

LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



Marchant, T (2013) Maternal and newborn health care. Baseline findings from Ethiopia. Interactions between families and frontline workers (their frequency, quality, and equity), and coverage of interventions for mothers and newborns. Project Report.

Downloaded from: <http://researchonline.lshtm.ac.uk/1126640/>

DOI:

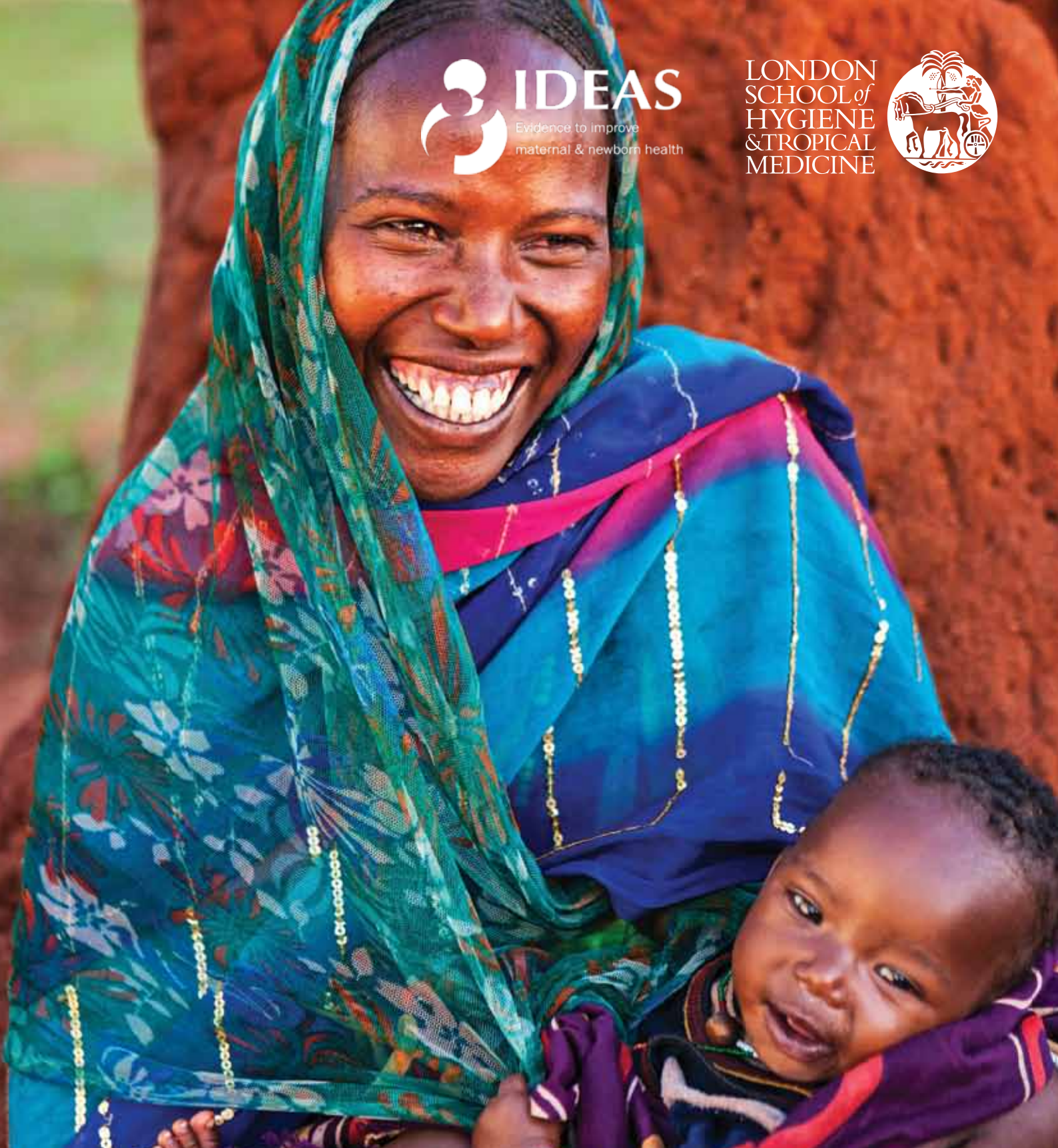
Usage Guidelines

Please refer to usage guidelines at <http://researchonline.lshtm.ac.uk/policies.html> or alternatively contact researchonline@lshtm.ac.uk.

Available under license: <http://creativecommons.org/licenses/by/2.5/>



LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



Maternal and newborn health care

Baseline findings from Ethiopia, June 2013

Interactions between families and frontline workers (their frequency, quality, and equity), and coverage of interventions for mothers and newborns

Prepared by **Dr Tanya Marchant** on behalf of the IDEAS team

This publication was produced by the IDEAS project led by Dr Joanna Schellenberg at the London School of Hygiene & Tropical Medicine.

This report is one of three country-specific reports and is based on research findings from Ethiopia.

Acknowledgements

This publication was produced by the IDEAS project led by Dr. Joanna Schellenberg at the London School of Hygiene & Tropical Medicine.

The IDEAS team wishes to acknowledge the work of JaRco Consulting, Ethiopia who implemented this baseline survey, and the cooperation of the Bill & Melinda Gates Foundation grantees in Ethiopia throughout the development and implementation process. We are grateful to the Regional officials in Ethiopia who provided support to the survey implementation, and to all households, facilities and individuals surveyed. We also thank Dr Chris Grundy (LSHTM) for assistance in manipulating GIS information, and Professor Oona Campbell (LSHTM) for review of an early draft.

Funded by the Bill & Melinda Gates Foundation

Coordination of publication by Agnes Becker

Copyright London School of Hygiene & Tropical Medicine

w: ideas.lshtm.ac.uk

Cover image © iStockphoto

Images right

Top: Children farming, Zuqala, Ethiopia. © Dr Neil Spicer

Middle: Outskirts of Lalibla. © Tania Ghosh

Bottom: Mother and child, Amhara region, Ethiopia.

© Mihretab Salasibew



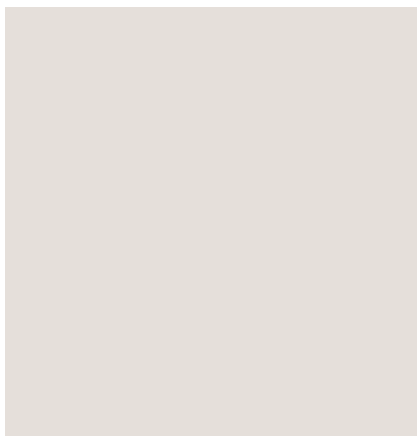
ISBN – 978 0 902657 95 X



Table of Contents

EXECUTIVE SUMMARY	5	PREGNANCY CARE	25
INTRODUCTION AND BACKGROUND	9	<ul style="list-style-type: none"> • Frequency of pregnancy care interactions • Quality of pregnancy care interactions • Coverage of pregnancy care critical interventions • Triangulation of data sources on pregnancy care 	<ul style="list-style-type: none"> 25 28 29 30
<ul style="list-style-type: none"> • Maternal and newborn health profile in Ethiopia • The context of this investigation • Enhancing interactions in Ethiopia • Organisation of survey findings 	<ul style="list-style-type: none"> 9 9 10 12 	INTRA-PARTUM CARE	31
METHODOLOGY	13	<ul style="list-style-type: none"> • Frequency of intra-partum care interactions • Quality of intra-partum care interactions • Coverage of intra-partum care interventions • Triangulation of data sources on intra-partum care 	<ul style="list-style-type: none"> 31 32 34 37
<ul style="list-style-type: none"> • Timeline • Survey modules • Sample size and selection • Survey implementation • Data management and analysis • Research ethics 	<ul style="list-style-type: none"> 13 13 14 14 15 15 	POST-PARTUM CARE	39
CHARACTERISTICS	17	<ul style="list-style-type: none"> • Frequency of post-partum care interactions • Quality of post-partum care interactions • Coverage of post-partum care interventions 	<ul style="list-style-type: none"> 39 40 40
Characteristics of the primary level health facilities surveyed	17	POST-NATAL CARE	41
<ul style="list-style-type: none"> • Sample selection and maternal and newborn health services provided • Infrastructure and availability of basic equipment and supplies in primary health facilities • Staff employed and at work in primary health facilities • Supervision at health facilities 	<ul style="list-style-type: none"> 17 17 20 20 	<ul style="list-style-type: none"> • Frequency of post-natal care interactions • Quality of post-natal care interactions • Coverage of post-natal care interventions • Triangulation of data sources on post-natal care 	<ul style="list-style-type: none"> 41 41 43 45
Characteristics of frontline workers interviewed	21	FRONTLINE WORKER CONTACT WITH FAMILIES	47
<ul style="list-style-type: none"> • Sample selection • Services provided by frontline workers • Training and supervision of frontline workers 	<ul style="list-style-type: none"> 21 21 21 	DISCUSSION	49
Characteristics of households and women interviewed	23	ABBREVIATIONS AND ACRONYMS	51
<ul style="list-style-type: none"> • Sample selection • Equity measures • Characteristics of individuals interviewed 	<ul style="list-style-type: none"> 23 23 23 	ANNEX	52
		<ul style="list-style-type: none"> • Annex 1: Critical interventions for mothers and newborns • Annex 2: Indicators for enhanced interactions (more and better) between families and frontline workers across the continuum of care • Annex 3: Routine obstetric and newborn signal functions for all mothers and babies 	<ul style="list-style-type: none"> 52 53 55

Executive summary



The aim of the IDEAS baseline study was to gather information about the frequency, quality, and equity of interactions that women have with frontline workers during pregnancy, delivery, and in the first 28 days after birth, and to estimate the coverage of life saving interventions that frontline workers are able to deliver to mothers and newborns.

Photo above: Blue Nile river.
© Tania Ghosh

In the context of Ethiopia, frontline workers include the Health Development Army, Community Health Promoters and Traditional Birth Attendants working in communities, Health Extension Workers working at health posts and in communities, and nurses, midwives and doctors working in primary health centres.

The findings represent a descriptive analysis of interactions and intervention coverage along the continuum of care. At least two years after baseline, an endline survey will be carried out to investigate the extent to which innovations implemented in the study area that aim to enhance family and frontline worker interactions (by making them more frequent, better quality, and more equitable) result in measurable increases in intervention coverage.

This investigation was carried out

in the context of the Bill & Melinda Gates Foundation funding strategy to support actions to improve maternal and newborn health care in Ethiopia. In the baseline study area one such grant was active at the time of writing in May 2013, the Last Ten Kilometres grant (L10K), run by John Snow Incorporated and funded by the Bill & Melinda Gates Foundation. L10K works closely with the Government of Ethiopia to implement innovations that engage local communities in improving maternal, newborn and child health. The project works to enhance the interactions between Ethiopian families, communities and the Government of Ethiopia's Health Extension Workers, and to achieve sustainable reproductive, maternal, newborn and child health improvements at scale.

Data was collected in areas where

L10K is working (intervention areas), and from comparison areas. Intervention areas include 59 woreda (districts) spread over four regions (Tigray, Amhara, Oromia and Southern Nations, Nationalities and Peoples) where the project had previously only implemented its foundational 'Anchor' innovation. (Anchors being a team of community members who support the Health Development Army at community meetings and offer them continued assistance and encouragement). Since the baseline survey in May 2012, the L10K project has implemented new innovations across these 59 woreda. Comparison areas include the woreda in the same four regions where no foundation-funded maternal and newborn health innovations are implemented. The purpose of data collected from comparison areas was to estimate the magnitude of change in outcomes between baseline and endline using a 'difference-in-differences' approach.

A population-level household survey using cluster sampling (clusters defined as villages) segmented into groups of approximately 75 households) asked women details about any live births they had in the 12 months preceding survey. This data was linked to interviews with community based frontline workers, and staff at health posts and primary health centres who provide maternal and newborn health services to those households. Across the 40 intervention area clusters, 2118 households were surveyed and 2153 resident women aged 13-49 interviewed, of whom 277 had a recent live birth. From the same clusters, 166 frontline workers were interviewed and 81 facilities surveyed. Across the 40 comparison area clusters, 2176 households were surveyed and 2003 resident women aged 13-49 interviewed, of whom 256 had a recent live birth. From the same

clusters, 150 frontline workers were interviewed and 81 facilities surveyed.

This report presents baseline key findings on interactions and coverage of critical interventions from the intervention area.

Pregnancy care

Antenatal care in facilities and care provided by frontline workers in communities is described under the term 'pregnancy care'. Almost all pregnancy care was delivered at facilities rather than in the community.

Fifty-seven percent of women had at least one pregnancy care interaction and one in every five women (22%) had at least four pregnancy care interactions. Almost all women receiving any pregnancy care had attended a primary health centre at least once, and just three percent of women reported receiving any pregnancy care at home. Inequity was observed in the percent of women receiving at least four pregnancy care interactions by socio-economic status of households, coverage being 17% amongst women in the most poor households compared to 30% amongst women in the least poor households.

Most of the essential basic commodities for providing pregnancy care were widely available in the surveyed facilities, with some exceptions. Urine dipsticks to detect protein, and a watch or timing device, were frequently missing from both

health posts and primary health centres, and iron prophylaxis and tetanus toxoid vaccinations were also frequently missing from health posts. The absence of these items resulted in 12% of facilities surveyed having all the basic equipment needed for pregnancy care. These findings were consistent with the least frequently received medical components of pregnancy care: urine testing (12% of women), iron prophylaxis (19% of women) and tetanus toxoid protection (41% of women).

Fewer than 40% of frontline workers cited birth preparedness as an essential component of pregnancy care. Almost three quarters of women reported that they made some preparations for their delivery while still pregnant (predominantly food preparations), but fewer than 10% had identified a birth attendant or a facility, or transport to travel to that facility.

Intra-partum care

Fifteen percent of women delivered in a health facility (primary health centre or higher level) and 17% of women delivered in a health facility or a health post. Inequity was observed in the percent of women delivering in a health facility, being 5% amongst the most poor and 34% amongst the least poor women.

Sixteen percent of women reported having a skilled birth attendant, 15% had another cadre of frontline worker



This report presents baseline findings from intervention areas where projects work with the government to enhance interactions between families and frontline workers”

in attendance, while 68% of women reported having no frontline worker in attendance at birth. This large proportion of women delivering without a frontline worker in attendance considerably reduced the population level estimates of life saving interventions during delivery (prophylactic uterotonics and AMTSL). Just two percent of women in the household survey reported giving birth by caesarean section.

Many essential equipment items for intra-partum care had high availability in primary health centres, and the majority of birth attendants working in health centres reported that they had been able to prepare the essential consumable items needed to provide good quality basic intra-partum care at the last birth they attended. However there was a large difference between their access to uterotonics (over 90% had uterotonics available) and their administration of uterotonics at the last birth they attended (fewer than 40% said they administered a uterotonic).

Important items (blood pressure cuffs, fetal stethoscopes, oral thermometers, or infant weighting scales) were missing from approximately one quarter of health posts. And fewer health extension workers at health posts had been able to prepare all essential consumable items, fewer still amongst frontline workers working in the community (predominantly TBAs). For these cadres, uterotonics, disinfectant and eye ointment for the

newborn were frequently missing when attending births.

As a result of the large socio-economic inequality in skilled attendance at birth, inequalities were also apparent in coverage of life saving interventions. For example, a large difference was observed in use of gloves by the birth attendant by place of birth and by socio-economic status of households (being reported by 98% of women in the least poor households and just 11% of women in the most poor households).

Finally, there were large differences by cadre of frontline worker in knowledge of actions to take when attending a woman who begins to bleed heavily during labour. Over 70% of all cadres said that they would refer such a woman to the next level of care, but 72% of health staff in primary health centres compared to just 10% of health extension workers at health posts said that administration of a uterotonic was an appropriate action to take for a woman who bleeds heavily during delivery.

Post-partum care

Just eight percent of women in the household survey reported having any post-partum checks during the first month after birth, 60% of these checks being made by nurses or midwives, the remainder by health extension workers. Four percent of women had a health check within two days of birth, with large differences by place of birth (12%

amongst women who delivered in a health facility, 3% amongst women who delivered at home).

Further, post-partum checks lacked content, and just one percent of women interviewed had her breasts and extent of bleeding checked, plus received counselling on danger signs, use of family planning, and nutrition.

Post-natal care

Many life saving newborn care interventions occur at birth, including cord cutting and tying, immediate drying and wrapping, and immediate breastfeeding, while others depend on behaviours that take place in the first days after birth, such as not putting anything on the cord, exclusive breastfeeding for the first three days, and care seeking for danger signs (which may lead to a treatment intervention).

Three quarters of newborns had clean cord cutting and tying with no difference by place of birth, but just 43% of newborns had clean cord care in the days following birth, partly because of the practise of applying ointments to the cord after birth. There was no difference in immediate drying or wrapping by place of birth, but a large difference in delayed bathing with newborns born at home being bathed more quickly than newborns born in a facility. Just half of newborns were breastfed within one hour of birth, and almost all newborns were breastfed exclusively for the first three days of life – again with no difference in breastfeeding behaviour by place of birth. Ten percent of mothers reported that their newborn had at least one danger sign in the first month of life and approximately three quarters sought care outside the home for their sick newborn.



Three quarters of newborns had clean cord cutting and tying, but just 43% had clean cord care in the days following birth, partly because of the practise of applying ointments to the cord after birth.”

Similar to estimates of post-partum care, fewer than ten percent newborns had any post-natal care in the first month of life, and just four percent had a post-natal check in the two days. The quality of care received during post-natal checks was low, and no newborns in the sample received the five core components of good quality care (weighed, cord checked, caregiver counselling on breastfeeding, thermal care and danger signs).

