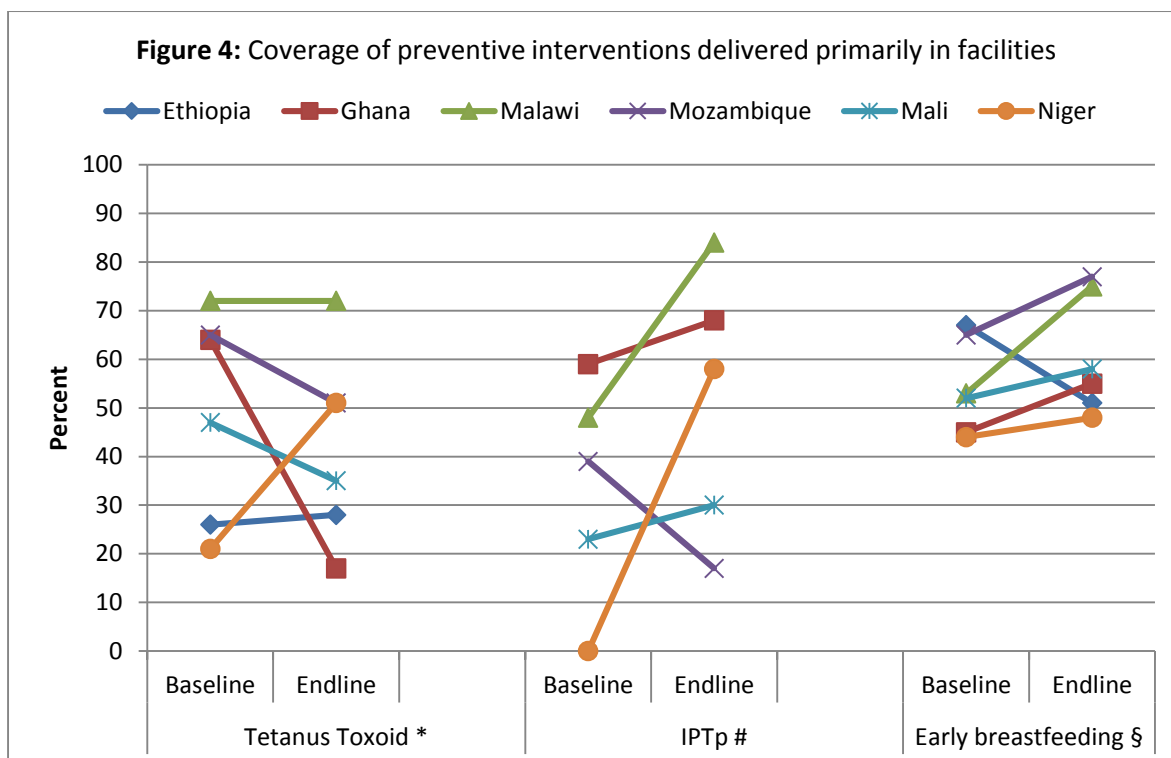
Coverage of preventive interventions

Figure 4 shows coverage of preventive interventions occurring in pregnancy or immediately after delivery and provided mostly in facilities. Most of the countries evaluated were able to achieve elimination of maternal and neonatal tetanus including Malawi in 2004, Mozambique in 2010, and Ghana in 2011, while Ethiopia has managed to achieve elimination in all areas except neighbouring Somaliland. Data on tetanus toxoid coverage reflects these achievements with coverage expectedly either remaining stable or dropping thereafter. Malawi had stable rates of tetanus toxoid coverage over the IHSS period, while rates dropped significantly in Mozambique from 65% to 51%, and in Ghana from 64% to 17%. Ethiopia maintained stable rates of coverage for tetanus toxoid, with coverage remaining between 26% and 28% over the period. Niger was able to achieve significant increases over the IHSS period with respect to tetanus toxoid, with coverage increasing by 30% over the 6 year period from 21% to 51%. Mali experienced declines in coverage of tetanus toxoid vaccination by just over 10% over the same period.

The majority of the countries collected data on mothers having received at least one dose of Fansidar during pregnancy to prevent malaria. Malawi, Niger, and Ghana experienced large increases in IPTp coverage, although confidence intervals from baseline survey data in Ghana are not available to state if the 9% increase is significant. Mali experienced fluctuations with respect to IPTp coverage, where coverage increased from 23% in 2006 to 61% by 2010, only to resume pre-IHSS rates of 30% by 2012. Mozambique, as opposed to the other countries, collected data on at least two doses of IPTp and experienced a significant drop in coverage over the IHSS period. IPTp coverage was not collected in the endline survey (2011 DHS) in Ethiopia to enable assessment of changes in the IHSS period.

Significant increases were noted for early breastfeeding in Malawi and Mozambique and a 10 ppts increase in Ghana (no confidence interval available for the baseline estimate). Early breastfeeding rates were stable in Niger and Mali during the IHSS period, while rates dropped significantly in Ethiopia by 16%.

It is important to note that the LQAS survey was used as the endline estimate for Malawi and Ghana, and differs from other surveys in that it includes estimates for children 0-5 months old, whereas other surveys collect data for children up to 2 years old. Due to the differences in the recall period, baseline estimates for these countries may be underestimating coverage due to longer recall periods.



Notes: For Ethiopia baseline is 2005 DHS and endline is 2011 DHS; for Ghana baseline is 2007 MICS and endline is 2012 LQAS; for Malawi baseline is 2006 MICS and endline is 2012 LQAS; for Mali baseline is 2006 DHS and endline is 2012 DHS; for Mozambique baseline is 2008 MICS and endline is 2011 DHS; for Niger baseline is 2006 DHS and endline is 2012 DHS. *Decline is significant in Mozambique; increase is significant in Niger; # increases are significant in Malawi and Niger; § increases are significant in Malawi and Mozambique, decline is significant in Ethiopia.

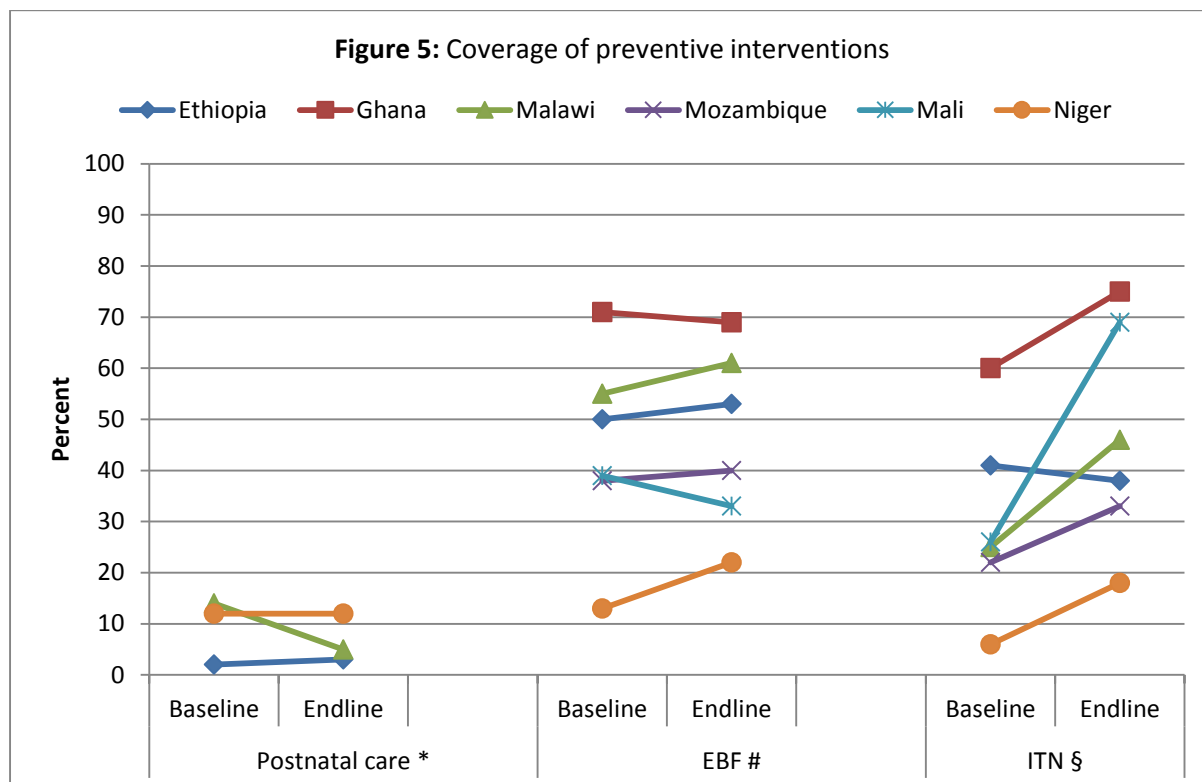
Figure 5 shows coverage of preventive interventions occurring in the postnatal period (PNC and EBF) as well as ITN coverage. Availability of data on postnatal care was unavailable for Ghana, Mozambique, and Mali. In Mozambique, PNC coverage data was only available for one survey year prior to IHSS, while in Mali, the lack of raw data for the endline estimate meant that coverage data could not be restricted to only include out of facility births so as to be comparable to the baseline survey. In Ghana, postnatal care was not collected in the baseline 2007 MICS survey.

While Malawi notes a drop in PNC coverage from 14% to 5% over the IHSS period, endline data from the LQAS does not capture PNC received prior to discharge from hospital, whereas the baseline MICS survey includes both facility and home visits. As a result, the noted drop between survey years has to be interpreted with caution as postnatal care received from home deliveries is expected to be lower. Postnatal care remained unchanged in Ethiopia and Niger, with coverage remaining extremely low at 3% in Ethiopia and slightly higher at 12% in Niger over the IHSS period.

Niger was the only country that was able to achieve significant increases in exclusive breastfeeding rates, with coverage increasing from 13% to 22%. All the other countries maintained stable rates of exclusive breastfeeding during the IHSS period, although all had higher baseline estimates in comparison to Niger, ranging between 40% and 70%.

All the countries, with the exception of Ethiopia, were able to achieve increases with respect to ITN coverage, which were statistically significant in Malawi and Niger. Rates in Ethiopia remained stable at 40%. Rates in Malawi almost doubled from 25% to 46%, while coverage increased even more starkly

in Mali, rising from 26% to 69%, which is highly likely to be significant. While Niger only achieved coverage of 18% by the end of the IHSS period, coverage tripled during the IHSS period.

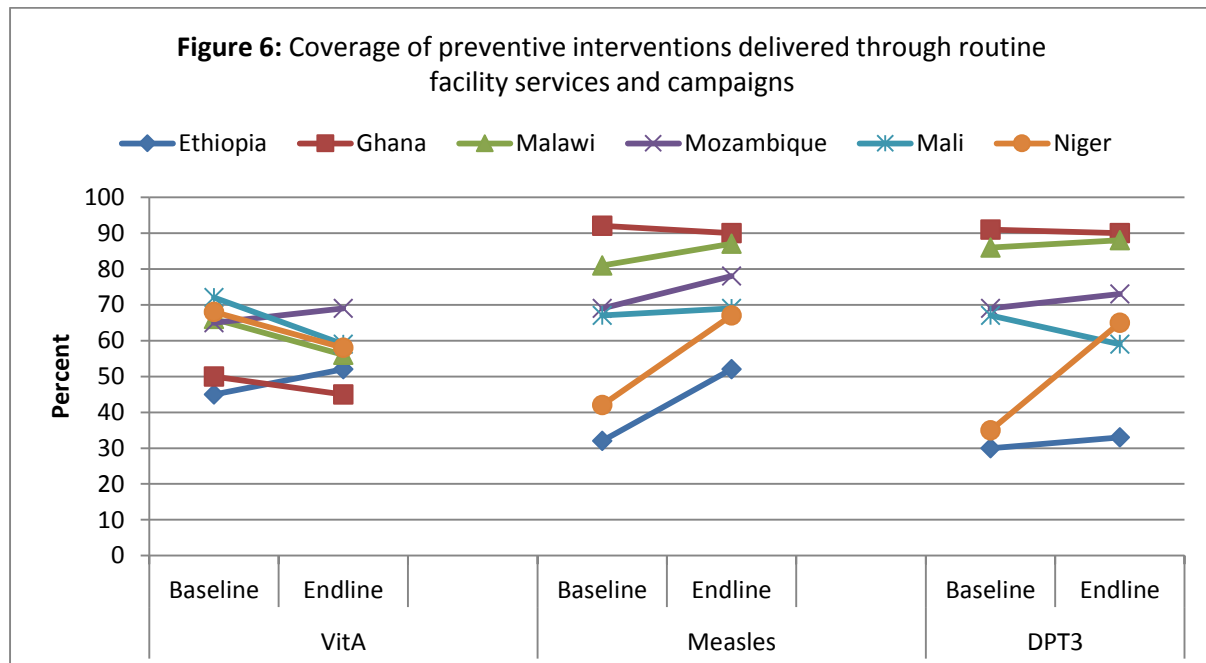


*Notes: For Ethiopia baseline is 2005 DHS and endline is 2011 DHS; for Ghana baseline is 2007 MICS and endline is 2012 LQAS; for Malawi baseline is 2006 MICS and endline is 2012 LQAS; for Mali baseline is 2006 DHS and endline is 2012 DHS; for Mozambique baseline is 2008 MICS and endline is 2011 DHS; for Niger baseline is 2006 DHS and endline is 2012 DHS. *Decline is significant in Malawi; # increase is significant in Niger; § increases are significant in Malawi and Niger.*

Figure 6 shows trend in coverage of preventive interventions delivered through routine facility services or outreach campaigns; namely immunisations and vitamin A supplementation. Only Ethiopia achieved a significant increase with respect to Vitamin A coverage over the IHSS period, and there was no change in coverage in Mozambique or Ghana. In two countries coverage declined significantly (Malawi and Niger); although in Malawi, coverage did increase from 66% in 2006 to 86% in 2010, only to drop to 56% by 2012. When assessing Vitamin A coverage in Malawi over the entire IHSS period, this drop between 2006 and 2012 is significant. Malawi did experience a severe fuel and financial crisis between 2010 and 2011 however, which is likely to be the reason behind this dramatic drop over the last 2 year period. In Mali coverage declined from 72 to 59% which is likely to be significant. Mali also experienced a significant political crisis likely disrupting routine services. The timing of the surveys in relation to the outreach campaigns may also result in inaccurate coverage estimates, and thus drops in coverage must be interpreted cautiously.

The fuel and financial crisis in Malawi in 2010 is also likely to have affected coverage rates for DPT3 and measles vaccination. While over the entire IHSS period, coverage estimates did not appear to significantly change, having remaining stable at rates of over 80%, coverage went up to over 90% in 2010, before resuming pre-IHSS rates by 2012. Ethiopia experienced a significant increase in measles coverage from 32 to 52% while DPT3 coverage remained around 30%. In Ghana, rates remained stable over the IHSS period, but were already over 90% at baseline. In Mozambique, DPT3 coverage remained

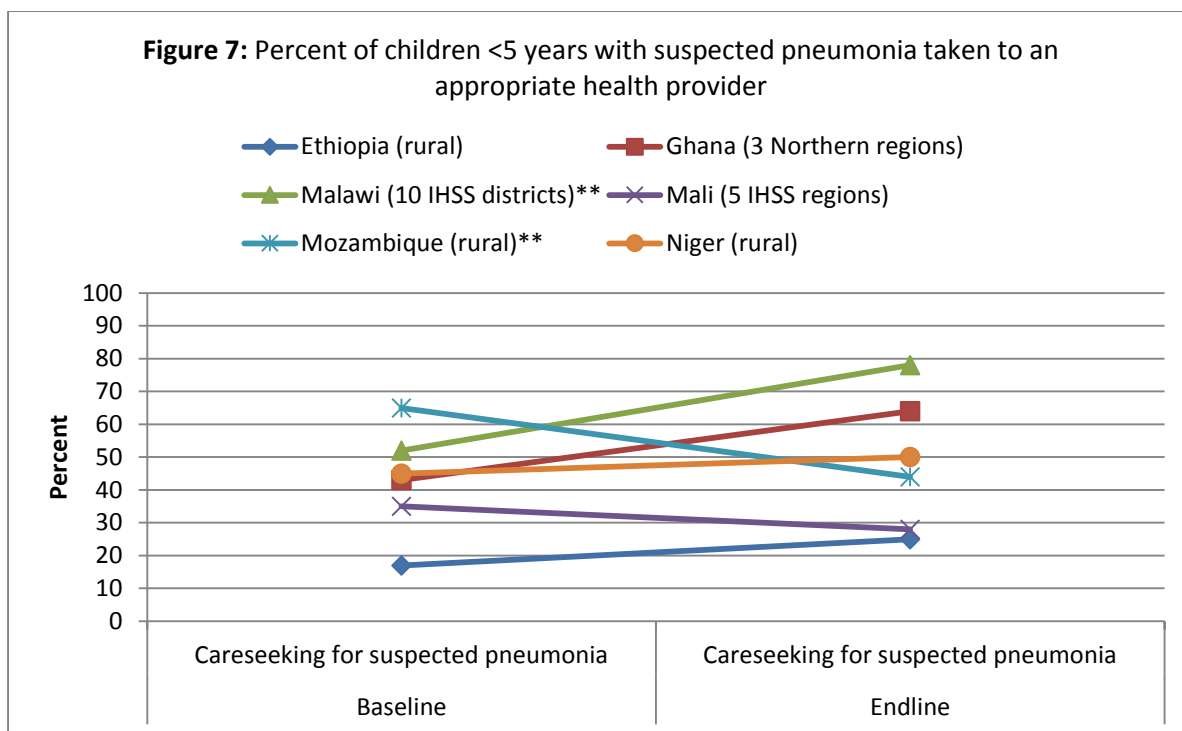
stable, around 70%, while measles vaccination coverage significantly increased by about 10ppts over the IHSS period. In Mali, despite the political crisis during the IHSS period, measles vaccination coverage rates were maintained; DPT3 coverage decreased by almost 10ppts, however. Niger achieved commendable gains in vaccination coverage, with measles vaccination increasing from 42% to 67% and DPT3 coverage increasing from 35% to 65% over the IHSS period.



