

Trends in reproductive, maternal,
newborn and child health care practices
in 115 L10K woredas: Analyses of three
rounds of survey data

Addis Ababa, Ethiopia
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The Last Ten Kilometers: What it takes to improve health outcomes in rural Ethiopia (L10K) works to strengthen the bridge between households and the primary health care unit (PHCU), Ethiopia's basic health service delivery structure. The aim is to improve high impact reproductive, maternal, newborn and child health (RMNCH) care behaviors and practices among the rural households and contribute towards achieving child and maternal health related Millennium Development Goals 4 and 5, decreasing child and maternal mortality rates. L10K is implemented by JSI Research & Training Institute, Inc., with grants primarily from the Bill & Melinda Gates Foundation and with additional funding from UNICEF and USAID. L10K works closely with the Ethiopian Government and other development partners, and provides technical and financial support to 12 civil society organizations.

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ACRONYMS

ANC	Antenatal Care
ARI	Acute Respiratory Infection
BCG	Bacillus Calmette-Guerin Vaccine
BF	Breastfeeding
CBDDM	Community Based Data for Decision Making
CHP	Community Health Promoter
CSO	Civil Society Organization
EBF	Exclusive Breastfeeding
EDHS	Ethiopian Demographic and Health Survey
ENC	Essential Newborn Care
EPI	Expanded Program on Immunization
FHC	Family Health Card
FMOH	Federal Ministry of Health
FP	Family Planning
GoE	Government of Ethiopia
HC	Health Center
HDA	Health Development Army
HEP	Health Extension Program
HEW	Health Extension Worker
HH	Household
HMIS	Health Management Information System
HP	Health Post
iCCM	integrated Community Case Management
JSI	John Snow, Inc.
L10K	Last Ten Kilometers
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
MNCH	Maternal Newborn Child Health
MNH	Maternal Newborn Health
NMR	Neonatal Mortality Rate
ORS	Oral Rehydration Solution
ORT	Oral Rehydration Therapy
PCQI	Participatory Community Quality Improvement
PENTA	Pentavalent
PHCU	Primary Health Care Unit
PNC	Postnatal Care
PPS	Probability Proportional to Size
RHB	Regional Health Bureau
RMNCH	Reproductive Maternal Newborn Health
SDGs	Sustainable Development Goals
SNNPR	Southern Nations, Nationalities and Peoples' Region
U5MR	Under 5 Mortality Rate
WHO	World Health Organization

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EXECUTIVE SUMMARY

Introduction

The Last Ten Kilometers: What it Takes to Improve Health in Rural Ethiopia (L10K), funded by the Bill & Melinda Gates Foundation and implemented by JSI Research & Training Institute, Inc. (JSI), launched innovative community-based strategies in December 2008 to improve high-impact reproductive, maternal, newborn and child health (RMNCH) care behavior and practices. L10K works closely with Ethiopia's health system at the grassroots—the primary health care unit (PHCU) including the Health Extension Program (HEP)—and enhances interactions between the health workers of PHCUs (i.e., health center [HC] service providers, health extension workers [HEWs], and health development army [HDA] members) and communities to achieve more accessible, efficient and equitable RMNCH services. The goal of the project is to ultimately contributing towards the achievement of Ethiopia's Millennium Development Goals (MDGs) 4 and 5, that is, reducing under-5 mortality rate and maternal mortality ratio.

The Bill & Melinda Gates Foundation funded L10K activities are being implemented in 115 *woredas* (i.e., districts) in Amhara, Oromia, Southern Nations, Nationalities and Peoples' (SNNP) and Tigray, covering a population of about 17 million people (i.e., about 16 percent of the country's population). The original project timeline was from October 2007 to September 2012. Through a supplemental fund, the project period was extended to September 2015; and the scope of its strategies modified. The specific objectives of the L10K project supplemental period are:

- Households (HHs) and *kebeles* actively engage in the provision of *kebele*-based health services in conjunction with the HEP in order to increase availability of services and change HH/*kebele* health practices.
- HHs, *kebeles* and PHCU address identified barriers to quality maternal and newborn health (MNH) HH/*kebele* practices and services through innovative *kebele* approaches.
- Civil society partners capable of implementing grants program and building capacities of HHs and *kebeles* to participate in health programming with HEWs.
- L10K project partners learn, document and disseminate project experiences through monitoring and evaluation.
- Demonstrate innovative processes and solutions that improve effective care-seeking and response for critical maternal and newborn health conditions.
- Demonstrate innovative approaches and solutions to advancing continuity of care and optimizing utilization from pregnancy to year one.
- Demonstrate innovative solutions to address barriers to demand and quality of community-based long acting FP services provided by PHCUs.

L10K partners with 12 civil society organizations (CSOs) and provides them technical and financial support to implement its innovative strategies to engage local communities to take responsibilities to improve their RMNCH. The L10K platform is implemented across all the 115 *woredas* and includes Community Based Data for Decision Making (CBDDM) that ensures targeted RMNCH services; family conversation, a health education forum that promotes birth preparedness and emergency readiness; birth notification, a community based information system to ensure safe birthing, early postnatal care (PNC), and immediate newborn care; and, non-financial incentives to motivate and sustain volunteerism among the HDAs. In addition to the platform, L10K implements four distinct innovative community strategies to test their added

value in reaching its objectives. These strategies include: Participatory Community Quality Improvement (PCQI) that addresses barriers to access and quality of RMNCH services through community engagement; Early Care Seeking and Referral Solutions that ensures timely and appropriate management of critical maternal and newborn health services; Advancing Continuity of Care; and Improving the Demand and Quality of Community-based Family Planning methods. The latter two strategies were still at the design phase at the time of the Round III survey.

Since the inception of L10K, three rounds of HH and community surveys were conducted to measure the impact of L10K's innovations on RMNCH care behavior and practices. The Round I survey (i.e., the baseline survey) was conducted in December 2008–January 2009, the Round II survey was conducted in December 2010–January 2011 and the Round III survey was conducted in December 2014–January 2015. This summary report presents the changes across these three surveys in 1) the *kebele* health system situation supporting HEP, 2) access and exposure to RMNCH messages and services, and 3) RMNCH behavior and practices; discusses the adequacy of these changes; and identifies gaps that need further attention.

Methodology

Three rounds of cross-sectional surveys (Round I, Round II and Round III) data were analyzed stratified by region to assess the adequacy of the L10K intervention; that is, whether the expected changes in RMNCH care behavior and practices set by project objectives were achieved or not.

All three surveys applied two-stage stratified cluster sampling to obtain 1) family planning information from women of reproductive age (15–49 years), 2) MNH information from women with children 0–11 months, and 3) child health information from women with children 12–23 months in the L10K intervention areas.

At the first stage, *kebeles* were randomly selected as primary sampling units (PSU) with probability proportional to their population sizes (PPS). One community questionnaire was completed in each *kebele* by interviewing at least one HEW. In second stage, HHs in the *kebele* were selected for interviews for each target population using the WHO 30 by 7 sampling method. In Round I, 204 *kebeles* were visited from which 203 community questionnaires were completed and 6,178 women were interviewed, including 4,000 women of reproductive age, 2,400 women with children 0–11 months and 2,000 women with children 12 to 23 months. In Round II, 330 *kebeles* were visited, from which 324 community questionnaires were completed and 9,781 women were interviewed, including 3,888 women of reproductive age, 3,887 women with children 0–11 months, and 3,876 women with children 12 to 23 months. In Round III, 324 *kebeles* were visited, from which 316 community questionnaires were completed and 9,449 women were interviewed, including 3,988 women of reproductive age, 3,883 women with children 0–11 months, and 3,903 women with children in 12–23 months.

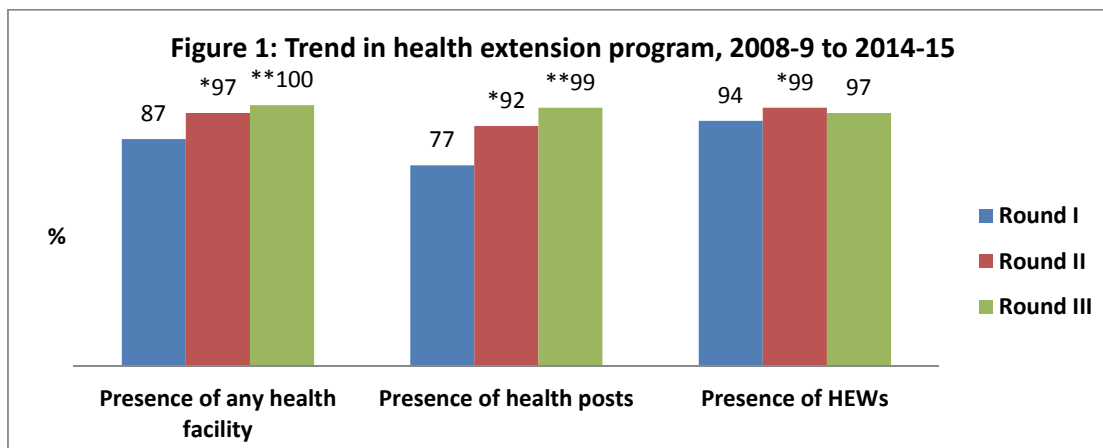
Statistical tests were conducted to explore whether difference in RMNCH indicators over time and across regions were statistically significant. For significance testing, the critical value of two-tailed p-value was set at 0.05. Only statistically significant findings are discussed in this report, and findings are generalizable to the L10K areas only.

Key Findings and Its Implications

Situation of Kebele Health Services

HEP Coverage:

The coverage of the HEP has been improving during the project period, reaching almost universal in Round III; 99 percent of the *kebeles* had at least one health post (HP) and 97 percent of *kebeles* had at least one HEW in Round III (Figure 1). The ratio of population to one HEW in a *kebele* was 3,278 in Round I, 2,942 in Round II and 3,067 in Round III, which is approaching the Government of Ethiopia's target of one HEW for every 2,500 people.



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

HDA:

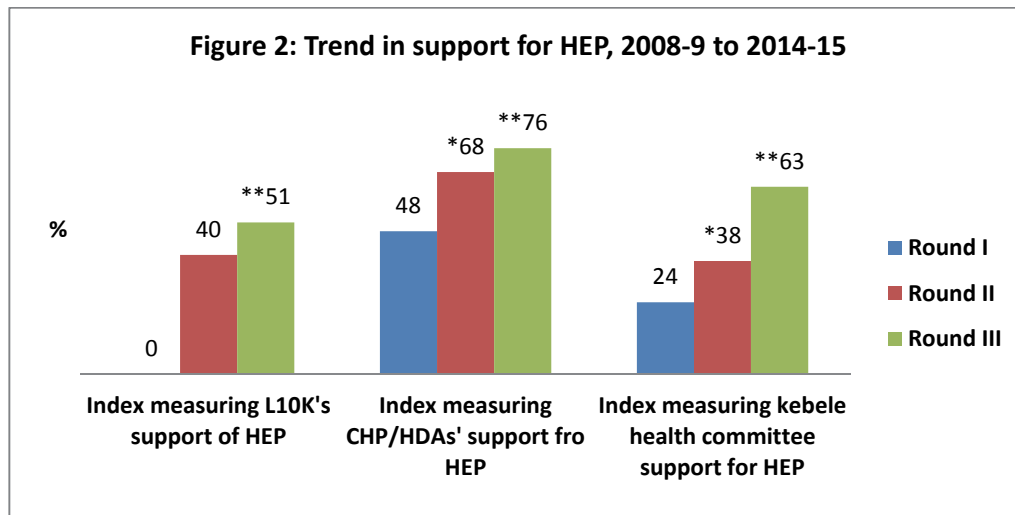
The average number of HHs per HDA team leader was 46 in Round III, much higher than the anticipated one HDA team leader for every 30 HHs. Amhara was the closest to the mark (38 HHs per HDA team leader), followed by Oromia (43 HHs per HDA), SNNP (49 HHs per HDA), and Tigray (68 HHs per HDA). Seventy-five percent of the HDA team leaders attended a *kebele* meeting in the last 3 months with the highest percentage of leaders observed in Tigray (82 percent) and the lowest in Oromia (74 percent).

L10K Support for HEP:

HEWs' perception regarding the support they receive from L10K have significantly improved between Round II (2010-11) and Round III (2014-15) for nutrition/growth monitoring, antenatal care (ANC), referral, postnatal care (PNC), counseling for breastfeeding, counseling for complementary feeding and training for HDAs. Moderate improvement in support and supervision was reported for delivery and essential newborn care, and no improvement was reported for immunization and family planning. Perceived support on training on different components did not increase except for nutrition/growth monitoring and referral. The intensity of perceived L10K support in a *kebele* was measured using an index based on HEW self-report across each of the 11 services. Based on the percentage of the maximum score, the average intensity of L10K's support for HEP in a *kebele* improved from 40 percent in Round II to 51 percent in Round III (Figure 2). The mean L10K intensity score was 56 percent in Oromia, 53 percent in Amhara, 52 percent in Tigray and 41 percent in SNNP in Round III.

HDA Support for HEP:

An index was constructed to measure HEWs' perception regarding the support they receive from HDAs for HEP in Round III and that from the community health promoters (CHPs) in Rounds I and II. The index was based on the perceived support to each of the 17 HEP service components considered. The index was expressed as a percentage of the maximum score. HEWs' perception regarding HDAs' support was higher in Round III (79 percent) compared to that from the CHPs in Round II (68 percent) (Figure 2). The highest HDA support for HEP was observed in Tigray at 80 percent, followed by Amhara and Oromia (77 percent) and SNNP (74 percent) in Round III.



*Statistically significant difference between Round I and Round II

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Kebele Health Committees' Support for HEP:

An index was constructed to measure the overall support the HEP received from the *kebele* health committee by summing all 12 different aspects of support. The index was then expressed as a percentage of the maximum possible score. The mean score increased from 24 percent in Round I to 38 percent in Round II and then nearly doubled to 63 percent in Round III (Figure 2). The *kebele* health committee index score in Round III was highest in Tigray (69 percent) and Oromia (68 percent), followed by SNNP (63 percent) and Amhara (57 percent).

Community Based Health Management Information System (HMIS):

Over 96 percent of the HPs in Round III had family folders. Eighty percent of HPs in Amhara, 60 percent in Oromia and 50 percent in Tigray and SNNP kept updated records in family folders.

Availability of Commodities:

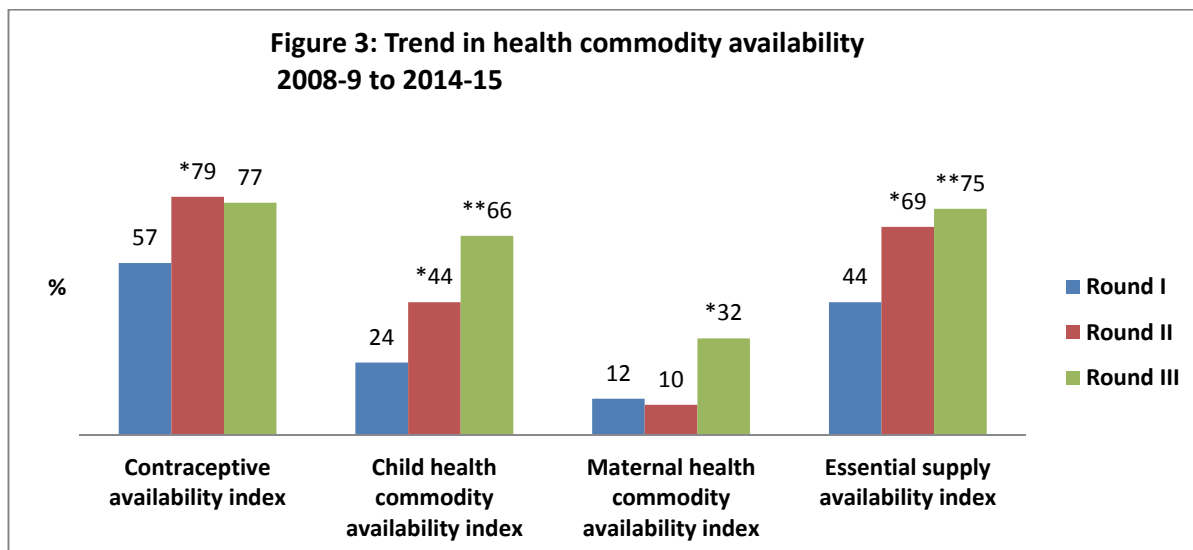
Four indices were constructed to measure the availability of MNCH commodities and essential supplies at the HPs (Figure 3). The indices were expressed as a percentage of the maximum possible availability of the commodities considered.

The contraceptive availability index (i.e., availability of pills, condoms and injectables) score increased from 57 percent in Round I to 79 percent in Round II, and remained around the same at 77 percent in Round III. An increase in *the contraceptive availability index* between Round I and Round II was seen in all the regions. However, only Tigray showed an increase between Round II and Round III from 78 percent to 93 percent. The index remained the same or dropped in other regions.

The *child health commodity availability index* (i.e., ORS, vitamin A, vaccines, de-worming medicines, co-trimoxazole and anti-malarial medicines) score increased substantially from 24 percent in Round I to 44 percent in Round II and to 66 percent in Round III (Figure 3). All four regions showed improvements in the index over time and in Round III. The highest score was observed in Tigray at 85 percent, followed by Amhara at 72 percent, then in Oromia at 63 percent and in SNNP at 48 percent.

The *maternal health commodity availability index* (i.e., iron tablets and misoprostol) score remained same between Round I and Round II and increased from 10 percent in Round II to 32 percent in Round III (Figure 3) showing similar regional trends. The maternal health commodity availability index in Round III was highest in Tigray (51 percent), followed by 31 percent in Amhara, 29 percent in SNNP and lowest in Oromia (24 percent).

An *essential supplies availability index* was constructed using 17 supplies at the HPs. The index was also expressed as a percentage of the maximum possible availability of the supplies considered. The essential availability supply index increased from 44 percent in Round I to 69 percent in Round II and to 75 percent in Round III.



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

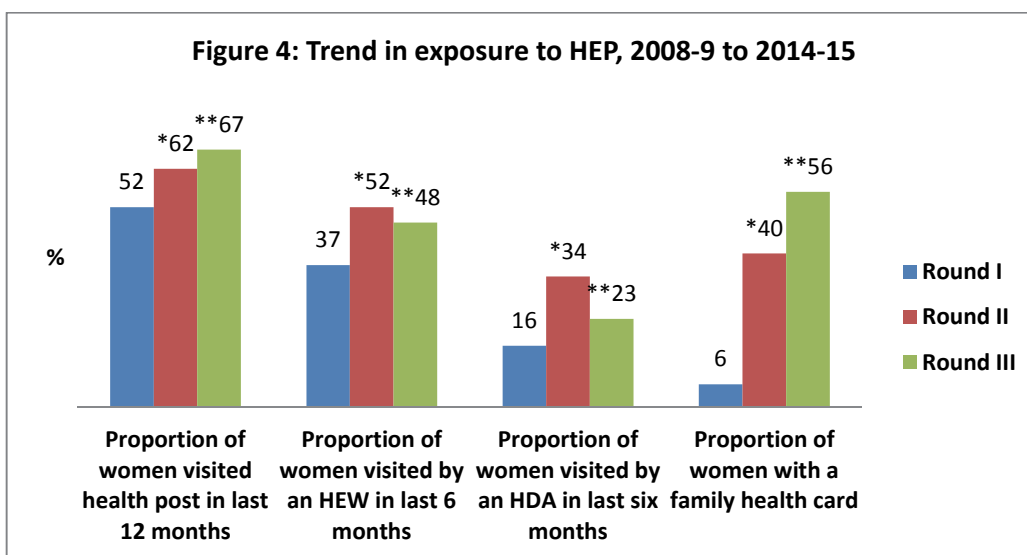
Interactions between HEWs and HDAs with HHs and Families

Visits to the HPs in Last 12 Months:

The proportion of women visiting HPs in last 12 months increased from 52 percent in Round I to 62 percent in Round II and to 67 percent in Round III (Figure 4). The proportion of women who visited HPs in Round III was 71 percent in Oromia, 69 percent in Amhara, 64 percent in Tigray and 63 percent in SNNP.

Visited by an HEW in Last Six Months:

The proportion of women being visited or contacted by an HEW in the last six months increased from 37 percent in Round I to 52 percent in Round II, and then declined slightly in Round III to 48 percent (Figure 4). The proportion of women visited by an HEW was about 52 percent in Tigray, Amhara and Oromia and 32 percent in SNNP in Round III.



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Visited by an HDA/CHP in Last Six Months:

The proportion of women being visited by a HDA in the last six months was 23 percent in Round III, which is lower than the proportion of HHs visited by CHPs observed in Round II (Figure 4). In Round III, the proportion of women visited by an HDA was 40 percent in Tigray, 24 percent in Amhara, 18 percent in Oromia and SNNP.

Proportion of HHs with a Family Health Card:

The proportion of HHs with a family health card increased substantially from 6 percent in Round I to 40 percent in Round II and to 56 percent in Round III (Figure 4). In Round III, The proportion of women with a family card was 63 percent in Tigray, 57 percent in Amhara, 55 percent in Oromia and 53 percent in SNNP.

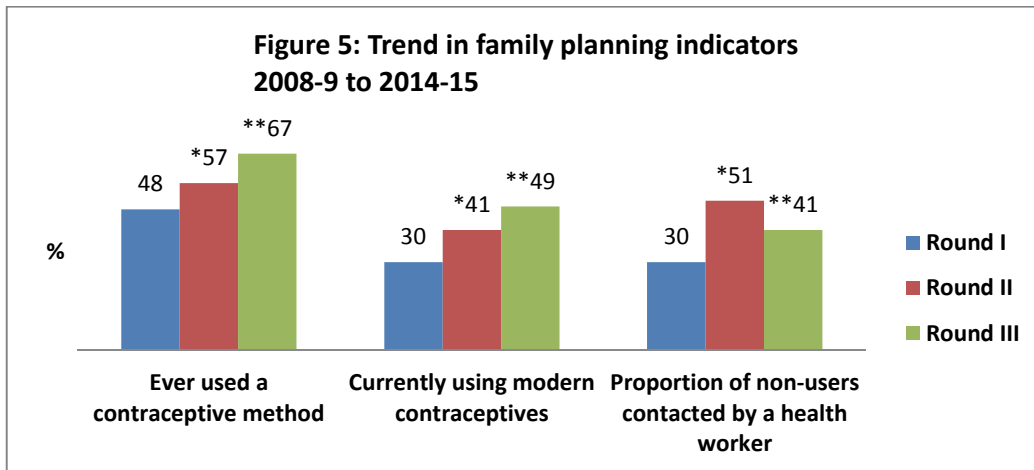
Family Planning Indicators

The proportion of women who reported ever using a modern contraceptive method increased from 48 percent in Round I to 57 percent in Round II and to 67 percent in Round III (Figure 5).

The proportion of women of reproductive age who were in a union and currently using a contraceptive method (i.e., the contraceptive prevalence rate or CPR) increased from 30 percent in Round I to 41 percent in Round II to 49 percent in Round III (Figure 5). In Round III the CPR was highest in Oromia (56 percent), followed by Amhara (49 percent), SNNP (48 percent) and Tigray (36 percent).