Limitations

A number of limitations are present. First, survey data collection approaches to estimate the prevalence of behaviours in pregnancy, intra-partum and newborn periods may be susceptible both to recall error and to recall bias. We tried to limit recall error by only analysing data on births from the last 12 months in the household survey, and the last birth attended by frontline workers. Recall bias is harder to control (for example a frontline worker may report that she had used uterotonics at the last birth attended, even if she had not), but by triangulating data from different sources we have given more focus to findings that are both coherent and consistent, and we have highlighted areas where it was less clear. Second, estimating population level coverage of some intra-partum interventions is problematic: frontline workers cannot provide population level estimates where the majority of women have no skilled attendance at birth, and women cannot reliably answer questions about the drugs or medical interventions they received during labour. Therefore, for two intra-partum life saving interventions we have combined information



Photo above: © Pixeltheater

from frontline worker reports about behaviours with population level reports about attendance at birth. Finally, this report shows

binary associations: analysis that adjusts for education level, or age of women is planned for the next phase of work. ■

Overall, the survey results present a clear picture of maternal and newborn primary health care in the study area. Over half of women receive some pregnancy care. Although higher than previous estimates, the number of women having skilled attendance at birth was still low in 2012, and post-natal and post-partum care were largely absent. Inequalities in health care access were observed, with the poorest women receiving the least

care. Maternal and newborn health workers working in primary health facilities were relatively well prepared to deliver basic care, and their knowledge of appropriate care was high. Conversely, health extension workers working at sub-posts were less well prepared to deliver care across the continuum from pregnancy to newborn care, underlining the importance of the primary health care unit as a model for health care delivery. ■

Introduction and background



Maternal and newborn health profile in Ethiopia

The 2007 Ethiopian census estimated the national population size to be 74 million people living in nine regions, 550 woreda (districts) and approximately 12,000 kebele (sub-districts). In 2010 it was estimated that there are 9,000 maternal deaths per year in Ethiopia (maternal mortality ratio 350 deaths/100,000 live births (95% CI 370-1,200)¹, with one woman in 67 dying of maternal complications. Neonatal mortality in the county is also high with an estimated 82,000 neonatal deaths per year, translating to 31 deaths in the first 28 days of life per 1,000 live births.²

Photo above: Addis Ababa, Ethiopia.
© Dr Neil Spicer

The context of this investigation

The work fits into a broad portfolio of investigation by the IDEAS project (Informed Decisions for Actions in maternal and newborn health) <http://ideas.lshtm.ac.uk/>, based at the London School of Hygiene and Tropical Medicine and funded by the Bill & Melinda Gates Foundation. The foundation has developed a Theory of Change that shapes its investments to improve the survival outcomes of mothers and newborn (figure 1). This Theory of Change supposes that in order to reduce

mortality, the coverage of interventions that are known to save lives (critical interventions, see Annex 1) must be increased, and in order to increase coverage of interventions the interactions between families and the frontline workers who can deliver interventions must be enhanced (in that they occur more often, are better quality, are equitably distributed, and are cost-effective to implement, see Annex 2 for a list of indicators for enhanced interactions). To realise these changes the foundation supports innovations that aim to enhance interactions between families and frontline workers in three high mortality geographies: North-Eastern Nigeria, Ethiopia, and Uttar Pradesh, India.

In areas where projects funded by the foundation are working to enhance interactions between families and frontline workers, the IDEAS project is investigating whether and how these projects are able to enhance interactions, and whether the coverage of critical interventions increases as a result. In doing so, IDEAS carried out a baseline survey in households, health facilities, and frontline workers across these three geographies in 2012, and will repeat this survey after at least two



In areas where projects are working to enhance interactions, the IDEAS project is investigating whether and how interactions are enhanced, and whether the coverage of critical interventions increases as a result.”

years of implementation by foundation funded projects. These quantitative data will be supplemented by qualitative data collected around the time of the endline survey.

This report describes baseline results from intervention areas in Ethiopia.

Enhancing interactions in Ethiopia

Interactions between families and frontline workers in Ethiopia occur at home, at health posts, and at primary health centres, coordinated through the Primary Health Care Unit (PHCU). The PHCU includes (a) service delivery in communities by health extension workers (HEW) who also supervise community health volunteer cadres (health development army (HDA) and community health promoters (CHP)); (b)

service delivery at five health posts, each staffed by HEWs; and (c) service delivery at one primary health centre, the lead of the PHCU. There are approximately four or five PHCUs per woreda.

Health staff at **primary health centres** provide basic routine preventive and curative care to the population, including services across the continuum of care from pregnancy to newborn.

¹ Maternal Mortality: 1990 to 2010. WHO, UNICEF, UNFPA and The World Bank estimates. Available at http://whqlibdoc.who.int/publications/2012/9789241503631_eng.pdf (last accessed 15/3/13)

² Inter-agency Group for Child Mortality Estimation: 2012. WHO, UNICEF, UNFPA, and the World Bank. Available at http://www.who.int/healthinfo/statistics/mortality_child/en/ (last accessed 15/3/13)

Figure 1 – Bill & Melinda Gates Foundation Theory of Change to improve maternal and newborn survival

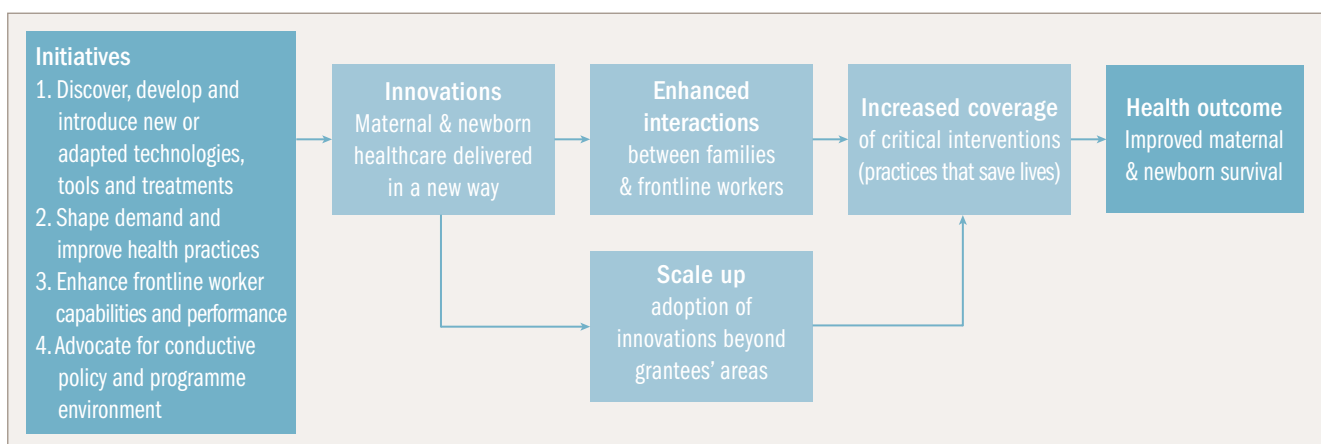




Photo above: Health post, rural Ethiopia. © Dr Neil Spicer

Photo above right: Mother with child, Ethiopia. © Mihretab Salasibew



Health Extension Workers (HEW), working at **sub-posts** also provide basic routine preventive and curative care, in collaboration with primary health centres. Further, they coordinate the community level frontline worker volunteers (Health Development Army (HDA) and Community Health Promoters (CHP) to target all community members with health promotion messages covering three areas of care (1) Hygiene and Environmental Sanitation, (2) Disease Prevention and Control, (3) Family Health Services (including maternal and newborn health). Traditional Birth Attendants (TBA) and previous cadres of volunteer are now predominantly incorporated into this system.

In communities, pregnant women interact with members of the Health Development Army and the Community Health Promoters and receive information about birth preparedness, danger signs, and care seeking during pregnancy. These frontline workers also attempt to link pregnant women with the Health Extension Worker at the nearest health post; women with danger signs should be referred to higher levels of facility. At the time of writing, home births are the norm in Ethiopia, but throughout pregnancy

women are encouraged to prepare to give birth at the health post or higher level of facility. After delivery all new mothers and their infants should receive a visit at home from frontline workers within 24 hours of birth, and on the fourth and seventh day after birth. During these interactions, information about danger signs, feeding, immunisations, and care seeking is given.

The IDEAS investigation into enhanced interactions and coverage of critical interventions in Ethiopia is located in the context of foundation-funded innovations implemented by the Last Ten Kilometres project (L10K).

L10K began its **first phase of activity** in October 2007 in 115 woreda spread over 4 regions: Amhara, Oromia, Southern Nations, Nationalities and Peoples (SNNP), and Tigray. During the first phase of L10K activity, 59 woreda were exposed only to the foundational “Anchor” innovation. “Anchors” are teams of community members who support the HDA at community meetings and offer them continued assistance and encouragement. This innovation was designed to enhance the Government of Ethiopia initiative to embed the HDA

into existing community institutions. The remaining 56 woreda with L10K activity were exposed to other combinations of innovation that were tested for impacts in maternal and newborn health.

During the **L10K supplemental phase of activity**, from 2012 onwards, L10K innovations tested in other woreda will be rolled out in the 59 woreda exposed only to the “Anchor” innovation. These include (but are not restricted to): (a) “community-based data for decision making” when HEW work with their HDA to map households and monitor access to maternal and newborn health services and prioritise efforts e.g. for hard-to-reach families; (b) “non-financial incentives for the HDA” (e.g. badges, certificates) as recognition of good service to motivate

members to increase the number, completeness and timeliness of interactions with families of pregnant women and new mothers and with other community members; (c) “HDA training” by supporting HEWs to train volunteers in kebeles, guided by a handbook and using communication materials; and (d) “participatory community quality improvement” which works through PHCUs to encourage partnership between communities and service providers and to share responsibility for the quality of maternal and newborn health care.

Further detail about the work of the foundation funded grantees in Ethiopia can be found at the IDEAS website: <http://ideas.lshtm.ac.uk/>

Organisation of survey findings

The report presents data collected in 2012. The results are organised in chapters for each stage along the continuum of care: pregnancy, intra-partum, post-partum, and post-natal periods. Within each chapter, the number, quality, and equity of interactions between families and frontline workers are presented, and the coverage of critical interventions that save lives at each stage. A summary paragraph is included for each stage to link data from households, primary care facilities, and frontline workers where possible.

This forms the basis for meeting one of the IDEAS’ goals which is to investigate whether foundation funded projects that aim to enhance interventions do lead to more frequent, better quality, and more equitable interactions between families and frontline workers, and whether the coverage of critical interventions for mothers and newborns increase as a result. ■

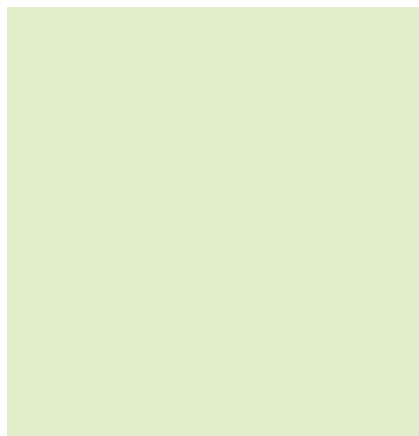


This report presents baseline results from intervention areas in Ethiopia.”



Photo left: Horse and cart ambulance, Amhara Region. © JaRco Consulting

Methodology



The IDEAS baseline survey was conducted May-June 2012 and interviewed women in households, the health posts and primary health centres serving those households, and the frontline workers working there.”

Timeline

The IDEAS baseline survey was conducted May – June 2012. It reports findings from household interviews with women about their health care experiences in the 12 months preceding survey (May 2011 – April 2012, household survey), from interviews with frontline workers about their training and supervision in the 12 months preceding survey (May 2011 – April 2012), and the last birth they attended (frontline worker survey), and from a survey of primary level health facilities summarising readiness to provide maternal and newborn health care on the day of survey (May – June 2012).

Survey modules

The **household survey** comprised of three modules. (1) A household module asked all household heads about characteristics of the household, ownership of commodities, and registered all normally resident people in the household. (2) A women’s module asked all women aged 13-49 years and normally resident in the household about the health care available to them, their recent contact

with frontline workers, and their birth history in the two years preceding the survey. (3) A mother’s module asked all women who reported a birth in the last two years (identified in the women’s module) a detailed set of questions about their contact with health services across the continuum of care from pregnancy to post-natal care.

The **health post and primary health centre survey** comprised of four sections. (1) An inventory of equipment and supplies available and functioning on the day of survey. (2) An inventory of staff employed at the facility, their cadre, training and whether they were present on the day of survey. (3) An interview with the in-charge of the facility about the services available at that facility, and about recent supervision visits they had received. (4) Data extraction from facility registers recorded the number and outcomes of all births at the facility during the previous six months.

The **frontline worker survey** comprised of four sections. (1) The services provided by the frontline worker and the amount of time they typically spend on each service. (2) The training and supervision the frontline worker had received to provide those services. (3) The workload of the frontline worker



Photo left: Waiting for a bus under a tree, Zuqala, Ethiopia. © Dr Neil Spicer

³ DHS Ethiopia 2011

during the month preceding survey, and their recall of activities that took place during the last delivery they attended. (4) An interview comprising unprompted questions about knowledge of appropriate care for mothers and newborns.

The content of each survey module or section was informed by existing large scale survey tools such as the Demographic and Health Surveys, the Service Provision Assessment, Averting Maternal Death and Disability, and Safe Motherhood. All questionnaires were extensively pre-tested prior to survey implementation.

Sample size and selection

A map of Ethiopia showing the sampled households, facilities and frontline workers interviewed in intervention areas is provided in figure 2. The baseline survey sampled 40 intervention clusters from the 59 woreda (districts) over four regions (Amhara, SNNP, Oromia, Tigray) where the L10K project previously implemented its “Anchor” innovation (see Enhancing interactions in Ethiopia), and where L10K plan the implementation of new innovations between 2012 and 2014. We also

sampled and surveyed 40 comparison clusters from woreda in these four regions where no foundation-funded maternal and newborn health innovations are implemented. The purpose of data collected from comparison areas is to estimate the magnitude of change in outcomes between baseline and endline using a ‘difference-in-differences’ approach.

Multi-stage sampling was applied. Before field work began, all kebele (sub-districts) within the eligible woreda were listed and 40 kebele selected using probability proportional to size of the kebele. During field work, survey supervisors visited officials at each selected woreda and kebele and listed all the villages in the selected kebele, then selected one villages using simple random sampling. At the selected village, household listing was carried out by the field team. In a village with more than 75 households, standard segmentation methods were applied to define a household cluster of more than 50 households and no more than 75 households: all households in the selected segment were surveyed. In a village with fewer than 75 households, all households were surveyed. (Note that the resulting average cluster size was 54 households (range 50-69). In addition, the health

post and the primary health centre assigned to provide primary care to those households were visited, and any frontline workers providing maternal and newborn health services to the households were identified and interviewed. Finally, the nearest referral facility was also visited for record review and data extraction on births and birth outcomes.

The minimum target number of households per cluster was set at 50 so that a minimum total number of 2000 households would be visited. In Ethiopia, where the total fertility rate was estimated to be 4.3³, this number of households would result in interviews with a minimum of 200 women with a live birth in the previous 12 months (i.e. one in every ten households surveyed). This size of sample was sufficient to measure as statistically significant, and with 90% power, changes of 20 or fewer percentage points in a range of interaction and intervention coverage indicators across the continuum of care.

Survey implementation

The survey was implemented by JaRco Consulting, Ethiopia (www.jarrco.info). Facility and frontline worker questionnaires were written to handheld digital devices (Samsung model GT-S6102) using EpiCollect software. Household questionnaires were implemented on paper. All questions were written in Amharic and Oromifa and Tigrinya, depending on the region of implementation. Interviewers from Amhara, SNNP, Oromia and Tigray were recruited from



Photo above: Outskirts of Lalibela, Ethiopia. © Tania Ghosh

a pool of interviewers previously employed by JaRco. Ten survey teams were recruited, each comprised of one supervisor, four household interviewers, and one facility and frontline worker interviewer who was medically trained. Each team aimed to complete each cluster in two days.

The survey teams were trained in-house for five days to familiarise themselves with the questionnaires and procedures, followed by a full pilot (including a review of data downloads) in two clusters (not included in the final 40 cluster survey). Each team member carried a survey manual through-out the field work.

In addition to pre-testing the questionnaires, training interviewers, and pilot testing all protocols, during field work supervisors carried out at least three re-interviews a day and observed each interviewer in his or her team each day of data collection. These re-interviews and observations were used as a means of providing feedback to interviewers, ensuring consistency between interviewers, and continuously improving the standard of work. Finally, the data manager and

survey supervisor from JaRco coordinated visits to the survey teams throughout the data collection period to provide support to team supervisors and to retrieve completed data forms.

Data management and analysis

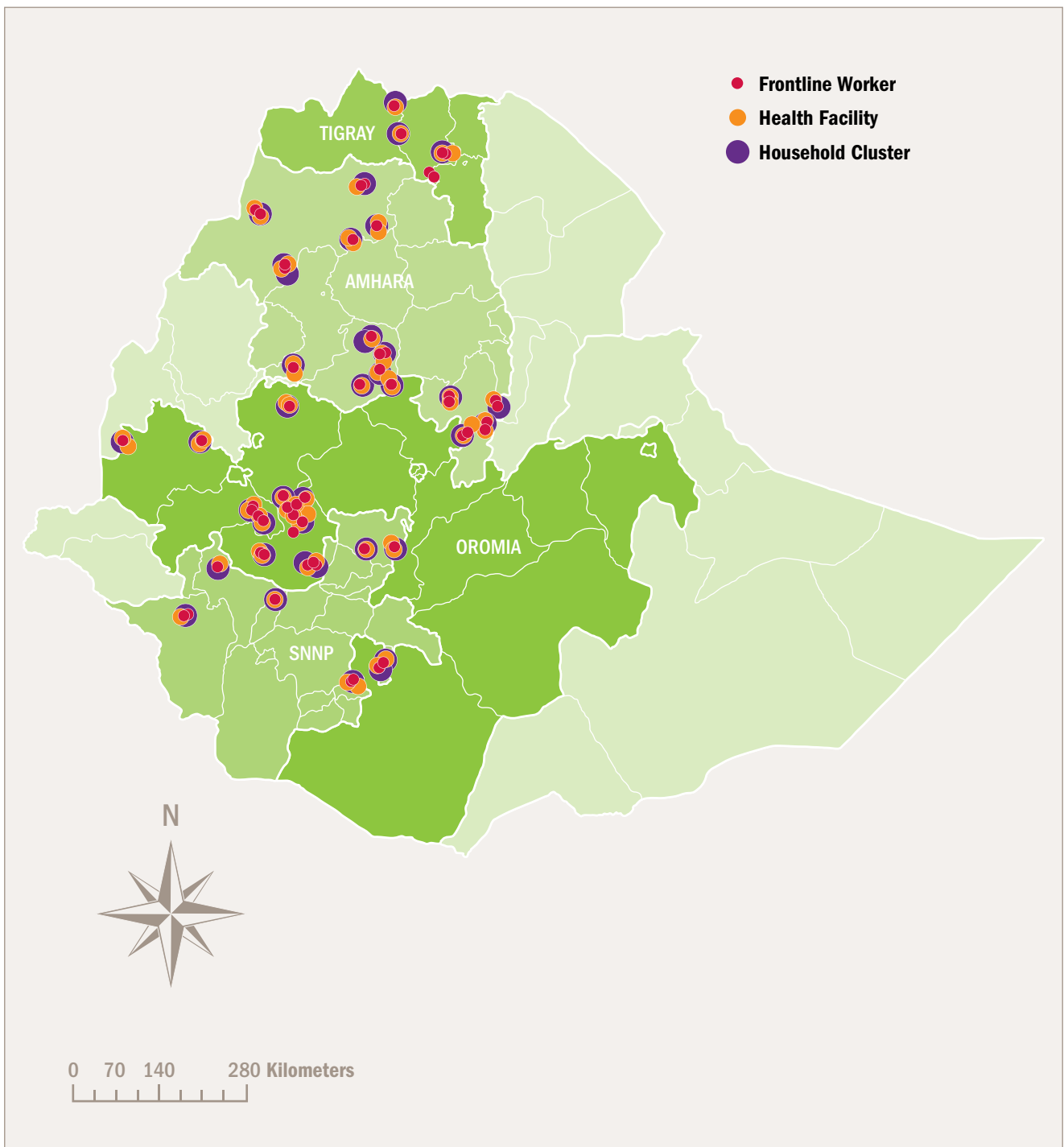
Every day, digital data (facility and frontline worker surveys) were synchronised from the interviewer devices to the supervisor's laptop: these daily downloads were then burned to a labelled and securely stored compact disk. In addition, when the supervisor had internet connectivity, data were uploaded from the laptop to a secure, dedicated server. Data collected on paper (household surveys) were checked for completeness by the team supervisor on the same evening as interview and any inconsistencies taken back to field the following day for clarification. Completed and checked paper questionnaires were collected at weekly intervals and returned to Addis Ababa by senior supervisors making visits to the field teams. These data were doubled entered and reconciled using CSPro software.

