

Report on the Summative External Evaluation of the Catalytic Initiative (CI)/ Integrated Health Systems Strengthening (IHSS) Programme in Ethiopia

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



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Study team

Country visit: Marian Loveday, Duduzile Nsibande, Charles Hongoro

Report writing: Tanya Doherty, Marian Loveday, Duduzile Nsibande, Karen Daniels, Emmanuelle Daviaud, Kate Kerber, Wanga Zembe, Natalie Leon, Mary Kinney

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

LiST analysis: Kate Kerber

Report peer reviewers: David Marsh, Wim van Damme, Igor Rudan

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***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)

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ACRONYMS

ACT	Artemisinin-based combination therapy
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal care
ARI	Acute Respiratory Infection
BCG	Bacillus Calmette–Guérin
CBN	Community-based Nutrition
CCM	Community Case Management
CHERG	Child Health Epidemiology Reference Group
CI	Catalytic initiative
DFATD	Department of Foreign Affairs, Trade and Development
C-IMNCI	Community Integrated Management of Neonatal and Child Health
CMNCH	Community-based Maternal Neonatal and Child Health
DPT3	Diphtheria, Pertussis and Tetanus vaccine
EBF	Exclusive breastfeeding
EmONC	Emergency Obstetrics and Newborn Care
EPI	Expanded Programme on Immunisation
FGD	Focus group discussion
FMOH	Federal Ministry of Health
GAVI	Global Alliance for Vaccines and Immunisation
GDP	Gross domestic product
HC	Health centre
HDA	Health development army
HEP	Health extension programme
HEW	Health extension worker
HIV	Human Immunodeficiency Virus
Hib	Haemophilus influenzae type b
HP	Health post
iCCM	Integrated community case management of common childhood illnesses
ICS	Immunisation coverage survey
IFHP	Integrated family health programme
IHSS	Integrated health systems strengthening
IMNCI	Integrated Management of Neonatal and Child Health
IP	Implementing partner
IPLS	Integrated Pharmaceutical Logistics System
IPTp	Intermittent Preventive Treatment of malaria for pregnant women
IRC	International Rescue Committee
ITN	Insecticide Treated Net
IYCF	Infant and Young Child Feeding
JHU	Johns Hopkins University
JICA	Japan International Cooperation Agency
L10km	Last 10 kilometers project
LiST	Lives saved tool
LLIN	Long lasting insecticide treated bednets
LQAS	Lot Quality Assurance Sampling
M&E	Monitoring and evaluation
MCWH	Maternal, child and women’s health
MDG4	Millennium Development Goal 4
MDP	Malaria, Diarrhea, Pneumonia

MIS	Malaria Indicator Survey
MNCH	Maternal, Neonatal and Child Health
NGO	Non-governmental Organization
NMR	Neonatal mortality rate
OECD-DAC	Organisation for Economic Co-operation and Development-Development Assistance Committee
ORS	Oral rehydration salts
PEPFAR	President's Emergency Plan for AIDS Relief
PFSA	Pharmaceutical fund supply agency
PHC	Primary health care
PMTCT	Prevention of Mother to Child Transmission of HIV
PNC	Postnatal Care
PRCMM	Performance Review and Clinical Mentoring Meeting
RDTs	Rapid Diagnostic Test
RUTF	Ready-to-Use Therapeutic Food
SEARCH	Society of Education, Action and Research in Community Health
SC4CCM	Supply chain for community case management
SNNP	Southern Nations Nationalities and Peoples
TT2+	Tetanus Toxoid, at least 2 doses
U5MR	Under Five Mortality Rate
UK	United Kingdom
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
US	United States
USAID	United States Agency for International Development
VCT	Voluntary Counselling and Testing
WASH	Water, sanitation and hygiene interventions
WHO	World Health Organization

EXECUTIVE SUMMARY

Background

An ambitious Health Extension Programme (HEP) was launched in 2003 as the pillar of primary health care services and included the deployment of health extension workers (HEWs) for provision of high impact preventive interventions. The core of the HEP was the construction of health posts in all of the kebeles (neighbourhoods) in Ethiopia and the training and assignment of two HEWs to each health post. HEWs are recruited locally, trained for one year, formally employed and salaried. They focus on delivering 16 different Primary Health Care (PHC) packages of services including health promotion, immunization, family planning, hygiene, sanitation, disease control and family health. HEWs are chosen by the local ward administration and community. Each HEW is responsible for approximately 2500 people. They are supported by the Health Development Army (HDA), a cadre of unpaid volunteers. Each volunteer is responsible for approximately five families and works with these families to promote key family health practices.

The aim of the DFATD-funded Integrated Health System Strengthening (IHSS) programme was to support the HEP and to assist with strengthening the health system to deliver essential high-impact and cost effective services at the front-line level. Ethiopia began scaling up partial integrated community case management (iCCM) of diarrhoea and malaria and other non iCCM interventions in 2008 using IHSS programme funds. CCM for pneumonia began in the second half of 2010. The HEWs provide a full package of promotional, preventive and a few key curative services through iCCM.

IHSS programme funds provide full support to Ethiopia's iCCM services and the broader IHSS programme package in 239 woredas in 26 zones in the Tigray, Amhara, SNNP, Oromia and Benishangul-Gumuz regions. These areas are called Full IHSS Programme Areas and here IHSS programme funds provide all training materials, support for training, commodities, and technical support. There are also Partial IHSS Programme Areas – where IHSS programme funds partially support iCCM and the broader IHSS programme activities in an additional 32 zones and 340 woredas of Oromia, Tigray, Amhara, SNNP, Afar and Gambella.

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 System¹.

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"². 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) signed by DFATD and UNICEF³.

Purpose and objectives

The purpose of this external evaluation was two-fold:

- 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.
- To inform programme and policy decisions in Ethiopia 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, multi-sectoral collaboration 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 programme to observed changes in coverage of selected indicators due to the lack of true comparison areas (as similar programmes were being implemented across the country) and the lack of feasibility of a randomized intervention/control design. Geographically the scope of the external evaluation included five of ten regions (Amhara, Benshangul, Oromia, SNNPR and Tigray). 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 MOH of Ethiopia, DFATD, UNICEF, other UN agencies, and governmental and civil society partners at national, regional, and global levels.

Methodology

A mixed method approach to this evaluation was used^{4,5} in that quantitative, qualitative and economic evaluation methods were utilised. For analysis of coverage, trend analysis was performed using a non-parametric test of trend across years and wealth quintiles for all available surveys. Data to assess implementation strength, utilisation and quality of care were taken from routine programme data collected by UNICEF as well as the Johns Hopkins Evaluation in Oromia⁶. The indicators reported are aligned with the global iCCM indicators of the Expanded Results Framework⁷.

Using subnational population characteristics and regional household survey data, we used LiST to investigate the extent to which changes in child mortality could be attributed to changes in intervention coverage. On the basis of measured baseline mortality values and changes in coverage of newborn and child health interventions, we forecasted child mortality over three time periods (pre-IHSS, phase I and phase II).

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 HEWs for the treatment of malaria, diarrhoea and pneumonia in children under 5. It also assessed the financial sustainability of the programme in relation to current utilisation and anticipated increased future levels of utilisation.

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 health system resulting in coverage change which include, but are not limited to IHSS programme 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 costing analysis was based on *additional costs* and not the full cost of providing the iCCM intervention. Not being able to quantify the total cost of health system strengthening in particular at health post level, it is not possible to ascertain the full cost of delivering iCCM. Use of these costing figures would, therefore, be inappropriate as it underestimates the full costs (government and donor costs combined) of delivering iCCM. Additionally, for Ethiopia the most recent coverage and impact data available to estimate potential lives saved comes from the 2011 DHS, which does not align with the costing data.

The effect of contextual factors (including rapid 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 and focus group discussions with national stakeholders, key district personnel, HEWs, their supervisors, and beneficiaries.

The team visited Gojam and Gondor districts in the Amhara region and Shewa district in Addis Ababa in addition to three days spent in Addis Ababa.

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

Findings

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?

The implementation of IHSS programme in Ethiopia is both a display of the need to gain government buy-in, and a lesson in the process through which such buy-in can be achieved. The results show that there was initial reluctance to adopt iCCM as an approach, and this reluctance was born out of the experience with previous village health workers, particularly around antibiotic use. This evaluation reveals that timely policy change is critical to supporting the enabling environment for the establishment of community-based service delivery. The data from this evaluation also makes clear that the programme was owned by all, including officials all the way down to the village level. Furthermore, this programme did not appear to compete with the priorities set by other organisations in Ethiopia. Instead, UNICEF managed to harness the energy and resources of other development partners in the country so that, in the end, they too became implementing partners.

With regard to gender equality, the IHSS programme was able to ensure that the HDA and the HEWs were almost exclusively women. However, broader efforts are needed to ensure that women become part of the professional health care workforce, at levels above HEW, since the majority of workers at higher levels are men. Furthermore, demand creation strategies that address barriers to women's decision making in care-seeking are also needed.

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?

The HEP with its tens of thousands of HEWs is a bold strategy devised by the Ethiopian Government to provide health care to a population of over 80 million people, most of whom are located in rural and hard-to-reach areas. From our observations, interviews and document review there were two phases to the IHSS programme strategy in Ethiopia and the use of money from UNICEF and DFATD. The first phase was the strengthening of the HEP and the second the introduction of iCCM with support for continuation of delivery of preventive interventions. The manner in which DFATD money was channelled therefore proved to be a catalyst, as it initiated a process of reform and consolidation of the HEP and child health services. In addition, it strengthened the community service delivery platform from which iCCM and newborn care interventions could be implemented.

A notable contribution of the IHSS programme to health systems strengthening is arguably in the area of training of frontline health workers (HEWs and nurses). As part of the IHSS programme, UNICEF worked closely with the Ethiopian FMOH and assisted in co-ordinating the development of iCCM treatment guidelines, training materials and recording and reporting tools. Following this, over 30,000 frontline health workers were trained (HEWs and nurses/clinicians) and equipped with essential supplies and commodities with IHSS programme funds. Thereafter, a rigorous supervisory and support system was developed and implemented to ensure quality of care and sustainability when IHSS programme funds are no longer available.

An aspect that will impact on the effectiveness of the programme is utilisation of the HEWs. Both routine data and specific surveys show low utilisation of HEWs for case management of children (around 22 treatments per HEW/ year) coupled with low utilisation overall of appropriate providers. Demand creation and community mobilisation strategies are needed to change social norms around care-seeking and demand for quality services, to increase utilisation at health posts.

Improvements in phase I of IHSS programme (as measured in 2011) are noted in exclusive breastfeeding in children <6 months, coverage of measles and DPT3 immunisation, Vitamin A supplementation, care-seeking for fever and malaria treatment. Coverage of postnatal care, ORS, ITNs and care-seeking for pneumonia was unchanged. A decline in the rate of annual coverage change between the pre-IHSS and phase I of IHSS programme occurred for tetanus toxoid (which may be due to the virtual elimination of neonatal tetanus and more women with lifetime protection) and early initiation of breastfeeding. However confidence intervals for the point estimates of coverage for

tetanus toxoid overlap suggesting that although the rate of change was faster in the pre-IHSS period, IHSS programme support possibly contributed to the maintenance of coverage levels and prevented declines. The same is likely to be true for ITNs although confidence intervals are not available for those point estimates. There is not yet population-based household survey data at the IHSS programme endline to accurately assess the impact of iCCM, or phase II of the IHSS programme.

With regard to impact on equity, no changes in coverage in the poorest wealth quintile were noted between 2005 and 2011 for postnatal care, vitamin A supplementation, care-seeking for pneumonia, ORS and ITNs whilst increased coverage in the poorest wealth quintile are noted for DPT3 and measles. However, the gap in coverage between the richest and poorest wealth quintiles did not decrease. Care-seeking and treatment of malaria appeared to be a pro-poor intervention with higher coverage in the poorest wealth quintile in 2007 and 2011, and the gap in coverage of care-seeking for fever between the richest and poorest wealth quintiles decreased substantially from 14 to 2 percentage points.

Impact

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

The main causes of under-five deaths in Ethiopia in 2010 included pneumonia, diarrhoea and complications of prematurity.⁸ The LiST analysis estimated higher under-five mortality rates than those of the demographic health surveys in both the pre-IHSS period and IHSS programme period, indicating that the coverage changes cannot account for all factors relating to child mortality reductions, or that the model is not accurately capturing the mortality impact of the coverage changes. During the first phase of IHSS programme implementation, changes in wasting and stunting, coverage of care-seeking for pneumonia, ORS and zinc for diarrhoea and WASH interventions contributed to the largest proportion of deaths averted across the five regions. During Phase I of IHSS (2007-2010), the LiST analysis indicated that there were an estimated 47 000 deaths averted in 2010 as compared to 2007 in 5 regions, with an average across regions of 85% of these lives saved due to increases in coverage of interventions to which the IHSS programme contributed and decreases in wasting and stunting rates.

Using a scenario-based approach due to the lack of endline data for phase II through 2013, Hib vaccination, through the introduction of the pentavalent vaccine, care-seeking for pneumonia, ORS and zinc for diarrhoea were the most important interventions saving lives. If the coverage changes applied in the scenario were achieved, an additional 72 000 deaths would have been averted between 2010 and 2013 compared to the baseline in 2010. Because only IHSS programme-supported interventions were scaled up in this scenario, the percentage of lives saved due to the IHSS programme is not provided.

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 DFATD/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?

This costing focusses on additional costs, excluding costs already covered by the health services such as salaries. The cost of a malaria treatment, including rapid diagnostic tests (RDTs) and drugs as per protocol, as well as stationary stands at US\$7.65, diarrhoea treatment with ORS and zinc costs \$6.62 and pneumonia treatment \$6.21. Fixed costs, the HEWs related costs (training, kits, supervision and management), represent an average of 86% of the cost per treatment. Fixed costs spread over a higher number of treatments translate into lower cost per treatment and marginal increase in programme costs. With an additional 15% in treatments per existing HEW, iCCM costs would increase by only 1.9% and by 3.8% with 30% more treatments.

The current cost per iCCM treatment is high at an average of \$6.81 when compared to \$4.18 for a treatment visit at a health centre in 2011 (the cost per iCCM treatment does not cover the share of HEW salaries). The high cost per iCCM treatment is directly linked to the low level of utilisation of iCCM services. Currently each HEW covers an average of 377 children but provides only 20 treatments a year for the three diseases. If demand was significantly higher, the health impact of the program would be higher and the cost per treatment would decrease markedly. The uptake of the program by the community is, thus, the central factor to justify the investment.

To assess the financial sustainability of this programme, the additional expenditure on iCCM for 2012 was compared to the total annual public health expenditure (government and donors), and to the government's own health expenditure which represented 34% of public health expenditure. iCCM accounts for 0.04% of total public health expenditure and 0.13% of government health expenditure. Adding 15% to iCCM costs, to cover additional systems strengthening activities, such as IMCI training, demand generation activities (iCCM+), would put iCCM+ costs at 0.05% of total public health expenditure and 0.18% of government own health expenditure for the current number of HEWs.

Conclusions

Relevance

The IHSS programme support has resulted in the strengthening of the HEP platform for community-based service delivery and facilitated the introduction of iCCM in an environment that was not wholly receptive at the outset of implementation.

Effectiveness

The phase I support, primarily for preventive interventions resulted in substantial increases in exclusive breastfeeding, vitamin A supplementation, DPT3 and measles immunisation, and set the stage for policy change and roll-out of the full iCCM package. Improvements in overall coverage and pro-poor coverage are also seen for care-seeking and treatment of malaria. The effectiveness of iCCM is currently hampered by low utilisation of health posts. Estimates from routine data based on

numbers of trained HEWs and total treatments given, reveals an average of 22 treatments per iCCM trained HEW per year (range 19-26).

Impact

The lives saved analysis confirms that the IHSS programme focused on many of the high impact, low coverage interventions necessary for achieving mortality change. The lack of endline data prohibits a full assessment of lives saved at this stage, but a scenario-based approach of a 15 percentage point increase in iCCM interventions alongside a 5 percentage point increase in the other IHSS programme-supported interventions during phase II between 2000 and 2013 would account for over 72 000 deaths averted across 5 regions from 2010 to 2013, in addition to 28 400 deaths averted during phase I between 2007 and 2010, with 78% of these deaths averted due to interventions to which IHSS programme contributed.

Sustainability

The sphere of influence of the IHSS programme currently covered 10 million (83%) of the country's 12 million children under 5. If the programme was extended to new areas to cover 100% of children, increasing by 20.5% the number of HEWs and supervisors, the cost of iCCM+ would represent 0.05% of total public health expenditure and 0.15% of government health expenditure for the current number of HEWs. In fact the small increase in budget requirements is likely to be even smaller since a part of the treatments delivered by HEWs were previously provided in health centres. Such low proportions of government health expenditure point to the capacity of the government to finance the additional costs of this programme from its own funding. Financial sustainability is not the main issue for the programme; the low level of utilisation of iCCM services is the central concern as it affects health impact hence the justification of the program.

Lessons learnt

Relevance

- The IHSS programme support has consolidated the HEP platform for community service delivery and enabled the inclusion of iCCM. The high level of government and partner commitment, especially engagement and leadership from the Ministry of Health has played a major role in the success of this programme and has brought together implementing partners.
- The IHSS programme has provided evidence that large-scale community-based platforms for delivery of MNCH and nutrition interventions are possible. The HEP has been strengthened through this programme with the addition of iCCM and improved supply chain and supervision systems.
- Promoting gender equity in training of HEWs was achieved, but the gains could be jeopardised due to attrition of HEWs. Health workers at levels above HEWs are mostly men, most likely due to broader gender dynamics limiting women's roles in the health workforce.

Effectiveness

- There may be lessons learnt from the success in increasing care-seeking for fever which could be applied more generally to other services provided at health posts. There are also lessons to be learnt from the success in increasing IYCF in areas supported by the HDA and HEWs⁹.
- Improvements have been seen in both preventive and curative indicator coverage particularly exclusive breastfeeding, vitamin A supplementation, measles and DPT3 immunisation care-seeking and treatment of fever.
- Coverage of supervision with observation of case-management is very low and could impact the quality of care provided at health posts.
- Utilisation of HEWs at health posts appears low.

Impact

- Improvements in indicators contributing to maternal health (especially skilled attendants) have improved at a far lower rate than those for child health which are largely 'quick win' interventions.

Sustainability

- The low utilisation of HEWs for iCCM resulted in a relatively high cost per treatment.
- Sustainability of funding for iCCM, particularly for commodities, has been raised as a concern by several stakeholders.

Recommendations

Relevance

- The role of the HEWs in improving maternal health should also be considered, particularly to increase the coverage of postnatal care. There may be lessons to be taken from the evaluation of the community-based nutrition programme⁹.

Effectiveness

- Now that the platform for delivery has been established, strategies are needed to increase utilisation of health posts for iCCM through demand creation, addressing social norms and awareness raising regarding the skills and services provided by HEWs.
- The promotion of key family practices (especially IYCF and WASH) through HEWs and the HDA should continue.
- Further research is needed to assess issues of utilisation and demand creation, particularly whether health posts are optimally located in terms of distance from health facilities and distance from each other. Assessment of the adequacy of the current HEW training and equipment to support maternal and newborn health is recommended.
- Supply chain improvement is needed particularly for zinc and RDTs with a focus on getting supplies from medical stores to health posts.
- Coverage of supervision with observation of case-management needs to be improved and routinized within the HEWs monthly programme.

- The decline in early breastfeeding initiation should receive attention given the strong link between early breastfeeding initiation and neonatal mortality¹⁰ and considering that neonatal mortality now constitutes 42% of under 5 deaths in Ethiopia.
- More efforts are needed with regard to postnatal care, exclusive breastfeeding and vitamin A supplementation.

Impact

- More attention is needed on newborns and young infants and the recent training of HEWs in newborn care and management of neonatal sepsis will hopefully start to address this.
- Plausible contribution of IHSS programme to lives saved has been assessed through modelling. It is acknowledged that other interventions not included in the IHSS programme package may have 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 impact is expected to be made, e.g. the health post level.
- Plausible contribution for mortality changes is difficult to ascertain for a discrete set of health interventions, such as those delivered through the iCCM package, 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.

Sustainability

- It is recommended that the issue of financial provision for commodities be addressed by the relevant government authorities and their funding partners. The 'financial sustainability' costing analysis provided in this study can inform such deliberations and future planning.
- Costing scenarios indicate that either a 15% or a 30% increase in utilisation of iCCM services should be considered as feasible options for improving cost-efficiency of the programme.
- Given that the main cost driver of the CCM program is the fixed cost associated with iCCM training of HEWs and supervisors, finding ways to integrate iCCM training into basic training programmes would improve the cost-efficiency of the programme.

1. Background

1.1 Country context

Ethiopia, located in the Horn of Africa, is the second-most populous nation on the African continent. It is bordered by Eritrea to the north, Djibouti and Somalia to the east, Sudan and South Sudan to the west, and Kenya to the south. The country has about 80 groups of people, the largest being the Oromo and Amhara tribes. In 2012, the World Bank-estimated population size was 91.7 million, and the population growth has remained at about 3% for the last few years. Almost half the population is under 15 years, and there are 12 million children under-five.

Ethiopia has its own calendar and time system and has the most UNESCO World Heritage Sites in Africa. While plagued by a series of famines in the 1980s, exacerbated by adverse geopolitics and civil wars, Ethiopia has begun to recover, and the GDP was estimated to be \$43 billion in 2012, an increase from \$29 billion in 2010 with annual GDP growth of around 8%.¹¹ Absolute poverty has declined from 39% in 2004 to 29% in 2011. Since mid-2011, Ethiopia together with other East African countries has been in the grip of yet another drought, which has resulted in thousands of refugees fleeing to Ethiopia, from Sudan and Somalia, many of whom have died of malnutrition.

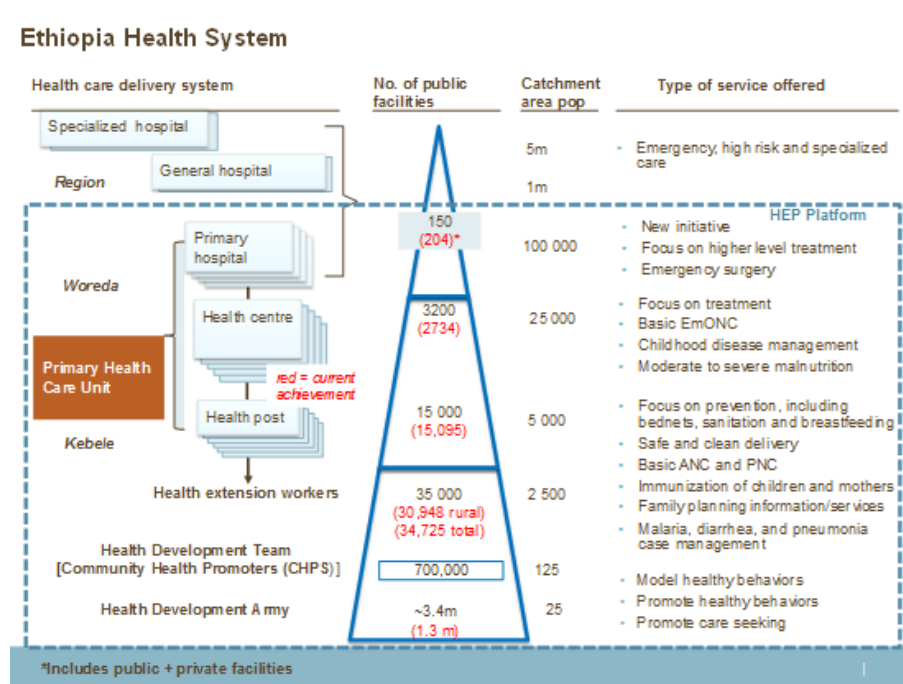
1.2 Ethiopia's health system

Since 1991, the Ethiopian government has been involved in reforming the health care system through decentralization and reorganization to both increase access to health care and improve governance and democratization of the health care system. The system has been reformed to a three tier system (Figure 1) consisting of a frontline PHC unit comprising of five satellite health posts, one health centre and a Primary Hospital to serve 5,000, 25,000 and 100,000 population, respectively. The second level consists of a general hospital to serve 1 million and the third a Specialized Referral Hospital to serve 5 million.

As part of the health care reforms, and particularly to enable the scale up of access to anti-retroviral treatment, Ethiopia embarked on a human resources for health "flooding strategy" to rapidly increase the total number of health workers at all levels including medical doctors, together with improved retention strategies¹².

An ambitious Health Extension Programme (HEP) was launched in 2003 as the pillar of primary health care services and included the deployment of health extension workers (HEWs) for provision of high impact preventive interventions. The core of the HEP was the construction of health posts in all of the kebeles (neighbourhoods) in Ethiopia and the training and assignment of two HEWs to each health post. HEWs are recruited locally, trained for one year, formally employed and salaried. They focus on delivering 16 different PHC packages of services including health promotion, immunization, family planning, hygiene, sanitation, disease control and family health. HEWs are chosen by the local ward administration and community. Each HEW is responsible for approximately 2500 people. They are supported by the Health Development Army (HDA), a cadre of unpaid volunteers. Each volunteer is responsible for five families and works with them to promote key family health practices. As part of a broader political developmental strategy the HDA has received increased focus since 2012.

Figure 1: Structure of the Ethiopian health care system



Ethiopia has received considerable donor funding for maternal, newborn and child health (MNCH). In terms of official development assistance (ODA) to health services between 2003 and 2012 the largest donors were Global Fund (24%), GAVI (20%), UK (15%), Canada (10%), US (10%) and UNICEF (5%). The annual MNCH funding has increased from \$105 million in 2003 to \$215 million in 2010¹³. Since 2003, Ethiopia has received \$1.4 billion from the Global Fund, 64% of which was spent on HIV/AIDS. According to ANC surveillance results, HIV prevalence among pregnant women aged 15-24 declined from 5.6% in 2005, to 3.5% in 2007, and then to 2.6% in 2009, demonstrating a declining HIV prevalence trend¹⁴. This massive funding input is thought to have had spillover effects for wider health system strengthening beyond the actual programmes it was targeting.

1.3 Policy, plans and programmes for MCWH prior to the IHSS programme

From 2006, when the HEP was fully operational, until the end of 2009, HEWs were involved mainly in preventive and promotive work and their treatment services, which were neither integrated nor optimal, included only malaria, diarrhoea (not including low osmolarity ORS) and severe acute malnutrition. Their role was to promote healthy living by creating 'model households' which implement the 16 PHC packages. The operational feasibility of adding pneumonia to the package of treatment for HEWs was tested between 2006 and 2008 and was formally adopted as policy by the Ministry of Health in late 2009.

2. Object of Evaluation: The IHSS programme

For a detailed timeline of the history of the IHSS programme refer to Appendix A. Initially, HEWs spent 75% of their time on community visits and 25% at health posts (HPs). However, in 2012, due to small numbers of people accessing care at HPs, this was revised, and each new HEW is now expected to spend 50% of her time carrying out home visits and 50% in the HP. Consequently, each HP is now supposed to be open all day, as all health posts should be staffed by at least two HEWs who should be supervised quarterly and paid approximately US\$40 per month. Initially HEWs were accountable to the Woreda (district) health office, but now, as the programme has matured and the role of the HEWs has changed to include curative services, accountability and technical support is provided by the PHC unit. The head of the Health Centre (HC) is the head of the PHC unit and is responsible for supporting five HPs, and thus technically supporting 10 HEWs. Therefore, the entire PHC unit staff has been trained in integrated community case management (iCCM).

Ethiopia began scaling up partial iCCM (diarrhoea and malaria) and other non-iCCM interventions in 2008 using IHSS programme funds. CCM for pneumonia began in the second half of 2010. The HEWs provide a full package of promotional, preventive and a few key curative services (Table 1).

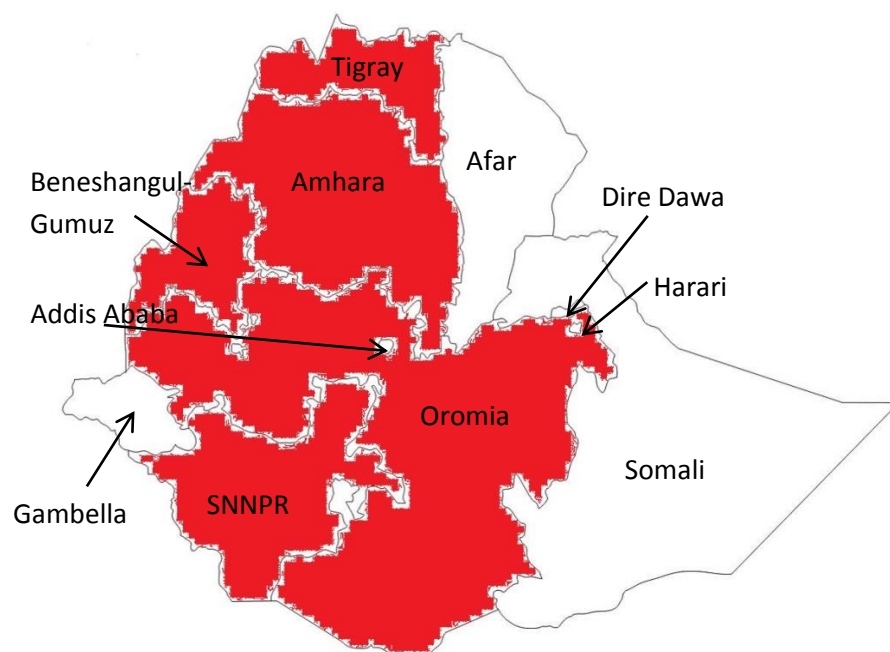
Table 1: IHSS programme and UNICEF interventions in Ethiopia.

IHSS programme focussed interventions	Activities supported by the IHSS programme grant	Activities supported by UNICEF matching fund
Correctly assess, classify and treat pneumonia, diarrhoeal disease and malaria	Support for proper functioning of the HEP. All HEWs provided with diarrhoea, malaria and pneumonia treatment at community level.	Advocacy and policy dialogue. IMNCI training and provision of IMNCI kit-treatment of diarrhoea, malaria and pneumonia at health facilities. Refresher training of HEWs in IMNCI for community-based diarrhoeal disease, malaria and pneumonia treatment.
Immunisations	Provision of routine EPI and defaulter tracing	Procurement of vaccines Training of programme managers Cold chain maintenance Polio, measles, TT SIAs
Tetanus immunisation for pregnant women	HEWs encourage pregnant women through health communication and model family training to seek ANC including TT immunisation	SIAs TT immunisation in antenatal clinics
Long lasting insecticide treated bednets (LLIN) for pregnant women and <5s		LLINs provided by Global Fund and other partners. UNICEF assists with distribution.
Vitamin A supplementation	Provide vitamin A	Operations cost of vitamin A distribution
Nutrition: Breastfeeding promotion and counselling	HEWs promote early initiation and exclusive breastfeeding for six months	Community-based nutrition (CBN) and c-IMNCI promotion of early initiation and exclusive breastfeeding National communication strategy for breastfeeding promotion
Birth spacing and/or contraceptive provision	HEWs provide contraceptives (procured by government and other development partners)	Supporting girls' education, youth friendly health services

		HEWs trained to provide long-term family planning (Implannon)
PMTCT (use of nevirapine or equally effective drug)	HEWs promote HIV prevention and HIV testing for pregnant women through health communication and community dialogue	UNICEF supports PMTCT in 66 health centres ARVs included nevirapine provided by other development partners

Ethiopia has 770 woredas, 68 zones and 11 regions. IHSS programme funds provide full support to Ethiopia’s iCCM services and the broader IHSS programme package (Table 1) in 239 woredas in 26 zones in the Tigray, Amhara, SNNP, Oromia and Benishangul-Gumuz regions. These areas are called Full Programme Areas and IHSS programme provide all training materials, support for training, commodities, and technical support (Figure 2). There are also Partial IHSS Programme Areas – where IHSS programme funds partially support iCCM and the broader IHSS programme activities in an additional 32 zones and 340 woredas of Oromia, Tigray, Amhara, SNNP, Afar and Gambella. Local UNICEF staff estimate that IHSS programme funds contribute roughly 80% of the support to iCCM and the broader package in these Partial IHSS programme areas. UNICEF, with the Somali Regional Health Bureau (RHB) is in the process of initiating iCCM in selected zones. Nationally, 579 out of 770 woredas are supported by IHSS programme funds [239 with full support; 340 with partial (80%) support]. With regards to population coverage, there are 4,598,961 children under 5 in rural areas covered by full IHSS programme support and 5,631,489 in rural areas covered with partial IHSS programme support.

Figure 2: Map of Ethiopia (full IHSS programme supported areas in red)



UNICEF, funded in part by the IHSS programme, was a major and critical partner in the conceptualization, planning and implementation of HEP and was involved in curricular development, training and distribution of supplies.

As a starting point to strengthening the HEP, a review was conducted by the “Center for National Health Development in Ethiopia, Columbia University” in 2006¹⁵ which identified the following problems:

- A lack of career development for HEWs;
- Attrition and absence from their places of assignment;
- A lack of supplies at HPs;
- Delays in training and deployment of model households;
- Poor coordination of the training of HEWs by various partners;
- Poor quality and infrequent supervision;
- Low utilization of HEP services

Consequently, in 2008 and 2009, with DFATD funding, UNICEF designed interventions to address these problems, thereby, contributing significantly to supporting the HEWs and consolidating the HEP. These health strengthening interventions, which were implemented at community level, included quality of care, human resource development and logistic support. More specifically, to address the lack of career path and attrition, UNICEF supported the upgrading of HEW training to include community IMCI - by scaling up diarrhoea and malaria treatment-, and to address the lack of supplies to health posts UNICEF developed better procurement, repackaging and distribution systems, thereby ensuring supplies and equipment were available at the health posts.

In December 2009 following the change in policy, allowing HEWs to administer antibiotics in the community, iCCM planning and implementation was able to commence. In 2010, with UNICEF co-ordination, a working group with all implementation partners was set up. This group planned iCCM implementation, designed the training course and training materials and prepared training kits. The training of HEWs in improved iCCM, including the pneumonia component, commenced in 2011. In 2013 Ethiopia launched community-based newborn care including newborn sepsis management using the iCCM platform. This is another significant policy breakthrough for the country.

3. Evaluation Rationale, Purpose and Objectives

3.1 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”.² 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) signed by DFATD and UNICEF³.

3.2 Purpose and Objectives

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.
2. To inform programme and policy decisions in Ethiopia 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
- Strengthened multi-sectoral collaboration
- 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/ governance¹⁶).
- 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 IHSS programme.

Sustainability:

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

3.3 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. Any interventions not funded by the IHSS programme, but necessary in order to execute the LiST estimation and construct a robust plausibility argument, 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”¹⁷. 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”. In assessing plausibility of attribution, the external evaluation attempted to “rule out external factors [factors outside of the programme] which might have caused the observed effects”.

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 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)

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.

3.4 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 System¹.

3.5 Intended Audience

The intended audience of this external evaluation includes the MOH of Mali, DFATD, UNICEF, other UN agencies, and governmental and civil society partners at national, regional, and global levels.

3.6 Research 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 DFATD/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^{4,5} 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 rapid 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, community health workers, their supervisors and beneficiaries.

Data collection occurred at a national, regional and district levels. Thereafter, each set of data was analysed and reported on independently. The analyses and their separate findings are brought together and synthesised at the level of interpretation 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 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'.

The Ethiopia country evaluation framework was based on a preliminary country logic model (Appendix B), which was developed following a desk review. The review highlighted several issues for exploration during the country visit which had not previously been explored and were expected to make a unique contribution to documenting lessons learnt from this programme. Ethiopia, like Niger, provided an opportunity to explore a community based health model where there are two levels of community based workers. Firstly, there is the paid HEW with clearly defined expectations who is accountable to the health care system. Secondly, there is a volunteer from the HDA who is accountable to the community and works to promote health and, since the introduction of iCCM, aims to influence health seeking behaviour.

4.1 Quantitative data sources and analysis

4.1.1 Coverage trend analysis

A full list of all indicators collected for coverage and LiST analysis can be found in Appendix C. Data sources for the coverage and LiST analyses included the Ethiopia Demographic and Health Survey (DHS) 2000, 2005, 2011; Malaria Indicator Survey (MIS) 2007 and 2011 and the Ethiopian National Immunisation Coverage Survey (ICS) 2012. The most recent data source for coverage and impact indicators was the 2011 DHS. For the anthropometric data, the 2000 and 2005 z-scores were re-calculated using the 2006 WHO growth reference standards to be comparable with the 2011 DHS. Datasets were available for all the three DHS. However, only point estimates of the coverage prevalence of malaria and immunization indicators were available from the other MIS and Epi 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 and wealth quintiles. Trend analysis was performed on data for rural areas only, corresponding to the

areas of implementation of iCCM through UNICEF/DFATD support. The complex sampling design of these DHS surveys such as regional and rural/urban stratification, clustering at enumeration areas and sampling weights (due to non-proportional sampling) were taken into account.

Graphical presentations of the derived results in the form of line graphs and bar charts with confidence limits were generated in Excel. Figures provided in the report are for rural areas, reflecting the main areas of support for the IHSS programme and main areas of activity of the HEWs. National estimates are also shown for comparison purposes. The figures showing wealth quintiles are national estimates.

In order to assess the plausible contribution of IHSS programme to changes in coverage (if such were observed) coverage levels in the implementation areas (rural areas) were compared with the national coverage levels over the period of implementation for which data was available (2005 to 2011). Furthermore, we assessed whether there was a significant difference in the average annual rate of change in coverage of pertinent indicators between the rural areas and the national level estimates, in addition to a comparison of the annual rate of change between the pre-IHSS period (2000-2005) and during IHSS programme implementation (2005-2011). We assume linear rates of change, which we calculated by subtracting the endline point estimate from 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, we calculated these 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 the 95% confidence intervals around the changes are reported.

It is important to note, however, that the time period of analysis utilized to capture IHSS programme implementation, did not capture the entire period of implementation, as the DHS survey used as a baseline was conducted in 2005 before implementation began in 2007 and the last DHS took place in the first half of 2011 prior to the end of the programme period in 2013, though some later data were taken from the MIS 2011 and EPI survey 2012.