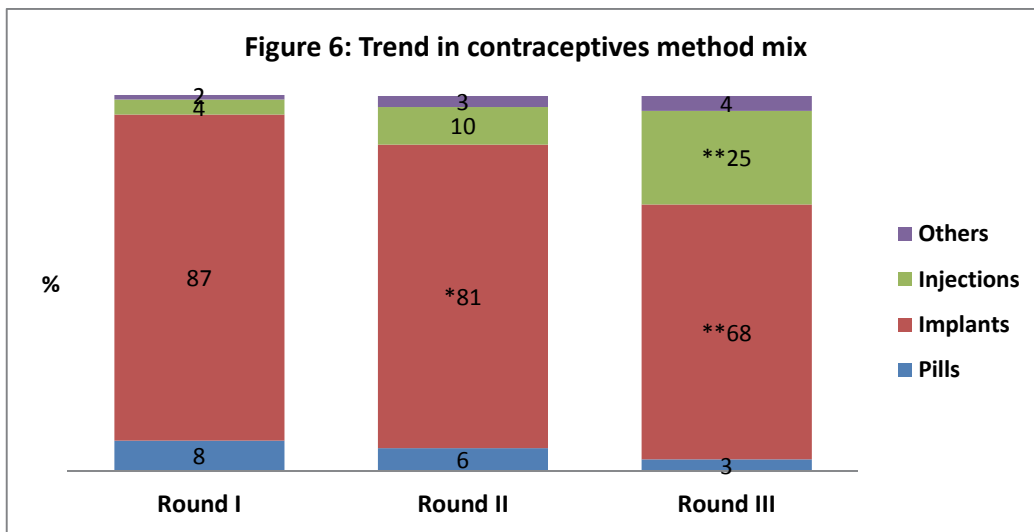
The proportion of non-users contacted by a health worker was 30 percent in Round I; which increased to 51 percent in Round II and then declined to 41 percent in Round III (Figure 5). Similar trend was observed across the four regions.

The share of injectables among contraceptives users declined from 81 percent in Round II to 68 percent in Round III; while the share of Implanon increased from 10 to 25 percent during that period (Figure 6).



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Maternal and Newborn Health Indicators

HH Visits by an HEW during Pregnancy:

The proportion of women with children of 0-11 months who were visited by an HEW during their last pregnancy increased from 12 percent in Round I to 32 percent in Round II and to 39 percent in Round III (Figure 7). The indicator though showed improvement in Tigray and Amhara and declined in the other two regions. In Round III, the visit by an HEW during last pregnancy was highest in Tigray and Amhara at 55 and 54 percent and about 24 percent in SNNP and Oromia.

Neonatal Tetanus Protected Childbirth:

The proportion of women with children 0 to 11 months whose last childbirth was protected against neonatal tetanus increased moderately from 58 percent in Round II to 63 percent in Round III (Figure 7).

Utilization of Antenatal Care:

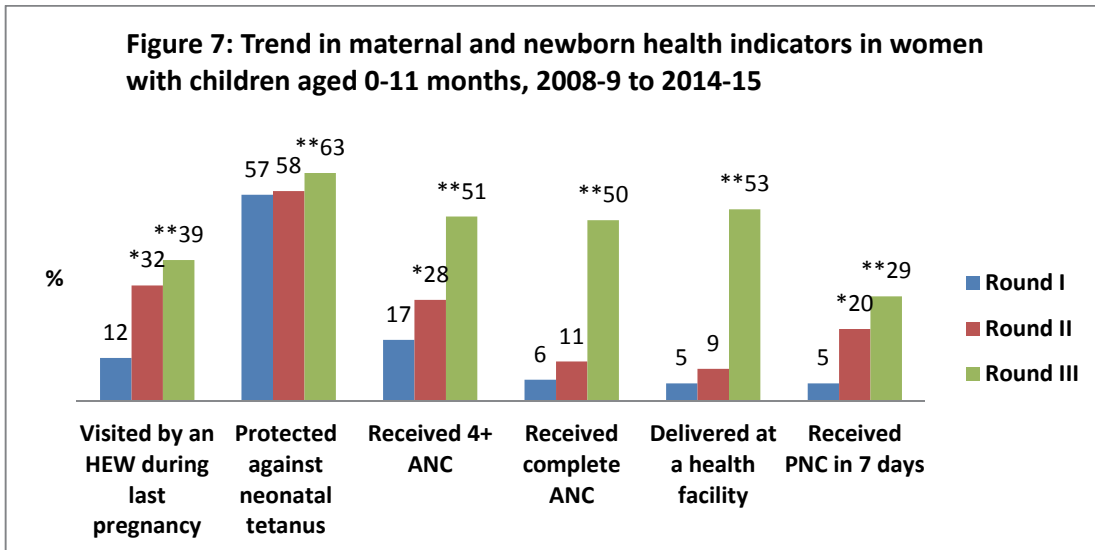
The coverage of four or more (4+) ANC increased substantially from 17 percent in Round I to 28 percent in Round II and to 51 percent in Round III. The coverage of complete ANC (i.e., blood pressure measured, blood and urine tests conducted) also increased from 10 percent in Round II to 50 percent in Round III (Figure 7).

Institutional Delivery:

The proportion of women with children 0-11 months who chose institutional deliveries (i.e., deliveries at the HC or hospital) for their last birth increased sharply from 9 percent in Round II to 53 percent in Round III (Figure 7). The increase was the highest in Tigray (from 14 to 77 percent) followed by Oromia (from 10 to 56 percent), Amhara (from 3 to 47 percent) and then SNNP (from 6 to 45 percent).

Postnatal Care:

The proportion of women with children 0-11 months receiving PNC within 48 hours following their last childbirth did not increase from Round II; but PNC within 7 days increased from 5 percent in Round I to 20 percent in Round II to 29 percent in Round III (Figure 7).



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Birth Preparedness:

Birth preparedness has been improving over the project period. Sixty-nine percent women in Round I, 77 percent women in Round II and 90 percent women in Round III used at least one birth preparedness measure. The highest improved birth preparedness component was identifying a facility for delivery; 3 percent in Round I, 6 percent in Round II, and 23 percent in Round III.

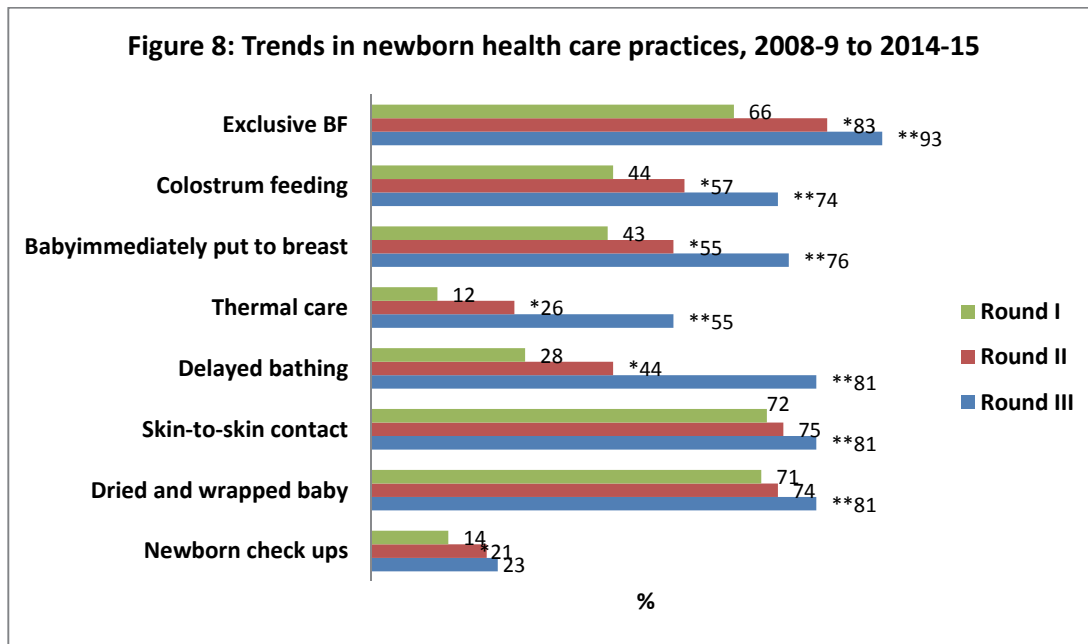
Newborn Check-up:

The quality of newborn check-up has not improved much since 2010-11. An index assessing the quality of newborn check-ups, measured by summing the newborn check-up components recalled by mothers, was 14 percent of the maximum in Round I, 21 percent in Round II and 23 percent in Round III (Figure 8).

Newborn Health Practices:

Several components of newborn care practices improved between Round II and Round III (Figure 8). Dried and wrapped baby after delivery improved from 74 to 81 percent; skin-to-skin care improved from 75 to 81 percent; delayed bathing of newborn improved from 44 to 81 percent; thermal care improved from 26

percent to 55 percent; fed colostrum improved from 57 to 74 percent; early initiation of breastfeeding improved from 55 to 76 percent; and exclusive breastfeeding improved from 83 to 93 percent. Similar trends were observed in all four regions.



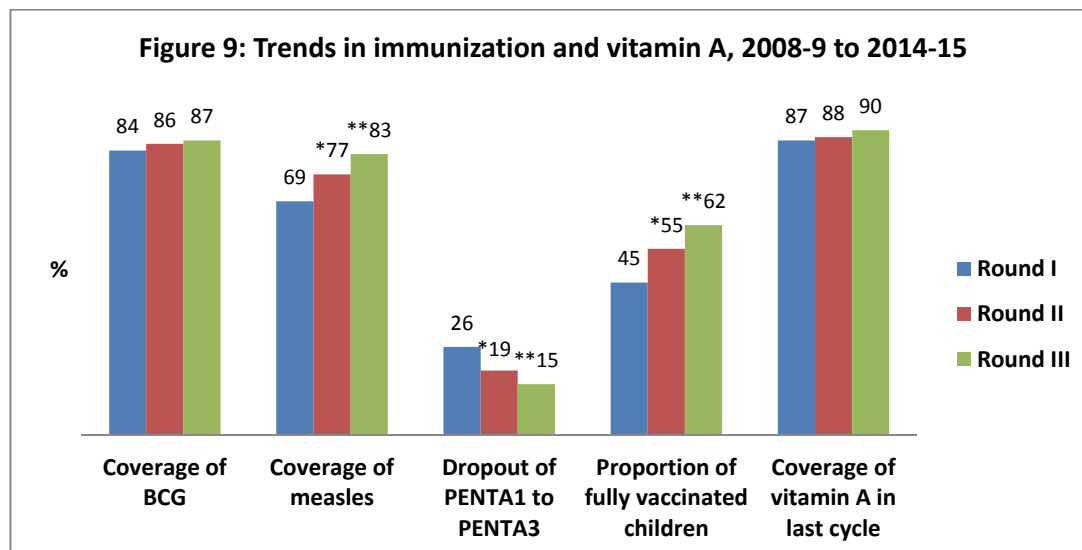
*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Child Health Indicators

Coverage of Immunization and Vitamin A:

The coverage of BCG did not improve much across the survey rounds. In Round III, the BCG coverage was 87 percent. The coverage of measles vaccination increased from 69 percent in Round I to 77 percent in Round II



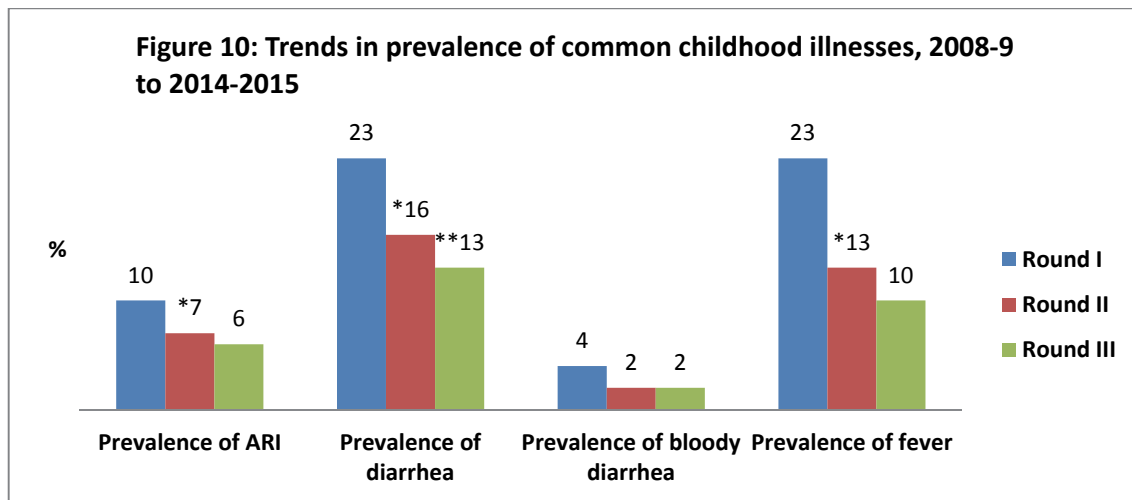
*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

to 83 percent in Round III. The coverage of fully vaccinated children increased from 45 percent in Round I, to 55 percent in Round II, and to 62 percent in Round III (Figure 9). The coverage was the highest in Tigray (67 percent), followed by Oromia (66 percent), Amhara (63 percent) and then SNNP (53 percent). The dropout rate between PENTA 1 and PENTA 3 declined from 26 percent in 2008-9 to 15 percent in 2014-15. The coverage of vitamin A did not change across survey rounds and was 90 percent in Round III (Figure 9).

Childhood Illnesses and Care-seeking Behaviors:

The prevalence of childhood illnesses showed a declining trend over time. The prevalence of acute respiratory infection (ARI) declined from 10 percent in Round I to 6 percent in Round III; the prevalence of diarrhea declined from 23 in Round I to 13 percent in Round III; and the prevalence of fever declined from 22 percent in Round I to 10 percent in Round III (Figure 10).



*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Although there was no change in the management of sick children between Round I and Round II; there was significant improvements between Round II and Round III. ARI case management increased from 35 percent in Round II to 69 percent in Round III; diarrhea management with oral rehydration therapy (ORT) improved from 44 percent in Round II to 51 percent in Round III; and management of fever increased from 41 percent in Round II to 66 percent in Round III.

Conclusions and Recommendations

This situation analysis of health services in *kebeles* indicates major improvement in the infrastructure and coverage of HEP. The availability of any health facility is almost universal with population to HEW ratio approaching target (one HEW per 2,500 people). However, to achieve the optimum 30 HHs per HDA team leader (current average is 46) as planned by the HDA strategy, **more HDAs need to be selected and trained to minimize the gap.**

There was impressive increase in L10K’s support as per perception of the HEWs. However, it was deemed weak in training related activities. HEWs were given a wide range of training on iCCM, ENC, IRT, and nutrition. These were part of the country’s national effort to improve HEWs’ performance where L10K provided major input. Since the trainings were led by the Government of Ethiopia (GoE) staff, it is likely the reason why the HEWs did not link those training with L10K.

The HDAs replaced CHPs around 2011/2012; however, the HDAs' level of support for HEP has improved only marginally compared to the level of support the CHPs had provided. ***Thus, special initiatives will be required to improve the support HDAs provide to HEWs. Further visibility and involvement of HDAs in HEWs' activities should be encouraged to enhance HEWs perception on HDAs.***

On the other hand, perceived support from the *kebele* health committee has improved substantially. ***The improving role of kebele committee for health issues is encouraging. This vehicle should be used for HEP issues that are lagging behind.***

A high availability of family folders at the time of Round III survey was observed, and yet, the irregular practice of updating the records ***underscore the need for reinforcing the importance of HMIS data for decision making. Supportive supervisions should focus more on record keeping. Experience sharing between high and low performing kebeles should be encouraged.***

The availability of commodities at the HPs has improved with substantial increase in the availability of life-saving child health medicines, such as co-trimoxazole, and maternal health medicines, such as misoprostol. Seventy-five and 80 percent of HPs had implants and injectables, respectively. ***The HPs should aim for near 100% availability of life-saving drugs and contraceptives. No client should be rejected services due to lack of product availability. Thus, given the rising demand for modern treatment for childhood and maternal health and family planning, ensuring uninterrupted commodity supplies, and avoiding stock-outs are very important to further improve and sustain quality services.***

While interactions with HEWs at the HP level increased, visits by HEWs at HH level declined moderately in Round III compared to Round II. However, the moderate reduction in HH visits by the HEWs is not very discouraging given the fact that the responsibility to conduct outreach activities (like HH visits) after introduction of integrated community case management (iCCM) of common childhood illnesses was supposed to be reduced from 75 percent of their time to 50 percent.

The low reporting of the HDA visiting the respondents' HH could be due to the possibility that some women see the HDA as a community member and not as an agent (i.e., HDA) for promoting HEP services, the HDA is not very pro-active as such the respondent did not remember visiting her HH for promoting HEP, or the combination of both. The transition from CHP strategy to HDA strategy was not straight forward. For example, in SNNP the HDAs were men for few years before they were replaced by women. This may have affected the performance of HDAs. In any case, HDAs mainly replaced the role of CHPs and should be performing at least at the level of CHPs. Thus, it is of concern that HH visits by HDA during Round III was lower than the HH visits by CHPs in Round II. ***Priorities should be given to make HDAs more knowledgeable regarding the best practices in RMNCH care, motivate them to be more active and active in their RMNCH related activities and engage more meaningfully in the community. A functioning HDA body is likely to contribute to the reduction of HEWs' HH visits.***

Assessment of the quality of interactions between women and the HDAs measured by spontaneous recalling of topics discussed by the HDAs in the last six months shows a negative trend compared to the quality of the interactions between HHs and the CHPs. This may be the result of a poor quality of training as the number of HDAs who received training was much higher than the CHPs. ***The quality of interaction also needs to be improved in order for the women to internalize the topics of discussion and then adopting healthy practices as per these discussions. The support that HEWs provide in training and reviewing HDAs' performances and HDAs' interactions with the HHs and communities should be strengthened.***

The annual rate of increase in CPR was not as substantial between Round II and Round III as it was between Round I and Round II. Strategies to enhance the CPR should be a priority. Reaching out to the non-users should be a major focus of family planning initiatives. ***Long term method Implants is replacing use of injectables, which reflects the GOE's initiative of popularizing implants as a cost-effective method. However, as the long acting family planning methods is increasing, the quality of methods and service delivery should be monitored and ensured.***

An unprecedented surge in ANC coverage and institutional deliveries, and reasonable increase in newborn health care practices have been observed between Round II and Round III. ***To improve and sustain this trend, current strategies that are impacting the results need to be monitored for quality of the services.***

There was no change in PNC in 48 hours between the last two survey rounds. Newborn health care practices have shown improvements, and some components, such as delay in bathing the newborn and thermal care, showed substantial gains. An increase in positive newborn health care practices reflects the impact of increasing utilization of four or more ANC visits, birth preparedness and better understanding of family health cards. The newborn care practices that are simple to conceptualize and implement have been adopted by the community. The question may be raised how such improvement happened in the context of low coverage of early PNC and limited knowledge of danger signs. PNC within 48 hours, and knowledge about danger signs and acting immediately upon emergencies are pertinent for identifying life threatening conditions like neonatal sepsis, and post-partum hemorrhage. ***Thus, the major gap in the current strategy is to ensure early PNC where the bulk of maternal and newborn mortalities take place.***

In Round III survey, most deliveries are taking place at HCs. PNC among those delivering at HC is low. ***Strategies will be required to inform HEWs to follow-up with women for PNC, especially those delivering at the HC; perhaps through the use of mHealth. Strategies will also be needed to ensure early PNC among those delivering at home (women may be ostracized for delivering at home and thus, become fearful to inform the HEW for PNC). The coverage of 'birth notification' strategy of L10K aimed at improving PNC is suboptimum; reasons for this needs to be sought and addressed possibly through operation research.***

Priorities also need to focus on improving women's knowledge on maternal and newborn health related danger signs, which is currently low for sustainable practice.

The coverage of child immunization is showing an increasing trend, though still nearly 40 percent children are not fully immunized and dropout rates are still of a concern. ***Strategies to improve vaccination coverage, including finding ways to reduce dropout rates, need to implemented.***

The prevalence of four major childhood illnesses (ARI, diarrhea, bloody diarrhea and fever) have declined in Round III and care-seeking behaviors for these illnesses have improved significantly, which is most likely due to the effect of iCCM strategies adopted by the HEP. However, utilization of these services from the HPs is still low. ***Strategies should focus on informing mothers/caretakers about HEWs' roles in clinical services for common childhood illnesses. Building communities' trust and confidence on HEWs' clinical services also need to be improved.***

Way Forward

The HEP has evolved since 2005 and has supported the achievement of impressive milestones in RMNCH outcomes in Ethiopia. In the last three years, an unprecedented higher percentage of women are seeking antenatal care, choosing institutional deliveries, and choosing long term family planning methods like implants. Service utilizations for common childhood illnesses, including use of antibiotics, have also

improved substantially, among others. Having met MDG 4, and on the track of reaching MDG 5 with emerging demand for institution based deliveries, priorities need to focus on monitoring and ensuring quality of services provided at the PHCUs. Next generation priorities should address transforming the PHCU as a whole to ensure timely and quality care. A stronger linkage and better communication between the community (including HDAs), HPs and HCs will be required to ensure timely referral and continuity of care. This will be critical to elevate Ethiopia's health sector from the current level to a state-of-the-art community sensitive health system, providing preventive and curative services. L10K has been a key partner in the HEP's endeavor and will be contributing to the process of this transformation of the PHCUs to set-up and achieve the Sustainable Development Goals (SDGs).

BACKGROUND

Between 1990 and 2012, the under-5 mortality rate (U5MR) in Ethiopia declined dramatically by two-thirds from 204 to 68 deaths per 1,000 live births—thereby reaching the country’s Millennium Development Goal (MDG) 4 three years early. During the same period the reduction in neonatal (first 28 days of life) mortality rate (NMR) and maternal mortality ratio (MMR) has shown more modest change—NMR declined from 54 to 29 deaths per 1,000 live births and MMR declined from 708 to 497 deaths per 100,000 live births [1–3]. Decreasing NMR further is critical for Ethiopia to sustain its under-five mortality reduction effort beyond 2015. Meeting the country’s MDG 5 target for MMR remains a challenge given the low utilization of skilled personnel and facility-based services during childbirth [4].

Committed to reach its health related MDGs, Ethiopia established its primary health care unit (PHCU) as the major platform for health service delivery at the grassroots level, comprising one health center (HC) and five satellite health posts (HPs) for every 25,000 people [5]. In 2004, the health extension program (HEP) was launched, which focused on expansion of HPs in each *kebele*¹ (i.e., community) and the deployment of two female health extension workers (HEWs) trained to provide a package of preventive health care services and some basic curative services a [6,7]. The HCs are staffed with health officers, nurses and midwives, providing primarily curative care and receive referrals from the HP, while also serving as the administrative, technical, and supportive supervision links to the HPs. HCs also provide drugs and other medical supplies to HPs.