Analysis was carried out using STATA 12. Clustering was adjusted for using svy commands when tabulating single percentages or calculating means.

Research ethics

This work obtained National level support from the Ministry of Health in Ethiopia, and ethical approval from the Ministry of Science and Technology. At the Regional level, approval was granted by the Regional IRBs in Amhara, Oromia, SNNP, and Tigray. Ethical approval was also obtained from LSHTM (reference 6088). All respondents provided informed, voluntary written consent to be interviewed. ■

Figure 2 – Map of intervention area survey sample showing household cluster locations (purple dots), the location of the surveyed primary health centres or sub-posts assigned to household clusters (orange dots), and the location of interviewed frontline workers providing services to household clusters (red dots)



Characteristics

Characteristics of the sub-posts and primary health centres surveyed



Photo above: IDEAS staff visiting a health post, rural Ethiopia.

© Dr Neil Spicer

Sample selection and maternal and newborn health services provided

The intervention area facility survey visited 37 sub-posts and 41 primary health centres (PHCs) to conduct a survey of MNH service provision, and also visited 3 referral level facilities for record extraction on birth outcomes (many primary level health facilities shared a referral facility). All surveyed facilities were government led.

The number of facilities and number of deliveries they conduct is shown in table 1.

Most health posts and PHCs surveyed provided the full range of basic maternal and newborn health care services. Thirty eight of the 41 PHCs opened seven days per week, the remainder opened five days per week. Ten of the 37 health posts were open

seven days per week, 11 were open five days per week, 16 were open fewer than five days per week. In some facilities, the services routinely provided were not available on the day of survey (figure 3).

Infrastructure and availability of basic equipment and supplies in primary health facilities

There were some gaps in the basic infrastructure of health posts and PHCs (table 2). Around three-quarters of PHCs were connected to electricity, and approximately sixty percent had a steriliser, room providing physical privacy, running water supply, and a 24 hour light source. At health posts, fewer than ten percent were connected to electricity or had a 24 hour light

Table 1 – Facilities surveyed and number of deliveries recorded in the six months preceding survey

Facility type	N	Total number of deliveries in last six months	Mean number of deliveries per facility, per month	Percent of deliveries by caesarean section	Percent of deliveries ending in a live birth
Health posts	37	131	1	0	95.4
Primary health centres (PHC)	41	3260	13	0	97.6
Referral centres	3	708	39	5.0	100
All facilities	81	4099	8	0.8	97.9

Figure 3 – Services provided at health posts and primary health centres, and services available on the day of survey

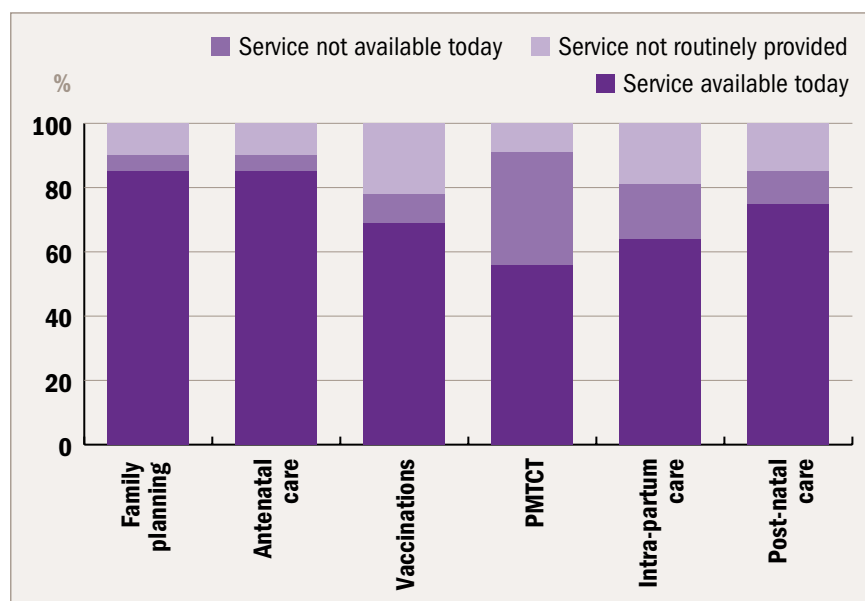


Table 2 – Infrastructure at health posts and PHCs

Item	Health post with item (N=37) % (95% CI)	PHC with item (N=41) % (95% CI)
Any means of telephone communication ¹	70% (53-83)	88% (73-95)
Toilet for facility users	68% (50-81)	98% (83-100)
Functional steriliser or stove	43% (28-60)	61% (45-75)
Functional fridge	27% (15-44)	95% (82-99)
Room providing physical privacy	14% (6-30)	63% (48-77)
Running water	11% (4-26)	61% (45-75)
Electricity supply ²	8% (3-23)	73% (57-85)
Motorised transport for referral	0	29% (17-45)
24 hr light source	3% (0-18)	59% (43-73)

¹ Personal phones of workers accounted for 96% of telephone communication availability at health posts, 50% at PHCs

² 5% of health posts and 63% of PHCs had a working electricity connection on the day of survey



Photo above: Mother and child, Amhara region, Ethiopia. © Mihretab Salasibew



Fewer than 10% of health posts were connected to electricity or had a 24 hour light source.”

Table 3 – Essential equipment and supplies to provide basic maternal and newborn health care at health posts and PHCs

Item	Health post with item (N=37) % (95% CI)	Primary level facilities with item (N=25) % (95% CI)	Item	Health post with item (N=37) % (95% CI)	Primary level facilities with item (N=25) % (95% CI)
General items for basic MNH			Diagnostics for MNH		
Single use syringes/needles	89% (74-96)	95% (82-99)	HIV rapid test kits*	69% (52-83)	93% (79-98)
Sharps container	89% (74-96)	98% (84-100)	Malaria rapid test kits	69% (52-83)	95% (82-99)
Stethoscope	86% (71-94)	98% (84-100)	Pregnancy test kit	14% (6-30)	88% (74-95)
Blood pressure cuff	78% (62-89)	95% (82-99)	Partographs	8% (3-23)	63% (48-77)
Fetal stethoscope	76% (59-87)	95% (82-99)	Urine dipstick	3% (0-18)	63% (48-77)
Thermometer	76% (59-87)	88% (74-95)	Haemoglobin test	0	58% (41-72)
Disposable gloves	73% (56-85)	93% (79-98)	Syphilis test kit	0	46% (32-62)
Infant weighing scale	73% (56-85)	95% (82-99)	Medications for MNH		
Sterile scissors or blade	70% (53-83)	98% (84-100)	Ferrous sulphate and folic acid	43% (28-60)	93% (79-98)
Disposable clamp/umbilical tie	46% (30-63)	93% (79-98)	Cotrimoxizole	36% (22-54)	98% (84-100)
Disinfectant	32% (19-50)	78% (63-88)	Oral antibiotics	27% (15-44)	98% (84-100)
Soap	32% (19-50)	78% (63-88)	Tetracycline/eye ointment	24% (12-39)	93% (78-98)
Needle holder	24% (13-41)	98% (84-100)	Local anaesthetics	14% (6-30)	93% (79-98)
Bag and mask for resuscitation	16% (7-33)	73% (57-85)	Sulphadoxine pyrimethamine	5% (1-20)	24% (12-39)
Waste receptacle with lid	14% (6-30)	61% (44-76)	Corticosteroids	3% (0-18)	51% (36-66)
Watch/timing device	11% (4-26)	17% (8-33)	Vitamin K	3% (0-18)	40% (26-56)
Disposable paper towels	5% (1-20)	15% (7-29)	Diazepam	3% (0-18)	63% (48-77)
Vacuum extractor	5% (1-20)	51% (36-66)	Uterotonic	3% (0-18)	95% (82-99)
Suction bulb for mucus extraction	5% (1-20)	39% (25-55)	IV metronidazole	0	28% (16-44)
Blanket for newborn	3% (0-18)	10% (4-24)	IV ampicillin	0	70% (54-83)
Suture material with needle	3% (0-18)	95% (82-99)	IV gentamycin	0	93% (79-98)
Phototherapy	3% (0-18)	10% (4-24)	Vaccinations for MNH		
IV fluids with infusion set	0	93% (79-98)	Oral Polio Vaccine (OPV)	50% (34-66)	93% (79-98)
Speculum	0	95% (82-99)	Tetanus toxoid vaccines	46% (30-63)	93% (79-98)
Manual vacuum aspirator	0	63% (48-77)	Bacille Calmette Guerin (BCG)	50% (34-66)	83% (67-92)
Baby warmer	0	15% (7-29)			
Oxygen	0	24% (12-39)			

*only 14/37 health posts did testing on site, and 37/41 PHCs

source, 11% had running water, and 43% had a functioning steriliser.

Equipment and supplies to provide basic maternal and newborn health care were checked for availability and functionality in the health posts and PHCs surveyed and are shown in table 3. The list of items recorded was synthesised from existing large-scale facility-based data collection tools including the Averting Maternal Disability and Death needs assessment¹, the Measure DHS Service Provision Assessment², and the WHO Safe Motherhood Needs Assessment³. Note that not all items are recommended for both levels of care.

Staff employed and at work in health posts and PHCs

At least one clinician was employed in 9% (95% CI 3-24) of health posts and in 68% (95% CI 51-81) of PHCs. At least one registered nurse or midwife was employed in 3% (95% CI 0-20) of health posts and 95% (95% CI 81-99) of PHCs. At least one HEW was employed at 100% of health posts. At least one assistant nurse was employed in 3% (95% CI 0-20) of health posts and in 30% (95% CI 17-46) of PHCs. At least one staff member trained in clean and safe delivery was present in 74%

(95% CI 57-86) of health posts, and in 68% (95% CI 51-80) of PHCs. At least one staff member trained in essential newborn care was present in 86% (95% CI 69-94) of health posts and 90% (95% CI 75-96) of PHCs.

Overall, 67% of all employed staff were at work on the day of survey, with the biggest absenteeism observed amongst clinicians (25% of those employed were at work), followed by registered nurses/midwives (55% at work), and health extension workers (56% at work), and assistant nurses (76% of whom were at work on the day of survey).

Supervision at health facilities

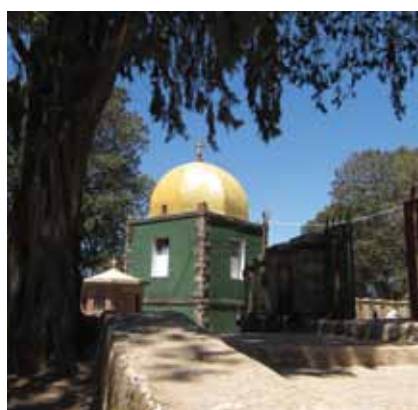
Eighty-one percent of health posts and 85% of PHCs had received a supervision visit in the six months preceding survey, median number of days since last supervision visit being 39 and 26 days respectively. At 60% of health posts the last supervision visit had been conducted by the woreda health team, 21% by project staff. At PHCs these figures were 54% and 29% respectively. Other frequently cited supervisor groups were Ministry of Health officials from the regional level. ■

- ¹ AMDD. EmONC Needs Assessment. Available from: <http://www.amddprogram.org/d/content/needs-assessments>
- ² Measure-DHS. SPA overview. <http://www.measuredhs.com/about-surveys/spa/start.cfm>.
- ³ WHO. Safe Motherhood. Needs Assessment, 2001; Available from: http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/rht_msm_96_18/en/index.html

Photo below: Addis Ababa, Ethiopia.

© Dr Neil Spicer

Photo below left: Addis Ababa, Ethiopia. © Dr Neil Spicer



Characteristics

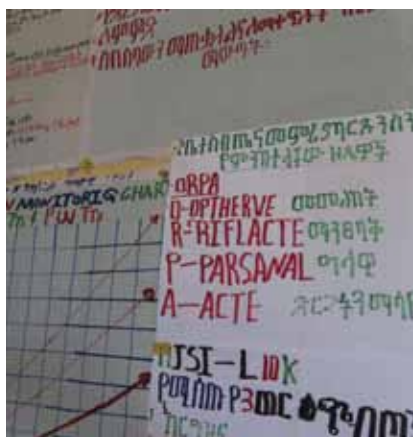
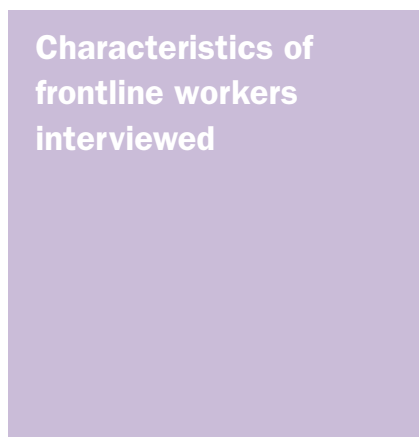


Photo above: Health post record keeping made highly visible.

© Dr Neil Spicer

Photo above right: Village scene, Amhara Region. © Dr Neil Spicer

Sample selection

A total of 166 frontline workers providing maternal and newborn care were interviewed across the 40 intervention clusters (table 4): 40 nurses working at PHCs, 42 HEWs working at health posts, and 84 community volunteers (including 44 CHP, 33 HDA and seven trained TBA).

Services provided by frontline workers

Frontline workers were asked to estimate the amount of time they spend on the services they provide in a typical week. Looking at their perceived relative distribution of time

it was observed that each cadre of frontline worker estimated that most of their time was spent on disease management (including pneumonia, diarrhoea, and malaria), essential newborn care (including making home visits), and promoting water and sanitation issues (figures 4-6 below).

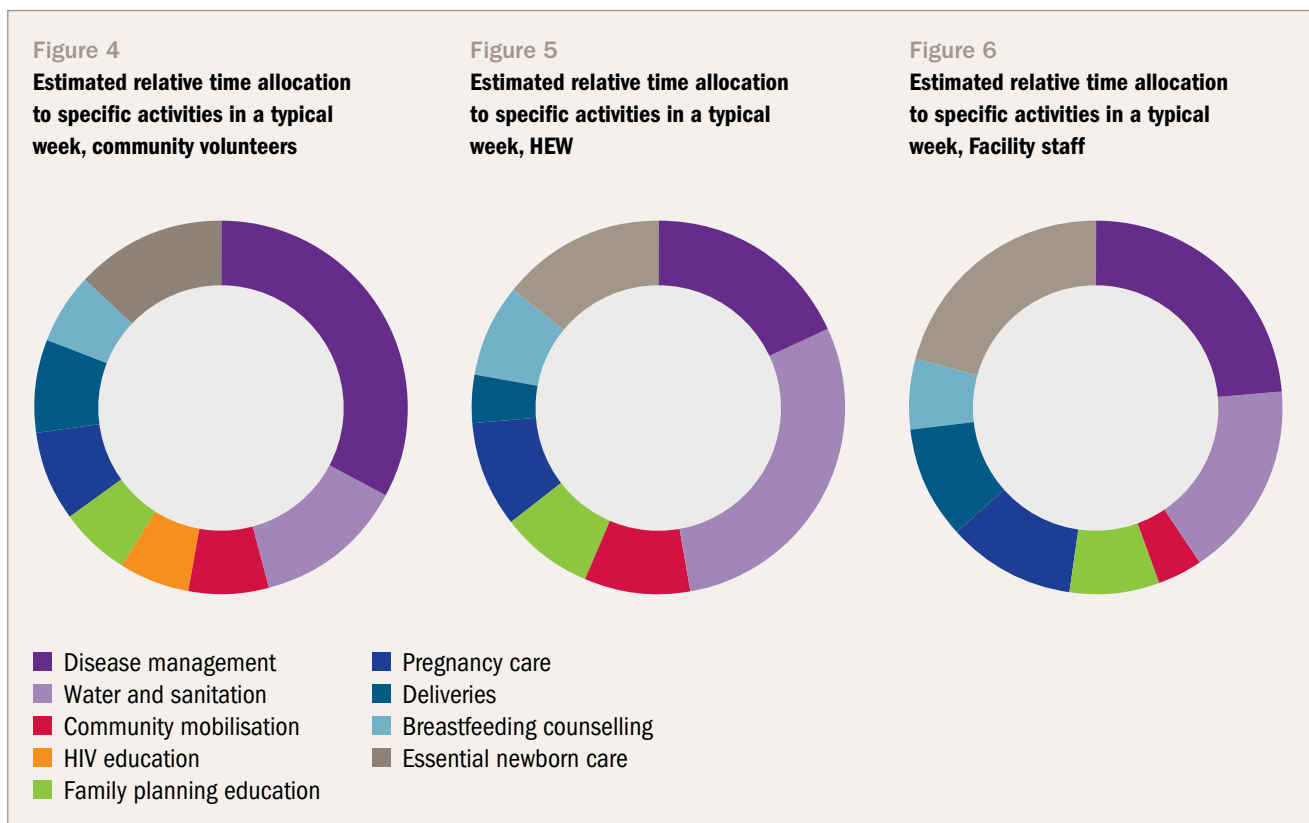
Training and supervision of frontline workers

One third of community volunteers (30% (95% CI 19-43), 81% of HEW (95% CI 66-90) and 38% of health workers at PHCs (95% CI 23-54) had received training in maternal and newborn health topics in the 12 months preceding survey, training

Table 4 – Frontline workers interviewed who provide maternal and newborn health services to the selected household clusters and their volume of work in the last month, by cadre

Frontline worker type	N	Years worked (median)	Number of women seen for pregnancy care in last month (median)	Number of deliveries attended in last month (median)*	Number of post partum visits in last month (median)	Number of post natal visits in last month (median)
PHC staff	40	3 years	33 (IQR 9-67)	4 (IQR 2-14)	5 (IQR 2-15)	4 (IQR 1-13)
HEW at HP	42	6 years	9 (IQR 5-21)	1 (IQR 0-2)	3 (IQR 1-7)	2.5 (IQR 0-6)
Community Volunteers	84	3 years	1 (IQR 0-2)	0 (IQR 0-0.5)	0 (IQR 0-0)	0 (IQR 0-0)

* 7 of 84 community volunteers, 31 of 42 HEW, and 40/40 PHC staff had ever attended a delivery



being conducted by Woreda and PHCU teams, and by a large number of external projects, including the L10K project.