We also considered contextual factors such as implementation strength (extent of drug stock outs, supervision) and relevant data from qualitative interviews. Where the contribution of the IHSS programme 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 a report from Johns Hopkins University for two zones in Oromia⁶. The indicators reported are aligned with the global iCCM indicators of the Expanded Results Framework⁷.

4.1.2 Lives Saved analysis

Using household survey data, as described above, we used the Lives Saved Tool (LiST) 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 we forecasted child mortality over three time periods:

- Prior to the start of the programme: under-five lives saved from the year 2000 to the start of IHSS programme implementation (roughly 2000-2007)
- Phase I: under-five lives saved from the start of IHSS programme implementation up to the early period of iCCM implementation (roughly 2007-2010)
- Phase II: under-five lives saved from the start of iCCM implementation to present (roughly 2010-2013) using a scenario-approach to estimate potential impact.

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 on stunting and wasting.¹⁸ 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 reviewed and published.^{19,20} The analysis was done with Spectrum version 4.62.

Coverage data for key indicators, representing the scope of the IHSS programme as well as broader health system indicators, were extracted from all of the available household surveys and other datasets for each time point available and entered into the projections.

For the first time period, we used 2000 as the baseline year with the “first year of intervention” in 2000 and projected forward to 2007, using all available data on changes in intervention coverage and nutritional status. For Phase I, we used 2005 as the baseline year of data and the “first year of intervention” as 2007 and projected forward to 2010, using all available data on changes in intervention coverage and nutritional status. For Phase II, we used 2010 as the baseline year and “first year of intervention”, with interpolated coverage values between the 2005 and 2011 DHS. Indicators from the 2012 ICS, and 2007 MIS and 2011 MIS were also used where applicable.

Due to the lack of national endline data for 2013, we applied an illustrative scenario for Phase II, whereby coverage of the iCCM interventions (ORS, ACT treatment for malaria and pneumonia careseeking) increased by 15 percentage points between what was reported in the DHS 2011 and the endline of 2013, whilst all other IHSS programme-supported interventions increased by 5 percentage points. Coverage of other interventions remained at the 2011 level from 2011-2013.

We present the annual number of estimated lives saved and the cumulative number of estimated lives saved across each period of analysis.

Table 2 shows the data sources used for the baseline characteristics - population, fertility, mortality rates, causes of death and nutrition – for the Ethiopia LiST analyses. These were modified to reflect the estimated annual population and births in the subnational regions under analysis.

Table 2: Additional data used to create LiST projections

Indicator	Source
Population served	Central Statistical Agency 2011 (by region); annual births calculated from regional population and regional crude birth rate (DHS 2011)
Total fertility rate	DHS 2000, 2005, 2011 (sub-national)
Stunting, wasting rates	DHS 2000, 2005, 2011 (sub-national)
Cause of death	CHERG trend analysis (national)
Mortality (under5, infant, neonatal)	DHS 2000, 2005, 2011 (sub-national)

4.1.3 Costing

The costing, 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 HEWs for malaria, diarrhoea, and pneumonia in under 5s?*

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 programme is rolled out to new woredas. These costs can be very significant, but they are not included in the costing as they will not be incurred again, and including them would artificially inflate the cost of scaling up the programme 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. The Table below shows which costs are included in the costing exercise. 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: Included and excluded costs

Costs NOT included	Costs Included
Initial one-off design costs	iCCM training of HEWs incl. post training follow-up
Health posts infrastructure	iCCM training of supervisors
HEWs salaries	iCCM training of woredas and zonal co-coordinator
Supervisors' salaries	HEWs supervision meetings
Basic training of HEWs	Supervisors and coordinators review meetings
Basic training of nurses supervisors	HEW kit for iCCM
	Drugs and diagnostic tests
	Motorbike for supervisor (share for iCCM)
	Overheads incl. share recurrent transport costs for supervisors

Data on costs were collected and analysed in the following way:

Fixed Costs: (independent from the number of treatments)

- HEWs iCCM training costs: these costs were extracted from UNICEF budgets and calculated per HEW. Training has been allocated 10 life years, due to the fact that the twice a year Integrated supportive & competency based supervision acts as refresher training. An annual attrition rate of 3.75% (range 2.5% to 5%) was applied base on the 2013 UNICEF annual report to DFATD and personal communication with Addis Ababa UNICEF office, to calculate the number of HEWs requiring initial training.
- HEWs kit: bag, timer, registers, reference books, excluding consumables, were costed from unit cost information provided by UNICEF. They were expected to need replacement after 3 years (3 life years).
- Twice yearly 2 days Integrated supportive & competency based supervision meetings (Performance Review and Clinical Mentoring Meeting -PRCMM) attended by HEWs
- Supervision and management costs:
 1. Supervisors iCCM training
 2. Twice a year review meetings (PRCMM) for supervisors and coordinators
 3. Share of HP supervisors' motorbike purchase price. 20% of motorbike use was attributed to iCCM and 4 life years applied due to poor road conditions.
- Overheads (5%) which include recurrent transport costs

All fixed costs are annualised, according to the number of life years, and calculated per HEW. These fixed costs are then calculated per treatment, by dividing the annualised fixed costs per HEW by the number of treatments per HEW in 2012. The number of treatments was extracted from the UNICEF – DFATD progress report for 2013.

Variable Costs (dependent on the number of treatments)

- Drugs & diagnostic tests and stationary costs for each of the three conditions, from unit cost information provided by UNICEF Ethiopia.

Cost per treatment per condition = Fixed cost per Treatment + Variable costs specific to each condition.

iCCM Additional Costs 2012 = Cost per treatment for each condition multiplied by the number of treatments in 2012.

Recognising that in order to implement iCCM, other systems strengthening inputs were necessary, an average 15% increase in iCCM costs was modelled to give the cost of iCCM+. This value is based on estimated costs of health system strengthening inputs but will vary over time and between regions depending on the existing capacity before introduction of iCCM and on the maturity of iCCM.

Scenarios: Increase in coverage

- Increase in number of treatments per existing HEWs per year: an increase of 15% was modelled
- Increase to reach total coverage of children under 5 years of age, moving from the current 83% of the country's 12 million children under 5 to 100%. The model increases the required number of HEWs and supervisors, applying the current ratio of children to HEWs and assumes current as well as increased (+15% and +30%) number of treatments per HEW.

Financial sustainability of the programme:

- iCCM and iCCM+ Additional Costs 2012 are calculated as a percentage of total Public health expenditure (government + donors) and as a percentage of government only health expenditure. Data on public health expenditure was extracted from <http://www.indexmundi.com/facts/ethiopia/health-expenditure>
- Similar calculations are made for each scenario.

4.2 Qualitative data sources and analysis

The country visit took place in October 2012. Individual interviews and focus group discussions were held with UNICEF staff and other partners, representatives of the Ethiopian Federal Ministry of Health in Addis Ababa, volunteers from the Health Development Army (HDA), Health Extension Workers (HEWs), staff from Health Centres and Woreda offices. The list of potential interviewees was discussed in advance with the UNICEF country team, who assisted the team with pre-scheduling appointments. In compiling this list, consideration was given to gaining as wide a range of opinion as possible so as to ensure a fair representation of how IHSS programme was experienced in Ethiopia. The interviews were conducted by one or more members of the country field team. Where necessary (in interviews with HEWs and volunteers from the HDA), the services of an interpreter were used. The interpreters were organised by UNICEF and provided by the Ministry of Health. All interviews took place either at the offices of the interviewees, at the health centres, health posts or in the communities. Interviews were audio recorded, and the researchers took field notes.

The analysis of qualitative data from the country visit was conducted by two members of the country field team. It was based on the typed interview notes, observations from the field and reflections from the annual reports. This analysis was conducted both deductively and inductively. Deductively, we 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, we tried to understand what new information and insights could be gleaned from the interviews and our observations. 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

5.1.1 Policy environment

Early caution towards community-based treatment of pneumonia by HEWs in Ethiopia

Although support for iCCM is now well established in Ethiopia, it has been said that this was not always the case, particularly when the idea was initially introduced (Box 1). A representative of the Agrarian Health Promotion and Disease Prevention Directorate suggested that there were concerns around the ability of non-professional health workers to administer antibiotic treatment. She explained that village health workers were involved in the administration of injectable antibiotics at a community level in Ethiopia in the early 1990s. This practice was considered both by government and by some non-governmental organisations to have resulted in the abuse of antibiotics.

Box 1: Scepticism about HEWs

“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” (International Rescue Committee (IRC) interviewee)

“Even employers of IRC implementing partner (“such as myself”) was sceptical about the skill of HEW 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 realized it will have positive results” (IRC interviewee)

As a consequence of these concerns about potential abuse, non-professional health workers no longer administered treatment, and the HEP focussed initially on promotive and preventive services only. Within this context, when pneumonia treatment was first discussed, the Ethiopian government was set on maintaining the promotive and preventive role of the HEP and was resistant to the introduction of community-based pneumonia treatment. The Ethiopian Federal Ministry of Health (FMOH) was initially reluctant to approve the policy of community case management of pneumonia by HEWs despite local and international evidence demonstrating its feasibility and effectiveness. A representative of the FMOH explained that the delay and reluctance was due to a government perspective that it was necessary for the HEW programme to mature and run smoothly before a curative component, such as iCCM, could be added. According to interviewees from the FMOH and IRC, a concern of the FMOH was that HEWs would abandon their preventative and health promotion roles once they started providing a curative service. In addition there were concerns that communities might abuse the HEWs roles in the community. This concern was based on a belief that, when available, people in the community preferred to be treated with injections, which they perceived to be very effective. In contrast to the initial position of the FMOH, nongovernmental organisations advocated support of iCCM. An interviewee from the IRC explained their position:

“..our mothers are buying drugs and treating infants themselves anyway; would it not be better to train someone to do this?” (IRC interviewee)

Policy shift

The policy shift to allowing HEWs to treat pneumonia at community level was based on high level advocacy and extensive lobbying by UNICEF, the Ethiopian Paediatric Society and other implementing partners (IPs) during 2008 and 2009²¹. According to a UNICEF staff member (*UNICEF Ethiopia country office*), this lobbying took a number of forms, including meetings of UNICEF and the IPs with the FMOH.

Field discussions and document review²¹⁻²³ 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 IPs.
- Experiences of Save the Children in Liben Woreda, Oromiya State between 1997-2006, where iCCM was implemented and evaluated, demonstrating high quality, demand and use of iCCM²⁴. 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.
- A new director of Health Promotion and Disease Prevention, who was not as influenced by the previous history of antibiotic abuse, was appointed in the second half of 2009.

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 delegation were responsible for influencing, and developing, health policies. Participants of this study tour included 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 (sponsored by IPs) 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.

Discussions with several people from UNICEF during the country visit suggested that beyond the lobbying and advocacy, UNICEF and the IPs also invested considerably in strengthening and consolidating the HEP so as to further overcome the reluctance of the FMOH. Field discussions further suggested that by strengthening the HEP and consolidating support for the iCCM strategy during the first couple of years of the IHSS programme support, UNICEF built the platform from which iCCM would be implemented.

From concern to ownership

Although the introduction of CCM of pneumonia in Ethiopia was seen by interviewees to be driven by UNICEF, there was active engagement of all parties to instil a sense of ownership (Box 2). According to UNICEF and other IPS, part of the strategy was to get iCCM implemented in the country in very close collaboration with the government, UN multilateral and bilateral organizations and non-governmental organisations. Some of the implementing partners interviewed suggested that the existence of bilateral agreements between development partners facilitated ownership of the programme. In combining organisations' contributions, it was believed that the programme would be implemented faster and with high quality. Within this collaboration, a Director in the FMOH, amongst others in the FMOH, perceived the government as the major role player. Respondents outside of government (*Integrated Family Health Programme, USAID*) also recognised the FMOH as leading the programme, claiming that iCCM was institutionalized and streamlined within the government system.

Box 2: Integration into the public health system

"The iCCM and HEWs are integrated into the public health system. It is not a parallel programme. We have experience in managing HEP as HEWs have been implementing the IMNCI programme in the past 5 years. There are clear referral networks, and tools have been developed, harmonized and shared among different stakeholders". (Director FMOH)

"Government now gives priority to maternal and child health and newborns, so you know this iCCM was introduced at appropriate time actually when the government is really serious about reducing maternal and child mortality.....for achieving MDGs the government believes the iCCM is very important..." (Woreda HEW supervisor).

Thus, it was argued that there is commitment at all levels (FMOH, Regional and Zonal bureau) to the programme, and this sense of stewardship for the programme by the FMOH was also felt at a local level. The FMOH was seen as giving high priority to iCCM, and the HEP was a major vehicle to deliver this package of interventions. Furthermore, we were told that the HEP was a priority on the agenda of the Joint Consultative Forum meetings, which are held bi-monthly between the FMOH and its partners within the health sector.

Ownership beyond the national level

Fieldwork and document review showed that local meetings were held at Regional, Zonal, woreda, health centre and community levels so as to encourage a sense of ownership at these levels. This was underpinned by the principle that ownership was needed for scale up. Thus, the local meetings emphasised the value and benefits of the iCCM in terms of the MDGs and the health of the citizens. Between 2004 and 2010 the number of HPs more than doubled from 6,191 to 14,192. To instil a sense of ownership, local communities were included in choosing sites for the construction of health posts.

At a regional level, orientation workshops, under UNICEF's leadership, were conducted so as to increase awareness of the programme among all stakeholders and facilitate smooth implementation of the programme (Box 3). To ensure buy in and ownership at this level government officials were tasked with leading and facilitating these workshops. After the orientation workshops, training of master trainers in every region was organized²¹.

Box 3: Support for the iCCM strategy came from various organisations as well as from the FMOH

“iCCM has been a useful tool to strengthen whole PHC system/HEP and has been fully integrated into the HEP.” (Interviewee, Save the Children Fund)

“iCCM not treated as a project. It has been used as a mission to improve the HEP. It is used as a platform to improve the whole health system.” (Director, Agrarian Health Promotion and Disease Prevention Directorate (FMOH))

Slow implementation

From our discussions with staff from the UNICEF country office we learnt that there was some concern regarding the slow implementation of iCCM in three regions - Southern Nations, Nationalities and Peoples (SNNP), Benishangul-Gumuz and Somali. Participants suggested two reasons for the slow implementation. Firstly, prior to iCCM, the IPs in these regions were previously involved in refugee care. A period of adjustment has been necessary for them to change their organisational philosophy and adapt their ways of working. Secondly, these regions are amongst the poorest and most rural in the country, as well as having considerable numbers of refugees. This would undoubtedly have impacted on the implementation strength and impact indicators for these regions especially SNNP and Benishangul-Gumuz.

5.1.2 Multi-sectoral collaboration and alignment

The iCCM’s goals and implementation plans were considered by UNICEF, IPs and the FMOH to be in line with national child health plans and strategies. A strong and effective collaboration between the FMOH and implementation partners existed in the planning and implementation of the IHSS programme and iCCM services. Government stewardship in this collaboration is evidenced by the successful co-ordination between developmental partners and government departments at all levels. In 2010, with UNICEF co-ordination, a working group with all implementation partners was set up. This group, which is chaired by the FMOH, meets quarterly.

Within this partnership UNICEF plays a critical role as a main player. It is UNICEF that championed the implementation of the iCCM collaboration between different stakeholders. They have the technical capacity and resources for establishment of partnerships and networking with the donors and government. Prior to introduction of iCCM, UNICEF coordinated the formation of a Child Survival working group.

Much of the multi-sectoral collaboration also happens at the level of implementation. This collaboration was regarded as particularly important given Ethiopia’s size. During discussions, the extent to which IHSS programme interventions varied across the country was emphasised. It was explained that in fully funded IHSS programme areas, IHSS programme funds provide all training materials, support for training, commodities, and technical support for Ethiopia’s IHSS programme interventions. In order to implement iCCM in Ethiopia, the different IPs divided the country into

regions, each taking responsibility for implementing iCCM in a given region. To implement iCCM equitably they all undertook to work at a woreda level.

The following quote reflects the role of the implementing partners:

“So the government was also convinced, as well as UNICEF, to implement the programme. So a project proposal was developed and a meeting was held where different districts in the country were shared. For example L10K came up with a list of areas to cover and same applied with IFHP and Save the Children. In order to avoid overlapping of areas and duplication, the organisations agreed on the number of areas to work on.” [John Snow Incorporated](JSI)

It should also be noted that government involvement in this collaboration was not limited to the FMOH. The Ministry of Works and Urban Development assisted with the infrastructure development especially building of health posts.

Perceptions of the success of collaboration

The IPs (for instance Save the Children and the USAID funded Integrated Family Health Programme (IFHP) were of the opinion that the comprehensive preparation and planning, and the manner in which UNICEF worked, had contributed significantly to the successful implementation of the IHSS programme and iCCM. The IPs indicated that the strong partnership between government and all donors working together, led and co-ordinated by UNICEF, has ensured successful planning, working and reporting together.

From what was observed and heard from a number of representatives of the FMOH, the FMOH claims ownership for iCCM and its successful implementation. Representatives of the FMOH felt that iCCM has contributed significantly to the consolidation of the HEP and enhanced the recognition and respect of the HEWs in the community.

5.1.3 Women’s participation and gender equality

The HDA and HEWs were almost exclusively women, and there was very little discussion of the issue of gender and women’s empowerment in the interviews. When visiting health centres, and Woreda offices and when attending the FMOH annual health sector review meeting, it was observed that for all categories above the HEW, the majority of those employed were men. The document review suggests that there are various reasons, including cultural factors, for these inequalities in terms of the health graduates, with the major ones relating to the following problems in the education system:

- The potential pool of female applicants is small because a lower proportion of female students are enrolled in secondary school in Ethiopia compared to most other Eastern and Southern African countries²⁵.
- There is scarce information on the gender distribution of application and acceptance rates in the health science training establishment of Ethiopia. Nevertheless, gender distribution of human Resources for Health education graduates is more unequal than that of secondary school enrolment.

The discussions with the FMOH participants suggested that it is only through the recent introduction of the HEWs training programme, in which all trainees are females, that the proportion of female

health workers has been boosted. The field visit team learned from the focus group discussions that the HEW programme was designed to only recruit women who have completed secondary school. However, although being female and having completed secondary school are entry requirements, males and some students who have not finished their secondary schooling were also recruited due to the scarcity of qualifying female candidates. One respondent suggested:

“HEWs in some areas don’t only recruit people that have finished grade 10. The standard of criteria is set by the government. So if you want to get 10 grade women only in Afar or Somali it is very difficult. That is why they end up having males as well.”

The scarcity of women who qualified for the recruitment criteria, therefore, resulted in some degree of flexibility depending on contexts, particularly in remote rural regions such as Afar and Somali.

One of the problems raised, by the HEWs, during the FGDs was high attrition rates, although only a 3% attrition rate was cited in the 2013 IHSS annual report. In order to address attrition, the FMOH was in the process of reviewing HEW career paths. The envisaged curriculum revisions will include iCCM as part of pre-service training and allow for HEWs to advance to a diploma level. These proposed changes could begin to address the question of gender equity, even if only on a small scale, because it would be furthering the careers of women in a context where health workers at all levels above the HEWs are mostly male.

Studies have drawn attention to the importance of exploring the role of gender dynamics in leading to health service user outcomes, including influences on child health and nutrition outcomes and service utilisation. Women’s bargaining positions and their access to, and control over, resources is often limited, which limits their ability to seek not only health care, but also other resources for development, such as education and economic opportunities. Recommendations emerging from these studies emphasise the need to develop interventions that address gender dynamics. Interventions found to be effective in addressing gender dynamics include service delivery that involves] making services more accessible to carers of children; interventions which have included a focus on accessing households directly through home visits or that address barriers to reaching facilities and seek to mobilize and engage communities have been effective in improving child health and nutrition outcomes.²⁶ These important components of promoting gender equity in health service access are captured in the activities of the IHSS programme.

5.2 Effectiveness

5.2.1 Availability and access (human resources, supplies and commodities)

5.2.1.1 Human resources: HEWs

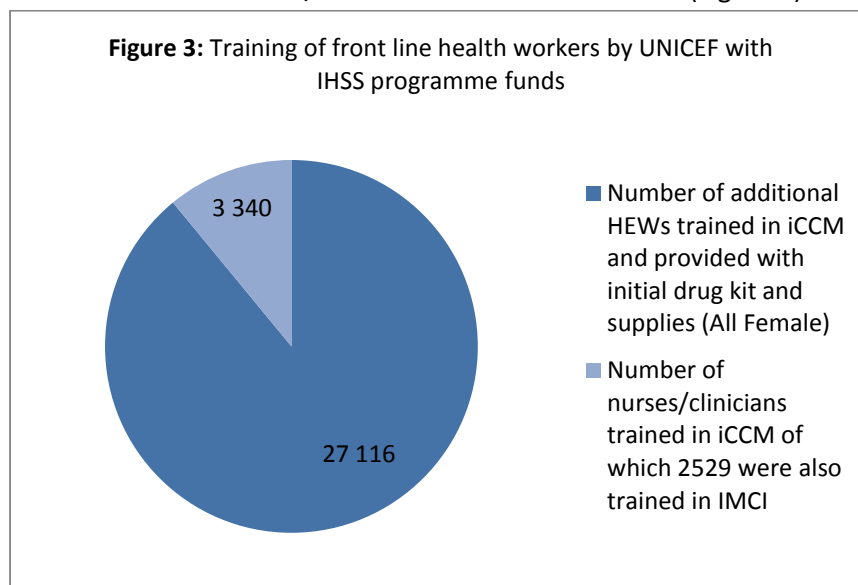
The great majority of HEWs in Ethiopia are female (except in pastoralist areas), above 18 years of age who have been recruited in their local areas and speak the local language. Their selection is carried out by the committee made up of members nominated by representatives of the Woreda Health Office. After training, the HEWs are allocated, in pairs, to Health posts and households in Kebeles and become salaried government employees. They work under the supervision of the Woreda Health office but receive technical and practical support from the Health Centre.

According to the stakeholder interviews, and the country visit team observations, there were two HEWs at each health post, and these HEWs were supported by the Health Development Army (HDA). These HDAs are volunteers that work within kebeles and mobilize communities to utilize health post and to improve their health seeking behaviour. All HDAs were women whilst men were recruited to work in sanitation and agriculture. Unlike the HEWs, the HDAs are not paid a salary.

HEW Training

In order to ensure the successful delivery of iCCM, UNICEF, with the FMOH and IPs, spent the whole of 2010 on preparing and developing the training materials (*UNICEF CI Annual Report 2011*). Other agencies, such as USAID and Carter Centre, supported the FMOH through accelerated training at health training colleges. Simultaneously, university networks increased their intake of other cadres of health professionals such as mid-level health officers. This was aimed at ensuring that there was a sufficiently large number of health care workers to support the HEW programme. This collaboration also included other government sectors beyond health care. For example, the Ministry of Education assisted with the scale up of HEWs through technical and vocational training. Training of HEWs by UNICEF, and the other implementing partners, took place in 2011.

Over the period of the IHSS programme grant UNICEF trained, in Ethiopia, a total of 27 116 HEWs in iCCM, the largest number of all the six IHSS programme countries. All those trained were females, and all were provided with the initial drug kit and supplies. In addition, 3340 nurses/ clinicians were trained in iCCM and 2529 nurses/ clinicians were trained in IMCI (Figure 3).



A desk review of government and UNICEF documents revealed that prior to the rollout of iCCM there was 12 months of planning in 2010 (*National Implementation Plan*). This included developing integrated training guides, job aids, tools development, testing in the field, translation, printing and distribution. UNICEF led and coordinated the development of training materials and the training sessions offered by the implementing partners and government officials. A training-of-trainers approach was used in which master trainers were trained nationally and they then offered further training at regional workshops to local health workers. The trainer to trainee ratio was aimed to be 1:5.

Over the course of 1 year, HEWs attended 5 training modules covering, iCCM (6 days training), community-based maternal, newborn and child health (CMNCH), Expanded programme on Immunisation (EPI), HIV, First Aid. They also received 10 days refresher training afterwards. This refresher training focuses on clean delivery so that they could provide safe deliveries of babies in the community. Although training the HEWs was the primary focus, the training was further broadened to managerial and supportive categories of workers so as to support the overall health service objectives. The training followed strict guidelines as set out by UNICEF. These guidelines were given to each implementing partner so as to maintain a consistent standard and quality. UNICEF also ensured that training tools such as videos, CDs, DVDs and booklets, were available. The additional training for iCCM including pneumonia is 6 days. Competency assessments were performed during training using assessment tools with actual observation of case management.

To ensure that this quality was maintained post-training, UNICEF also provided supervisory checklists.

HEW Salary and attrition

The salaries for HEWs are paid by the government. In a FGD of HEWs attending the 14th Annual Review Meeting 2012 in Bahir Dar, respondents explained that their monthly basic salary varies from region to region, educational level (Gr 8-10) and duration of training (6 months versus 1 year). They claimed that senior HEWs earned around 1427 birr (USD 76) whilst junior HEWs earned 908 birr (USD 48). HEWs were given an extra allowance for training. In addition, in rural areas HEWs received an extra hardship allowance.

“However for training when people come for iCCM we need to pay as per the budget and type of training. For trainings that are organised by the government, the government pays. If the partner calls for a specific training which is budgeted within their plans they cover the cost.”
(Implementing partner)

The FGDs also revealed that the HEWs were dissatisfied with their salaries. They felt that their salaries were not equivalent to the amount of work they were expected to do. Their dissatisfaction led to attrition in the past. However, the FMOH and IP respondents interviewed suggested that attrition rates of HEWs had stabilised. They attributed the decline to the recent introduction of career paths and improved working conditions for HEWs. According to one of the FGDs of 5 HEWs, none of their cohort had resigned since they had started working in their respective health posts 12 months ago. Annual reports from UNICEF reveal an average of 2% attrition and absences of HEWs from their posts due to engagement in non-health activities in the communities and due to many HEWs preferring to live in towns, where their children have access to better education. To curb this, Ethiopia has now embarked on upgrading HEWs from level 3 to 4 (community nurse) as an incentive. The addition of a third HEW to each health posts is being planned, where one of the three HEWs would be more skilled and able to provide MNCH services.

HEW Workload

According to the WHO, the acceptable health worker to population ratio is 2 per 1000. However, in Ethiopia it is 0.7 per 1000, including HEWs. In Ethiopia, the HEW staffing ratio is 2:5000 population. Participants in the FGDs suggested that the work load was too high and too many activities were

expected of HEWs. As mentioned, the HEP is designed to deliver 16 preventive and basic curative services, and a limited number of high-impact curative interventions, in order to address the main causes of maternal, neonatal and child morbidity and mortality. Concern was expressed over the HEWs' ability to integrate their roles without becoming overstretched, a concern shared by the implementing partners.

“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.” (IP official)

An attempt at workload alleviation through the Health Development Army

At a community level, the HDA is the basis of the health care system. Each HDA volunteer is responsible for five households with whom she meets weekly to promote key family health practices. In addition she encourages communities to access care through the HEWs at the Health Posts (HP), e.g. encouraging a pregnant woman or mother with a sick child to go to the HP for antenatal care (ANC) or care for her sick child. Together, six HDA volunteers and the 30 households they are responsible for form a health development team. This team chooses a team leader who meets every second week with the HEW.

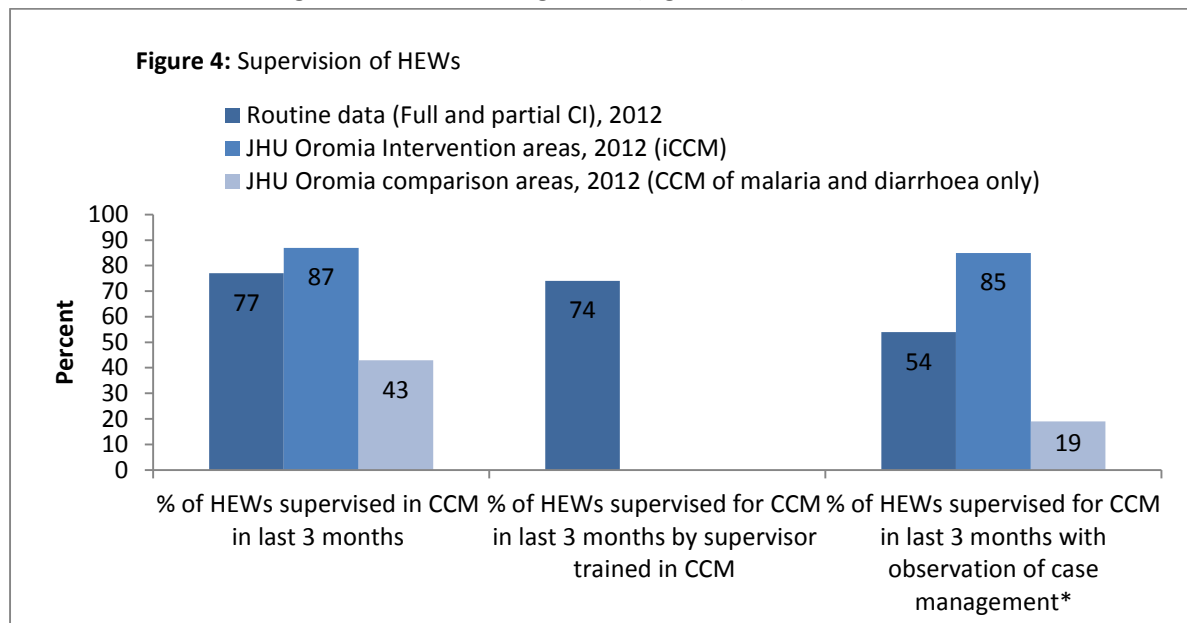
To reduce HEW workload, the HDAs encourage community members to seek care at the HP and notify HEWs when there is a home delivery or an illness so that they can do a household visit. This policy, and the development of the HDA system, were considered by respondents to have reduced the HEW workload, making it more manageable.

HEW supervision

In 2012, led and co-ordinated by UNICEF, the development and implementation of a supervisory system for iCCM was developed and implemented²⁷. This system was known as the Performance Review and Clinical Mentoring Meeting (PRCMM). UNICEF produced a guide on how to conduct a PRCMM, and in each region they conducted the first meeting, making sure all partners who will carry on with PRCMMs are trained to do so. The guide addresses supervision, detailing the need for supervisors to attend a 7 day training for iCCM – 6 days is for iCCM and one day on how to supervise. They are expected to supervise each HP once a week on their return. This system has regularised supervisory practises and clarified the roles of the Woreda and regional office staff in relation to supervision. After the first year's training HEWs' skills were updated and monitored through formal PRCM meetings in which all stakeholders participated. The aim of the review meetings was to improve technical skills and knowledge of HEWs and their supervisors. Each meeting lasts 2 days with an additional 1 day follow-up meeting at a later time.

The introduction of the review meetings has been important in setting up accountable supervisory systems. UNICEF funds the planning and co-ordination of PRCM meetings in certain sites, whilst the local IPs, e.g. USAID, cover the cost of the meetings. However, it was expressed that the budget to cover the cost for per diems for HEWs attending the training was not sufficient for the number of PRCMMs being held.

Despite the introduction of this ambitious supervisory system, routine data, as well as data from the John’s Hopkins University (JHU) research sites in two zones of Oromia⁶, reveal that whilst general supervision is happening, there is very little clinical mentorship involving observation of case management. Routine data, and data from JHU intervention areas, shows that over 70% of HEWs received supervision for CCM in the past three months. However, this was less than 50% in the JHU comparison areas where CCM includes the whole package except for antibiotic treatment for pneumonia. Routine data shows that about half of HEWs received supervision which included observation of case management. The proportion was higher in JHU intervention areas but includes either observation of registers or case management (Figure 4).



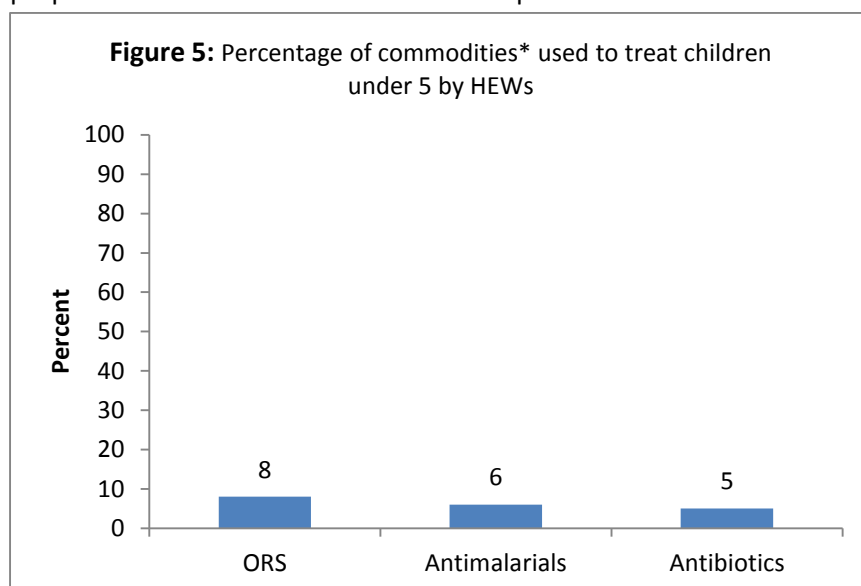
* JHU survey definition includes observation of consultation or register review

5.2.1.2 Supply of Medicines/Commodities and stock outs

A sustainable supply of drugs especially antibiotics is still evolving in Ethiopia. UNICEF, as a champion for iCCM implementation, collaborates with various stakeholders in this process, playing a critical role due to its technical expertise on supply requisition. UNICEF procures most of the iCCM commodities, but the distribution is the responsibility of the FMOH through the Pharmaceutical Fund Supply Agency (PFSA). Although still in its infancy and evolving, the PFSA is expected to provide and to sustain the provision of logistics, drugs and supplies for iCCM implementation. The Agency is responsible for ordering and distribution of iCCM drugs to 25 000 health posts. UNICEF provides support to the PFSA with iCCM drug supplies, trainer kits and delivers the supplies to the Woredas. It is hoped that gradually this responsibility will be transferred to the Government. UNICEF procured ORS and Cotrimoxazole using DFATD funding. Supply is based on estimations since the Government does not have a logistics information system.

To replenish HP stocks of medicines and other supplies UNICEF, following training of HEWs, provided each HEW with a training kit to take back to the HP. It was anticipated that these supplies would last 6 months, but they lasted longer due to low utilisation rates at the HPs. This was an efficient way of getting supplies back to health posts, avoiding the complicated logistics necessary to distribute supplies over a vast country with limited road infrastructure. UNICEF data on commodity purchase and under 5 children treated shows that less than 10% of commodities purchased were utilised by

HEWs in the full and partial IHSS programme areas (Figure 5). Since iCCM drugs are distributed through the PFSA it is possible that some leakage occurs with drugs being used at higher levels of care. The potential leak, together with low utilisation of HEWs, is likely to have contributed to the small proportion of commodities used at health post level.



**Assuming 3 ORS sachets per diarrhoea treatment, 10 antibiotic tablets per pneumonia treatment*

Despite all the attempts at streamlining, the country visit team learned that parallel systems and sources of funding exist for purchasing drugs in Ethiopia. Besides the UNICEF and government processes, IRC also purchases drugs including ORS, COARTEM, Cotrimoxazole, and RDTs. The IRC has its own stores at Regional, Zonal and Woreda levels. Distribution to health centres and HPs is done by staff stationed in Woreda offices.

Through UNICEF, DFATD is the main funder of iCCM, with other funds coming from different sources, including bilateral agreements. The FMOH has introduced new health care financing (Revolving Fund), which is hoped will lead to improved drug supply. In addition, the FMOH also reported that it would consider procurement of commodities such as ORS and Cotrimoxazole, using the MDG Pool Fund in an attempt to address supply chain challenges.

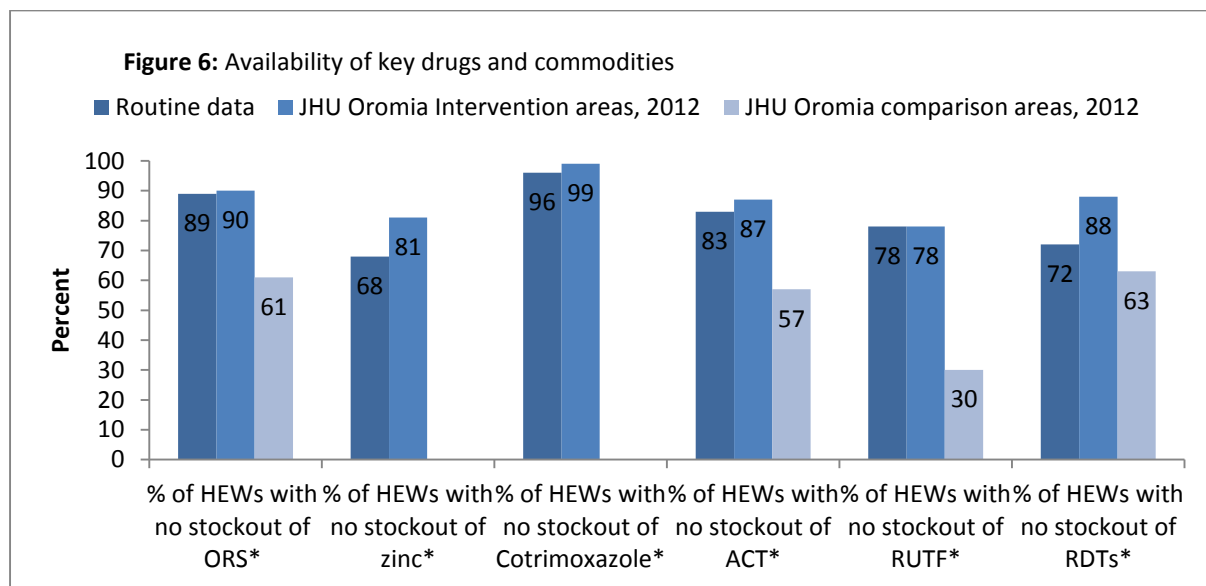
HEWs attending a FGD mentioned that stock-outs negatively influenced their credibility and trust with community members, and that it lowered health post utilization. From the FGD it was gleaned that:

- Drug items, such as ORS and polio vaccines, have been out of stock for 3 to 4 months and this results in HEWs referring people who are ill to health centres. Some HEWs reported running out of gloves leading to their inability to deliver babies at the health posts.
- In the 2 months before the country field visit (October 2012) the following commodities were out of stock: polio vaccine, coartem, ORS, paracetamol, chloroquine, gloves, chlorine and alcohol swabs, weighing scales and ambubags. In some health posts, some drugs were about to expire or had already expired. However, most essential drugs and supplies were available, as these were said to have been obtained during the Performance Review Clinical Meeting.
- The UNICEF training kits received did not contain Zinc and Coartem for Beningshagul and Gambela. There was also no plumpy nut, BP 100 biscuits or Amoxicillin.