To further extend the reach of the HEP and mobilize the community and households (HHs), each *kebele* includes a network of women called the ‘health development army’ (HDA). These women work in tandem with the HEWs to provide health promotion and facilitate uptake of health services. Each HDA is responsible for five HHs (1:5) and is organized into subgroups of five HDAs, which are led by one network team leader (1:30) [8].

The Last Ten Kilometers (L10K) Project funded by the Bill & Melinda Gates Foundation and implemented by JSI Research & Training Institute, Inc. launched innovative community based strategies in December 2008 to support the HEP. L10K enhances interactions between health workers of PHCU (i.e., HC service providers, HEWs, and HDAs) and communities to achieve more accessible, efficient and equitable reproductive, maternal, newborn and child health (RMNCH) services [9]. The goal of the project is to ultimately contributing towards the achievement of MDGs 4 and 5.

The original project timeline was from October 2007 to September 2012. Through a supplemental fund the project period as well as the project scope of the innovations were modified and extended to September 2015. The specific objectives of the L10K project supplemental period are:

- HHs and *kebeles* actively engage in the provision of *kebele*-based health services in conjunction with the HEP in order to increase availability of services and change HH/*kebele* health practices.
- HHs, *kebeles* and PHCU address identified barriers to quality maternal and newborn health (MNH) HH/*kebele* practices and services through innovative *kebele* approaches.
- Civil society partners capable of implementing grants program and building capacities of HHs and *kebeles* to participate in health programming with HEWs.
- L10K project partners learn, document and disseminate project experiences through monitoring and evaluation.

¹ The smallest administrative unit of the country, each with a population size of about 5,000 people.

- Demonstrate innovative processes and solutions that improve effective care-seeking and response for critical MNH conditions.
- Demonstrate innovative approaches and solutions to advancing continuity of care and optimizing utilization from pregnancy to year one.
- Demonstrate innovative solutions to address barriers to demand and quality of community-based long acting FP services provided by PHCUs.

The L10K extended its scope of activities and geography through funding from other donors (mainly, United Nations Children’s Fund [UNICEF] and US Agency for International Development [USAID]). However this report covers the 115 *woredas*² where the Bill & Melinda Gates Foundation funded activities are being implemented. Between 2008 and 2015, three population based surveys have been conducted in these 115 *woredas* by L10K. Using the three rounds of surveys, this report presents trend in RMNCH care behavior and practices in the L10K areas.

L10K Project Overview

The Bill & Melinda Gates Foundation funded L10K project is being implemented in 115 *woredas* in Amhara; Oromia; Southern Nations, Nationalities and Peoples’ (SNNP); and Tigray (Map 1)—the four most populous regions of country covering a population of about 17 million people (i.e., about 16 percent of the country’s population). In partnership with 12 implementing partners (IP) through technical and financial support, the L10K implements its innovative strategies to engage local communities to enhance the interactions between HHs, communities and the health workers.

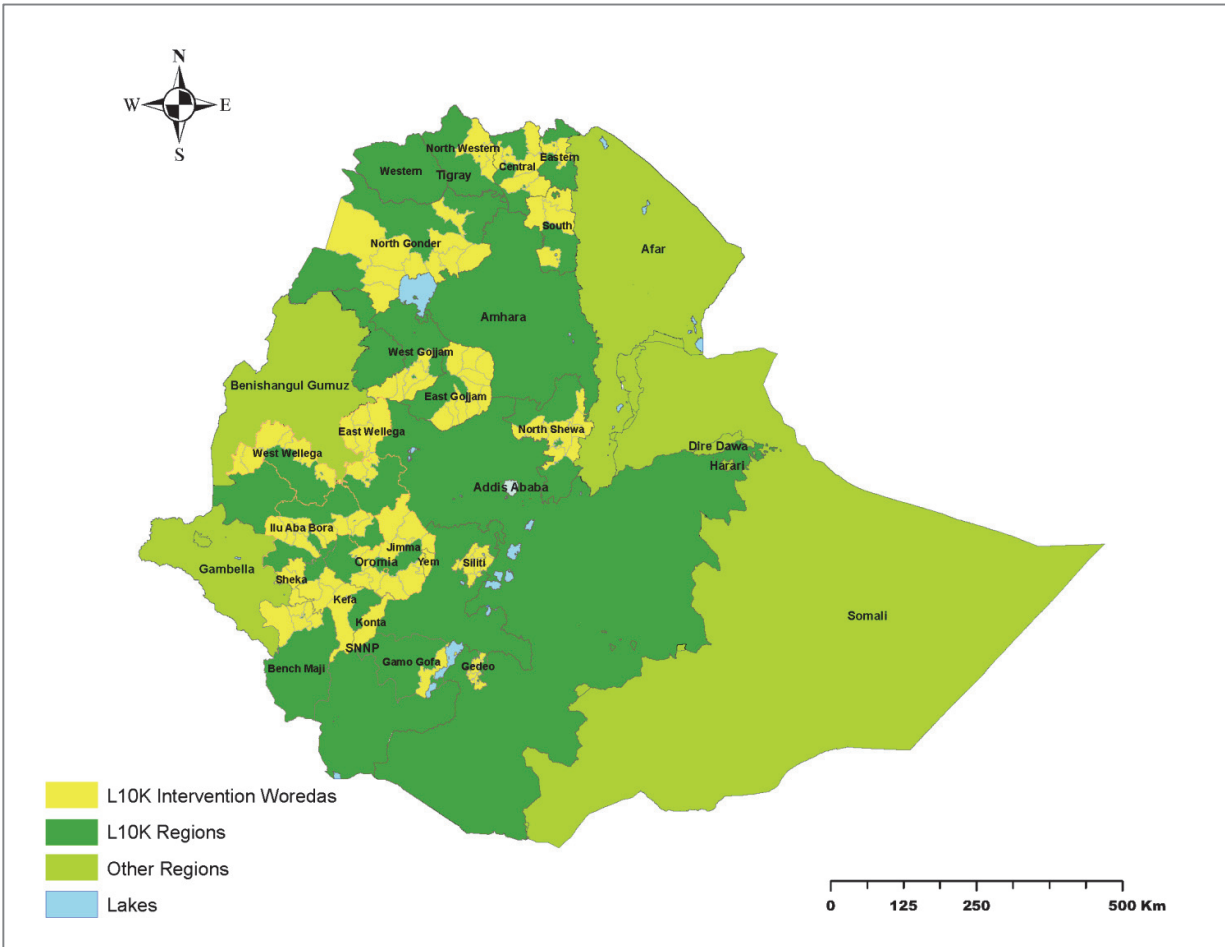
The L10K’s current foundational community strategy, referred to as the L10K platform, aims to improve the skills of HEWs to work within their communities by organizing and utilizing a geographically spread network of HDAs, including Community Based Data for Decision Making (CBDDM). CBDDM enables HDA team leaders to map their network of 25 to 30 HHs and maintain surveillance to ensure needed and targeted health services to HHs. More specifically, CBDDM is utilized to map pregnant women and ensure continuum of care along the lifecycle (i.e., ensure they receive antenatal; labor and delivery and post-partum services; and their newborns’ postnatal care [PNC], essential newborn care [ENC], immunization, and growth promotion). Family conversations³ to reinforce birth preparedness and ENC, and birth notification to the HEW to ensure early PNC and ENC are also part of the platform strategy.⁴ In addition, the platform uses non-financial incentives to foster sustained engagement of HDAs. L10K has also been working through women’s associations (command posts in some areas) to ‘anchor’ the HDAs to build and sustain their engagement and maintain positive changes in behavior and practices gained within HHs and communities.

In addition to the platform, L10K implements four distinct innovative community strategies designed to strengthen the platform in improving high-impact RMNCH care practices. These strategies include: 1) Participatory Community Quality Improvement (PCQI); 2) Early Care Seeking and Referral Solutions; 3) Advancing Continuity of Care; and 4) Improving the Demand and Quality of Community-based Family Planning Methods. The supplemental strategies are implemented in a limited number of *woredas* over the L10K platform to demonstrate their added value.

² *Woredas* are administrative units comprising about 20 *kebeles*, on average.

³ To perform family conversation the HEW or the HDA or both meets with the major decision makers of the HH of the pregnant women and discusses and negotiates birth preparedness and postpartum care needs of the mother and the newborn.

⁴ Family members, neighbors, or the HDA team leader of the neighborhood inform/notify the HEW the onset of labor of women delivering at home so that the HEW can attend the birth to ensure clean and safe delivery, and ensure ENC.



Map 1: The location of 115 *woredas* where Bill & Melinda Gates Foundation funded activities are being implemented

PCQI ensured continuous quality improvement through a cyclical process that involved identification of barriers to quality of services, developing an action plan to address barriers, implementing the action plan, and assessing the improvement. Barriers to quality of services are identified through discussion forums at the community as well as assessment of the HP called, ‘explore quality meetings.’ Discussions are conducted on the identified problems, solutions are forwarded and action plans are developed on regular forums referred as ‘bridging the gap workshop’. A quality improvement team led by the *kebele* manager and the HEW regularly monitors the implementation of the action plan and assesses improvements.

With Early Care Seeking and Referral Solutions, communities and health care providers at different levels come together to identify barriers and map community resources for early care-seeking and referral for critical maternal and newborn health services. The information is then used to prioritize the identified barriers and develop solutions to address them through a participatory process. The PHCU and the *woreda* health office then take charge in actively manage the referral system.

Advancing continuity of care and the family planning strategies were still at the design phase at the time of the Round III survey. L10K’s program strategies between 2007 and 2012 are described in the Appendix 1.

The L10K Project Theory of Change

The theory of change of the L10K project which is derived from the maternal, neonatal, and child health strategy of the Bill & Melinda Gates Foundation and the objectives mentioned in the earlier section are illustrated in Figure 11. The key challenges to adopting optimum RMNCH related behavior and practices that L10K aims to address through its innovative strategies and activities are 1) low demand of RMNCH services at the HH and community level, 2) geographical and financial barriers to seeking care, 3) suboptimal interaction between PHCU, HEWs and communities, 4) suboptimal RMNCH services and care at the HHs and health facilities and 5) ineffective supervision and communication between different level of health systems. L10K's strategies and activities are expected to foster quality interaction between health workers and communities that would eventually contribute toward increased RMNCH intervention coverage and reduce neonatal, infant and maternal mortality.

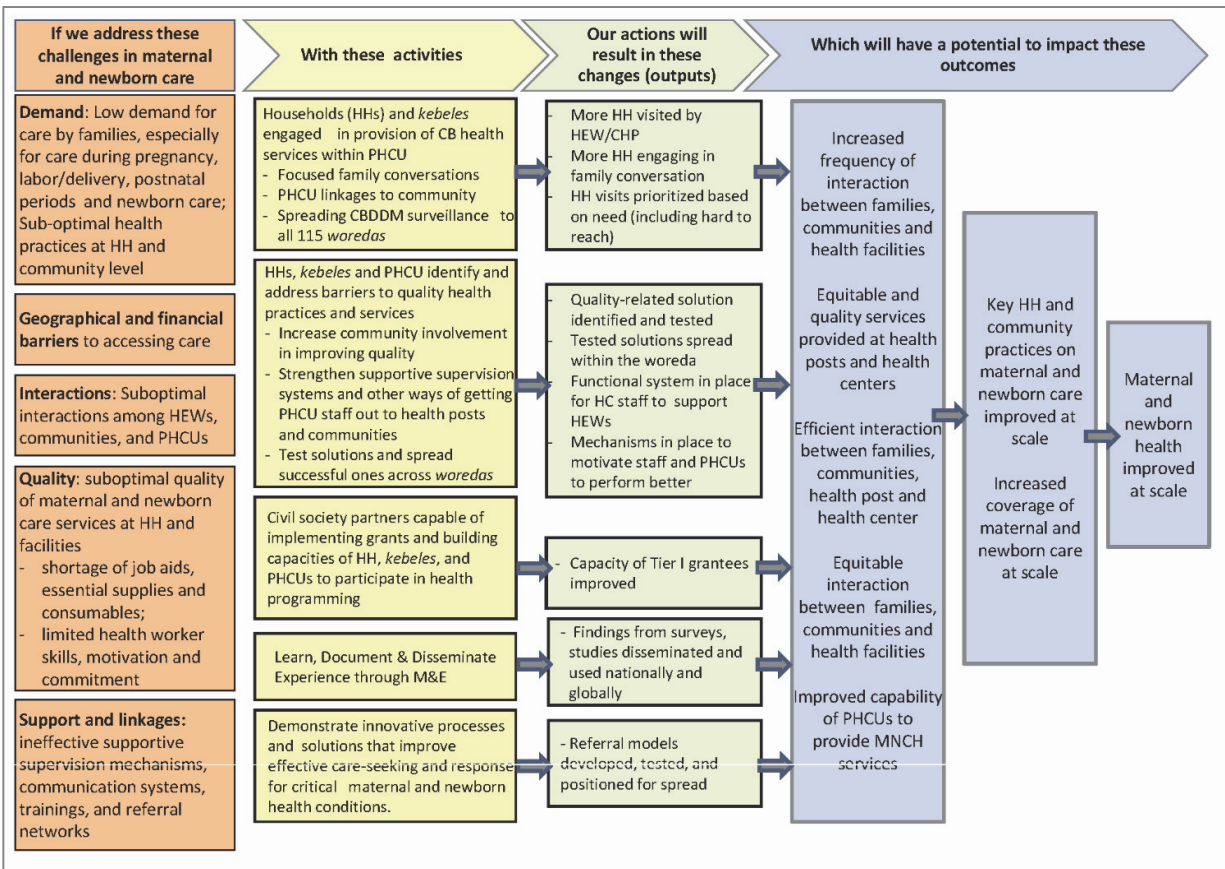


Figure 11: Theory of change, L10K project

METHODOLOGY

The objectives of this study were to assess the trends in RMNCH care behavior and practice indicators in the L10K areas, assess whether the changes in these indicators met the project's expected level of achievements, and identify gaps that need further attention.

The expected changes in the major RMNCH care behavior and practices indicators are depicted in Box 1 [10]:

Box 1: L10K targets

1. Timely initiation of breast feeding: 20 percentage points increase from baseline (Round I survey);
2. Institutional delivery: 20 percentage points increase from baseline;
3. Antenatal care 4 or more visits (ANC 4+): 10 percentage points increase from midterm (Round II survey);
4. Deliveries assisted by skilled health professionals: 20 percentage point increase from baseline;
5. Postnatal care (PNC) in 48 hours: 5 percentage points increase from midterm; and, Tetanus Toxoid 2+ of pregnant women: 20 percentage points increase from midterm.

Since the inception of L10K, three rounds of HH and community surveys were conducted to measure the impact of L10K's innovations on RMNCH care behavior and practices. Figure 12 presents the timeline of these surveys. The Round I survey (i.e., the baseline survey) was conducted in December 2008–January 2009, and the Round II survey (i.e., the midterm survey) was conducted in December 2010–January 2011. The Round III survey was conducted in December 2014–January 2015 to assess the plausible effect of L10K's supplemental fund period innovations.

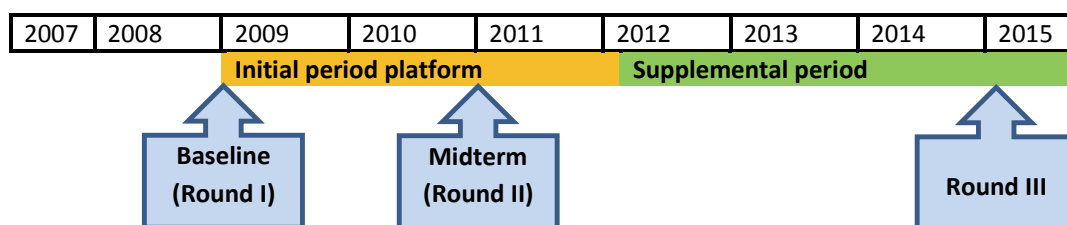


Figure 12: Timeline of L10K's Round I, Round II and Round III surveys

Study Design

Three rounds of cross-sectional surveys (Round I, Round II and Round III) were analyzed to assess the adequacy of the L10K intervention—that is, whether the expected changes in RMNCH care behavior and practices set by project objectives were achieved or not. All analyses were stratified by regions.

Data

In Round III survey, 324 *kebeles* from the Round II survey were revisited to obtain information from three groups of target population at the HHs: 1) family planning related information from women of 15-49 age, 2) MNH care information from women with children 0-11 months, and 3) child immunization and common childhood illness information from women with children 12-23 months. In addition, for the community survey, the HEWs were interviewed at the HPs to obtain coverage data of HEP, its performance, and exposure to the L10K project. All together four survey instruments were applied (i.e., three women

questionnaires at the HH level and one HEW questionnaire). The questionnaires are available at www.l10k.jsi.com.

Round II survey applied a two-stage stratified cluster sampling method where *kebeles* were selected as primary sampling units (PSU) with probability proportional to their population sizes (PPS), stratified by region and program strategy domains of the initial program period (The detail of the sampling strategy of Round I and II surveys are given in the Appendix 2). HPs at the selected *kebeles* were visited. If a *kebele* had more than one HP, then the HP with the larger catchment area was selected. At least one HEW from a HP was interviewed and at the time of interview, if both HEWs were present at the HP, then both were interviewed together.

At the second stage, the 30 by 7 cluster survey strategy [11] was used to obtain information from the three target respondents. In brief, the first HH was randomly selected from the middle of the *kebele* and then every fifth HH was visited and all consenting women aged 15–49 years were interviewed. From each *kebele*, quotas of 12 respondents from each of the three target groups were included in the survey. After reaching the quota for women aged 15–49 years in a *kebele*, the interviewers only sought to conduct interviews for the other target groups. Table 1 presents the number of clusters and sample sizes in each group of respondents in all three surveys.

Table 1: Sample sizes of different target population: Round I (2008-9), Round II (2010-11), and Round III (2014-15) surveys

		All (unique) respondents	Women of reproductive age	Women with children 0 to 11 months	Women with children 12 to 23 months	HPs
Tigray	Round I	1,557	1,080	648	540	54
	Round II	1,925	756	755	756	63
	Round III	1,870	770	760	750	60
Amhara	Round I	1,724	1,000	600	500	49
	Round II	2,931	1,068	1,068	1,068	89
	Round III	2,578	1,077	1,044	1,067	86
Oromia	Round I	1,527	1,000	600	500	50
	Round II	2,501	1,056	1,056	1,056	88
	Round III	2,470	1,083	1,055	1,056	87
SNNP	Round I	1,370	920	552	460	46
	Round II	2,424	1,008	1,008	996	84
	Round III	2,531	1,058	1,024	1,030	83
Total	Round I	6,178	4,000	2,400	2,000	199
	Round II	9,781	3,888	3,887	3,876	324
	Round III	9,449	3,988	3,883	3,903	*316

*In Round III, HH data were collected from 324 *kebeles* while HEW interviews and HP observations were done from 316 HPs. HP data from 8 *kebeles* could not be collected due to the absence of the HEWs

Data Collection

New items were included in the Round III questionnaires to measure the exposure to the supplemental fund period innovations. The questionnaires were translated into the three major local languages (Amharic, Oromifa, and Tigrigna). In SNNPR, with 11 more languages, the interviewers translated from Amharic while administering the questionnaires. Survey data was collected and archived using a web based mHealth

platform (i.e., SurveyCTO) using smart phones.⁵ The platform allowed data quality assurance through ensuring appropriate skip patterns during the interview and allowing only entering logical values. In the earlier two surveys, paper-based questionnaires were employed and data were entered conventionally using Epi Info 6.

Verbal consents from respondents were sought and documented by interviewers prior to interviewing. If a respondent was less than 18 years old, then consent was sought from her husband or guardian. Since majority of respondents were not able to read or write, written consents were not sought. If the respondent agreed to be interviewed upon listening to the consent statement, the interviewer electronically marked the questionnaire as consent given and then only continued with the interview.

The interviewers and supervisors were the health professionals from HCs and *woreda* health offices who were knowledgeable of the services provided by the HEP. They received five days of training on the questionnaires, including a day of field practice. The interviewers were assigned areas which were not under their supervision. Survey supervisors and regional coordinators were also trained to monitor and supervise the work and ensure data quality. Regional coordinators were consultants hired to monitor the quality of data collection by randomly revisiting selected HHs to validate responses.

Analysis

StataCorp (2013) has been applied to conduct the data analyses [12]. All point estimates were adjusted for sampling weights. Bivariate statistical analyses adjusted for cluster survey design effect were conducted to compare changes in the indicators of interest across the surveys. Statistical significant changes in proportions were assessed by Wald's statistics, and t-tests with linearized standard errors were applied to determine changes in means. The cut-off point for the two-sided alpha error was set at 5 percent.

⁵ Please visit <http://www.surveyccto.com/index.html> for the details on SurveyCTO

RESPONDENT CHARACTERISTICS

Key Findings

- The sample sizes of unique respondents were 6,178 in Round I, 9,781 in Round II and 9,449 in Round III.
- The sample distributions were mostly similar across the surveys in terms of regions, age groups and marital status.
- In all three samples on average, Tigray constituted 14 percent, Amhara constituted 39 percent, Oromia constituted 24 percent and SNNP constituted 22 percent of the total sample.
- Women’s education showed a positive trend with 58 percent women with no education in Round III compared to 76 percent in Round II and 82 percent in Round I.
- Distance to health facility has reduced since Round I survey.

This section describes and compares characteristics of respondents and households (HHs) across all three surveys. Reliably demonstrating changes in RMNCH care-seeking behavior and practices across time requires the assumption that respondents to all three surveys were similar; as such, it was important that the background characteristics of Round I, Round II and Round III survey respondents remain similar or at least not very different. This is especially true since Round II and Round III survey sampling strategies differed from the Round I sampling strategy (see Appendix 2).

Respondent Characteristics

The percentage distribution of all three survey population by background characteristics including region, age group, marital status, education, number of children, religion, distance of the respondent’s house from any health facility, and HH wealth are presented in Table 2. The distribution includes women of reproductive age, women with children 0-11 months, women with children 12-23 months as well as unique respondents from the three target groups (i.e., if a women participated in more than target group responses than she is counted only once).

Differences in a particular sample characteristic between the respondents of the surveys were assessed using Wald’s statistics (adjusted for sample weights and cluster survey design). Since a major fraction of the survey respondents were selected conditionally upon having a child between the ages 0-11 months or having a child between 12-23 months, the distribution of the background characteristics of L10K survey respondents were not expected to be similar to that of the general population of women of reproductive age in Ethiopia.

The sample distributions were mostly similar across the surveys in terms of region, age group and marital status. Out of the total sample, about 14 percent respondents were from Tigray, 39 percent from Amhara, 24 percent from Oromia and 22 percent from SNNP. About 70 percent of the respondents are in 20-34 age groups in all three surveys, and a vast majority (over 90 percent) was married.