Notes: For Ethiopia baseline is 2005 DHS and endline is 2011 DHS; for Ghana baseline is 2007 MICS and endline is 2012 LQAS; for Malawi baseline is 2006 MICS and endline is 2012 LQAS; for Mali baseline is 2006 DHS and endline is 2012 DHS; for Mozambique baseline is 2008 MICS and endline is 2011 DHS; for Niger baseline is 2006 DHS and endline is 2012 DHS. *Decline is significant in Malawi and Niger, increase is significant in Ethiopia; # increase is significant in Ethiopia and Mozambique.

Curative care for suspected pneumonia, diarrhoea and malaria

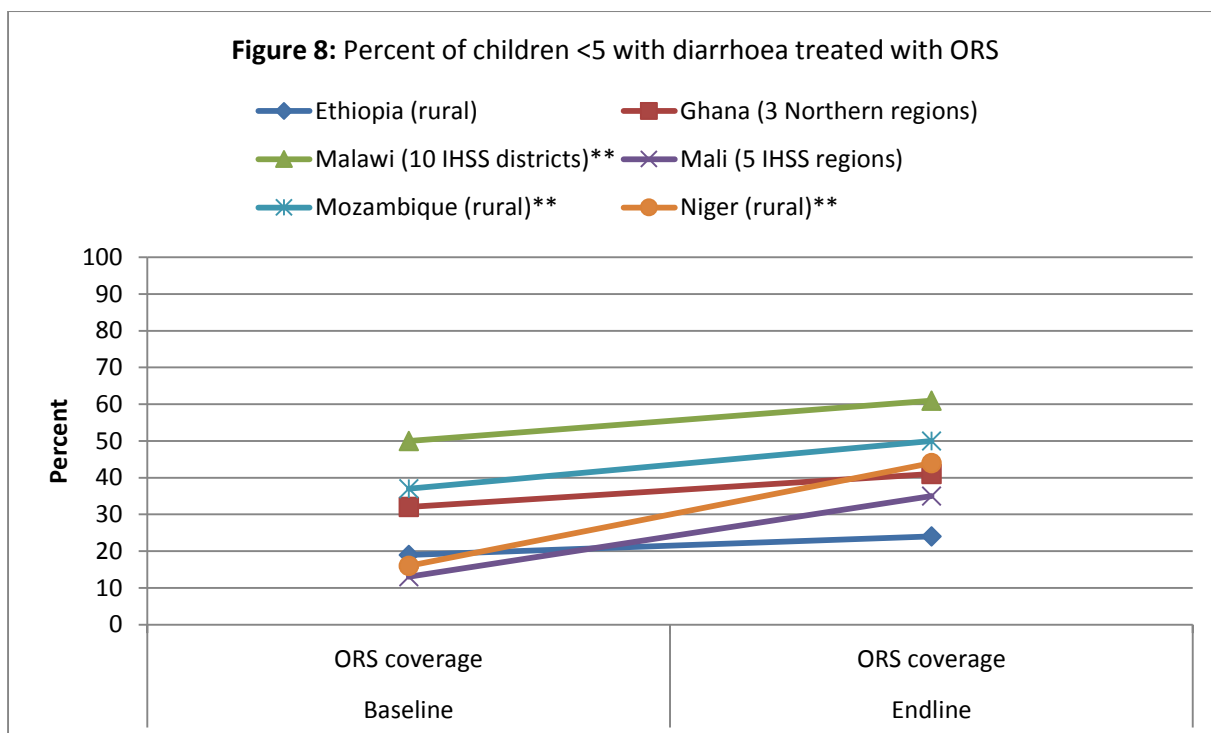
Two countries had significant changes in care-seeking for suspected pneumonia; Malawi achieved a significant increase, from 52% to 78%, whilst Mozambique had a significant decline from 65% to 44% (Figure 7). For two countries, significant changes cannot be determined due to lack of confidence intervals for either baseline (Ghana) or endline (Mali). For Ethiopia and Mozambique, the endline survey is too early to detect any impact of IHSS (both surveys occurred in 2011) which is reflected in the lack of change in care-seeking in Ethiopia, which remained at around 20% during the IHSS period. Care-seeking for pneumonia rates also remained stable in Niger over the IHSS period.



Notes: For Ethiopia baseline is 2005 DHS and endline is 2011 DHS; for Ghana baseline is 2007 MICS and endline is 2012 LQAS; for Malawi baseline is 2006 MICS and endline is 2012 LQAS; for Mali baseline is 2006 DHS and endline is 2012 DHS; for Mozambique baseline is 2008 MICS and endline is 2011 DHS; for Niger baseline is 2006 DHS and endline is 2012 DHS.

** change is statistically significant.

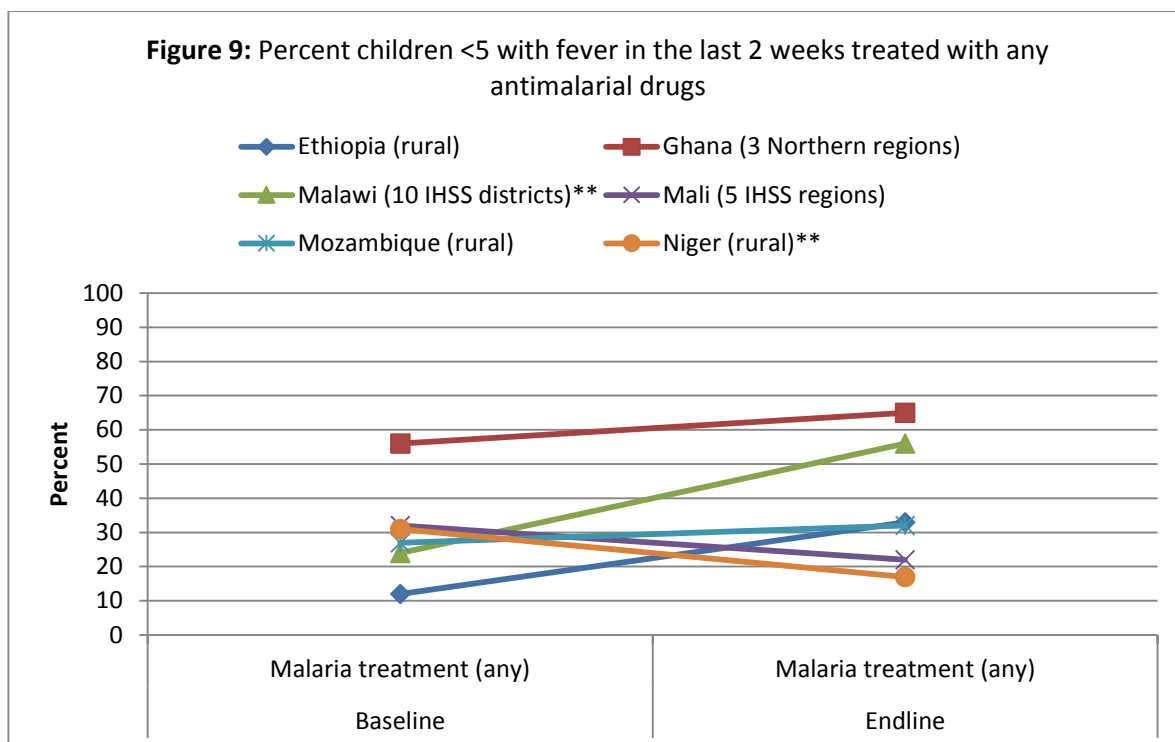
Four countries achieved significant increases in ORS coverage, including Niger, Malawi, Mozambique, and Mali, with the largest increase in Niger (28ppts). However despite these increases only one country achieved over 50% coverage at endline (Malawi), and Ethiopia showed little progress, although the endline is too early to determine IHSS impact. The lack of baseline confidence intervals for Ghana make it difficult to conclude whether the increase in ORS coverage from 32% to 41% was statistically significant (Figure 8).



Notes: For Ethiopia baseline is 2005 DHS and endline is 2011 DHS; for Ghana baseline is 2007 MICS and endline is 2012 LQAS; for Malawi baseline is 2006 MICS and endline is 2012 LQAS; for Mali baseline is 2006 DHS and endline is 2012 DHS; for Mozambique baseline is 2008 MICS and endline is 2011 DHS; for Niger baseline is 2006 DHS and endline is 2012 DHS.

** change is statistically significant.

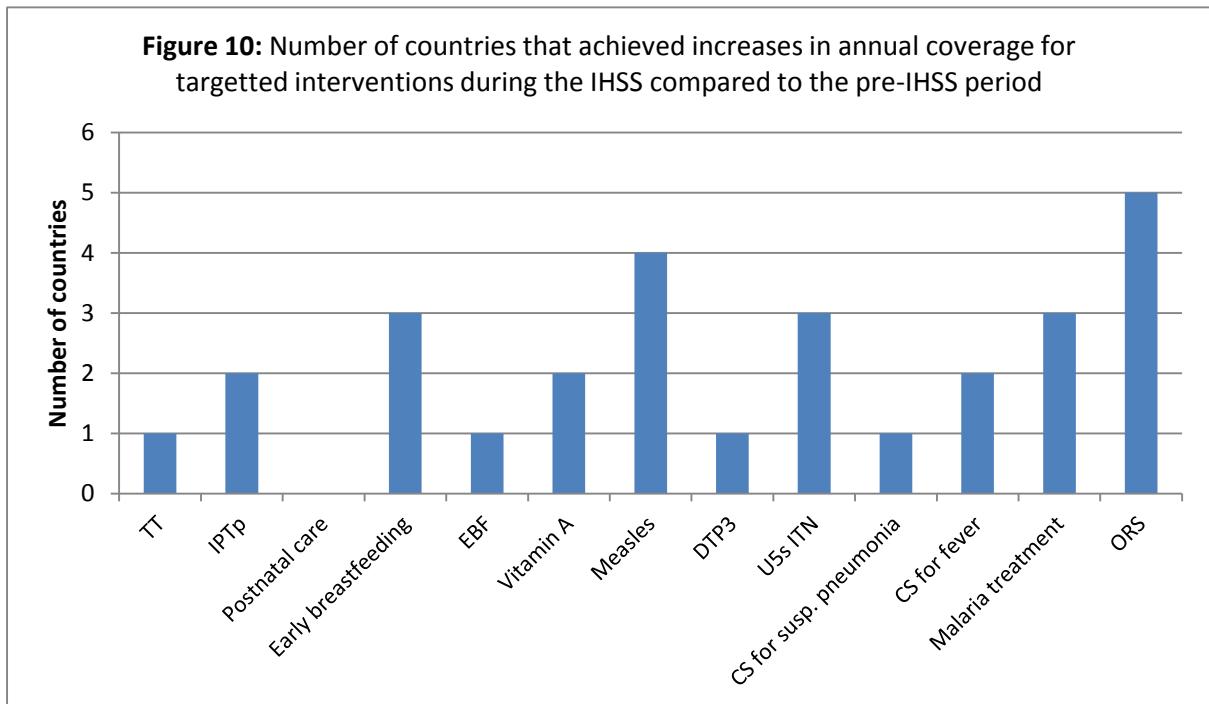
Treatment of fever in children under 5 improved significantly in Malawi with a large 32ppts increase, whilst a significant decline was noted in Niger and to a lesser extent in Mali. Mali did not have confidence intervals around the endline coverage estimate, however, to conclusively determine significance. Ethiopia and Ghana also showed improvements in coverage but the lack of confidence intervals prevents an assessment of the significance of those changes. No change was noted in Mozambique (Figure 9).



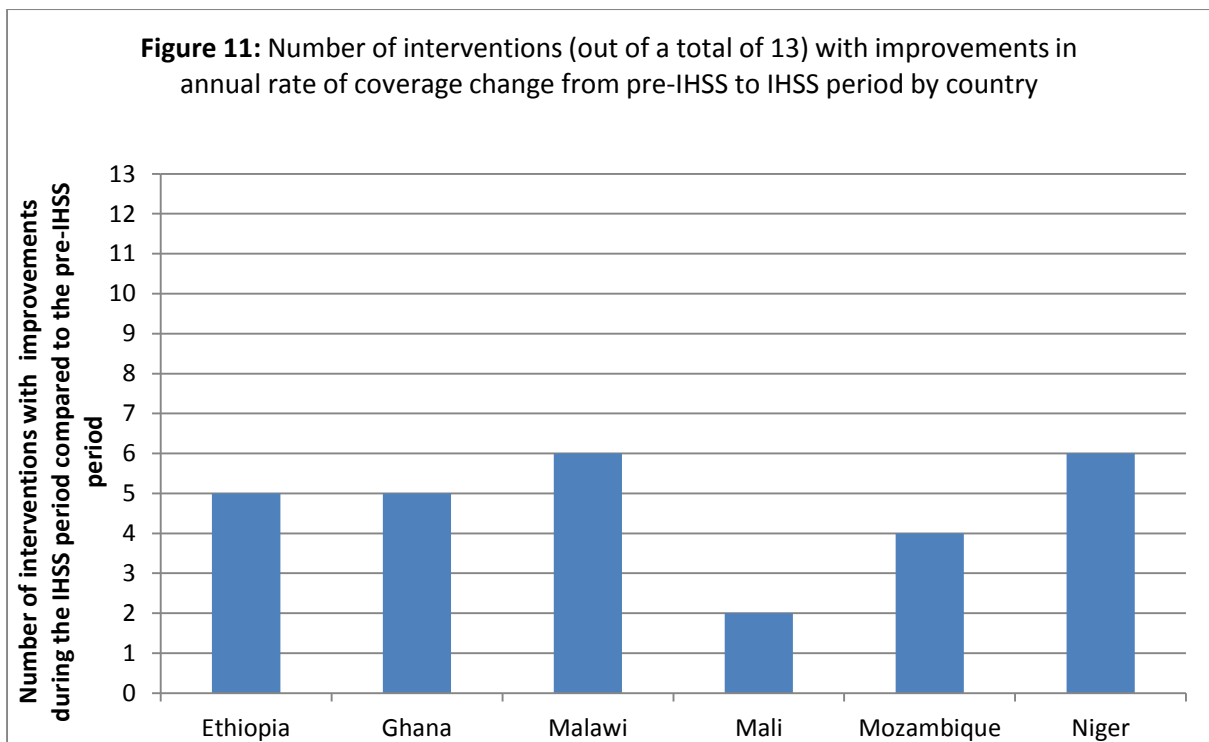
Notes: For Ethiopia baseline is 2007 MIS and endline is 2011 MIS; for Ghana baseline is 2007 MICS and endline is 2012 LQAS; for Malawi baseline is 2006 MICS and endline is 2012 LQAS; for Mali baseline is 2006 DHS and endline is 2012 DHS; for Mozambique baseline is 2008 MICS and endline is 2011 DHS; for Niger baseline is 2006 DHS and endline is 2012 DHS.

** change is statistically significant.

Figure 10 below shows the number of countries that achieved increases in the annual rate of coverage change between the pre-IHSS and the IHSS period. Five countries achieved coverage increases for ORS whilst in Ethiopia the rate of coverage change was the same as the pre-IHSS period (around 1% per year). Four countries achieved increases in measles immunisation during the IHSS period and three countries achieved increases in early breastfeeding, ITN coverage and malaria treatment. Although only one country (Ghana) achieved a significant increase in annual coverage during the IHSS period for care-seeking for suspected pneumonia, Ethiopia, Niger and Malawi also achieved coverage increase; however, they were not significantly different from the coverage increases achieved during the pre-IHSS period. Only Mozambique and Mali had declines in this indicator. No country achieved increases in coverage during the IHSS period for postnatal care.

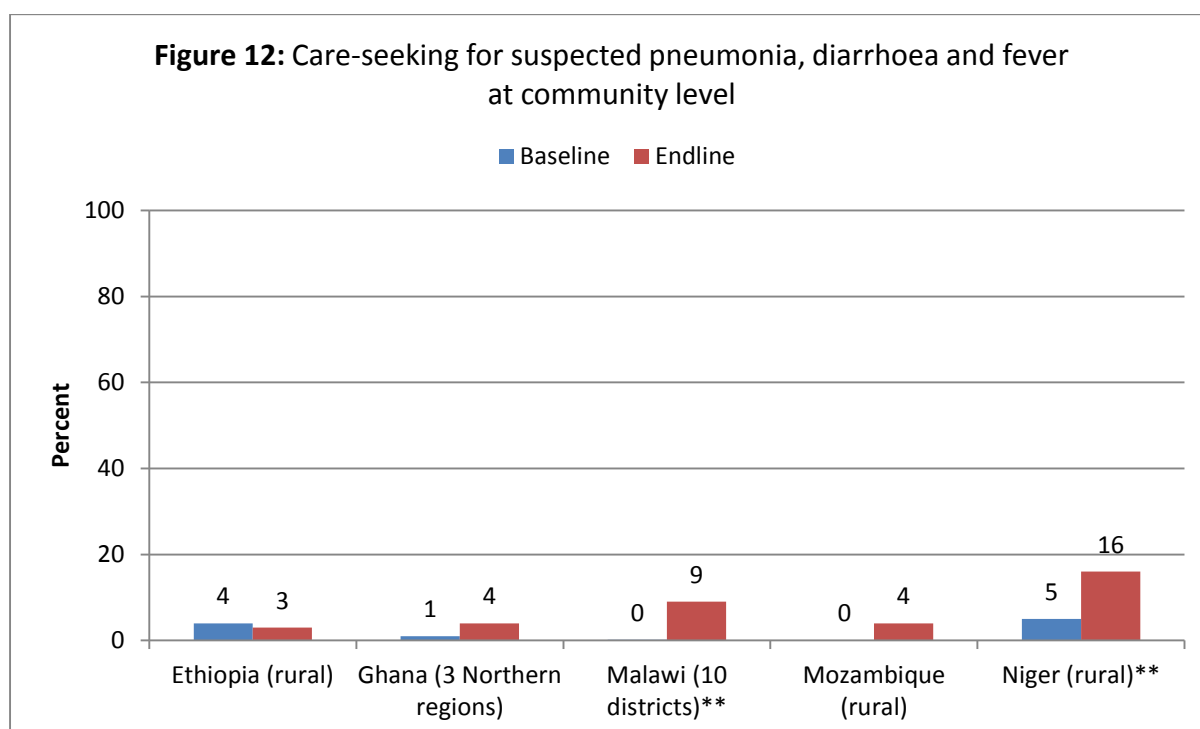


Malawi and Niger achieved increases in coverage during the IHSS period for 6 out of 13 interventions, Ghana and Ethiopia for 5, Mozambique 4 and Mali 2 (Figure 11). Malawi and Niger are the two countries with the longest period of community-based service provision and with later endline surveys providing greater likelihood of identifying changes.