- Although maternal and child health services are free in Ethiopia, patients sometimes have to purchase commodities from private pharmacies if these are out of stock at the health centres or HPs. As one HEW explained:

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

Data from routine collection, and the JHU Oromia survey from 2012⁶, shows that the commodity most commonly out of stock was zinc. Very little stock out occurred for cotrimoxazole. Considerably greater stock out was present in Oromia comparison areas, even for commodities that were part of the basic CCM package such as ACTs and ORS (Figure 6).



*Lasting longer than 1 week in the last 3 months

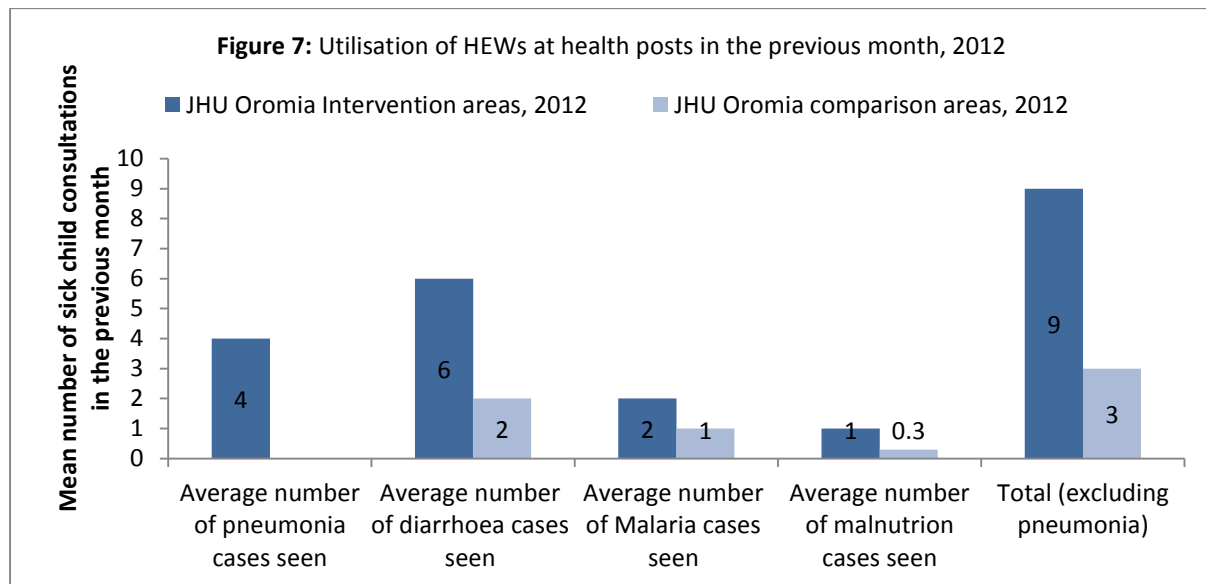
Support for supply chain management is being provided by JSI through the supply chains for community case management (SC4CCM) programme in 92 Woredas in 4 regions. Interventions are being undertaken to improve supply chain knowledge, skills and tools amongst HEWs as well as to strengthen implementation of the Integrated Pharmaceutical Logistics System (IPLS) for health posts.

5.2.2 Utilisation, M&E and quality of care

Utilisation

Almost all the interviews with the implementing partners and the FMOH raised the issue of poor utilisation of the health services by mothers and caregivers of children, especially those under the age of two months old. The 2013 UNICEF report to DFATD concurs with the view that the service utilization by newborns and sick young infants remains very low. This poor utilisation continued despite the introduction of iCCM, training of HEWs and improved provision of pharmaceutical supplies to HPs. The report states that as this age group is most at risk of morbidity and mortality and contributes to over 40% of <5 mortality, reaching them with lifesaving interventions is critical. Data from the JHU Oromia Survey⁶ intervention areas shows that, on average, health posts treated 6, 4, 2 and 1 cases of diarrhoea, pneumonia, malaria and malnutrition in the previous month, respectively. Utilisation was much lower in the comparison areas at 2, 1, 0.3 cases of diarrhoea, malaria and malnutrition,

respectively in the previous month (Figure 7). According to routine programme data, the most commonly treated condition by HEWs is diarrhoea (ORS) at 38% of all treatments during the project period, followed by pneumonia (28%), malaria (25%) and malnutrition (9%). Estimates from routine data, based on numbers of trained HEWs and total treatments given, reveal an average of 22 treatments per iCCM trained HEW per year (range 19-26).



Reasons given by interviewees for low caseloads at the HPs included: (1) Health seeking behaviour - sick people in the community do not first think of accessing help at a HP; (2) Stock-outs of drugs and other supplies at HPs; (3) No HEWs at HPs. HEWs are involved in other activities (other developmental work or campaigns); (4) Traditionally infants are kept inside for the first 42 days of their lives; and (5) Health posts were not open all the time.

Representatives from the FMOH were very concerned that community health-seeking behaviour contributed to poor utilisation of services at HP level. They were aware that the authors of the Oromia survey had recommended that care seeking needs improvement and that low utilization of the service is caused by lack of awareness and a lack of access. Throughout the interviews and observations it was clear that the FMOH, with the support of UNICEF and the IPs, have attempted to address these problems through improved replenishment of drugs and other supplies at the HPs, changing the policy regarding the opening of HPs so that they are open all day, consolidation of the HDA programme and using HDA volunteers to encourage people with sick children to seek help at a health post. In addition, the ministry introduced the 1-5 networks, by which HEWs mentor HDAs, and hoped this strategy would assist in ensuring that it would be easier to identify sick children within communities. However, a FMOH director acknowledged that the HDAs were not functioning as hoped in mobilising communities but they were confident that with the care-seeking strategies described above, and the improved supervisory structure initiated by UNICEF, services at a HP level would improve leading to increased health post utilisation.

Besides low utilisation of health posts another concern was that very few cases of pneumonia were treated monthly at health posts. HEWs mentioned that they attend to 3 - 5 children with pneumonia

a month, although this number varied depending on the season, and did go up to 8 per month. However, a respondent from the IRC said that there was high treatment coverage at health posts in regions where they work. There was a feeling that numbers of cases of pneumonia treated would increase if the HDA, not just the HEWs, were allowed to treat clients, as the HDA are closer to the community and visit a larger number of households (30-50) than the HEWs.

Monitoring and evaluation

The issue of monitoring and evaluation was discussed with the Director of Policy and Planning. He reported that the Ethiopian FMOH has an effective and well-functioning Health Management Information System (HMIS) which was implemented in 2005. The HMIS has been rolled out to 93% of hospitals, 83% of HCs and 25% HPs. Each month the PHC units report on 108 indicators. Although the HIV prevalence in rural areas is only 0.5%, 48 of the indicators are related to HIV. With the withdrawal of PEPFAR, revision of the national list of indicators was due to take place in early 2013.

According to the Director of Policy and Planning, FMOH and UNICEF Regional Office representative, at the time of the country visit (October 2012), iCCM indicators were not included in HMIS as the national set of HMIS indicators was finalised prior to the introduction of iCCM. At the time of the country visit iCCM indicators were being collected by UNICEF and the implementing partners in separate and parallel information systems and collated at the UNICEF office. However, with the revision of the HMIS in early 2013 iCCM indicators are planned to be included in the HMIS. FMOH is also rolling out a family folder that captures all vital events, and use of health services for preventive and curative care at the health post level.

Data collection and data flow

Data flows from the health post to the health centre, to the Woreda health office to the Zonal health office to the Regional health office to the FMOH at the national level. At HPs, on a weekly basis, HEWs are expected to collect data for the Community Health Information System (CHIS), which is different from the HMIS. HEWs report on 25 indicators (ANC, PMTCT, deliveries, family planning, immunisation, Voluntary Counselling and Testing (VCT), TB, home visits done, 16 packages, growth monitoring, weekly evaluations, toilet education), activities planned versus activities performed and commodities used. In addition, they collect iCCM data on the number of cases of each condition seen and the iCCM commodities used. Drugs and commodities utilisation data was used to estimate the drugs and supply needs of each HP.

At HCs and the Woreda health offices there are individuals responsible for data collation from the lower levels. On a quarterly basis there is a review meeting where data is verified and feedback is provided regarding the data submitted from the Zone to the Woreda. The data collectors are also given feedback during the course of onsite supervisory support visits. Regions are also provided with feedback every time data is submitted. We were told that data quality is always a problem, but the FMOH uses the guidelines from PEPFAR and the Global Fund and attempts are made roughly 6 monthly to use LQAS quality assurance sample methodology to verify the collected data.

In the health posts wall charts, that indicate the target for each condition treated, were visible. The HEWs went to great length to explain that this target is an estimate of the expected number of cases

and is generated at a national level. However, as correctional factors were not taken into account, the targets are without exception very high. The country visit team noted that the registers at Health posts were mostly correctly completed, and HEWs were able to read and give a basic explanation of the data charts displayed on the walls at HPs.

The country visit team observed how HDAs used colour-coded reporting cards to report cases requiring HEW attention within households. According to HEWs, these were developed by JICA and are colour coded for easy use even by illiterate HDA volunteers.

“Their (HDAs’) job is to motivate mothers to deliver under skilled professional supervision. They use different coloured cards for reporting and classifying clients as severe cases , those seen and referred, no sick child seen / no disease seen, etc” (HEW interviewee)

Data quality challenges

- The FMOH Director was concerned that the culture of using health information at lower levels is still evolving and needed to be strengthened.
- According to the FMOH Director, some HEWs expressed concern that the register was too big to be carried around during household visits.
- Woreda officials interviewed felt that collected health information was not used at lower level (Health centre and HP) and this needed to be strengthened.
- Some discrepancies in data were observed relating to clients who were referred to health centres and referral notes were not properly filed.
- HEWs reported that whilst they do receive feedback on patients that they refer to health centres, they feel that the supervisory support functions of the PRCMM supervisors are sometimes lacking.
- UNICEF, IPs and the FMOH all confirmed that the HEW register was being revised as some data elements were confusing.
- Discussions with staff from Health Centres suggested lack of resources such as photocopiers and inadequate numbers of computers.
- HEWs reported that they are expected to complete forms for all 16 packages and this can be time consuming.

Quality of care

Quality of care provided to sick children by HEWs was assessed in the intervention arm of the Oromia iCCM trial. The general finding was that HEWs correctly assessed, classified and managed children with iCCM illnesses. The evaluation found that although most children were checked for key signs of iCCM, checking for signs of severe illness was often not done. Overall 74% of children with pneumonia, 75% of children with diarrhoea and 53% of children with malnutrition were correctly classified. There were too few children with malaria to make any conclusions about the management of this illness. Seventy two percent (72%) of children with pneumonia, 64% of children and 59% of children with malnutrition were correctly managed. Only 14% of children received the first dose of treatment in the health post in the presence of the HEW. A missed opportunity was noted in that only 18% and 20% of children requiring routine vitamin A or anti-helminth treatment respectively were given these during the observed consultation. Over-treatment was rare with only 6% of children receiving an antibiotic when it was not indicated⁶.

5.2.3 Trends in coverage of selected maternal and child health indicators

This section includes analysis of coverage for selected maternal and child health indicators from 2000 to 2011. Descriptions include changes at the national level, within rural areas and in the richest and poorest wealth quintiles. Only figures for indicators included in the coverage trend analysis are included in this section. National and regional coverage profile figures, which include indicators not part of the trend analysis, can be found in Appendix E. These profiles have been included as an analysis product for in-country stakeholders, such as the Ministry of Health. Figures presented in this section are for rural areas only except for malaria indicators which are for malaria endemic areas (Figure 8). Statistically significant trends are indicated in figures with **.

Figure 8: Map of Ethiopia showing malaria endemic areas (source: Ethiopia National MIS 2007)

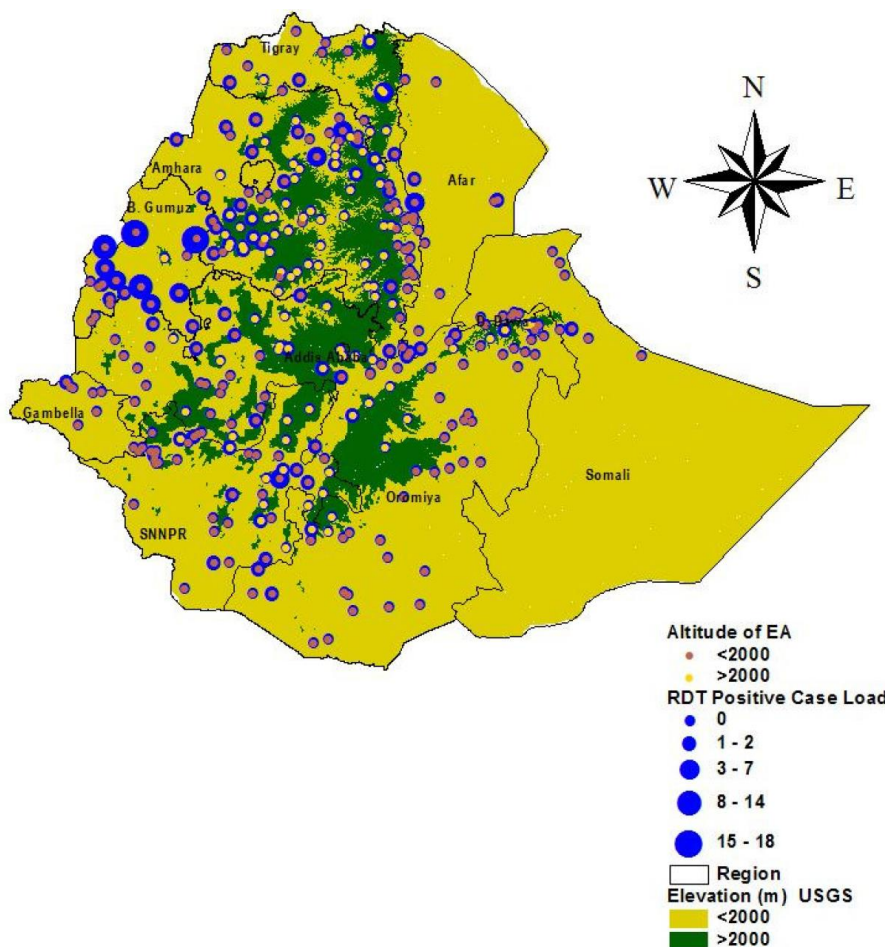


Table 4 below provides a summary of changes in the main IHSS programme intervention indicators in rural areas of Ethiopia. Improvements in the IHSS programme period are noted in exclusive breastfeeding, coverage of measles and DPT3 immunisation, care-seeking for fever and malaria treatment and Vitamin A supplementation. A stable annual coverage rate was observed for postnatal care, ORS, ITNs and care-seeking for pneumonia. A Decline in the annual rate of coverage change between the pre-IHSS and IHSS programme period coverage occurred for tetanus toxoid (which may be due to the virtual elimination of neonatal tetanus and more women with lifetime protection), early initiation of breastfeeding and ITNs. However confidence intervals for the point estimates of coverage for tetanus toxoid overlap suggesting that although the rate of change was faster in the pre-IHSS

period, IHSS programme support was able to maintain the levels of coverage and prevent declines. The same is likely to be true for ITNs although confidence intervals are not available for those point estimates. However the changes in ITN coverage in the IHSS programme-supported regions suggest that there may have been an impact in these regions even if not in all of rural Ethiopia.

Table 4: Summary of coverage trend indicators

Indicator	Ethiopia rural areas			Average annual rate of change pre IHSS (2000-2005). Data shown as % per year with confidence intervals	Average annual rate of change during IHSS (2005-2011). Data shown as % per year with confidence intervals
	DHS 2000 (pre IHSS) % (95%CI)	DHS 2005 (proxy for phase I baseline) % (95%CI)	DHS 2011 (proxy for phase II endline) % (95%CI)		
Tetanus toxoid vaccination of pregnant women (at least 2 doses)	13 (11-15)	26 (24-29)	28 (25-31)	3(2-3)	0.4(0.1-0.5)
IPTp (at least one dose)	1 (0.5 – 1)	2 (1 – 3)	Not collected	0.2(0.1-0.3)	-
Postnatal care for the mother	2 (2 - 3)	2 (2 -3)	3 (2 – 4)	0.02(-0.1-0.1)	0.03(-0.06-0.10)
Early breastfeeding	48 (44 – 51)	67 (64 – 69)	51 (47 – 54)	4(3-4)	-3 [3-(-2)]
Exclusive breastfeeding	56 (50 – 61)	50 (46 – 54)	53 (48 – 58)	-1[-2-(-0.7)]	0.6(0.02-0.9)
Vitamin A supplementation	58 (55 – 61)	45 (42 – 47)	52 (50 - 55)	-2.7[-3-(-2.5)]	1.3(1.1-1.4)
Measles immunisation	22 (19 – 26)	32 (29 – 36)	66	2(1-2)	6
DPT3 immunisation	18 (15 – 21)	30 (26 – 34)	56	2(2-3)	4
Care-seeking of suspected pneumonia	14 (11-17)	17 (14 – 21)	25 (20 - 30)	0.7(0.2-1)	1(0.8-2)
ORS coverage	10 (9 - 12)	19 (16 – 22)	24 (21 – 28)	2(1-2)	1(0.6-1)
	Ethiopia malaria endemic areas			Average annual rate of change during IHSS (2007-2011). Data shown as % per year with confidence intervals	
		MIS 2007	MIS 2011		
Care-seeking for fever *same or next day		16%*	51%*	9(7-10)	
Malaria treatment		12%	33%	5(4-6)	
ITN		41%	38%	-0.9[-1.4-(-0.3)]	

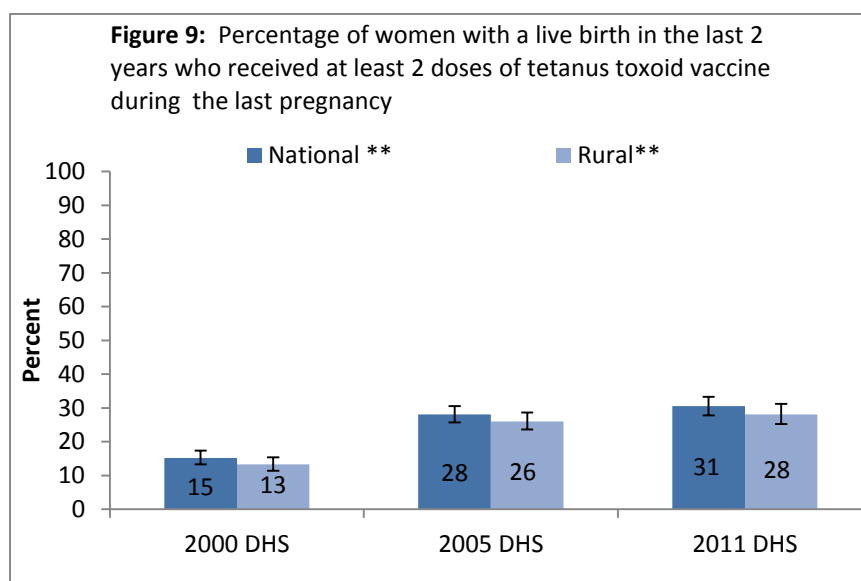
*IPTp = intermittent preventive treatment of malaria for pregnant women; ITNs = Insecticide Treated Nets; DPT = diphtheria, pertussis and tetanus; *2012 EPI Survey*

- Decrease in annual rate of change between pre-IHSS and IHSS programme period
- Stable annual rate of change between pre-IHSS and IHSS programme period
- Increase in annual rate of change between pre-IHSS and IHSS programme period

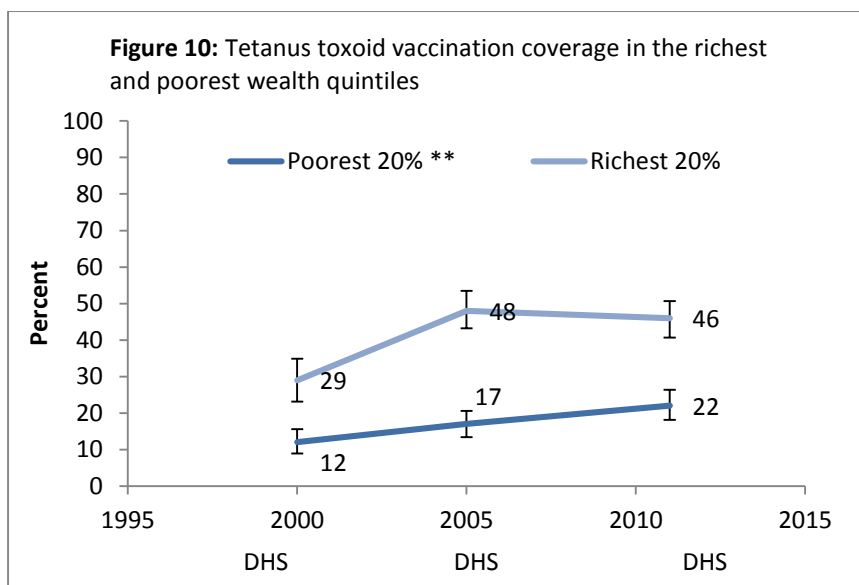
5.2.3.1 Antenatal care

Tetanus Toxoid vaccination of pregnant women

Nationally, the proportion of pregnant women having received at least two doses of tetanus toxoid (TT2+) to prevent neonatal tetanus in their previous pregnancy has increased considerably between 2000 and 2011 from 15% to 31% ($p=0.00$), with the majority of the change happening between 2000 and 2005. In rural areas, the trend follows a similar trajectory, with tetanus toxoid coverage having increased significantly ($p=0.00$) from 13% in 2000 to 26% in 2005 remaining fairly similar at 28% in 2011 (Figure 9). The average annual rate of change in the pre-IHSS period (2000-2005) is not significantly different between rural and national coverage estimates of TT2+, both increasing at approximately 2.5% per year. This average annual rate of increase tapers off in the IHSS programme (2005-2011) period, with an average annual rate of change, increasing at approximately 0.4% per year for both rural and national coverage estimates. While still considerably lower than urban areas (46% in 2011), rural coverage by 2011 is comparable to national estimates, with overlapping confidence intervals. The variation in tetanus toxoid coverage across the regions in 2011 is considerable. However, Ethiopia has managed to achieve elimination of maternal and neonatal tetanus in all areas except Somaliland.



Inequality in access to tetanus toxoid has increased significantly ($p=0.00$) since 2000 with a 24% difference in coverage between the richest and poorest wealth quintiles in 2011, compared to 17% in 2000 (Figure 10). The increase in the coverage gap between wealth quintiles occurs between 2000 and 2005, with a slight decrease again in the 2005-2011 period.



It is likely that most of the work towards neonatal tetanus elimination was achieved before the introduction of the IHSS programme with many women immunized before their latest pregnancy, resulting in little coverage change. However, it is likely that IHSS contributed to the maintenance of vaccination coverage during the IHSS programme period.

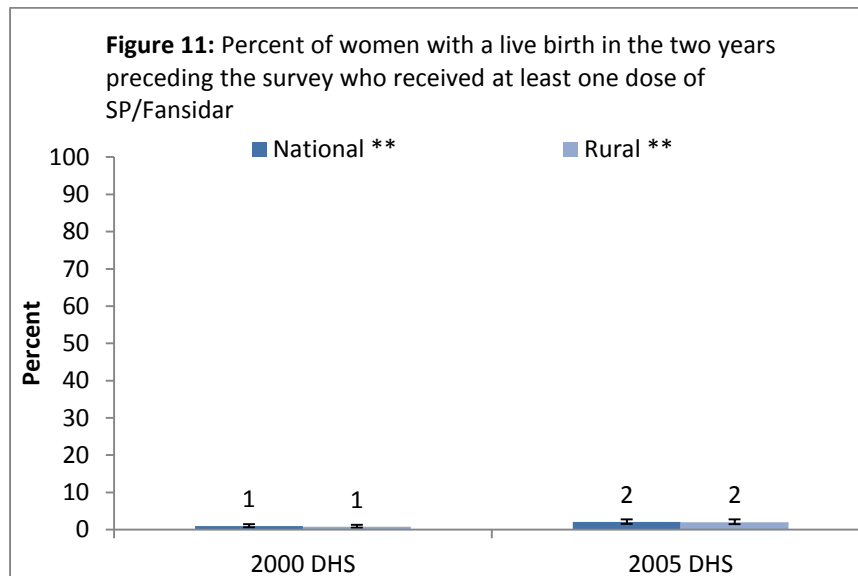
Malaria in Ethiopia

Malaria is a major public health problem in Ethiopia despite a relatively low malaria prevalence compared to most other malaria-endemic countries in Africa. Unstable malaria transmission patterns make Ethiopia prone to focal and multifocal epidemics that have on occasion caused catastrophic public health emergencies. Malaria is seasonal in most parts of Ethiopia, with variable transmission and prevalence patterns affected by the large diversity in altitude, rainfall, and population movement. Generally, areas below 2,000 meters above sea level (<2,000m) are considered malaria-endemic. The massive scale-up of malaria control interventions, including case diagnosis and treatment, distribution of long-lasting insecticide treated nets (LLIN), and indoor residual spraying of households with insecticides (IRS) have preferentially targeted these areas in Ethiopia²⁸. The MIS from 2007 and 2011 focus on areas <2,000m mapped by global positioning system (GPS). Hence, these provide a better estimate of coverage of malaria interventions. These two surveys have been used in this analysis of coverage of malaria interventions, except for IPTp which was not collected in the MIS. Malaria prevention in pregnancy is presented below whilst trend for ITNs, case-seeking for fever and malaria treatment are presented later.

Malaria prevention in pregnancy

Data on intermittent preventive treatment of malaria, with SP/Fansidar, for pregnant women was collected in Ethiopia in the 2000 and 2005 DHS. It was not included in either of the 2007 or 2011 MIS or the 2011 DHS. Both national and rural coverage increased from 1% to 2%, although the change is not significant for either, and there was very little difference between national and rural areas (Figure 11). The average annual rate of change is around 0.2% both for national and rural coverage estimates. The highest coverage in 2005 was in Benishangul-Gumuz at 6%. There was no difference between the

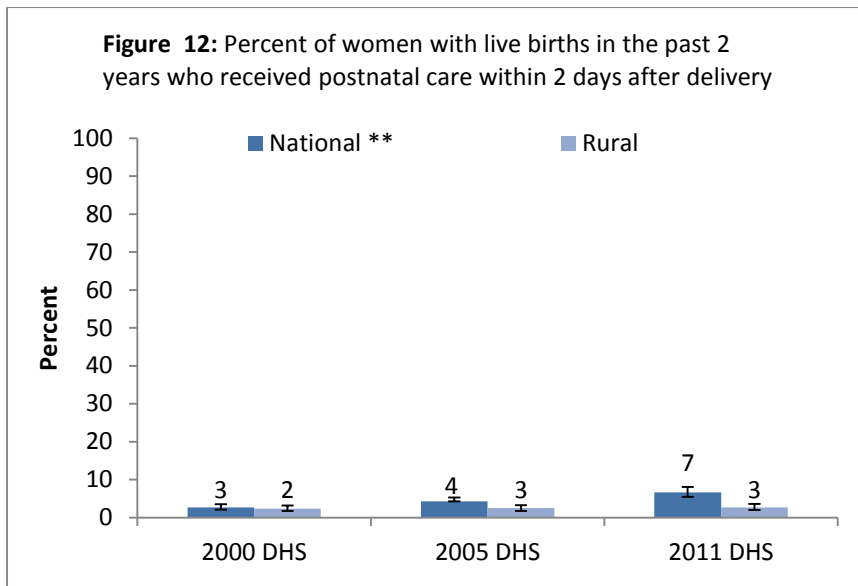
richest and the poorest wealth quintiles in either of the years. The DHS collects coverage estimates in both endemic and non-endemic areas, which could partly explain the low coverage estimates since low coverage estimates are expected in non-endemic areas. The IHSS programme did not procure any Fansidar in Ethiopia.



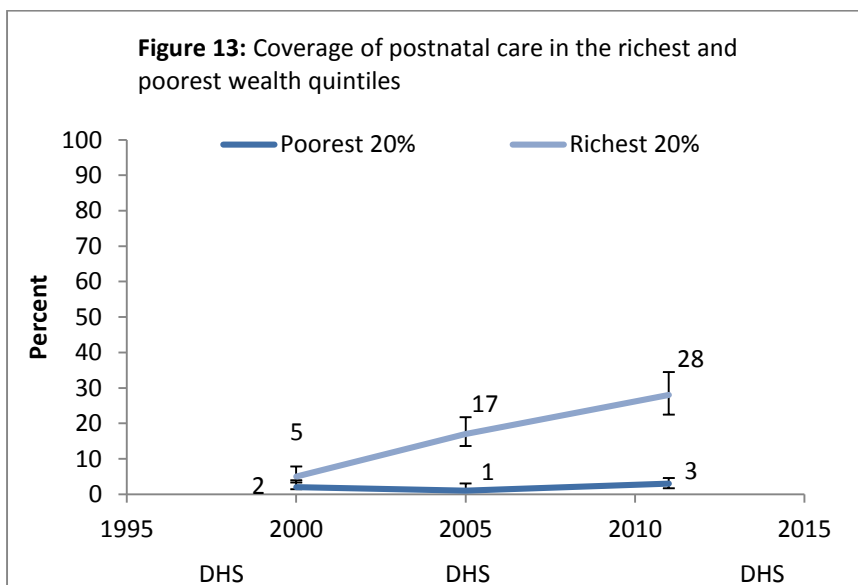
5.2.3.2 Postnatal care

Postnatal visits

The proportion of women receiving postnatal care within two days of childbirth showed some improvement nationally, from 3% in 2000 to 7% in 2011 ($p=0.00$). This still is, however, very low coverage. The average annual rate of change in coverage was similar in the pre-IHSS (2000-2005) and the IHSS programme (2005-2011) period, increasing at 0.3% and 0.4% per year, respectively. There was considerable variation in the postnatal care coverage from a high of 48% in the capital of Addis Ababa to a low of 5% in four regions (Amhara, Oromia Somali, and SNNP), with Afar and Benishangul-Gumuz very lightly higher at 6 and 7% in 2011. Postnatal care in the urban regions (Addis Ababa, Dire Dawa and Harari) and Gambela, with its small population, was far higher than in the mostly rural regions. In the five IHSS programme regions, the proportion of women receiving postnatal care was low. The gap in coverage between rural and urban areas was small in 2000 (3%) but increased in 2011 to 29% as coverage in rural areas changed little, and there was no significant trend ($p>0.05$) (Figure 12), whilst coverage in urban areas increased substantially, from 5% in 2000 to 32% in 2011. The average annual rate of change in rural areas remained unchanged between the pre-IHSS and IHSS programme period, with coverage increasing very slowly, at an average of 0.02% per year.



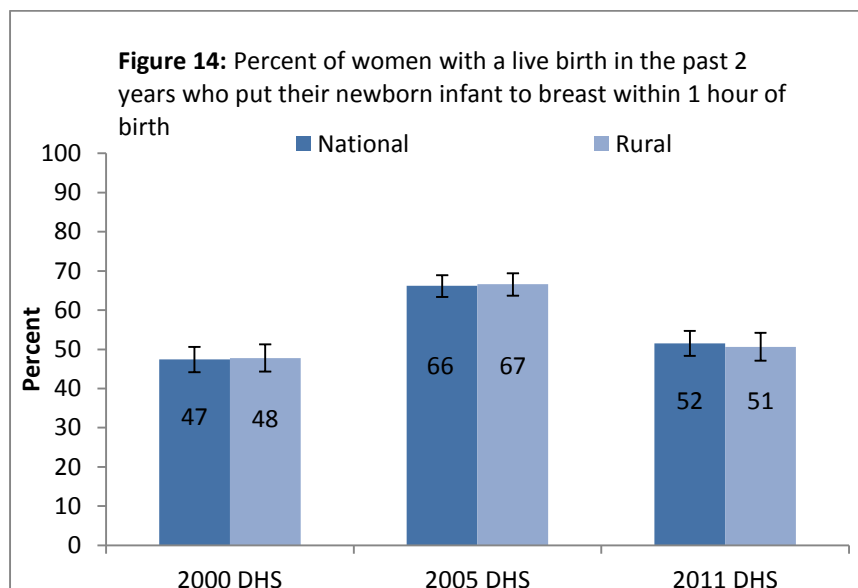
The gap in postnatal care coverage between the poorest and richest wealth quintiles increased, from 3% in 2000 to 25% in 2011, as coverage increased substantially in the richest quintile (from 5 to 28%) but changed very little (from 2 to 3%) in the poorest quintile ($p=0.1$) (Figure 13).



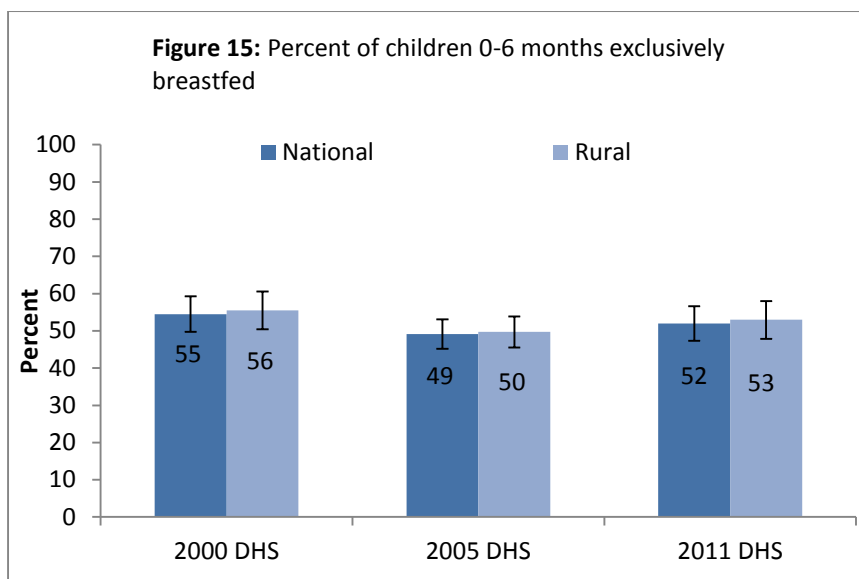
It is not clear why there was little change in postnatal care in rural areas during the IHSS programme period but there are several possible reasons. HEWs were only trained in newborn care in 2013, there was no demand creation for postnatal and newborn care and during qualitative interviews we were told of cultural beliefs which limit exposure to newborns soon after birth. An evaluation of the community-based nutrition programme in four regions of Ethiopia (all IHSS programme regions) showed a positive effect of HEWs on coverage of postnatal care within 2 days⁹ so it is expected that with the recent training coverage of postnatal care should increase.

5.2.3.3 Early initiation and Exclusive Breastfeeding (EBF)

The proportion of infants who were breastfed within one hour of birth did not change significantly at a national level between 2000 and 2011 (47% to 51%; $p=0.5$), despite a significant intervening rise to 66% in 2005. Early breastfeeding was similar in rural and urban at all three time periods ($p=0.07$) (Figure 14). The average annual rate of change in the pre-IHSS period for both national and rural began declining at an average of 2.5% per year. A recent evaluation⁹ of the Ethiopian community-based nutrition programme, implemented using volunteer community health workers (who have now become the health development army) supervised by HEWs, found no impact on early initiation of breastfeeding. Skilled birth attendance, while improving, is still low at 13% in 2012 nationally. This, together with cultural practices around access to newborns, may be hampering improvements in this indicator.