Table 2: Percentage distribution of the background characteristics of the respondents from Round I (2008-9), Round II (2010-11), and Round III (2014-15) surveys

	All			Women of reproductive age			Women with children 0 to 11 months			Women with children 12 to 23 months		
	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III
No. of respondents	6,178	9,781	9,449	4,000	3,888	3,988	2,400	3,887	3,883	2,000	3,876	3,903
Region												
Tigray	14.0	14.1	14.5	15.1	14.2	14.1	15.1	14.2	14.3	15.1	14.2	14.0
Amhara	42.2	39.3	36.1	39.0	36.2	35.5	39.0	36.2	35.6	39.0	36.2	35.9
Oromia	25.8	24.1	25.0	26.8	25.8	25.9	26.8	25.8	25.7	26.8	25.9	25.7
SNNP	18.0	22.6	24.4	19.1	23.8	24.5	19.1	23.8	24.4	19.1	23.7	24.4
Age group												
15-19	7.4	6.9	9.0	7.6	7.9	11.4	8.9	7.7	9.1	5.7	4.8	5.2
20-34	72.1	71.7	69.4	69.1	64.3	63.2	77.1	76.1	74.2	76.1	76.1	74.1
35-49	20.5	21.4	21.6	23.3	27.8	25.4	14.1	16.2	16.7	18.2	19.1	20.7
Marital status												
Not in union	6.9	8.1	6.9	8.7	12.2	11.3	3.7	4.8	3.4	4.7	5.9	3.9
In union	93.1	91.9	93.1	91.3	87.8	88.7	96.3	95.2	96.6	95.3	94.1	96.1
Education												
None	81.1	75.5	57.7	80.2	74.7	56.0	79.3	73.9	57.2	82.2	77.2	60.8
Primary	12.6	14.3	23.1	13.1	14.4	23.4	14.0	15.4	23.2	11.6	13.6	22.2
Higher	6.3	10.2	19.2	6.7	10.9	20.7	6.7	10.7	19.6	6.2	9.2	17.1
Number of children												
0	2.7	3.2	4.5	4.3	8.2	10.5	0.0	0.0	0.1	0.0	0.0	0.1
1	17.2	17.7	23.5	16.2	13.7	20.3	20.1	20.5	28.0	17.2	18.8	23.8
2	15.9	16.3	15.8	14.8	14.5	13.4	18.2	16.4	17.4	16.0	18.1	16.7
3	15.2	15.8	13.8	14.3	14.0	12.6	16.3	17.0	14.4	17.0	16.8	15.2
4+	48.9	47.0	42.5	50.4	49.7	43.2	45.5	46.0	40.1	49.8	46.3	44.3
Religion												
Orthodox	64.0	64.4	61.5	62.7	62.5	60.4	61.6	61.6	60.0	62.4	61.8	61.2
Protestant	12.4	17.7	20.3	12.7	18.5	20.3	12.5	19.0	20.9	11.7	19.9	20.0
Muslim	22.6	16.8	17.4	23.7	17.8	18.7	24.5	18.2	18.3	24.6	17.2	17.9
Other	1.1	1.1	0.9	0.8	1.3	0.6	1.4	1.3	0.9	1.4	1.1	1.0
Distance to health facility												
<30 minutes	53.8	65.9	55.9	54.1	71.0	63.0	53.0	64.2	54.5	52.8	64.4	52.9
30 minutes - <1 hour	24.1	24.8	30.5	23.3	20.9	26.3	23.4	26.0	30.8	24.6	25.6	32.6
1+ hours	22.1	9.3	13.6	22.7	8.2	10.7	23.5	9.8	14.6	22.6	10.0	14.5
Wealth quintile												
Most poor	19.6	16.9	18.8	17.4	24.9	18.9	18.7	24.4	19.8	20.0	24.5	19.0
More poor	20.3	19.3	17.9	20.7	19.6	17.6	19.8	20.6	18.2	19.7	20.9	18.2
Poor	21.6	19.4	19.6	21.6	19.8	17.5	23.2	20.1	19.8	20.4	19.2	20.3
Less poor	21.3	21.2	21.1	21.7	19.1	21.9	19.3	18.8	20.9	21.8	18.0	20.9
Least poor	17.2	23.2	22.5	18.6	16.5	24.2	19.0	16.1	21.3	18.1	17.5	21.7

The proportions of women with no children, and with one child are higher in Round III compared to the earlier surveys. On the other hand, the proportion of respondents with four or more children in Round III are 3 and 6 percentage points lower than the Round II and Round I, respectively. This indicates that the fertility rate in the L10K areas is probably declining.

Women's education shows an improving trend. Nineteen percent of the respondents in the Round III have higher education, which is 9 percentage points higher than the Round II survey, and 13 percentage points higher than the Round I survey. Likewise, the proportion of women with no education has dropped from 81 percent in Round I to 58 percent in Round III. This indicates that women's education in rural Ethiopia is improving at a fast pace, reflecting developmental momentum in rural Ethiopia.

Over 60 percent of the respondents are Orthodox Christians, 20 percent of the respondents are Protestant, and 17 percent are Muslim in the Round III survey. This distribution is slightly different from the earlier two surveys. The proportion of Orthodox has declined about 3 percentage points from Round II, and the proportion of Protestant respondents has increased by 8 percentage points from Round I, while the Muslim respondents dropped about 5 percentage points from Round I. The changes in the religious background of the respondents across the surveys are not large enough to raise any critical concern.

Over 85 percent of the respondents live within an hour distance from the nearest health facility, which is higher than the Round I survey but slightly lower than the Round II survey. This indicates that access to health care facilities have improved since Round I.

Conclusion

The respondents were very similar in terms of regions, age-group and marital status, thus enabling to make reliable comparisons in the changes in RMNCH indicators across the surveys. There were major improvements in two key development indicators; women's education is increasing and fertility rate is decreasing. These results show that Ethiopia is currently gaining momentum toward a path of development.

SITUATION ANALYSIS OF *KEBELE* HEALTH SERVICES

Key Findings

- The coverage of the HEP was almost universal, 99 percent of the *kebeles* had at least one HP and 97 percent of *kebeles* had at least one HEW in Round III (2014-15).
- The intensity of L10K's support for HEP improved between Round II and Round III. HEWs' perception regarding L10K's support for HEP, as measured by an index, increased from 40 percent of the maximum possible in Round II to 51 percent in Round III.
- In Round III, the average number of HHs per HDA team leader was 46, much higher than the anticipated one HDA team leader for every 30 HHs. Amhara was the closest to the mark (38 HHs per HDA team leader), followed by Oromia (43 HHs per HDA), SNNP (49 HHs per HDA), and Tigray (68 HHs per HDA).
- In Round III, Seventy-five percent of the HDA team leaders attended *kebele* meeting in the last three months with highest observed in Tigray (82 percent) and lowest in Oromia (74 percent).
- Over 90 percent of HDAs received training on CBDDM; however, the use of CBDDM data was much lower (only 47 percent of the *kebeles* used CBDDM data for *kebele* health committee meetings during the last three months) in Round III.
- A score measuring *kebele* health committees' support for HEP increased 25 percentage points between Round II and Round III; the increase was much higher than the change between Round I and Round II.
- Over 96 percent of the HPs had family folders in Round III. Eighty percent of HPs in Amhara, 60 percent in Oromia and 50 percent in Tigray and SNNP kept updated records in family folders.
- Availability of vaccines at the HPs increased from 36 to 66 percent between Round II and Round III. Similarly, during that period availability of co-trimoxazole increased from 2 percent to 65 percent; availability of iron tablet increased from 24 to 70 percent; and availability of misoprostol increased from six to 23 percent.
- Seventy-six percent of HPs had Implanon in Round III.
- The availability of injectables and pills were 80 and 74 percent, respectively in Round III, which had declined from Round II.

This section describes changes in health infrastructures, health services and health system that support the HEP in L10K areas. The Round III results are used to describe the current situation, with an emphasis toward the maternal, newborn and child services. The information presented in this chapter was obtained from the community surveys eliciting information from the HEW interviews and observation of HPs.

Coverage of Health Extension Program

Table 3 presents coverage of L10K area *kebeles* with any health facility (i.e., HP, HC or hospital), with a HP, with at least one HEW, and mean number of people served by a HEW across the survey periods. The findings indicate that the HEP has reached nearly universal coverage in L10K areas in all four regions by the time of Round III survey. The percentage of *kebeles* with at least one HP have increased significantly from 77 percent in Round I to 92 percent in Round II and to 99 percent in Round III, which is 23 percentage points higher than the Round I survey. The percentage of *kebeles* with at least one HEW was 97 percent in Round III.

Table 3: Percentage of *kebeles* with any health facility, with a HP, and with a HEW; and the mean number of population covered per HEW, by region and survey round

		Presence of any health facility	Presence of HP	Presence of HEWs	Population to HEW ratio	Sample size
Tigray	Round I	98.9	70.0	86.2	3,829	54
	Round II	97.9	*81.0	*100.0	3,611	63
	Round III	100.0	**91.0	100.0	3,842	60
Amhara	Round I	93.5	87.5	100.0	3,698	49
	Round II	*99.2	*97.8	100.0	3,744	89
	Round III	100.0	100.0	100.0	3,347	86
Oromia	Round I	67.4	56.8	84.8	2,781	50
	Round II	*93.8	*91.2	*96.0	2,010	88
	Round III	99.7	**99.7	100.0	2,240	87
SNNP	Round I	93.9	90.9	99.2	2,660	46
	Round II	*97.7	90.4	100.0	2,298	84
	Round III	100.0	100.0	88.0	3,151	83
Total	Round I	87.3	77.1	93.6	3,278	199
	Round II	*97.3	*91.9	*99.0	2,942	324
	Round III	**99.9	**98.7	97.1	3,067	316

*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Major achievements in the coverage of HEP have been observed in Oromia. The increase in the presence of any health facility was substantial between Round I and Round II (67 to 94 percent), and in Round III survey the coverage reached 100 percent. The percentage of *kebeles* with a HP has nearly doubled between Round I and Round III surveys. In Tigray, while 100 percent of *kebeles* had at least one health facility, about 9 percent of *kebeles* still do not have any HP. However, there has been a steady increase in the percentage of *kebeles* with HPs from 70 percent in Round I to 81 percent in Round II and to 91 percent in Round III.

The aim of the HEP is to have one HEW for every 2,500 to 3,000 people (13). Round III survey findings show the ratio of population to one HEW was within the national standard only in Oromia (2,240 per HEW), while it was the highest in Tigray (3,842 per HEW) followed by Amhara (3,347 per HEW) and then SNNP (3,151 per HEW).

L10K's Support to HEWs

Table 4 presents percentage of HPs, as reported by HEWs who received support, training, and supportive supervision for different RMNCH service components from L10K. The results presented here are from Round II and Round III (there were no L10K support during the time of the Round I survey). The HEWs reported that the L10K support for nutrition/growth monitoring, antenatal care (ANC), referral, postnatal care (PNC),

counseling for breastfeeding, and counseling for complementary feeding have significantly increased between Round II and Round III. The support for nutrition/growth monitoring nearly doubled between Round II and Round III. Supervision support from L10K for ANC and PNC services increased 9 and 11 percentage points, respectively. Supervision support for counseling in breastfeeding has increased by 12 percentage points and counseling for complementary feeding increased by 16 percentage points from Round II to Round III. HEWs reporting support for trainings did not improve between the rounds in most of the services except for growth monitoring and referral services.

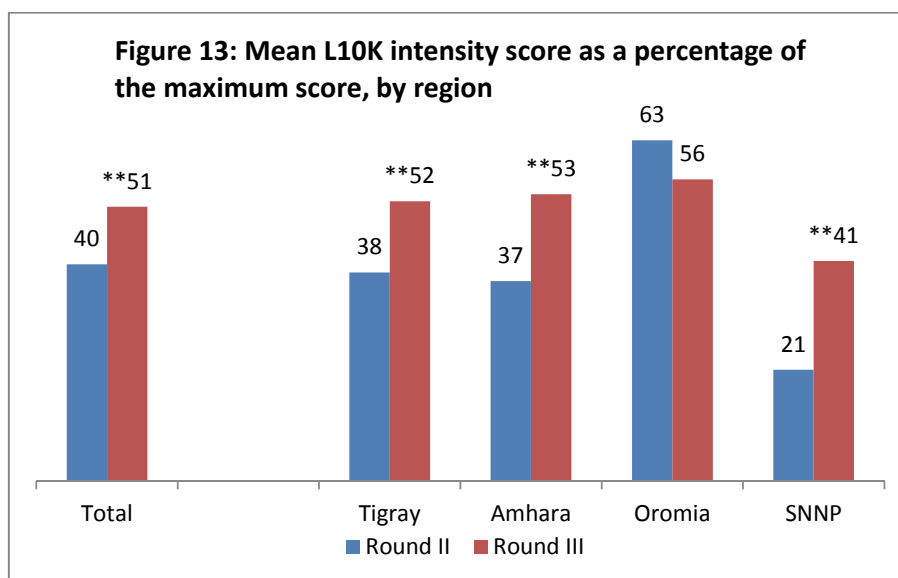
Table 4: Percentage of HPs that received L10K support, training, and supportive supervision for a particular service component during Round II (2011) and Round III (2015) surveys

Service component	Support		Training		Supervision	
	Round II	Round III	Round II	Round III	Round II	Round III
EPI	37.1	38.6	35.0	29.6	30.2	29.5
Nutrition/growth monitoring	23.2	**51.6	19.6	**43.0	16.9	**41.8
Essential newborn care	59.3	64.9	53.3	53.6	45.2	52.0
ANC	57.4	**66.8	52.5	55.5	45.2	**55.6
Delivery	47.4	52.9	41.0	41.0	34.3	42.2
Referral	17.0	**54.2	12.9	**44.3	10.1	**44.8
PNC	57.4	**68.9	51.7	55.0	44.8	**55.0
Breastfeeding counseling	54.7	**67.9	49.0	53.5	40.6	**53.0
Complementary feeding	48.0	**63.9	40.8	49.4	33.7	**49.8
Family planning	38.1	39.1	34.2	32.6	30.4	33.3
CHP/HDA training follow-up	63.5	**75.7	56.8	58.6	49.5	**59.1
No. of HPs	324	316	324	316	324	316

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Each *kebele* was assigned a L10K project intensity score based on HEW responses regarding their perceptions of L10K support for each of the 11 RMNCH components listed in Table 4. Each RMNCH component was assigned the following: a score of 0 for components not supported by L10K; a score of 1 for components supported by L10K but with no training or supportive supervision; a score of 2 for components with training by L10K but no supportive supervision; and a score of 3 for components with both training and supportive supervision. The 11 component scores were given equal weights and added to create the L10K project intensity score.⁶ Figure 13 presents the intensity scores for Round II and Round III. The average intensity score was 51 percent in Round III, which has increased by 11 percentage points from Round II. The mean L10K intensity score as perceived by HEWs increased in Tigray, Amhara and SNNP but declined in Oromia in Round III. The highest level of improvement in the mean L10K score between Round II and Round III was observed in SNNP (20 percentage points). There was 14 and 16 percentage points increase in the mean of intensity scores in Tigray and Amhara, respectively, and a 7 percentage point decline in Oromia. At the time of Round III survey, the mean L10K intensity score was 56 percent in Oromia, 53 percent in Amhara, 52 percent in Tigray and 41 percent in SNNP.

⁶ The internal reliability (i.e., Cronbach's alpha) of the items composing the L10K intensity index was 0.95



**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

HDA Activities

Table 5 presents HDA activities in the *kebeles* during Round III survey. The numbers of HDAs and HDA team leaders in a *kebele* were reported by the HEW. As the HDA program did not fully become implemented until 2012, the information related to HDA's services was only collected in Round III. In Round III survey, the average number of HDAs as per recommended ratio of one HDA for five households (1:5) per *kebele* was 139. There were significant regional variations with highest average number of 1: 5 HDAs per *kebele* in Tigray (192) and lowest in SNNP (93).

The average number of HDA team leaders per *kebele* was 25 per with highest mean observed in Tigray (32) and lowest mean in Oromia (20). As per the recommended coverage of 30 HHs per one HDA team leader per *kebele* (1:30), none of the regions met the benchmark. Nevertheless, Amhara was the closest to the mark (38 HHs per HDA team leader), followed by Oromia (43 HHs per HDA team leader), SNNP (49 HHs per HDA team leader), and Tigray (68 HHs per HDA team leader). Seventy-five percent of the HDA team leaders attended a *kebele* meeting in the last 3 months with the highest observed in Tigray (82 percent) and lowest in Oromia (74 percent).

The HDA team leaders received trainings on different components of RMNCH. A high percentage (86 percent) of HDA team leaders received training on birth notifications. The coverage of training in other components was not as high as seen for birth notification. Sixty-nine percent of HDA team leaders received training on ANC, 60 percent received training on ENC and PNC and 55 percent received training on immunization. There were significant regional variations in the coverage of team leaders' training with SNNP's coverage being better for most components compared to other regions.

Table 5: HDA activities in the *kebele*, L10K Round III (2015) survey

	Tigray	Amhara	Oromia	SNNP	Total
Avg. No. of 1 to 5 HDA per <i>kebele</i>	192.7	172.3	106.7	93.0	139.2
Avg. No. of 1 to 30 HDA team leader per <i>kebele</i> *	32.3	29.9	19.9	20.7	25.4
Avg. number of HHs per HDA team leader*	68.2	38.1	42.8	49.4	46.1
Percentage of HDA team leaders attended meeting in last 3 months	81.5	74.8	73.9	73.9	75.2
Percentage of HDA team leaders received training on ...					
ANC*	62.1	67.6	61.5	82.0	68.7
Birth preparedness*	59.8	65.3	62.0	78.5	66.8
Essential newborn care*	64.3	58.5	47.1	72.2	59.5
PNC*	67.8	58.9	45.3	69.1	58.9
Breastfeeding*	47.5	51.7	54.0	63.2	54.5
Complementary feeding*	30.7	51.3	45.8	64.2	50.1
Family planning*	25.5	48.5	57.2	62.2	51.0
Immunization*	45.1	54.8	48.2	70.3	55.4
Hygiene*	27.4	50.7	46.3	66.4	50.1
Family conversation*	88.8	67.7	82.9	63.1	73.5
Birth notification*	94.3	82.6	84.0	88.3	85.9
No. of HPs	60	86	87	83	316

*Statistically significant difference ($p < 0.05$) between regions

Community Based Data for Decision Making (CBDDM)

One of the major programmatic components of L10K platform is CBDDM, which supports the HEWs to actively plan, monitor, and implement the RMNCH services in the *kebeles*. Under this strategy, HDAs map their network of 25 to 30 HHs in their neighborhood and maintain surveillance to ensure needed and targeted health services to HHs. CBDDM ensures continuum of care from pregnancy through early childhood, such as antenatal care, skilled and clean delivery services, postnatal care, essential newborn care, immunization, and growth promotion.

A very high percentage of HDA team leaders had received CBDDM mapping training (91 percent) across regions (Table 6). While there was a high level training of HDA team leaders, only 50 percent of the HDA leaders reported on CBDDM data to the HEW in the previous month. There was not any striking regional variation on the reporting practice. The HPs maintain and update CBDDM registers based on the data reported by the HDA team leaders. Seventy percent of these registers were updated on HDA activities and pregnancy lists. There were major regional differences with over 85 percent HPs in Amhara updating the registers on these two indicators, followed by SNNP (64 to 67 percent). In other regions, between 50 to 60 percent registers were updated on this information. CBDDM data collection and data analyses in the registers were low at below 31 percent.

An index was developed from these four items to measure how well the *kebeles* are functioning in terms of maintaining the CBDDM registers.⁷ On a scale of 100 (each of the four items was given a value of 25), the

⁷ The Cronbach's reliability alpha of the CBDDM register maintenance index was 0.83

mean score for maintaining the registers was 64 with Amhara performing the highest at 77 and Oromia performing the lowest at 52.

Another finding was that only 47 percent of surveyed HPs utilized and shared the CBDDM data at the *kebele* meetings.

A CBDDM implementation strength index score was constructed based on four components 1) HDAs' completion of mapping, 2) monthly reporting of data, 3) maintenance of CBDDM registers and 4) utilization and sharing of CBDDM data.⁸ Each item was given a value of 25, and thus, the index score ranged from 0 to 100. The mean of CBDDM implementation strength score was 63 with no significant regional variation.

Table 6: CBDDM activities in the *kebele* and CBDDM implementation strength, Round III (2015) survey

	Tigray	Amhara	Oromia	SNNP	Total
Average percentage of HDA team leaders completed CBDDM mapping	88.5	94.5	92.3	86.8	91.3
Average percentage of HDA team leaders reported CBDDM data last month	52.8	48.1	51.9	48.4	49.8
Percentage of HP have CBDDM register	100.0	100.0	100.0	95.4	99.0
Percentage of CBDDM registers updated for ...					
HDA activities*	61.8	86.2	54.3	67.4	69.5
Pregnancy listing*	54.3	89.6	60.0	63.5	70.5
CBDDM data collection	36.1	51.6	27.0	39.4	38.8
CBDDM data analysis*	27.1	42.6	15.7	35.9	30.1
Mean CBDDM register maintenance score (range 0 to 100)*	59.3	77.6	52.1	60.4	64.0
Percentage of HP used CBDDM data for <i>kebele</i> meeting in last 3 months	57.9	50.6	32.1	51.7	46.9
Mean CBDDM implementation strength score (range 0 to 100)	63.0	67.0	58.0	62.0	63.0
No. of HPs	60	86	87	83	316

* Statistically significant difference (p <0.05) between regions

HDA Support for HEWs

The key responsibilities of HDAs and previously functioning community health promoters (CHPs)⁹ were to support HEWs in implementing their outreach RMNCH related services. In Round I and II, the community surveys collected information on CHPs and in Round III survey, same information was collected from the HDAs, thus providing an opportunity to compare the performances between CHPs and HDAs. HEWs were asked to rate the support they received from the HDAs/CHPs for each of 17 components from the HEP service package listed in Table 7 through a Likert type scale ranging from 1 to 4 (1=none, 2=some, 3=moderate, 4=high). The perceived support from the HDAs/CHPs increased at a significant level between

⁸ The Cronbach's reliability alpha of the CBDDM implementation strength index was 0.75

⁹ CHPs are a cadre of volunteers (both male and female) selected by the communities or HEWs from the "model family" (HHs trained by HEWs to lead a healthy lifestyle and serve as models in the communities). CHPs provided support to the HEWs to promote healthy behaviors and practices in the community. One CHP was assigned the responsibilities of 25-30 HHs. The CHPs were replaced by HDAs in 2012 (5). HDAs, selected by the *kebele* administrations, are also community volunteers, mainly women, engaged in supporting HEWs in RMNCH activities in the communities. One HDA is responsible for 5 HHs.

Round I and Round II. However, between Round II and Round III, the score of HDAs/CHPs support improved significantly only in two areas, diarrheal management and breastfeeding counseling.

Table 7: HEWs' perception of the support they received from CHPs and HDAs, Round I (2008-9), Round II (2010-11), and Round III (2014-15) surveys.