Care-seeking for fever, suspected pneumonia and diarrhoea at community level

A large focus of the IHSS support was on training and equipping CHWs to deliver curative and preventative interventions in rural and hard to reach communities. As stated earlier, changes in care-seeking patterns take time to occur and for several of these countries the endline survey data has not enabled sufficient time for these changes to occur. However, in two countries, Malawi and Niger, significant increases in care-seeking can be seen with the highest achieved in Niger (11ppts increase) (Figure 12). In Mali, data was not disaggregated to provider level for the endline survey. However, based on routine data, ASCs treated 18% of all under-5 cases treated in the public sector, with 32% of diarrhoea cases, 20% of pneumonia cases, and 15% of malaria cases treated by ASCs in comparison to the health facilities. The LQAS conducted in 2013 reveals similar utilisation rates.



Notes: For Ethiopia baseline is 2005 DHS and endline is 2011 DHS; for Ghana baseline is 2006 MICS and endline is 2012 LQAS; for Malawi baseline is 2006 MICS and endline is 2012 LQAS; for Mozambique baseline is 2003 DHS and endline is 2011 DHS; for Niger baseline is 2006 DHS and endline is 2012 DHS. ** change is statistically significant.

5b. What additional coverage is plausibly attributable to the programme?

The increases seen in coverage of high impact, low cost interventions overall were relatively modest. The reliance on existing surveys to assess these changes, the fact that the endline survey data did not enable sufficient time for changes to occur in 4 out of 6 countries, and lack of a counterfactual for comparison limited the ability of this evaluation to comment on attribution of any changes seen directly to the IHSS programme. Although increases cannot be specifically ‘attributed’, the results are encouraging particularly in the two countries which had longer time of implementation to endline survey. Malawi and Niger saw substantial increases in a number of interventions which increased (6 out of 13) and statistically significant increases in care-seeking at community level. Given the resources supplied to this programme, including training, deployment and supplies, and temporality

of the changes seen, based on the logic models developed it can be theorised that the IHSS could plausibly have 'contributed' to the improvements seen in the delivery of high impact, low cost interventions. This conclusion is strongest when applied to Malawi and Niger, which both had time for the programme to mature before the evaluation was completed.

6. What aspects of the IHSS programme worked? Why did these aspects work?

Alignment with policies, planning, and health surveillance of the Government

- Government ownership – Efforts to gain Government ownership worked well. Government was brought on as the central player from the start.
- Harmonisation and coordination – Efforts to harmonise and coordinate the technical and financial support of development partners worked well. This was achieved through bilateral agreements established through UNICEF.
- Advocacy – Advocacy efforts on the part of UNICEF and implementing partners for changes to policy and plans worked well. This was due to careful but persistent advocacy efforts on the part of UNICEF and implementing partners which provided the information Government needed to enact changes to policy and plans, which in turn enabled successful implementation of the IHSS programme.

Training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions

- Building on what exists – Building on existing systems and delivery platforms worked well when these existed. The IHSS was successful with regard to training large numbers of frontline health workers because it built on an existing service delivery platform that already had full Government support.
- Health systems approach – The health systems strengthening approach largely worked well. This ensured that the IHSS programme activities targeted building blocks underpinning the health system, and rooted the programme in a logic (even if implicit) for how outputs and outcomes were expected to be achieved.
- Planning for scale – Planning for scale worked. The IHSS programme planned for scale and thereby sought out strategies that could be implemented nationally. In doing so, it contributed to the training, equipping, and supervising over 50,000 community health workers across 6 countries in sub-Saharan Africa.
- Phased approach – The phased approach to training worked well. The IHSS programme took a phased approach to training and equipping frontline health workers which was linked to envisioned policy changes.

7. What aspects of the IHSS programme did not work? Why did these aspects not work?

- Demand creation and social mobilisation – The IHSS programme failed to adequately address demand-side barriers that are keeping utilisation of CHWs low. The IHSS programme failed to adequately address these barriers through demand creation, social mobilization and other cross-cutting strategies such as ensuring uninterrupted supplies at CHW level.
- Systems strengthening for supply chain management - The IHSS programme intended to build capacity and strengthen the government supply chain management system as part of its health systems strengthening approach. It failed to do so in all countries, and instead in some cases developed a parallel supply chain system which adequately served the needs of the IHSS programme but that may not be sustained by the Government without developing partners' assistance.
- Supervision - The majority of the CHWs did not receive monthly supervision visits as stipulated under policy. Major challenges noted included insufficient transportation and funds for fuel to carry out supervision at the community level, in addition to facility staff being overwhelmed with their various job requirements.

8. What were the major factors influencing the achievement or non-achievement of the IHSS programme objectives?

Country context was probably the most important factor influencing both achievement and non-achievement of the IHSS programme objectives. Issues like economic growth, stability, conflict, government health expenditure and policies, and existing health system and human resources available, in particular for phase II existing CHWs cadres and their scope of work. These all varied substantially across countries and influenced programme success. However, as outlined in the two previous sections there were common successes and challenges found across all countries, despite these variations.

Box 5: Key points under effectiveness theme

3. To what extent were the objectives related to health system strengthening (including policies, planning and health surveillance) and training, equipment, deployment, and supervision of front-line health workers achieved?

- The IHSS programme in all of the evaluated countries invested heavily in the training of CHWs for the provision of iCCM, in addition to facility based staff who were trained in IMCI and iCCM. In many countries, IMCI training was an early focus of the IHSS programme with support later redirected to training of community based staff in iCCM.
- The IHSS programme supported the procurement of a substantial proportion of essential drugs (including ORS, ITNs, zinc, cotrimoxazole, RDTs, ACTs, amoxicillin, and Fansidar) and supplies (boots, bicycles, thermometer, ARTI timers, etc.) for the successful delivery of

community based care. While the majority of drugs and equipment were meant for iCCM, the facility level was also supported through drug provisions to some degree.

- The IHSS programme was successful in supporting the development of an innovative drug tracking monitoring system in Malawi for the community level (c-stock). Most countries still rely heavily on UNICEF and donors for the procurement of drugs, with the exception of pneumonia and diarrhoea drugs in Mali which are replenished through user-fees.
- Many countries reported challenges with their supply chain systems, and as a result, a parallel drug delivery system was set up in Mali and Niger to ensure a consistent supply to CHWs. While this was essential in the short term to ensure that CHWs were capacitated to provide treatment, this does not address the shortcomings in the supply chain management system of countries, essential for the sustainability of the programme and an integral element of health system strengthening. Other attempts to circumvent the weak supply chain system and the misuse of drugs, include the provision of pre-packed drug supplies in Mozambique; this results in significant wastage of drugs and unnecessary costs and threatens the long term sustainability of the programme.
- The IHSS programme invested in training of health facility staff in iCCM and IMCI to equip them with the skills necessary to carry out supervision and observe case management at the community level. While the IHSS programme further invested in the provision of transport to facilities, the maintenance and upkeep of bicycles and motorbikes was reported as a consistent challenge. The majority of the CHWs did not receive monthly supervision visits as stipulated as policy. Major challenges noted included insufficient transportation and funds for fuel to carry out supervision at the community level, in addition to facility staff being overwhelmed with their various job requirements. A mentorship system in Malawi was set up to ensure that CHWs could at least receive support at the facility level.

4. To what extent were the objectives related to women's participation and gender-equality achieved?

- The IHSS included a gender equity focus by delivering interventions known to be effective for addressing gender dynamics, such as making services more accessible to carers of children, interventions promoting accessing households directly through home visits and seeking to mobilise and engage communities for improving child health and nutrition outcomes.
- There were challenges in meeting some of the IHSS objectives, particularly in reference to women's participation and gender equality as measured by the percentage of women trained as CHWs. Two of the countries (Mozambique and Malawi), were falling behind in increasing the participation of women in community level care. The findings show that in many of the countries IHSS made efforts to overcome these challenges, but the complex reasons behind the low recruitment of women as CHWs, such as low education levels and cultural issues, require innovation and efforts at both the macro and ground levels to resolve.

5. a. To what extent did coverage of the selected high impact and low cost interventions in the target populations increase?

- The IHSS programme investment has resulted in increased coverage of high impact health interventions with increases in ORS (5 of 6 countries), measles vaccination (4 of 6 countries), ITNs (3 of 6 countries) and malaria treatment (3 of 6 countries) featuring prominently.
- Shifts in care-seeking behaviour are noted in Malawi and Niger where care-seeking at community level has increased significantly over the period of IHSS implementation.
- Across the six countries EBF, DPT3, and care-seeking for suspected pneumonia have seen less improvement in coverage with only two countries achieving coverage of care-seeking for suspected pneumonia greater than 50% at endline.
- Utilisation of community-based health services was found to be low in several of the IHSS countries; however qualitative data suggests positive attitudes towards CHWS. More research is needed to understand what influences mothers choice of place of treatment.

b. What additional coverage is plausibly attributable to the programme?

- The increases seen in coverage of high impact, low cost interventions overall were relatively modest. The reliance on existing surveys to assess these changes, the fact that the endline survey data did not enable sufficient time for changes to occur in 4 out of 6 countries, and lack of a counterfactual for comparison limited the ability of this evaluation to comment on attribution of any changes seen directly to the IHSS programme. Although increases cannot be specifically 'attributed', the results are encouraging particularly in the two countries which had longer time of implementation to endline survey. Malawi and Niger saw substantial increases in a number of interventions which increased (6 out of 13) and statistically significant increases in care-seeking at community level. Given the resources supplied to this programme, including training, deployment and supplies, and temporality of the changes seen, based on the logic models developed it can be theorised that the IHSS could plausibly have 'contributed' to the improvements seen in the delivery of high impact, low cost interventions. This conclusion is strongest when applied to Malawi and Niger, which both had time for the programme to mature before the evaluation was completed.

6. What aspects of the IHSS programme worked? Why did these aspects work?

Alignment with policies, planning, and health surveillance of the Government

- Government ownership – Efforts to gain Government ownership worked well. Government was brought on as the central player from the start.
- Harmonisation and coordination – Efforts to harmonise and coordinate the technical and financial support of development partners worked well. This was achieved through bilateral agreements established through UNICEF.
- Advocacy – Advocacy efforts on the part of UNICEF and implementing partners for changes to policy and plans worked well. This was due to careful but persistent advocacy efforts on the part of UNICEF and implementing partners which provided the information Government needed to enact changes to policy and plans which in turn enabled successful implementation of the IHSS programme.

Training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions

- Building on what exists – Building on existing systems and delivery platforms worked well when these existed. The IHSS was successful with regard to training large numbers of frontline health workers because it built on an existing service delivery platform that already had full Government support.
- Health systems approach – The health systems strengthening approach largely worked well. This ensured that the IHSS programme activities targeted building blocks underpinning the health system, and rooted the programme in a logic (even if implicit) for how outputs and outcomes were expected to be achieved.
- Planning for scale – Planning for scale worked. The IHSS programme planned for scale and thereby sought out strategies that could be implemented nationally. In doing so, it contributed to the training, equipping, and supervising over 50,000 community health workers across 6 countries in sub-Saharan Africa.
- Phased approach – The phased approach to training worked well. The IHSS programme took a phased approach to training and equipping frontline health workers which was linked to envisioned policy changes.

7. What aspects of the IHSS programme did not work? Why did these aspects not work?

- Demand creation and social mobilisation – The IHSS programme failed to adequately address demand-side barriers that are keeping utilisation of CHWs low. The IHSS programme failed to adequately address these barriers through demand creation, social mobilisation and other cross-cutting strategies such as ensuring uninterrupted supplies at CHW level.
- Systems strengthening for supply chain management - The IHSS programme intended to build capacity and strengthen the government supply chain management system as part of its health systems strengthening approach. It failed to do so in all countries, and instead in some cases developed a parallel supply chain system which adequately served the needs of the IHSS programme but that may not be sustained by the Government without developing partners assistance.
- Supervision - The majority of the CHWs did not receive monthly supervision visits as stipulated under policy. Major challenges noted included insufficient transportation and funds for fuel to carry out supervision at the community level, in addition to facility staff being overwhelmed with their various job requirements.

8. What were the major factors influencing the achievement or non-achievement of the IHSS programme objectives?

Country contextual factors influenced achievement or non-achievement of IHSS programme objectives, but despite these differences common themes for both successes and challenges were found across these contexts.

5.3 Impact

Child mortality

IHSS support was focussed on six countries with a high burden of under-5 mortality. All of these countries have achieved declines in under-5 mortality between 2000 and 2012 with the largest declines, based on the Inter-agency Group for Child Mortality Estimation (IGME), occurring in Malawi and Niger and the smallest decline in Ghana (Table 12), though Ghana had the lowest baseline U5MR at the start of implementation in 2007 (Figure 13).

Related MNCH Indicators

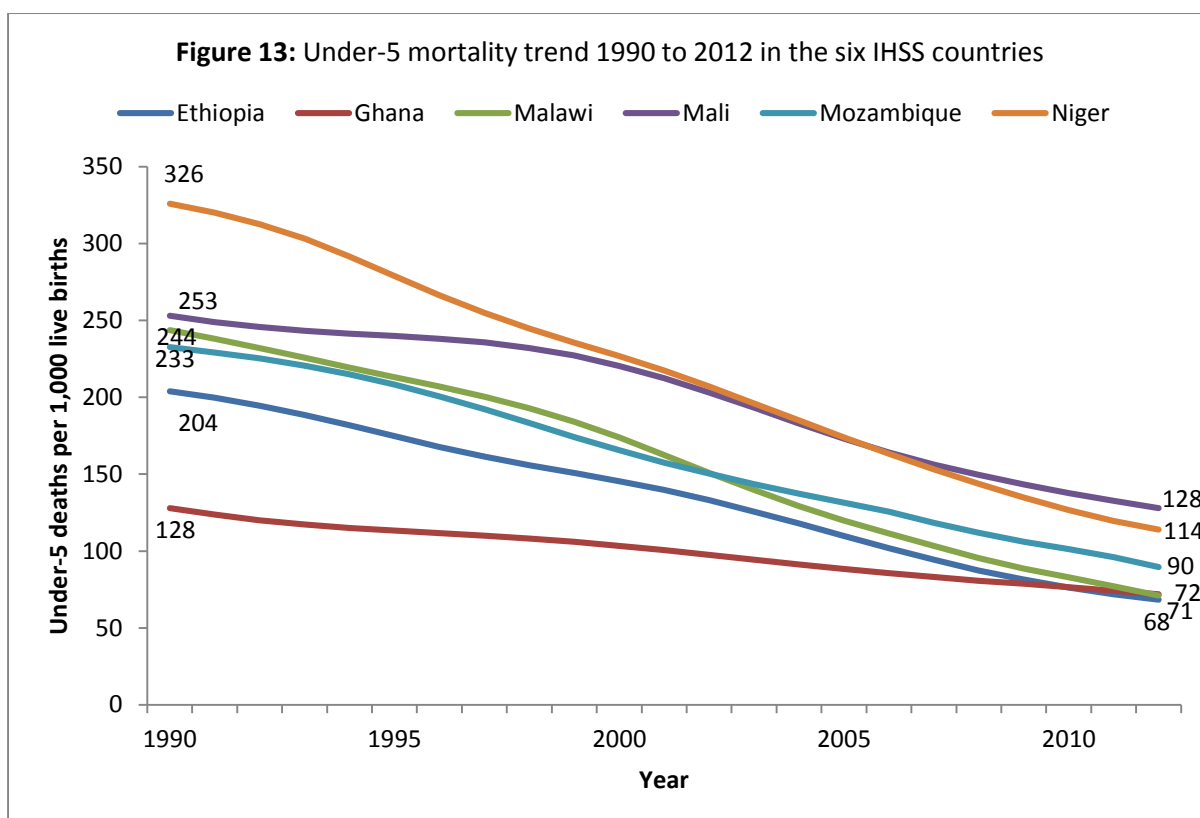
With regard to related indicators, minimal or no (in the case of Niger and Mali) change is seen in the fertility rates in these six countries between 2007 and 2012. The consequent high population growth rates may lead to reversal or stagnation of the mortality declines and suggest a greater focus needed on maternal health, in particular access to family planning.

Similarly, in all of the six countries the proportion of deaths that occur in the first month of life relative to the rest of the under-five period is increasing. While important gains have been made for survival after the first month of life, care during childbirth and the first week of life is becoming progressively more important to address.

Some improvements are noted in female literacy particularly in Ethiopia, Ghana and Malawi but this remains low in Mozambique, Mali and Niger. Given the strong association between maternal education and child mortality³² greater efforts are needed in this area.

Access to improved water sources in rural areas has improved substantially in Ghana and Malawi, and while some improvements are noted in Ethiopia, Mali, Mozambique and Niger, less than half or in the case of Mali, around half, of families in rural areas still rely on unsafe water sources.

These indicators are all strongly linked to child survival and need to remain a focus of attention in integrated efforts to sustain the achievements made in reducing child mortality.



Source: IGME 2013 mortality estimates www.childmortality.org

Table 12: Under 5 mortality and related indicators

Country	Under 5 mortality*		Fertility rate (births per woman)		Female literacy rate (adult)		Improved water source (rural)	
	2000	2012	2007	2012	2007	2012	2005	2012\$\$\$
Ethiopia	146	68	5.3	4.6	29%	59%	28%	42%
Ghana	103	72	4.2	3.9	49% [§]	65% [#]	67%	81%
Malawi	174	71	5.8	5.4	54% ^{**}	68% [#]	68%	83%
Mali	220	128	6.8	6.8	18% ^{##}	20% [#]	43%	54%
Mozambique	166	90	5.5	5.2	33% ^{§§}	42% [#]	30%	34%
Niger	227	114	7.5	7.5	15% ^{***}	-	38%	42%

Source: IGME 2013⁶; # Data is for 2010; § Data is for 2000; **Data is for 1998; ## Data is for 2006; §§ Data is for 2003; *Data is for 2005 §§§from MICS <http://data.unicef.org/water-sanitation/water>; see also Table 1 for data sources*

LiST results

A reduction in child mortality was observed in household surveys and in modelled LiST results amongst target populations in all countries with the exception of Benishangul-Gumuz region of Ethiopia across the time periods with mortality and coverage data available. However, the LiST-modelled reduction varied between countries from 1.1% to 7.3% per year.