Sixty five percent of the frontline workers had their work supervised in the 12 months preceding survey. For all frontline workers together, the content of the last supervision visit had included providing feedback on work (94% of last supervision visits), observing client interaction (91%), record keeping (83%), checking equipment and delivering supplies (71%), and conducting accompanied household visits (59% of last supervision visits). ■



Photo right: Children working on a farm, Zuzala, Ethiopia. © Dr Neil Spicer

Characteristics



Characteristics of households and women interviewed

Photo above: Fisherman on a boat in Awassa, Ethiopia. © Anne Narayan.

Sample selection

A total of 2118 household heads from the 40 clusters were invited to participate in the survey, 2106 of whom agreed. The average household size was 4.5 people. The total number of women aged 13-49 years living in surveyed households was 2153, 90% of whom (n=1934) were interviewed in detail about their recent fertility history. Amongst these 1934 women, 277 (14%) had a live birth in the 12 months preceding survey and completed a detailed module about that birth.

Equity measures

Socio-economic status of households

The household module asked questions about household building materials (walls, roof, floor), utilities (water, sanitation, cooking fuel, electricity),

and assets (radio, bicycle, fridge, television, mobile phone, bed, kerosene or pressure lamp, wrist watch).

In order to examine the relationship between key coverage outcomes and socioeconomic status, an index of socioeconomic status was constructed for each household using principal components analysis. The continuous index variable produced by the principal components analysis was divided into five equal sized groups (quintiles) of households from quintile 1 (most poor) to quintile 5 (least poor). Characteristics of households in the most poor and the least poor quintiles are demonstrated in figure 7.

Characteristics of individuals interviewed

The characteristics of individuals interviewed in the households are shown in Table 5. ■

Figure 7 – Characteristics of building materials and ownership of assets in the most poor (Q1) and the least poor (Q5) households surveyed

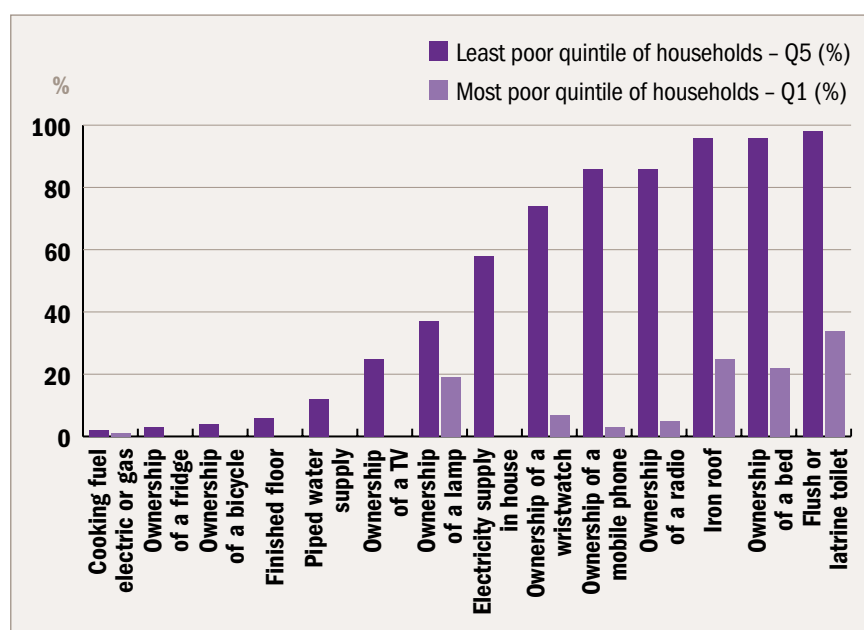


Table 5 – Characteristics of household survey respondents

Characteristic	Household heads N=2106	Women aged 13-49 yrs N=1934	Women with a live birth in the 12 months preceding survey N=277
Region			
Amhara	37%	38%	38%
Oromia	36%	37%	37%
SNNP	15%	15%	15%
Tigray	12%	12%	10%
Ethnicity			
Oromo	41%	41%	44%
Amehara	35%	35%	35%
Tigray	11%	11%	9%
Others	13%	13%	12%
Religion			
Muslim	31%	30%	35%
Orthodox	52%	53%	50%
Protestant	17%	17%	14%
Others	0%	0.5%	1%

Characteristic	Household heads N=2106	Women aged 13-49 yrs N=1934	Women with a live birth in the 12 months preceding survey N=277
Socio-economic status			
Q1 (most poor)	20%	17%	20%
Q2	20%	18%	19%
Q3	20%	19%	21%
Q4	20%	22%	20%
Q5 (least poor)	20%	24%	20%
Marital status			
Currently married	52%	63%	94%
Education level			
None	44%	48%	64%
Primary	40%	35%	27%
Secondary	16%	16%	9%

Pregnancy Care

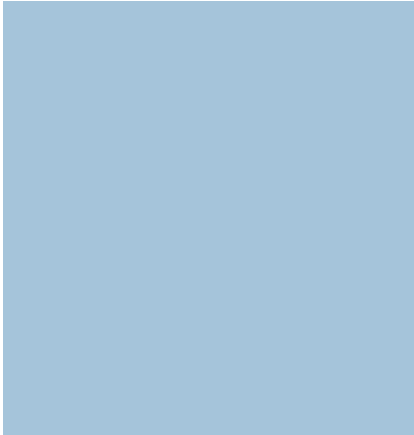


Photo above: Health extension worker, Amhara Region. © Dr Neil Spicer
Photo above right: Outside a primary health centre, Amhara Region © JaRco

This chapter presents results on the frequency of interactions, the quality of those interactions, and the coverage of critical interventions. Interaction frequency and intervention coverage are also broken down by socio-economic status of households.

Inequities in frequency of interactions

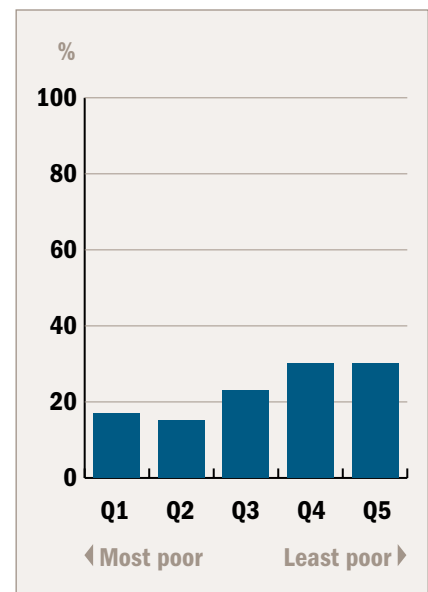
Inequity was observed in the percent of women who had at least four pregnancy care interactions, coverage being 76% higher amongst women from the least poor households compared to the most poor (17% vs 30%, figure 8).

Frequency of pregnancy care interactions

Antenatal care provided in health facilities is described under the label ‘pregnancy care’ which includes care delivered to pregnant women by different cadres of frontline worker.

On average, women in the intervention study area of Ethiopia who had a live birth in the 12 months preceding survey had 1.9 (95% CI 1.4-2.4) pregnancy care interactions during the pregnancy leading to that live birth. Overall, 57% (95% CI 46-68) had at least one pregnancy care interaction and 22% (95% CI 14-33) had four or more interactions. Fifty five percent (95% CI 43-66) attended a PHC for pregnancy care at least once. Thirty-two percent of women (95% CI 22-45) saw a doctor or a nurse at least once during pregnancy. Just three percent of women (95% CI 2-6) had any home visits for pregnancy care.

Figure 8 – Percent of women who had at least four pregnancy care interactions, by socio-economic status of household



Box 1 – Perspectives of quality of pregnancy care and their justification

	Quality perspective	Justification
1	Women's knowledge of danger signs in pregnancy ¹	Frontline workers aim to counsel women about danger signs: retention of this knowledge is one perspective of the quality of that counselling
2	Women's preparations for delivery ¹	Frontline workers aim to counsel women about the preparations needed for a safe delivery: taking action on this is one perspective of the quality of that counselling
3	Median gestation at first pregnancy interaction ¹	High quality care should encourage pregnancy visits to be made in a timely way, usually recommended for first visit to occur before 16 weeks of gestation
4	Components of pregnancy care by the end of pregnancy ¹	Women come into contact with a range of frontline worker cadres throughout pregnancy, but by the end of pregnancy all women should have had a core set of pregnancy health care (weight, height and blood pressure measured, urine and blood tested, counselled on birth preparedness, danger signs, and breastfeeding)
5	Frontline worker knowledge of the elements of focussed pregnancy care ²	The knowledge that frontline workers have about recommended pregnancy care could influence the quality of care that they are able to deliver
6	Availability of essential commodities to provide basic pregnancy care at primary health facilities ³	The quality of pregnancy care delivered to women is influenced by the availability of essential commodities to provide that care (stethoscope, blood pressure cuff, fetal stethoscope thermometer, adult scale, timing device, disposable gloves, urine protein test kit, single use syringes, tetanus toxoid vaccines, ferrous/folate)

¹ Measured during the household survey: women with a live birth in the 12 months prior to survey

² Measured during the frontline worker survey: frontline workers who have pregnancy care interactions with women in the household survey location or nearest health facility

³ Measured during the primary health facility survey: health facilities allocated to provide pregnancy care to the household survey location



Photo left: Health Development Army members at a health post.
© Dr Neil Spicer

Figure 9 – Unprompted knowledge of danger signs in pregnancy amongst women with a live birth in the 12 months preceding survey

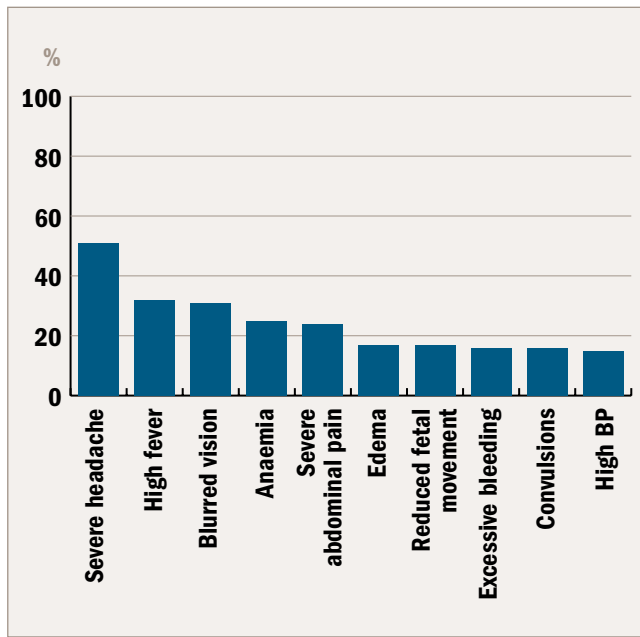


Figure 10 – Preparations made for delivery by women during pregnancy

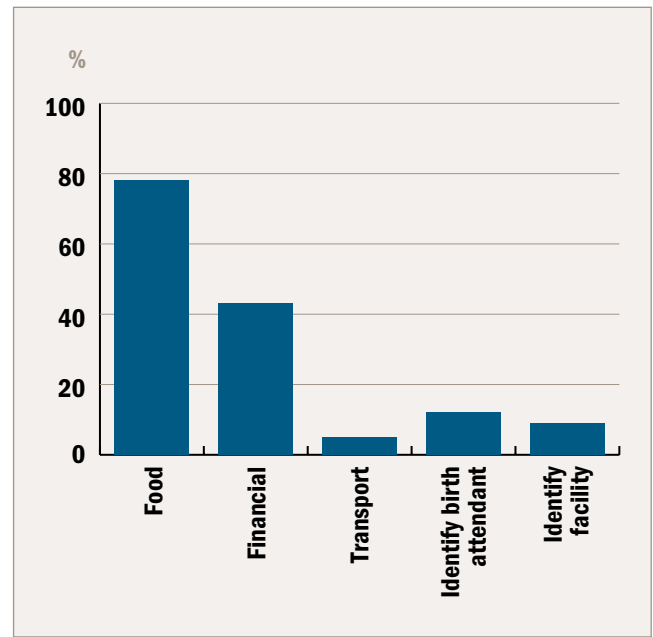


Figure 11 – Coverage of core components of good quality pregnancy care by the end of the pregnancy period

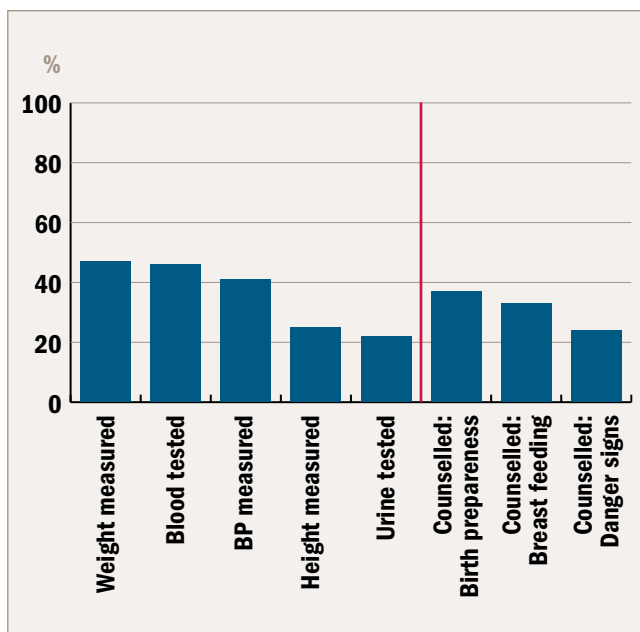
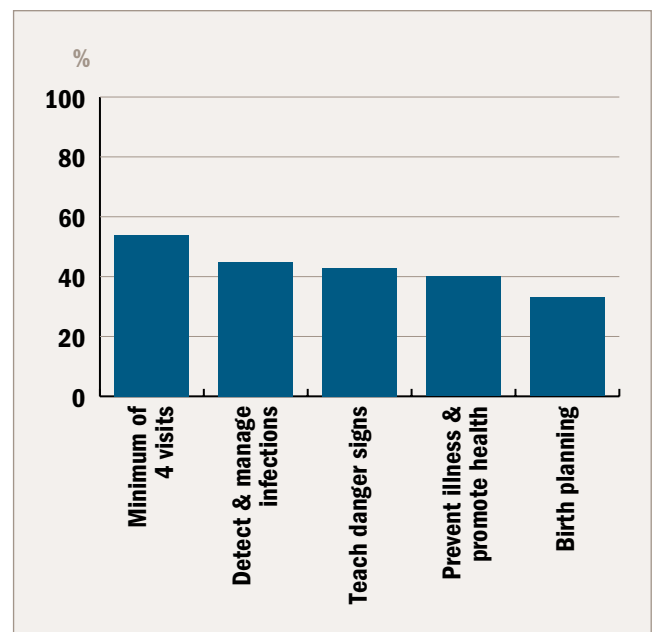


Figure 12 – Unprompted knowledge of the elements of focussed pregnancy care amongst all frontline workers



Quality of pregnancy care interactions

The quality of pregnancy care interactions was evaluated from six different perspectives (box 1).

1. Women's knowledge of danger signs in pregnancy

Seventy-eight percent of women (95% CI 71-85) were able to state at least one danger sign, with each woman stating an average of 2.4 pregnancy danger signs (95% CI 2.1-2.7) without any prompting from the interviewer. A breakdown of the frequency with which different danger signs were mentioned by women is provided in figure 9.

2. Women's preparations for delivery

Counselling during pregnancy care interactions includes advising women to make preparations for their delivery namely: to put aside some money, to

plan transport and food requirements, and to identify a birth attendant and a health facility. In the study area, 72% (95% CI 64-79) reported making any preparations for delivery, but just four women prepared all five things (figure 10).

3. Median gestation at first pregnancy care interaction

The median gestation at first pregnancy interaction was 16 weeks (inter-quartile range 7-24).

4. Components of pregnancy care received by women by the end of pregnancy

Good quality pregnancy care includes a minimum of eight core components, including checks on the health of the pregnant woman and providing life saving counselling. Three percent of women (95% CI 1-5) who had a live birth in the 12 months preceding survey reported having received all

eight components by the end of their pregnancy period (figure 11). Eight percent of women (95% CI 5-14) received the five medical components that involve measurement or testing but not counselling).

5. Frontline worker knowledge of the elements of focussed pregnancy care

Six percent (95% CI 3-11) of frontline workers had unprompted knowledge of all six elements of focussed pregnancy care (figure 12). There were differences in knowledge by cadre of frontline worker with 13% of health facility staff able to cite all six elements compared to 10% of HEWs and one percent of community volunteers: in this survey pregnancy care was most frequently accessed in health facilities. The most frequently cited component was to have at least four pregnancy care interactions (mentioned by 54% of all frontline workers).