	Round I (n=199)	Round II (n=324)	Round III (n=316)
Average rating given by HEWs on the support they received from CHPs/HDAs ^φ (scale ranges from low of 1 to high of 4) for ...			
Immunization	3.0	*3.3	3.4
Child health/nutrition	2.2	*2.9	2.9
Essential neonatal care	1.8	*2.8	2.9
Diarrhea management	2.2	*2.6	**3.0
Recognition of danger signs of childhood illness	2.0	*2.8	3.0
Breast feeding practices	2.1	*3.0	3.2
Complementary feeding	2.1	*3.1	3.2
Family planning	3.0	*3.5	3.5
Maternal health (ANC, Deliver, PNC/nutrition)	2.4	*3.1	3.3
Latrine construction and use	2.9	*3.2	3.2
Personal hygiene	2.8	*3.0	3.1
Community mobilization	2.9	*3.1	3.2
Training/FU model families	2.2	*2.6	2.7
HH visits	2.5	*3.0	2.9
Outreach services	2.8	*3.0	3.1
HMIS	2.0	*2.8	**2.5
Malaria	2.4	*2.7	2.6
Index score of CHP/HDA support for HEP (% of the maximum score)	48.5	65.8	76.3

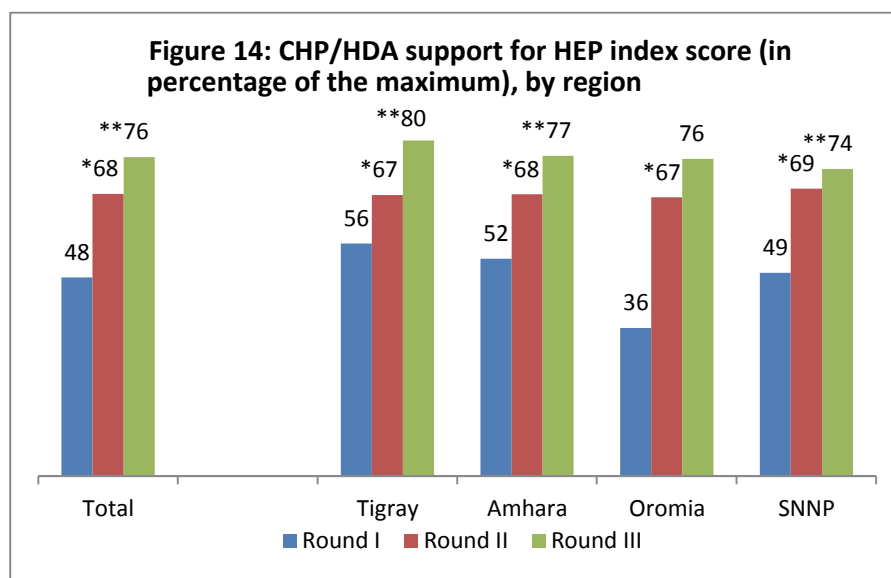
^φ Round I and Round II estimates are for CHPs while Round III estimates are for HDAs

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

All the 17 items were summed to create a scale measuring overall HDA/CHP support for the HEP. This index of CHP support ranged from 17 to 68, with higher scores indicating greater HDA/CHP support for the HEP.¹⁰ The index was expressed as a percentage of the maximum score of 68. Figure 14 presents the mean HDA/CHP support index. Between Round I and Round II, the support score increased 20 percentage points and between Round II and Round III, the score increased only 8 percentage points but still statistically significant. In the Round III survey, the highest score was observed in Tigray at 80 percent, followed by Amhara and Oromia (77 percent) and SNNP (74 percent). The increase in the HDA/CHP support index between Round I and Round II was significant for all regions, and the increase between Round II and Round III was also significant for all regions except for Oromia. The increase between Round II and Round III was highest in Tigray (13 percentage points) and lowest in SNNP (5 percentage points).

¹⁰ The Cronbach's reliability alpha of the HDA/CHP support index is 0.95



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Kebele Health Committee Support

One of the two HEWs in a *kebele* is expected to be a member of the *kebele* administration and serve as the secretary of the *kebele* health committee, which is responsible for ensuring that the HEP is being implemented properly. The L10K project encourages the HEW to use the *kebele* health committee to organize community mobilization activities including promoting community conversations, establishing anchors, motivating HDAs to sustain their activities and mitigating problems associated with providing services within the *kebeles*. In the CBDDM areas, the *kebele* health committee is also engaged in monitoring and evaluating RMNCH services in the *kebele*.

Table 8: HEW's perception of the support received from *kebele* health committee, expressed in a Likert-type scale from a low of 1 to a high of 5; Round I (2008-9), Round II (2010-11), and Round III (2014-15) surveys

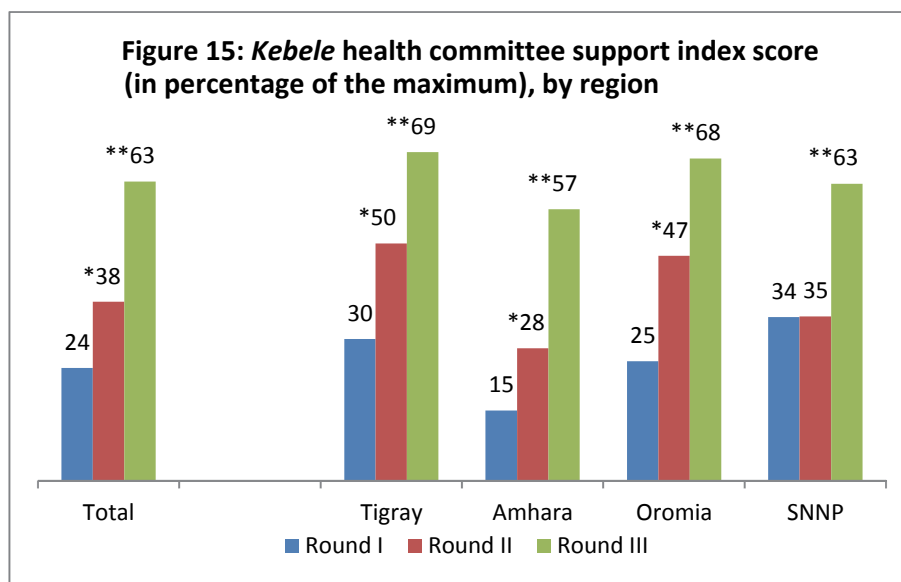
	Round I (n=199)	Round II (n=324)	Round III (n=316)
Plan and monitor HEP activities (e.g. outreach services)	2.2	*2.6	**3.2
Pull essential supplies from the <i>woreda</i> /PHCU	1.9	2.0	2.9
Pull supportive supervision from the <i>woreda</i> /PHCU	1.6	*2.0	**2.8
Identify barriers to quality RMNCH services	1.8	*2.5	**3.2
Coordinate with local public and private sector developmental partners to overcome barriers to quality RMNCH services	1.8	*2.5	**3.1
Referral services for BEmONC	1.7	*2.2	**2.9
Referral services for sick children	1.8	*2.3	**3.1
Community mobilization	2.3	*3.0	**3.6
Latrine construction	2.4	*3.1	**3.6
Personal hygiene	2.2	*2.8	**3.3
School health	2.2	*2.4	**3
Provide incentives/encouragement to HDAs	1.4	*2.6	**3.1
Index score of <i>kebele</i> health committee support for HEP (% of maximum score)	23.7	*37.6	**62.9

*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

The HEWs were asked to rate the support that they get from the *kebele* health committee for each of the 12 components of the HEP service package (Table 8). Each of the 12 components was assigned a score on a Likert type scale ranging from 1 to 5 (1=none, 2=limited, 3=some, 4=frequent, 5=always). As per these scores, significant improvements were observed for all the components between the survey rounds.

A scale was constructed to measure the overall support the HEP receives from the *kebele* health committee by summing all the 12 items. The possible *kebele* health committee support index score ranged from 12 to 60, with higher scores indicating relatively stronger support from the *kebele* health committee. The index was then expressed as a percentage of the maximum possible score.¹¹ The index increased 25 percentage points between Round II and Round III, with all the regions showing significant improvement (Figure 15). In Round III, the *kebele* health committee index score was highest in Tigray (69 percent) and Oromia (68 percent), followed by SNNP (63 percent) and Amhara (57 percent).



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Health Management Information System (HMIS)

The health management information system (HMIS) forms the backbone of the HEP monitoring and evaluation system. Table 9 presents the distribution of HPs maintaining HMIS activities at the time of the Round III survey. Ninety-six percent of the HPs had family folders available with no regional variations. Only 76 percent had the tickler files for injectable contraceptives and 70 percent maintained file for childhood immunization services. There were significant regional variations in these indicators. Ninety percent of HPs in Tigray had these files compared to only 62 percent in Oromia. However, when it comes to updating the records, the indicators fell sharply, again with significant regional variations. A higher percentage of HPs in Amhara kept updated records compared to other regions. Around 80 percent of HPs in Amhara had updated family folders and family health cards compared to only less than 50 percent HPs in Tigray and SNNP and 60 percent in Oromia updating these records.

¹¹ The Cronbach's reliability alpha of the *kebele* health committee support index was 0.95

Table 9: Percentage of HPs with that are maintaining or performing Health Management Information System (HMIS) activities, L10K Round III (2015) survey

	Tigray (n=60)	Amhara (n=86)	Oromia (n=87)	SNNP (n=83)	Total (n=316)
Family folders available	93.3	97.4	91.3	100.0	95.7
Tickler file for injectable contraceptive services available*	90.2	76.7	61.8	83.3	76.0
Tickler file for childhood immunization services available*	89.5	63.1	62.5	76.3	69.7
Updated records available for ...					
Family folder *	46.3	80.0	63.2	49.0	62.8
Tally sheet*	29.9	69.9	19.6	49.9	43.5
Field book*	47.5	59.9	19.0	46.3	41.8
Family health card*	48.6	82.1	60.3	49.9	63.1

* Statistically significant difference ($p < 0.05$) between regions

Availability of Commodities and Supplies

Availability of essential medicines and supplies at the *kebele* level is crucial for providing optimal RMNCH services. Stock-outs of essential commodities may lead to program failure; for example, family planning clients who leave health facilities without receiving contraceptives may have unintended pregnancies with adverse consequences. The availability of essential commodities reflects the performance of HEP commodity supply chains. Table 10 presents the availability of commodities and supplies at the HPs. The percentage of HPs with pills at the time of survey dropped significantly from Round II to Round III (83 to 75 percent). The availability of commodities for child health improved significantly between Round II and Round III including vaccines (from 36 to 66 percent) and de-worming medicine (from 52 to 70 percent). Availability of co-trimoxazole increased substantially during the same period from non-existence to 65 percent. Availability of an iron tablet, a vital maternal health commodity, increased substantially from 24 percent in Round II to 70 percent in Round III; there was also more than four folds increase in the availability of misoprostol during the same period.

Providing high-quality HEP services requires continuous availability of essential supplies, equipment, and tools, not to mention communication. There were significant improvements observed between Round I and Round II in almost all the supplies and equipment. In Round III, the improvement from Round II was observed for some of the supplies and equipment, such as vaccine carriers, FP card, salter scales, growth monitoring charts, functional thermometers and ORT supplies. Availability of a functional refrigerator, which is essential for storing medicines in the right temperature condition, was low and didn't increase from the earlier rounds.

The availability of the essential supplies listed in the Table 10 was used to construct an essential supplies availability index, with a higher score indicating better availability of supplies.¹² The index was also expressed as a percentage of the maximum possible score. The essential availability supply index increased significantly across the rounds (44 percent in Round I, 69 percent in Round II and 75 percent in Round III).

¹² The Cronbach's reliability alpha of the availability of supplies index was 0.83

Table 10: Percentage of *kebeles* with essential commodities, supplies, materials and equipment, Round I (2008-9), Round II (2010-11), and Round III (2014-15) surveys

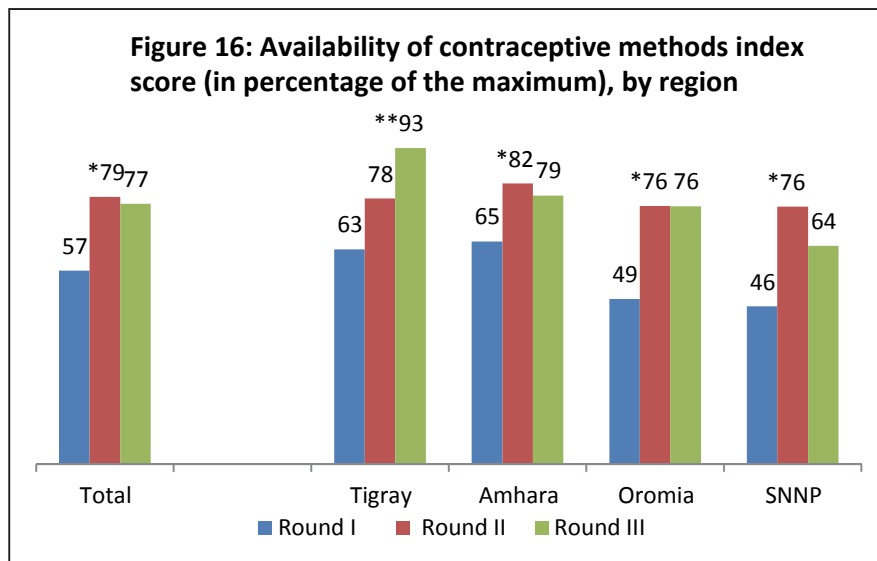
	Round I (n=199)	Round II (n=324)	Round III (n=316)
Percentage of HPs where the following essential commodities were available...			
Combined pills	58.7	*82.5	**74.5
Injectables	63.0	*84.9	80.1
Condoms	48.5	*67.8	75.0
Implanon			76.3
ORS	39.0	*68.6	76.0
Vitamin A	30.0	*59.6	61.5
Vaccine	19.4	*35.5	**66.3
De-worming	17.0	*52.2	**70.2
Co-trimoxazole	1.8	1.9	**65.4
ACT (Coartem)	37.5	48.5	55.2
Rapid test for malaria	37.7	45.6	54.3
Bed net	16.1	21.8	26.7
Iron Tablet (Fe tab)	27.0	24.1	**69.7
Misoprostol	2.5	5.7	**22.9
Index score of contraceptive availability (% of maximum score)	56.8	*78.5	76.5
Index score of child health commodity availability (% of maximum score)	24.1	*44.4	**65.7
Index of maternal health commodity availability (% of maximum score)	11.6	10.0	**31.5
Percentage of <i>kebeles</i> with the availability of the following essential supplies/materials/ equipment:			
Family health card	48.2	*90.4	95.0
Vaccination card	70.6	76.9	83.4
Immunization diploma	54.4	*76.8	73.6
Vaccine carrier with at least four ice packs	60.8	*83.8	**90.6
FP counseling card	25.8	*44.4	**65.4
Training manual for CHPs	36.5	*94.0	**87.4
Training materials for model families	37.2	*65.6	63.7
Functional BP apparatus	55.5	*76.3	68.5
Functional weighing scale	44.8	*78.1	77.6
Functional Salter scale	49.6	*62.0	**82.6
Growth monitoring chart	35.4	*53.4	**64.1
Functional thermometer	42.9	*74.5	**83.1
Delivery kit	51.5	*82.9	84.9
First-aid kit	50.4	*66.6	64.3
ORT corner supplies	22.4	*35.7	**82.4
Delivery couch	47.1	*78.9	**88.6
Functional refrigerator	18.4	25.6	22.4
Essential supplies availability index score (% of the max.)	44.3	*68.5	**75.0

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

The availability of commodities for contraceptives, reproductive, child and maternal health was assessed separately for each service categories. All the commodities within each service category were summed to produce commodity availability indices. The indices were then expressed as percentages of the maximum possible score.¹³

The contraceptive method availability index is created from the availability of combination pills, injectables and condoms (Figure 16). While there was a significant increase (22 percentage points) in the index between Round I (57 percent) and Round II (79 percent), at the time of Round III, the index remained unchanged from Round II. There were major regional variations with Tigray showing significant improvements, while other regions either remained the same in Round III. During Round III survey, the method mix availability index was highest at 93 percent in Tigray, followed by Amhara (79 percent), Oromia (76 percent) and lowest at 64 percent in SNNP.

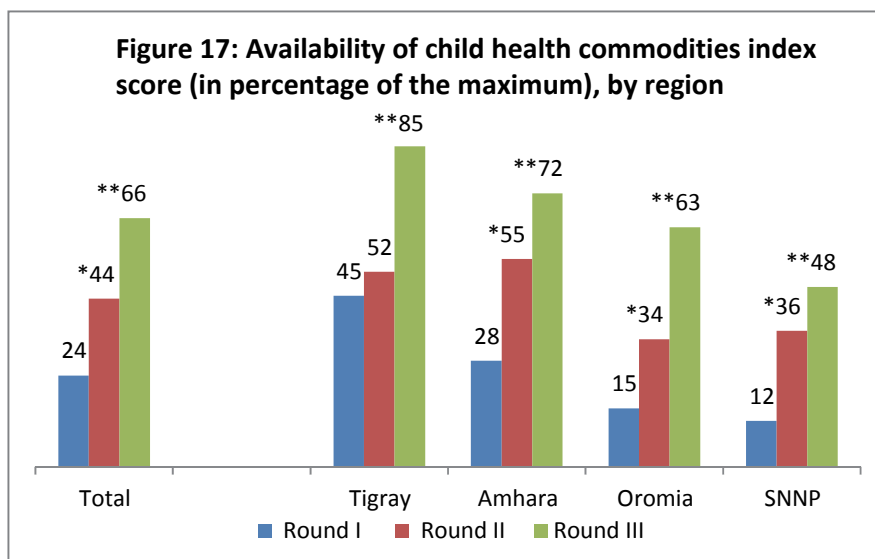


*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

The child health commodity availability index includes ORS, vitamin A, vaccines, de-worming medicines, co-trimoxazole and anti-malarial medicines (Figure 17). The index shows a significant increase in the child health commodities with about a 20 percentage point increase between each of the survey rounds. Highest improvement between Round II and Round III was observed in Tigray (33 percentage points), followed by Oromia (29 percentage points), then Amhara (17 percentage points) and SNNP (12 percentage points). The child health commodity availability index was 85 percent in Tigray, 72 percent in Amhara, 63 percent in Oromia and 48 percent in SNNP in Round III.

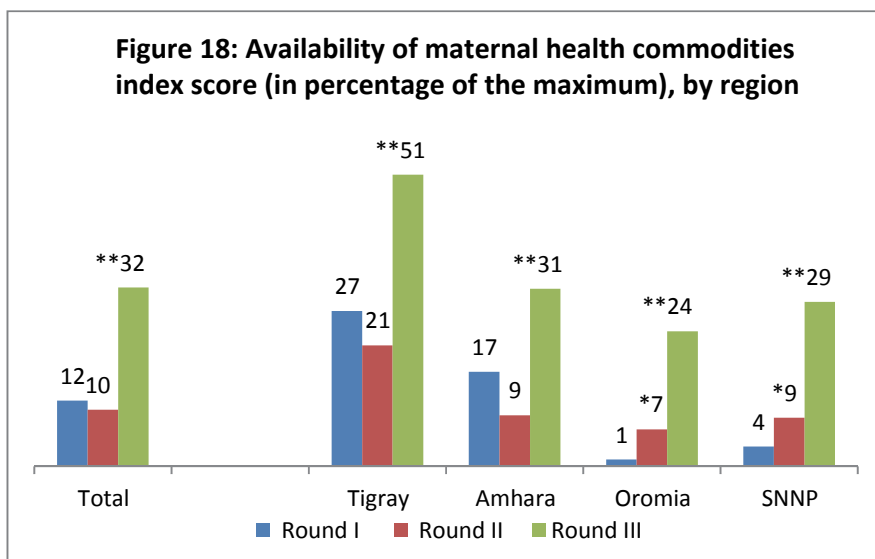
¹³ The Cronbach's reliability alphas for contraceptive availability, child health commodity availability, and maternal health commodity availability indices were 0.82, 0.77, 0.36 respectively.



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

The maternal health commodity availability index includes iron tablets and misoprostol (Figure 18). After remaining unchanged between Round I and Round II, major improvement was observed between Round II and Round III (22 percentage point increase). All four regions have shown significant improvement. Highest improvement between Round II and Round III was observed in Tigray (30 percentage points), followed by Amhara and SNNP (22 and 20 percentage points, respectively), and then Oromia (17 percentage points). The maternal health commodity availability index was highest in Tigray (51 percent), followed by 31 percent in Amhara, 29 percent in SNNP and lowest in Oromia (24 percent).



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Conclusion and Recommendations

This situation analysis of health services in the survey *kebeles* indicates major improvement in the infrastructure and coverage of HEP. The availability of any health facility is almost universal with population to HEW ratio approaching the target (one HEW per 2,500 people) and in Oromia, the target was met.

However, to achieve the optimum 30 HHs per HDA team leader (current average is 46) as planned by the HDA strategy, **more HDAs need to be selected and trained to minimize the gap.**

There was an impressive increase in L10K's support as per perception of the HEWs. However, it is deemed weak in training related activities. HEWs were given a wide range of training on iCCM, ENC, IRT, and nutrition. These trainings were part of the country's national effort to improve HEWs' performance where L10K provided major input. Since the trainings were led by the GoE staff, it is likely the reason why the HEWs did not link those training with L10K.

The HDA activities in the *kebeles* indicated that more than half of the deployed HDA leaders have received trainings on RMNCH components. A high percentage of HDA team leaders also received training on CBDDM. Attendance of *kebele* meetings by HDAs was also high. Yet, there were gaps in the application of the CBDDM by the HDAs despite the high level of training. Reporting of data from CBDDM mapping, updating of registers, maintenance of registers and sharing of data for decision making were still less than optimum. Amhara's performance was much better compared to other regions for CBDDM activities. **It would be helpful to understand the barriers the HDAs are facing in applying CBDDM strategies in different regions.**

The HDAs replaced CHPs; however, the HDAs' level of support for HEP has improved only marginally compared to the level of support the CHPs had provided. **Thus, special initiatives could be required to improve the support HDAs provide to HEWs.**

Further visibility and involvement of HDAs in HEWs' activities should be encouraged to enhance HEWs perception on HDAs. On the other hand, perceived support from the *kebele* health committee has improved substantially. **The improving role of kebele committee for health issues is encouraging. This vehicle should be used for HEP issues that are lagging behind.**

Situation regarding keeping and maintenance of HMIS is interesting. Availability of family folders at the time of Round III survey was very high and availability of other files, such as injectable contraceptive record and immunization records, were also high. Tigray's performance in availability of records was better than other regions. Yet, the practice of updating the records was irregular, with Tigray indicating one of the lowest percentages.