The LiST mortality projections matched measured mortality change in household surveys only in Malawi and Ethiopia's Oromia region. In other settings, modelled mortality rates were significantly higher than those measured in household surveys with the exception of Ghana where mortality was predicted by LiST to be significantly lower in all three regions compared to the endline household survey (Table 13). For this reason and those mentioned below, the results of the LiST analyses should be treated with caution. Two potential explanations for this misalignment could be that some of the coverage, health status, and intervention effectiveness assumptions used in LiST did not match, and/or factors outside of the health sector, and not included in the model, have contributed to mortality change. In order to effectively measure impact and contribution there is a need for continuing efforts to improve the availability of sound, prospective demographic, epidemiological and intervention coverage data at national and sub-national levels. The same time periods across countries could not be compared given the different years of the household survey data.

Table 13: Comparing under-5 mortality and average annual rate change between national surveys and modelled results

Country		U5MR endline in household survey	U5MR predicted by LiST	Average annual rate of U5 mortality reduction using household survey data	Average annual rate of mortality reduction using LiST results*
Ethiopia	Amhara	108 (2011)	142 (2010, end of Phase I projection)	5.9% (2005-2011)	1.4% (2007-2010)
	Benishangul-Gumuz	169	146	-1.2%	1.1%
	Oromia	112	114	1.4%	1.6%
	SNNP	116	130	3.4%	1.6%
	Tigray	85	96	3.7%	2.2%
Ghana	Northern	124 (2011)	113 (2011)	-0.8% (2007-2011)	1.5% (2007-2011)
	Upper East	98	70	-1.3%	7.3%
	Upper West	108	99	1.1%	3.2%
Malawi (10 CI districts)		128 (2010)	120 (2010)	2.4% (2006-2010)	4.7% (2007-2010)
Mali (CI regions)		108 (2012)	198 (2012)	12.5% (2006-2012)	2.6% (2007-2012)
Mozambique (national)		97 (2011)	129 (2011)	12.5% (2008-2011)	2.1% (2007-2011)
Niger (national)		127 (2012)	166 (2012)	7.4% (2006-2012)	3.1% (2006-2012)

*The annual rate of reduction is calculated using an exponential function. The following equation was used: $x = \text{EXP}(\text{LN}(b/a)/t) - 1$

Where a is the baseline mortality rate, b is the endline mortality rate, t is the number of changes in years. For the percentage annual change, x is multiplied by 100.

The modelled results indicate that thousands of deaths of children under five were averted during the implementation of IHSS across the six countries (Table 14). The top three interventions that saved the most lives during the implementation of IHSS varied between countries and were affected by increasing coverage rates and interventions with high impact (Table 14). Amongst interventions also supported by IHSS, those saving the most lives included ITN ownership (Ghana, Malawi, Mali, and Mozambique), pneumonia case management (Ethiopia and Ghana), ACTs for malaria (Ghana, Malawi and Mozambique), and ORS (Mali and Niger). Other interventions featuring prominently in the analysis

included pneumococcal and Hib vaccine, which were also supported by IHSS through routine EPI and campaigns.

The proportion of deaths averted due to interventions also supported by IHSS throughout implementation where data were available ranged from 63% in Ghana and Malawi to 90% in Mali, emphasizing that IHSS interventions were those receiving the most priority during this time period. With increased focus on the interventions also supported by IHSS and coverage gains experienced in these countries, it is plausible that the IHSS programme contributed to the proportion of the lives saved by the focus interventions. It is important to note that the deaths averted represent the total and are a reflection of multi-factorial inputs within the health system, from other donors, and other sectors, not just those of the IHSS programme. Additionally, this LiST analysis does not reveal the implementation strength of IHSS in relation to specific interventions, nor does it assign weights to different levels of service provision (e.g. community level). The effect sizes of interventions are the same regardless of where they are delivered, even though in reality these might be different. These are limitations of the LiST model.

Table 14: Results from Lives Saved analyses for six countries during IHSS implementation

Country		Proportion of deaths averted at endline year	Cumulative number of deaths averted throughout IHSS implementation	Top 3 interventions that saved lives during IHSS implementation at endline year	Proportion of deaths averted§ due to interventions supported by IHSS^ throughout implementation
Ethiopia*	Amhara	Range across 5 regions: 4-6% (2007-2010)	28,400 (2007-2010)	<ul style="list-style-type: none"> • Hib vaccine (29%) • Pneumonia case management (13%) • Water connection in the home (13%) 	78% (2007-2010)
	Benishangul-Gumuz				
	Oromia				
	SNNP				
	Tigray				
Ghana	Northern	Range across 3 regions: 7-32%	6,500 (2007-2013)	<ul style="list-style-type: none"> • ACT malaria (21%) • ITN ownership (17%) • Pneumonia case management (15%) 	63% (2007-2013)
	Upper East				
	Upper West				
Malawi		33% (2013)	43,000 (2007-2013)	<ul style="list-style-type: none"> • Pneumococcal vaccine (25%) • ITN ownership (19%) • ACT malaria (12%) 	63% (2007-2013)
Mali		15% (2007-2012)	41,900 (2007-2012)	<ul style="list-style-type: none"> • ITN ownership (31%) • ORS (22%) • Pneumococcal vaccine (20%) 	90% (2007-2012)
Mozambique*		8% (2011)	26,900 (2007-2010)	<ul style="list-style-type: none"> • Hib vaccine (29%) • ITN ownership (25%) • ACT malaria (15%) 	65% (2007-2011)
Niger		19% (2007-2012)	63,600 (2007-2012)	<ul style="list-style-type: none"> • ORS (26%) • Hib vaccine (19%) • ITN (14%) 	89% (2007-2012)

*Results are Phase I only; Phase II scenario not included. Note: numbers rounded to avoid spurious accuracy

§The proportion of deaths averted is calculated using the additional child deaths averted in a given year, divided by the sum of the additional child deaths averted and total child deaths for that same year. This provides an estimate of the additional deaths averted (not necessarily lives saved) due to changes in intervention coverage relative to the first year of the intervention program. The deaths averted reflect the additional deaths averted in relation to the baseline year, not years preceding which is standard presentation for these analyses. Note that LiST operates with the assumption that the number (proportion) of deaths averted increases linearly with coverage as coverage increases though the true relationship is likely more complex at varying levels of intervention coverage.

^As per page 5 of Schedule A of the Grant Agreement and tailored country programme implementation, in this context "IHSS interventions" in LiST are assumed to include maternal tetanus vaccination; exclusive breastfeeding; complementary feeding; ITN use and IPT in pregnancy; DPT, Hib, pneumococcal, and measles vaccines; vitamin A supplementation; vitamin A for

measles treatment (vitamin A supplementation used as proxy for coverage); ACTs for malaria; ORS for diarrhoea; zinc for diarrhoea; and case management of pneumonia (care-seeking used as proxy for coverage). PMTCT interventions are not included as IHSS supported interventions in Malawi, Mali and Mozambique.

Box 6: Key points under impact

9. Was a reduction in child mortality observed amongst target populations? Based on plausible attribution of coverage, how many lives were saved?

- A reduction in child mortality was observed amongst target populations in all countries across the time periods with mortality and coverage data available; however, the reduction varied significantly from 1.1% to 7.3% per year.
- The LiST analysis did not accurately capture the factors contributing to mortality declines in the evaluated countries and the modelled mortality rates did not align with those measured in household surveys. Two potential reasons for this misalignment could be that factors outside of the health sector could have contributed to mortality declines, and/or incorrect assumptions were used for coverage of high impact interventions without empirical data available to run the LiST model.
- Given the complex donor environment and shared responsibility for implementation in each of the settings, causal attribution of impact is not possible but the proportion of deaths averted due to interventions to which IHSS contributed where data were available ranged from 63% in Ghana and Malawi to 90% in Mali, demonstrating that the interventions promoted by IHSS were high impact and for the most part showed the greatest increases in coverage.

5.4 Sustainability

10. What is the additional cost per treatment for each of the three iCCM conditions?

The purpose of the costing analysis was to answer the following questions:

- What is the additional cost per treatment of malaria, diarrhoea and pneumonia through iCCM?
- What would be the cost of increased utilisation?
- What is the likelihood that results/benefits continue after CIDA/UNICEF's involvement ends? Are committed financial and human resources sufficient to maintain benefits and results?

The findings below do not reflect the actual expenditure on iCCM. They reflect expected additional costs if the services are implemented according to each country protocol: a normative approach which determines the cost of treatments as per the clinical protocol and the costs of support services (supervision etc.) as per the prescribed country plans.

Different contexts

The contexts are different for the six countries, affecting findings on additional costs of the programmes (Table 15). Therefore, costs cannot be directly compared across countries; rather differences are shown to highlight factors impacting on costs.

- Some countries (Ethiopia, Malawi and Niger) had pre-existing systems with CHW cadres already paid, with iCCM added as part of the CHWs' other tasks, whilst other countries set up a new system (Ghana, Mali, Mozambique).
- In Ghana iCCM is provided by volunteers while in the other five countries CHWs receive a salary or a subsidy. In Ethiopia, Malawi, and Niger this salary is already covered by the government.
- Niger had over 80% of the trained CHWs operating for four years at the endpoint of the IHSS programme (2013), in Mali the majority of CHWs were trained in 2011 and in Ethiopia, Ghana, Malawi and Mozambique the CHWs had been functioning at that level for around a year prior to the end of the IHSS grant.
- The number of iCCM treatments per CHW per year ranges from 10 in Ghana to 603 in Niger. This number is clearly, but not exclusively, influenced by the size of the catchment population under five, which ranges from a very low 72 in Ghana, to 360 in Mali, 377 in Ethiopia, 576 in Niger and 632 in Malawi. This number is not available for Mozambique as the number of CHWs was at the time arbitrarily set at 25 per district, independently from the population of the district, but estimates put the number at 1250 per CHW.
- The number of iCCM training days ranges from 6 in Ethiopia, Malawi and Niger to 15 in Mali and 23 in Mozambique.

Table 15: Contextual factors which influence costs

	Ethiopia	Ghana	Mali	Malawi	Moz	Niger
Pre-Existing system	X			X		X
Paid / Volunteer	P	V	P	P	P	P
Monthly Salary included in costing			80		40	
Months at scale (iCCM trained CHWs > 80%) by end of grant (May 2013)	12	12	12	24	12	48
# CI iCCM trained CHWs in CI districts	27 116	16 812	1 847	1 018	905	2 560
# iCCM Treatments/CHW per Year	20	10	134	546	99	603
Population <5 per CHW	377	72	360	632	1250*	576
# CHWs/Supervisor	8	30	4	10	25	3
Days Training on iCCM	6	3	15	6	23	6

*Actual # children unknown, estimated <5 per APE

Current cost per treatment

Cost per treatment is made up of the cost of consultation (the share of CHW fixed costs) and cost of consumables. Annualised fixed costs per CHW are presented in the table below (Table 16). Calculated CHW costs are lower in countries where CHW subsidies and supervision salaries/allowances are already paid by the state (Ethiopia, Malawi and Niger). These costs are significant in both Mali and Mozambique. These two countries also have longer training (15 and 23 days respectively) compared to 6 days in the other countries, with the consequent higher training costs. Annualised CHW cost is divided by the number of treatments to give cost per consultation. Combined with the previous contextual differences, level of utilisation plays a central role in cost per consultation which shows very wide variation, from a low of \$0.1 in Malawi to \$12.3 in Ghana.

Table 16: Additional annualised fixed costs per CHW for year 2012/13

Annualised Additional Cost per CHW	Ethiopia	Ghana	Mali	Malawi	Moz	Niger
Training	16	22	87	12	134	55
Subsidy			960	-	480	
Equipment	11	57	96	34	75	82
Management & Supervision	96	40	127	7	286	42
Other Overheads 5%	6	6	63	3	49	9
Total	129	126	1 333	55	1 023	188
% MDP	100%	100%	70%	100%	70%	100%
Annualised CHW cost	129	126	933	55	716	188
# MDP Treatments/CHW per Year	20	10	134	546	99	603
Annualised CHW cost/Treatment	6.5	12.3	7.0	0.1	7.2	0.3

Whilst similar cost of drugs and tests per type of treatment could have been expected, differences reflect again variation in context (Table 17):

- Differences in protocols: Paracetamol is provided differently between countries.
- Different positivity rate for malaria: from 40% to 67% in Niger, affecting the number of tests required to end up in a treatment.
- Pricing system: in Mali, drugs distributed from health centers are 50% more expensive than at national level.

The weighted average cost per consumables is a function of the relative share of the three conditions.

Table 17: Drugs and Tests per iCCM treatment for year 2012/13

Cost Consumables / Treatment	Ethiopia	Ghana	Mali	Malawi	Moz	Niger
Malaria, incl RDT	1.70	1.52	2.67	2.26	1.48	4.73
Diarrhea	0.67	0.35	1.01	0.59	0.30	0.59
Pneumonia	0.26	0.38	0.09	0.13	0.33	1.21
Weighted Average	0.86	0.92	1.80	1.34	0.77	3.01

Cost (additional cost) per malaria treatment ranges from \$2.4 in Malawi to \$5 in Niger, \$8.7 in Mozambique, \$8.2 in Ethiopia, \$9.6 in Mali, and \$13.8 in Ghana. As expected, in countries with high consultation cost the cost per treatment is higher. In Mali, patients pay \$0.2 per consultation and a weighted average of \$0.11 for the drugs (malaria drugs and tests are free to the patient). In Ghana, patients contribute for drugs only at a weighted average of \$0.33 per treatment (Table 18).

Table 18: Cost per iCCM treatment for year 2012/13

Cost Consumables / Treatment	Ethiopia	Ghana	Mali	Malawi	Moz	Niger
Malaria, incl RDT	8.17	13.81	9.62	2.36	8.68	5.04
Diarrhoea	7.14	12.63	7.96	0.70	7.50	0.91
Pneumonia	6.72	12.66	7.04	0.23	7.53	1.52
Weighted Average	7.33	13.20	8.75	1.44	7.98	3.32
Consultation Cost as % Treatment cost	88%	93%	79%	7%	90%	9%
Paid by Patient/Treatment						
Consultation			0.20			
Drugs		0.33	0.11			

11. What is the cost of increased utilisation?

Given the strong relationship between cost per treatment and level of utilisation, the following section models the impact of increased demand on costs. This increase can result from the maturing of the programme and population growth. To assess whether existing CHWS can manage increased utilisation, time spent on iCCM was analysed.

Time spent on iCCM includes consultation time for recorded treatments for MPD for children under five, plus an additional 20% visits to reflect cases requiring consultations but which did not translate into treatments. In countries where consultations do not take place in a health post, travel time was added. Time for meetings and other activities related to the programme vary with the format of supervision, whether supplies have to be fetched from the facility and whether iCCM is the only function of the CHW.

Time on iCCM varies as expected with the average number of visits per week. It stands at, or under, 3 hours a week in Ethiopia, Ghana, Mali, and Mozambique. In Malawi and Niger it represents around 1 working day. If the number of treatments and visits per CHW increases by 30%, time on iCCM will increase by a smaller ratio because the time on meetings and other activities will remain unchanged. These findings indicate that an increase of 30% in utilisation could be absorbed by the existing CHWs (Table 19).

Table 19: Workload and Time on iCCM

Current Utilisation	Ethiopia	Ghana	Mali	Malawi	Mozambique	Niger
Number Visits / Week	0.5	0.3	3.5	15.4	2.2	15.7
Time per Visit	0.5	0.5	1	0.5	0.5	1
Travel time per visit	0.5	0.25			0.5	
Meetings, other iCCM (Hours/Month)	3	3	5	5	3	3
Hours of iCCM work per week	1.2	1.0	3.1	7.2	3.0	8.6
Increase of utilisation +30%						
Number Visits / Week	0.7	0.3	4.6	20.1	2.9	20.4
Hours of iCCM work per week	1.4	1.0	3.6	9.0	3.6	11.0

With an increase of 30% in utilisation, CHW annualised fixed costs are shared between higher numbers of treatments, as a consequence the net cost per consultation (share of CHW fixed cost) decreases, and as a consequence, so does the cost per treatment (consultation + drugs/tests). In Ethiopia, Ghana, Mali, and Mozambique the decrease stands at about 20%. In Malawi and Niger the decrease in cost is small (between 2 and 3%) due to the combined impact of high utilisation and lower fixed cost per CHW since their subsidy is not an additional cost, hence not included. The cost of the programme covering all CHWs increases, however, due to additional drugs and tests (Table 20).

Table 20: Impact on costs of increased number of treatments by CHWs

	Ethiopia	Ghana	Mali	Malawi	Mozambique	Niger
Current cost per Treatment	7.33	13.20	8.75	1.44	7.98	3.32
Cost per Treatment with +30% utilisation	5.86	10.43	7.09	1.40	6.30	3.25
Change in cost per treatment	-20%	-21%	-19%	-3%	-21%	-2.2%
Change in program cost	3.80%	1.70%	5.90%	26.07%	2.80%	27%

Introduction of iCCM requires some level of system strengthening to make it possible. To reflect this wider platform, iCCM+, an arbitrary additional 15% was added to the iCCM basic costs, recognizing that this additional 15% underestimates the additional systems costs at the beginning of the programme but will overestimate them as the programme matures (Table 21). The table represents the net cost to government budgets of the program as it is currently implemented:

- Patients payments have been factored out (Ghana and Mali)
- CHWs subsidies in Mali are not paid from the public health budget
- Full CHWs subsidies are reflected in Mozambique although they spend part of their time on other activities or on over five consultations. This is done because the programme could not have taken place there without the full subsidy of the CHWs.