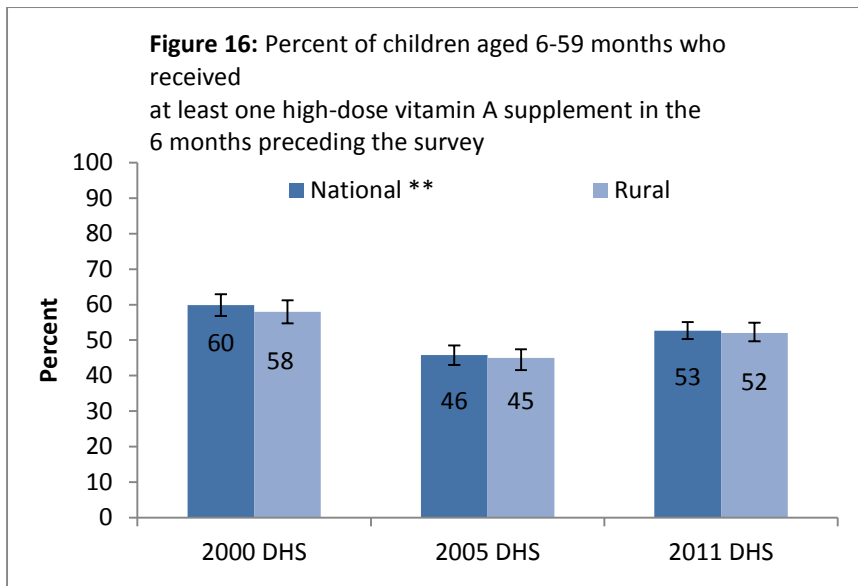
Similarly, there was little change nationally between 2000 and 2011 in the proportion of infants <6 months who were exclusively breastfed (55% to 52%; $p=0.4$). Rural areas achieved similar levels of EBF compared to urban areas at all three time points, and there was no improvement over time across rural areas (Figure 15) ($p=0.5$). The proportion of infants <6 months who were exclusively breastfed was higher in the IHSS programme regions, with the highest coverage of 72% in Amhara in 2011. Coverage estimates were declining at an average of approximately 1% per year in the pre-IHSS period, both at the national and rural levels, but began to increase at a rate of 0.6%, both nationally and in rural areas during the IHSS programme period. This is a significant change, which could plausibly be due to the IYCF counselling and promotion undertaken by the HEWs and HDA. The evaluation of the community-based nutrition programme found a significant effect of volunteer CHWs on EBF rates. The high ratio of volunteers to children (10-20 children per volunteer CHW) is considered to be an important contributor to the impact seen.⁹



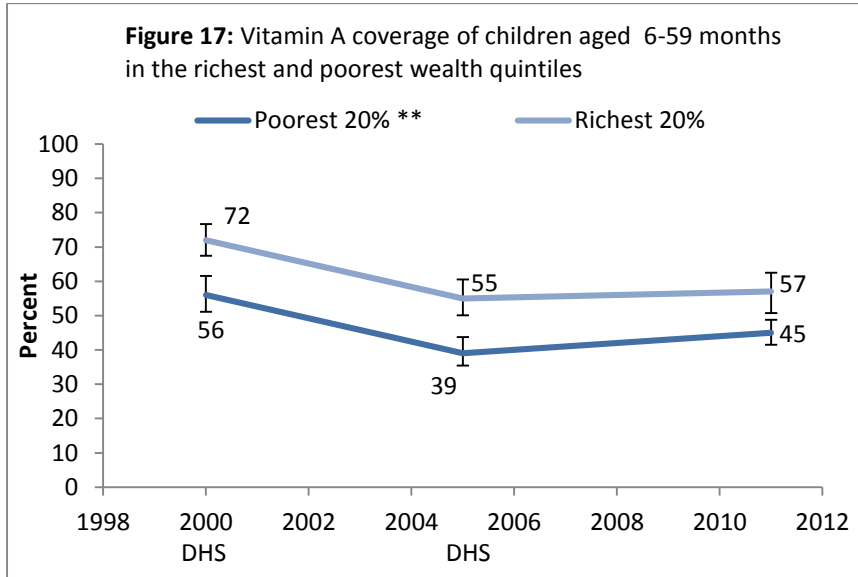
5.2.3.4 Preventive care

Vitamin A supplementation

Vitamin A coverage is measured in DHS as the proportion of children receiving a dose of vitamin A in the last 6 months preceding the survey. Nationally, Vitamin A coverage decreased from 60% in 2000 to 46% in 2005 and subsequently increased to 53% in 2011. In rural areas, coverage followed a similar trajectory, where it decreased from 58% in 2000 to 45% in 2005, and increased again to 52% by 2011. Declines in coverage in the pre-IHSS period, at an average of approximately 3% per year followed by an average rate of increase of approximately 1% in the IHSS programme period, were similar for both national and rural estimates. In 2011, there was variation in the proportion of children receiving vitamin A supplementation from a high of 83% in Tigray to a low of 26% in Somali. Between 2000 and 2011, vitamin A supplementation increased in Tigray and Benishangul-Gumuz and decreased marginally, or remained the same, in Oromia and Amhara and SNNP, respectively (Figure 16). The statistically significant decline in coverage between 2000 and 2005, and the significant rebound between 2005 and 2011, could plausibly be due to the IHSS programme contributions to the operational costs of vitamin A distribution through Supplemental Immunisation Activities and Child Health Days, which may have turned around the downward trend in this indicator that was occurring between 2000 and 2005.

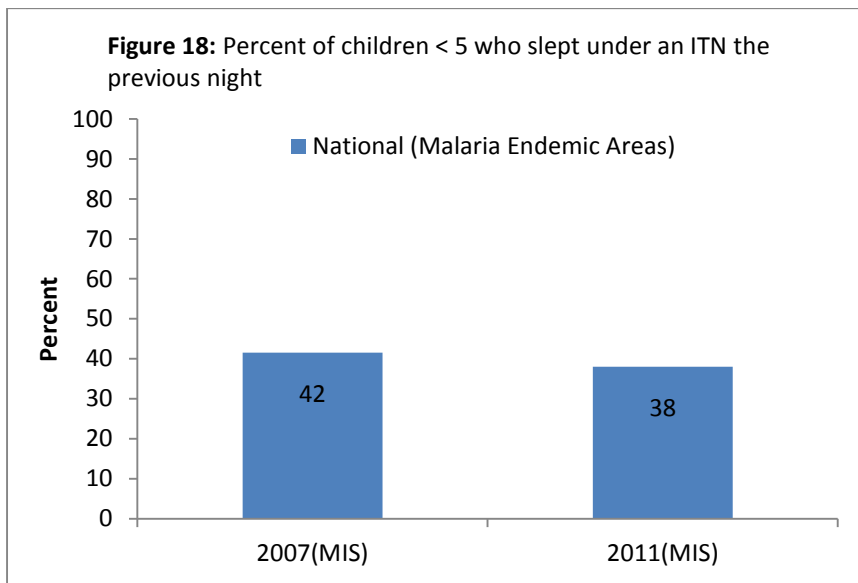


The difference in coverage between the richest and the poorest wealth quintiles declined, from 16% in 2000 to 11% in 2011 ($p=0.00$), due to the decline in coverage particularly in the richest quintile between 2000 and 2005, in addition to a slightly faster rate of increase between 2005-2011 in the poorest quintile (Figure 17). The increase in access to vitamin A in the poorest quintile during the IHSS programme period (2005 – 2011) could plausibly be due to the support for child health days which focus on outreach in hard to reach rural areas.



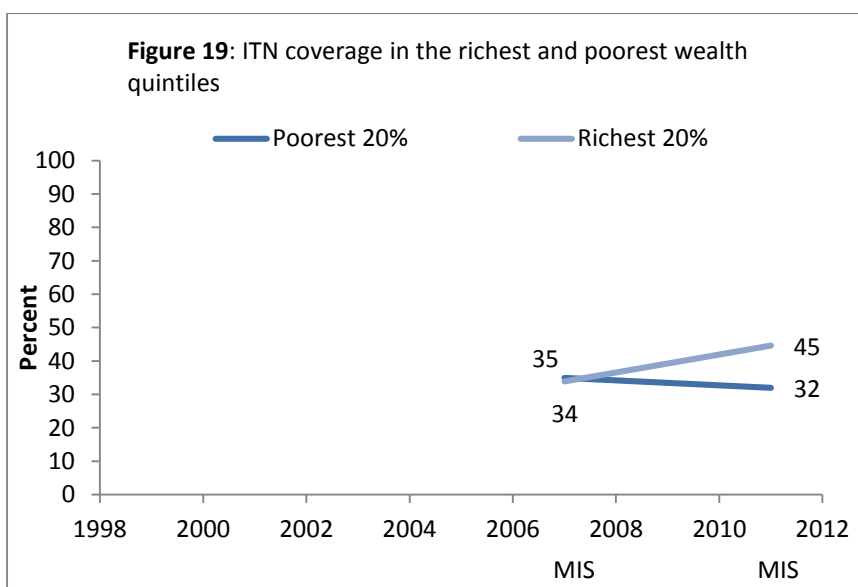
Children under 5 sleeping under ITNs

The proportion of children under 5 in malaria endemic areas who slept under an ITN the night preceding the survey was shown to be at a similar level in 2007 (42%) and 2011 (38%) (Figure 18). The annual rate of change in coverage declined at an average of approximately 1% per year. In the IHSS programme regions there was an increase in the proportions of children under 5 sleeping under ITNs between 2007 and 2011, with the largest increase in SNNP and Tigray (see Appendix E). UNICEF procured over 7 million ITNs during the IHSS programme period and supported their distribution through the HEWs.



**confidence intervals not available due to lack of raw data*

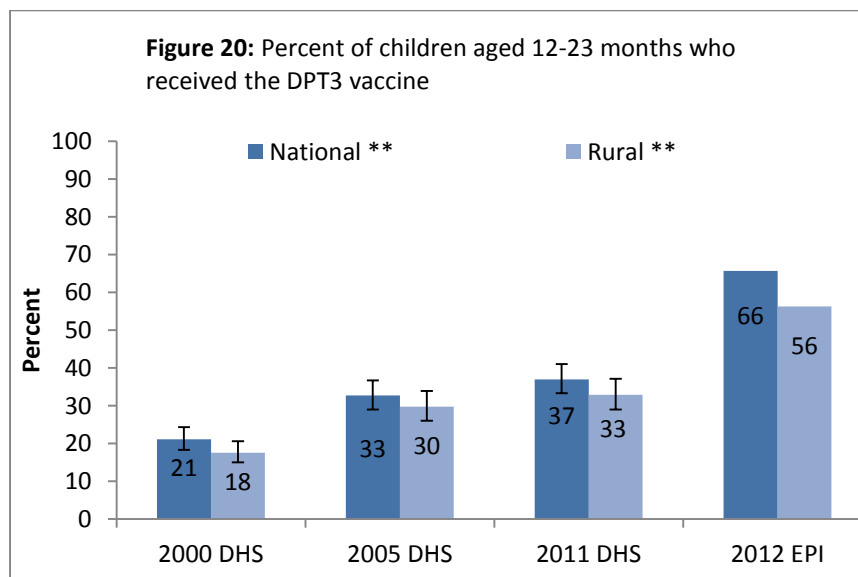
The gap in coverage between the richest and poorest wealth quintiles increased between 2007 and 2011, as a result of increasing coverage amongst the richest wealth quintile (Figure 19).

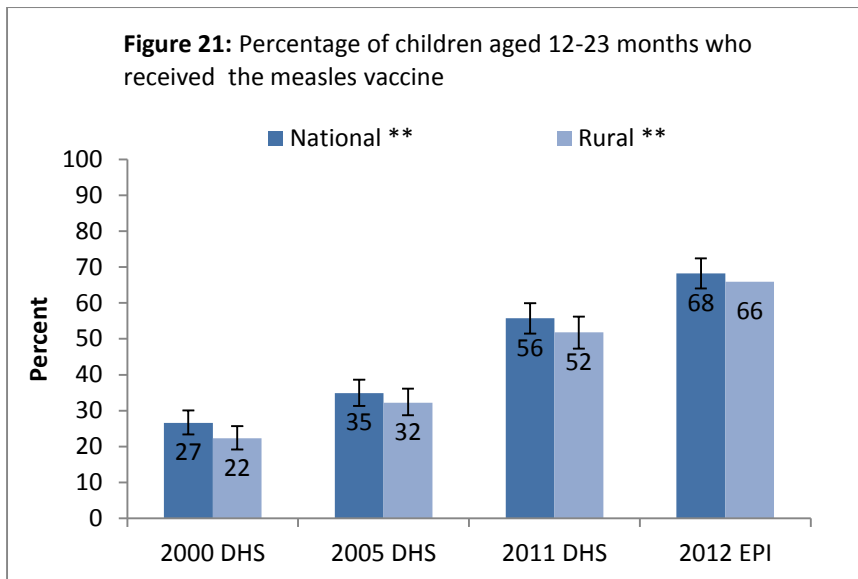


Vaccinations: Measles and DPT3

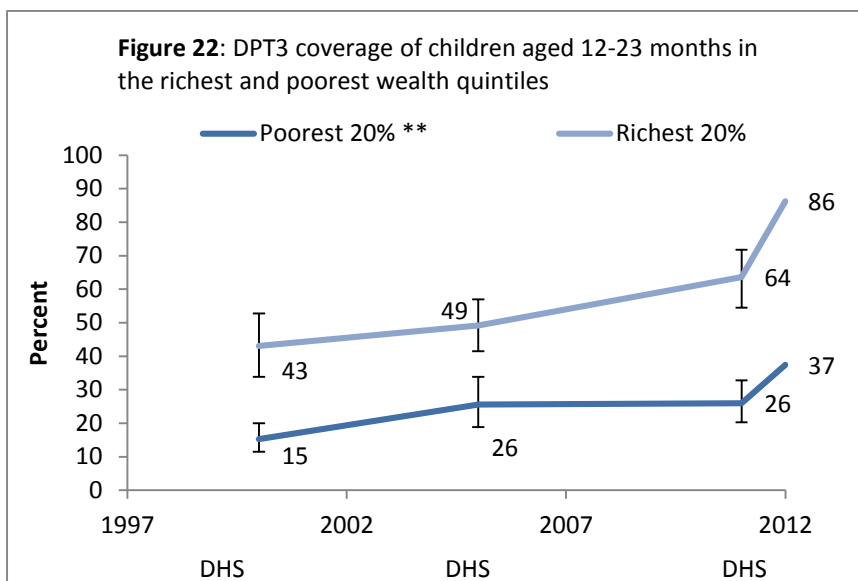
The proportion of children receiving three doses of DPT vaccine nationally has steadily increased between 2000 and 2012, from 21% to 66%, respectively (Figure 14). Similarly, measles vaccination coverage increased from 27% in 2000 to 68% in 2012 (Figure 15). There were marked differences in the coverage between DPT3 and measles nationally and within regions, with all regions reporting lower proportions of DPT3 coverage compared to measles, up until 2011. Although significant inter-regional variations were reported for both these vaccines between 2000 and 2012, among IHSS programme regions, Tigray consistently reported higher proportions than others. If the three urban regions (Addis Ababa, Harari, and Dire Dawa) are excluded, the IHSS programme regions had higher immunization coverage than the remaining non-IHSS programme supported regions (see appendix E). The IHSS programme supported both routine vaccination and campaigns (SIAs) which could plausibly have contributed to the upward trend in coverage for both vaccines.

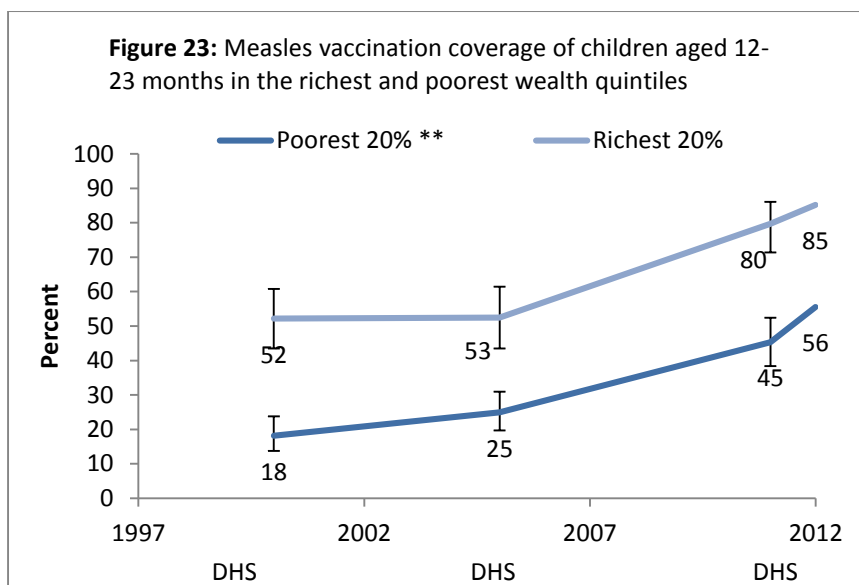
Rural areas achieved consistently lower coverage than urban areas although the difference decreased to 16% in 2012 with rural areas reaching over 50% coverage for both DPT3 and measles (p value for trend 0.00 for both measles and DPT3) (Figure 20 & 21). National and rural estimates for both DPT3 and measles were significant for trend (p=0.00). The annual rate of change in coverage for DPT3 both nationally and in rural areas were not significantly different from each other, increasing at an average of approximately 2.4% in the pre-IHSS period. During the IHSS programme period coverage rates increased at approximately 4% per year in rural areas. With regards to measles, the annual rate of change nationally and in rural areas was higher in the IHSS programme period in comparison to the pre-IHSS period, with annual rates of increase of 2% and 6% respectively for the two time periods.





The difference in coverage between the richest and the poorest wealth quintiles increased since 2000 for DPT3 (Figure 22) but remained similar for measles (Figure 23). There was a significant increase in coverage in the poorest quintile for both measles and DPT3, especially in the 2005-2011 period ($p=0.00$) (figures 22 and 23).

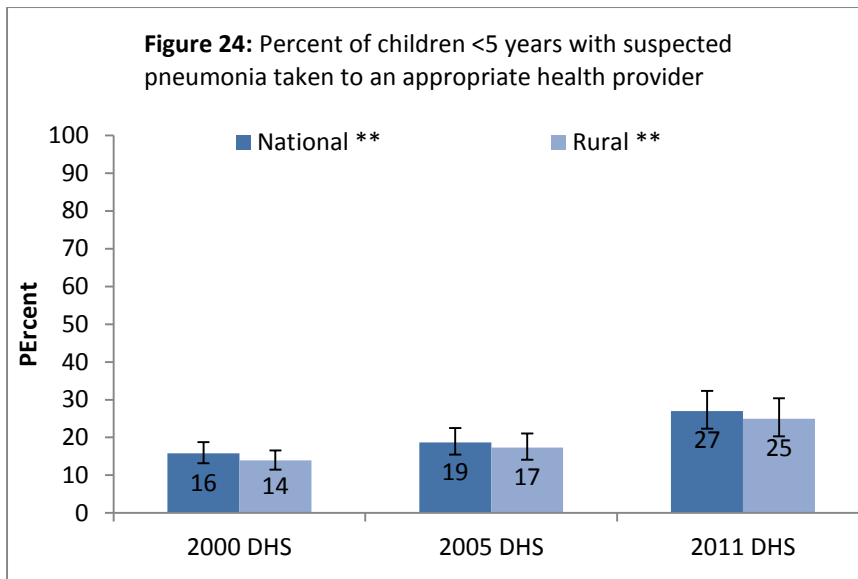




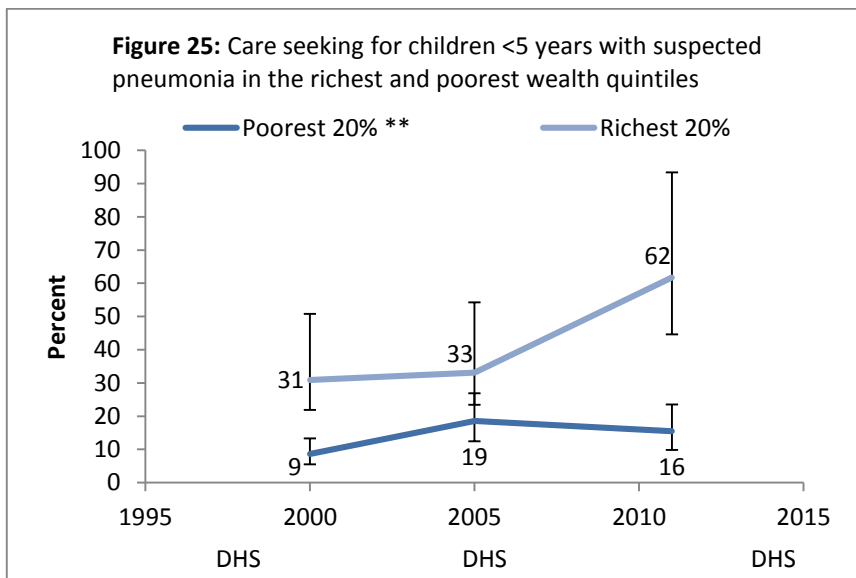
5.2.3.5 Curative care for malaria, pneumonia and diarrhoea

Care seeking and treatment for suspected pneumonia

Nationally, the proportion of children taken to an appropriate provider upon showing ARI symptoms did not change significantly between 2000 and 2005. However, it rose from 19% to 27% between 2005 and 2011. In all IHSS programme regions, there was an increase in the proportion of children taken to an appropriate provider between 2005 and 2011. This increase varied between 3% (in Oromia) and 20% (Benishangul-Gumuz). The gap in coverage between urban and rural areas decreased between 2005 and 2011, with rural areas reaching coverage of 25% in 2011 ($p=0.00$) (Figure 24) compared to urban reaching coverage of 47%. Increases in rural coverage estimates occurred between 2005 and 2011, although the confidence intervals for the two periods overlap. Both national and rural average rates of change were similar in the IHSS programme period, increasing at approximately 1.3% per year; this average rate of change did not increase significantly in comparison to the pre-IHSS period. The IHSS programme could plausibly have contributed to the increase in care-seeking for suspected pneumonia in the rural areas through demand generation by HEWs and the HDA. This is supported by the increases noted in the IHSS programme regions and the slope change, which is indicative of an upwards trend which is of borderline statistical significance.



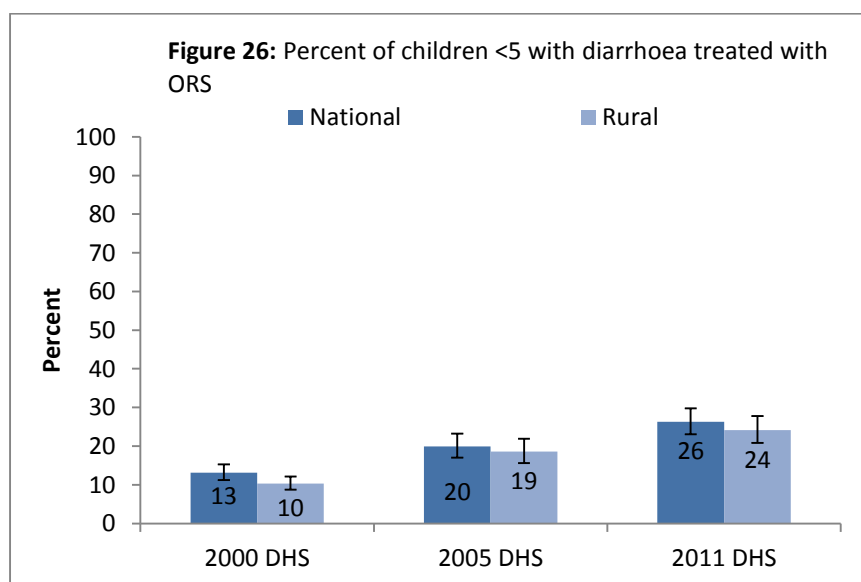
The difference in coverage between the richest and poorest quintiles increased considerably, from 22% in 2000 to 46% in 2011, as a result of a much higher rate of increase in coverage among the richest wealth quintile (p value for trend p=0.00) (Figure 25). It is important to note that the definition of ARI needing assessment was different in the 2011 DHS compared to the earlier surveys in that only 'chest related' cough and difficult breathing are included as opposed to any cough or difficult breathing, which decreased the sample of children with suspected pneumonia.



Care seeking and treatment of diarrhoea

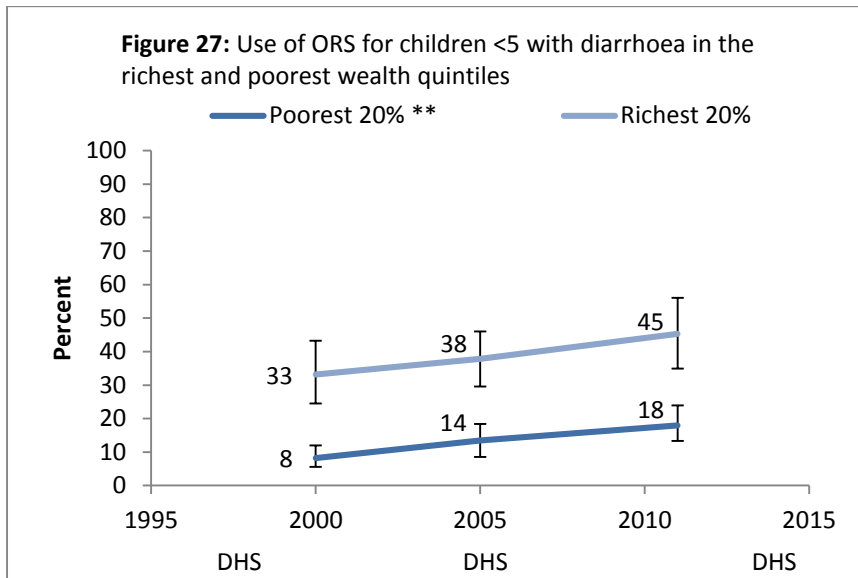
Nationally, the proportion of children taken to an appropriate provider for the treatment of diarrhoea increased from 13% in 2000 to 32% in 2011. All but one region (Somali, a non-IHSS region) reported an increase in the proportion of children taken to an appropriate provider for the treatment of diarrhoea, varying from an increase of 5% to 25% (see appendix E). The increases in the IHSS programme regions could plausibly have resulted from the health promotion and demand creation efforts of the HEWs and HDA supported through the IHSS programme. However, levels of care-seeking are still low and further improvement is needed.

Nationally, the provision of ORS to children with diarrhoea doubled from 2000 to 2011 increasing from 13% to 26% (national p value for trend $p=0.00$). Regionally, the increase in provision of ORS to children with diarrhoea was similar to the increase reported for the proportion of children taken to an appropriate provider. Increases between 9% and 19% were reported in all regions except for Somali which reported a decrease, when comparing 2000 and 2011 rates (see appendix E). Although the gap in coverage of ORS between urban and rural areas decreased between 2000 and 2011, still roughly half the proportion of children in rural areas with diarrhoea received ORS (24%) compared to urban areas (45%) in 2011 (p value for trend in rural areas $p=0.00$)(Figure 26). The average annual rate of change was not significantly different between the pre-IHSS and IHSS programme periods both for national and rural estimates, and remained between 1% and 1.7%, respectively. The continued increase in trend during the IHSS programme period could plausibly be due to the efforts of UNICEF, through the IHSS programme, to increase the provision and supply of ORS both through HEWs and facilities. During the IHSS period, UNICEF, through its own and DFATD funding, procured over 14 million ORS sachets.



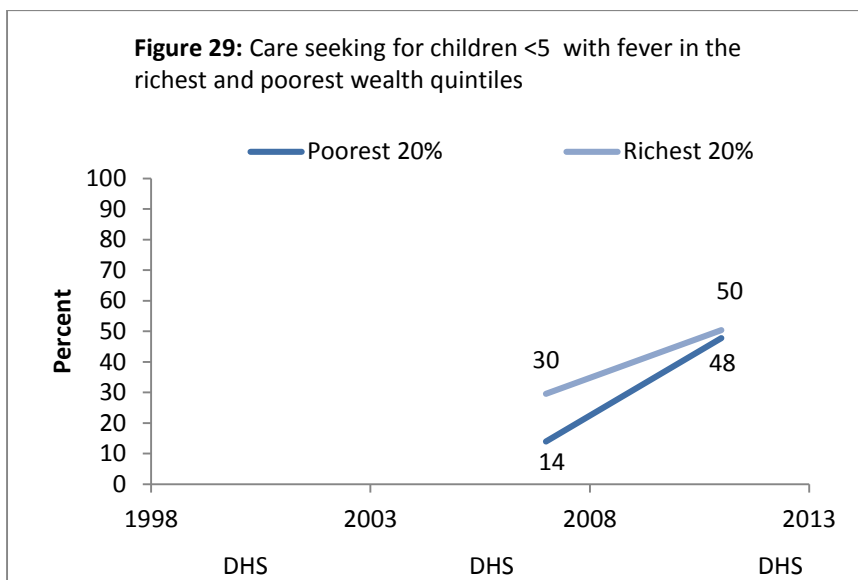
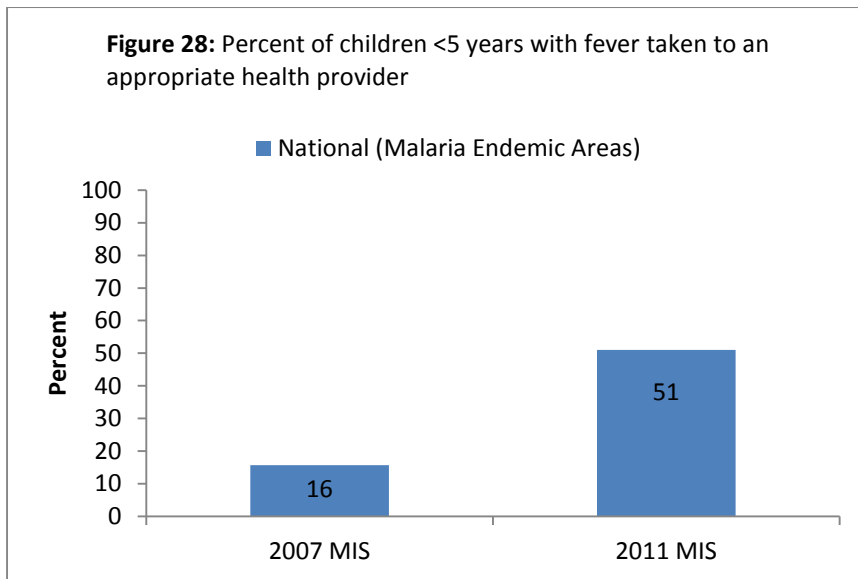
The gap in ORS coverage between the richest and the poorest wealth quintiles remained fairly similar between 2000 and 2011 (25% and 27%, respectively) suggesting no improvement in equity in access to ORS, although coverage in the poorest quintile has increased from 8% in 2000 to 18% in 2011 (p

value for trend $p=0.00$) which could plausibly be due to the increased availability of ORS through HEWs in rural areas (Figure 27).

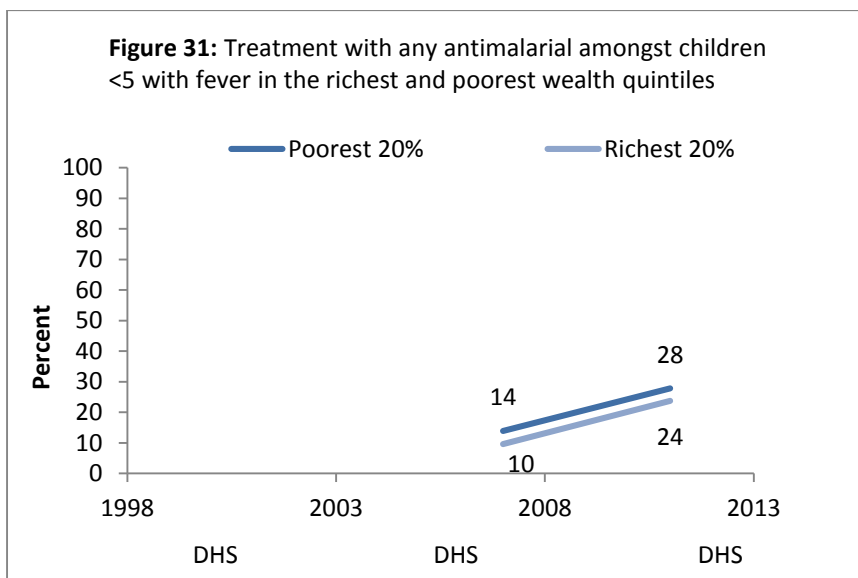
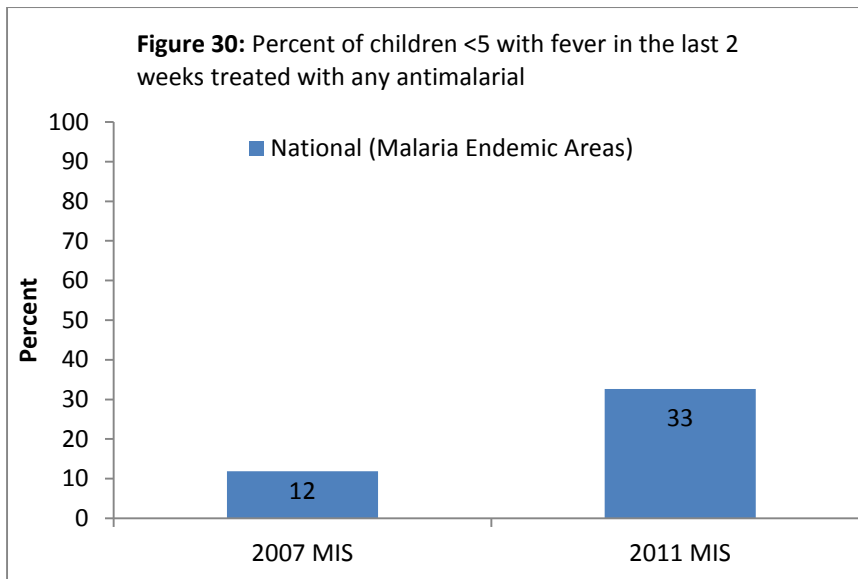


Care seeking and treatment of children with fever (suspected malaria)

Coverage of care seeking for fever in malaria endemic areas increased, from 16% in 2007 to 51% in 2011, according to the 2007 and 2011 MIS data (Figure 28), with an average annual rate of increase of approximately 9% per year. With regard to equity in care seeking for fever, MIS data indicates a gap of 16% in 2007 and 2% in 2011 (Figure 29). The reasons for the greater increase in care-seeking for fever compared to suspected pneumonia and diarrhoea are unclear. It is possible that the HEWs may have focused more on care-seeking for fever and generated greater demand for this condition with the availability of more efficacious ACT medicines. UNICEF procured almost 4 million ACT packs for use at the health posts. ACT is a fairly recent drug, and this may have made it easier to generate demand for it than for ORS, which has been around for a long time.

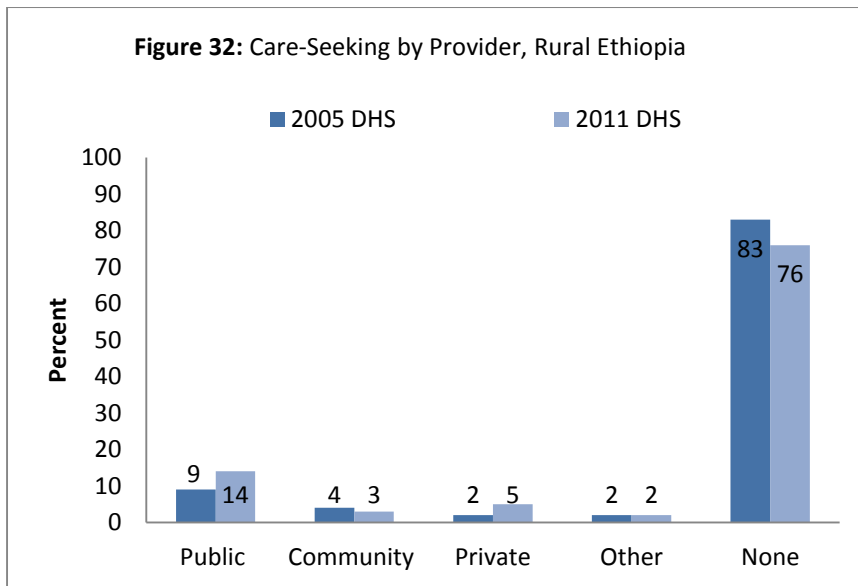


Coverage of antimalarial drugs for children with fever increased from 12 to 33%, between 2007 and 2011, in malaria endemic areas (Figure 30), with an average annual rate of increase in coverage of approximately 5%. In both the MIS surveys, coverage of antimalarial drugs was reported to be marginally higher in the poorest quintile, and the gap was the same in both years (4%) (Figure 31).

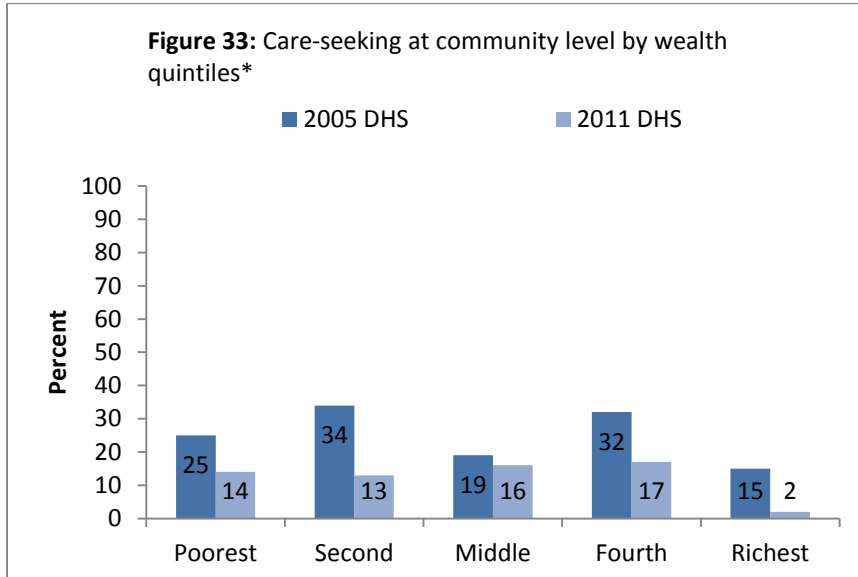


5.2.3.6 Care seeking for fever, suspected pneumonia and diarrhoea by provider

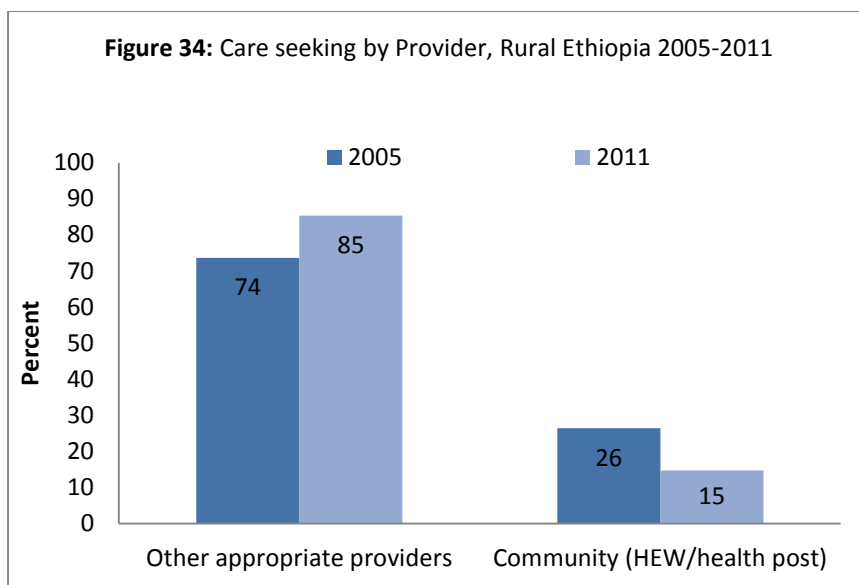
Within rural areas of Ethiopia, amongst children with fever, suspected pneumonia or diarrhoea, whose caretakers sought care, the proportion seeking care from public and private health facilities increased between 2005 and 2011, whilst the proportion seeking care from community providers (government health post/HEW) stayed fairly similar (Figure 32). In both periods, rural areas of Benishangul-Gumuz (an IHSS programme region) had the highest proportion of children seeking care in the community compared to other regions (10%).