Photo left: Zuqala, Ethiopia.
© Dr Neil Spicer

Figure 13 – Availability of commodities to provide pregnancy care in health posts and PHCs

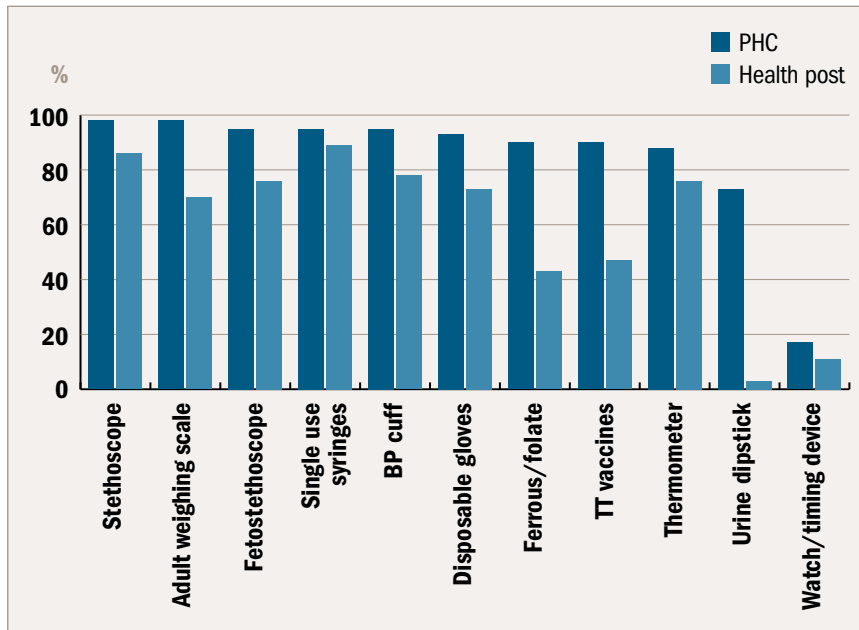


Photo right: Children playing, Amhara Region. © Mihretab Salasibew

6. Availability of essential commodities to provide basic pregnancy care at health posts and primary health centres

On the day of the survey, 12% (95% CI 5-26) of PHCs had all essential commodities required to provide pregnancy care but no health posts had all items. The items most frequently missing were a working watch or timing device and urine dipsticks to detect protein (available in fewer than 10% of health posts), and tetanus toxoid vaccinations and iron prophylaxis (available in fewer than 50% of health posts, figure 13).



12% of PHCs had all essential commodities to provide pregnancy care

Coverage of pregnancy care critical interventions

The coverage of pregnancy care interventions that can be delivered at community or primary level of health care is presented in table 6. Approximately two in ten women with a live birth in the 12 months preceding survey received iron supplementation when pregnant, four in ten had tetanus toxoid protection (at least two doses in the last three years), and almost one in ten had received a test result for syphilis during pregnancy care.

Inequities in coverage of critical interventions in pregnancy

No clear evidence of an increasing trend in coverage of critical interventions was observed by socio-economic status of households, although fewer women living in the poorest households had tetanus toxoid protection than did women living in the less poor quintiles (figure 14).

Triangulation of data sources on pregnancy care

Fifty-seven percent of women had at least one pregnancy care interaction and one in every five women had at least four. Almost all women receiving any pregnancy care had attended a PHC at least once, and just three percent of women reported receiving any pregnancy care at home. Most of the essential basic commodities for providing pregnancy care were widely available in the surveyed facilities with the following exceptions. Urine dipsticks to detect protein, and a watch or timing device, were frequently missing from both health posts and PHCs, and iron prophylaxis and tetanus toxoid vaccinations were also frequently missing from health posts. The absence of these items resulted in 12% of facilities surveyed having all the basic equipment needed for pregnancy care. When considering availability of services on the day of survey, just seven percent of facilities had all the basic equipment needed and were providing antenatal care services on the day of survey; 78% of facilities surveyed were providing services but had at least one item missing (Annex 3).

Each of the individual components of good quality pregnancy care were reported to have been received by fewer than 50% of women. The least frequently received medical component was urine testing and this may be consistent with the stock outs of urine test kits in surveyed facilities. The life saving interventions iron prophylaxis and tetanus toxoid protection should be delivered to all pregnant women but coverage was found to be 40% and 19% respectively: again, both these items were amongst those most frequently missing from the facilities surveyed (although stock-outs are unlikely to be the sole explanation for the observed level of coverage –

planned qualitative work may reveal further reasons).

Fewer than 40% of frontline workers cited birth preparedness as an essential component of pregnancy care. Almost three quarters of women reported that they made some preparations for their delivery while still pregnant (predominantly food preparations), but fewer than 10% had identified a birth attendant or a facility, or transport to travel to that facility. ■

Photo right: Waiting outside a Health Centre, Oromia Region, Ethiopia. © Dr Bilal Avan



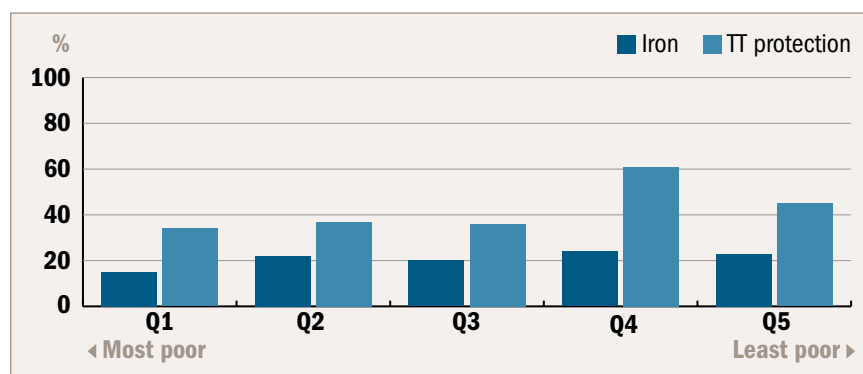
Table 6 – Coverage of pregnancy care critical interventions amongst women with a live birth in the 12 months preceding survey

Critical intervention	Coverage amongst women with a live birth in the 12 months preceding survey (N=277) % (95% CI)
Iron supplementation: received	19% (14-26)
Iron supplementation: used	15% (10-21)
Tetanus toxoid protection	41% (34-49)
Intermittent preventive treatment for malaria (≥2 doses) ¹	5% (3-9)
Syphilis prevention ²	8% (5-13)

¹ IPTp is not policy throughout the study area

² Women receiving a test result for syphilis during pregnancy care

Figure 14 – Coverage of iron prophylaxis and of tetanus toxoid protection by socio-economic status of household



Intra-partum Care

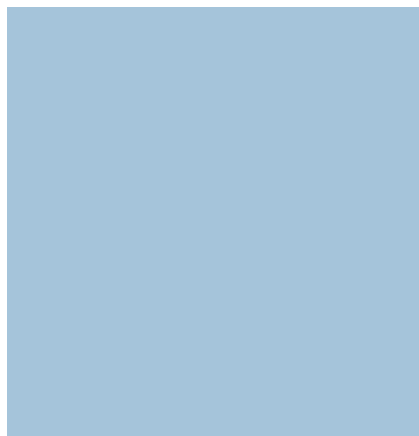


Photo above: A newborn's foot size is a proxy for birth weight.
© Bill & Melinda Gates Foundation

This chapter presents results on the frequency of interactions, the quality of those interactions, and the coverage of critical interventions. Interaction frequency and intervention coverage are also broken down by socio-economic status of households.

Frequency of intra-partum care interactions

Just 15% (95% CI 8-24) of women who gave birth between April 2011 and May 2012 in the study area did so in a health facility, and when including births in a health post in the definition of facility birth we observed that 17%

(95% CI 10-27) of women gave birth in a health post or health facility. Sixteen percent (95% CI 10-26) of women were attended by a skilled birth attendant (doctors and registered or auxiliary nurse/midwives), three percent of women by a HEW, 12% by a community volunteer (predominantly TBAs), 62% by family, friends or neighbours, and six percent gave birth alone (table 7).

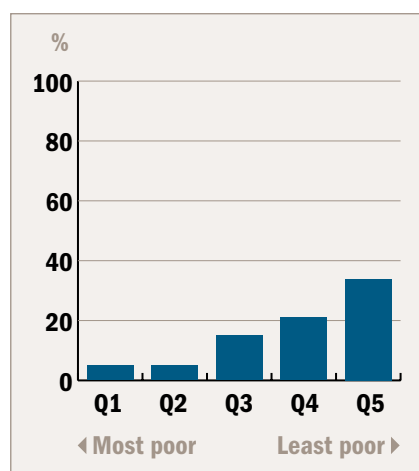
In the household survey, two percent of women reported that their baby was delivered by caesarean section, higher than the one percent of births recorded from health facility registers (see table 1, primary and referral levels combined).

Table 7 – Frequency of intra-partum interactions between women and frontline workers during the intra-partum period

Interaction type	Coverage amongst women with a live birth in the 12 months preceding survey (N=277) % (95% CI)
Births in a health facility	15% (8-24)
Births attended by a skilled attendant (doctor, registered or auxiliary nurse or midwife)	16% (10-26)
Births by caesarean section	2% (1-6)
Women advised to seek extra care who did seek extra care (home – facility; intra-facility)*	33% (22-45)

*40 women reported that they were advised to seek extra care during the intra-partum period

Figure 15 – Percent of women who had a skilled attendant at birth (doctor, registered nurse/midwife or assistant nurse/midwife), by household socio-economic status quintile



Inequities in frequency of interactions

There was considerable inequity in the percent of women having a skilled attendant at birth, with women in the least poor households having over six times the coverage of women in the most poor households (34% vs. 5%, figure 15).

Quality of intra-partum care interactions

The quality of intra-partum care interactions was evaluated from four different perspectives (box 2).

1. Women’s knowledge of intra-partum danger signs

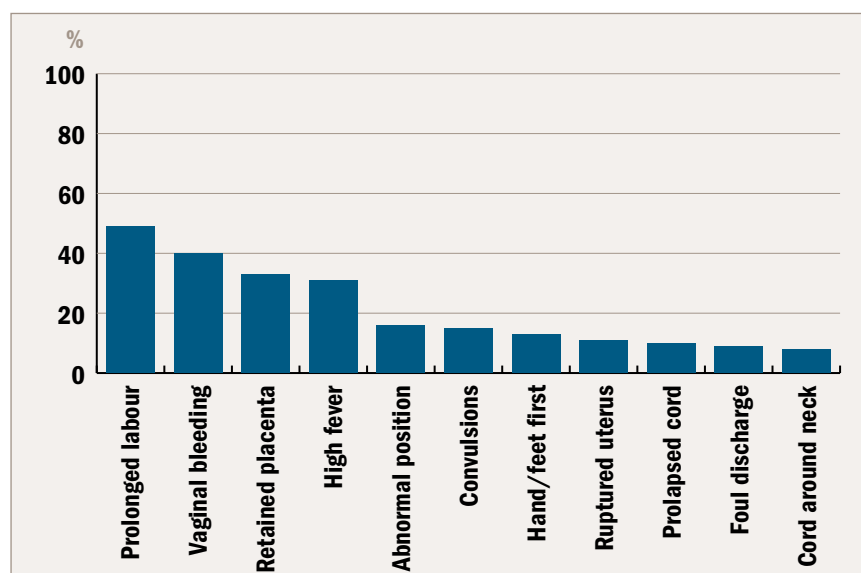
On average, women who had a birth in the 12 months preceding survey were able to cite 2.0 intra-partum danger signs (95% CI 1.7-2.4). A breakdown of the frequency that each danger sign was cited is provided in figure 16.

Box 2 – Perspectives of quality intra-partum care and their justification

	Quality perspective	Justification
1	Women’s knowledge of intra-partum danger signs ¹	Women who are better informed about intra-partum danger signs will be better placed to seek quality care
2	Frontline worker’s knowledge of actions to take when a woman bleeds heavily during labour ²	The knowledge that frontline workers have about recommended care could influence that quality of care that they are able to deliver
3	Frontline workers who attend births have all the essential items they need to provide good quality care ²	The quality of intra-partum care delivered to women is influenced by the items that frontline workers have access to during delivery (sterile gloves, disinfectant, gauze, clean cloths, sterile cord cutter, cord ligature, uterotonic, eye ointment)
4	Availability of essential equipment to provide basic intra-partum care at health facilities ³	The quality of intra-partum care delivered to women is influenced by the availability of essential equipment to provide that care (stethoscope, bp cuff, infant weighing scale, fetal stethoscope, sterilizer, thermometer, manual vacuum aspirator, speculum, vacuum extractor)

¹ Measured during the household survey: women with a live birth in the 12 months prior to survey
² Measured during the frontline worker survey: frontline workers who have intra-partum care interactions with women in the household survey location or nearest health facility
³ Measured during the primary health facility survey: health facilities allocated to provide pregnancy care to the household survey location

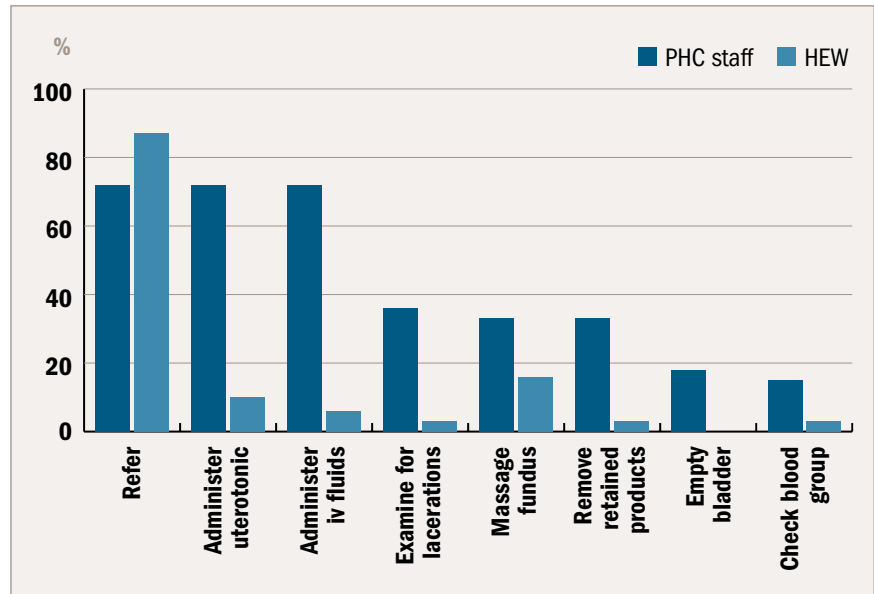
Figure 16 – Unprompted knowledge of intra-partum danger signs amongst women interviewed in the household survey who had a live birth in the 12 months prior to survey



2. Frontline worker knowledge of actions to take when a woman bleeds heavily during labour

Amongst PHC staff who had ever attended a birth (n=39), eight percent (95% CI 2-22) stated all eight possible responses for actions to take when a woman bleeds heavily during or immediately after labour, and stated 3.5 responses (95% CI 2.7-4.2) on average. No HEWs who had ever attended a birth (n=31) stated all eight possible responses, and stated 1.3 responses (95% CI 1.0-1.6) on average. The frequency with which each possible response was stated is shown in figure 17. Seventy two percent of PHC staff and 87% of HEWs said that a woman with heavy bleeding should be referred to the next level of care.

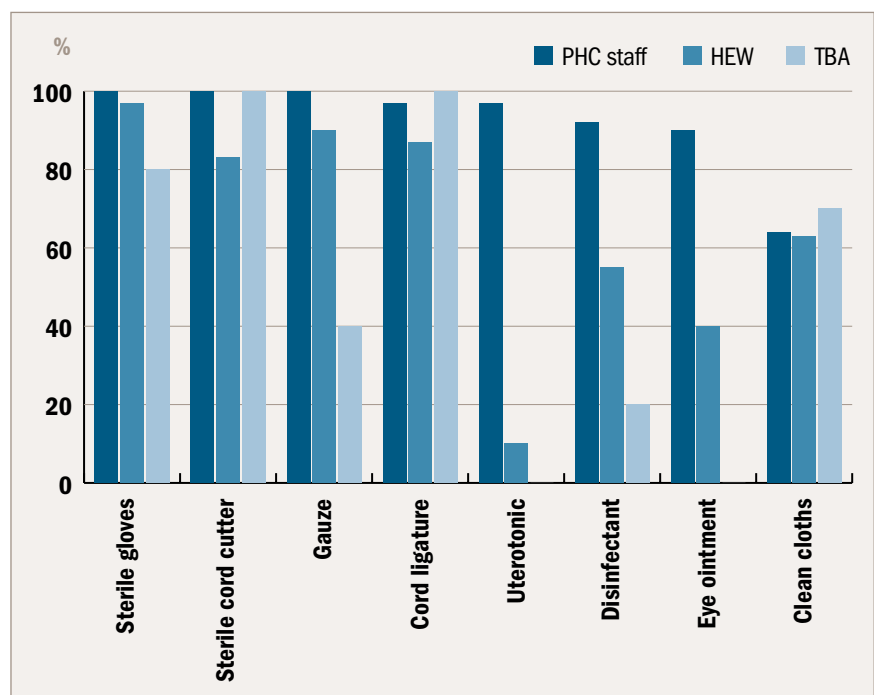
Figure 17 – Frontline worker knowledge of actions to take when a woman bleeds heavily during labour, amongst HEWs or PHC staff who had ever attended a delivery



3. Frontline workers have all the essential items they need to provide good quality care

A breakdown of frontline worker reports about the last birth attended, specifically whether they had been able to prepare all essential, is provided in figure 18. The majority of health facility staff had been able to prepare all items except for clean cloths (lack of stock cited as the primary reason for not preparing the item). Availability of items was less high amongst HEWs and TBA, many of whom lacked uterotonics, disinfectant, eye ointment as well as clean cloths or gauze.

Figure 18 – Frontline worker preparation of items at the last birth attended, amongst TBAs, HEWs and PHC staff who were able to recall the last birth they attended



4. Health facilities have the equipment needed for basic intra-partum care

An inventory of equipment available to provide basic intra-partum care at health posts and PHCs was carried out. Twenty two percent of PHCs (95% CI 12-37) had all nine items available on the day of survey. Not all items are required to be present at health posts. (figure 19).