Table 21: Program Net cost for current coverage

Current utilisation	Ethiopia	Ghana	Mali	Malawi	Mozambique	Niger
Net Current cost excl patients contributions	3 750 978	2 243 133	1 135 104	3 131 594	2 199 760	5 125 615
Net cost iCCM +15%	4 313 624	2 579 603	1 305 370	3 601 333	2 529 725	5 894 457
Increase of utilisation +30%						
Net Current cost excl patients contributions	3 919 920	2 355 800	1 170 202	3 948 013	2 245 936	6 518 912
Net Cost iCCM +15%	5 095 896	2 709 170	1 345 732	4 540 215	2 582 827	7 496 749

12. What is the likelihood that results/benefits continue after DFATD/UNICEF's involvement ends?

Funding from the Catalytic Initiative, and the five years horizon it provided, have ensured that it has really been catalytic and that there is potential for the impact to remain after the end of the project. Scalable policies and programmes (IMCI, iCCM) have been developed and implemented, and the benefits recognised by governments and other stakeholders, providing a policy environment that supports continued roll-out and sustainability of the IHSS supported programme components. Also, the additional costs of the current programme represent a small proportion of the countries’ public health expenditure (as outlined in the next section). However, neither donor funding, nor governments’ own health expenditure are stable. Whilst in the medium term, it is likely that governments’ health expenditure will increase with country economic development in Ethiopia, Ghana, and Mozambique, no such prediction can be made for Malawi, Mali and Niger. In the short term donor funding is required to ensure maintenance of the programme, and some countries have negotiated support from other funders. Box 7 below contains illustrative quotes in relation to sustainability gathered during key informant interviews.

Box 7: Quotes related to sustainability

Government ownership

“There is a sense of ownership of iCCM within the FMOH. The iCCM is a government programme. It is the role of government to develop policies on Child survival and UNICEF only supports with resources; they do not formulate policy.” (Woreda programme coordinator, Ethiopia)

Concern over affordability

“Free care was ‘paid for’ by the exchange of debt relief - where Niger had a cancellation of debt in exchange for free care for children under five years. Free care is very popular, but this government is struggling to continue.” (Ministry of health official, Niger)

Concern with overloading the community

“Mali has a policy of decentralization. The process is administrative only-how do you ensure that financial flow and decisions are also decentralized? The community does not have money to implement a development plan. This is a big fight at the moment-because they feel that they are given the responsibility for sectors (health, education, etc.) without the financial backing. There is need at the national level to appropriate funds for the programme in order to expand the programme.” (Ministry of Health official, Mali)

12a. Are committed financial and human resources sufficient to maintain benefits and results?

To assess the financial sustainability of this programme, the 2012 cost of delivering iCCM was compared to the total annual public health expenditure (government and donors), and to the governments' own health expenditure in 2011 to further evaluate the possibility of the services remaining without donor support.

The additional costs of the current iCCM services represent a small proportion of the countries' public health expenditure, from 0.05% in Ethiopia, to 0.25% in Ghana, 0.45% in Mali, 0.72% in Mozambique, 1% in Malawi, and 3.2% in Niger. Their share of government own expenditure is linked to the importance of donor funding in the public health budget. It ranges from 0.15% in Ethiopia, to 0.33% in Ghana, 1.05% in Mali, 2.34% in Mozambique, 3.49% in Malawi, and 6.55% in Niger (Table 22).

Table 22: iCCM impact on Public Health Expenditure

Current utilisation	Ethiopia	Ghana	Mali	Malawi	Mozambique	Niger
Net cost iCCM +15%	4 313 624	2 579 603	1 305 370	3 601 333	2 529 725	5 894 457
Share Public Health Expenditure 2011	0.05%	0.25%	0.45%	1.00%	0.72%	3.22%
Share Government Own Expenditure 2011	0.15%	0.33%	1.05%	3.49%	2.34%	6.55%

The share of the health budget is clearly a function of the coverage of the current iCCM services. Target coverage of iCCM is modelled to assess the resource implications. In Malawi and Niger iCCM is already spread throughout the country (rural and urban areas), and no additional CHWs will be required. In Ethiopia, if iCCM is extended to cover all under five children, this will involve an additional 20% HEWs; in Ghana expansion to all children under five, but reducing the number of CBAs from 2 to 1 per average 1000 community, the total number of CBAs would increase by 150%; in Mozambique the target number of APEs for 2017 was used and would translate into a 190% increase in the number of APEs; whilst in Mali, a young program, 350% additional ASCs will be required to cover all children under five. The purpose of iCCM, however, is not to cover all children, rather those in more remote hard to reach areas, as such for some countries, the assumptions for target coverage will overstate targets. It, however, represents the maximum cost the services would incur if run as currently, except for Ghana, and if the level of utilisation per CHW increases by 30%, a likely move with maturing of the programme.

In this projection, the iCCM costs would represent a very small portion of Ethiopia's public health and government's own health expenditure, as it would do in Ghana, for both countries at 0.5% or less. In Mali, Malawi, Niger, and Mozambique, it would amount to between 2.5% and 3.2% of public health expenditure and between 4.4% and 6.5% of the government's own health expenditure, except Mozambique where it would stand at 10% of the government's own health expenditure (Table 23).

Table 23: Impact of iCCM target coverage on Public Health Expenditure

ICCM+ & 30% higher utilisation/CHW	Ethiopia	Ghana	Mali	Malawi	Moz	Niger
Assumptions Scale-Up	All under 5s	All under 5s 1 CBA/Community	All under 5s	All districts	Target CHWs 2017	All districts
Scale-up: % increase CHWs	20%	151%	350%	0%	190%	0%
Projected Number CHWs	32 670	25 415	8 320	1 018	3 809	2 560
Share Govt own + Donors Expenditure	0.1%	0.4%	2.5%	1.3%	3.1%	3.2%
Share Govt own Expenditure	0.2%	0.5%	5.8%	4.4%	10.0%	6.5%

Regarding human resources, the current coverage can be sustained by existing CHWs and utilisation could be increased without need for additional CHWs in the areas covered. However, expanding iCCM to new districts to reach the target geographical coverage will require recruitment of significant numbers of additional CHWs and the resources for training and deployment would be substantial. As would the community commitment as noted by a key informant (Box 7). However, it is likely affordable based on results presented in Table 23, particularly in the context of continued donor expenditure.

12b. Is the external environment conducive to maintenance of results?

Share of the government's own health expenditure must be seen in light of the likely trends in the government's own health budget. Whilst in the medium term, it is likely that government health expenditure will increase with country economic development in the case of Ethiopia, Ghana and Mozambique; however, no such prediction can be made for Malawi, Mali and in Niger. In the short term donor funding is required to ensure maintenance of iCCM, and some countries have negotiated support from other funders. For Mali and Niger, increased donor funding is required as government health expenditure is likely to decrease with the pressure to redirect budgets to deal with the countries' security threats. The New Funding Model of the Global Fund which could cover a significant share of the operational costs of iCCM (including CHW salaries) could assist not only the maintenance but the further development of the programme. In addition, the RMNCH Trust Fund initiative seeks to fill gaps in government and donor funding to maintain evidence-based MNCH interventions in high burden countries, of which the six countries in the IHSS are included. Of particular relevance, in March 2014 UNICEF, Global Fund and the RMNCH Trust Fund all announced a unified plan to scale-up iCCM, with suggested increased resources to expand this initiative in the near term.² **Funding from the Catalytic Initiative will have, thus, really played its catalytic role.**

² <http://www.mdghealthenvoy.org/unicef-global-fund-and-rmnch-trust-fund-announce-new-approach-to-align-malaria-and-iccm-planning/>

Box 8: Key points under Sustainability

10. What is the additional cost per treatment for each of the three iCCM conditions?

- The level of additional resources involved in the introduction and running of iCCM for children under five varies greatly between the countries studied. These variations are influenced by the length of time the programmes have been functioning, which in turn impacts on level of utilisation, the existence of pre-existing systems which cover CHWs'/supervisors' salaries, and at times bicycles. As such, comparisons can only be used to highlight factors influencing costs.
- Additional cost per treatment amounts to \$1.4 in Malawi, \$3.3 in Niger, \$7.3 in Ethiopia, \$8 in Mozambique, \$8.8 in Mali, and \$13.2 in Ghana. Cost of consultation, representing CHW cost, is the main cost driver amounting to 88% of treatment cost in Ethiopia, 93% in Ghana, 79% in Mali, and 90% in Mozambique, whilst standing at 7% and 9% in Malawi and Niger, respectively.
- Besides the impact of pre-existing systems, consultation cost is highly dependent on the number of patient visits per CHW. This costs varies from \$0.1 in Malawi, \$0.3 in Niger, \$6.5 in Ethiopia, \$7.2 in Mozambique, \$7 in Mali, and \$12.3 in Ghana. The weighted (by share of condition) cost of drugs and tests per treatment, established as per country protocols, showed much smaller variation from \$0.9 to \$3.

11. What is the cost of increased utilisation?

- Data suggest that a 30% increase in utilisation could be absorbed by the existing CHWs. Cost per treatment decreases with higher utilisation. With 30% more treatments per CHW, the cost per treatment (consultation + drugs) decreases by around 20% in Ethiopia, Ghana, Mali and Mozambique, and by between 2 and 3% in Malawi and Niger, which have already high utilisation.
- However, the overall cost of the programme increases due to higher utilisation of drugs and tests, from 27% in Malawi and Niger down to 1.7% in Ghana.

12. What is the likelihood that results/benefits continue after CIDA/UNICEF's involvement ends?

- Implementation of iCCM funded from the Catalytic Initiative, and the five years horizon it provided, contributed to the decision of the Global Fund and the RMNCH Trust Fund to scale-up iCCM, highlighting its role as catalytic and ensuring that the impact remains after the end of the project.
- Scalable policies and programmes (IMCI, iCCM) have been developed and implemented, and the benefits recognised by most governments and other stakeholders, providing a policy environment that supports in most countries continued roll-out and sustainability of the IHSS supported programme components.

12a. Are committed financial and human resources sufficient to maintain benefits and results?

- Whilst in the medium term, it is likely that government health expenditure will increase with country economic development in Ethiopia, Ghana and Mozambique, no such prediction can be made for Malawi, Mali, and Niger.
- In the short term donor funding is required to ensure maintenance of the services, and some countries have negotiated support from other funders. For Mali and Niger, increased donor funding is required as government health expenditure is likely to decrease with the pressure to redirect budgets to deal with the country security threats.
- The additional costs of the current iCCM services represent a small proportion of the countries' public health expenditure, from 0.05% in Ethiopia, to 0.25% in Ghana, 0.45% in Mali, 0.72% in Mozambique, 1% in Malawi and 3.2% in Niger.
- It amounts to 0.15% of the government's own health expenditure in Ethiopia, 0.33% in Ghana, 1.05% in Mali, 2.34% in Mozambique, 3.49% in Malawi, and 6.55% in Niger. However, share of the government's own health expenditure must be seen in light of the likely trends in the government's own health budget.
- Regarding human resources, the current coverage can be sustained by existing CHWs and utilisation could be increased without the need for additional CHWs in the areas covered. However, expanding iCCM to new districts to reach geographical target coverage will require recruitment of significant numbers of additional CHWs, which will in turn require additional resources representing increased share of public health expenditure.

12b. Is the external environment conducive to maintenance of results?

- The New Funding Model of the Global Fund, which could cover a significant share of the operational costs of iCCM, could assist not only the maintenance but the further development of the iCCM programme. In addition, UNICEF, Global Fund, and the RMNCH Trust Fund have committed to expansion of iCCM a key aspect of IHSS.

6. Conclusions

Relevance

The six countries selected for IHSS support were all relevant for implementing community level interventions delivered by CHWs based on their high burden of maternal and child mortality, dire shortages of human resources for health, and access to care challenges.

1. To what extent did the programme's objectives reflect a health systems strengthening approach, including:

a. alignment with the health policies, planning and health surveillance of the Government?

Alignment of IHSS with the health policies, planning and health surveillance of the Governments was successful and represented one of the strengths of this initiative. The policy environment in each of these countries was critical to the implementation of the IHSS programme. In many of the IHSS countries, the policy environment was primed to implement a programme such as IHSS with many child-survival oriented policy processes already in place or occurring soon after the programme was rolled out. However, for some countries such as Ethiopia, the introduction of iCCM required a lot of groundwork preparation, with UNICEF often at the helm of these efforts, to gain buy-in from various stakeholders including policy makers, health practitioners, and communities.

Further, the instability experienced by some countries, particularly Mali, during the IHSS period, due to geo-political crises, interrupted the implementation of the programme, especially in the areas of supplies, medicines and outreach and supervision activities, but IHSS efforts mitigated the worst impact of these challenges and helped maintain services.

b. training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions?

Training and deployment of front-line health workers represented a success for the IHSS with over 50 000 CHWs trained in iCCM, almost 10 000 nurses/clinicians trained in IMCI, and over 4000 nurses/clinicians trained in iCCM.

2. To what extent did the programme's objectives include a focus on women's participation and a gender equality approach?

Increasing women's participation and gender equality, was included in the IHSS objectives, however implementation of these objectives was only partially met.

The IHSS included a gender equity focus by delivering interventions known to be effective for addressing gender dynamics, such as making services more accessible to carers of children, interventions promoting accessing households directly through home visits and seeking to mobilise and engage communities for improving child health and nutrition outcomes.

There were challenges in meeting some of the IHSS objectives, particularly in reference to women's participation and gender equality as measured by the percentage of women trained as CHWs. Two of

the countries (Mozambique and Malawi), were falling behind in increasing the participation of women in community level care. The findings show that in many of the countries IHSS made efforts to overcome these challenges, but the complex reasons behind the low recruitment of women as CHWs, such as low education levels and cultural issues, require innovation and efforts at both the macro and ground levels to resolve.

Effectiveness

3. To what extent were the objectives related to health system strengthening (including policies, planning and health surveillance) and training, equipment, deployment, and supervision of front-line health workers achieved?

Objectives related to training and deployment of front-line health workers were met, however there were lessons learned which will need to be addressed in any expansion of these programmes.

Objectives related to supervision and supplies, on the other hand, were only partially met, with on-going challenges that impacted overall programme performance in these two areas.

Human resources – recruitment, training and deployment

The IHSS programme resulted in the expansion of health services further into hard to reach communities by strengthening community level service delivery platforms through the conceptualization of a policy framework, the development of training materials and protocols for the implementation of the programme, training of the frontline staff, and the provision of essential drugs and supplies required to implement the services. The programme served to address access challenges by limiting costs to communities through reduced travel times and in most instances, subsidized health care services for pregnant mothers and children. In all of the countries, increased health care utilisation was further facilitated through governments implementing policies to abolish user fees for mothers and children. The financial barriers to health care access are evident when reflecting on Mali, where free health care only applies for malaria drugs and diagnostics, and in Ghana, where iCCM services are charged for despite a free National Health Insurance Scheme for other levels of service delivery. Both countries demonstrated limited community level health care utilisation with populations reporting user fees as a barrier, although other factors are at play including the infancy of the programme in Mali and the sparsely populated communities in both countries where geographical access to health services still remains a significant problem despite the placement of CHWs in remote villages.

Although the duration of training varied in each country, most health care workers reported being comfortable with the level of training but expressed their desire for consistent refresher training to ensure an upkeep of high quality service provision. Some CHWs even expressed a desire to increase their scope of practice. This was further echoed by community members who indicated that they would like CHWs to extend their services to include older children and adults, in addition to providing family planning services in countries where it was not currently being provided. In most countries, workloads are not very high for CHWs and this may be possible, although this would have to be implemented incrementally to ensure that current service provision quality is not compromised. In addition, many of the CHWs subsidize their income through other work activities, and this will have to

be considered when exploring this possibility. While the IHSS programme included early investments in IMCI training at facilities, in most instances, once CHWs were recruited, funding was largely directed towards the support of CHW training. Although IMCI training in countries such as Niger and Malawi is integrated into the training curriculum of staff, in the remaining countries it is not.

In most countries, recruitment for CHWs was done centrally, with the exception of Mozambique and Ghana, in order to ensure equal opportunities for all applicants and central management of the programme. Furthermore, some countries reported that this recruitment process was done so that villages were not uncomfortable with a member of their own community providing health services due to privacy issues; this view point was not shared with all countries, however, with places such as Mozambique indicating that village member participation in CHW selection from their own community promoted buy-in towards the programme and encouraged health care utilisation due to the familiarity with the health care provider. Central recruitment was found to be problematic in countries such as Malawi, where health care worker retention was challenged due to the fact that HSAs were placed in very remote areas away from their own homes. In addition, since not all of the health care workers were provided with homes in the villages where they worked, as this was often the responsibility of the community, this meant that CHWs lived outside of their work catchment area. This presented a burden on CHWs who had to travel long distances in addition to limiting the availability of the service in the community. Health care worker retention was a particular challenge amongst female CHWs who were recruited across all the countries, as they had less decision making power due to cultural and financial constraints and often left their deployment areas, should their partners find work in the city. With none of the implementing countries having a specific gender recruitment policy, the majority of CHWs in all the countries, with the exception of Ethiopia and Ghana, are male due to the educational requirements, in addition to the fact that health care worker attrition is most prevalent amongst women.

Observing the way that iCCM services were implemented differently in the various countries served as a comparison between the notions of whether community level services should be provided door to door, in homes, versus an extension of the health service by providing a fixed structure further into the community where care could be accessed. In the majority of the implementing countries including Malawi, Niger, Mali, and Ethiopia, CHWs worked out of a fixed health post. Most communities felt comfortable with a fixed structure that they could come to at any time of the day to receive health services, as door to door visits meant that children may be missed within the 24 hour critical period of illness, especially in places such as Mozambique where recruitment of CHWs has not reached scale yet.

Many of the countries, including Mali, Ethiopia, Niger, and Mozambique had a volunteer cadre who worked in conjunction with the CHWs to conduct home visits to provide health promotion messages and to identify children and facilitate referrals to the CHWs when needed. This was observed as a critical enabler to successful coverage of services at the community level. The recognition that this important cadre plays is reflected in some of the countries, including Mali and Niger, in addition to Mozambique, although to a lesser degree, moving towards standardising their activities and even considering a clearer compensation mechanism for this historically volunteer cadre. While formal recognition of their roles and consistent supervision and support would ensure that this important cadre is retained in the health system, countries will have to consider the implications this has on

sustainability in light of the fact that most don't have a clear grasp of how many volunteers are operational in the health system.