Assessing care-seeking at health post/HEW level across wealth quintiles shows a decline in care-seeking at this level across all wealth quintiles between 2005 and 2011 (Figure 33). Amongst appropriate providers*, care-seeking at levels above health post/HEW level increased, from 74% in 2005 to 85% in 2011 (Figure 34). The timing of the 2011 DHS may preclude any conclusions about care-seeking to HEWs since they were only trained in iCCM in 2011. There are also concerns about whether respondents in national surveys are able to distinguish HEWs from facility-based staff.²⁹



*as a proportion of appropriate providers only which included: Government hospital, government health center, government health station/ clinic, other public, NGO health facility private hospital, private doctor, private clinic, other private, government Health Post/ HEW.



Other appropriate providers: Government hospital, government health center, government health station/ clinic, other public, NGO health facility private hospital, private doctor, private clinic, other private, government.

5.2.3.7 Additional maternal and child health indicators not included in the statistical trend analysis

These indicators were not the primary targets for the IHSS programme but are included here to give a complete picture of the state of maternal and child health services in the country over the period of IHSS programme implementation. Figures for these indicators can be found in appendix E.

Antenatal care

ANC visits

In Ethiopia, between the 2000 DHS and the 2012 Epi survey, there was an upward trend in both the proportion of women who attended at least one ANC visit and the proportion of women who attended at least four ANC visits. However, the upward trend was more pronounced for women attending at least one visit, almost doubling from 27% in 2000 to 52% in 2012. In all five of the IHSS programme regions there was an increase in the proportion of women attending at least one visit. In contrast, there was improvement in only two of the non-IHSS programme regions, most notably in Somali. Although the improvement in the proportion of women attending at least four ANC visits was less marked, from 10% in 2000 to 16% in 2012, again there was more improvement in the IHSS programme regions, except for Tigray where coverage declined from 15 to 11% (see Appendix E). Since the largest change in antenatal care-seeking occurred between 2005 and 2011, it is plausible that the HEWs could have contributed to this improvement through the promotion of antenatal care.

Childbirth and newborn care

Skilled attendance

Although nationally the proportion of women having a skilled birth attendant at delivery increased, from 6% in the 2000 DHS to 13% in the 2012 EPI survey, this coverage is still low. There was considerable variation across the regions with high proportions of care during childbirth in 2012 reported in the three cities: Dire Dawa (70%), Addis Ababa (82%), Harari (39%). In contrast, low proportions of care during childbirth were reported in the more rural regions, including the IHSS programme regions of Amhara, Benishangul-Gumuz, Oromia and SNNP, which reported rates between 10 and 11%. The exception amongst the IHSS programme regions was Tigray, which had coverage of 21% in 2012 (Appendix E).

Infant and young child nutrition

Complementary feeding

The proportion of children between 6 and 8 months who received complementary foods fluctuated between 43% (2000), 54% (2005) and 51% (2011). There were no significant variations between IHSS and non IHSS programme regions, with the exception of Afar and Somali, both non IHSS programme regions reporting the lowest rates of complementary feeding, 14% and 25% respectively. Other regions ranged between 40% to 66% rates of complementary feeding, with Benishangul-Gumuz, an IHSS programme region, reporting the highest rate of complementary feeding, at 66% in 2011 (see Appendix E). The evaluation of the community-based nutrition programme found significant increases in dietary diversity and minimal acceptable diet in 6-23 month olds as a result of visits and counselling from volunteer CHWs⁹. The lack of change in national coverage could be due to the dilution of effects as data is aggregated to the national level. The relatively higher rates of complementary feeding in IHSS programme regions could plausibly be due to the impact of HEWs and HDA on IYCF practices.

Vaccinations

BCG

Nationally, the proportion of infants receiving BCG vaccine steadily increased, from 46% in 2000 to 80% in 2012. There was an increasing trend in the proportion of BCG coverage in all UNICEF-supported regions between 2000 and 2012. Addis Ababa consistently had the highest proportions overall and Tigray consistently reported the highest proportions among the UNICEF -supported regions. In 2012 Afar and Somali, two non-UNICEF-supported regions, reported the lowest proportion of infants receiving BCG vaccine (48% and 50%, respectively). All UNICEF-supported regions reported proportions over 75% in 2012.

Polio

Nationally, the proportion of children who received three doses of polio vaccine remained low, with an increase from 34% to 45% between 2000 and 2005 and no change between 2005 and 2011. A large increase was noted between 2011 and 2012, to a level of 70%. In 2012, there was considerable variation across the districts from a low of 42% in Somali to a high of 98% in Addis Ababa.

HepB and Hib

HepB and Hib vaccines were included in the EPI in Ethiopia in 2007. They are delivered as a penta-valent vaccine together with DPT. Data on the coverage of HepB and Hib vaccines were reported in 2011 and 2012. Nationally, there was a significant increase from 28% to 66% in the proportion of children vaccinated, with HepB and Hib, between 2011 and 2012. After Addis Ababa, Tigray reported the highest proportion of children vaccinated against HepB and Hib, i.e. 88%. Three non-IHSS programme regions Afar, Gambela and Somali reported low coverage of HepB and Hib in 2011 and 2012 (<50%). In contrast, all the IHSS programme regions reported coverage of over 55%. The IHSS programme supported HepB and Hib vaccination efforts through the support for routine immunisation.

Nutrition indicators: Stunting and underweight

Nationally the proportion of children under 5 years who were either stunted or underweight decreased a similar amount between 2000 and 2011 (~13%). The improvement in the proportion of children who were underweight varied across regions, from a reduction of 18% in SNNP to a slight increase of 2% in Dire Dawa. The proportion of children who were stunted reduced in all but one region (Dire Dawa). There was no meaningful difference between the IHSS and non-IHSS programme regions in the proportion of children who were either stunted or underweight (see appendix E).

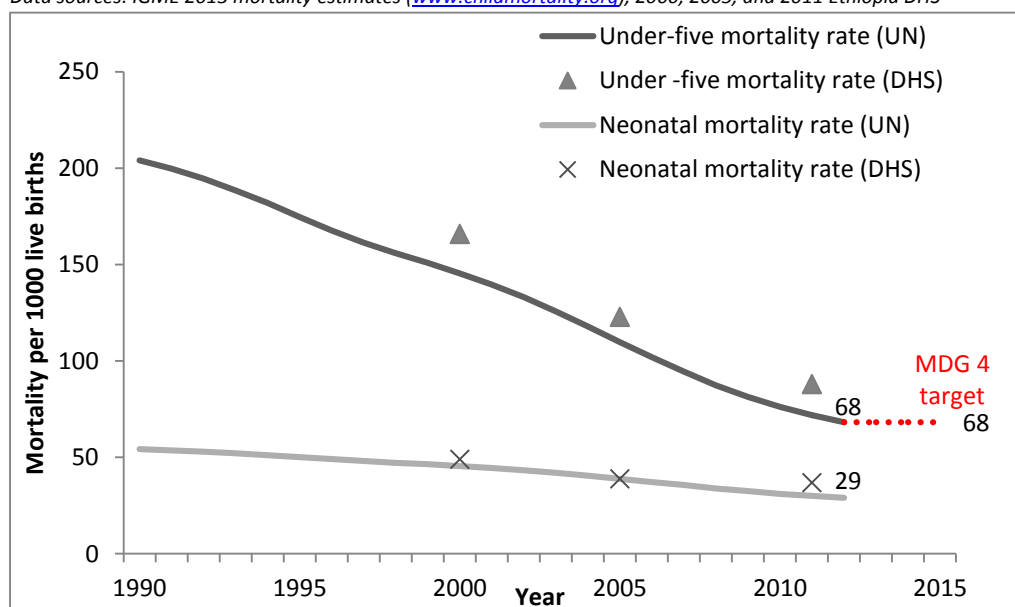
5.3 Impact

5.3.1 Change in child mortality

According to the 2013 UN Inter-Agency Group for Child Mortality Estimation (IGME), Ethiopia has achieved the target for Millennium Development Goal 4 for child survival³⁰(Figure 35). Still, nearly 205 000 children died before their fifth birthday in 2012. Approximately 42% of these deaths occur in the neonatal period, up from 27% in 1990. The average rate of reduction of under-five mortality for Ethiopia has been 5.0% per year since 1990, which is higher than the average for sub-Saharan Africa (2.7%).³¹ The 2011 DHS reported the national under-five mortality rate (U5MR) at 88 deaths per 1000 in 2011, a decline from 166 per 1000 for 2000, translating to an average reduction of 5.7% per year.

Figure 35: National under-five and neonatal mortality change

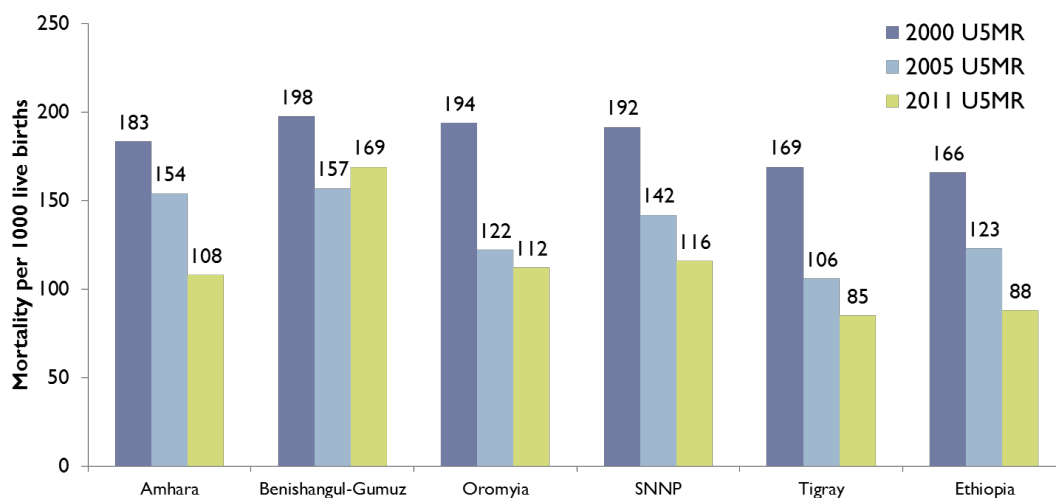
Data sources: IGME 2013 mortality estimates (www.childmortality.org), 2000, 2005, and 2011 Ethiopia DHS



Across the IHSS programme regions, Benishangul-Gumuz had the highest U5MR (169) in 2011 and slowest rate of reduction from 2000-2011 (1.4% per year); whereas Tigray has performed better than the national average with 85 deaths per 1000 live births in 2011 and an average rate of reduction of 6.5% per year (Figure 36). The biggest declines, in U5MR, were seen between 2000 and 2005, with the exception of Amhara. Between the 2005 and 2011 DHS, there was little to no change in neonatal deaths with an increase in rates in Amhara, Benishangul-Gumuz, SNNP and Tigray.

Figure 36: Under-five mortality rates for IHSS programme regions and nationally since 2000

Data sources: 2000, 2005, and 2011 Ethiopia DHS. Note: regional U5MR is for the 10-year period preceding the survey and national data are for the 5-year period preceding the survey.

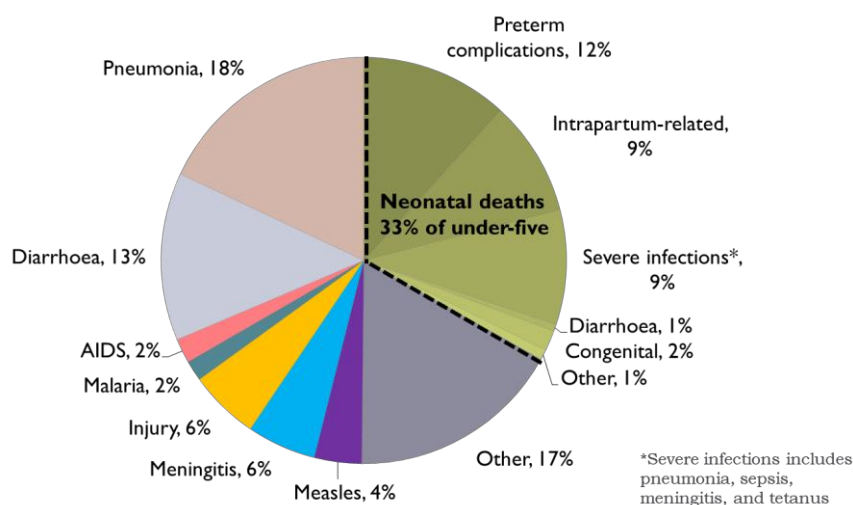


In 2010, the main causes of under-five deaths in Ethiopia were: pneumonia (18%), diarrhoea (13%) complications from prematurity (12%), intrapartum-related (birth asphyxia) (9%), and severe neonatal infection (9%)⁸ (Figure 37a). According to modelled estimates, since 2000 cause specific U5MR reductions have been observed for only three causes: diarrhoea, pneumonia and AIDS (Figure 37b). Ethiopia has a high rate of preterm births with 10% of all babies being born before 37 weeks gestational age.³² The national cause of death profile masks disparities between regions, particularly for malaria, which can be assumed to contribute a much higher proportion of deaths in malaria-endemic areas.

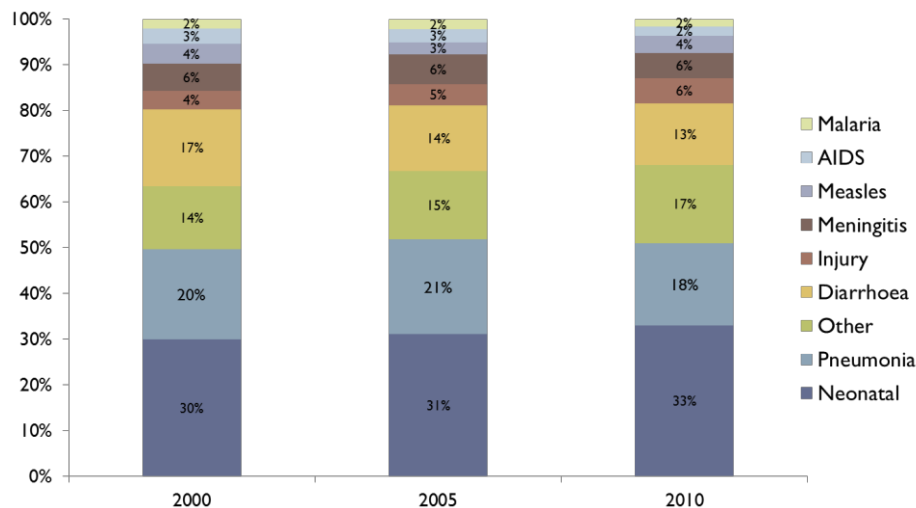
Figure 37: Causes of under-five deaths in Ethiopia

Data source: Liu et al, Lancet 2012.⁸

(a) 2010



(b) Trend from 2000 to 2010



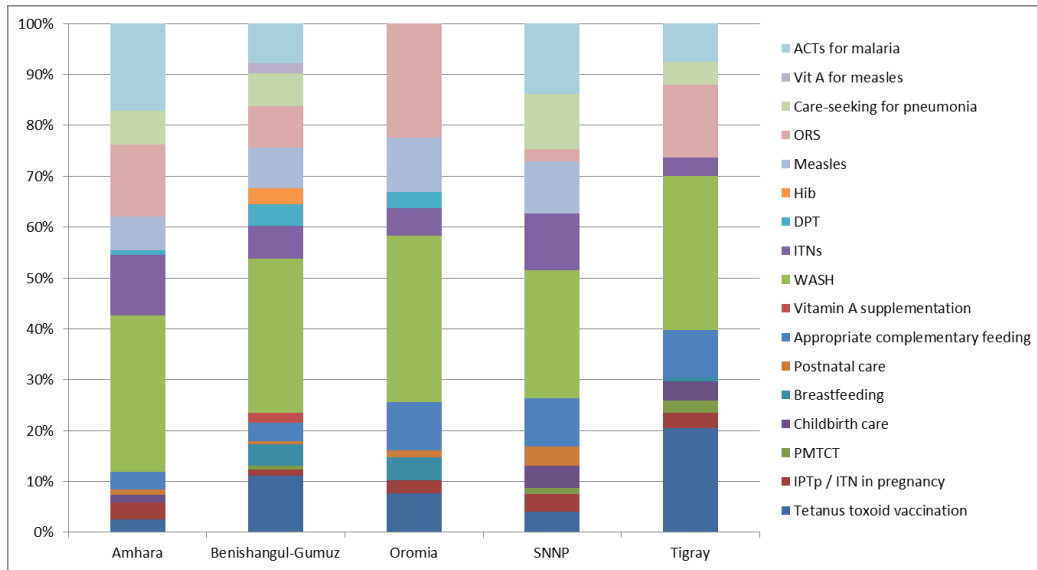
5.3.2 Lives saved results

We calculated the proportion of child lives saved by intervention using the LiST-estimated number of child deaths averted in 2007, 2010 and 2013 (relative to the situation in 2000, 2007 and 2010, respectively) as a denominator. The results are presented by intervention and by phase for each region. Area graphs for each region over the various phases are also provided in Appendix C.

Pre-IHSS implementation

Prior to the start of the IHSS programme, changes in coverage between 2000 and 2007 accounted for an average of 10% fewer deaths in 2007, or more than an estimated 164,000 child deaths averted cumulatively between 2000-2007 across the five IHSS programme regions relative to the situation in 2000 (i.e. had there been no change in coverage between 2000 and 2007). The greatest proportion of overall deaths averted occurred in SNNP (13%) with the lowest proportion of deaths averted in Oromia and Tigray at 9% each. Oromia, SNNP, and Amhara (the most populated regions) accounted for the largest numbers of child deaths averted (Table 6a). The main factors contributing to the prevention of these deaths included increases in water, sanitation and hygiene interventions (WASH), tetanus toxoid immunisation coverage, and ORS (Figure 38).

Figure 38: Proportion of deaths averted by intervention for pre-IHSS time period (2000-2007)



Phase 1 (2007-2010)

In Phase I of IHSS programme, during the scale up of the HEP and prior to the rollout of iCCM, an estimated 28,400 child deaths were averted in the five IHSS programme regions cumulatively between 2007 and 2010. The percentage of deaths averted in 2010 relative to the situation in 2007 ranged between 4% and 6% across the five IHSS programme regions, and again Oromia, SNNP, and Amhara contributed the largest numbers of child deaths averted (Table 6a). The introduction of the Hib vaccine accounted for the largest proportion of deaths averted across most regions (Figure 39). Care-seeking for suspected pneumonia (used as a proxy for appropriate treatment for pneumonia) and WASH interventions also reported increases in coverage across most regions. Interventions to which the IHSS programme contributed accounted for an estimated 22,000 (78%) of all child deaths averted, including an estimated 8,000 deaths averted from the Hib vaccine and 3,800 from increases in care-seeking for pneumonia (Table 5).

Figure 39: Proportion of deaths averted by intervention for Phase I (2007-2010)

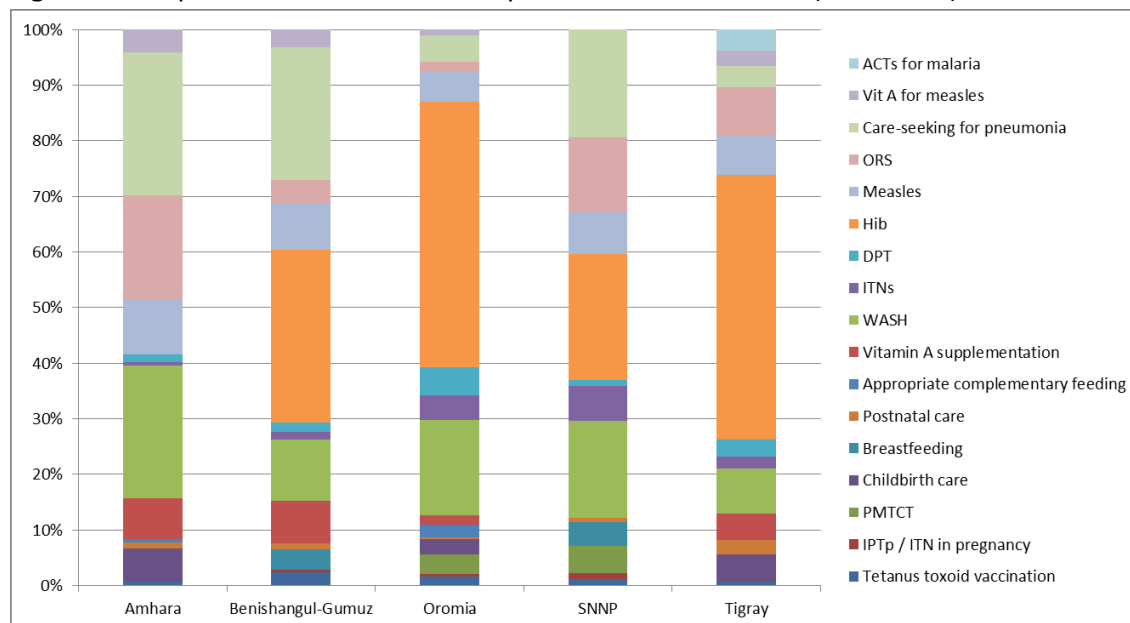


Table 5: Deaths averted due to interventions to which the IHSS programme contributed

	All regions	Amhara	Benishangul-Gumuz	Oromia	SNNP	Tigray
Number of deaths averted (cumulative, 2007-2010) due to interventions to which the IHSS contributed	22,000	4,600	400	9,200	6,100	1,800
Percentage of deaths averted due to interventions to which the IHSS contributed	78%	69%	88%	78%	82%	86%

^As per page 5 of Schedule A of the Grant Agreement and the tailored Ethiopia programme implementation, in this context “IHSS programme interventions” in LiST are assumed to include 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).

This result considers the deaths averted due to the overall coverage change in these interventions which is a reflection of multi-factorial inputs within the health system and otherwise, not just those of the IHSS programme. Additionally, this LiST analysis does not reveal the implementation strength of IHSS programme in relation to specific interventions, nor does it assign weights to different levels of service provision (e.g. community).

Phase II (2010-2013 – scenario based coverage change)

We applied a scenario to generate estimates of lives saved during Phase II to account for the lack of endline coverage data. A 15 percentage point increase in iCCM interventions and 5 percentage point increase in other IHSS programme interventions was assumed. Using these assumptions, an estimated 57 700 child deaths would have been averted during Phase II, resulting in 11% fewer child deaths in 2013 compared to 2010. The percentage of child deaths averted in 2013 relative to the

situation in 2010 would have ranged between 15% in SNNP to 7% in Amhara, and again the numbers of child deaths averted would have been largest in these regions (Table 6a).

The proportion of deaths averted varied across the three phases assessed. Table 6a shows the proportion and the overall number of deaths averted each year. The average annual rate of under-five mortality decline ranged from 1.2% in Oromia to 1.8% in SNNP over the 7 years pre-IHSS, with wider variation in progress between regions during Phase I (1.1% to 2.2%). The scenario-based coverage increases in Phase II, if seen in practice, would have resulted in faster mortality change in Phase II ranging from 2.4% to 4.7% between regions. Only in Oromia did the LiST projection adequately predicted mortality change against measured rates between 2000 and 2011. LiST predicted a more conservative (slower) mortality decline in the other 3 regions, but the projection for Benishangul-Gumuz predicted a much faster rate of decline, though the region recorded an increase in mortality between the 2005 and 2010 DHS (Table 6b).

Table 6 (a) Annual and cumulative deaths prevented from Lives Saved analysis, by phase

	Pre-IHSS									Cumulative lives saved	Phase I			Cumulative lives saved	Phase II (scenario-based coverage change)			
	2000	2001	2002	2003	2004	2005	2006	2007	2008		2009	2010	2011		2012	2013	Cumulative lives saved	
Amhara																		
<i>Proportion of under five deaths averted</i>	-	2%	3%	5%	6%	8%	11%	14%			3%	5%	8%		3%	9%	13%	
<i>Additional under five deaths prevented</i>	-	178	347	510	674	848	117	147	52043	225	435	625	12868	204	567	810	15817	
<i>Rate of under-five mortality reduction</i>	-	1.6%	1.7%	1.7%	1.7%	1.8%	3.3%	3.3%	2.1%	2.7%	2.6%	2.6%	2.7%	3.5%	6.3%	4.2%	4.7%	
Benishangul-Gumuz																		
<i>Proportion averted</i>	-	2%	5%	7%	8%	10%	12%	15%		2%	3%	6%		5%	11%	15%		
<i>Additional prevented</i>	-	147	284	423	531	645	850	1053	3933	95	170	326	591	291	670	951	1912	
<i>Rate of reduction</i>	-	3.0%	2.8%	2.8%	2.3%	2.2%	2.5%	2.7%	2.6%	1.7%	1.2%	2.9%	1.9%	4.7%	6.6%	5.1%	5.5%	
Oromia																		
<i>Proportion averted</i>	-	2%	3%	5%	7%	8%	10%	12%		2%	4%	6%		3%	8%	11%		
<i>Additional prevented</i>	-	326	678	105	145	182	227	272	103347	273	540	792	16065	436	109	154	30698	
<i>Rate of reduction</i>	-	2.1%	2.2%	2.2%	2.2%	2.1%	1.8%	2.1%	2.1%	2.2%	2.1%	2.1%	2.2%	3.5%	5.2%	3.5%	4.1%	
SNNP																		

<i>Proportion averted</i>	-	2%	5%	7%	9%	11%	14%	17%		3%	6%	9%		3%	11%	15%	
<i>Additional prevented</i>	-	219 0	457 2	715 0	985 0	123 71	156 33	188 92	70658	254 4	495 8	714 9	14651	209 8	773 8	102 39	20075
<i>Rate of reduction</i>	-	2.9 %	2.9 %	3.0 %	3.0 %	2.8 %	2.7 %	2.9 %	2.9%	3.3 %	3.2 %	3.2 %	3.3%	3.3 %	8.7 %	4.0 %	5.3%
Tigray																	
<i>Proportion averted</i>	-	1%	3%	4%	5%	6%	10%	14%		4%	7%	10%		3%	11%	14%	
<i>Additional prevented</i>	-	342	660	972	127 3	158 7	260 5	359 6	11035	600	113 6	157 6	3312	461	153 3	200 6	4000
<i>Rate of reduction</i>	-	1.3 %	1.3 %	1.3 %	1.3 %	1.4 %	4.2 %	4.1 %	2.1%	3.9 %	3.7 %	3.3 %	3.6%	3.7 %	8.4 %	3.7 %	5.3%

Table 6 (b): Mortality rate in 2011 and reduction from 2000 to 2011, DHS and LiST comparison

	Amhara	Benishangul-Gumuz	Oromia	SNNP	Tigray
Under-five mortality rate measured in DHS 2011	108	169	112	116	85
<i>Average annual rate of mortality reduction</i>	4.7%	%1.4	4.9%	4.5%	6.1%
Under-five mortality rate predicted in LiST for 2011	138	142	109	125	90
<i>Average annual rate of mortality reduction</i>	2.5%	3.0%	5.1%	3.8%	5.6%

5.4 Sustainability

5.4.1 Costing

Findings from this costing analysis aim to answer the following questions:

- What is the additional cost per treatment for each of the 3 conditions?
- What is the cost of increased utilisation?
- What is the financial sustainability of this programme?

The results below do not reflect the actual expenditure on the iCCM. They reflect expected costs if the intervention is implemented according to 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 plans.

In 2012, a total of 27 116 iCCM trained HEWs were deployed. Each of them provided an average of 22 iCCM treatments a year, 20 (91%) of them for the 3 conditions (Malaria, Diarrhoea, Pneumonia) and 2 of them for severe malnutrition.

5.4.1.1 Current cost per treatment

Additional annualised fixed costs per HEW stand at \$129. Ninety one percent (91%) of this additional annualised fixed cost per HEW is attributable to HEWs providing iCCM treatment for malaria, pneumonia and diarrhoea, since these three conditions represent 91% of HEWs' treatment load. This translated to \$5.88 per treatment, as shown in Table 7 below. The cost of a malaria treatment, including rapid diagnostic tests (RDTs), drugs as per protocol, as well as stationary, stands at \$7.65. Diarrhoea treatment with ORS and zinc costs \$6.62, and pneumonia treatment \$6.21. Fixed costs represent an average of 86% of the cost per treatment (Table 8).

Table 7: Additional annualised costs per HEW for 2012

Additional Annualised Fixed Cost by HEW in \$	Fixed Cost/HEW/Year	% for MDP	Fixed cost MDP	# MDP treatments/year	Fixed Cost per Treatment
Training	15.80				
Equipment	11.30				
Management & Supervision	96.06				
Other Overheads 5%	6.16				
Total Additional fixed cost	129.32	91%	117.56	20	5.88

Table 8: Fixed and variable costs per iCCM treatment for 2012

Cost per treatment 2012-13	Fixed Cost	Drug/ Diagnostic	Stationary/ Cards	Total	% Fixed Cost
Malaria, incl RDT	5.88	1.70	0.07	7.65	77%
Diarrhea	5.88	0.67	0.07	6.62	89%
Pneumonia	5.88	0.26	0.07	6.21	95%
Average cost per Treatment	5.88	0.86	0.07	6.81	86%

Fixed costs related to HEWs and their supervision & management are incurred regardless of the number of treatments per HEW. Since fixed costs per HEW are divided by the number of treatments per HEW per year to establish fixed cost per treatment, the lower the number of treatments the higher the fixed cost per treatment. The higher the number of treatments, the smaller the fixed cost per treatment will be. For detailed costing tables see Appendix D. This raises the issue of the time feasibility and cost impact of increasing the number of treatments for children under 5 per HEW.

5.4.1.2 Scenario for increased iCCM service utilisation

If the number of treatments per HEW per year increases by 15% or 30%, the time spent by an HEW on iCCM for children under 5 would increase from the current 1.1 hours a week to 1.17 hours, or 1.23 hours, respectively. The marginal increase in required time is due to the fact that the length of supervisory meetings would not increase.

Costs do not increase in the same proportion as activity, due to the share of fixed costs. With an additional 15% in treatments per existing HEW, the fixed costs per treatment would decrease from \$5.88 to \$5.11 and to \$4.52 for a 30% increase in treatments. The cost of treatments per HEW per year would increase by 1.9% with 15% more treatments and by 3.8% with 30% more treatments (Table 9).

Table 9: Cost per HEW of increased utilisation

Increased Efficiency by HEW	% Increase in number of Treatments by HEW/Year		
		15%	30%
Number Treatments/Year	20	23	26
Hours on iCCM / Week	1.10	1.17	1.23
Fixed Cost per Treatment	5.88	5.11	4.52
Average Drug/Test cost per Treatment	0.86	0.86	0.86
Total Cost per Treatment	6.74	5.97	5.38
Treatment cost per HEW per Year	134.75	137.32	139.90
% increase in cost		1.9%	3.8%

This costing, focusing on additional costs, has assumed that health workers were already trained in IMCI, HEWs had already received basic training, and that treatments were given as per protocol. In practice additional funds were used to provide IMNCI training to health centre staff (nurses), and basic training to HEWs, as part of systems strengthening. To reflect this wider platform, iCCM+, an additional 15% was added to the iCCM costs in the analysis of sustainability.

The costs above are annualised to assist with future planning and sustainability analysis. Because a large part of training and equipment expenditure takes place at the beginning of the programme, actual expenditure per initial year is higher than annualised costs. Actual amount of drugs procured in 2012 is also higher than what is used by iCCM, pointing to the likelihood that some of these drugs were also used above health post level in health centres.

The current program is expensive. According to a recent report by the International Health Partnership¹⁸, the cost per visit at a health centre stood at \$4.18 in 2011. This \$4.18, to be seen by a nurse or a doctor, compares to an average cost per iCCM treatment of \$5.38 with a 30% increase in the current number of treatments. Note that the cost per iCCM treatment does not cover the share of HEW salaries. However, given the low percentage of the population that has geographic access to health centers and the high cost of increasing access thereto, increasing utilization of the HEWs may be the most viable option for increasing coverage.

Currently 10 230 450 children under 5 reside in the areas covered by full or partial Catalytic Initiative. With the 27 116 HEWs deployed for iCCM, each HEW covers an average of 377 children but provides only 22 treatments a year for the three diseases, which occur frequently in that age group. If demand was significantly higher, the health impact of the program would be higher and the cost per treatment would decrease markedly. The uptake of the program by the community is, thus, the central factor to justify the investment.

5.4.1.3 Financial Sustainability

To assess the financial sustainability of this programme, the additional expenditure on iCCM for 2012 was compared to the total annual public health expenditure (government and donors), and to the government health expenditure in 2011. In 2011, government expenditure stood at 34% of public health expenditure. With the current number of HEWs and current number of treatments per HEW, iCCM accounts for 0.04% of total public health expenditure and 0.13% of government health expenditure. For iCCM+ (iCCM + 15% cost for additional support to health centres) these percentages would stand at 0.05% of total public health expenditure, and 0.15% of government health expenditure for the current number of HEWs.

iCCM currently covers 10 million (83%) of the country's 12 million children under 5. If iCCM were to be extended to new areas to cover 100% of children, increasing by 20.5% the number of HEWs and supervisors, the total cost impact of iCCM would be 0.05% of the total public health expenditure and 0.16% of government own health expenditure. For iCCM+ these proportions would be 0.06% and 0.18%, respectively. As shown in the costing section, increasing by 15% or 30% the number of treatments per HEW would have a very marginal impact on the share of public health expenditure or government's own health expenditure. Assuming 100% iCCM national coverage, and with an increase of 30% in the number of treatments per HEW, the total cost impact of iCCM+ would stand at 0.07% of Ethiopia's public health expenditure, and 0.21% of the government's own health expenditure (Table

10). In fact, the small increase in budget requirements is likely to be even smaller as a proportion of treatments currently delivered by HEWs were previously provided in health centres.

Table 10: iCCM additional costs as % of health expenditure

	Total 2011 (\$)	Government own	Donors
Public Health expenditure	100%	34%	66%
	8 141 046 438	2 802 655 331	5 338 391 107

Cost for the country	With Actual # Treatments / HEW	With 15% increase in treatmts / HEW	With 30% increase in treatmts / HEW
Current areas covered: 83% of children under 5			
ICCM Basic	3 653 805	3 723 700	3 793 596
% of Public Health Expenditure	0.04%	0.05%	0.05%
% of Government Own Health Expenditure	0.13%	0.13%	0.14%

ICCM+ with Additional for System Stengthening	15%		
ICCM +	4 201 876	4 840 810	4 931 674
% of Public Health Expenditure	0.05%	0.06%	0.06%
% of Government Own Health Expenditure	0.15%	0.17%	0.18%
100% of country covered			
ICCM Basic	4 402 175	4 486 386	4 570 597
% of Public Health Expenditure	0.05%	0.06%	0.06%
% of Government Own Health Expenditure	0.16%	0.16%	0.16%
ICCM+ with Additional for System Stengthening	15%		
ICCM +	5 062 501	5 832 302	5 941 776
% of Public Health Expenditure	0.06%	0.07%	0.07%
% of Government Own Health Expenditure	0.18%	0.21%	0.21%

This low proportion of government health expenditure (0.2%) points to the capacity of the government to finance the additional costs of this programme from its own funding. The real growth of the GDP is slowing down, but still stands at 7.5% in 2011 (World Bank). However, the share of health in government expenditure has increased steadily, from 11.8% in 2008 to 14.6% in 2011. Our interview data suggests that donor funding is unlikely to decrease. This is due both to the strategic location of Ethiopia in the horn of Africa and due to the continued poor development indicators, despite improvements for some. As such it is unlikely that the current government expenditure on health would be cut.

Since the original set-up expenditure (design costs) of the programme has already been incurred, the additional annualised costs of the programme could likely be covered by the government budgets. However, the roll-out to new areas would need to be undertaken on an incremental basis as a significant portion of the costs takes place as a non-annualised expenditure at the beginning of the programme, i.e. training and kits. Financial sustainability is not the main issue for the programme. It is the low level of utilisation of iCCM services that is the central concern as it affects the health impact. Hence, the need to focus on demand creation.

5.4.2 Qualitative findings related to sustainability

Perceptions of success

The majority of interviewed participants, both from the FMOH, UNICEF and implementing partners felt that major successes had been achieved with the introduction of iCCM. According to discussions at the UNICEF and partners meeting, there was a general perception that iCCM has contributed positively to the broader National Child Survival Strategy and Plan. Participants felt that iCCM had improved both access at health posts and the referral system to higher levels of care. The State Minister of Health Programmes said that:

“Introducing iCCM has provided a chance to increase the quality of care to children”.

iCCM activities were considered to have led to positive spill over effects for primary health care programmes. This was especially felt to be coming from the integrated supervision approach, in which resources are shared and this was perceived to lead to the improvement of other programmes such as nutrition. The implementing partners interviewed believed that there was a healthy cross-fertilization of ideas across programmes. For example, they felt that the management of iCCM supplies and logistics had built on years of experience from the malaria programme implementation.