Figure 19 – Health post and PHC equipment available for basic intra-partum care

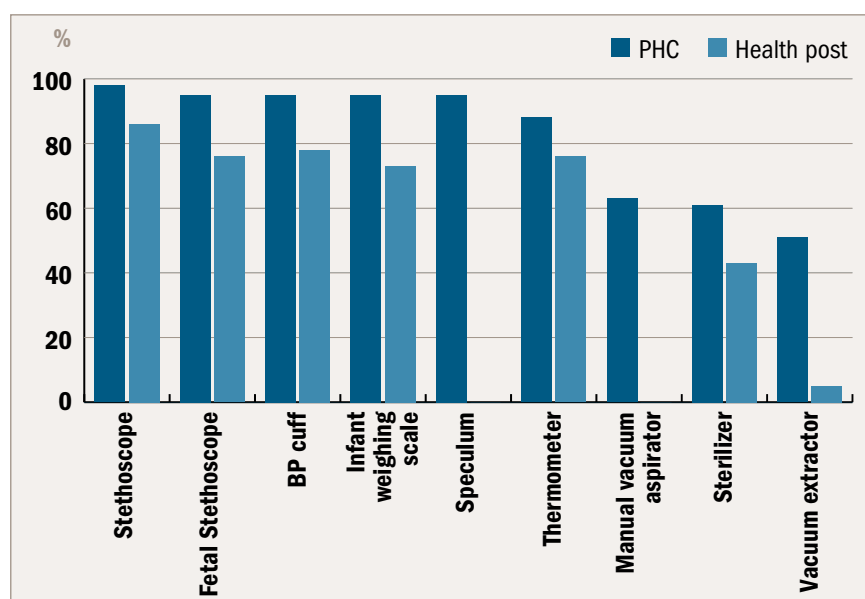
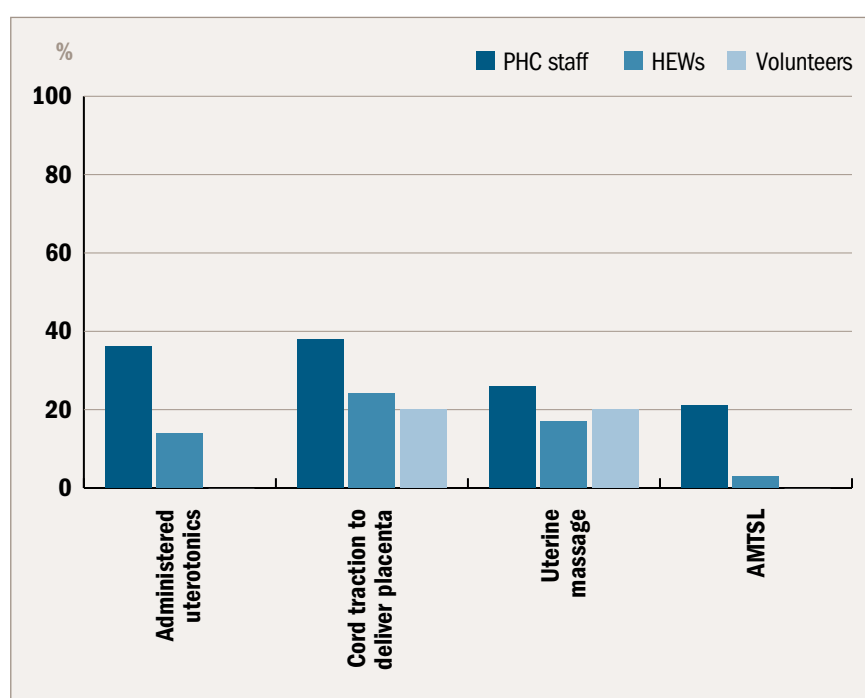


Figure 20 – Frontline worker reported behaviour with regard to components of active management of the third stage of labour at the last delivery attended



Coverage of intra-partum care interventions

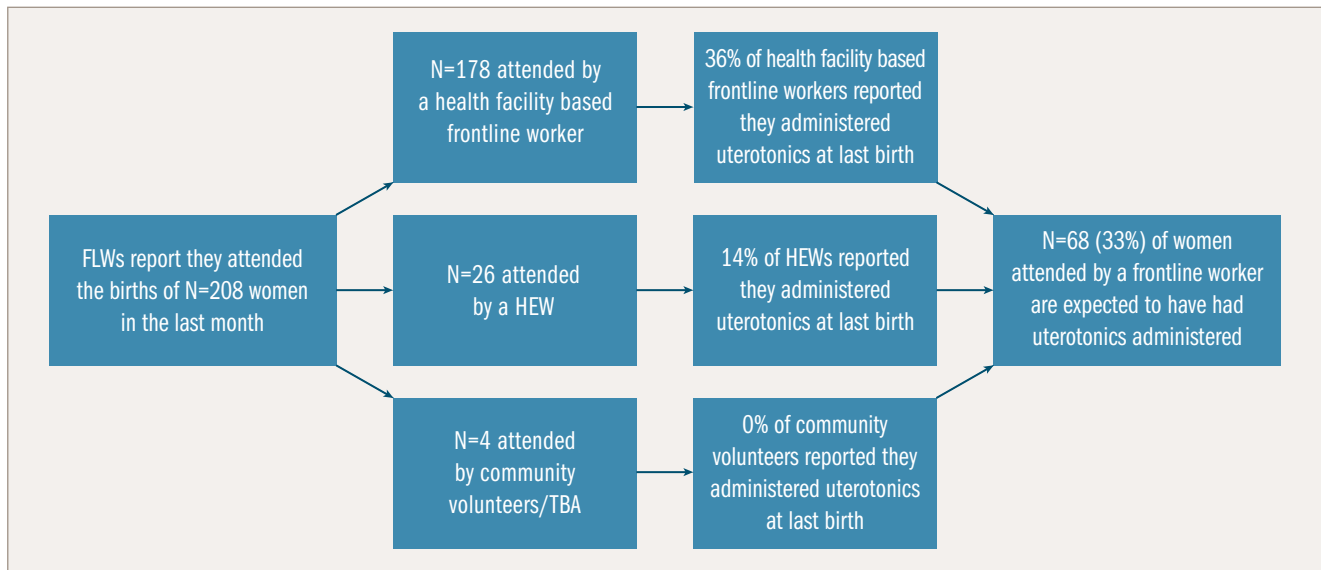
Four intra-partum critical interventions amenable to delivery by frontline workers are presented. Frontline workers providing intra-partum care include health staff at PHCs, HEWs at health posts, and a very small number of volunteers (including TBAs) in communities.

The intra-partum interventions (1) administration of prophylactic uterotonics to prevent post-partum haemorrhage and (2) active management of the third stage of labour (administration of prophylactic uterotonic and uterine massage and controlled cord traction) were measured through interviews with frontline workers who attend deliveries, and the estimates applied to household survey responses about the birth attendant for individual women. Differences in delivery of these two interventions were observed by cadre of frontline worker, being higher amongst health facility workers – who attend the most deliveries – than other cadre (figure 20).

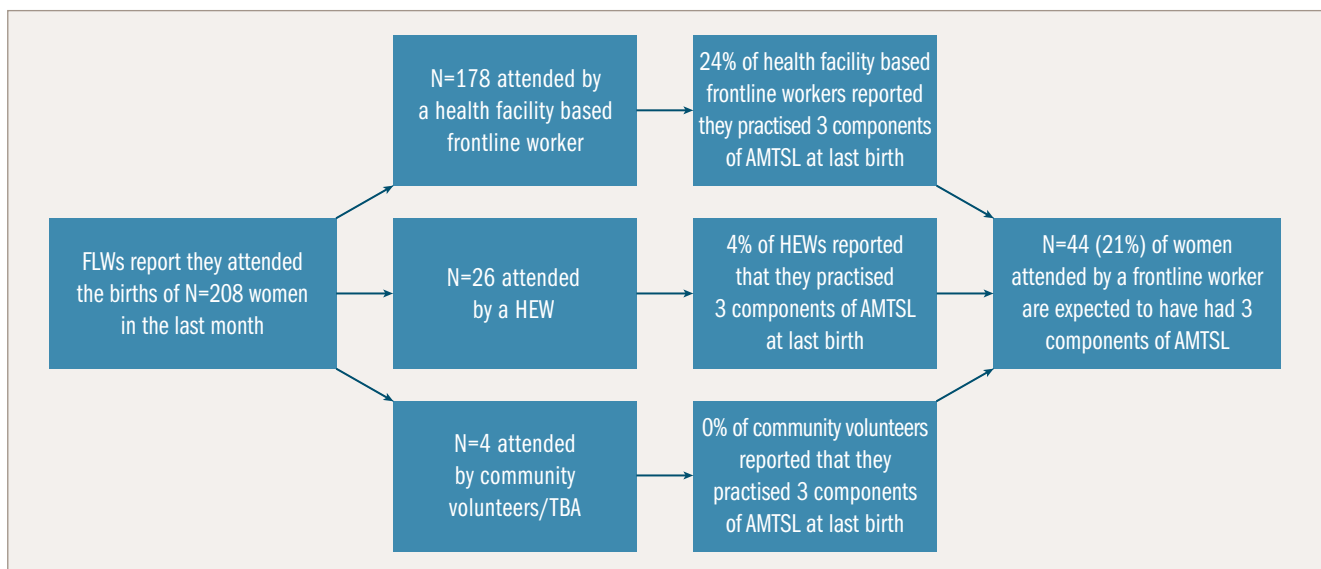
In order to estimate coverage of these interventions amongst recently delivered women who were attended by a frontline worker, we adjusted the frontline worker reports by the volume of births each cadre of frontline worker had attended in the month prior to survey.

In Box 3 we observe that the expected percent of women who were attended by a frontline worker to have received prophylactic uterotonics was 33%. To extrapolate this to the population level it is necessary to adjust for the 68% of women who did not deliver with a frontline worker (5% delivered alone and 63% of women delivered at home with family or friends). Thus we estimate the population level coverage

Box 3 – Expected percent of women who were attended by a frontline worker to have had prophylactic uterotonics administered during their delivery.



Box 4 – Expected percent of women who were attended by a frontline worker to have had prophylactic uterotonics administered during their delivery.





16% of women had a skilled birth attendant at birth, 3% were attended by a HEW, 12% by a volunteer, 62% by family or friends, and 6% gave birth alone”

of prophylactic uterotonics during delivery to be $33 \times (1.0 - 0.68) = 11\%$ (table 8).

In Box 4 we observe that the expected percent of women who were attended by a frontline worker to have had active management of the third stage of labour was 21%. To extrapolate this to the population level it is necessary again to adjust for the 68% of women who were not attended by a frontline worker. Thus we estimate the population level coverage of AMTSL to be $21 \times (1.0 - 0.68) = 7\%$ (table 8).

The intra-partum interventions (3) hand-washing with soap and (4) use of gloves by the delivery attendant were measured in the household survey interview with women with a live birth in the 12 months preceding survey, and estimated separately for women who delivered in a health facility or at home (table 9). Coverage of both these interventions is considerably higher amongst women who delivered in health facilities compared to those who delivered at home (table 9). At the population level, coverage of hand-washing with soap was 81% (95% CI 73-87), and use of gloves by the delivery attendant was 25% (95% CI 17-37)

Photo right: A delivery bed in a Health Centre, Oromia Region, Ethiopia.
© Dr Bilal Avan

Table 8 – Estimated coverage of intra-partum care critical interventions (1-2)

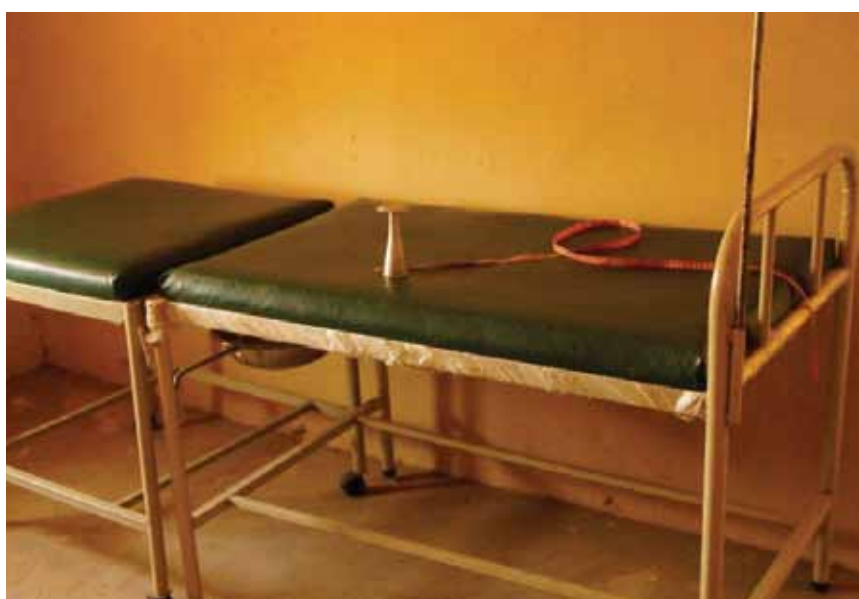
Critical intervention	Estimated population level coverage ¹
Administration of prophylactic uterotonics	11%
Active management of the third stage of labour ²	7%

¹ Based on frontline worker reports about volume of deliveries in the month preceding survey and the actions taken at the last delivery attended (frontline worker survey), and the birth attendant reported by women who had a live birth in the 12 months preceding survey (household survey)

² Active management of the third stage of labour (AMTSL) includes administration of prophylactic uterotonics, uterine massage, controlled cord traction to deliver the placenta

Table 9 – Coverage of intra-partum care critical interventions (3-4) measured through interviews with women with a live birth in the 12 months preceding survey

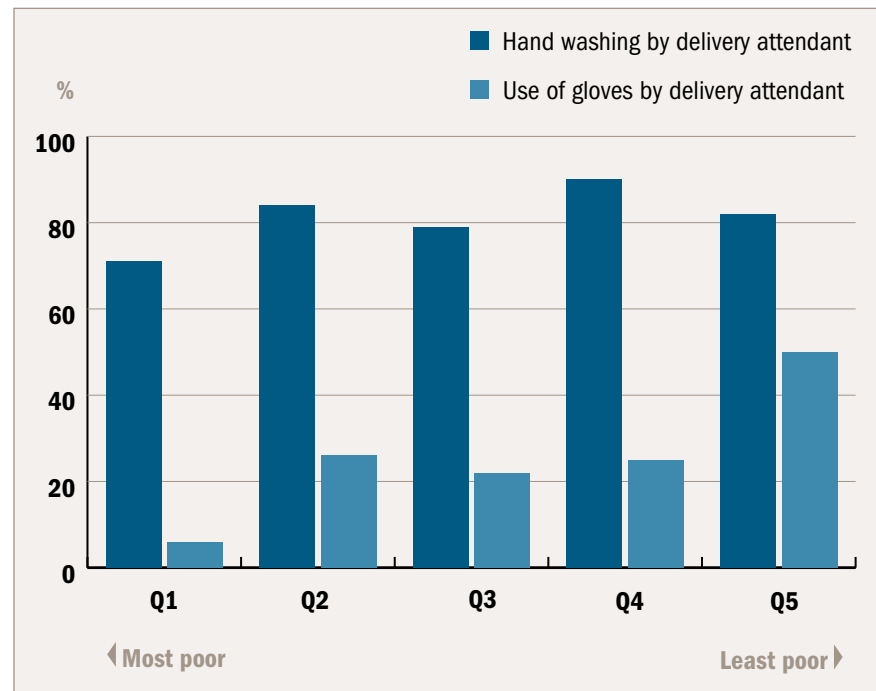
Critical intervention	Coverage amongst women with a live birth in the 12 months preceding survey (N=277) % (95% CI)
Hand washing with soap by the delivery attendant	
Health facility delivery	85% (63-95)
Home delivery	80% (71-29)
Use of gloves by the delivery attendant	
Health facility delivery	98% (82-100)
Home delivery	11% (7-19)





Hand washing with soap was reported to be universally high, however there was a large difference in use of gloves by the birth attendant by socio-economic status of households.”

Figure 21 – Coverage of critical interventions in the intra-partum period, by socio-economic status of households



Inequities in coverage of critical interventions in the intra-partum period

Hand washing with soap was reported to be universally high and no evidence of socio-economic inequity was observed. However, there was a very large difference in use of gloves by the birth attendant between women living in the most poor households (6%) and those living in the least poor households (50%, figure 21).

Triangulation of data sources on intra-partum care

Fifteen percent of women delivered in a health facility (PHC or higher level) and 17% of women delivered in a health facility or a health post. Sixteen percent of women reported having a skilled attendant while 68% of women

reported having no frontline worker in attendance at birth. This large proportion of women delivering without a frontline worker in attendance considerably reduced the population level estimates of life saving interventions during delivery (prophylactic uterotonic and AMTSL). Just two percent of women in the household survey reported giving birth by caesarean section.

Many essential equipment items for intra-partum care had high availability in PHCs, although some PHCs lacked basic infrastructure (e.g. just 61% of PHCs had a functioning steriliser). Important items were missing from approximately 25% of health posts including a BP cuff, fetal stethoscope, oral thermometers, or infant weighing scales. A functioning steriliser was present in just 43% of health posts. Taken as a whole, just 19% of facilities

providing maternity care were providing services on the day of survey and had all the items required for the basic signal function 'monitoring and management of labour using a partograph' (Annex 3).

The majority of health staff working in PHCs reported that they had been able to prepare the essential consumable items needed to provide good quality basic care during delivery at the last birth they attended, with the exception of clean cloths. However there was a large difference between availability of uterotonics for health staff working in PHCs (over 90% had uterotonics available) and their administration of uterotonics at the last birth they attended (fewer than 40% said they administered a uterotonic).

Fewer health extension workers at health posts had been able to prepare all essential consumable items, fewer still amongst frontline workers working in the community (predominantly TBAs). For these cadres, the items most frequently unavailable were uterotonics, disinfectant and eye ointment for the newborn. The finding that these cadre of frontline worker often did not have a uterotonic available was consistent with their reports that they frequently did not administer a uterotonic at the last birth (for example, uterotonics were present in fewer than five percent

of health posts and approximately ten percent of health extension workers reported administering a uterotonic at the last birth they attended).

Inequalities in interactions and coverage of life saving interventions were more apparent during intra-partum care than they had been for pregnancy care, largely because of the large difference in skilled attendance at birth by socio-economic status of households (34% amongst the least poor, 5% amongst the most poor). For example, while hand washing with soap was reported by over 80% of all women irrespective of their place of birth, large differences in use of gloves by the birth attendant was observed by place of birth and by socio-economic status of households (being reported by 98% of women in the least poor households and just 11% of women in the most poor households).

Finally, there were large differences by cadre of frontline worker in knowledge of actions to take when attending a woman who begins to bleed heavily during labour. Over 70% of all cadres said that they would refer such a woman to the next level of care, but 72% of health staff in PHCs compared to just 10% of health extension workers at health posts said that administration of a uterotonic was an appropriate action to take for a woman who bleeds heavily during delivery. ■



Photo right: Health post record keeping. © Dr Bilal Avan

Post-partum Care



This chapter presents results on the frequency of interactions, the quality of those interactions, and the coverage of critical interventions. Interaction frequency and intervention coverage are also broken down by socio-economic status of households.