Supervision

Inconsistent supervision across all the countries was perceived as an area requiring particular attention, especially in light of the fact that CHWs were placed in remote villages with limited access to technical support. While the requirement of most CHWs to go into the facilities to retrieve their monthly drug supplies facilitated linkages to the overall health system and in some instances an opportunity for mentoring and support, the need for observed case management in the villages where the CHWs provide care was challenging in all countries and required particular attention to ensure that CHWs felt supported and confident in their skills to provide a high level of quality of care. Finances linked to the availability of transport support for supervisors and competing job requirements were cited as the most prevalent reasons for inconsistent supervision. Some countries, such as Mali, are considering an integrated supervision mechanism to reduce the burden on limited health care staff. Standardised, simple supervision checklists could be considered as these have been shown to facilitate improved supervision.⁵

Equipment, Supplies and Commodities

Implementing partners, including UNICEF, aimed to ensure a consistent drug supply at the community level, which at times even required circumventing national procurement systems that were weak and experienced recurrent financial challenges, in order to ensure that community service provision was not compromised. As a result, iCCM services at the community level sometimes had a more regular supply of drugs than higher level facilities. However, despite the good intentions of partners, consistent drug supply at the community level was not always maintained, with most IHSS countries reporting stock-outs of essential iCCM commodities. Challenges related to stock-outs were frequent and included poor supply chain mechanisms, inadequate funding including a reliance on external funding that was not always maintained, as well as limited health care worker capacity in supply chain management and procurement, as evidenced in places such as Niger with large amounts of expired drugs at the community level. While routine data was not able to capture this in other countries, reflecting a need for strengthened M&E systems, it is likely that other countries experienced challenges with expired drugs as well.

While the CHWs in most countries have their drugs replenished according to utilisation on a monthly basis, Mozambique's push system, with drug provision through a pre-packed system regardless of burden of disease and utilisation will have to be reassessed to address mismanagement of supply and unnecessary costs on the health system. Ethiopia's implementation of a similar system, although initially necessary to start up the programme, while addressing geographical challenges faced by CHWs to retrieve drugs, will have to be evaluated for the longer-term. Drug utilisation will have to be interrogated further as in all of the countries, only a fraction of the drugs procured using UNICEF/CIDA funds were utilised at the community level. This is likely due to a multitude of factors including inadequate demand at the community level, highlighting the need for increased demand generation from the bottom up, as well as consumption of some of the UNICEF procured drugs at the facility level. It is, however, important to remember that many of the countries, including Mozambique and Mali, have just around a year of implementation at the time of assessment, and as a result, demonstrate great potential for health care expansion despite current levels of utilisation. This is evidenced by

increased health care access at the community level in some of the countries evaluated including Niger, Malawi and Mozambique, with corresponding decreases in the proportion of children under five not accessing any health care. Longer standing programmes such as Niger demonstrate an increase in community- level care-seeking of as much as 11 percentage points over the IHSS period, while Mozambique, despite its infancy, has seen health care utilisation at the community level increase by 4% in approximately one year.

The investment in the procurement of drugs, and the training and support of staff to deliver services, has resulted in increased coverage of drugs and services known to have significant impacts on childhood morbidity and mortality. All of the countries were able to achieve significant increases in ORS coverage and either increased or sustained levels for measles immunisation, while approximately half achieved increases in early breastfeeding, ITN coverage and malaria treatment. Given the fact that coverage of exclusive breastfeeding and postnatal care did not achieve the same level of success in the countries speaks to a need to further invest in maternal and neonatal interventions in addition to interventions for children under five. All of the countries, with the possible exception of Mali due to its cost recovery mechanism using consultation fees and drug sales with the exception of malaria drugs, are heavily dependent on external funding for sustained drug supplies. This was observed during the evaluation period when dramatic drops in drug supplies or commodities followed funding disruptions by major donors including the Global Fund. The success of the programme is extremely dependent on consistent supplies, and the potential for countries to take up this responsibility will need to be explored.

4. To what extent were the objectives related to women's participation and gender-equality achieved?

Increasing women's participation and gender equality, was included in the IHSS objectives, however implementation of these objectives was only partially met. There were challenges in meeting some of the IHSS objectives, particularly in reference to women's participation and gender equality as measured by the percentage of women trained as CHWs. Two of the countries (Mozambique and Malawi), were falling behind in increasing the participation of women in community level care. The findings show that in many of the countries IHSS made efforts to overcome these challenges, but the complex reasons behind the low recruitment of women as CHWs, such as low education levels and cultural issues, require innovation and efforts at both the macro and ground levels to resolve.

5. a. To what extent did coverage of the selected high impact and low cost interventions in the target populations increase?

Utilisation for some high impact and low cost interventions were increased. Interventions showing increases varied across countries, with ORS, measles vaccination, ITNs and malaria treatment featuring prominently.

An important aspect requiring attention is demand for CHW services. Utilisation of community based health services was found to be low in several of the IHSS countries and more research is needed to understand what influences mothers choice of place of treatment for ill children.

b. What additional coverage is plausibly attributable to the programme?

The increases seen in coverage of high impact, low cost interventions overall were relatively modest. The reliance on existing surveys to assess these changes, the fact that the endline survey data did not enable sufficient time for changes to occur in 4 out of 6 countries, and lack of a counterfactual for comparison limited the ability of this evaluation to comment on attribution of any changes seen directly to the IHSS programme. Although increases cannot be specifically 'attributed', the results are encouraging particularly in the two countries which had longer time of implementation to endline survey. Malawi and Niger saw substantial increases in a number of interventions which increased (6 out of 13) and statistically significant increases in care-seeking at community level. **Given the resources supplied to this programme, including training, deployment and supplies, and temporality of the changes seen, based on the logic models developed it can be theorised that the IHSS could plausibly have 'contributed' to the improvements seen in the delivery of high impact, low cost interventions. This conclusion is strongest when applied to Malawi and Niger, which both had time for the programme to mature before the evaluation was completed.**

6. What aspects of the IHSS programme worked? Why did these aspects work?

Alignment with policies, planning, and health surveillance of the Government

- Government ownership – Efforts to gain Government ownership worked well. Government was brought on as the central player from the start.
- Harmonisation and coordination – Efforts to harmonise and coordinate the technical and financial support of development partners worked well. This was achieved through bilateral agreements established through UNICEF.
- Advocacy – Advocacy efforts on the part of UNICEF and implementing partners for changes to policy and plans worked well. This was due to careful but persistent advocacy efforts on the part of UNICEF and implementing partners which provided the information the governments needed to enact changes to policy and plans, which in turn enabled successful implementation of the IHSS programme.

Training, equipping, deploying and supervising front-line health workers to deliver the selected high impact and low cost health interventions

- Building on what exists – Building on existing systems and delivery platforms worked well when these existed. The IHSS was successful with regard to training large numbers of frontline health workers because it built on an existing service delivery platform that already had full government support.
- Health systems approach – The health systems strengthening approach largely worked well. This ensured that the IHSS programme activities targeted building blocks underpinning the health system, and rooted the programme in a logic (even if implicit) for how outputs and outcomes were expected to be achieved.

- Planning for scale – Planning for scale worked. The IHSS programme planned for scale and thereby sought out strategies that could be implemented nationally. In doing so, it contributed to the training, equipping, and supervising over 50,000 community health workers across six countries in sub-Saharan Africa.
- Phased approach – The phased approach to training worked well. The IHSS programme took a phased approach to training and equipping frontline health workers which was linked to envisioned policy changes.

7. What aspects of the IHSS programme did not work? Why did these aspects not work?

- **Demand creation and social mobilization** – The IHSS programme failed to adequately address demand-side barriers that are keeping utilisation of CHWs low. The IHSS programme failed to adequately address these barriers through demand creation, social mobilisation and other cross-cutting strategies such as ensuring uninterrupted supplies at CHW level.
- **Systems strengthening for supply chain management** - The IHSS programme intended to build capacity and strengthen the government supply chain management system as part of its health systems strengthening approach. It failed to do so in all countries, and instead in some cases developed a parallel supply chain system which adequately served the needs of the IHSS programme but that may not be sustained by the government without developing partner assistance.
- **Supervision** - The majority of the CHWs did not receive monthly supervision visits as stipulated under policy. Major challenges noted included insufficient transportation and funds for fuel to carry out supervision at the community level, in addition to facility staff being overwhelmed with their various job requirements.

8. What were the major factors influencing the achievement or non-achievement of the IHSS programme objectives?

Country contextual factors influenced achievement or non-achievement of IHSS programme objectives, but despite these differences common themes for both successes and challenges were found across these contexts as highlighted under questions 4 & 5 in this section.

Impact

9. Was a reduction in child mortality observed amongst target populations?

A reduction in child mortality was observed in household surveys and in modelled LiST results amongst target populations in all countries with the exception of Benishangul-Gumuz region of Ethiopia across the time periods with mortality and coverage data available.

However, the LiST-modelled reduction varied between countries from 1.1% to 7.3% per year. For Ghana and Malawi, the annual rate of mortality reduction as measured by surveys was slower than the annual rate of reduction predicted by the LiST model; whereas for Ethiopia, Mali, Mozambique and Niger, survey data showed a faster rate of reduction than the model.

The LiST analysis did not accurately capture the factors contributing to mortality declines in the evaluated countries and the modelled mortality rates did not align with those measured in household surveys. Two potential reasons for this misalignment could be that factors outside of the health sector could have contributed to mortality declines, and/or incorrect assumptions were used for coverage of high impact interventions without empirical data available to run the LiST model.

9b. Based on plausible attribution of coverage, how many lives were saved?

Of the modelled deaths averted in each of the countries, the majority were due to interventions to which IHSS contributed.

Neither the implementation nor the evaluation of IHSS was designed to definitively measure mortality change. The total deaths averted are a reflection of multi-factorial inputs within the health system, from other donors and other sectors, not just those of the IHSS programme. Additionally, this LiST analysis does not reveal the implementation strength of IHSS in relation to specific interventions, nor does it assign weights to different levels of service provision (e.g., community level). Modelling using LiST provides important information about potential survival gains and the interventions which may have contributed most to lives saved. As with all models, the quality of LiST outputs is determined by the validity and completeness of the input data. Given the limitations of the national and sub-national input data, the different time periods between surveys across the countries, and the entirely modelled endline scenarios in two countries (Ethiopia and Mozambique), it is not possible to quantify a true measure of lives saved overall in these countries, nor lives saved based on plausible attribution of coverage of interventions to which IHSS contributed. The overall deaths averted provided by country and phase are illustrative and informative in their own right but should not be used as a true measure of lives saved in any of the countries or phases examined.

Sustainability

10. What is the additional cost per treatment for each of the three iCCM conditions?

Additional cost per treatment amounts to \$1.4 in Malawi, \$3.3 in Niger, \$7.3 in Ethiopia, \$8 in Mozambique, \$8.8 in Mali, and \$13.2 in Ghana.

The level of additional resources involved in the introduction and running of iCCM, hence its sustainability, is mainly influenced by the pre-existence, or otherwise, of health posts already existing, CHWs' and supervisors' subsidies/salaries (Ethiopia, Malawi, Niger), and by the level of utilisation. As such, comparisons between countries can only be used to highlight factors influencing costs.

Cost of consultations, representing CHW cost (recruitment, training, equipping, supervision, salary or stipend) is the main cost driver (between 79% and 93%) in Ethiopia, Ghana, Mali and Mozambique, whilst standing at 7% and 9% in Malawi and Niger, respectively. The combined time spent on consultations and meetings for iCCM ranges from an average of 8.6 hours a week per CHW in Niger, 7.2 in Malawi, 3.1 in Mali, 3 in Mozambique, 1.2 in Ethiopia, and 1 in Ghana, indicating that a 30% increase in utilisation could be absorbed by the existing CHWs.

11. What is the cost of increased utilisation?

Cost per treatment decreases with higher utilisation. With 30% more treatments per CHW, the cost per treatment (consultation + drugs) decreases by around 20% in Ethiopia, Ghana, Mali, and Mozambique, and by between 2 and 3% in Malawi and Niger, which have already high utilisation.

Strengthening of the health system to enable iCCM to be implemented means that the cost of iCCM must also include an additional 15%, an arbitrary value as this ratio is higher at the beginning of the programme but lower as the programme matures.

Whilst some cost reduction can be achieved through reducing the length of training (Mali, Mozambique) or the ratio of CHW to population (Ghana), level of utilisation is the main driver in cost per treatment. Limitation on utilisation does not appear to come significantly from the supply side, although it may be influenced at times by drug/tests stock-out. In many countries the largest challenge is on the demand side, and strategies are required to increase demand.

12. What is the likelihood that results/benefits continue after DFATD/UNICEF's involvement ends?

Funding from the Catalytic Initiative, and the five years horizon it provided, has ensured that it has really been catalytic, and that the potential exists for impact to remain after the end of the project.

Ultimately, it was the combination of IHSS aligning its funding and support with national priorities in each of the countries, along with the political will and commitment of governments and national ministries of health in particular, which led to the catalytic effect on child survival and health systems strengthening in these countries.

12a. Are committed financial and human resources sufficient to maintain benefits and results?

Whilst in the medium term, it is likely that government health expenditure will increase with country economic development in Ethiopia, Ghana, and Mozambique, no such prediction can be made for Malawi, Mali and Niger. In the short term, donor funding is required to ensure maintenance of the programme, and some countries have negotiated support from other funders. For Mali and Niger increased donor funding is required as government health expenditure is likely to decrease with the pressure to redirect budgets to deal with the countries' security threats.

The additional costs of the current programme represent a small proportion of the countries' public health expenditure, from 0.05% in Ethiopia, to 0.25% in Ghana, 0.45% in Mali, 0.72% in Mozambique, 1% in Malawi, and 3.2% in Niger. It amounts to 0.15% of the government's own health expenditure in Ethiopia, 0.33% in Ghana, 1.05% in Mali, 2.34% in Mozambique, 3.49% in Malawi, and 6.55% in Niger. However, neither donor funding nor government own health expenditure are stable.

Regarding human resources, the current coverage can be sustained by existing CHWs and utilisation could be increased without the need for additional CHWs in the areas covered. However, expanding iCCM to target coverage will require recruitment of significant numbers of additional CHWs.

12b. Is the external environment conducive to maintenance of results?

The external environment is very conducive to maintenance of results as resources are available from Global Fund and the RMNCH Trust Fund, which can be accessed by the participating countries for continued support for IHSS activities.

The New Funding Model of the Global Fund which could cover a significant share of the operational costs of iCCM could assist not only the maintenance but the further development of the programme to reach target coverage. In addition, UNICEF, Global Fund, and the RMNCH Trust Fund have committed to expansion of iCCM as a key aspect of IHSS.

7. Strengths and limitations of the evaluation

7.1 Strengths and limitations of the quantitative component

A strength of this multi-country evaluation is the large amount of survey data available for analysis. A statistical trend analysis was performed on all available data points over time periods corresponding to pre-IHSS, phase I and phase II of the programme. Where necessary, indicator definitions were adjusted to ensure valid comparisons over time between survey types. A limitation of this evaluation is the lack of a comparison group or counterfactual due to the programmes being scaled up at a national level in these settings.

DHS and MICS surveys may dilute the effect of community-based mechanisms as data is aggregated to regional level since exposure to CHWs is localised so the effect is only expected for the villages in which they work. By aggregating to regional level that effect becomes diluted.

We have combined DHS and MICS data files to recalculate coverage indicators over time and care was taken to use standard indicator definitions and appropriate sampling weights. The use of these data was guided by two main reasons: the two are major programmes that generate household-level survey data needed to measure coverage for maternal and child health in low- and middle-income countries and they collaborate closely with interagency processes to ensure that their survey tools are harmonized and comparable as far as it is possible. The latter point, therefore, makes combining these data logical. Additionally, both surveys adhere to the fundamentals of scientific sampling that included updating sampling frames and preparation of appropriate sample documentation.

However, an important difference between MICS and DHS surveys is in the collection of information on under-five children. MICS surveys collect information on the children from mothers or primary caregivers in the household, making it possible to collect information on all children, including orphans and foster children, regardless of whether their biological mothers are in the same household. On the other hand, in DHS surveys most information is collected from the biological mothers in the Woman's Questionnaire. There are also a number of differences in the population covered and the reference periods used to measure coverage, where MICS usually uses births within 0-2 years of the survey, DHS uses 0-5 years; the latter potentially resulting in recall problems. These differences between DHS and MICS surveys may affect coverage estimates and need to be considered when comparing estimates over time.

There are also differences between the LQAS (used in Ghana and Malawi for endline data) and DHS/MICS indicators which need to be taken into account when interpreting trends. The LQAS survey collects data on women and infant health (Tetanus toxoid, IPTp, PNC, early breastfeeding and EBF) from mothers of 0-5 month old infants (as opposed to all women with a live birth in the past two years); therefore, these denominators are different. Furthermore data on vitamin A coverage in the LQAS uses the denominator of children 12-23 months, whilst the MICS and DHS surveys use 6-59 months.

These differences may explain the anomalies in the observed trends. In most cases, coverage estimates using one data source, say DHS, clearly show either upwards or downwards trends. However, when coverage estimates from MICS, DHS and LQAS are combined, the trends are heavily

distorted resulting in non-linear trends. This may be a true reflection of the coverage estimates or a reflection of differing population and reference coverage inherent in the three survey types.

7.2 Strengths and limitations of the LiST analysis

The analysis for these six countries benefited from multiple household surveys including DHS, MICS and LQAS. However, trends in coverage and mortality did not always align between surveys conducted over a similar time period e.g. DHS 2008 and MICS special 2007 in Ghana. In addition, data points were missing particularly for the earlier years in the analyses in Malawi and Ghana.

Household survey indicator definitions do not perfectly match LiST indicators in all cases and closest available proxies were used where needed. Ghana and Malawi had endline coverage data to 2013 for most relevant indicators through the LQAS; however, for the other countries the lives saved analysis only captures the time period from 2007 through to 2011 (Ethiopia and Mozambique) and 2012 (Mali and Niger), missing the most recent year of implementation, just as iCCM services were scaling up in many countries. Data points between the household survey years were interpolated linearly, not necessarily reflecting true coverage patterns, especially for campaign-based interventions. Additionally, the time lag and recall period in the household surveys (two years prior to the interview for many questions) places most of the endline surveys even earlier than the endpoint used for this analysis, i.e., the year of the household survey report release. National mortality data in the DHS represent the midpoint of the five year period preceding the survey, not the year before the survey is published. Given that subnational data was used for many of these analyses, the mortality rate represents the midpoint of a ten year period prior to the survey (to provide stability in estimates for smaller subgroups, e.g., districts, the ten-year period before the survey is used). This is a major limitation of relying on subnational household survey mortality data for an evaluation of a programme that ended so recently. It's also part of the reason why the cumulative lives saved as a definitive number is not presented.