According to the FMOH director, the initial plan for the HEP has progressed from being promotive and curative to include community case management of the “major killer diseases” among children. From the FMOH’s view, success is attributed to the government’s level of commitment and leadership in playing a coordinating role for different stakeholders. Most respondents believed that one of the success factors was the timeliness of the introduction of the pneumonia treatment, i.e. at a time when HEP had matured in Ethiopia; thus, making it easy to build on the existing experience. The full iCCM package was further strengthened by the government’s launch of the HDA programme to support the work with the HEWs (*UNICEF health specialists, FMOH Director*).

Much of the success of iCCM was also attributed to the way in which the HEWs and the HDA worked in the field to raise awareness and mobilise communities for planned prevention campaigns. The HEP was seen as having a solid base, which enabled the community to develop confidence in HEWs. Findings from interviews and focus groups suggested that members of the HDA and HEWs also felt a personal sense of success. One HDA volunteer stated that the use of traditional healers as first contact for child illnesses has declined within kebeles. Other HDA volunteers and HEWs felt that being able to treat patients with antibiotics had elevated HEW credibility in the community and improved community trust.

Although there was a general perception amongst the FMOH officials interviewed that many lives were saved with the introduction of iCCM, some participants acknowledged that there was no routine nationalised data with which to substantiate these perceptions, aside from research-based information. Although it was felt that it is still early to measure the impact, participants hoped that the 2015 DHS would show cumulative improvement in child health outcomes.

Concerns about limited extent of the programme

Community perception

From FGDs with HEWs, it was understood that initially there were mixed reactions to HEWs in the community. Some community members struggled to trust the HEWs as they are not health professionals but lay people. However, it was reported that the ability to provide treatments resulted in showing of respect and acceptance by the community. It was also clear that there was initial resistance from the community due to a lack of understanding that the HEWs were in provision of treatment. Subsequently, understanding of this resulted in communities' support for iCCM. However, maintaining the trust and credibility of the HEWs was dependant on stock being available. Thus stock-outs at health posts were perceived as negatively influencing communities' perceptions and leading to a drop in utilisation rates.

Respondents from the FMOH and IPs stated that some community members felt that having the HEWs at health posts saves time for mothers because the service is accessible, allowing them to get back to their tasks of harvesting and mothering. In remote rural areas health post utilization was not perceived to have increased, which is supported by utilisation figures, for a number of reasons: poor accessibility, fewer hours of operation, distance, and lack of transport. It was said that this explains why most deliveries are commonly conducted at home. As a consequence, HEWs reported that they play a small role in assisting births at health posts as the majority of mothers prefer to deliver at home.

Infrastructural challenges

A lack of basic resources at health posts such as electricity, water and fixed telephones were reported by some HEWs. HEWs explained that in the absence of electricity, hand battery torches, solar batteries, solar lamps or candles were used. When water shortages were experienced, sometimes the community assisted with collection of water from the stream or from a spring, and HEWs treated it with chemicals. At other times water would be bought with money from the health post revenue which is generated through selling grass and vegetables. It was unclear whether this lack of basic commodities contributed to the low health post utilization for women during labour and delivery. In two of the health posts visited, the fridges were reported to be out of order for over a year. The Woreda officials also confirmed that some fridges had never worked since they were delivered to the health post. This was a problem because vaccines now had to be kept at the health centre, rather than the health post, where they had to be collected by HEWs before going for household visits. Collecting these vaccines and other commodities could involve HEWs having to walk long distances, approximately 2 hours, to the health centre. HEWs also reported that they had no umbrellas or bicycles.

Funding

UNICEF and the IPs explained that funding came from strategic commitments in the form of bilateral agreements between development partners, which ensured funds for staff training and iCCM commodities. Organizations involved in funding the IHSS programme included UNICEF, DFATD, IRC, and Save the Children (US, UK). UNICEF was funded by DFATD, while also providing funding to implementing partners. Funds are transferred to IPs based on their activity requests and budgets every quarter.

Limited length of IHSS programme funding cycle

Local UNICEF staff at the Ethiopian country office and the IPs were concerned that the funding for iCCM is only available until the end of 2013. They all expressed concern that the delayed initiation of iCCM in Ethiopia meant that there was little time in which to consolidate what was thought to be a huge programme. Furthermore, there was still additional work to be done in extending neonatal sepsis case management so that this could be provided by HEWs at the health posts.

Sense of government commitment

There was a strong sense of conviction among the FMOH directors that iCCM would be sustained even when external funding was withdrawn, although they conceded that problems around the budget and drug supply could arise. They argued that HEWs were already paid by the FMOH and that training and supervision had been transferred to them. However, it was also felt that there would be a need for technical support to the FMOH as one programme co-ordinator shared:

“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).

Threats to sustainability

The major challenge expressed by all partners, including the FMOH was that of sustaining drug and supplies provision. A couple of those interviewed within the FMOH suggested that there had been a reliance on donor support and consequently the PFSA system had not matured adequately. It was feared that a poor drug supply could lead to stock-outs which might affect community confidence and ultimately health post utilization.

6 Conclusions

6.1 Relevance

Owning iCCM in Ethiopia

The implementation of IHSS programme in Ethiopia is both a display of the need to gain government buy-in, and a lesson in the process through which such buy-in can be achieved. As the results show, there was initial reluctance to adopt iCCM as an approach, and this reluctance was born out of the experience with previous village health workers, particularly around antibiotic use. This evaluation provides a good example of timely policy change creating an enabling environment for the establishment of community-based service delivery. The findings from this evaluation clearly demonstrate that the programme was owned by all, including officials all the way down to the village level. Furthermore, this programme did not appear to compete with the priorities set by other organisations in Ethiopia. Instead, UNICEF managed to harness the energy and resources of other development partners in the country so that in the end they too became implementing partners. The IHSS programme, and its subcomponent iCCM, could therefore in the end be widely supported by all relevant stakeholders.

Encouraging gender equity in an inequitable environment

Our field visit findings point to lack of equity amongst the health work force in Ethiopia. The basis for this disparity lies well beyond the IHSS programme, in the way in which boys and girls are allowed access to education or not. While it is clearly a gain that the IHSS programme was able to ensure that the HDA and the HEWs were almost exclusively women, broader efforts are needed to ensure that women become part of the professional health care workforce. Furthermore, demand creation strategies that address barriers to women's decision making in care-seeking are also needed.

6.2 Effectiveness

6.2.1 Assessment of the contribution of the IHSS programme to health system strengthening

The HEP with its tens of thousands of HEWs is a bold strategy devised by the Ethiopian Government to provide health care to a population of over 80 million people, most of whom are scattered in rural areas over a vast geographical area. From our observations, interviews and document review there were two phases to the IHSS programme strategy in Ethiopia and the use of money from UNICEF and DFATD. The first phase was the strengthening of the HEP and the second the introduction of iCCM with support for preventive interventions continuing. We are of the opinion that UNICEF's decision to initially use money from DFATD to strengthen the HEP and provide a platform on which iCCM could be launched and function effectively, was both strategic and effective. The manner in which DFATD money was channelled, therefore, did indeed prove to be a catalyst, as it initiated a process of reform and consolidation of the HEP and child health services. In addition, it strengthened the community service delivery platform from which iCCM and newborn care could be implemented (see logic model Appendix B). This approach was, therefore, highly relevant in supporting Ethiopia to reach MDG4.

The strategy employed by UNICEF to support iCCM facilitated co-operation from implementing partners and a standardised approach to iCCM implementation throughout the different regions of the country. Moreover, the successful implementation of iCCM has facilitated another significant policy breakthrough for under 5 care with the recently approved community-based newborn care including newborn sepsis management²¹.

Training and supervision

A notable contribution of the IHSS programme to health systems strengthening is arguably in the area of training of frontline health workers (HEWs and nurses). As part of the IHSS programme, UNICEF worked closely with the Ethiopian FMOH and assisted in co-ordinating the development of iCCM treatment guidelines, training materials and recording and reporting tools. Following this, over 30,000 frontline health workers (HEWs and nurses/clinicians) were trained and equipped with essential supplies and commodities with IHSS programme funds. This is a considerable contribution to the Ethiopian health sector workforce. Thereafter, a rigorous supervisory and support system was developed and implemented to ensure quality of care and sustainability when IHSS programme funds are no longer available. This included the training of woreda level staff to conduct support and supervisory sessions. Both routine and Oromia survey data show impressive levels of HEW supervision, exceeding 70% of HEWs supervised in the previous three months. Improvements could still be made to the clinical mentorship of HEWs⁶.

Supply chain management/commodities and stock-outs

The distribution of drugs and commodities throughout such a large country, with limited infrastructure, remains a challenge³³. In particular, as pointed out by Chandani and others³³, significant challenges to supply chain management for iCCM in Ethiopia pertain to product availability, supply chain knowledge and capacity among HEWs and their supervisors, inadequate data availability, and transportation problems. The supply chain management system has been further complicated by the more recent addition of pneumonia treatment in the HEP³³.

It should be noted that the IHSS programme support included a large procurement of ITNs (over 7 million). The coverage of ITNs amongst children under five may not have been maintained at the same level as 2007 without this support. There is evidence that suggests that the availability of commodities and supplies is improving in the Oromia region⁶. Furthermore, the strategy of starter packs used by UNICEF at the start of iCCM was very effective in distributing drugs throughout the country. During the project period, the iCCM partners supported the distribution and re-distribution of key iCCM commodities. However, as project support phases out, the national pharmaceutical funding and supply agency (PFSA) will struggle to sustain the level of drug and commodity distribution needed.

Accessibility of services and care-seeking

By providing free treatment services at health posts and during home visits, iCCM has increased the geographical and financial accessibility to U5 services. White and Mason⁹ also note that the frequent contact that the village CHWs (supervised by HEWs) have with mothers has improved access to IYCF information and counselling. Barriers to care seeking identified in a recent qualitative assessment in Oromia include financial barriers, lack of knowledge and information, socio-cultural beliefs, health facility deterrents, and access barriers³⁴. This is not surprising given the lack of attention to demand creation and social mobilization. While financial barriers were rarely directly linked with care-seeking

at a health post, caregivers believed that finances became a deterrent as a result of HEWs penchant for referring sick children to higher levels of care.

In a qualitative evaluation amongst caretakers undertaken in Oromia³⁴, mothers of children under two months most frequently reported financial barriers. However, health facility barriers were also identified and were related to the absence of medications and stock outs, as well as the absence of HEWs at health posts. The study is careful to note that perceptions about the absence of medications may be more a reflection of the past when stock-outs were a more severe problem, than a reflection of current reality: *“Caregivers’ past experiences of going to the health post and not getting a medicine continues to affect their perceptions today”*³⁴.

An aspect that will impact the effectiveness of the programme is utilisation of the HEWs. Routine data and specific surveys show low utilisation of HEWs for case management of children, i.e. around 22 treatments per HEW/ year. Demand creation and community mobilisation strategies are needed to change social norms around care-seeking and demand for quality services, to increase utilisation at health posts. It should be noted that this evaluation did not find evidence of demand-side interventions which are a critical determinant of utilisation.

6.2.2 Assessment of the contribution of the IHSS programme to mortality and coverage changes

In the past two decades, Ethiopia has witnessed steady social and economic development and absolute poverty was reduced, from 39% in 2004/05 to 29% in 2010/11; a decline that was sharper in the rural areas³⁵. Primary school enrolment has increased dramatically and the total fertility rate in the country has also declined considerably, from 7 in 1990 to 4.6 in 2012. These improvements, together with the absence of conflict and enormous government and donor investments in WASH, nutrition and health infrastructure led to a steep decline in child mortality which has enabled Ethiopia to have reached MDG4 in 2013³⁰. The LiST analysis presented in this report shows that in the pre-IHSS period and during phase I of the IHSS programme ITNs, changes in stunting, tetanus toxoid vaccination and WASH interventions contributed the most to lives saved across the 5 IHSS programme regions. During phase I, changes in wasting and stunting, coverage of care-seeking for pneumonia, ORS and zinc for diarrhoea and WASH interventions contributed to largest proportion of deaths averted. Using a scenario-based approach, due to the lack of endline data for phase II, Hib vaccination through the introduction of the pentavalent vaccine, care-seeking for pneumonia, ORS and zinc for diarrhoea, were the most important interventions saving lives.

The HEP had a large focus on prevention within the 16 packages and results from the LiST analysis highlight the importance of these interventions in saving lives. Furthermore, the majority of IHSS programme support in Ethiopia (74%) was spent on the preventive interventions (non-iCCM activities). Analysis of coverage data has shown improvements in rural areas in measles and DPT3 immunisation and vitamin A supplementation both of which were supported by IHSS programme through provision of supplies (vitamin A), support for Child Health Days and SIAs and outreach activities of the HEWs.

The decline seen in EBF, between 2000 and 2005, in rural areas did not worsen between 2005 and 2011 and was maintained at a similar level during the IHSS programme period. This is likely to be due to the breastfeeding promotion undertaken by the HDA and HEWs, as also shown in the evaluation of the community-based nutrition programme⁹. The decline noted in early initiation of breastfeeding,

however, is cause for concern and will hopefully be addressed through the recent newborn care training.

Results from the recent Oromia endline iCCM evaluation³⁶ show that all indicators, except exclusive breastfeeding and care-seeking for pneumonia, have declined compared to rural levels reported in the 2011 DHS, most notably for vitamin A supplementation, measles immunisation and all malaria interventions. Even though it is not advisable to compare results from two zones in one region to all rural areas of the country the fact that the study sites received additional support with regard to supervision and supply chain management makes these findings somewhat surprising and somewhat contradictory to the evaluation of the community-based nutrition programme⁹ in four regions which found a large effect of HEWs and HDA volunteers on infant and young child feeding, treatment of diarrhoea, antenatal care attendance and postnatal care.

Assessment of the impact of iCCM on mortality is difficult due to the absence of true endline data. An assessment of changes in coverage show that large increases occurred for care-seeking and treatment of malaria with more modest increases in care-seeking for suspected pneumonia and coverage of ORS. Whilst 2011 is too early to determine the impact of the full iCCM package, treatment of diarrhoea and malaria was occurring throughout the IHSS programme period and the changes noted for these interventions in rural areas could plausibly be due to the IHSS programme support through provision of ACTs, RDTs, ORS sachets and from June 2010 cotrimoxazole in addition to the training and supervision support for HEWs.

Impact on equity

With regard to impact on equity, no changes in coverage in the poorest wealth quintile were noted between 2005 and 2011 for vitamin A supplementation, care-seeking for pneumonia, ORS and ITNs whilst increased coverage in the poorest wealth quintile are noted for DPT3 and measles. However the gap in coverage between the richest and poorest wealth quintiles did not decrease. For measles it appears that the gap may have started to decrease between 2011 and 2012. Treatment of malaria appeared to be a pro-poor intervention with higher coverage in the poorest wealth quintile in 2007 and 2011 and the gap in coverage of care-seeking for fever between the richest and poorest wealth quintiles decreased substantially from 14 to 2 percentage points. Caution should be exercised when interpreting this data since lack of availability of raw data from the MIS surveys prevents the assessment of confidence intervals around these estimates.

6.3 Impact

The lives saved analysis confirms that the IHSS programme focused on many of the high impact, low coverage interventions necessary for achieving mortality change. During Phase I of the IHSS programme (2007-2010), the LiST analysis indicated that there were an estimated 47 000 deaths averted in 2010 as compared to 2007 in 5 regions, with an average across regions of 85% of these lives saved due to increases in coverage of interventions supported by the IHSS programme and decreases in wasting and stunting rates. The lack of endline data prohibits a full assessment of lives saved at this stage, but a scenario-based approach of a 15 percentage point increase in iCCM interventions, alongside a 5 percentage point increase in the other IHSS programme supported interventions during phase II, would account for over 57 700 deaths averted across 5 regions from 2010 to 2013. However, the LiST projection nearly matched measured mortality change in only one region. In 3 regions LiST predicted conservatively and in 1 region the LiST projection doubled the estimated rate of mortality decline. Two potential explanations for this misalignment could be that some of the coverage, health status, and intervention effectiveness assumptions used in LiST were inaccurate, and/or factors outside of the health sector and not included in the model have contributed to mortality change.

Given the limitations of the sub-national input data (particularly the cause of death profile) and the modelled endline scenario, there are many limitations with the estimates provided here across each region and specifically representing the IHSS programme contribution. The overall deaths averted are illustrative and should not be summed up or combined. 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.

With regard to implementation strength of iCCM services, routine UNICEF data shows an average of 1.8 treatments per HEW/month while data from an evaluation in Oromia⁶ shows 9.1 treatments per HEW/ month in the intervention areas, most likely reflecting a 'best case' scenario, and 3.2 in the control areas (with no pneumonia case management). Furthermore, considering all providers, care seeking from HEWs/health posts did not change between 2005 and 2011, remaining at a level of 3%. The recent final evaluation of the Oromia study by Johns Hopkins confirms previous findings and shows that very little care-seeking occurred at the level of HEWs/health posts; the majority of care-seeking was at higher levels (public health facilities excluding health posts)³⁶.

However, it is plausible that the IHSS programme and iCCM interventions are likely to have contributed to some of the decline in childhood mortality through encouraging increased care seeking for diarrhoea, malaria and pneumonia. The role of the HDA volunteers (previously known as volunteer CHWs) should also not be overlooked especially with regard to mobilising communities to seek care (seen in increased immunisation coverage) and adopt healthy behaviours⁹.

6.4 Sustainability

Programme Costs

Analysis of the additional costs incurred by health providers with the implementation of iCCM (specifically for malaria, diarrhoea and pneumonia) shows that an average of 86% of the annualised costs were 'fixed costs', which are incurred independently from the number of treatments (HEW training, kit and supervision/management). Expressed in cost per treatment, fixed costs amounted to \$5.88. Drugs, tests and stationary ranged from \$1.70 for malaria (23% of total cost by treatment), to \$0.67 for diarrhoea (11%) and \$0.26 for pneumonia (5%), a weighted average of \$0.86 (14%).

Given the importance of fixed costs, increasing the number of treatments per HEW would have a limited financial impact. If the number of treatments per HEW would increase by 30%, the increase in time per HEW would be feasible moving from the current average of 1.1 hour a week on iCCM treatments, and related supervisory meetings, to 1.3 hours a week. In this scenario, the total cost per treatment (fixed cost +supplies) would stand at \$5.38, a decrease from the current \$6.74 due to smaller fixed costs per treatment. The cost for the country would only increase by 3.8%.

Financial sustainability of iCCM has been raised as a concern by participants, in particular the sustained ability to afford supplies. However, based on this analysis, financial sustainability appears to be feasible, given the small share of government expenditure, the increasing share of government expenditure on the health sector and maintenance of donor contribution to the health sector.

In 2011, the annualised total additional costs of the programme represented only 0.04% of the total public health expenditure (government + donors) and 0.13% of the government's own health expenditure. If the programme was rolled out to new areas to reach 100% of the country children, , increasing by 20.5% the number of HEWs and supervisors these proportions would stand at 0.05% of the total public health expenditure and 0.16% of the government's health expenditure. Even when adding 15% to the iCCM costs for health systems strengthening the cost of the programme for 100% coverage would still only represent 0.06% of the total public health expenditure and 0.18% of government's health expenditure.

It is unlikely that public health expenditure will decrease. GDP continues to increase in real terms, and the share of health in government expenditure has been increasing, even if at a low rate, largely due to donors funding (2/3 of public health expenditure). Donors are unlikely to reduce their contribution to the health sector, in particular due to the strategic position of Ethiopia in the horn of Africa.

A larger concern for sustainability is the current low utilisation of the programme with the consequent relatively high cost per treatment. The current average cost per iCCM treatment, excluding HEW share of salary, is \$6.81, while that for the cost of treatment at a health centre is \$4.18. However, it should be noted that the cost of iCCM treatment was calculated following protocols whilst the actual cost per health centre visit may well reflect under resourcing (staff shortages, stock out). In addition the cost of iCCM treatment must be seen in the context of the objective of increased access, in particular for remote areas. A low population density in such areas means that economies of scale are not achievable, and therefore not always cheaper, even through the use of less skilled staff. Cost-efficiency, whilst important cannot be the only criteria, and, despite limitations in efficiency, the costing analysis has demonstrated that financial sustainability is feasible.

7 Strengths and limitations of the evaluation

7.1 Strengths and limitations of the quantitative component

A statistical trend analysis was performed on all available data points over three time periods corresponding to pre-IHSS, phase I and phase II of the IHSS programme. Where necessary, indicator definitions were adjusted to ensure valid comparisons over time.

The coverage trend analysis is limited by the lack of endline data, following the roll out of pneumonia treatment which occurred in 2011, the same year as the DHS. Whilst endline data is available for the two zones in Oromia, where the JHU intervention study was undertaken, these cannot be generalised to all rural areas of Ethiopia. Furthermore, the intervention areas received additional support for supervision and supply chain management which would make them 'best case' areas. A further limitation is the lack of comparison areas. National coverage was included in all figures but this is not a valid comparison.

For the LiST analysis a scenario approach has been used to estimate the lives saved in the last phase of the programme. Furthermore there was no raw data available for the MIS or Epi surveys, and therefore those data points do not have confidence intervals.

Furthermore DHS and MICS surveys may dilute the effect of community-based mechanisms when data is aggregated to regional or national levels since exposure to HEWs is localised. Where coverage of a district or region with HEWs is low, care-seeking at that level will be consequently low. Therefore, the effect of HEWs is best measured within communities that have HEWs compared with communities that don't, which was not possible in this evaluation due to the scale of the programme.

7.2 Strengths and Limitations of the LiST analysis

The LiST analysis was useful to help disambiguate a complex set of changes in coverage of many interventions at the subnational level, and to identify which set of interventions were the primary drivers of mortality change. The analysis pulled data from multiple population-based sources: 3 DHS, 2 MIS and one ICS. However, the lack of endline data prevented a complete assessment of Phase II, and a scenario was created to illustrate an ambitious level of coverage increase. For between-survey years without coverage data, we imputed coverage values. The linear interpolations do not necessarily reflect true coverage patterns, especially for campaign-based interventions.

Subnational data were used to create regional projections, using many assumptions. The number of births and total population in each region were overestimated in the model, compared to best available estimates from national sources, e.g. projections based on the national census. Hence, the number of deaths and lives saved presented in this report may be inflated.

The survey indicator definitions do not perfectly match LiST indicators in all cases. Additionally, the DHS data used in this analysis does not capture many of the facility-based interventions included in LiST. These interventions are often high impact for children, e.g. Kangaroo Mother Care, and 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 (e.g. antenatal corticosteroids, case management of severe neonatal infection). PMTCT coverage is based on

assumptions from the AIM module in Spectrum, and we set coverage to reflect the Countdown to 2015 report, though regional data were not available.³⁷

While coverage indicators have been calculated to reflect the two years prior to the survey, regional mortality data in DHS reflect the 10 year period prior to the survey. The causes of death used to calculate lives saved are those modelled at national level by the Child Health Epidemiology Reference Group. This is particularly an issue for malaria in Ethiopia. To compensate for the low percentage of child deaths due to malaria in the national estimates, the percentage of women exposed to falciparum was assumed to be 85% in the regions under consideration, but the true regional number of deaths due to malaria is unknown.

The LiST model did not accurately predict measured mortality change within a confidence range for either phase under consideration, in any of the five regions, resulting in an inability to directly link measured mortality reduction with coverage change. For this reason and those mentioned above, the results of the LiST analysis 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, may not reflect the true result and should be used exclusively for illustrative purposes.

The hypothetical scenario applied in the last phase of the programme given the lack of endline mortality and coverage data is not provided as a cumulative number of deaths averted because it is an ambitious scenario unlikely to have been achieved across these regions in the short time period.

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 to other iCCM costing exercises (current multi-country evaluation and MSH study). 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 programme effectiveness. 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. HEWs' or supervisors' salaries already covered in existing government budgets). Knowledge of the added cost of iCCM can inform decision-making and planning about the cost of rolling-out the iCCM activities to other areas where a similar HEP infrastructure exists. This additional costing model also allows building scenarios for increasing cost-efficiency based on changes in service utilisation. 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 'one-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 health services are delivered in an integrated way at health posts and

between health posts and health centres. For instance, in Ethiopia, the HEWs package included delivering 16 different preventive, promotive and curative services, and the curative service included treating severely malnourished children and deworming.

The validity of the costing exercise is dependent on the availability of accurate cost data. This was more specifically an issue for training costs, which were extracted from budgets rather than actual expenditure.

7.4 Strengths and limitations of the qualitative component

This country visit was 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 who visited Ethiopia are experienced in health systems research. The key strength of this evaluation was that this group of researchers is not in the direct employ of UNICEF, and therefore is able to objectively assess the impact, outcomes and experiences of the implementation of the IHSS programme and to see and experience for themselves how the IHSS programme was implemented. The field visits helped the team to understand the cultural and political context in which the interventions took place, something that could not have been achieved by merely conducting a desk based evaluation.

While in Ethiopia the team spoke to a wide range of stakeholders. These included participants at national, regional, district, facility and village level. The visit also coincided with the 14th Annual Review Meeting of the Ethiopian Federal Ministry of Health which the team attended and this allowed for a wide range of stakeholders to be interviewed in a short period of time. The team was, therefore, able to gain a composite picture on which to base the evaluation.

Although the team was able to gain snapshots of iCCM implementation during the seven day visit, it couldn't completely ground itself in the context. The large number of interviews in this short time also meant the team was 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 office to assist with selecting appropriate people to interview. The team was able, though to gather a wide range of perspectives during the visit and via document reviews. Although it was able to explain to high level participants that it was separate from, and not employed by, UNICEF, it may have been harder for community level participants to make the distinction. This was especially so when the team came in UNICEF vehicles, with UNICEF staff. Thus, the community members' 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 sought by UNICEF. This meant that the team was reliant on the translators' interpretation of both the questions and the participants' responses.

8 Lessons learned and Recommendations

8.1 Lessons learned

Relevance

- The IHSS programme support has consolidated the HEP platform for community service delivery and enabled the inclusion of iCCM. The high level of government and partner commitment, especially engagement and leadership from the Ministry of Health has played a major role in the success of this programme and has brought together implementing partners.
- The IHSS programme has provided evidence that large-scale community-based platforms for delivery of MNCH and nutrition interventions are possible. The HEP has been strengthened through this programme with the addition of iCCM and improved supply chain and supervision systems.
- Promoting gender equity in training of HEWs was achieved, but the gains could be jeopardised due to attrition of HEWs. Health workers at levels above HEWs are mostly men most likely due to broader gender dynamics limiting women's roles in the health workforce.

Effectiveness

- There may be lessons learnt from the success in increasing care-seeking for fever which could be applied more generally to other services provided at health posts. There are also lessons to be learnt from the success in increasing IYCF in areas supported by the HDA and HEWs⁹.
- Improvements have been seen in both preventive and curative indicator coverage particularly exclusive breastfeeding, vitamin A supplementation, measles immunisation care-seeking and treatment of fever.
- Coverage of supervision with observation of case-management is very low and could impact on the quality of care provided at health posts.
- Utilisation of HEWs at health posts appears low.

Impact

- Improvements in indicators contributing to maternal health (especially skilled attendants) have improved at a far lower rate than those for child health which are largely 'quick win' interventions.
- 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. In order to effectively measure this in the future there is a need for continuing efforts to improve the availability of sound, demographic, epidemiological, intervention, coverage and cost data at national and sub-national levels, but the burden of collecting these data should be weighed against the usefulness for end users.

Sustainability

- The low utilisation of HEWs for iCCM resulted in a relatively high cost per treatment.
- Sustainability of funding for iCCM, particularly for commodities, has been raised as a concern by several stakeholders.

8.2 Recommendations

Relevance

- The role of the HEWs in improving maternal health should also be considered, particularly to increase the coverage of postnatal care. There may be lessons to be taken from the evaluation of the community-based nutrition programme⁹.
- Demand creation strategies that address barriers to women's decision making in care-seeking need to be devised.

Effectiveness

- Now that the platform for delivery has been established, strategies are needed to increase utilisation of health posts for iCCM through demand creation, addressing social norms and awareness raising regarding the skills and services provided by HEWs.
- Further research is needed to assess issues of utilisation and demand creation, particularly whether health posts are optimally located in terms of distance from health facilities and distance from each other. Assessment of whether HEWs' current training is adequate, and equipment sufficient, to support maternal and newborn health, is needed.
- Coverage of supervision with observation of case-management needs to be improved and routinized within the HEWs monthly programme.
- Supply chain improvement is needed particularly for zinc and RDTs with a focus on getting supplies from medical stores to health posts.
- The promotion of key family practices (especially IYCF and WASH) through HEWs and the HDA should continue.
- The decline in early breastfeeding initiation should receive attention given the strong link between early breastfeeding initiation and neonatal mortality¹⁰ and considering that neonatal mortality now constitutes 42% of under 5 deaths in Ethiopia.
- More efforts are needed with regard to postnatal care, exclusive breastfeeding and vitamin A supplementation.

Impact

- More attention is needed to focus on newborns and young infants, and the recent training of HEWs in newborn care and management of neonatal sepsis will hopefully start to address this.
- Plausible contribution of the IHSS programme to lives saved has been assessed through modelling. It is acknowledged that other interventions not included in the IHSS programme package, such as improved care at birth, may have played a role in child survival, and that the modelled estimates reflect changes in coverage at all levels of the health system, and not merely the community level. The modelled estimates have a number of important

limitations. It is recommended that future evaluations strive to collect data at the level at which we expect to see impact, e.g. the 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.

Sustainability

- It is recommended that the issue of financial provision for commodities be addressed by the relevant government authorities and their funding partners. The 'financial sustainability' costing analysis provided in this study can inform such deliberations and future planning.
- Costing scenarios indicate that either a 15% or a 30% increase in utilisation of iCCM services should be considered as feasible options for improving cost-efficiency of the programme.
- Given that the main cost driver of the CCM program is the fixed cost associated with iCCM training of HEWs and supervisors, finding ways to integrate iCCM training into basic training programmes would improve the cost-efficiency of the programme.

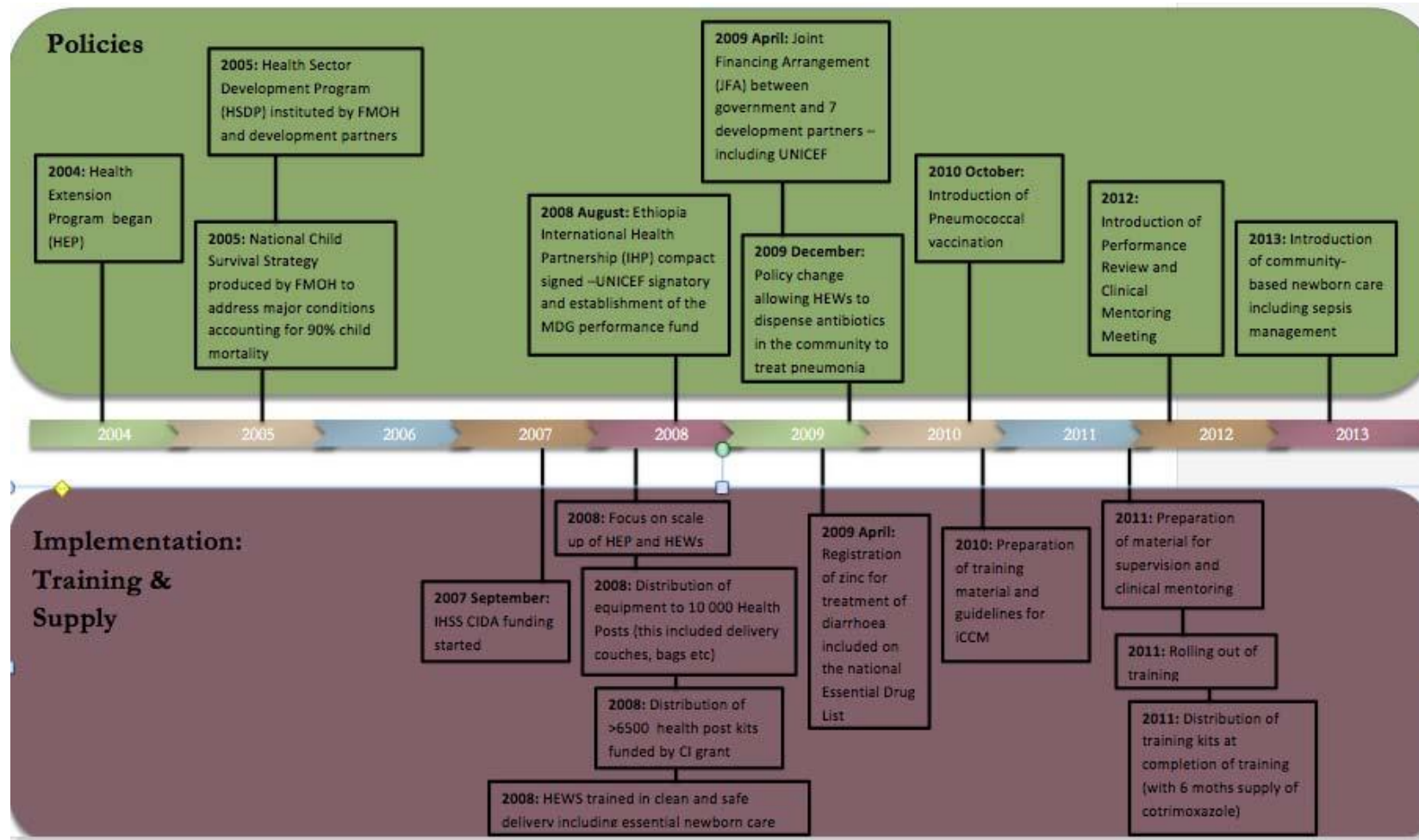
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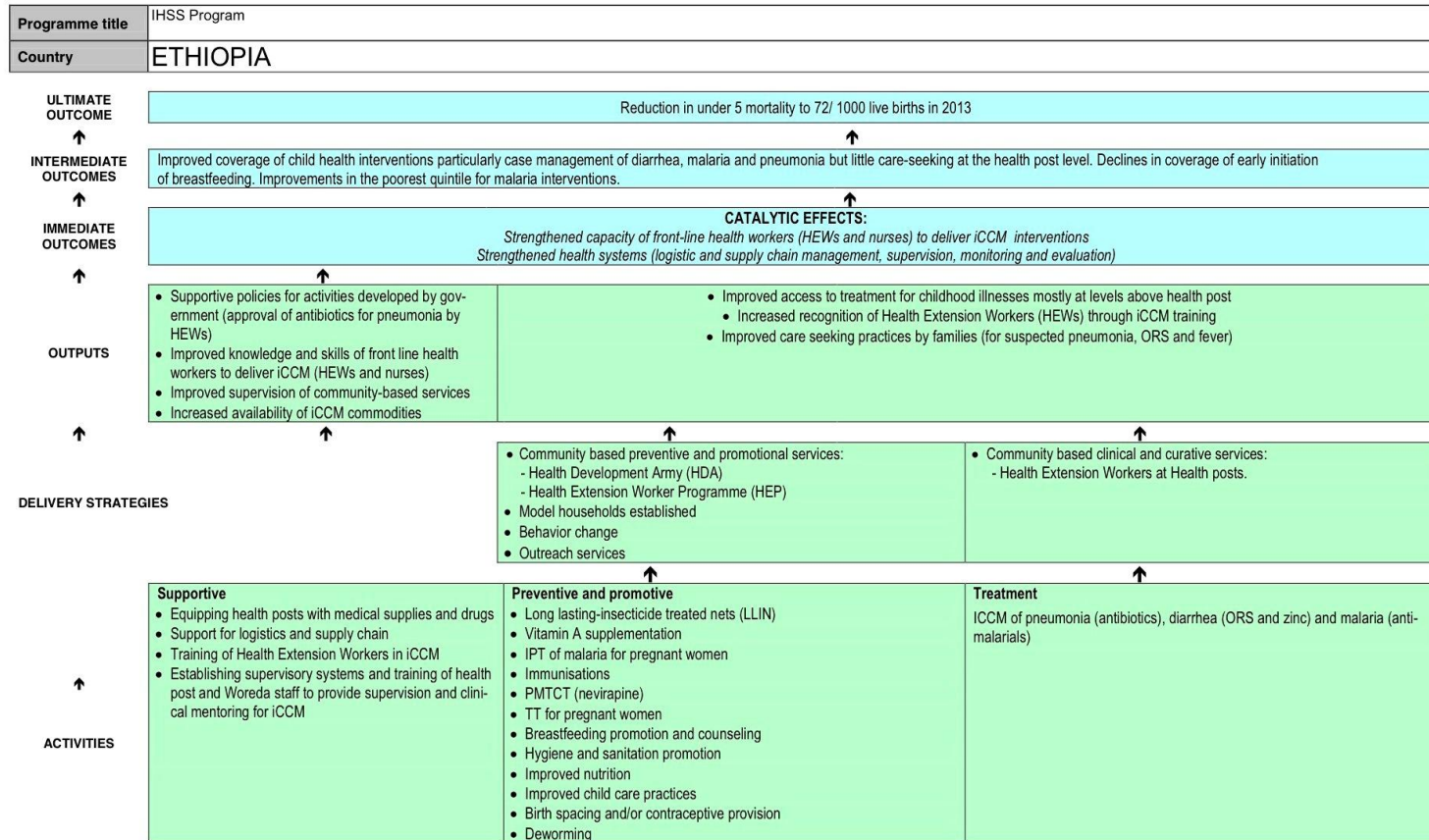
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10 Appendices

Appendix A: Ethiopia policy and implementation timeline



Appendix B: Country Logic Model



Appendix C: Indicators and additional results for the LiST analysis

Indicators collected for coverage and LiST analyses (IHSS programme indicators taken from the DFATD grant agreement)

Packages	Coverage indicators*	Interventions in LiST	Indicator definition in LiST	Data source used for LiST 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 LiST 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		
Childbirth & Immediate Newborn Care		Facility based births	Proportion of infants delivered in a facility	Household surveys			X
	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	
Curative 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