A high availability of family folders at the time of Round III survey and yet the irregular practice of updating the records **underscore the need for reinforcing the importance of HMIS data for decision making. Supportive supervisions should focus more on record keeping. Experience sharing between high and low performing kebeles should be encouraged.**

The availability of commodities at the HPs has improved with substantial increase in the availability of life-saving child health medicines, such as co-trimoxazole, and maternal health medicines, such as misoprostol. Seventy-five and 80 percent HPs had implants (Implanon) and injectables, respectively. Availability of Implanon for the first time in Round III survey is the direct result of GoE's policy adopted in 2010 about promoting Implanon as the key long active FP method and encouraging women to come to the HPs to get it inserted by the trained HEWs. **The HPs should aim for near 100% availability of life-saving drugs and contraceptives. No client should be rejected services due to lack of product availability. Thus, given the rising demand for modern treatment for childhood and maternal health and family planning, it is important to ensure uninterrupted commodity supplies, avoiding stock-outs to further improve and sustain services.**

INTERACTION WITH HEWs AND HDAs

Key Findings

- HPs visits in last 12 months by the respondents have increased from 52 percent in Round I to 62 percent in Round II and then to 67 percent in Round III.
- Three most common reasons for visiting HPs in Round III were child immunization, family planning and ANC; reasons similar to that observed during previous survey rounds.
- Although the percent of the respondents who knew the HEW in their *kebele* was higher in Round III (93 percent) compared to Round II (88 percent), there was a drop in HH visits by the HEWs during that period (from 52 percent to 48 percent), which was mainly due to the drop in SNNP.
- An index assessing the quality of HEWs' HH visit, measured by the topics of discussion during the visit recalled by the respondents, dropped between Round II and Round III (from 32 to 29 percent).
- Sixty percent of respondents were aware of the presence of HDAs in Round III while only 23 percent reported being visited by one.
- An index assessing the quality of HDAs' HH visit, measured by the topics of discussion during the visit, recalled by respondents was of poor quality in Round III (18 percent), compared to the same matrix for the CHPs' HH visit in Round II (27 percent).
- The key topics of discussions during interactions with HEWs or HDAs spontaneously recalled by respondents were hygiene, latrine construction and use and child nutrition; ANC related discussions increased between Round II and Round III but still around 15 percent; newborn care related discussions was less than 5 percent in Round III.
- The percentage of women possessing family cards increased from 6 percent in Round I to 40 percent in Round II to 56 percent in Round III.

Interactions of HHs or families with HEWs and HDAs are measured by any HP visit by women, any HH visit by HEWs and/or HDAs, and HH's possession of family health cards. The target populations for these analyses are the women in reproductive age, women with children 0-11 months, and women with children 12 -23 months. Only the unique respondents from all three target groups of women were included in the analysis. The analyses explore the trend and changes in the exposure to HEWs and HDAs/CHPs across the three surveys, and the regional variations in these indicators.

Visit to the HPs

The percentage of women who visited a HP in the last 12 months before the surveys showed significant increase over time, from 52 percent in Round I to 62 percent in Round II to 67 percent in Round III (Table 11). The highest increase in the HP visits between Round II and Round III was observed in Amhara (54 to 69 percent) followed by Oromia (68 to 71 percent) (Table 12).

Table 11: Percentage of respondents who visited a HP during last 12 months and their reasons for visiting; and the percentage of respondents who visited by a HEW during last 6 months and the topics discussed; L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Round I	Round II	Round III
Number of respondents	6,178	9,781	9,449
% visited HP in 12 month	52.2	*61.6	**67.3
Main reasons for visiting the HP (n)	(3,230)	(6,059)	(6,321)
Child immunization	59.0	*53.1	54.6
Family planning	33.3	36.4	37.5
Antenatal care	17.6	*21.5	19.9
Malaria treatment	15.5	*8.1	**5.4
Referral of sick child	9.5	*5.2	**2.7
Health education	5.0	6.2	**11.1
Postnatal care	2.1	2.5	1.8
Growth monitoring	2.2	2.9	**6.6
Diarrhea treatment	4.2	1.9	**4.6
Pneumonia treatment	2.3	0.8	**2.2
Obtain bed nets	0.8	1.0	**2.0
Delivery care	0.6	1.1	**1.9
Neonatal care	0.6	1.1	0.8
% heard of HEW	72.2	*87.9	**92.8
% visited by HEW in 6 months	36.8	*51.7	**48.3
Topics recalled being discussed by the HEW (n)	(2,203)	(4,977)	(4,465)
Latrine use	51.5	*60.3	**46.8
Hygiene	53.7	*59.9	54.7
Pit latrine construction	57.9	56.1	**42.4
Immunization	47.2	48.5	**56.6
Child nutrition	9.6	*28.8	27.4
Safe water use	19.3	*24.8	**20.1
Family planning	16.8	19.7	17.3
Pregnancy care (ANC)	3.7	*9.3	**15.7
HIV/AIDS	5.7	*8.6	**2.7
New born care		8.3	**4.8
Diarrhea treatment	2.5	*5.3	5.1
PNC		3.4	3.1
% of the expected No. of topics recalled being discussed	26.7	*32.1	**28.9

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

The three most commonly reported reasons (i.e., child immunization, family planning and ANC) to visit a HP remained the same between the survey periods (Table 11). However, childhood immunization significantly dropped from 59 percent in Round I to 53 percent in Round II, and remained unchanged between Round II and Round III. Family planning did not show any statistically significant change across the rounds and was 37 percent at Round III. ANC visit increased marginally between Round I and Round II (from 18 to 22 percent) but did not change between Round II and Round III.

HP visits for malaria treatment declined significantly from 16 percent in Round I to 8 percent in Round II and to 5 percent in Round III. Similarly, HP visits as a result of referral for a sick child declined from ten percent in Round I to 5 percent in Round II and to 3 percent in Round III.

There was a 6 percentage point increase in the HP visit for health education between Round II and Round III. Growth monitoring as a reason for visiting a HP was 11 percent in Round III, which was about a 5 percentage point increase from Round II.

HH Visits by HEWs

In all three surveys, respondents were asked whether they knew any HEWs in their *kebele*, followed by questions about interactions with the HEWs. The proportion of women who knew an HEW in their *kebele* steadily increased across the surveys. Ninety-three percent of women in Round III knew or heard of an HEW in their *kebeles* (Table 11). In nearly all regions over 90 percent of women knew an HEW from their *kebeles*, except in Tigray where it was 86 percent (Table 12).

Table 12: Percentage of respondents who visited a HP during last 12 months, knew a HEW, and were visited by a HEW during last 6 months; and the percentage of topics discussed by the HEW; L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

		% visited HP in 12 month	% heard of HEW	% visited by HEW in 6 months	No. of all respondents	% of the expected No. of topics recalled being discussed	No. received HEW visit
Tigray	Round I	53.6	56.2	36.7	1,557	34.3	522
	Round II	62.3	*86.4	*51.9	1,925	36.3	1,045
	Round III	63.9	86.4	53.2	1,870	*33.1	943
Amhara	Round I	50.9	76.3	35.2	1,724	25.2	656
	Round II	54.2	*90.4	*52.7	2,931	*30.0	1,526
	Round III	**69.0	**96.5	54.4	2,578	29.7	1,400
Oromia	Round I	50.5	66.1	35.1	1,527	26.3	471
	Round II	*68.6	*90.0	*53.9	2,501	*35.0	1,294
	Round III	71.0	92.5	52.5	2,470	**26.0	1,273
SNNP	Round I	56.9	83.8	42.9	1,370	25.2	557
	Round II	*66.7	82.4	47.4	2,424	*29.6	1,111
	Round III	62.9	**91.5	**32.2	2,531	27.6	849

*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

The percentage of women being visited or contacted by an HEW in the last six months of survey administration increased from 37 percent in Round I to 52 percent in Round II, and then dropped slightly in Round III to 48 percent (Table 11). The drop between Round II and Round III was mainly due to the decrease SNNP region (47 percent in Round II to 32 percent in Round III; see Table 12). In other regions, women reporting visits by HEWs were around 50 percent, and remained same between Round II and Round III.

Women were asked about the information that was provided by the HEWs during the last HH visit. Their spontaneous responses were recorded without probing. The items they mentioned were matched with a list of ten expected topics, where the frequency reported was then used as a measure of the quality of HEW's

HH visit.¹⁴ The key assumption was of this quality indicator is that a higher quality interaction between an HEW and HH would lead to better spontaneous recall of the topics discussed. According to this metric, the quality of HH visits by HEWs increased from 27 percent in Round I to 32 percent in Round II, but then decreased to 29 percent in Round III (Table 11). The percent of expected number of topics recalled was less than 30 in all the regions, except for Tigray, where it is slightly higher at 33 percent in Round III (Table 12).

HH sanitation (e.g., latrine use, hygiene, and latrine construction) and immunization were the major topics of discussion during HEW’s visit across the three surveys. There was a significant increase in the recall of immunization as a discussion topic between Round II and Round III (from 49 percent to 57 percent). Recalling child nutrition as a discussion topic increased three folds between Round I (10 percent) and Round II (29 percent), but remained somewhat unchanged between Round II and Round III—the latter being at 27 percent. The percentage of women recalling ANC as a discussion topic increased from Round II (9 percent) to Round III (16 percent). Less than 5 percent recalled HEWs discussing PNC and newborn health.

HH Visits by HDAs

The network of HDAs informs and reminds HH to maintain good hygiene and HH sanitation, and to utilize services offered by the HEP. One of the major activities of the L10K project has been to encourage and support the HEWs as they train and supervise the HDAs to promote RMNCH care behaviors and practices. The proportion of women who reported to know the HDA in their neighborhood in Round III was compared to women knowing the CHP in Rounds I and II. The proportion who knew the HDA in her neighborhood in Round III was higher (60 percent) than the proportion who knew the CHP in Round II (52 percent) (Table 13).

Table 13: Percentage of respondents visited by a CHP/HDA^ϕ during last six months and the topics recalled being discussed by the CHP/HDA^ϕ, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Round I	Round II	Round III
No. of respondents	6,178	9,781	9,449
% heard of CHP/HDA ^ϕ	37.1	*51.5	**60.3
% visited by CHP/HDA ^ϕ in 6 months	16.5	*33.9	**23.3
Topics recalled being discussed by the CHP/HDA (n)	(1,184)	(3,291)	(2,284)
Hygiene	41.7	*59.6	**41.2
Pit latrine construction	44.6	*54.8	**34.9
Immunization	60.5	*55.4	**36.6
Child nutrition	16.3	*26.9	**17.1
Latrine use	35.0	*53	**31
Safe water use	15.8	*22.1	**14.7
HIV/AIDS	9.0	11.4	**2.6
Pregnancy care (ANC)	5.7	*10.9	**14.5
Family planning	18.7	16.6	**11.4
Diarrhea treatment	4.3	4.9	4
Newborn care	NA	7.7	**2.7
Postnatal care	NA	1.1	**1.8
% of the expected No. of topics recalled being discussed	21.8	*27.1	**17.7

^ϕ Round I and Round II estimates are for CHPs while Round III estimates are for HDAs

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

¹⁴ The Cronbach’s alpha was 0.44

Examination of these indicators by regions shows that in Round III the awareness of the presence of an HDA was highest in Tigray at 76 percent followed by Amhara at 61 percent, Oromia at 57 percent and SNNP at 54 percent (Table 14).

The percentage of women who reported being visited by the CHP in six months preceding the survey doubled between Round I (16 percent) and Round II (34 percent). However, in Round III the percentage of women visited by the HDA was 9 percentage points lower than the percentage visited by the CHP in Round II (Table 13). Region stratified analysis shows the similar trend (Table 14).

The quality of HDA visit during Round III and CHP visit during Rounds I and II was assessed using methods similar to how the quality of HH visits by an HEW was assessed. The percentage of topics that women spontaneously recalled HDAs discussing in Round III or the CHP discussing in Rounds I and II, out of an expected list of 12 items, was used as a measure of quality of HH visits by the HDA (Table 13).¹⁵ The quality of CHP HH visits, as measured by the index, increased between Round I and Round II (22 to 27 percent) but there was a substantial decline in the quality of HDA visits during Round III from the quality of CHP visits in Round II. The decline in the quality of HDAs' visits in Round III from the quality of CHP visits in Round II was observed in all the four regions; the level of quality of HDAs' interaction in Round III was at or below what was reported on the quality of CHP visits in Round I (Table 14). As expected, the top five types of discussion topics by the HDAs or the CHPs were similar to the topics discussed most by the HEWs (hygiene, latrine construction and use, immunization, child nutrition).

Table 14: Percentage of respondents visited by a CHP/HDA^ϕ during the last six months and the percentage of the expected number of topics recalled being discussed by the CHP/HDA^ϕ, by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

		% heard of CHP/HDA	% visited by CHP/HDA	Sample size	% of the expected No. of topics recalled being discussed by CHP/HDA	Sample size
Tigray	Round I	71.4	42.9	1,557	27.8	606
	Round II	*82.0	*57.0	1,925	28.5	1,091
	Round III	**76.4	**40.0	1,870	**24.7	699
Amhara	Round I	36.3	17.5	1,724	17.6	335
	Round II	*57.5	*35.1	2,931	*26.0	983
	Round III	60.7	**24.1	2,578	**17.1	622
Oromia	Round I	24.6	4.4	1,527	17.9	103
	Round II	29.9	*22.2	2,501	*30.8	517
	Round III	**56.8	17.9	2,470	**14.1	501
SNNP	Round I	30.3	10.9	1,370	21.3	140
	Round II	*45.4	*30.0	2,424	*24.4	700
	Round III	**53.9	**17.9	2,531	**13.3	462

^ϕ Round I and Round II estimates are for CHPs while Round III estimates are for HDAs

*Statistically significant difference (p<0.05) between Round I and Round II surveys

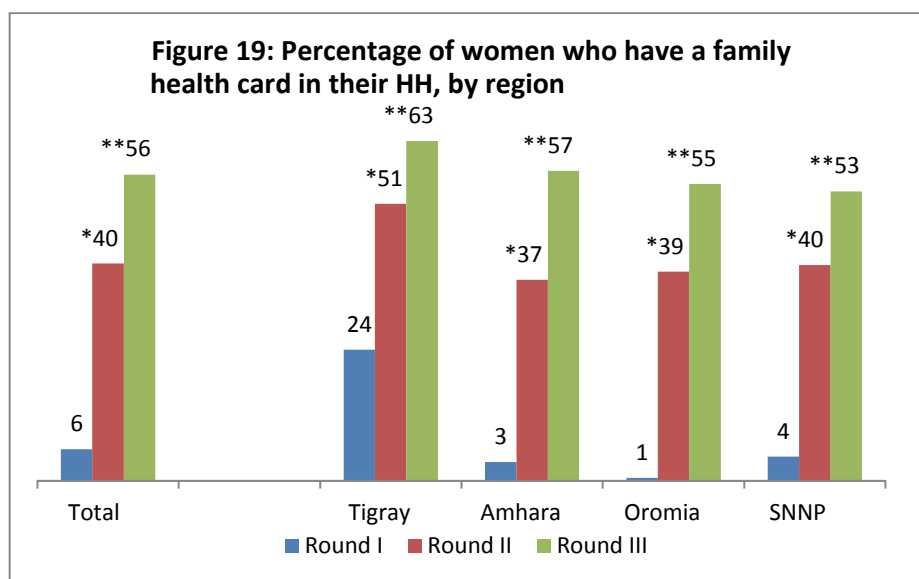
**Statistically significant difference (p<0.05) between Round II and Round III surveys

Examination of these indicators by regions shows that in Round III the awareness of the presence of an HDA was highest in Tigray at 76 percent followed by Amhara at 61 percent, Oromia at 57 percent and SNNP at 54 percent (Table 14).

¹⁵ The Cronbach's alpha was 0.58

Family Health Cards

Family health cards (FHCs) were distributed by HEWs to all women of reproductive ages in a HH. The cards are used as a tool to provide health education and thus, promote RMNCH. The card is also used to record the RMNCH services provided to the HH. The HDAs use the FHCs to re-enforce health education and remind HHs about the health services they can receive from the HEP. The percentage of women with a FHC increased from 6 to 40 percent between Round I and Round II, and to 56 percent in Round III (Figure 19). As indicated in the Round I survey, possession of FHC was really low, below 5 percent in Amhara, Oromia and SNNP; while in Tigray, 24 percent of the women reported to have had a FHC. There were major gains between Round I and Round II in all four regions (51 percent in Tigray, 37 percent in Amhara, 39 percent in Oromia and 40 percent in SNNP had FHCs). Between Round II and Round III, though the improvements were not as striking as between the earlier rounds, substantial improvements nevertheless have been observed in all regions. The increase in the possession of FHCs between Round II and Round III was highest in Amhara (from 37 in Round II to 57 percent in Round III), followed by Oromia (from 39 to 55 percent), and SNNP (40 to 53 percent), and then Tigray (51 to 63 percent).



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Access to Health Care Services

Respondents were asked from a list of barriers (9 items) which they perceive as small or no problems in seeking health care services from themselves and for their children (Table 15). The items were used to construct a self-efficacy index for accessing health care services.¹⁶ The mean score of the self-efficacy index for women increased from 68 to 80 percent between Round I and Round II, and to 85 in Round III. Similarly, self-efficacy index for accessing health care services for the child was constructed. The mean of the index also increased from 69 percent in Round II to 81 percent in Round III.

Figure 20 and Figure 21 show the self- efficacy index score for accessing health services for the women respondent and their children respectively by region. Regional gains were observed mainly in Tigray and SNNP between Round II and Round III.

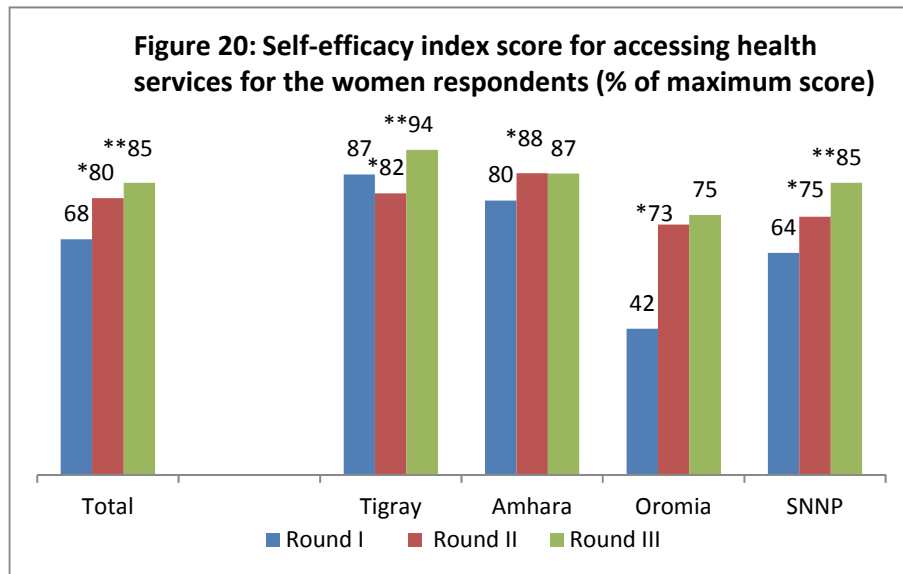
¹⁶ The Cronbach's alpha for both the self-efficacy index for accessing health care services was 0.84

Table 15: Self-efficacy in accessing health care services for the respondent and for her child, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

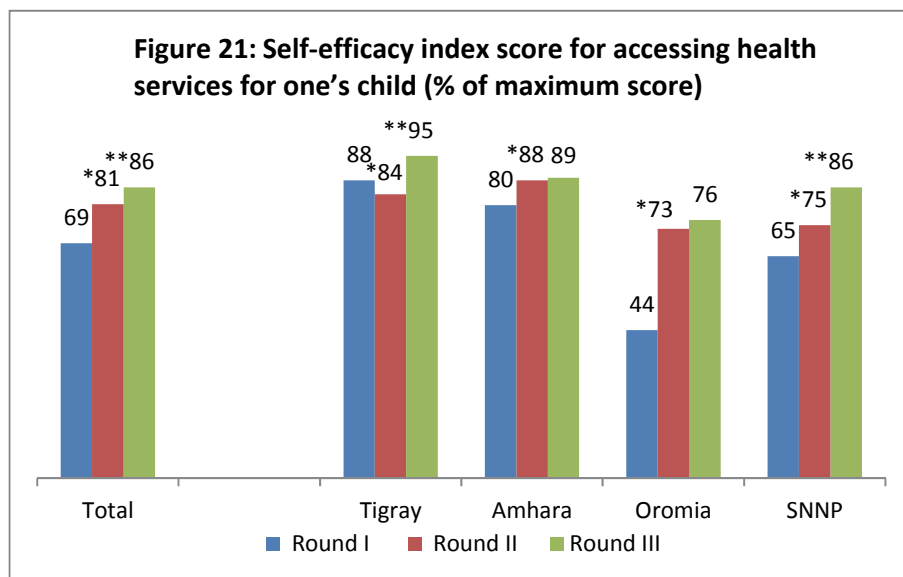
	Round I (n=6,178)	Round II (n=9,781)	Round III (n=9,449)
Percentage perceive the following issues as small problem or no problem for accessing health services for herself			
Not knowing where to go	81.8	*93.3	92.0
Not getting permission to go	82.9	*93.9	93.0
Not getting money for treatment	46.3	*60.7	**75.0
Not having a health facility nearby	60.4	*69.9	**77.1
Transportation problem	49.6	*61.5	**68.9
Not wanting to go alone	55.8	*73.8	**81.8
Concern that there may not be a female health provider	82.2	*89.5	**92.6
Concern that there may not be any provider	75.8	*89.7	90.7
Due to HH chores	79.8	*89.2	90.9
Mean self-efficacy index for accessing health care services for herself (% of maximum score)	68.4	*80.3	**84.7
Percentage perceive the following issues as small problem or no problem for accessing health services for her child			
Not knowing where to go	81.6	*93.2	92.3
Not getting permission to go	82.8	*93.9	93.2
Not getting money for treatment	48.1	*61.4	**75.6
Not having a health facility nearby	59.9	*69.7	**78.0
Transportation problem	49.9	*62.3	**69.9
Not wanting to go alone	56.8	*74.9	**84.0
Concern that there may not be a female health provider	85.7	*91.6	**94.0
Concern that there may not be any provider	76.1	*89.8	91.5
Due to HH chores	81.5	*88.9	91.3
Mean self-efficacy index score for accessing health care services for her child (% of maximum score)	69.2	*80.7	**85.6

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys
 **Statistically significant difference ($p < 0.05$) between Round II and Round III surveys



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys
 **Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Conclusion and Recommendations

The indicators measuring the exposure of HHs and families to the HEP (i.e., interactions of HEWs and HDAs/CHPs with HHs and families) across the three survey administrations demonstrate major advances across time. While interactions with HEWs at the HP level increased, visits by HEWs at the HH level declined moderately in Round III compared to Round II. However, the moderate reduction in HH visits by the HEWs is not very discouraging given the fact that the responsibility to conduct outreach activities (like HH visits) after the introduction of iCCM was supposed to decrease from 75 percent of their time to 50 percent.