The household surveys used as LiST inputs do not capture data on a number of high impact interventions included in LiST (e.g., resuscitation after birth, Kangaroo Mother Care, full supportive care for infection, therapeutic feeding for severe wasting, vitamin A for measles treatment), and coverage might have changed during the period under consideration. LiST automatically calculates some of these indicators based on coverage of a contact point, such as antenatal care, or facility birth. This is a limitation that might help to explain the differences seen between the mortality rate measured in the household survey and that predicted by LiST.

For subnational projections (all but Mozambique and Niger), population data were extracted from national census data or other national sources, and applied to national population age distribution and crude birth rates. Other inputs where national level data were used as proxy for regional data include causes of newborn and child deaths, nutritional deficiencies, economic status, and indicators in the AIDS impact module (AIM) which calculates lives saved from prevention of mother-to-child transmission of HIV. The use of national cause of death data is particularly important to note in Ethiopia where there is large variability across the country in malaria endemicity and malaria as a cause of child death. Maternal exposure to *falciparum* was adjusted to account for this limitation.

LiST did not accurately predict measured mortality change within a confidence range for 4 regions in Ethiopia, Ghana, Mali, Mozambique, and Niger, resulting in an inability to confidently link measured

mortality reduction with coverage change. For this reason and those mentioned above, the results of the LiST analyses should be treated with caution. The number and proportion of total deaths averted as well as deaths averted due to interventions also supported by the IHSS programme are modeled estimates that do not reflect true lives saved by the IHSS programme or others and should be used exclusively for illustrative purposes.³³

While this evaluation has quantified both the additional cost incurred by the health system, and the estimated under-five lives saved due to changes in coverage of healthcare interventions, efficiency in terms of a single cost per life saved figure is not provided. The methodology for assessing lives saved impact using LiST is based on modelled estimates, not measured outcomes linked to specific interventions delivered at different levels of the health system whereas the costing methodology specifically addressed the community intervention component. Additionally, the lives saved results reflect inputs across the health system resulting in coverage change which include but are not limited to IHSS inputs.

7.3 Strengths and limitations of the costing exercise

Two approaches have shaped the costing exercise each with their strengths and limitations:

- The normative costing approach used in this evaluation has the benefit of reflecting costs as per programme design, and to make it comparable between countries and with other iCCM costing exercises (e.g. MSH²³). However, the limitation of this approach is that it does not reflect the variations in actual implementation (stock-outs, uneven supervision) with its impact on effectiveness of iCCM. As a consequence it also does not reflect actual use of donor funds of which a significant proportion was spent on initial design, set-up, and systems strengthening.
- The benefit of the additional costs approach is that it recognises existing structures and systems and avoids double-counting (e.g., supervisors' salaries already covered in existing government budgets). However, the additional cost approach does not reflect all the costs by excluding those already funded as part of the existing system.

Some elements of the total additional cost of iCCM are excluded (the cost of design, policy development, and broad capacity development) as these costs are 'once-off' costs which will not recur with expansion of iCCM.

It is also important to note that costing a set of iCCM (curative) activities for three key diseases in isolation is limited as in practice CHWs often deliver both preventive and curative services, one strengthening the other.

7.4 Strengths and limitations of the qualitative component

The six country visits were conducted by a mixed methods team with expertise in quantitative, qualitative, and economic evaluation methods, allowing for inter-researcher triangulation from different methodological perspectives. All of the researchers are experienced in health systems research. The key strength of this evaluation was that this group of researchers are not in the direct employ of UNICEF and, therefore, are able to objectively assess the outcomes, impact, and experiences of the implementation of CI/IHSS and to see and experience for themselves how the

CI/IHSS was implemented. The field visits also helped the team to understand the cultural and political context in which the support took place, something that we could not have been achieved by merely doing a desk based evaluation.

While in countries the team spoke to a wide range of stakeholders. These included participants at national, regional, district, facility, and village level. The team was, therefore, able to gain a composite picture on which to base the evaluation.

Although the evaluators were able to gain snapshots of iCCM implementation during the 7-10 day visits, they couldn't completely ground themselves in the contexts. The large number of interviews in this short time also meant they were not able to investigate issues in-depth.

Selection of participants for interviews may have been biased towards those more favourable towards the programme, partly because the team was dependent on the UNICEF offices to assist with selecting appropriate people to interview. The team was able though to gather a wide range of perspectives during the visits and via document reviews. Although the team was able to explain to high level participants that they were separate and not employed by UNICEF, it may have been harder for community level participants to make the distinction. This was especially so when the evaluation team came in UNICEF vehicles, with UNICEF staff. Thus, their inability to make the distinction may have influenced how they related their experiences. When interviewing these community level participants the team also had to rely on translators who were found for them by UNICEF and the Ministries of Health. This meant that they were reliant on the translators' interpretation of both their questions and the participants' responses.

8. Lessons Learnt

8.1 Methodological lessons

8.1.1 Quantitative

Evaluation methods

The assessment of the impact of the programme on changes in coverage of IHSS focused interventions and in turn the analysis of the corresponding deaths averted was challenged due to the use of variably scheduled surveys. In the majority of the countries, with the exception of Malawi and Ghana, where the evaluation was able to make use of the LQAS, data retrieved from the DHS and MICS surveys did not align accurately with the time frame in which the IHSS programme was implemented. For example, baseline measures were often retrieved from survey data either prior to the onset of the IHSS programme, as in the case of Ethiopia, Malawi, Mali and Niger, or after the roll out of the IHSS programme, as in the case of Mozambique, making it difficult to accurately assess the impact of the programme and separate it out from progress that had already been achieved through other programmes and routine health services. Furthermore, the latest available health coverage data for Ethiopia and Mozambique were retrieved from their respective 2011 DHS surveys; with Ethiopia having implemented iCCM at scale only by 2010, and Mozambique even later in 2011. The latest available survey data, therefore, serves to assess the mid-term impact of iCCM at best.

In countries like Mali and Mozambique, where full iCCM implementation had only taken place by 2011, with scale up still underway in 2013, the evaluation was conducted too early to be able to effectively capture the full impact of the programme. The evaluation of these countries at this stage can point to early progress made; however, the lack of positive impact at this state can dangerously misconstrue the potential of the programme if not considered with this limitation in mind.

A lack of counterfactual to serve as a true comparison for the assessment of IHSS programme impact in all of the countries further challenged this evaluation. In countries such as Malawi and Niger, the programme was implemented nationally, although not only through UNICEF and DFATD support, and thus, could not be measured against areas that did not receive the intervention. Similarly, the programme in Mozambique was incrementally scaled up from 33 to 144 districts, and thus, a lack of district level data from the surveys rendered it impossible to find a true counterfactual. Although the programme in Mali was only implemented in the five Southern Regions due to war and political unrest, the Ministry of Health eventually plans to scale up the programme nationally. While the three northern regions in Mali still did not receive IHSS support to date, they could not serve as a comparison area as they are very different in terms of burden of disease and population density. In other countries such as Ethiopia and Ghana, while the IHSS programme is not being implemented nationally, other maternal and child health programmes are occurring elsewhere. Furthermore, the intervention and non-intervention areas, as is the case with Mali, differ with regard to factors beyond whether they received the intervention so as to render them inappropriate as true counterfactuals.

Coverage trend analysis

Careful reading of the country survey reports and the questionnaires used for each indicator made it easier to understand the data and to identify discrepancies between surveys. One main observation made was that different survey types collect data over varying time spans wherein DHS mainly collects over the preceding 5 years while MICS over a period of 2 years. Therefore, it was necessary to redefine DHS data by restricting it to the most-recent two years wherever both surveys had to be included in an analysis.

Secondly, survey data tends to improve with technical advancement over the years and hence questionnaires used in gathering data need to be evaluated before merging data from different time points within a survey type. An example is that older DHS surveys tend to be simpler and the most-recent ones are more detailed. Therefore, the former may not give adequate information needed for an indicator whose definition is relative to the current health recommendations which in most cases have also changed over the years. In such cases, it becomes necessary to re-define an indicator around the limitations of earlier survey data if the latter has to be included in the analyses. In the Ghana data for example, surveys before 2008 simply indicate whether a child received vitamin A or not while the more recent surveys further give the number of doses administered.

A third main observation is that the way in which sampling frames are defined may differ between surveys thus affecting the way in which weighting needs to be done. In setting the data as a survey before analysis, the correct primary sampling unit and strata need to be used in conjunction with the assigned weights. In most cases, these variables were already generated and named accordingly in the survey datasets. However, in our evaluation, the sample stratum was not readily generated in the Ghana MICS survey data. Therefore, the evaluators had to read the corresponding survey reports to understand how the sampling frame was defined and then generate the appropriate strata variable from the data. The overall lesson learned is that no assumptions should be made about anything in the data but rather careful reading of the country survey reports and questionnaires is necessary a priori.

LiST

Due to the specific parameters of the LiST modelling (e.g., not attributing lives saved to specific health service levels), and the parameters of the costing analysis (calculating additional, not full costs of delivering iCCM), the evaluation did not calculate cost-per-life saved.

Assessment of lives saved over such a short time (less than one year) after a programme is at scale (over 80% of CHWs trained in iCCM) is likely to be an underestimate of their actual number in a more mature programme. A recent international symposium on iCCM (to which this evaluation contributed) recommended to *“only conduct endline evaluations of impact after being at scale (i.e., 80% of providers trained and equipped) with high utilisation for at least 1 year”*³

³ <http://iccmsymposium.org/>

Costing

Cost per treatment is not fixed; it is very dependent on the level of utilisation.

Costing of impact can be very misleading when done too early in the life of a programme and result in artificially high cost due to as yet too small quantifiable impact. This could lead to the rejection of the programme by policy makers.

Actual costing of a programme (by opposition to a per protocol costing) requires a significant amount of time due to the multiple stakeholders and the absence of routine information with the level of detail required.

8.1.2 Qualitative

The evaluation field visits proved to be invaluable. In each country team an effort had been made to be fully au fait with the country context before the visit. This meant reading as much of the material that UNICEF had provided as well as reading the relevant published literature related to both the country and the topic of iCCM. Still, this reading was nowhere as valuable as seeing how the programme operated in the field. Each of the field visits deliberately included both a metropolitan visit to see policymakers and other key informants as well as visits to the rural areas to see the programme in action. The team was, therefore, able to see the difference between what was intended to be implemented and what was in the end occurring on the ground. It allowed for example to understand what was meant by infrastructural difficulties when the state of bicycles and other equipment could be seen directly. Having time in the field also allowed the team to experience the divergent viewpoints of national role players, because a range of people could be interviewed. The team worked hard at separating programme lessons in one country from another, while still comparing the similarities and differences. The team believes a strength of its approach was to have field teams comprised of researchers with different experiences and different skill sets. This allowed for triangulation of the members' experiences in the field so as to create a fuller picture of each country context. In summary, the quantitative data is extremely useful, but it becomes illuminated when considered using the lens of what was observed on the ground in each country.

8.2 Programmatic lessons

Relevance

- Receptive political environments, good collaboration and alignment with government priorities, is necessary for the successful implementation of MNCH programmes such as the IHSS.
- Promoting gender equality in recruitment and training of female CHWs can be achieved; however, the gains may not be sustainable if attrition amongst female workers is high, most likely due to broader gender dynamics limiting women's roles.

Effectiveness

- Recruitment policies of CHWS take on various forms across countries-including both central and decentralised hiring processes. These differences draw a balance between fair and equitable work opportunities when managed centrally, and that of community participation and acceptance when CHWS are selected from their own villages and furthermore ensures that CHWs are always available to provide care. The approach taken will need to be considered within local contexts in the development of any new CHW programme.
- Training of large numbers of CHWs across countries can be effective in creating a new layer of service delivery for hard to reach populations, and in some cases promote the establishment of a new cadre of community health care workers.
- While the duration of training can vary across countries, systematic focus on the three main childhood diseases ensures a standardised level of competency among CHWs.
- Two tiered CHW systems provide a volunteer cadre able to augment the work of CHWs by providing health education and promotion services through home visits and the identification and referral of children. Furthermore, this cadre felt recognized and supported due to the presence of CHWs.
- Transport, financial and time constraints need to be addressed in any programme to ensure consistent supervision of CHWs which has repeatedly been identified as a critical challenge across countries.
- Even with focused objectives to strengthen and work through the national supply chain system, weak systems sometimes result in the need to circumvent the national supply chain to ensure consistent commodity provision to the community. While essential to ensure that services are not disrupted, this undermines health system strengthening.
- Furthermore, critical gaps in data monitoring systems need to be addressed in any programme to monitor stock-outs of the critical drugs, and data on expired drugs.
- To ensure drugs are consumed at the community level a combination of factors must be addressed, including low levels of utilisation, mismanagement of drugs, and consumption of commodities at higher level services (facility level).
- Increases in coverage of high impact interventions can be achieved through these programmes even in the context of major challenges of famines, droughts, and political and economic crises in some of the countries.
- There is a lack of understanding of the drivers of utilisation and mothers' choices of place of treatment.
- There is a dependence of countries on donor support for the provision of essential commodities as evidenced through drops in coverage of select indicators (e.g., ITNs) following national funding disruptions.
- Community members across countries may request expansion of CHW-provided services to include older children and adults, and other services such as family planning.

Impact

- Improvements in the availability of sound, prospective demographic, epidemiological, and intervention coverage data at national and sub-national levels are needed to monitor progress, apply course corrections and evaluate results.

Sustainability

- Community-based interventions are not necessarily 'cheap', and even in situations where CHWs are volunteers, significant costs have to be incurred (e.g., training, kits, bicycles).
- Level of utilisation is a central driver in the cost per treatment. The catchment area of each CHW must balance access and sufficient level of demand.
- Aligning funding and support for child health initiatives with national priorities, along with the political will and commitment of governments, and national ministries of health in particular, is important for programme sustainability.
- The short term and medium term likelihood of continued results and benefits from donor programmes such as IHSS are dependent on country context and economic outlook.

9. Recommendations

9.1 Methodological recommendations – For Researchers and Evaluators

Quantitative

Using currently available household surveys for programme evaluation is common. However, in using currently available surveys, it is recommended that researchers evaluate all the questions used in different surveys for gathering data for each indicator of interest. The evaluation team observed some small but very important differences which could mislead results. In such cases, it becomes necessary to revise a definition for which comparable data can be extracted from the different sources. These differences should not only be expected between different survey types but also checked within a survey type between different time-points. Older surveys for example, tend to give less detailed information and hence the definition would need to be restricted around their limitations.

In line with the challenges faced in extracting point estimates for the specific definitions recommended for some indicators, one major recommendation would be that all aspects related to a health indicator be captured during data collection to allow for a broad array of data to be available. A common example is that of vitamin A. A number of surveys did not capture the number of doses a child received, thereby, forcing the evaluators to generalise the definition to just 'ever received vitamin A'. Lack of detailed information limits the ability to report whether such an indicator was delivered adequately in an area by the service provider or whether it is the caregiver who failed to use the service optimally. If all possible questions were asked around vitamin A in a survey where the recommendation is administration of 2 doses by the age of 2 years, for example, it will then be possible to tell from the survey data whether the programme did offer 2 doses of vitamin A and, hence, the problem was poor uptake of the service from those seeking care or whether the program failed to meet the recommendations and only offered a single dose of vitamin A.

Self-report can lead to recall bias when it comes to survey information required from a longer retrospective time period. An example is information about health-care given during the most-recent pregnancy where the last pregnancy was 4-5 years ago. There is need to collect and keep all health data in reliable databases. Using health cards is necessary for the individual seeking care but these could get lost or fade with time or not be easily available for research purposes. Also, collection and storage of routine information on an ongoing basis will provide a rich data resource for evaluating health outcomes more effectively. Routine data collected annually will for example make inter-country comparisons more plausible and easier to perform in more accurate ways by allowing researchers to select the most comparable time-periods depending on research goals.

The reliance on national surveys, while providing robust coverage data on a national scale, lacks specific details on the quality of care at the service provision level, and, therefore, results in a critical gap for programme evaluations. Such limitations result in the need to conduct additional surveys that can obtain these essential details for comprehensive evaluation of health programmes. Examples of this were seen in Niger where a recently conducted census survey of health facilities was undertaken which included a component on observation of case management, and in Ghana a survey was undertaken amongst CBAs to determine their case load amongst other indicators. This is an area of

critical research that should be applied across implementing countries, especially in light of inconsistent supervision and low utilisation of services.

Another critical gap in programme evaluation is linked to interrogating the factors associated with health service demand in the population. Frequently new health programmes are delinked from community mobilisation and demand generation activities, which are critical elements in service uptake. While many of the countries in the evaluation are still in the early stages of programme implementation and, therefore, have expected low levels of utilisation, other critical elements of health care demand including awareness raising, financial constraints, long travel distance, and elements linked to the health sector itself including drug stock-outs, staff attitudes, and the quality of service provision. The LQAS survey is one such example of a survey that is able to obtain data linked to the population's demand for services, and should be implemented systematically in countries. Data from the LQAS in Mali was able to identify financial challenges as the one key element affecting the population's utilisation of health services; such data can be used in future programming plans when attempting to reach the most marginalised populations in critical need of health care.

Data from the DHS and MICS surveys are able to capture data on the proportion of the population who seeks care and at what level of service delivery they receive it. While this data is critical and has been used for the evaluation, the time lags between each survey mean that this level of data cannot be captured on a continuous basis. Furthermore, these surveys lack the ability to provide specific workload data at the community level and more specifically per CHW. Such data is integral in assessing whether CHW/patient ratios are appropriate and whether there is room for increasing the scope of practice of CHWs as encouraged by recipients across countries.

LiST

Plausible contribution of IHSS to lives saved has been assessed through modelling. It is acknowledged that other interventions not included in the IHSS package have also played a role in child survival such as improved care at birth, and that the modelled estimates reflect changes in coverage at all levels of the health system (and not only the community level). It is recommended that future evaluations strive to collect data at the level at which we expect to see impact, e.g., the CHW/ health post level.

Plausible contribution for mortality changes is difficult to ascertain for a discrete set of health interventions such as iCCM, given the contribution of a wide range of health services and non-health factors, and the long implementation time required for interventions to change population level health outcomes. It is recommended that future evaluations of UNICEF interventions broaden the outcome parameters to be measured so as to take these complexities into account.

9.2 Programmatic recommendations

Relevance

- For **Programme Managers**, child health initiatives should be aligned with national priorities, along with the development of political will and commitment of governments, and national ministries of health in particular.
- For **National Policy Makers**, inter-sectoral efforts are required to address gender equity amongst CHWs and more broadly in education and economic empowerment.