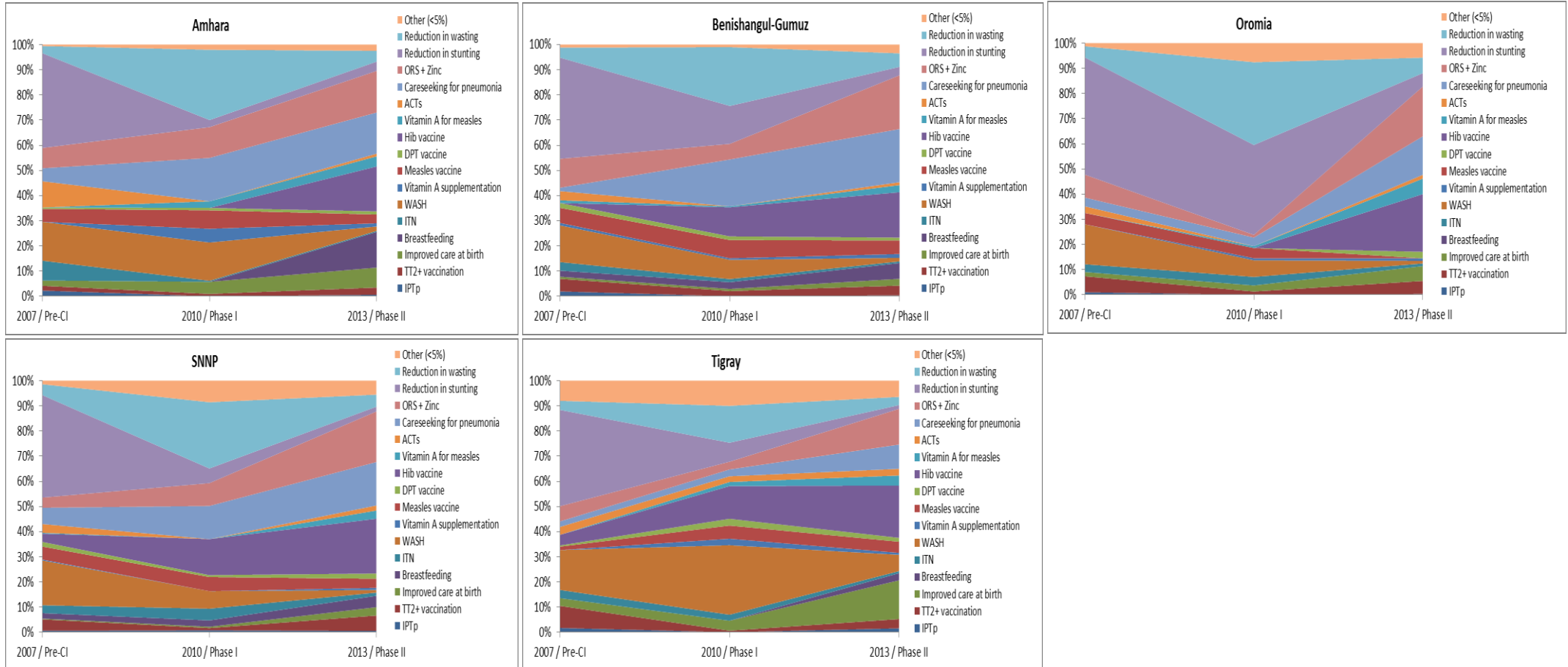
		Injectable antibiotics: case management of severe neonatal infection	Proportion of neonates with suspected pneumonia, sepsis or ARI in the 2 weeks preceding the surveys treated with antibiotics	No national level data available. Set at 0 for baseline			X
		Full supportive care: case management of severe 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)	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	
	(1.3.2.11.3)						
		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

* Indicator definitions correspond to the objective numbers provided in brackets

Information source: Lives Saved Tool manual; DFATD/UNICEF Request for proposal for services indicators by objective

**Included in the coverage trend analysis

Area graphs illustrating proportionate lives saved by phase, by region



Appendix D: Detailed costing tables

Fixed Cost per HEW						
Training	Days	Cost per Training	Life Years	Annualised Cost (A)	Attrition Rate	Annualised Cost (B)
Initial ICCM Training	6	149.5				
Post training follow-up		2.8				
Total per HEW		152.3	5	30.5	3.75%	31.60

Supervision Meetings	No per Year	Cost per Supervision	Annualised Cost
Integrated supportive & competency based supervision (2 days)	2	11.6	
Total per HEW			23.12

Equipment Cost	Unit Cost	Life Years	Annualised Cost
Bag	9.15	3.0	3.05
Timer/watch	5.87	3.0	1.96
OTP Reference Book	0.19	3.0	0.06
ICCM Registers	18.68	3.0	6.23
Total			11.30

Supervision and Management	
Number HEWs per	
Supervisor	8
HEPFP - Woreda	40
Zonal Co-ordinator	480

Training of Supervisors & Managers	Days	Cost per Training	Life Years	Annualised Cost	Attrition Rate	Annualised Cost (B)	Annualised Cost per HEW
Per Supervisor	7	167.5	5	33.5	3.75%	34.77	4.3
Per HEPFP	7	167.5	5	33.5	3.75%	34.77	0.9
Per Zonal	7	167.5	5	33.5	3.75%	34.77	0.1
Total							5.3

Management meetings				
CCM Review Meetings	No per Year	Cost per Meeting	Annualised Cost	Annualised Cost per HEW
Per Supervisor	2	252.2	504.4	63.0
Per HEPFP	2	252.2	504.4	12.6
Per Zonal	2	252.2	504.4	1.1
Total				76.7

Transport Cost							
Capital	Quantity	Purchase Cost	Life Years	Annualised Cost	% for ICCM	ICCM annualised Cost	Annualised Cost per HEW
Motorbike for Supervisor	1	2 251	4	562.8	20%	112.55	14.07

Recurrent Transport costs

incl in overheads

Additional Annualised Fixed Cost by HEW in \$	Fixed Cost/HEW/Year	% for MDP	Fixed cost MDP	# MDP treatments/year	Fixed Cost per Treatment
Training	31.60				
Equipment	11.30				
Management & Supervision	96.06				
Other Overheads 5%	6.95				
Total Additional fixed cost	145.91	91%	132.65	20	6.63

Medicine & Diagnostic test / Treatment	Medicine & Diagnostic test
Malaria, incl RDT	1.70
Diarrhea	0.67
Pneumonia	0.26
Total	

Consumable Stationary / Treatment	Unit Cost	% of treatments	Cost per Treatment
OTP cards	0.04	20%	0.01
Family cards	0.44	15%	0.07
Total			0.07

Appendix E: National and regional coverage profiles

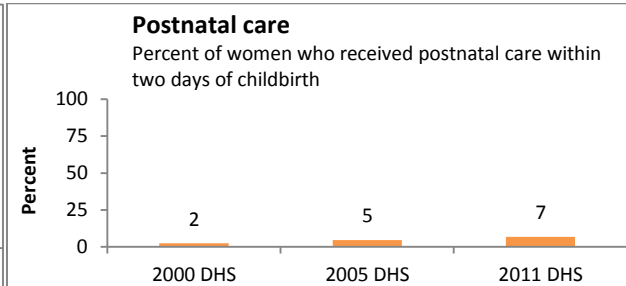
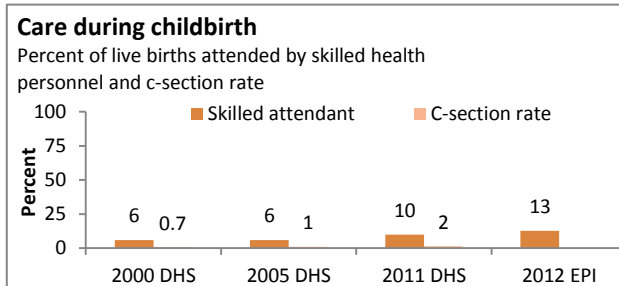
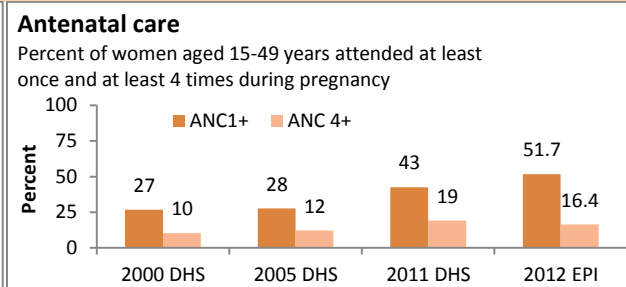
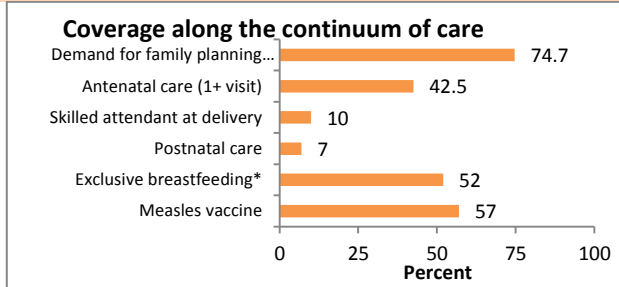


National

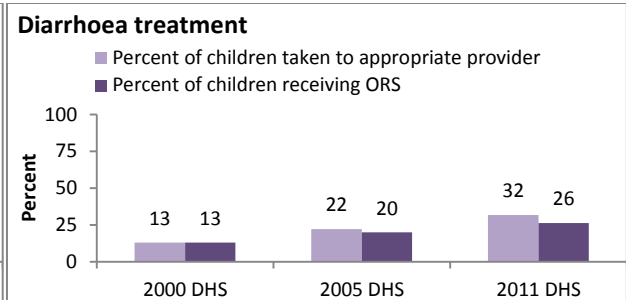
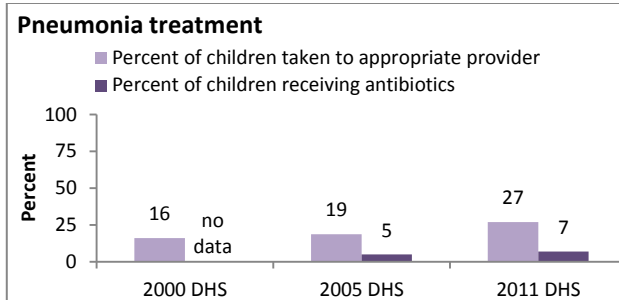
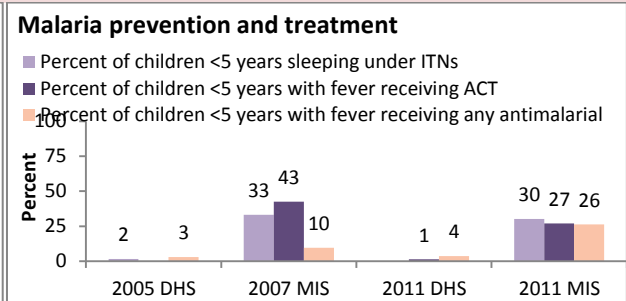
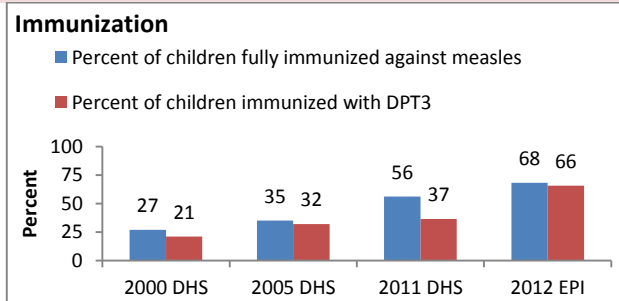
DEMOGRAPHICS

Total population	4,900,000	Annual births	162,000
Neonatal mortality rate (per 1000 live births)	44	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	7,000	Maternal deaths	1,000
Under-five mortality rate (per 1000 live births)	85	Total fertility rate	4.6
Under-five deaths	14,000	Average annual rate of U5MR reduction, 2000-2011	6.5%

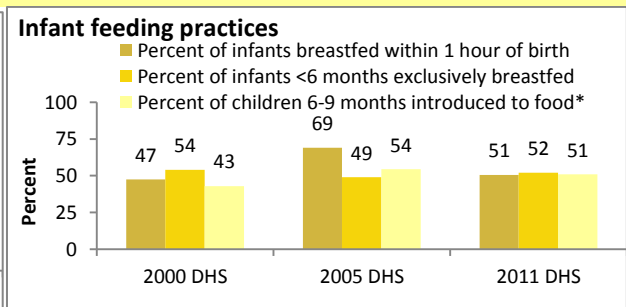
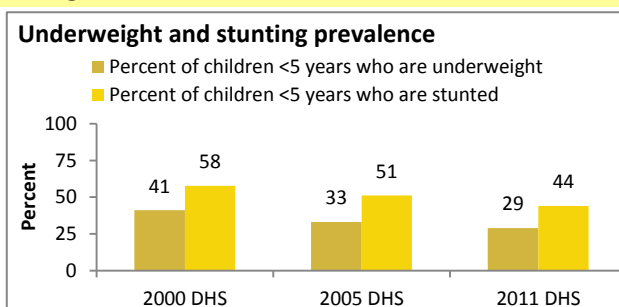
MATERNAL AND NEWBORN HEALTH



CHILD HEALTH



NUTRITION





Addis Ababa

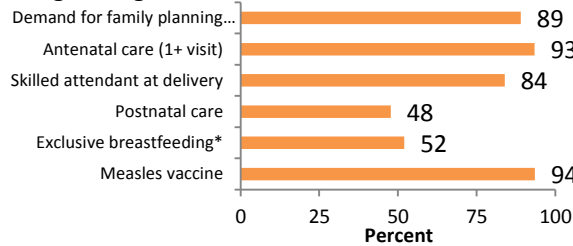
* Refers to national data, not region-specific

DEMOGRAPHICS

Total population	4,900,000	Annual births	162,000
Neonatal mortality rate (per 1000 live births)	21	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	7,000	Maternal deaths	1,000
Under-five mortality rate (per 1000 live births)	53	Total fertility rate	1,5
Under-five deaths	14,000	Average annual rate of U5MR reduction, 2000-2011	6.5%

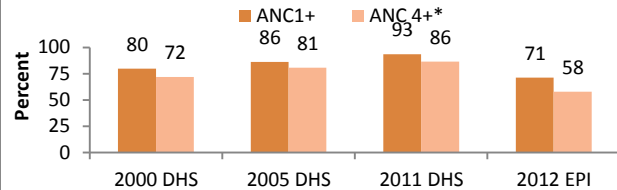
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



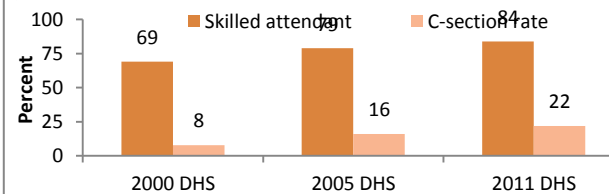
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



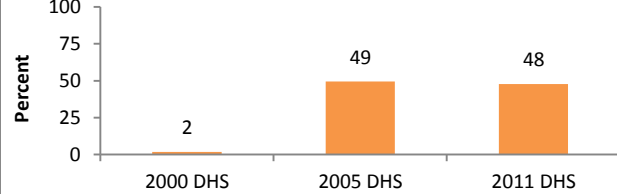
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



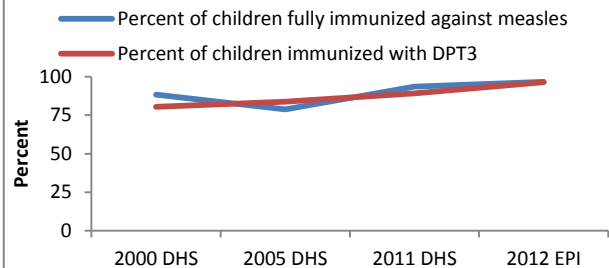
Postnatal care

Percent of women who received postnatal care within two days of childbirth

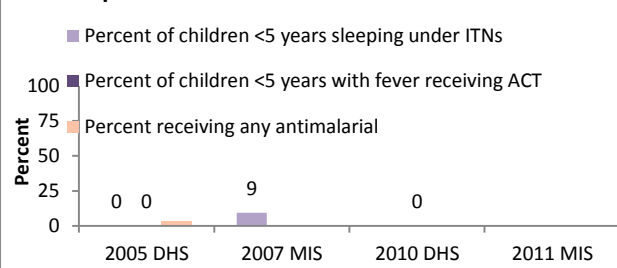


CHILD HEALTH

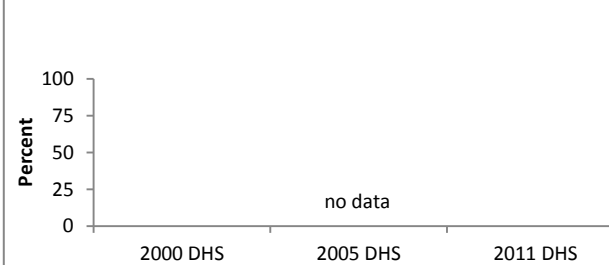
Immunization



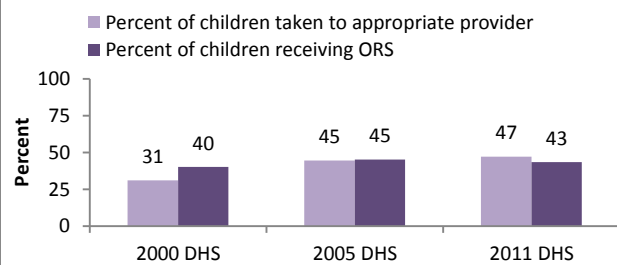
Malaria prevention and treatment



Pneumonia treatment

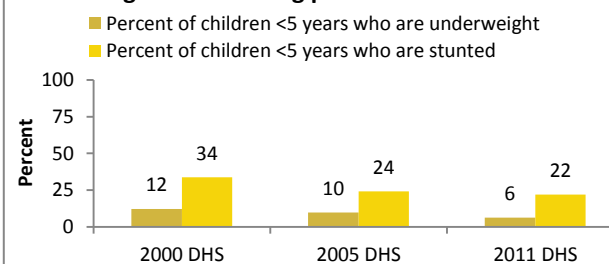


Diarrhoea treatment

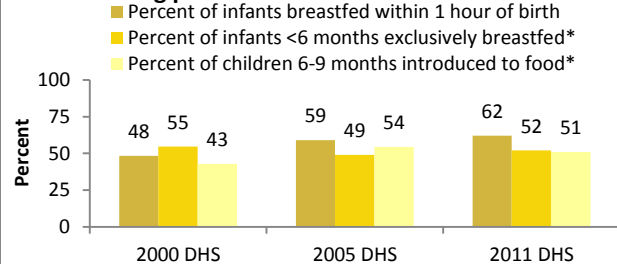


NUTRITION

Underweight and stunting prevalence



Infant feeding practices





Afar

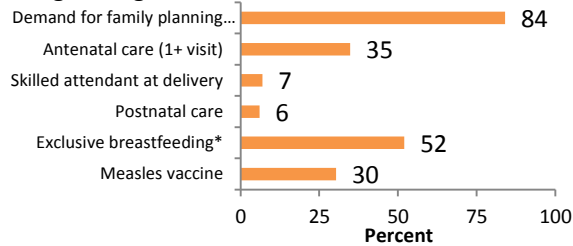
* Refers to national data, not region-specific

DEMOGRAPHICS

Total population	1,560,000	Annual births	56,000
Neonatal mortality rate (per 1000 live births)	33	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	2000	Maternal deaths	400
Under-five mortality rate (per 1000 live births)	127	Total fertility rate	5.0
Under-five deaths	7000	Average annual rate of U5MR reduction, 2000-2011	5.5%

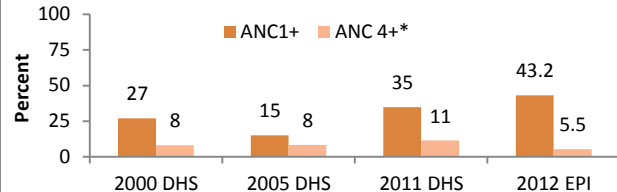
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



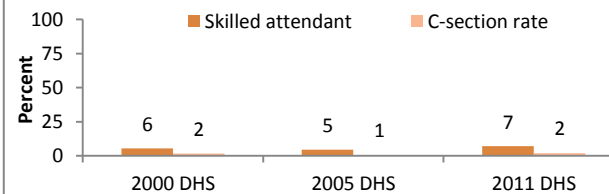
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



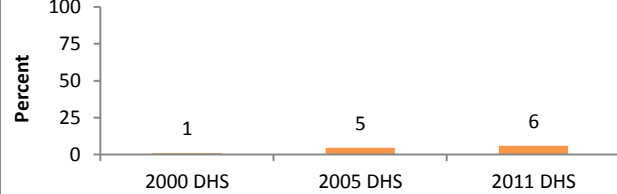
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



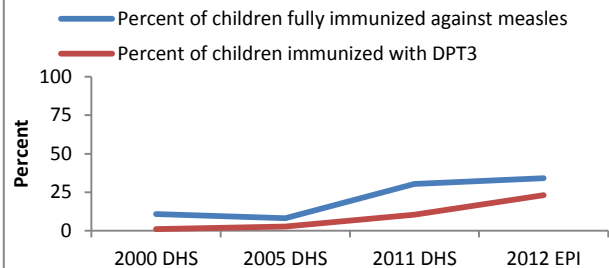
Postnatal care

Percent of women who received postnatal care within two days of childbirth

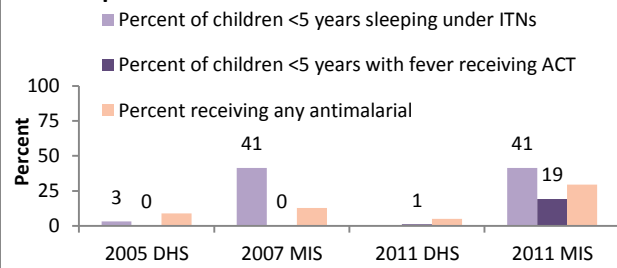


CHILD HEALTH

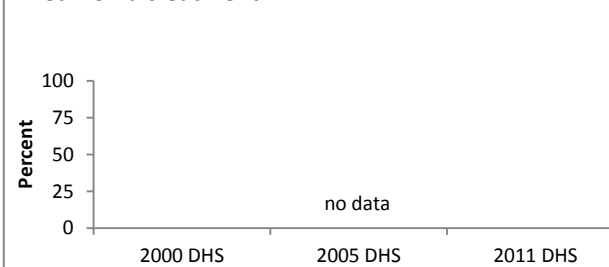
Immunization



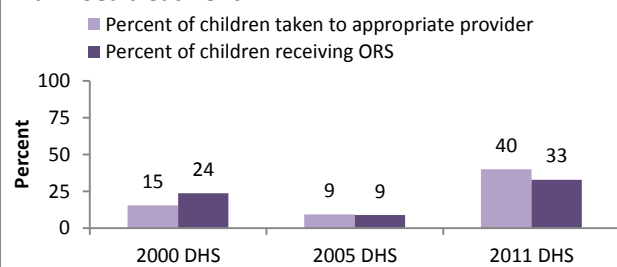
Malaria prevention and treatment



Pneumonia treatment

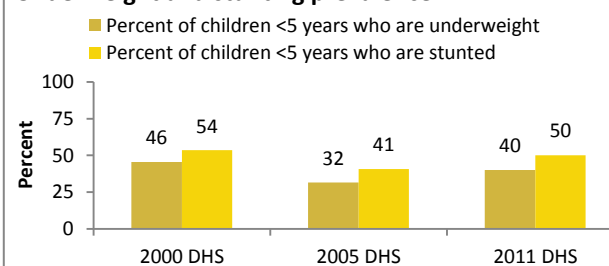


Diarrhoea treatment

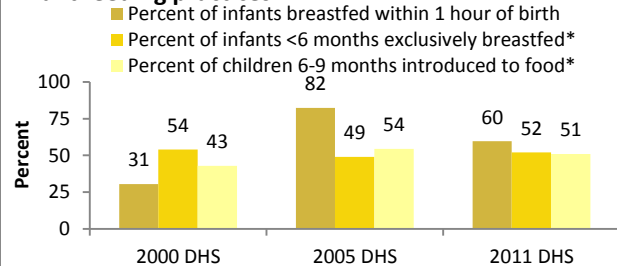


NUTRITION

Underweight and stunting prevalence



Infant feeding practices





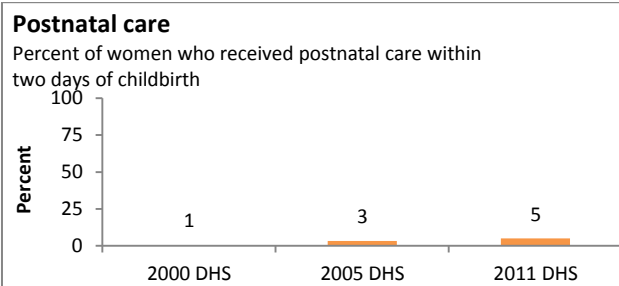
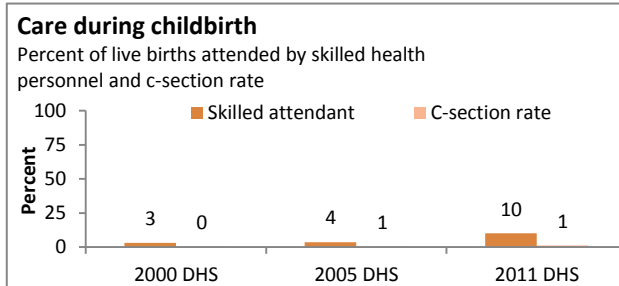
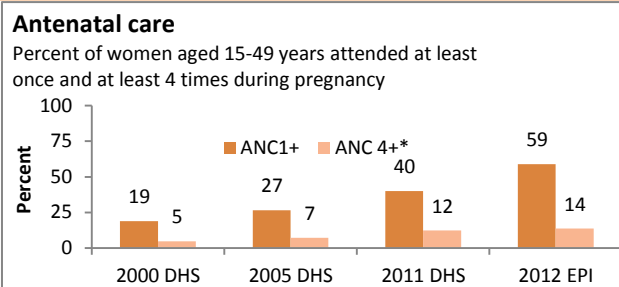
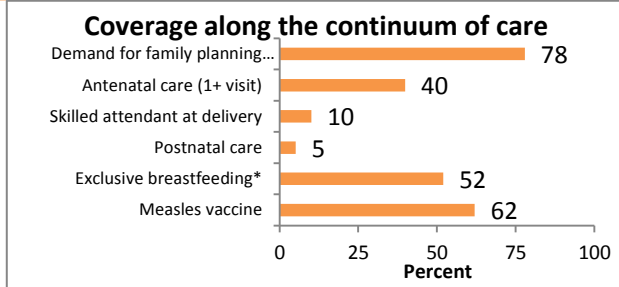
Amhara

* Refers to national data, not region-specific

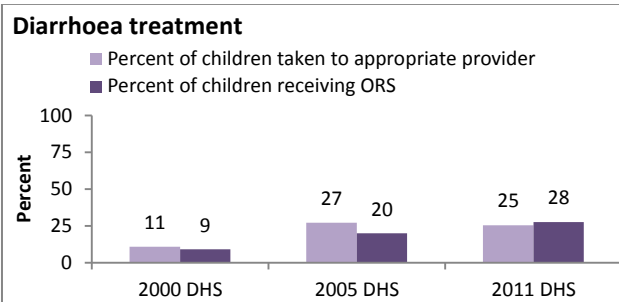
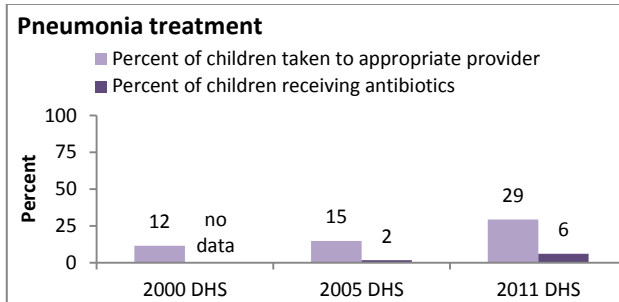
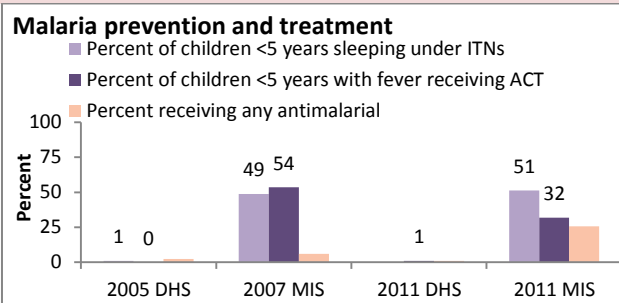
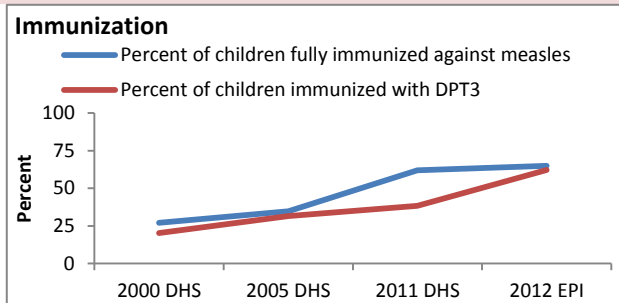
DEMOGRAPHICS

Total population	18,600,000	Annual births	561,000
Neonatal mortality rate (per 1000 live births)	54	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	30,000	Maternal deaths	8,000
Under-five mortality rate (per 1000 live births)	108	Total fertility rate	4.2
Under-five deaths	61,000	Average annual rate of U5MR reduction, 2000-2011	4.9%

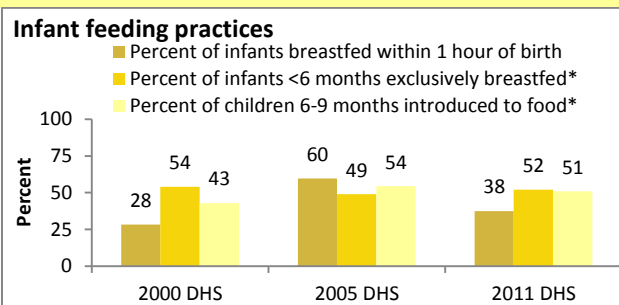
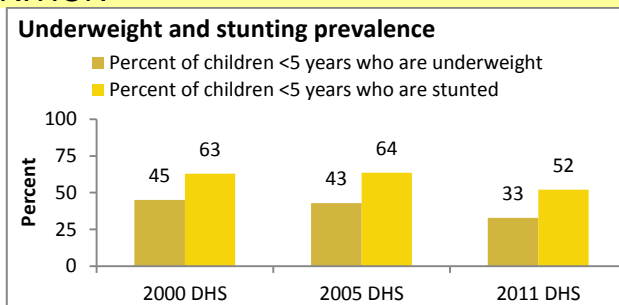
MATERNAL AND NEWBORN HEALTH



CHILD HEALTH



NUTRITION





Benishangul-Gumuz

* Refers to national data, not

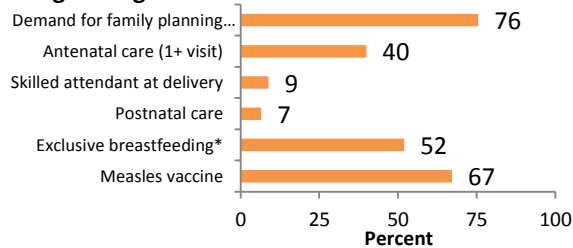
region-specific

DEMOGRAPHICS

Total population	940,000	Annual births	35,000
Neonatal mortality rate (per 1000 live births)	62	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	2,000	Maternal deaths	8,000
Under-five mortality rate (per 1000 live births)	169	Total fertility rate	5.2
Under-five deaths	6,000	Average annual rate of U5MR reduction, 2000-2011	1.4%

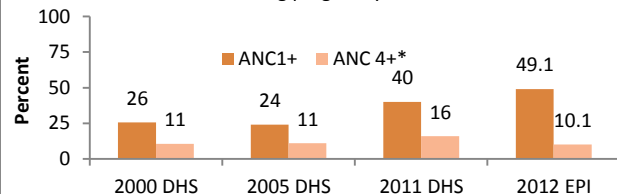
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



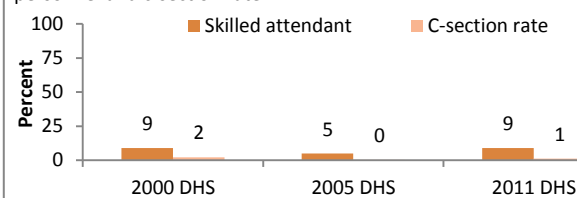
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



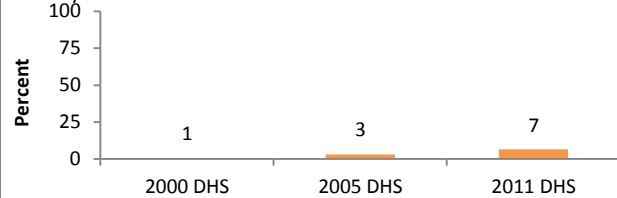
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



Postnatal care

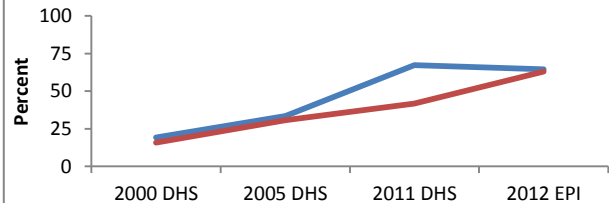
Percent of women who received postnatal care within two days of childbirth



CHILD HEALTH

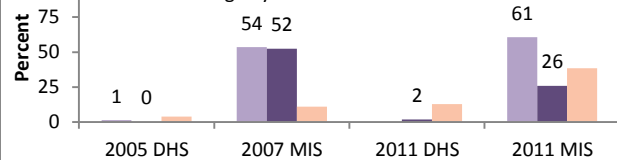
Immunization

Percent of children fully immunized against measles and immunized with DPT3



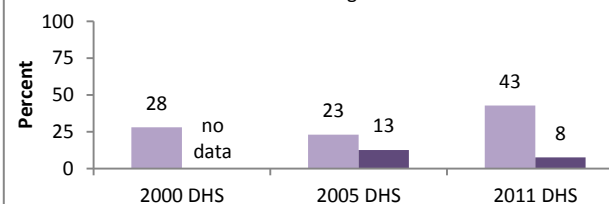
Malaria prevention and treatment

Percent of children <5 years sleeping under ITNs, receiving ACT, and any antimalarial



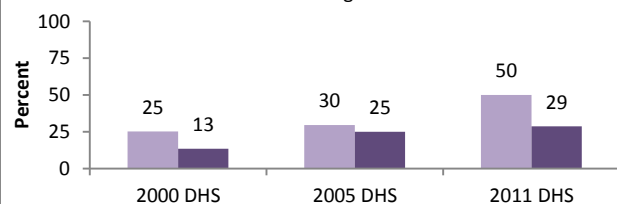
Pneumonia treatment

Percent of children taken to appropriate provider and receiving antibiotics



Diarrhoea treatment

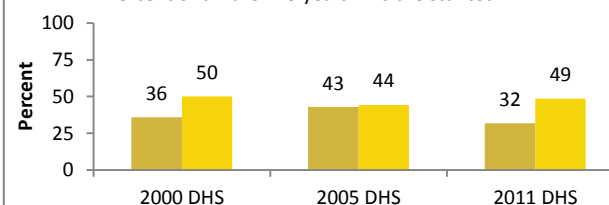
Percent of children taken to appropriate provider and receiving ORS



NUTRITION

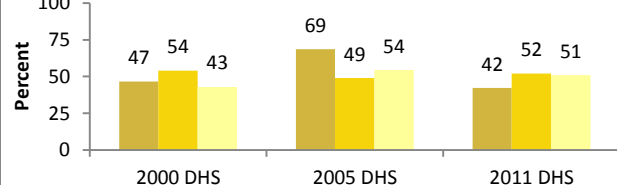
Underweight and stunting prevalence

Percent of children <5 years who are underweight and stunted



Infant feeding practices

Percent of infants breastfed within 1 hour of birth, exclusively breastfed, and introduced to food





Dire Dawa

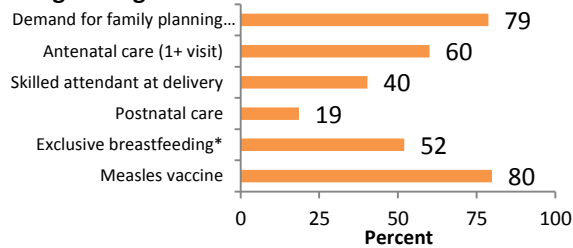
* Refers to national data, not region-specific

DEMOGRAPHICS

Total population	400,000	Annual births	10000
Neonatal mortality rate (per 1000 live births)	30	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	300	Maternal deaths	70
Under-five mortality rate (per 1000 live births)	97	Total fertility rate	3.4
Under-five deaths	1000	Average annual rate of U5MR reduction, 2000-2011	5.5%

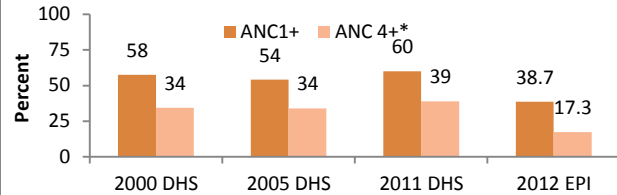
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



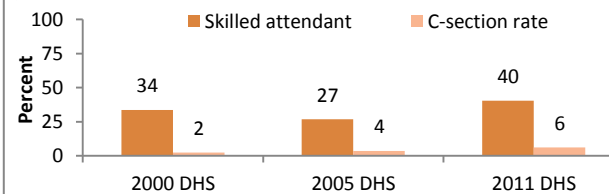
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



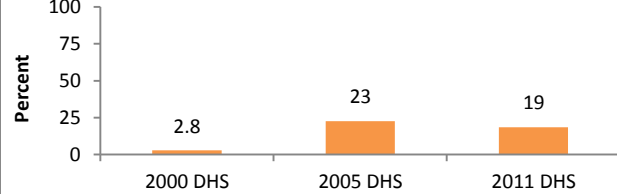
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