The low reporting of the HDA visiting the respondents' HH could be due to a few possibilities: some women see the HDA as a community member and not as an agent (i.e., HDA) for promoting HEP services, the HDA is not very pro-active as such the respondent did not remember visiting her HH for promoting HEP, or the

combination of both. The transition from CHP strategy to HDA strategy was not straightforward. For example, in SNNP the HDAs were men for few years before they were replaced by women. This may have affected the performance of HDAs. In any case, HDAs mainly replaced the role of CHPs and should be performing at least at the level of CHPs. Thus, it is of concern that HH visits by HDA during Round III were lower than the HH visits by CHPs in Round II. ***Priorities should be given to make HDAs more knowledgeable regarding the best practices in RMNCH care, motivate them to be more active in their RMNCH related activities and engage more meaningfully in the community. A functioning HDA body is likely to contribute to the reduction of HEWs' HH visits.***

Assessment of the quality of interactions between women and the HDAs measured by spontaneous recalling of topics discussed by the HDAs in the last 6 months shows a negative trend compared to the quality of the interactions between HHs and the CHPs. This may be the result of a poor quality of training as the number of HDAs who received training was much higher than the CHPs. ***The quality of interaction also needs to be improved in order for the women to internalize the topics of discussion and then adopting healthy practices as per these discussions. The support that HEWs provide in training and reviewing HDAs' performances and interactions with the HHs and communities should be strengthened.***

FAMILY PLANNING

Key Findings

- The percentage of respondents who have ever heard of family planning increased from 90 percent in Round I to 95 percent in Round III.
- The prevalence of ever used contraceptives increased from 45 percent in Round I to 57 percent in Round II to 67 percent in Round III.
- Contraceptive prevalence rate (CPR) was 30 percent in Round I, which increased to 41 percent in Round II and to 50 percent in Round III. In Round III, the lowest CPR rate was in Tigray (37 percent) and the highest was in Oromia (57 percent).
- The share of injectables among contraceptives users declined from 81 percent in Round II to 68 percent in Round III, while the share of Implanon increased from 10 to 25 percent during that period.
- Primary source of family planning methods at Round III was the HPs (72 percent for injectables and 62 percent for Implanon).
- Primary source of family planning message was health workers in all three rounds, and in Round III, 80 percent received information from health workers.
- Almost all (97 percent) of the FP users reported that they are currently using the method of their choice.
- Majority (59 percent) of the FP adopters were not told about side effects of the method by the provider.
- The percentage of non-users contacted by a health worker was 30 percent in Round I, 51 percent in Round II and 41 percent in Round III.
- “Wantedness” of current pregnancy among women of reproductive age increased from 57 percent in Round I to 80 percent in Round III.

Improving FP is expected to decrease maternal and newborn health morbidity and mortality (13). As part of its efforts to improve maternal and newborn health, the L10K project enhances the FP component of the HEP. This section describes changes in indicators that measure the interactions of HEWs and other health workers with women of reproductive age aimed at improving family planning indicators, changes in their knowledge and perception regarding FP. The target population for this analysis is women of reproductive age. The analyses include trend in the FP indicators, the rate of changes in these indicators across the surveys and the regional variations.

Knowledge and Approval of Family Planning, and Ever Used Contraceptives

Table 16 illustrates percentage of women who have knowledge about FP, their perception regarding FP and prevalence of ever used FP methods. There is a modest increase in the percentage of women of reproductive age who have ever heard of FP methods from Round I (90 percent) to Round II (93 percent) to

Table 16: Percentage of women (in reproductive age) heard of any family planning method, approve of using a family planning method, and ever used a family planning method; and percentage of women in union currently using a family planning method; by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	Round I	Round II	Round III	Round I	Round II	Round III	Round I	Round II	Round III	Round I	Round II	Round III	Round I	Round II	Round III
Ever heard of FP method	93.0	*96.4	**94.4	92.0	*96.0	97.3	87.0	*93.7	94.4	85.7	86.4	**94.1	89.6	*93.2	**95.3
Approve of FP	88.8	90.8	91.3	86.0	*91.5	93.5	80.8	*89.3	91.8	81.0	82.8	90.8	84.1	*88.7	**92.0
Knows where to obtain FP method	88.1	*94.3	91.3	84.2	*89.6	**96.1	77.0	*88.4	91.5	76.9	78.6	**92.7	81.5	*87.4	**93.4
Ever used a FP method	50.2	51.4	**59.6	47.2	*59.3	**72.4	47.0	*57.1	**68.2	47.3	*55.7	**63.4	47.6	*56.8	**67.3
No. of women in reproductive age	1,080	756	770	1,000	1,068	1,077	1,000	1,056	1,083	920	1,008	1,058	4,000	3,888	3,988
Currently using a FP method	24.3	*34.4	37.1	29.7	*42.6	**49.6	31.4	*45.7	**56.6	32.1	*40.4	**48.3	29.9	*41.9	**49.6
Pill	1.9	1.6	0.7	0.7	0.8	0.8	3.7	*5.2	**2.5	3.5	2.0	**1.4	2.3	2.5	**1.4
Injectables	20.9	*26.4	23.7	27.4	*35.5	35.2	26.2	*35.5	32.7	26.8	*34.0	37.4	26.1	*34.0	33.6
IUD	0.0	0.0	0.4	0.3	0.0	0.3	0.1	0.4	2.5	0.2	0.0	0.5	0.2	0.1	**1.0
Implant	0.2	5.6	**11.3	1.3	*5.4	**12.4	1.1	*2.8	**17.2	1.4	*3.0	**8.3	1.1	*4.1	**12.5
Condom	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sterilization	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.5
Other modern methods	0.1	0.5	0.3	0.0	0.2	0.4	0.0	0.9	0.7	0.0	0.3	0.3	0.0	0.0	0.0
Traditional	0.7	0.0	0.8	0.0	0.1	0.3	0.2	0.8	0.8	0.0	0.8	0.3	0.2	0.5	0.5
Not mentioned	0.5	0.2	0.0	0.0	0.4	0.1	0.0	0.2	0.2	0.0	0.1	0.1	0.1	0.3	0.1
No. of women in union	879	598	615	881	898	945	957	1,005	1,000	891	916	967	3,608	3,417	3,527

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

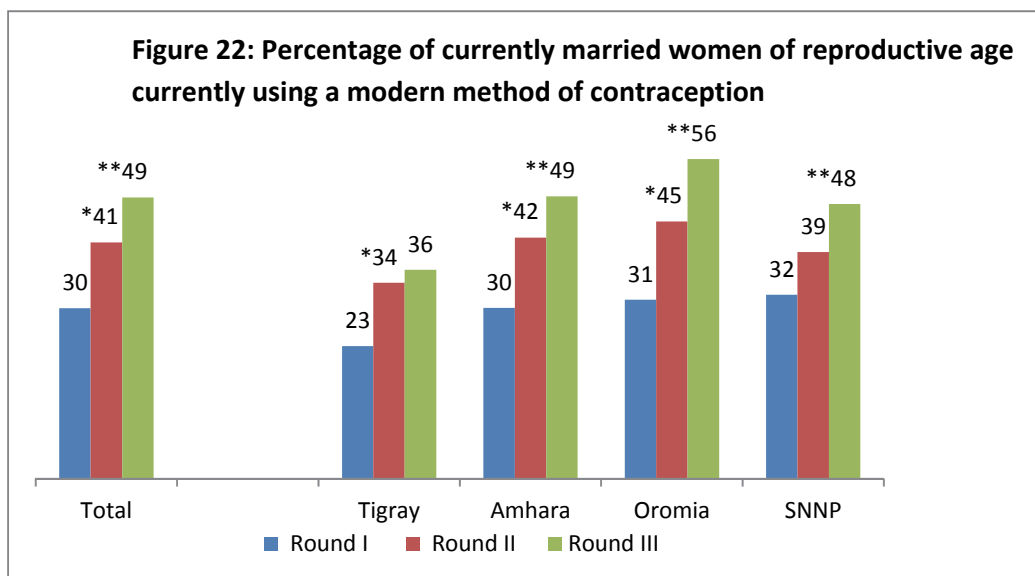
Round III (95 percent; Table 16). The percentage of women who approved of family planning also increased modestly from 84 percent in Round I to 89 percent in Round II and to 92 percent in Round III. While the percentage of women who knew where to obtain family planning methods increased from 81 percent in Round I to 87 percent in Round II and to 93 percent in Round III. The percentage of women who had ever used family planning methods increased from 48 percent in Round I to 57 percent in Round II and to 67 percent in Round III.

The indicator “ever heard of family planning” remained same between Round II and Round III in most of the regions except SNNP. This is not surprising, as this indicator was already quite high in Round I and Round II in these regions. An improvement of 8 percentage points was observed in SNNP between Round II and Round III. Similarly, the rate of increase in the approval of FP was highest in SNNP from 83 percent in Round II to 91 percent in Round III.

The prevalence of ever using contraceptives increased 10 percentage points across the survey rounds (48 percent in Round I, 57 percent in Round II, and 67 percent in Round III). The proportion increased between 9 to 12 percentage points from Round I and to Round II in Amhara, Oromia and SNNP, while remaining unchanged in Tigray. All regions have shown gains between Round II and Round III surveys, with 13 and 11 percentage points increase in Amhara and Oromia, respectively, followed by Tigray (9 percentage points) and SNNP (8 percentage points). In Round III, the prevalence of ever using contraceptives was highest in Amhara (72 percent) followed by 68 percent in Oromia, 63 percent in SNNP and 60 percent in Tigray.

Currently Using Contraceptives

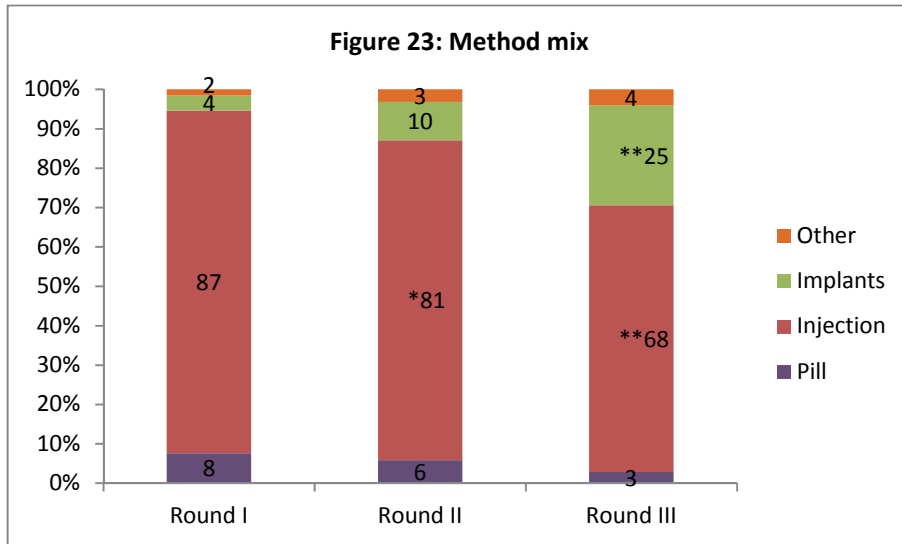
Table 16 presents the prevalence of women currently using any FP methods. The percentage of women of reproductive age who were in union and currently using contraception (i.e., the contraceptive prevalence rate or CPR) showed a positive trend across the surveys, and increased from 30 percent in Round I to 42 percent in Round II, and to 50 percent in Round III (Figure 22). Similar positive trend was observed in all four regions. While the increase between Round II and Round III was between 9 to 11 percentage points in Amhara, Oromia and SNNP, the gain was only 3 percentage points in Tigray. In Round III, the CPR was highest in Oromia (56 percent), followed by Amhara (49 percent), SNNP (48 percent) and Tigray (36 percent).



*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Considering method mix as shown in Figure 11, 68 percent of the current contraceptives users in Round III were using injectables, which is 13 percentage points lower than Round II, and a fourth of the users are using implant, which is 15 percentage points increase from Round II (Figure 23). Pills only contribute to 4 percent of the method mix. Usage of other modern methods is practically nonexistent.



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Source of Contraceptives

Table 17 shows the percentage of women using contraceptives according to the source of their methods. The major sources of contraceptives remained the same in all three surveys: HPs supply more than 65 percent, and HCs provide about a fourth. Figure 24 illustrates method specific source. HPs are the key sources for all contraceptives.

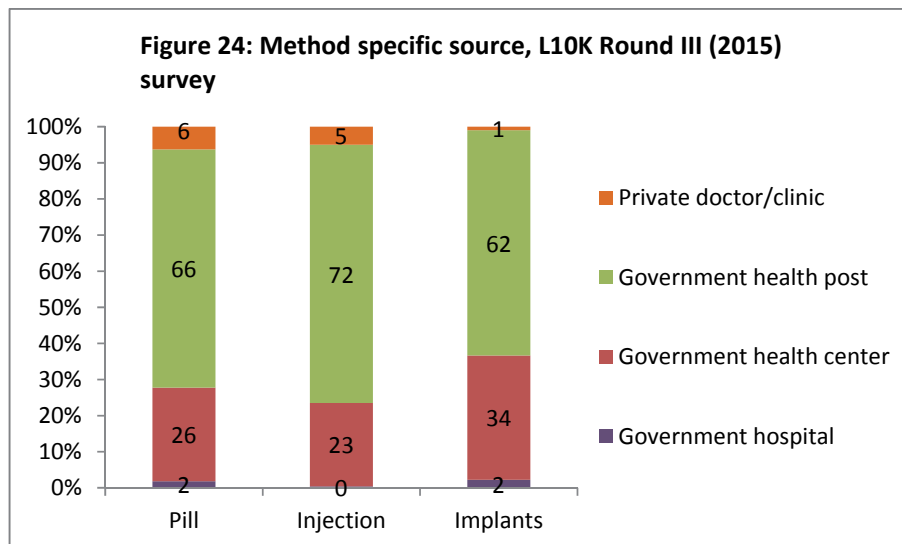


Table 17: Percentage distribution of women of reproductive age contraceptive users according to the source of their method, by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

Source of method	Tigray			Amhara			Oromia			SNNP			Total		
	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III
Government hospital	0.8	1.0	**3.1	0.7	1.9	0.4	1.8	3.7	4.4	0.4	2.4	1.0	1.0	2.4	2.0
HC	57.0	*37.7	40.6	16.1	*29.1	29.2	18.3	*15.6	**21.8	16.8	*21.6	22.2	21.7	24.3	26.4
HP	38.3	*59.4	56.4	81.7	*63.5	67.4	62.4	*76.3	**69.2	79.6	*70.5	71.0	70.6	68.5	67.7
NGO health facility	0.0	0.0	0.0	0.0	0.3	1.1	5.0	0.8	0.3	0.1	1.6	0.3	1.5	0.7	0.5
Private doctor/clinic	0.0	0.0	0.0	0.7	0.7	1.5	4.0	1.9	3.6	0.0	0.5	4.7	1.4	0.9	**2.8
Pharmacy	0.0	0.0	0.0	0.3	0.7	0.3	3.2	0.4	0.3	0.7	0.4	0.6	1.2	0.5	0.3
Other	3.9	2.0	0.0	0.4	3.8	0.3	5.3	1.2	0.3	2.5	3.1	**0.3	2.7	2.7	**0.3
No. of women using method	251	238	240	283	381	474	303	466	554	301	364	476	1,138	1,449	1,744

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Quality of FP Counseling

In Round III survey, respondents were asked what sorts of information was provided to them about FP, how they chose which method to use, their satisfaction about the methods they are using and whether any service charge was paid to obtain the methods. The results are presented in Table 18. Nearly 60 percent of respondents mentioned being informed about the side effects of the methods and little over half (56 percent) mentioned being told what to do in case of side effects. The percentage of women who were informed about other methods besides the one they were using was 78 percent. Region specific analysis shows that a higher percentage of women in Tigray are informed about side effects (72 percent), what to do in case of side effects (71 percent), and other methods (90 percent) compared to women in other regions. Only half of the respondents in Amhara reported about being informed about side effects and measures needed to be taken in case of side effects. In Oromia and SNNP, 60 percent of women were informed about potential side effects, and about 54 to 57 percent were told what to do in case they developed side effects.

An overwhelming percentage (97 percent) of women who are currently using family planning reported that they obtained the FP methods of their choice. In response to the question about who decides which method to choose, half of the respondents mentioned that the method of choice was their decision, nearly 40 percent reported that the decision was taken jointly with their partners or the providers, and another 11 percent said that someone else (e.g., provide, partner or others) chose the methods for them. The percentage of women who made the decision on their own about which method to obtain was lowest in Oromia (32 percent). In other regions nearly 60 percent of women made the decision for themselves.

Nearly all respondents (97 percent) expressed satisfaction with their service providers of FP methods in all regions, and 89 percent mentioned that they would recommend them to others. Only 5 percent reported to have paid for family planning services.

Table 18: Information provided on method, choosing method, satisfaction with the FP provider, and service charge for FP, by region, L10K Round III survey

	Tigray	Amhara	Oromia	SNNP	Total
Information provided on method					
Percentage of users told about...					
Side effects of the method*	72.5	51.7	60.3	60.2	58.9
What to do if had side effects*	71.4	50.5	54.3	57.3	55.8
Other methods*	90.2	80.4	77.3	67.4	77.8
Choosing method					
Percentage obtained the method of their choice					
	99.4	96.4	95.0	98.0	96.7
Who decided the method obtained					
Self*	57.8	59.4	32.6	58.3	50.5
Jointly with partner or provider*	31.5	33.3	53.9	29.1	38.6
Provider or partner alone or other	10.7	7.4	13.5	12.7	10.9
Satisfaction with the provider					
Percentage mentioned they would return to the provider for FP service					
	96.7	97.5	96.3	97.5	97.0
Percentage mentioned they would refer the provider to her friends and relatives*					
	87.4	90.2	91.3	83.6	88.7
Service charge					
Percentage paid for FP services					
	1.8	4.2	5.8	5.7	4.7
Number of modern method users in last 12 months					
	231	364	465	346	1,406

* Statistically significant difference ($p < 0.05$) between regions

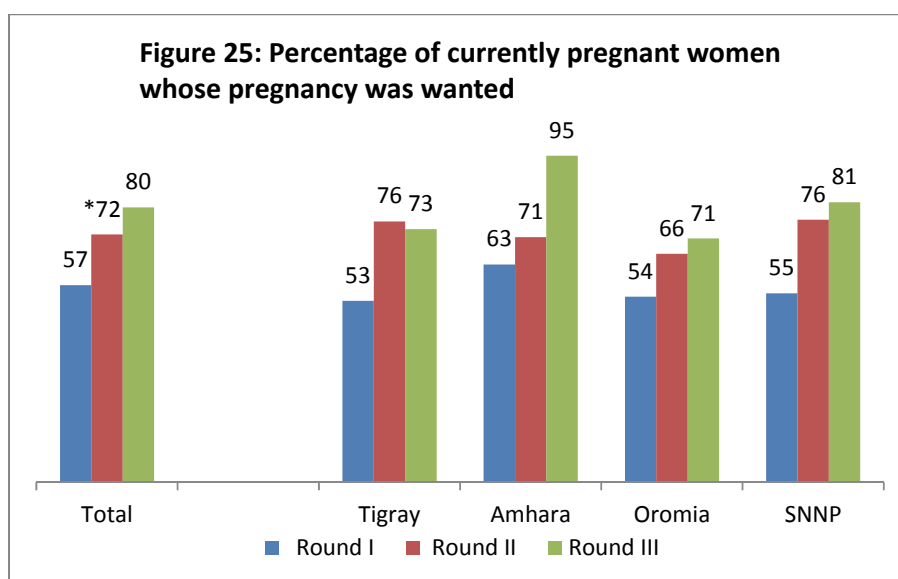
Sources of Family Planning Messages

Women of reproductive age were asked whether they received any information regarding family planning from a list of potential sources during the six months preceding the survey (Table 19). In the Round III survey, the primary source of family planning messages was health workers (HEWs and other community health workers; 80 percent), followed by family or friends (35 percent), community events and radio (21 percent) and then others (i.e., television, newspaper or magazine, and pamphlet or posters-10 percent). The relative order of sources of family did not shift across the survey rounds.

In the Round I survey, 55 percent of women reported health workers as a source of FP information which has increased substantially to 73 percent in Round II and to 80 percent in Round III. This indicator has increased substantially in Amhara, Oromia and SNNP since the Round I survey. In Tigray, the indicator was already high at 83 percent during Round II survey, and remained same in Round III. Radio as a source of information has increased over the years in Tigray (11 percent in Round I, 17 percent in Round II and 22 percent in Round III), but not so much in other regions. The role of community events as sources of FP methods has declined between Round II and Round III in Tigray (14 percentage points) and in Oromia (11 percentage points), but increased 6 and 8 percentage points in Amhara and SNNP, respectively.

Fertility Preference

Fertility preference was measured among currently pregnant women, by asking whether the pregnancy was desired. Figure 25 shows that the percentage of pregnancy women who reported that their current pregnancy was desired increased from 57 in Round I to 72 percent in Round II and 80 percent in Round III. Statistical significance for the regional level indicator was not estimated due to small sample size.



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Health Workers' Interactions with Contraceptive Non-Users

Table 19 presents the percentage of non-users who were contacted by health workers. The percentage of contraceptive non-users who were either contacted by a health worker at home to discuss FP, or who discussed FP during a health facility visit in the last 12 months increased from 30 in Round I to 51 percent in Round II, but then declined to 41 percent in Round III. Same trends have been observed regionally.

Table 19: Percentage of women of reproductive age who received FP messages during the last six months, according to source; and percentage of contraceptive non-users who were told about FP by a health worker during the past 12 months, by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
Source of FP message															
Radio	10.9	*16.7	**21.6	16.3	*12.2	**17.0	26.9	29.1	27.1	19.4	20.0	21.2	18.9	19.1	21.3
Television	2.6	*6.0	7.7	0.7	0.6	**7.3	1.8	4.1	5.2	0.7	1.8	**5.3	1.3	2.5	**6.3
Newspaper/magazine	2.0	1.6	**3.3	1.1	0.7	**2.7	1.5	4.4	1.3	0.9	1.7	0.8	1.3	2.0	1.9
Pamphlet/poster	2.4	3.1	2.4	0.8	1.7	2.4	1.2	10.9	**0.7	1.0	2.9	1.7	1.2	4.6	*1.8
Any health worker	67.6	*83.2	81.2	54.9	*71.9	**82.1	47.8	*75.2	**82.8	57.9	*65.8	**73.8	55.5	*72.9	**80.1
Community events	26.9	26.4	**12.2	22.3	*12.8	**21.4	30.7	*35.3	**24.2	23.6	*15.9	**21.6	25.5	*21.3	20.9
Friends/family	18.4	20.7	**16.7	34.6	*23.9	**57.9	26.3	*32.2	**19.9	26.6	*22.0	**26.5	28.4	*25.2	**34.6
Sample size	1,080	756	770	1,000	1,068	1,077	1,000	1,056	1,083	920	1,008	1,058	4,000	3,888	3,988
Percentage of non-users contacted by health worker to discuss FP	47.8	64.8	51.2	25.4	*46.0	**40.0	22.5	*47.5	44.0	35.3	*53.9	**34.6	29.9	*51.0	**41.3
Number of non-user	817	508	525	712	646	600	687	577	518	617	617	576	2,833	2,348	2,219

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Reasons for Not Using Contraceptives

Table 20 illustrates the reasons for not using contraceptives. In Round III, nearly a fourth of the non-users mentioned currently breastfeeding, and 21 percent mentioned postpartum amenorrhea as reasons for not using contraceptives. Another 13 percent held some negative views about contraceptives, 8 percent mentioned not having sex, 6 percent women were menopausal and 7 percent expressed health concerns and fear of side effects as reasons for not using contraceptives. A small proportion (3 percent) reported husband's opposition as a cause. These percentages are more or less similar to those of in Round I and Round II.