Frequency of post-partum care interactions

There was very little evidence of timely post-partum care taking place in the study area. Eight percent of women in the household survey (95% CI 5-12) reported having any post-partum

Photo above: Debre Zeyit, Ethiopia.
© Dr Neil Spicer

checks during the first month after birth. Just four percent (95% CI 2-8), and five percent (95% CI 3-9) respectively reported that anyone checked on their health within the recommended first two days and the first seven days after birth (table 10). However there were large differences by place of delivery (table 10). The post-partum checks that took place were conducted predominantly by nurses or midwives (60%), followed by HEWs (40%).

Table 10 – Frequency of post-partum interactions between women and frontline workers

Interaction type	Coverage amongst women with a live birth in the 12 months preceding survey (N=277) % (95% CI)
Any post-partum check in the first month after delivery	8% (5-12)
Post-partum check within 2 days of birth (all women)	4% (2-8)
Facility birth	12% (4-31)
Home birth	3% (1-6)
Post-partum check within 7 days of birth (all women)	5% (3-9)
Facility birth	17% (8-34)
Home birth	3% (2-7)

Inequities in interactions

Coverage of post-partum care in the first month after birth was universally low and no evidence of household socio-economic inequity was observed (figure 22).

Quality of post-partum care interactions

The quality of post-partum care interactions was evaluated from one perspective (box 5).

1. Components of post-partum care received by women in the first week after birth

A good quality post-partum check should include physical examination of the women to check her breasts, and extent of bleeding, plus counselling on danger signs that might occur post-partum, use of family planning, and nutrition. Amongst women who had a birth in the 12 months preceding survey, one percent (95% CI 1-3) received all five components of post-partum care in the first week after birth: a breakdown of the frequency of each component is provided in figure 23.

Coverage of post-partum care interventions

The post-partum care interventions amenable to delivery by frontline workers are detection and treatment of anaemia, and detection and treatment of post-partum sepsis. In this survey, no women with a live birth in the 12 months preceding survey reported having these complications and no women reported seeking advice for any adverse health conditions during the post-partum period. ■

Photo left: Health Extension Workers. © Dr Bilal Avan

Figure 22 – Percent of women who had any post-partum check in the first month after birth, by household socio-economic status

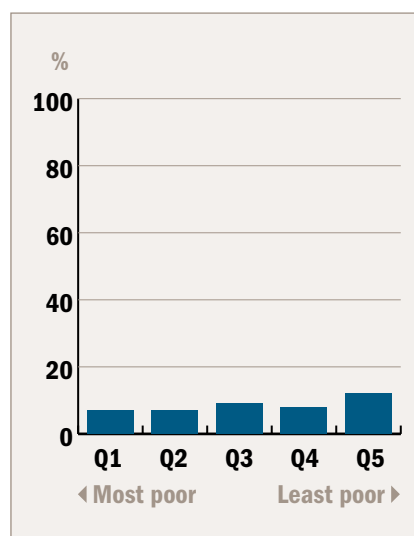
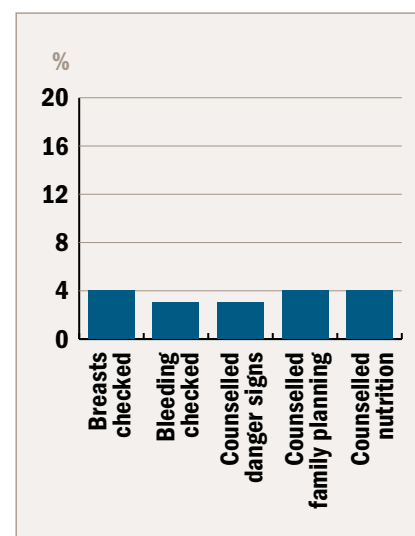


Figure 23 – Coverage of core components of good quality post-partum care checks in the first week after birth



Box 5 – Perspective of quality post-partum care and its justification

Quality perspective	Justification
Components of post-partum care received by women in the first week after birth ¹	Good quality post-partum care includes the following five core elements: breasts and bleeding checked, counselled on danger signs, family planning, and nutrition

¹ Measured during the household survey: women with a live birth in the 12 months prior to survey



Post-natal care

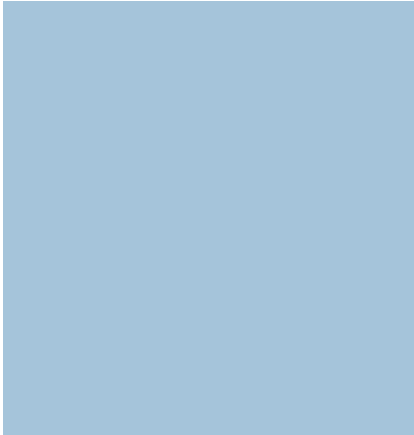


Photo above: Adult weighing scale.

© Dr Neil Spicer

Photo above right: Patient flow chart in a primary health centre, Amhara Region. © Dr Neil Spicer

This chapter presents results on the frequency of interactions, the quality of those interactions, and the coverage of critical interventions. Interaction frequency and intervention coverage are also broken down by socio-economic status of households.

Frequency of post-natal care interactions

In the household survey, eight percent of mothers (95% CI 5-12) reported that their newborn had any post-natal checks during the first month of life (table 11).

Just four percent (95% CI 2-7) of mothers reported that anyone checked on the health of their newborn within the recommended first two days and this estimate did not increase when calculating checks in the first seven days of life (table 11). Approximately half post-natal health checks were carried out by a HEW, thirty percent by staff at a health facility, and twenty percent by community volunteers.

Amongst newborns who had experienced at least one danger sign in the first month of life, 72% (95% CI 58-83) were taken outside the home to seek health care. The main reason for not taking a newborn outside the home

to seek health care was because the caregiver expected the newborn to get better without drugs.

Inequities in interactions

As for post-partum checks, coverage of post-natal care in the first month after birth was universally low and no evidence of household socio-economic inequity was observed (figure 24).

Quality of post-natal care interactions

The quality of post-natal care interactions was evaluated from two perspectives (box 6).

1. Components of post-natal care received by newborns in the first week of life

A good quality post-natal check should include physical examination of the newborn to check weight and the umbilical cord, plus counselling the caregiver on newborn danger signs, breastfeeding, and newborn thermal care. All components were universally low at the population level and no newborns received all five components of post-natal care. A breakdown of the frequency of each component is provided in figure 25.

Table 11 – Frequency of post-partum interactions between women and frontline workers during the first week after birth

Interaction type	Coverage amongst women with a live birth in the 12 months preceding survey (N=277) % (95% CI)
Any post-natal check in the first month after delivery	8% (5-12)
Post-natal check within 2 days of birth (all live births)	4% (2-7)
Facility birth	7% (2-20)
Home birth	3% (1-6)
Post-natal check within 7 days of birth (all live births)	4% (2-8)
Facility birth	9% (3-23)
Home birth	3% (2-7)
Newborns with ≥1 danger sign in the first month of life for whom care was sought outside the home ¹	72% (58-83)

¹ 29 mothers reported that their newborn had at least one danger sign in first 30 days of life

Box 6 – Perspectives of quality post-natal care and their justification

	Quality perspective	Justification
1	Components of post-natal care received by newborns in the first week of life ¹	Good quality post-natal care includes the following five core elements: physical examination of the newborn to check weight and the umbilical cord, plus counselling the caregiver on newborn danger signs, breastfeeding, and newborn thermal care
2	Frontline worker knowledge of actions to take for the low birth weight newborn	The knowledge that frontline workers have about the recommended actions to take for low birthweight newborns could influence the quality of care that they are able to deliver.

¹ Measured during the household survey: women with a live birth in the 12 months prior to survey



Figure 24 – Percent of newborns who had any post-natal check in the first month after birth, by household socio-economic status quintile.

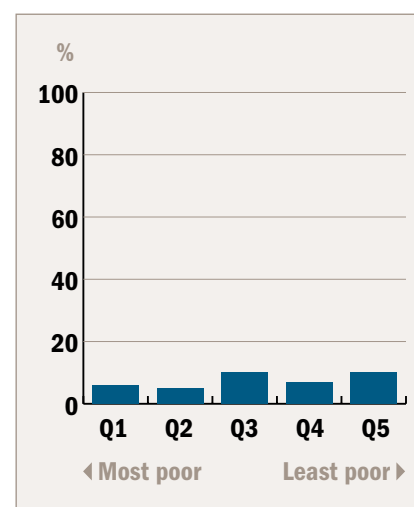


Figure 25 – Coverage of core components of good quality post-natal care checks in the first week of life

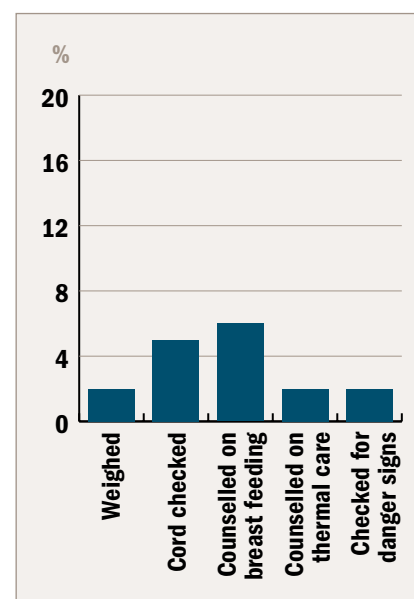
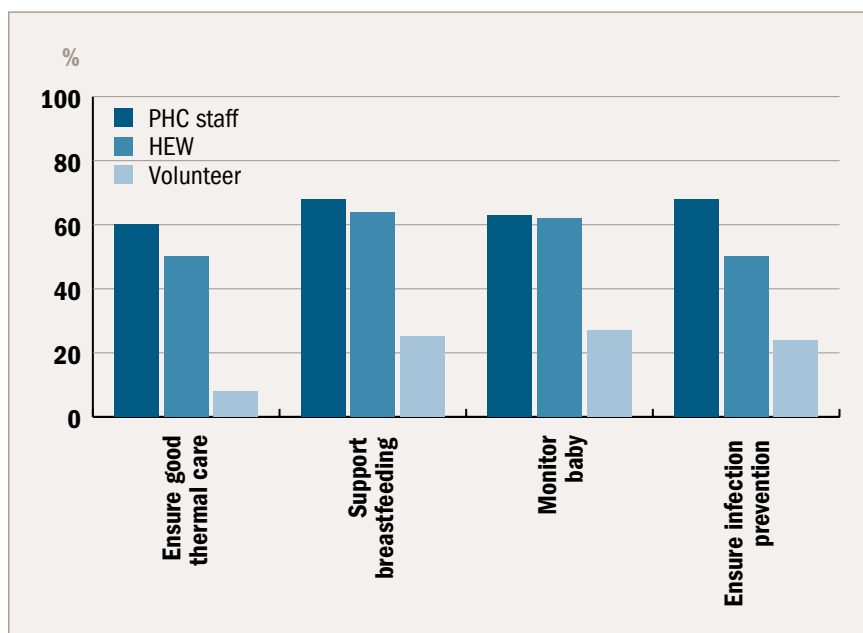


Photo left: Village scene, Amhara Region. © Dr Neil Spicer

Figure 26 – Unprompted knowledge of the actions to take for the low birth weight newborn, all frontline workers



2. Frontline worker knowledge of actions to take for the low birth weight newborn

Forty-three percent (95% CI 27-60) of staff in health facilities, 33% (20-50) of HEWs and 2% (1-9) of community volunteers had unprompted knowledge of at least four actions to take for low weight newborns (ensure good thermal care, support breastfeeding, try to prevent infections, and monitor the newborn closely). The frequency with which each action was cited is shown in figure 26. Of the three frontline worker groups, community volunteers were least likely to mention any of these actions.

Coverage of post-natal care interventions

Life saving interventions for the newborn that can be delivered at community or primary health facility

level predominantly focus on three sets of behaviours: clean cord care, thermal care, and breastfeeding; a breakdown of these is shown in table 12.

Approximately three quarters of newborns had their umbilical cord cut with a new blade, three quarters had their cord tied with a new or boiled string, and two thirds had nothing put on their cord in the first days after birth, but just 43% (95% CI 37-52) of newborns had all these elements of clean cord care.

Fewer than half of newborns benefited from immediate drying (41%) or delayed bathing (44%); a higher percentage benefited from immediate wrapping (57%, table 12). Forty-four percent (95% CI 34-55) of mothers reported that they always or often held the newborn skin to skin in the first week of life (note that no information was collected on the duration of this skin to skin contact).

Fifty percent (95% CI 42-57) of newborns were breastfed immediately at birth, and 93% (95% CI 86-96) were breastfed exclusively for the first three days of life. Fifty percent (95% CI 43-57) of mothers reported that they discarded their milk in the first day after birth.

Inequities in coverage of critical interventions for newborns

There was no statistical evidence of difference in newborn life saving behaviours by socio-economic status of households (figure 27). There was a large difference in delayed bathing by place of birth with 82% (95% CI 59-94) of newborns born in a facility benefiting from delayed bathing compared to 38% (95% CI 29-48) of newborns born at home.

Finally, vaccination coverage amongst live infants who were born six to 12 months prior to survey is presented in table 13.

Table 12 – Coverage of post-natal care critical interventions: behaviours that save newborn lives

Interaction type	Coverage amongst newborns born to women with a live birth in the 12 months preceding survey (N=349) (95% CI)
Clean cord care	
Cutting using a new blade	79% (70-85)
Tying cord with new or boiled string	75% (67-81)
Nothing put on the cord*	69% (61-76)
Newborns with clean cord care*	43% (37-52)
Thermal care	
Immediate drying (<30 minutes)*	41% (35-49)
Immediate wrapping (<30 minutes)*	57% (47-67)
Delayed bathing (>6hrs)	44% (35-55)
Breastfeeding	
Immediate (<1hr)	50% (42-57)
Exclusive (first 3 days of life)	93% (86-96)

* Don't know responses excluded from denominator: nothing put on the cord N=249; drying N=235; wrapping N=216

Figure 27 – Percent of newborns who received a life saving behaviour, amongst those born in the most poor quintile and the least poor quintile of households

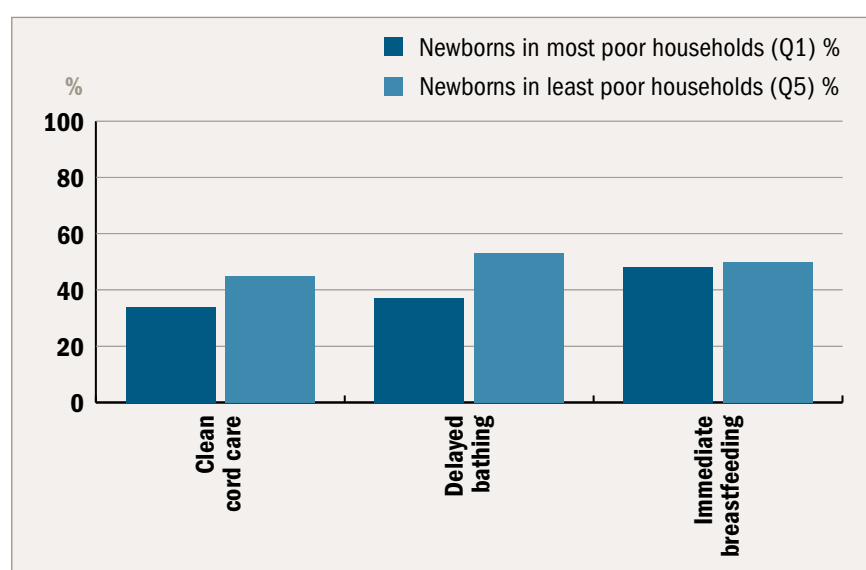


Table 13 – Vaccination coverage amongst infants born six to 12 months prior to survey

Vaccination coverage	Coverage amongst infants alive on the day of survey who were born in the 6-12 months preceding survey (N=182) % (95% CI)
BCG	66% (51-78)
OPV 0	23% (15-35)
OPV 1	69% (56-80)
OPV 2	57% (43-70)
DPT 1	71% (56-82)
DPT 2	64% (48-77)
DPT 3	51% (37-64)



Photo above: Family health card storage at a health post. © Dr Neil Spicer

Photo right: Rural houses, Amhara region, Ethiopia. © Mihretab Salasibew
Photo far right: Mother and child, Ethiopia. © Mihretab Salasibew



Triangulation of data sources on post-natal care

Some of the life saving newborn care interventions occur at birth (cord cutting and tying, immediate trying and wrapping, immediate breastfeeding), while others depend on behaviours that take place in the first days after birth (not putting anything on the cord for cord care and exclusive breastfeeding for the first three days of life, plus care seeking for danger signs (which may lead to a treatment intervention). These interventions depend both on cultural norms and facility practise together with the duration of facility stay after delivery.

Three quarters of newborns had clean cord cutting and tying with no difference by place of birth, but just 43% of newborns had clean cord care in the days following birth, partly because of the practise of applying ointments to the

cord after birth. There was no difference in immediate drying or wrapping by place of birth, but a large difference in delayed bathing with newborns born at home being bathed more quickly than newborns born in a facility. Just half of newborns were breastfed within one hour of birth, and almost all newborns were breastfed exclusively for the first three days of life – again with no difference in breastfeeding behaviour by place of birth. Ten percent of mothers reported that their newborn had at least one danger sign in the first month of life and approximately three quarters sought care outside the home for their sick newborn.

Fewer than ten percent of newborns had any post-natal care in the first month of life, and just four percent had a post-natal check in the first week of life. Checks were more frequently reported by mothers who had a facility birth, but because of the high prevalence



A large difference in delayed bathing of newborns was observed with babies born at home being bathed more quickly than those born in a facility.”

of home births these had little influence over the population level coverage estimate. It was interesting to observe that no difference was observed between coverage of post-natal checks in the first two days and the first seven days of life: it would appear that if newborns did not receive a check immediately they were unlikely to receive a check in subsequent days. The quality of care received during post-natal checks was low however and no newborns in the sample received the five core components

of good quality care. But despite this low coverage of post-natal care, over half of staff at PHCs and health extension workers at health posts had knowledge of appropriate actions to take for low birth weight newborns.

All newborns should receive two vaccinations in the first two weeks of life, BCG and OPV and approximately two thirds of mothers reported that their newborns had received these. Both vaccines were available on the day of survey in half of health posts and over 80% of PHCs. ■

Photo below: Mother with children, Ethiopia. © Bill & Melinda Gates Foundation



Frontline worker contact with families

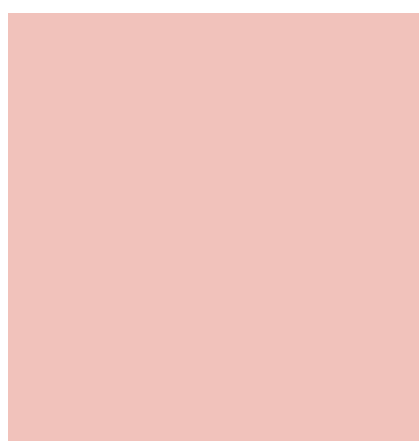


Photo above: Market scene, Ethiopia.
© Tania Ghosh

In the household survey, 1930 women aged between 13-49 years were asked about the contact that they and their families have with frontline workers.