Postnatal care

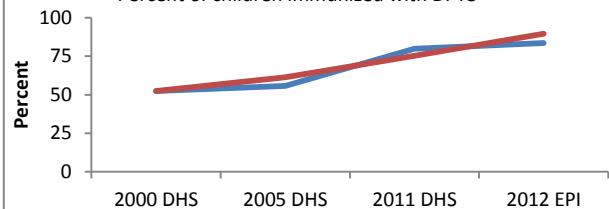
Percent of women who received postnatal care within two days of childbirth



CHILD HEALTH

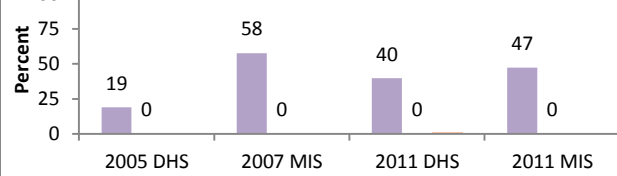
Immunization

Percent of children fully immunized against measles and immunized with DPT3



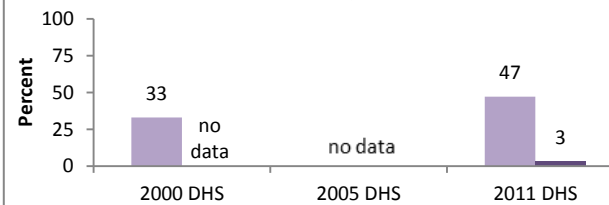
Malaria prevention and treatment

Percent of children <5 years sleeping under ITNs, receiving ACT, and any antimalarial



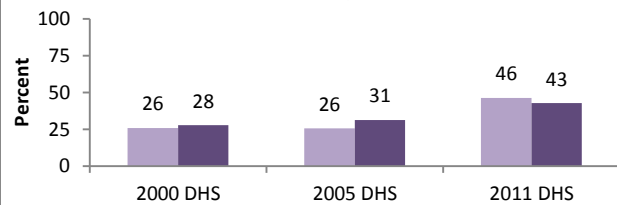
Pneumonia treatment

Percent of children taken to appropriate provider and receiving antibiotics



Diarrhoea treatment

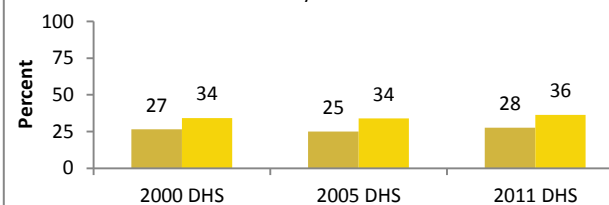
Percent of children taken to appropriate provider and receiving ORS



NUTRITION

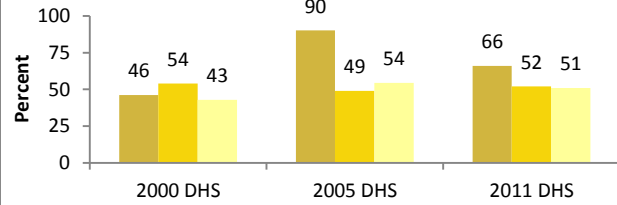
Underweight and stunting prevalence

Percent of children <5 years who are underweight and stunted



Infant feeding practices

Percent of infants breastfed within 1 hour of birth, exclusively breastfed, and introduced to food





Gambela

* Refers to national data, not

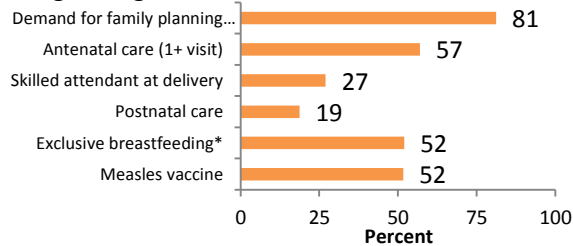
region-specific

DEMOGRAPHICS

Total population	400,000	Annual births	12000
Neonatal mortality rate (per 1000 live births)	39	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	500	Maternal deaths	<100
Under-five mortality rate (per 1000 live births)	123	Total fertility rate	4.0
Under-five deaths	1000	Average annual rate of U5MR reduction, 2000-2011	6.0%

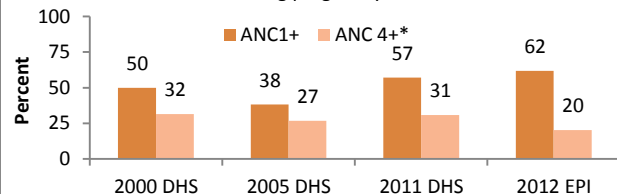
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



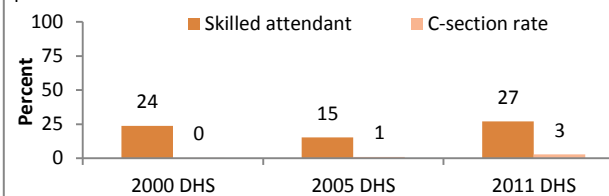
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



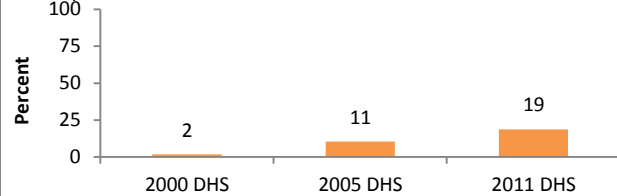
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



Postnatal care

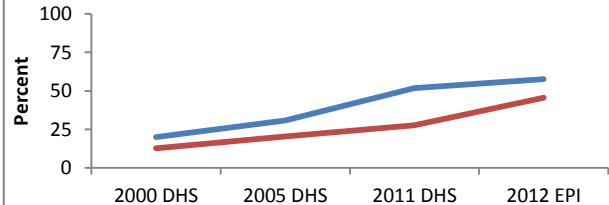
Percent of women who received postnatal care within two days of childbirth



CHILD HEALTH

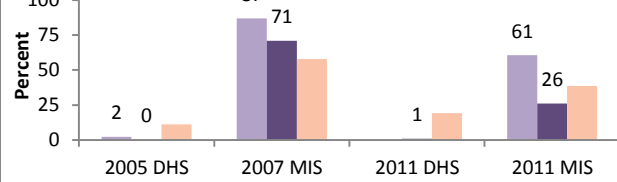
Immunization

Percent of children fully immunized against measles
Percent of children immunized with DPT3



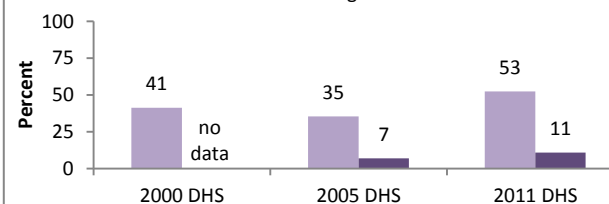
Malaria prevention and treatment

Percent of children <5 years sleeping under ITNs
Percent of children <5 years with fever receiving ACT
Percent receiving any antimalarial



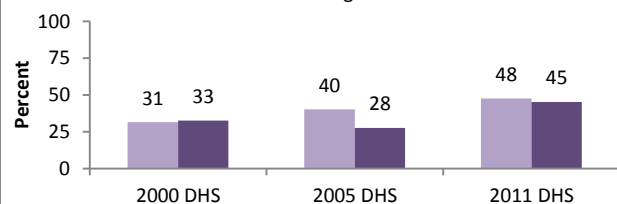
Pneumonia treatment

Percent of children taken to appropriate provider
Percent of children receiving antibiotics



Diarrhoea treatment

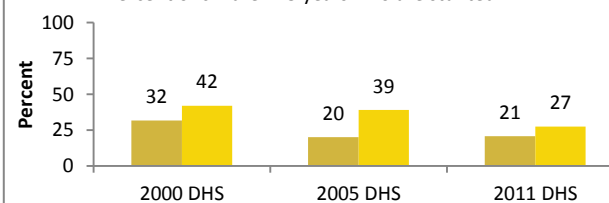
Percent of children taken to appropriate provider
Percent of children receiving ORS



NUTRITION

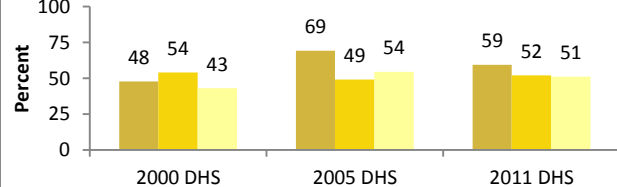
Underweight and stunting prevalence

Percent of children <5 years who are underweight
Percent of children <5 years who are stunted



Infant feeding practices

Percent of infants breastfed within 1 hour of birth
Percent of infants <6 months exclusively breastfed*
Percent of children 6-9 months introduced to food*





Harari

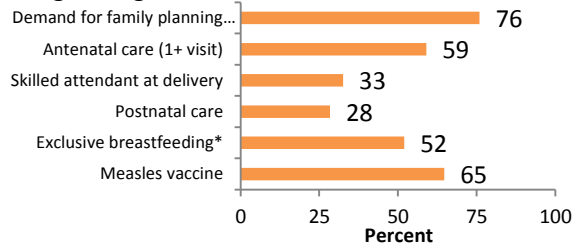
* Refers to national data, not region-specific

DEMOGRAPHICS

Total population	250,000	Annual births	7000
Neonatal mortality rate (per 1000 live births)	35	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	300	Maternal deaths	<100
Under-five mortality rate (per 1000 live births)	94	Total fertility rate	3.8
Under-five deaths	1000	Average annual rate of U5MR reduction, 2000-2011	6.7%

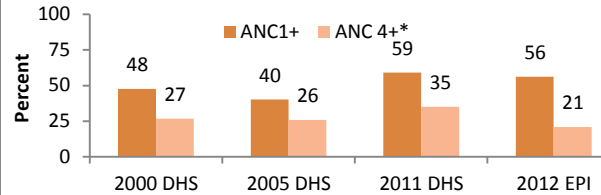
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



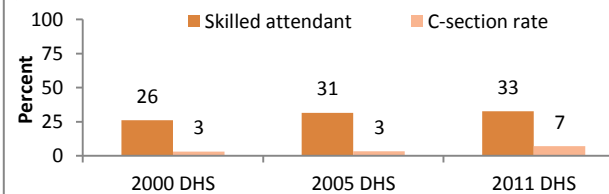
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



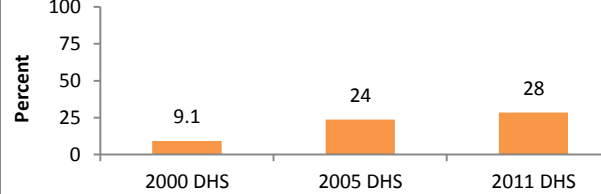
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



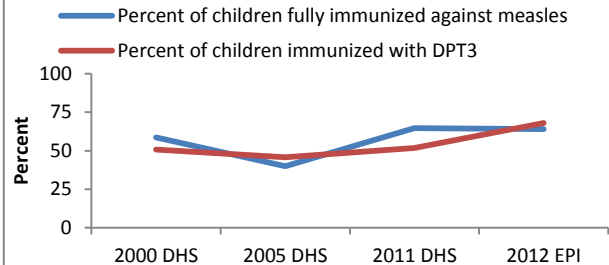
Postnatal care

Percent of women who received postnatal care within two days of childbirth

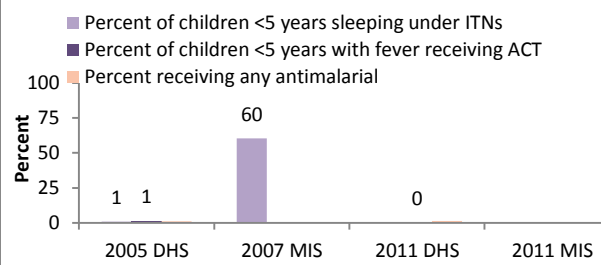


CHILD HEALTH

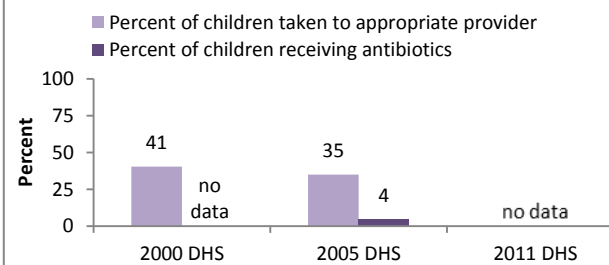
Immunization



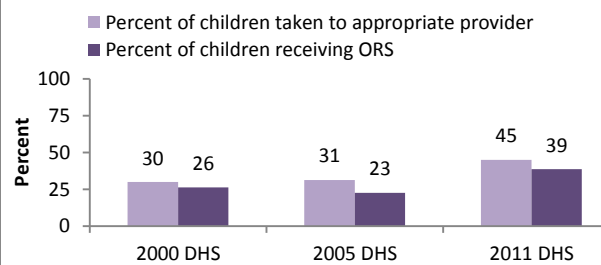
Malaria prevention and treatment



Pneumonia treatment

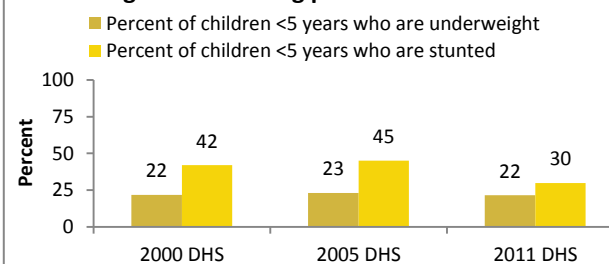


Diarrhoea treatment

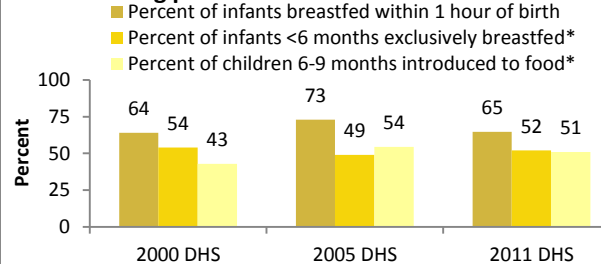


NUTRITION

Underweight and stunting prevalence



Infant feeding practices





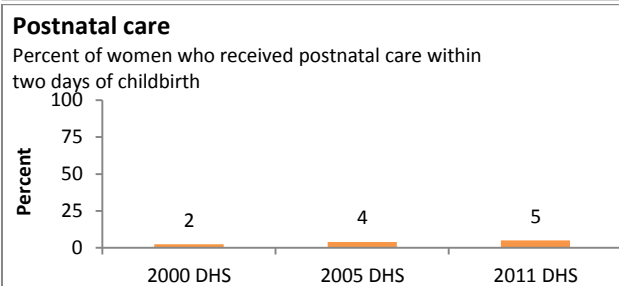
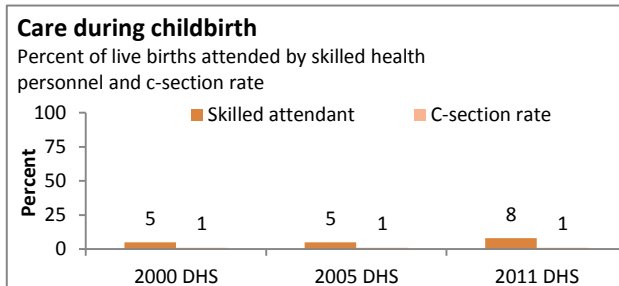
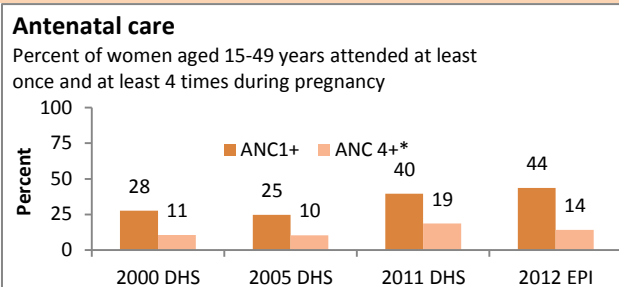
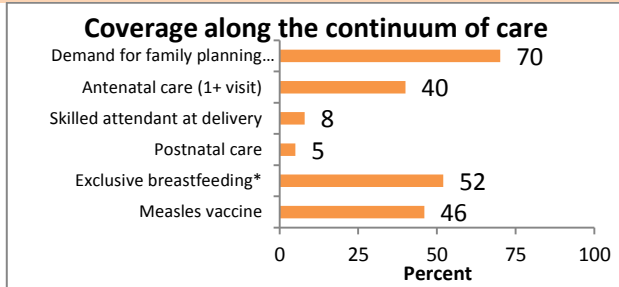
Oromia

* Refers to national data, not region-specific

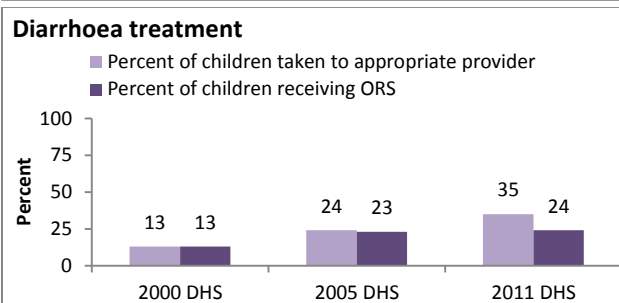
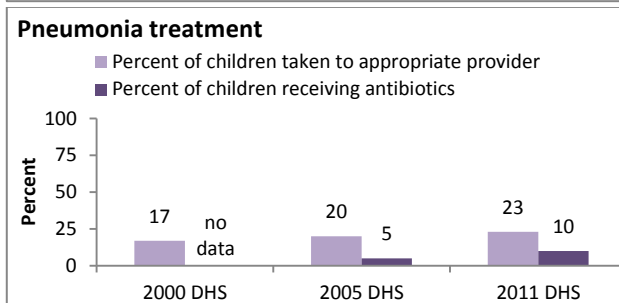
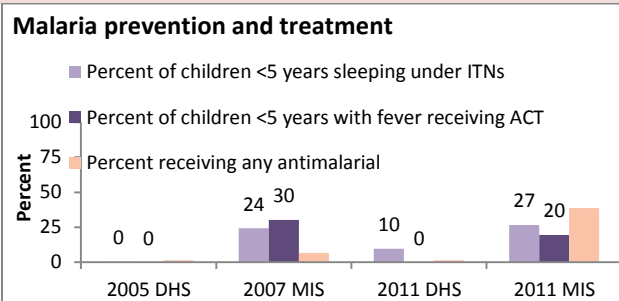
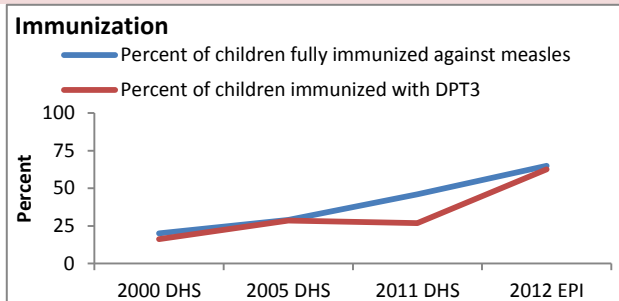
DEMOGRAPHICS

Total population	30,400,000	Annual births	1,224,000
Neonatal mortality rate (per 1000 live births)	40	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	49,000	Maternal deaths	8,000
Under-five mortality rate (per 1000 live births)	112	Total fertility rate	5.6
Under-five deaths	137,000	Average annual rate of U5MR reduction, 2000-2011	5.1%

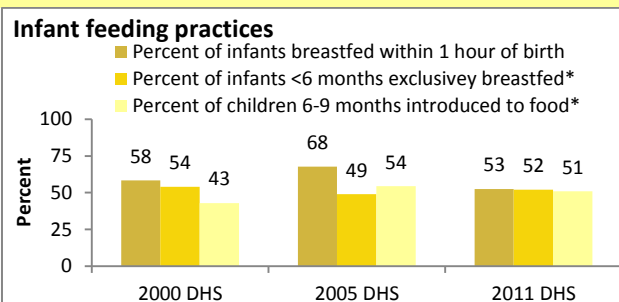
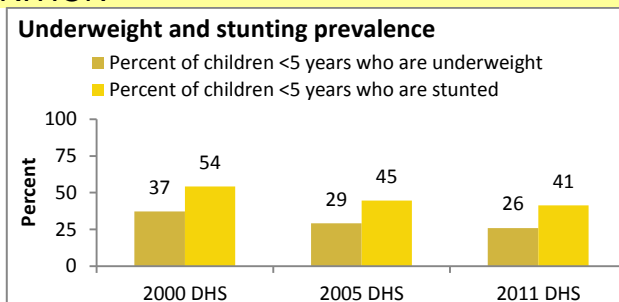
MATERNAL AND NEWBORN HEALTH



CHILD HEALTH



NUTRITION





SNNP

region-specific

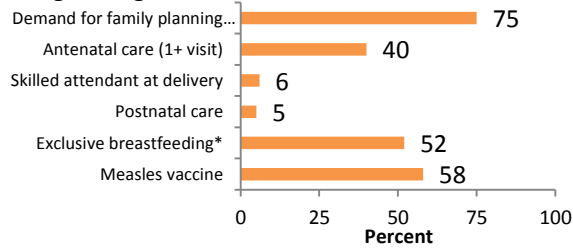
* Refers to national data, not

DEMOGRAPHICS

Total population	17,000,000	Annual births	595,000
Neonatal mortality rate (per 1000 live births)	38	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	23,000	Maternal deaths	4,000
Under-five mortality rate (per 1000 live births)	116	Total fertility rate	4.9
Under-five deaths	69,000	Average annual rate of U5MR reduction, 2000-2011	4.7%

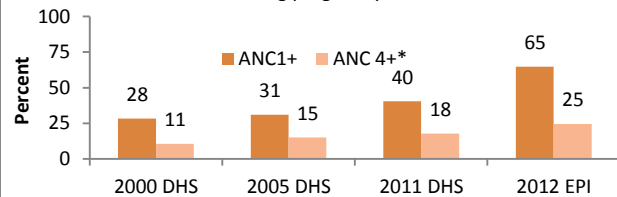
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



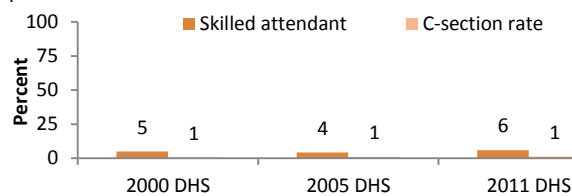
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



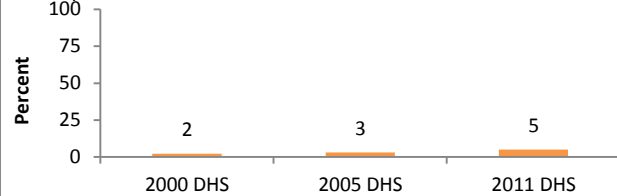
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



Postnatal care

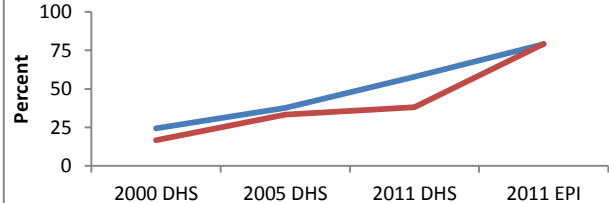
Percent of women who received postnatal care within two days of childbirth



CHILD HEALTH

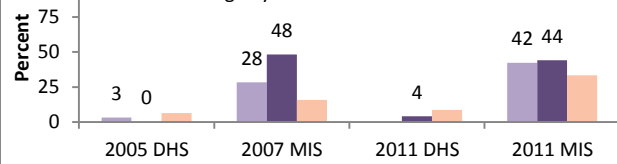
Immunization

Percent of children fully immunized against measles
Percent of children immunized with DPT3



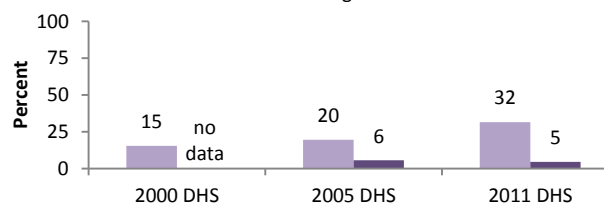
Malaria prevention and treatment

Percent of children <5 years sleeping under ITNs
Percent of children <5 years with fever receiving ACT
Percent receiving any antimalarial



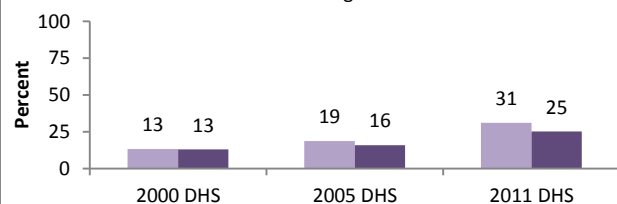
Pneumonia treatment

Percent of children taken to appropriate provider
Percent of children receiving antibiotics



Diarrhoea treatment

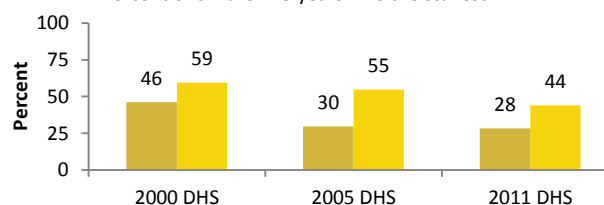
Percent of children taken to appropriate provider
Percent of children receiving ORS



NUTRITION

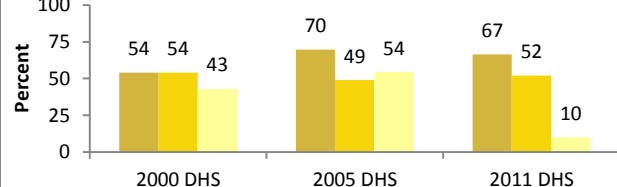
Underweight and stunting prevalence

Percent of children <5 years who are underweight
Percent of children <5 years who are stunted



Infant feeding practices

Percent of infants breastfed within 1 hour of birth
Percent of infants <6 months exclusively breastfed*
Percent of children 6-9 months introduced to food*





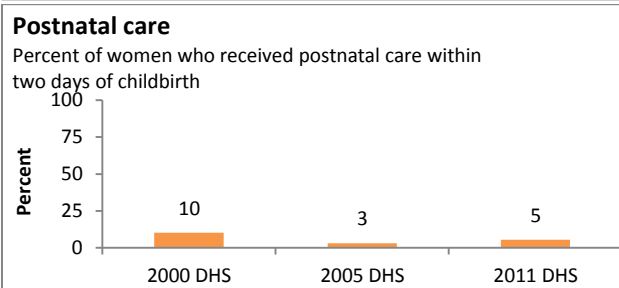
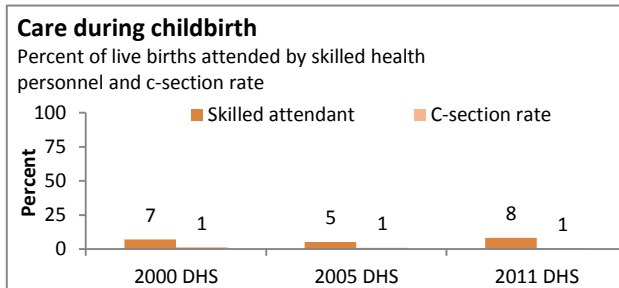
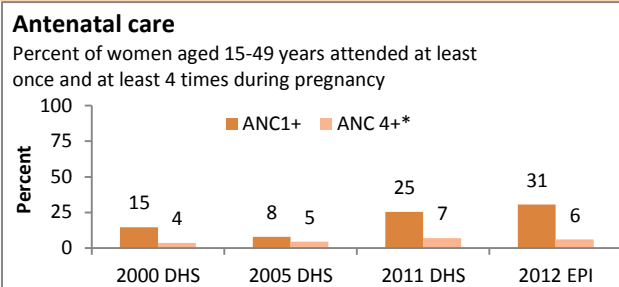
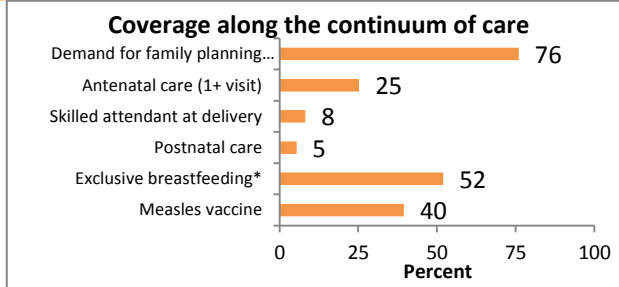
Somali

* Refers to national data, not region-specific

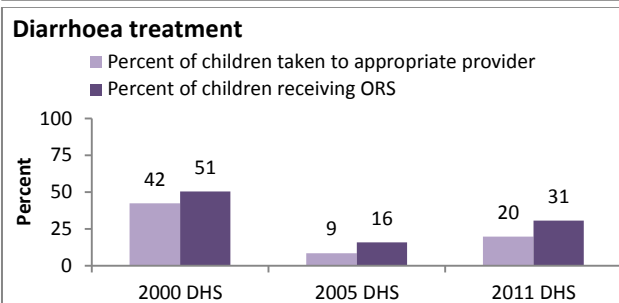
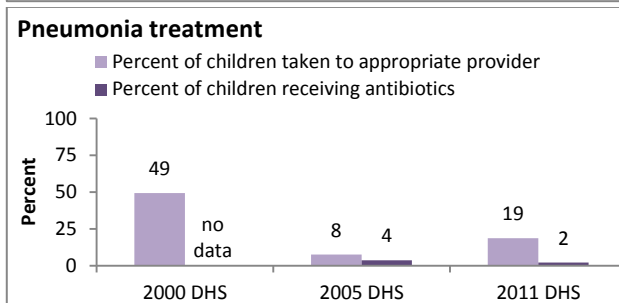
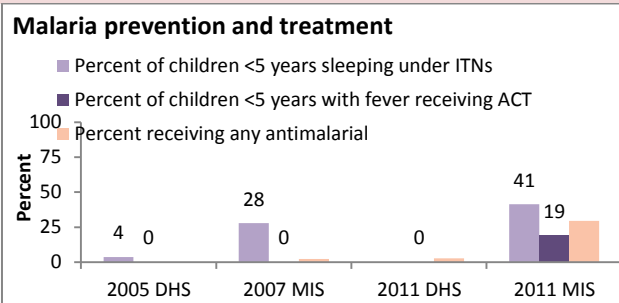
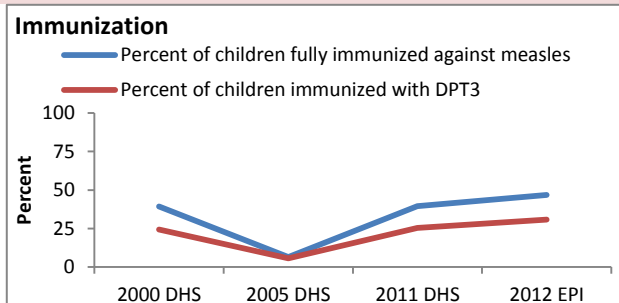
DEMOGRAPHICS

Total population	5,000,000	Annual births	255,000
Neonatal mortality rate (per 1000 live births)	34	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	9000	Maternal deaths	2000
Under-five mortality rate (per 1000 live births)	122	Total fertility rate	7.1
Under-five deaths	31,000	Average annual rate of U5MR reduction, 2000-2011	3.8%

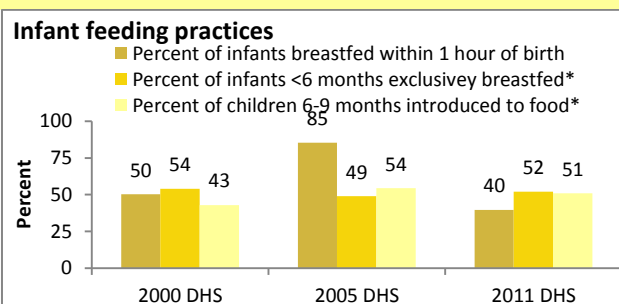
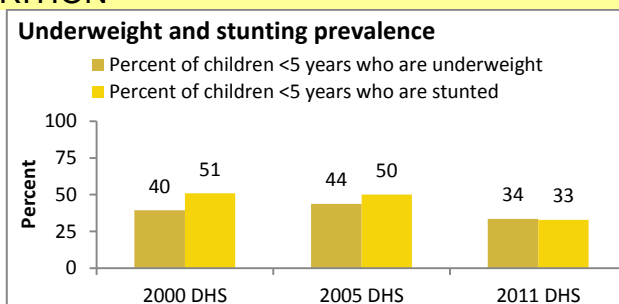
MATERNAL AND NEWBORN HEALTH



CHILD HEALTH



NUTRITION





Tigray

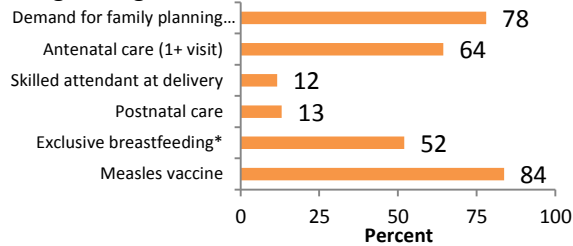
* Refers to national data, not region-specific

DEMOGRAPHICS

Total population	4,900,000	Annual births	162,000
Neonatal mortality rate (per 1000 live births)	44	Maternal mortality ratio (per 100,000 live births)	676*
Neonatal deaths	7,000	Maternal deaths	1,000
Under-five mortality rate (per 1000 live births)	85	Total fertility rate	4.6
Under-five deaths	14,000	Average annual rate of U5MR reduction, 2000-2011	6.5%

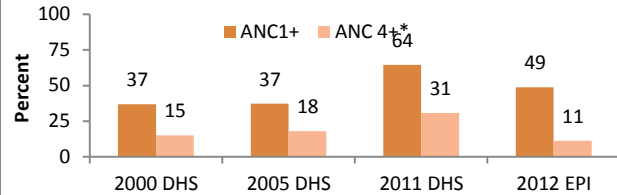
MATERNAL AND NEWBORN HEALTH

Coverage along the continuum of care



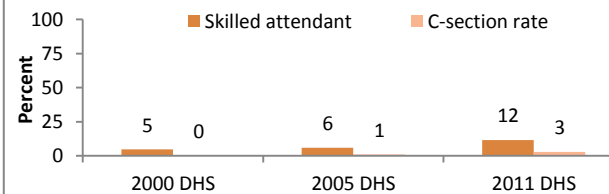
Antenatal care

Percent of women aged 15-49 years attended at least once and at least 4 times during pregnancy



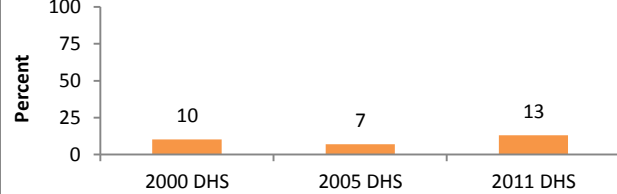
Care during childbirth

Percent of live births attended by skilled health personnel and c-section rate



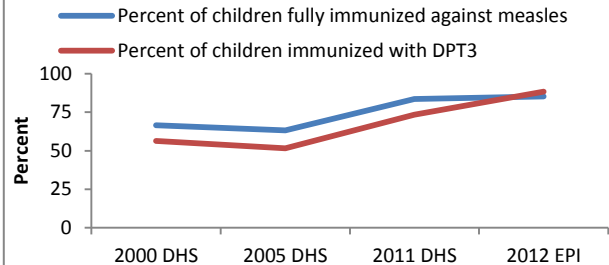
Postnatal care

Percent of women who received postnatal care within two days of childbirth

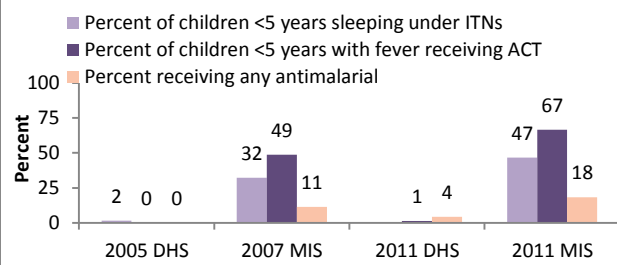


CHILD HEALTH

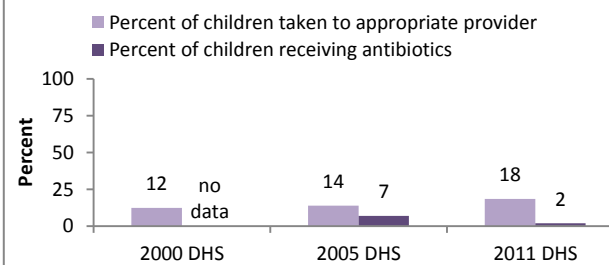
Immunization



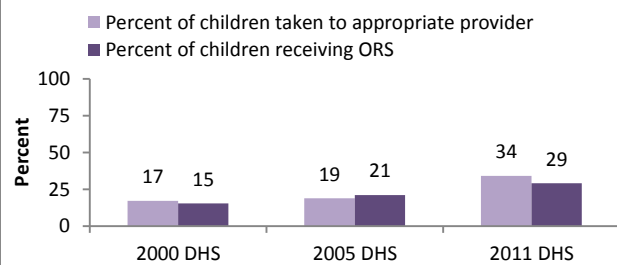
Malaria prevention and treatment



Pneumonia treatment

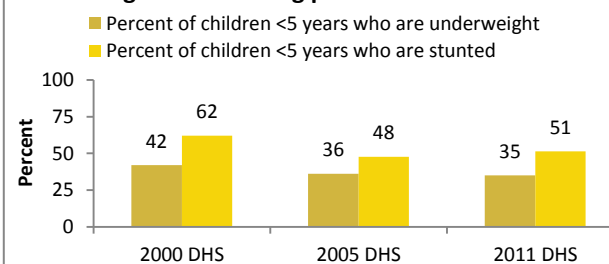


Diarrhoea treatment



NUTRITION

Underweight and stunting prevalence



Infant feeding practices