Effectiveness

- For **National Policy Makers and Programme Managers**, the IHSS programme has provided evidence that large-scale community-based platforms for delivery of MNCH and nutrition interventions are possible, suggesting that these programmes should be considered for national implementation.
- For **Programme Managers**, the community driven selection process of CHWs is recommended as it improves acceptability of selected health workers. However, there is a need for checks and balances to ensure fair opportunities for qualified applicants and a participatory consultative recruitment process.
- For **Programme Managers**, the number of iCCM training days may need to be reviewed to be adapted to the pre-existing level of competency of the CHWs.
- For **Programme Managers**, ensure policies are in place to prioritise women for recruitment and address the barriers to recruitment of women and factors linked to attrition among females.
- For **Programme Managers**, the two tiered community level health cadre system is recommended as it ensures an equitable distribution of tasks between health promotion through home visits and curative service provision. When not in place, sufficient CHW to population ratios must be ensured to allow them to provide these dual roles. Furthermore, CHWs need to be provided with ongoing transportation maintenance support for adequate population coverage.
- For **Supply Managers**, data revealing levels of drug stock-outs and expired drugs should be in place to identify the need for stock management training and better quantification of drug requirements to avoid unnecessary costs through the mismanagement of drugs.
- For **Programme Managers**, supervision with observation of case-management needs to be improved by ensuring accountability mechanisms are in place. The challenges to adequate supervision can be addressed through innovations including mentorship programmes in health facilities, integrated supervision visits, use of simple objective supervision checklists⁵, and specific budget line allocations for supervision. The requirement could be established that a completed supervision check list is a pre-requisite for payment of per-diems to supervisors.
- For **Researchers**, more research is needed to understand what influences mothers choices of place of treatment for their ill children.

Impact

- For **National Policy Makers**, immunisations, notably the HiB and pneumococcal vaccines, featured prominently in the lives saved modelling. Given the high impact of these interventions they should be prioritised for scale up, particularly for hard to reach areas.
- For **Researchers and Evaluators**, in order to effectively measure impact and contribution there is a need for continuing efforts to improve the availability of sound, prospective demographic, epidemiological, and intervention coverage data at national and sub-national levels.
- For **Researchers and Evaluators**, it should be recognised that care-seeking patterns take time to change significantly. A new sustainability study should be undertaken when iCCM has reached higher maturity, and likely higher utilisation. Patterns of utilisation at health centers and community level would have stabilised and with such stabilisation, health impact could be quantified; new costing should calculate the cost per life saved.

Sustainability

- For **International Development Donors**, continued donor support is required to sustain health system strengthening gains and continue iCCM programmes and drug supply. Such donor support should have a concurrent focus on strengthening the government drug supply systems to promote sustainability of iCCM.
- For **Programme Managers**, catchment areas per CHW must be assessed to combine 2 factors moving at times in different directions: 1) geographic access and 2) size of population covered, to optimise utilisation of CHWs.
- For **Financial Managers**, in countries where CHWs are not based in a health post, bicycles must not be seen as a one-off expenditure, replacement of bicycles (or system to finance parts) must be factored in (Note: this was done in this costing through the annualisation of the capital costs).
- For **Financial Managers**, proper budgeting for transport needs to be made for CHW programmes, in particular to ensure higher supervision: purchase and maintenance of motorbikes, and budget for fuel.
- For **National Policy Makers**, countries interested in funds for new or continuing iCCM programmes should include these programmes in their Global Fund/RMNCH Trust Fund proposals.
- For **Researchers and Evaluators**, accompanying later utilisation studies suggested in the impact section above, costing studies should be done of iCCM, but also of visits at health centre level for which there is a real paucity of information. The additional costs of iCCM could then be better put in the perspective of other savings at higher level in the health system due to fewer consultations at health center level, or even hospitalizations. As part of the costing of iCCM, the studies should identify the percentage of visits which do not translate into treatments.

10. References

1. Canadian International Development Agency. The Catalytic Initiative to Save a Million Lives. 2007. <http://www.acdi-cida.gc.ca/acdi-cida/acdi-cida.nsf/eng/NAD-1249841-JLG>.
2. Creswell John W, Plano Clark Vicki L. Choosing a Mixed Methods Design. Designing and Conducting Mixed Methods Research. 2 ed. Los Angeles, London, New Dehli: Sage; 2011: 53-106.
3. Victora CG, Black RE, Boerma JT, Bryce J. Measuring impact in the Millennium Development Goal era and beyond: a new approach to large-scale effectiveness evaluations. *The Lancet* 2011; **377**(9759): 85-95.
4. USAID., MCHIP. Indicator Guide: Monitoring and Evaluating Integrated Community Case Management. Washington: USAID, 2013.
5. Hill Z, Dumbaugh M, Benton L, et al. Supervising community health workers in low-income countries--a review of impact and implementation issues. *Global health action* 2014; **7**: 24085.
6. UNICEF. Committing to Child Survival: A Promise Renewed Progress Report 2013. New York: UNICEF, 2013.
7. Victora CG, Schellenberg JA, Huicho L, et al. Context matters: interpreting impact findings in child survival evaluations. *Health Policy Plan* 2005; **20 Suppl 1**: i18-i31.
8. Biesma RG, Brugha R, Harmer A, Walsh A, Spicer N, Walt G. The effects of global health initiatives on country health systems: a review of the evidence from HIV/AIDS control. *Health Policy and Planning* 2009; **24**(4): 239-52.
9. World Health Organisation Maximising Positive Synergies Collaborative Group. An assessment of interactions between global health initiatives and country health systems. *The Lancet* 2009; **373**(9681): 2137-69.
10. Bryce J, Victora CG. Ten methodological lessons from the multi-country evaluation of integrated Management of Childhood Illness. *Health Policy Plan* 2005; **20 Suppl 1**: i94-i105.
11. Bryce J, Gilroy K, Jones G, Hazel E, Black RE, Victora CG. The Accelerated Child Survival and Development programme in west Africa: a retrospective evaluation. *Lancet* 2010; **375**(9714): 572-82.
12. Prime Minister of Canada Stephen Harper. PM launches Initiative to Save a Million Lives. 2007. <http://www.pm.gc.ca/eng/media.asp?id=1911> (accessed 23.04.12).
13. WHO. Everybody's business: strengthening health systems to improve health outcomes: WHO's framework for action. Geneva: WHO, 2007.
14. Habicht JP, Victora CG, Vaughan JP. Evaluation designs for adequacy, plausibility and probability of public health programme performance and impact. *International journal of epidemiology* 1999; **28**(1): 10-8.
15. United Nations Evaluation Group. Standards for Evaluation in the UN System. New York: UNEG, 2005.
16. CIDA/UNICEF. Schedule A for Grant Funding to a UNICEF Program. Quebec/New York: CIDA/UNICEF, 2010.
17. UNICEF. Important Note for Request for Proposal for Services (RFPS) #2012-501385. New York: UNICEF, 2012.
18. Hazir T, Begum K, El Arifeen S, et al. Measuring coverage in MNCH: a prospective validation study in Pakistan and Bangladesh on measuring correct treatment of childhood pneumonia. *PLoS Med* 2013; **10**(5): e1001422.
19. Johns Hopkins Bloomberg School of Public Health. LiST: The Lives Saved Tool. An evidence-based tool for estimating intervention impact. 2010. <http://www.jhsph.edu/dept/ih/IIP/list/index.html>.
20. Boschi-Pinto C, Black RE. Development and use of the Lives Saved Tool: a model to estimate the impact of scaling up proven interventions on maternal, neonatal and child mortality. *International journal of epidemiology* 2011; **40**(2): 520-1.

21. Stover J, McKinnon R, Winfrey B. Spectrum: a model platform for linking maternal and child survival interventions with AIDS, family planning and demographic projections. *International journal of epidemiology* 2010; **39 Suppl 1**: i7-10.
22. Walker N, Tam Y, Friberg IK. Overview of the Lives Saved Tool (*LiST*). *BMC public health* 2013; **13**(Suppl 3): S1.
23. Jarrah Z, Lee A, Wright K, Schulkers K, Collins D. Costing of Integrated Community Case Management in Malawi. Boston: Management Sciences for Health, 2013.
24. Bhutta Z, Chopra M, Axelson H, et al. Countdown to 2015 decade report (2000-10): taking stock of maternal, newborn, and child survival. *Lancet June 5* 2010; **375**(9730): 2032-44.
25. Wroe D. Donors, dependency and political crisis in Malawi. *African Affairs* 2012; **111**(442): 135-44.
26. Degefie T, Marsh D, Gebremariam A, Tefera W, Osborn G, Waltensperger K. Community Case Management Improves Use of Treatment for Childhood Diarrhea, Malaria and Pneumonia in a Remote District of Ethiopia. *EthiopJHealth Dev* 2009; **23**(2): 120-6.
27. UNICEF and Liverpool School of Tropical Medicine. . New York: UNICEF and Liverpool School of Tropical Medicine. Gender Influences on Child Survival, Health and Nutrition: A Narrative Review: New York: UNICEF and Liverpool School of Tropical Medicine, 2011., 2011.
28. Johns Hopkins Bloomberg School of Public Health. Independent Evaluation of the Integrated Community Case Management of Childhood Illnesses in Oromia Region, Ethiopia. Baltimore, 2013.
29. Save the Children USA. Endline Evaluation of the Integrated Community Case Management Program in Mozambique. Washington: Save the Children, 2013.
30. Malaria Consortium. Evaluation of community-based management of childhood illnesses in Inhambane province, Mozambique. Results from baseline and endline household surveys undertaken in August 2010 and November 2012: Malaria Consortium, 2013.
31. National Statistical Office Malawi and Institute for International Programs - Johns Hopkins University. Measuring CCM Implementation Strength: Report of Findings from a Pilot Study Catalytic Initiative Rapid Scale-Up program, Malawi, 2011.
32. Cleland JG, Van Ginneken JK. Maternal education and child survival in developing countries: the search for pathways of influence. *Soc Sci Med* 1988; **27**(12): 1357-68.
33. McCoy D, Jensen N, Kranzer K, Ferrand RA, Korenromp EL. Methodological and policy limitations of quantifying the saving of lives: a case study of the Global Fund's approach. *PLoS Med* 2013; **10**(10): e1001522.

11. Appendices

Appendix A: Table of indicators included in the evaluation

Packages	Coverage indicators*	Interventions in <i>LiST</i>	Indicator definition in <i>LiST</i>	Data source used for <i>LiST</i> analysis	IHSS basic	IHSS- iCCM	Non-IHSS
Periconceptual	Contraception use (1.3.2.17)	Contraception use	Proportion of women currently married or in union aged 15-49 years of age who are using (or whose partner is using) a contraceptive method (either modern or traditional)	Household surveys			X
	(1.3.2.18)		Proportion of women that are currently married or in union 15-49 years of age that have an unmet need for contraception				
		Folic acid supplementation or fortification	Proportion of married women receiving folic acid supplementation tablet or fortification at conception	No national level data available. Set at 0 for baseline			X
Expanded Antenatal Care Package	Antenatal care (1.3.2.19)	Antenatal care (4 visits)	Proportion of women who were attended at least 4 times during pregnancy by any provider (skilled or unskilled)	Household surveys			X
	(1.3.2.20)						
	Tetanus toxoid vaccination** (1.3.2.14)	Tetanus toxoid vaccination	Proportion of women with a live birth in the last 2 years who received at least 2 doses of tetanus toxoid vaccine during the last pregnancy	Household surveys	X		
	IPTp** (1.3.2.13)	IPTp	Proportion pregnant women living in malaria endemic areas and receiving IPT for malaria (at least two doses of SP) or sleeping under an ITN during their last pregnancy	Household surveys	X		
	ITNs (1.3.2.8)						
		Syphilis detection and treatment	Proportion of pregnant women screened for syphilis with the rapid plasma reagent test and treated with 2.4 miu benzathin penicillin, if needed	Calculation in <i>LiST</i> based on antenatal care 4 visits			X
		PMTCT – prevention of mother to child transmission of HIV	Proportion of HIV+ pregnant women receiving prenatal prophylaxis – single dose nevirapine, dual ARV, HAART	National country program data, UNAIDS/PEPFAR	X		
		Facility based births	Proportion of infants delivered in a facility	Household surveys			X

Childbirth & Immediate Newborn Care	Skilled birth attendance (1.3.2.21)	Skilled birth attendance	Proportion of births attended by skilled health personnel (doctor, nurse, midwife, auxiliary midwife)	Household surveys			X
		Essential care for all women and immediate essential newborn care		Calculation in LiST based on facility delivery			
		Basic emergency obstetric care (clinic)		Calculation in LiST based on facility delivery			
		Comprehensive emergency obstetric care		Calculation in LiST based on facility delivery			
		Clean birth practices	Proportion of neonates delivered with appropriate clean birth practices	Calculation in LiST based on facility delivery			
		Immediate assessment and stimulation	Proportion of neonates with appropriate drying and stimulation immediately after birth	Calculation in LiST based on facility delivery			
		Labor and delivery management		Calculation in LiST based on facility delivery			
		Neonatal resuscitation	Proportion of newborns with access to detection of breathing problems and resuscitation	Calculation in LiST based on facility delivery			
		Antenatal corticosteroids for preterm labor	Intramuscular injection of betamethasone sodium phosphate to women with suspected premature labor	Calculation in LiST based on facility delivery			
		Antibiotics for PROM	Administration of oral erythromycin to women with premature rupture of membranes who are not in labor to prevent PROM	Calculation in LiST based on facility delivery			
Breastfeeding	Breastfeeding initiation** (1.3.2.23)	Breastfeeding initiation	Proportion of newborns put to the breast within one hour of birth	Household surveys	X		
	Exclusive breastfeeding prevalence (0-5 months)** (1.3.2.24)	Exclusive breastfeeding prevalence (0-5 months)	Proportion of infants aged 0-5 months of age who are exclusively breastfed: 0- <1 month, 1-5 months	Household surveys	X		

	Complementary feeding (1.3.2.25)	Complementary feeding	Proportion of infants aged 6-8 months of age who are breastfed and receive complementary food	Household surveys	X		
Preventive care	Preventive postnatal care - includes thermal care and clean postnatal practices (1.3.2.26)	Preventive postnatal care - includes thermal care and clean postnatal practices	Proportion of mothers who received a postnatal care visit within two days of birth	Household surveys			X
	Vitamin A supplementation** (1.3.2.5.1)	Vitamin A supplementation	Proportion of children 6-59 months who received at least one high dose Vitamin A supplement in the last 6 months	Household surveys	X		
		Zinc supplementation	Proportion of children 6-59 months receiving full coverage with zinc	Household surveys			X
	Improved water source (1.3.2.28)	Improved water source	Proportion of the population using improved drinking water sources	Household surveys			X
		Improved sanitation – utilization of latrines or toilets	Proportion of homes with access to an improved latrine or flush toilet	Household surveys			X
		Hand washing with soap	Proportion of mothers washing their hands with soap appropriately	No national level data available. Set at 17% (global average)			X
		Hygienic disposal of children's stool	Proportion of children whose fecal matter is adequately contained	Household surveys			X
	ITN ownership** (1.3.2.9)	ITN ownership	Proportion of children under 5 years of age sleeping under an insecticide treated net the previous night	Household surveys	X		
Vaccines		BCG	Proportion of children 12-23 months of age who received 1 dose of BCG vaccine	Household surveys			X
		Polio	Proportion of children 12-23 months of age who received 3 doses of polio vaccine	Household surveys			X
	DPT3** (1.3.2.7)	DPT3	Proportion of children 12-23 months of age who received the third dose of DPT or Pentavalent vaccine	Household surveys	X		

		Hib	Proportion of children 12-23 months of age who received the third dose of Haemophilis influenza type B (Hib) vaccine	Household surveys			X
		HepB	Proportion of children 12-23 months of age who received the third dose of Hepatitis B vaccine	Household surveys			X
		Pneumococcal	Proportion of infants having received 3 doses of pneumococcal vaccine	No national level data available. Set at 0 for baseline			X
		Rotavirus	Proportion of infants having received 3 doses of rotavirus vaccine	No national level data available. Set at 0 for baseline			X
	Measles** (1.3.2.6)	Measles	Proportion of children 12-23 months of age who received measles vaccine	Household surveys	X		
urative care		Kangaroo mother care	Proportion of low birth weight infants with access to kangaroo mother care	No national level data available. Set at 0 for baseline			X
		Oral antibiotics: case management of severe neonatal infection	Proportion of neonates with suspected pneumonia, sepsis or ARI in the 2 weeks preceding the surveys treated with antibiotics	No national level data available. Set at 0 for baseline			X
		Injectable antibiotics: case management of severe neonatal infection	Proportion of neonates with suspected pneumonia, sepsis or ARI in the 2 weeks preceding the surveys treated with antibiotics	No national level data available. Set at 0 for baseline			X
		Full supportive care: case management of severe neonatal infection	Proportion of neonates with serious infection with facility based care	Data not available – LiST uses same proportion as facility deliveries			X
	Diarrhoea** (1.3.2.12.4)	Oral rehydration solution	Proportion of children under 5 years of age with diarrhoea in the last 2 weeks who received ORS	Household surveys	X	X	
	(1.3.2.12.5)	Zinc for treatment of diarrhoea	Proportion of children under 5 years of age with diarrhoea in the last 2 weeks who received zinc	Household surveys		X	
	(1.3.2.12.6)	Antibiotics for treatment of dysentery	Proportion of children with dysentery treated with antibiotics	Household surveys, if available, otherwise set at 50% of ORS			X

	Pneumonia** (1.3.2.11.2) (1.3.2.11.3)	Case management of pneumonia in children	Proportion of children under 5 years of age with ARI symptoms in the last 2 weeks whose mothers/caregivers sought care	Household surveys		X	
		Vitamin A for treatment of measles	Proportion of measles cases treated with vitamin A.	Set at level of vitamin A supplementation Household surveys			X
	Malaria** (1.3.2.10.3)	Malaria	Proportion of children under 5 years of age with fever in the last 2 weeks who received appropriate treatment (as per national policy)	Household surveys		X	
		Therapeutic feeding for severe wasting	Proportion of wasted children receiving therapeutic feeding	No data available – set at 0		X	
		HIV treatment	Cotrimoxazole ART	Country program data, UNAIDS/PEPFAR			X