Contact with frontline workers at primary health centres

Thirty eight percent of women reported that there was a PHC in their kebele and the median time to travel on foot from their household to that PHC was 60 minutes (inter-quartile range 30-120 minutes). Thirty-two percent of women (n=616) had visited the PHC at least once in the six months preceding survey. Amongst these women, 56% said that treatment seeking was the primary reason for their last visit, 17% for family planning, 10% for pregnancy care, 7% for child immunisations, and 10% for other reasons.

Contact with frontline workers at health posts

Eighty-eight percent of women reported that there was a health post in

their kebele and the median time to travel on foot from their household to that health post was 20 minutes (inter-quartile range 5-50). Twenty six percent of women (n=506) had visited a health post at least once in the six months preceding survey. Amongst these women, 35% said that family planning was the main reason for their last visit, 24% for child immunisation, 24% for treatment, 10% for pregnancy care, and 7% for other reasons.

Contact with health extension workers at home

Forty-five percent of women (n=892) reported having a home visit by a health extension worker in the previous six months. These women were asked about what was discussed during the last visit (multiple topics were recorded). The most common topics of conversation with the health extension worker were: sanitation and hygiene (71% of last visits), family planning (35%), child nutrition and

immunisation (34%), HIV education (19%) maternal and newborn health care (17%).

Contact with community health volunteers at home

Twenty-five percent of women (n=489) were aware of community health volunteers who made home visits in their area (amongst these 489 women, 52% knew about community health promoters, 40% about the health development army, 31% about environmental health agents, 14% knew about TBAs, and 11% did not know the name of volunteer cadre).

Forty-one percent of the women who were aware of volunteers (202/489) had been visited at home by a community health volunteer in the six months preceding survey (health development army making 34% of last home visits, environmental health agents 32%, community health promoters 28%, and other cadres 6% of last home visits to these women). Again, women were asked about what was discussed during the last visit and multiple topics were recorded. The most common topics of conversation were: child health (100%), sanitation and hygiene (93%),



Families have contact with frontline workers at primary health centres, health posts, at community meetings and in their own homes.”

HIV education (74%), family planning (40%), and maternal and newborn health (22%).

Contact with frontline workers at community meetings

Thirty-one percent of women (n=608) had attended at least one community meeting to discuss health issues in the previous six months. They reported that the last meeting they attended had been organised by HEWs (62% of 608 women), community health volunteers (12%), kebele health committee (10%); 16% of women didn't know who the organiser was. The most common topics of conversation with the frontline worker at community meetings were sanitation and hygiene (90% of last meetings), family planning (63%), child health (53%), HIV (50%) and maternal and newborn health (50%). ■



Photo left: Rural village, Ethiopia.
© Dr Neil Spicer

Discussion



Photos: Health centres in West Wellega, Ethiopia. © Maternity Worldwide Denmark

This report has presented intervention area findings from the baseline 2012 Ethiopia survey of interactions between families and frontline workers, and coverage of critical interventions for mothers and newborns. For each stage along the continuum of care between pregnancy and the newborn period, the number and quality of interactions has been described, and the coverage of critical interventions at the population level estimated. Where possible, number of interactions and coverage of interventions has also been disaggregated by indicators of equity.

Overall, the survey results present a detailed insight into different elements of maternal and newborn health care in Ethiopia, and a review of these findings in light of previous study results from the country is planned.

Amongst women who had a live birth in the 12 months preceding survey, fifty-seven percent had accessed pregnancy care at least once, and twenty-two percent did so at least four times. However, there was some inequity by socio-economic status of households, and just seventeen percent of the poorest women had four or more pregnancy interactions compared to thirty percent of the least poor women.

It was apparent also that many interactions lacked content, with just three percent of women reporting that they received all of the core components of pregnancy care.

Sixteen percent of women had a skilled attendant at birth, again with some evidence of inequality - coverage being just 5% amongst the most poor. Women reported the practise of hand washing with soap by birth attendants to be universally high, and use of gloves was high in facilities, less so for home births. But it was apparent that there were areas where birth attendants could improve practise. For example, just thirty-six percent of health workers in primary health facilities reported using a prophylactic uterotonic at the last birth they attended, despite over ninety percent having a uterotonic available. Far fewer health extension workers at health posts reported using uterotonics, and indeed uterotonics were frequently missing from health posts. Fifteen percent of women reported giving birth at a health facility. In the health facility survey, we observed that just nineteen percent of facilities were providing maternity services on the day of survey and had all the items needed to monitor labour using a partograph.





Post-partum and post-natal care was largely absent, except for women who delivered in a health facility, and their newborns. The majority of post-partum and post-natal care that was reported was provided by nurses or midwives, but the quality of that care was frequently lacking with no newborns receiving all components of good quality care. Approximately four in ten newborns had clean cord care, were immediately wrapped, had immediate breastfeeding, and delayed bathing. Almost all newborns were exclusively breastfed for the first three days of life.

Limitations

A number of limitations are present. First, survey data collection approaches to estimate the prevalence of behaviours in pregnancy, intra-partum and newborn periods may be susceptible

both to recall error and to recall bias. We tried to limit recall error by only analysing data on births from the last 12 months in the household survey, and the last birth attended by frontline workers. Recall bias is harder to control (for example a frontline worker may report that she had used uterotonics at the last birth attended, even if she had not), but by triangulating data from different sources we have given more focus to findings that are both coherent and consistent, and we have highlighted areas where it was less clear. Second, estimating population level coverage of some intra-partum interventions is problematic: frontline workers cannot provide population level estimates where the majority of women have no skilled attendance at birth, and women cannot reliably answer questions about the drugs or medical interventions they received during labour. Therefore, for two intra-partum life saving

interventions we have combined information from frontline worker reports about behaviours with population level reports about attendance at birth.

Next steps

This report shows binary associations: analysis that adjusts for education level, or age of women is planned for the next phase of work. In 2014 it is planned to repeat this household, facility, and frontline worker survey in the same intervention and comparison areas. At that time, an analysis of change between baseline and endline indicators in interactions and coverage of critical interventions will be carried out, adjusting for important contextual factors. ■

Abbreviations and acronyms

Acronym	Meaning
95% CI	95% confidence interval
AMTSL	Active management of the third stage of labour
ANC	Antenatal care
BCG	Bacille Calmette Guerin
BP cuff	Blood pressure monitor
CHP	Community Health Promoters
DHS	Demographic and health survey
DPT	Diphtheria, pertussis, tetanus vaccination
HDA	Health Development Army
HEW	Health Extension Worker
IDEAS	Informed Decisions for Action in maternal and newborn health
IPTp	Intermittent presumptive treatment for malaria
L10K	Last Ten Kilometres project
LBW	Low birth weight
LSHTM	London School of Hygiene and Tropical Medicine
MNH	Maternal and newborn health
OPV	Oral Polio Vaccine
PHC	Primary health centre
PHCU	Primary health care unit
PMTCT	Prevention of mother to child transmission of HIV
SNNP	Southern Nations, Nationalities and Peoples
TBA	Traditional Birth Attendant
TT vaccines	Tetanus toxoid vaccination
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

Annex 1

Critical interventions for mothers and newborns

Interactions between families and frontline workers target the delivery of **critical interventions**¹ for mothers and newborns, as summarised in table A1.

¹ Adapted from “Partnership for Maternal Newborn & Child Health, Essential Interventions, Commodities and Guidelines for Reproductive, Maternal, Newborn and Child Health. A Global Review of the Key Interventions Related to Reproductive, Maternal Newborn and Child Health (RMNCH), 2011.”

Table A1 – Critical interventions for mothers and newborns along the continuum of care that are amenable to be delivered by frontline workers

Pregnancy care	Intra-partum care	Newborn immediate and post-natal care	Maternal post-natal care
1. Tetanus toxoid vaccine (effective protection being at least two doses in last three years or five in a lifetime)	1. Prophylactic uterotonics to prevent post-partum haemorrhage	1. Clean cord care (cutting, tying, nothing put on cord)	1. Detection and treatment of maternal anaemia
2. Iron supplementation	2. AMTSL (above + cord traction)	2. Breastfeeding (immediate (<1hr) and exclusive (3 days))	2. Detection and treatment of post partum sepsis
3. Prevention of malaria with IPTp and personal use of ITNs	3. Hand washing with soap by delivery attendant	3. Thermal care (immediate drying, wrapping, immediate skin to skin, delayed bathing)	
4. Syphilis prevention and management	4. Use of gloves by delivery attendant	4. Detection and appropriate management of complications (infection, respiratory, low birth weight, preterm)	

Annex 2

Indicators for enhanced interactions (more and better) between families and frontline workers across the continuum of care

Table A2 – Indicators for enhanced interactions (more and better) between families and frontline workers across the continuum of care

Stage	Indicator
More pregnancy care interactions	
1	Mean number of pregnancy interactions per woman ¹
2	Percent of women who had any pregnancy care ¹
3	Percent of women who attended a health facility at least once for pregnancy care ¹
4	Percent of women who had a least one pregnancy care interaction with a skilled provider ¹
5	Percent of women who had a least four pregnancy care interactions (with any provider) ¹
Better pregnancy care interactions	
1	Percent of women who had (unprompted) knowledge of at least one danger sign in pregnancy (valid responses included: severe headaches, blurred vision, reduced foetal movement, high blood pressure, convulsions, excessive bleeding, severe abdominal pain, high fever, anaemia) ¹
2	Percent of women who reported having made any preparations for delivery (Components included preparing finances, transport, food, and identification of a birth attendant and a facility) ¹
3	Median gestation at first pregnancy care interaction ¹
4	Percent of women who reported having received good quality pregnancy care (components included weight, height and blood pressure measured, urine and blood tested; counselled for breastfeeding, danger signs, birth preparedness) ¹
5	Percent of frontline workers who have knowledge of focussed pregnancy care ²
6	Percent of primary level facilities with all essential commodities needed to deliver pregnancy care ²
More intra-partum interactions	
1	Percent of women who delivered in a health facility ¹
2	Percent of women who were attended by a skilled attendant during last birth ¹
3	Percent of women who were advised to seek extra care during intra-partum period who did seek extra care ¹
4	Percent of births delivered by caesarean section ^{1,2}
Better intra-partum interactions	
1	Women with (unprompted) knowledge of at least one intra-partum danger sign (Valid responses included: vaginal bleeding, foul discharge, high fever, foetus hand or feet present first, foetus in abnormal position, prolonged labour, retained placenta, ruptured uterus, prolapsed cord, cord around newborns neck, convulsions) ¹
2	Percent of frontline workers with knowledge of actions to take when a women bleeds heavily in the intra-partum period ²
3	Percent of frontline workers who have the essential items they need to provide good quality care
4	Percent of health facilities with essential commodities needed for intra-partum care ²

Stage	Indicator
More postpartum interactions	
1	Percent of women who had at least one postpartum check within 2 days of birth ¹
2	Percent of women who had at least one postpartum check within 7 days of birth ¹
Better postpartum interactions	
1	Percent of women who reported receiving good quality postpartum care (breasts checked, bleeding checked, counselled for: danger signs, family planning, nutrition) ¹
More postnatal interactions	
1	Percent of newborns who had at least one postnatal check within two days of birth ¹
2	Percent of newborns who had at least one postnatal check within seven days of birth ¹
3	Percent of mothers whose newborn had at least one danger sign in the first 28 days of life who sought care for that danger sign outside the home ¹
Better postnatal interactions	
1	Percent of newborns receiving good quality postnatal care (components include newborn weighed, cord checked, mother counselled on breastfeeding, thermal care, and newborn danger signs) ¹
2	Percent of frontline workers with knowledge of actions to take for low birth weight newborns ²

¹ Measured through household surveys, interviewing women with a live birth in the 12 months preceding survey

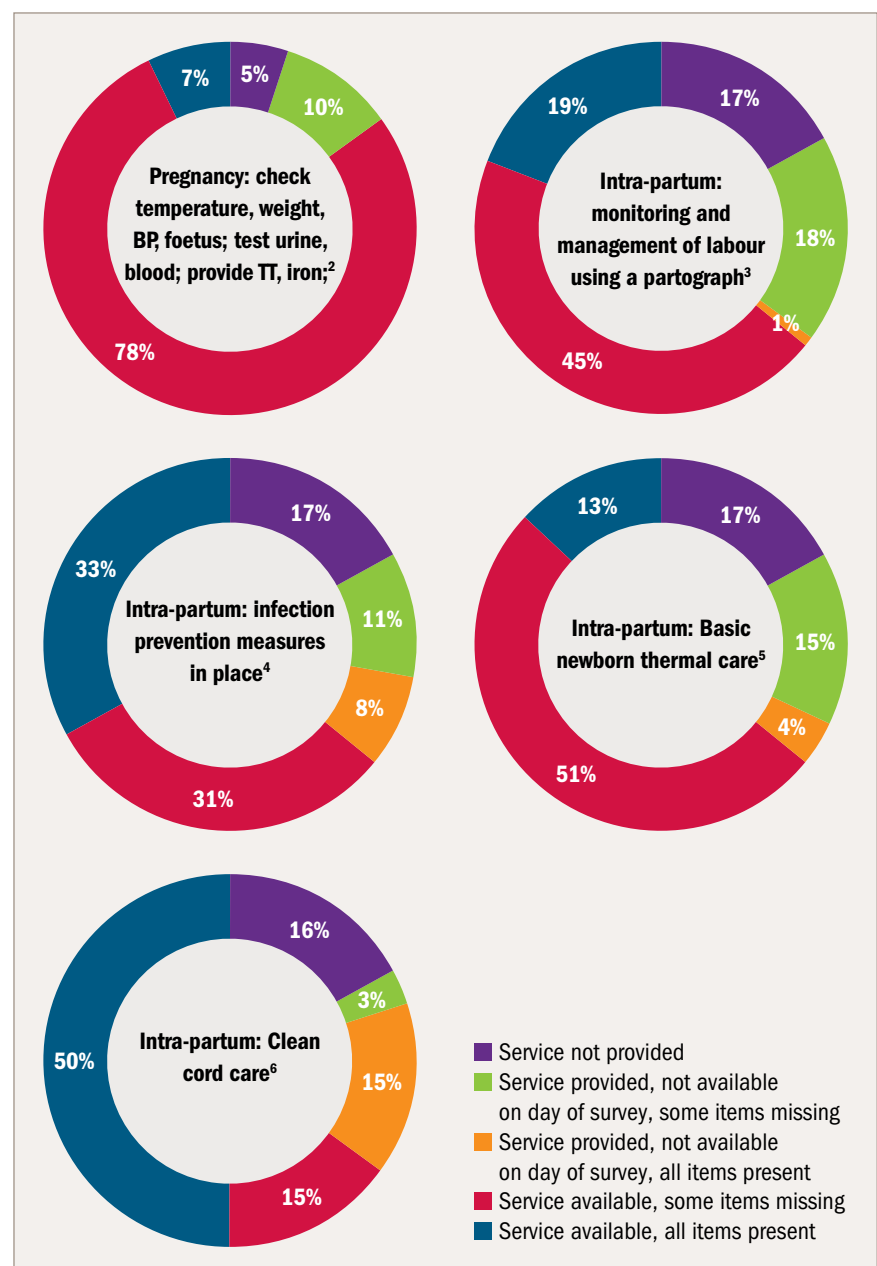
² Measured through health facility and frontline worker surveys, recording availability of supplies on the day of survey

Annex 3

Routine obstetric and newborn signal functions for all mothers and babies

The basic care requirements for all mothers and newborns include the following signal functions⁴: (1) monitoring and management of labour using partograph, (2) infection prevention measures (hand-washing, gloves), (3) active management of third stage of labour (AMTSL), (4) thermal protection of the newborn, (5) infection prevention including hygienic cord care, (6) immediate and exclusive breastfeeding. In addition, basic pregnancy care includes checking temperature, weight, blood pressure, foetal heartbeat, testing urine for protein and testing blood for syphilis, providing tetanus toxoid protection, and iron prophylaxis (protection from malaria excluded since it is not endemic throughout Ethiopia). In Figure A3 we present facility readiness to provide each of these functions (excluding AMTSL since the commodity required, a uterotonic drug, is included in monitoring and management of labour using a partograph, and excluding immediate and exclusive breastfeeding since these do not require commodities under normal circumstances).

Figure A.3 – Facility readiness (services provided and commodities available) to provide focussed pregnancy care and four basic obstetric and newborn signal functions to all mothers and newborns (excluding the third signal function, AMTSL, which overlaps with monitoring and management of labour using a partograph, and the sixth signal function: immediate and exclusive breastfeeding which has no essential commodity)



¹ Gabrysch et al (2012) New Signal Functions to Measure the Ability of Health Facilities to Provide Routine and Emergency Newborn Care. *PLoS Med* 9(11)

² Stethoscope, BP cuff, thermometer, adult scale, fetal stethoscope, timing device, disposable gloves, urine protein test kit, single use syringes, tetanus toxoid vaccines, ferrous/folate

³ Partograph, BP cuff, urine dipstick, fetal stethoscope, thermometer, uterotonic

⁴ Disinfectant, disposable gloves, soap

⁵ Towel to dry the newborn, blanket to wrap the newborn

⁶ Sterile cord cutter, cord tie

IDEAS project

IDEAS (Informed Decisions for Actions) aims to improve the health and survival of mothers and babies through generating evidence to inform policy and practice. Working in Ethiopia, North-Eastern Nigeria and the state of Uttar Pradesh in India, IDEAS uses measurement, learning and evaluation to find out what works, why, and how in maternal and newborn health programmes.

IDEAS is funded between 2010 and 2015 by a grant from the Bill & Melinda Gates foundation to the London School of Hygiene and Tropical Medicine.

ideas.lshtm.ac.uk

London School of Hygiene & Tropical Medicine

The London School of Hygiene & Tropical Medicine is a world-leading centre for research and postgraduate education in public and global health, with 4000 students and more than 13000 staff working in over 100 countries. The school is one of the highest-rated research institutions in the UK, and was recently cited as one of the world's top universities for collaborative research.

www.lshtm.ac.uk

IDEAS project

London School of Hygiene & Tropical Medicine
Keppel Street, London, WC1E 7HT, UK

t +44 (0)207 927 2871/2257

w ideas.lshtm.ac.uk

t @LSHTM_IDEAS