Table 20: Reasons for not using contraceptives (in percentage), L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Round I	Round II	Round III
Not having sex	4.4	3.6	**8.5
Infrequent sex	1.4	1.1	1.2
Menopausal	5.6	5.9	6.0
Infecund	0.2	0.2	1.1
Postpartum amenorrhea	23.9	*18.0	**20.5
Breastfeeding	23.9	*21.5	**24.5
Fatalistic	10.0	10.6	12.7
Respondent opposed	1.3	1.2	0.5
Husband/partner opposed	5.7	*2.7	2.6
Others opposed	0.3	0.1	0.3
Religious prohibition	2.8	3.7	**1.4
Knows no method	6.0	*3.4	**1.2
Knows no source	0.9	0.7	0.0
Health concern	7.8	7.6	**4.1
Fear of side effects	3.7	4.4	3.3
Lack of access/too far	0.3	0.8	0.1
Cost too much	0.1	0.0	0.0
Inconvenient to use	0.8	1.0	0.5
Interferes with body's normal function	0.5	2.1	1.1
Method not available	0.5	1.0	0.6
Other	0.0	10.4	9.9
Sample size	1,809	1,473	1,447

*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Self-Efficacy of Non-Users

Table 21 presents how confident the non-users feel about obtaining different contraceptive methods. Sixty one percent of non-users expressed a high confidence about obtaining an injectable contraceptive when they want to, which is much lower than the findings in earlier two surveys. Similarly, the percentage of non-users reporting a high confidence in obtaining pills also fell nearly 30 percentage points from Round II (at 71 percent) to Round III (at 42 percent). On the other hand, 43 percent women were very confident in getting implants in Round III, which is a 22 percentage point increase from Round II. High confidence about getting IUD also increased from Round II to Round III (from 5 percent to 14 percent).

Table 21: Percentage of non-users who are very confident, somewhat confident and not confident in obtaining a particular contraceptive, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

		Round I	Round II	Round III
Injection	Very confident	75.5	*84.2	**60.7
	Somewhat confident	8.5	6.1	28.3
	Not at all confident	16.1	9.7	11.0
Pills	Very confident	59.9	71.3	41.5
	Somewhat confident	16.5	11.7	39.6
	Not at all confident	23.6	17.0	18.8
Implant	Very confident	5.9	21.1	43.0
	Somewhat confident	14.9	23.6	29.8
	Not at all confident	79.1	55.3	27.2
IUD	Very confident	1.7	5.0	14.2
	Somewhat confident	13.8	21.9	26.7
	Not at all confident	84.5	73.1	59.1
	Sample size	2,833	2,348	2,219

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Conclusion and Recommendations

There was an increase in the CPR between Round II (2010-11) and Round III (2014-15); however, the annual rate of improvement was not as substantial as it was between Round I (2008-9) and Round II (2010-11). While the utilization of an injectable contraceptive stalled in Round III, implant contraceptives on the other hand have shown a major momentum with three folds increase in its use over the past four years. This is not surprising given that the HEWs were trained on how to insert implants in line with promoting implant as a long acting FP method. However, most of FP users were not told by the providers about the side effects of the current method or what to do if they experienced such side-effects.

In Tigray, there were improvements in the FP related knowledge and perception, and knowledge about sources of FP, and yet, similar to the previous surveys, the CPR in Round III lagged behind other regions. The interaction between non-users and health workers has declined in Round III compared to Round II in all four regions with a sharp fall in Tigray. The causes for these declines need to be investigated with proper guidelines for way forward.

Strategies to enhance the CPR should be a priority. Reaching out to the non-users should be a major focus of family planning initiatives. **Long-term method implants is replacing use of injectables, which reflects the GoE's initiative of popularizing implants as a cost-effective method. However, as the long acting family planning methods is increasing, the quality of methods and service delivery should be monitored and ensured.**

MATERNAL AND NEWBORN HEALTH

Key Findings

- Visit by an HEW during the last pregnancy among women with children of 0-11 months increased from 12 percent in Round I to 32 percent in Round II to 39 percent in Round III.
- Visit by an HEW during pregnancy was 55 percent in Tigray, 54 percent in Amhara, 23 percent in Oromia and 25 percent in SNNP in Round III.
- The prevalence of HEWs and or HDAs conducting family conversation during Round III administration was 16 percent.
- Neonatal tetanus protected childbirth was 57 percent in Round I and Round II, and 63 percent in Round III. The indicator was the highest in Oromia and Tigray (73 percent) followed by SNNP (62 percent) and then Amhara (53 percent in Amhara) in Round III.
- The coverage of 4 + ANC was 17 percent in Round I, 28 percent in Round II and 51 percent in Round III.
- The coverage of complete ANC (blood pressure measured, blood and urine tests conducted) was 10 percent in Round II and 50 percent in Round III.
- The key sources of ANC is currently the HC (60 percent) followed by the HPs (36 percent).
- Sixty-nine percent of women in Round I, 77 percent women in Round II and 90 percent women in Round III took birth preparedness measures.
- The highest improved birth preparedness component was identifying a facility for delivery; 3 percent in Round I, 6 percent in Round II, and 23 percent in Round III.
- Institutional deliveries among women with children 0-11 months for their last birth increased sharply from 9 percent in Round II to 53 percent in Round III. The increase was the highest in Tigray (from 14 to 77 percent) followed by Oromia (from 10 to 56 percent), Amhara (from 3 to 47 percent) and then SNNP (from 6 to 45 percent).
- Clean umbilical cord care practice among home deliveries declined in Round III from Round II.
- There was no improvement in PNC in 48 hours between Round II and Round III. However, the quality of PNC, assessed by an index, increased from 7 percent in Round II to 10 percent in Round III.
- An index measuring newborn check-ups measured from all the components was 14 percent in Round I, 21 percent in Round II and 23 percent in Round III.
- Newborn care practices improved between Round II and Round III. For example, dried and wrapped baby after delivery improved from 74 to 81 percent; skin-to-skin care improved from 75 to 81 percent; delayed bathing of newborn improved from 44 to 81 percent; thermal care

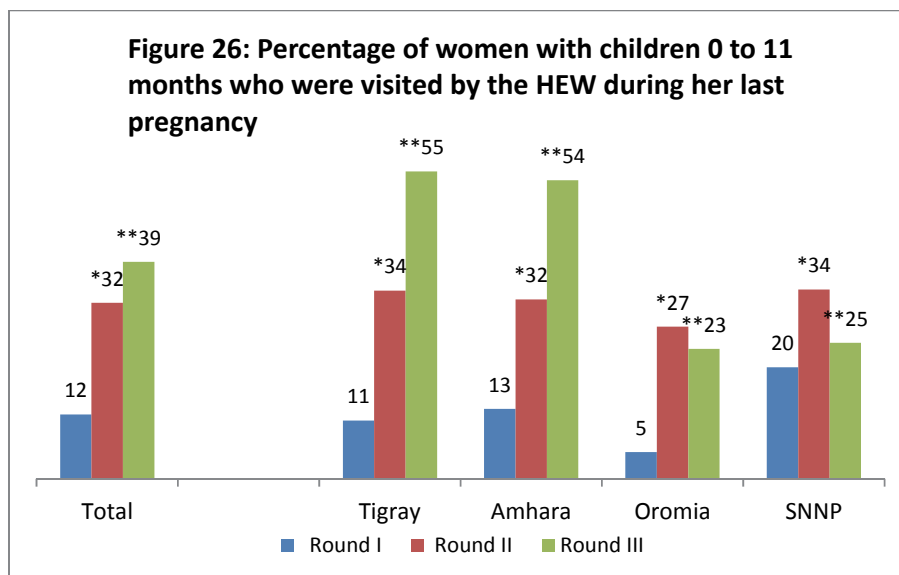
improved from 26 percent to 55 percent; fed colostrum improved from 57 to 74 percent; early initiation of breastfeeding improved from 55 to 76 percent; and exclusive breastfeeding improved from 83 to 93 percent.

- Knowledge of danger signs of pregnancy, childbirth and neonatal period did not improve between the last two survey rounds. For example, the level of knowledge of danger signs during pregnancy was 17 percent in Round I, 20 percent in Round II and 20 percent in Round III; the level of knowledge of danger signs during postnatal period was 27 percent in Round I, 33 percent in Round II and 37 percent in Round III; and the level of knowledge of danger signs in neonatal period was 17 percent in Round I, 19 percent in Round II and 18 percent in Round III.

This section describes 1) changes in the health workers' interactions with HH and women to provide maternal and newborn health (MNH) information and services between the three rounds of survey, and 2) changes in the antenatal, delivery, perinatal and postnatal behaviors and practices across time. The target population for this analysis was women with children of 0-11 months with M&NH indicators measured only for the most recent pregnancy. Thus, the antenatal period indicators reflect events mostly occurring over the 18 to 20 months preceding the survey, while the perinatal and postnatal indicators reflect events occurring over the 12 months preceding the survey.

HH Visits by HEWs during Pregnancy

Figure 26 illustrates the percentages of women with children 0-11 months visited by an HEW during their recent pregnancy. HEWs contact with pregnant women increased nearly three folds between Round I (12 percent) and Round II (32 percent), and increased about 7 percentage points between Round II and Round III (39 percent). Over a half of the target women in Tigray (55 percent) and in Amhara (54 percent), and only a quarter in Oromia and in SNNP at the time of Round III were visited by an HEW during their last pregnancy. The percentage points increase in HEWs' visits between Round I and Round II, and between Round II and Round III were around 20 percentage points in Tigray and Amhara. In the other two regions, though there were major increases in HEW visits, especially in Oromia between Round I (5 percent in Oromia and 20



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

percent in SNNP) and Round II (27 percent in Oromia and 34 percent in SNNP), the rates declined in Round III from Round II (23 percent in Oromia and 25 in SNNP).

The respondents were asked if the HEW or HDA conducted any family conversations addressing issues of birth preparedness. An overwhelming, 84 percent of women with children of 0-11 months reported that they did not attend any family conversation on birth preparedness conducted by any HEW or HDA, 12 percent mentioned attending such sessions held by HEWs with or without an HDA, and only 4 percent reported attending birth preparedness sessions conducted by HDAs. The highest percentage of family conversations was conducted in Tigray (30 percent), followed by Amhara (17 percent) and then Oromia and SNNP (around 10 percent; see Table 22). Eighty percent of family conversations were attended by respondents' husbands and nearly 30 percent were attended by mothers-in-law.

Table 22: Percentage of women with children 0 to 11 months who reported that HEW or HDA or both conducted family conversation for birth preparedness, by region, L10K Round III (2015) survey

	Tigray	Amhara	Oromia	SNNP	Total
Family conversation conducted by* ...					
None	68.8	82.7	88.8	88.9	83.8
HEW with or without HDA	21.2	13.6	7.8	8.9	12.0
HDA only	10.0	3.7	3.4	2.2	4.2
No. of family conversations conducted*					
None	68.8	82.7	88.8	88.9	83.8
1	8.8	4.7	3.3	1.9	4.3
2	13.8	3.1	4.2	3.0	4.9
3+	8.6	9.6	3.6	6.2	7.1
Sample size	760	1,044	1,055	1,024	3,883
Family conversation participated by* ...					
Husband	82.6	75.4	74.1	89.6	79.5
Mother-in-law	14.0	16.8	20.0	10.3	15.5
Mother	33.7	22.9	30.7	30.3	28.5
Other family members	24.7	16.5	20.1	17.3	19.6
Neighbor	11.7	17.6	20.4	19.1	16.7
Sample size	216	169	133	117	635

*Statistically significant difference (p <0.05) between regions

Round III respondents were asked the kind of topics the HEWs/HDAs discussed during family conversation sessions on birth preparedness. The frequency of recalling each topic is presented in Table 23. The most commonly discussed topic recalled was ANC (85 percent). Other ANC related topics discussed were recommending pregnant women to take extra food (45 percent), recommending taking enough rest (37 percent), and avoiding heavy work (30 percent). Only 23 percent recalled discussing tetanus toxoid injection. Some of the topics that the HEWs/HDAs discussed related to delivery were places of delivery (43 percent), where to seek care if problem arises (30 percent), how to prepare for facility delivery (22 percent), how to contact an ambulance (16 percent), saving money for emergency (10 percent) and arrange for emergency transport (10 percent). Table 23 shows major regional variations in this indicator. The proportion of women reporting that family conversation topic covered ANC, was more than 80 percent in Tigray (85 percent), Amhara (95 percent) and SNNP (82 percent), but was only 64 percent in Oromia. Discussion related to place of delivery was highest in Tigray (49 percent), followed by Oromia (44 percent), and Amhara (42 percent),

and lowest in SNNP (33 percent). Discussion on where to seek care in case of emergency was highest in Amhara (44 percent), followed by SNNP (33 percent), and lowest in Tigray and Oromia (17 percent). Around a fourth of women recalled discussion related to how to prepare for facility delivery in Amhara (29 percent), Oromia (25 percent) and SNNP (27 percent) but only 8 percent in Tigray.

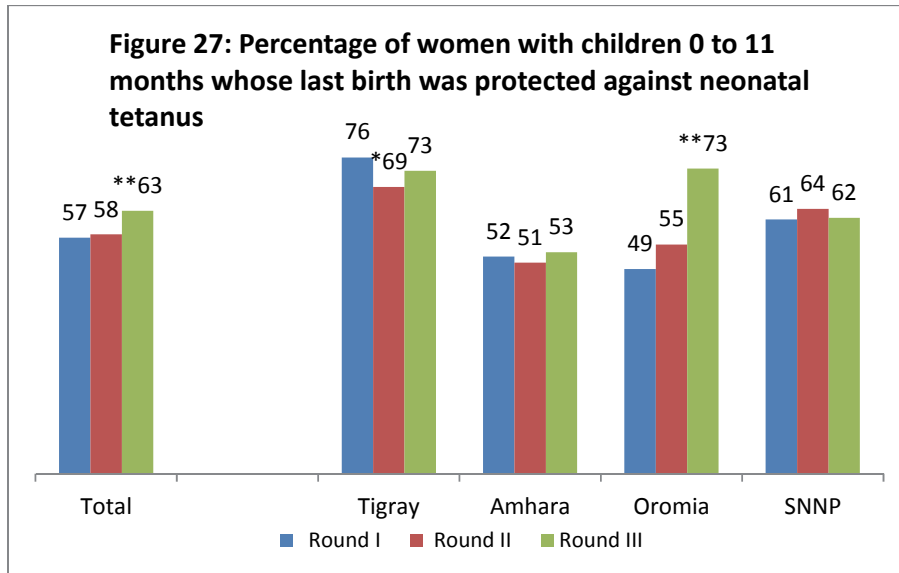
Table 23: Topics discussed during family conversation (in percentage), by region, L10K Round III (2015) survey

	Tigray	Amhara	Oromia	SNNP	Total
To get ANC	85.5	94.8	64.1	81.6	84.6
To get TT injection	25.0	20.9	25.2	23.5	23.2
To take Iron Folate supplement	24.0	17.8	9.5	12.8	17.2
To take extra food	48.1	42.1	45.9	45.0	44.9
To take rest	41.1	43.1	22.1	31.7	36.9
To avoid heavy work	26.8	39.6	17.1	23.3	29.3
Where to seek care if there was any problem	16.5	44.6	17.4	33.4	30.2
Place of delivery	49.4	42.1	44.1	32.7	42.9
How to contact ambulance if necessary	8.3	21.4	19.5	15.0	16.4
How to prepare for facility delivery	8.0	28.7	24.5	26.6	21.9
Save money for emergency	5.1	12.8	4.4	19.8	10.3
Arrange for emergency transport	2.5	14.3	7.2	17.5	10.3
To contact HEW for home delivery	2.6	7.6	0.3	8.1	5.0
To contact HEW for PNC	7.0	4.2	2.2	1.9	4.2
Ensure trained birth attendance	7.2	2.8	9.8	3.8	5.4
Put baby to breast immediately after birth	3.1	3.0	3.5	2.9	3.1
Give colostrum	7.1	5.6	1.6	2.5	4.8
No pre-lacteals	1.1	3.7	3.5	5.2	3.2
Exclusive breastfeeding	6.5	7.5	7.6	4.4	6.7
Cord care	3.3	1.4	9.7	3.9	3.8
Delay bathing the newborn	1.7	1.1	1.5	3.8	1.8
To sleep under bed net	3.0	3.0	3.5	0.2	2.6
Family planning	0.6	1.7	4.7	5.9	2.6
LAM	0.7	0.7	1.5	0.0	0.7
Counsel and test for HIV	0.6	2.0	1.5	0.4	1.3
Sample size	216	169	133	117	635

Neonatal Tetanus Protected Childbirth

If the mother reports receiving at least two tetanus toxoid injection (TTI) during her lifetime—the of which occurred less than 3 years ago, if she received at least three TTI during her lifetime—the last of which occurred in the last 10 years, of if she has received at least five TTI during her lifetime, then she was considered that her last birth was neonatal tetanus protected (NTP). NTP births during the 12 months preceding the survey increased 5 percentage points between Round II (58 percent) and Round III (63 percent). NTP births remained almost the same between Round I and Round II. The increase in the NTP births between the survey rounds was not uniform across the regions. The rate of increase across the rounds was highest in Oromia (55 percent in Round II and 73 percent in Round III). In Tigray, the coverage was highest in Round I (76 percent), then it fell to 69 percent in Round II, and did not show any statistically

significant change in Round III. In Amhara and SNNP, the coverage remained almost unchanged across the three rounds with marginal variations (Figure 27).



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Utilization of Antenatal Care

Antenatal care coverage, at least one visit and at least four visits, were the indicators for measuring progress towards MDG5. The percentage of pregnant women who reported at least one ANC visit showed an upward trend over time, and increased 18- 19 percentage points between the survey rounds (Table 24). At Round III, the coverage of at least one ANC visit was highest in Tigray (95 percent), and between 86 to 89 percent in other regions.

The proportion of women with children 0-11 months, who received four or more ANC visits (i.e., ANC 4+ coverage), increased 11 percentage points from Round I to Round II and 23 percentage points between Round II and Round III (Table 24). The increase in ANC 4+ coverage between Round II and Round III was the highest in Amhara (30 percentage points). The ANC 4+ coverage in Tigray, after remaining the same between Round I and Round II (33 percent), increased by 21 percentage points from Round II to Round III (54 percent). The percentage increase in the coverage of ANC 4+ between Round II and Round III was also about 18 to 19 percentage points in Oromia and SNNP (Figure 28). The coverage of ANC in Round III was highest in SNNP (57 percent), followed by Tigray (54 percent), Oromia (50 percent) and Amhara (47 percent).

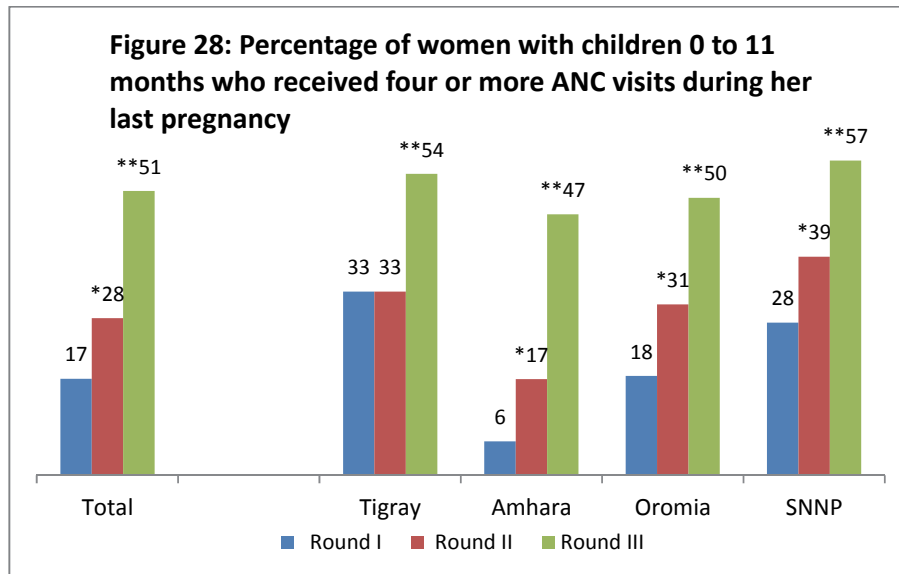
As Table 24 illustrates, major sources of ANC in Round III are the HCs (60 percent) and HPs (36 percent). The three rounds of data show that during Round I, majority (55 percent) got ANC from HCs, then in Round II, 45 percent sought ANC from HCs, and in Round III, the proportion using HCs again increased to 60 percent. During Round III, HCs were the key source of ANC services for three fourth of women in Amhara and Tigray. In Oromia and SNNP, less than half of the pregnant women mentioned HCs as the source of ANC during Round III.

Table 24: Percentage of women with children 0 to 11 months whose last birth was neonatal tetanus protected, received antenatal care during last pregnancy, and source and components of the ANC during last pregnancy, by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
Protected against neonatal tetanus	76.0	*68.9	**72.8	52.2	50.7	53.2	49.2	*55.1	**73.3	61.1	63.6	61.5	56.7	57.5	**63.2
Received ANC	78.3	84.9	**94.6	37.5	*59.8	**88.6	51.6	*69.2	**87.6	61.2	*76.0	**86.4	52.0	*69.7	**88.7
None	21.8	*15.4	**5.4	62.5	*41.0	**11.4	49.1	*30.9	**12.4	39.1	*24.5	**13.6	48.3	*30.8	**11.3
1	9.8	8.1	**3.3	13.5	10.1	7.3	9.1	5.3	**2.9	5.1	4.7	**2.8	10.2	*7.3	**4.5
2	11.8	*14.8	**7.0	10.7	14.3	10.3	8.7	8.0	7.6	9.8	9.6	7.5	10.1	11.6	8.4
3	19.7	*27.9	**29.9	7.1	*16.8	20.1	14.3	*22.9	25.3	17.1	21.4	18.1	12.8	*21.0	22.4
4+	33.1	33.1	**54.3	6.1	*17.3	**47.0	17.9	*30.8	**50.0	27.5	*39.4	**56.7	17.4	*28.3	**51.2
No. of women	648	755	760	600	1,068	1,044	600	1,056	1,055	552	1,008	1,024	2,400	3,887	3,883
Source of ANC															
Hospital	3.1	*1.8	1.0	2.7	4.3	1.1	5.0	5.7	10.7	0.6	0.4	0.8	2.9	3.2	3.5
HC	63.2	*47.0	**71.0	69.2	*57.4	**75.2	44.1	*36.6	**47.5	42.2	*35.7	**41.4	55.1	*44.6	**59.5
HP	32.2	*49.7	**27.5	24.9	*36.3	**23.0	23.3	*54.6	**40.7	53.8	*61.6	**55.3	32.6	*49.9	**35.9
Other	1.6	1.5	0.4	3.2	1.9	0.6	27.7	*3.1	1.1	3.5	2.3	2.5	9.4	2.3	1.1
ANC components															
Weight taken	85.8	*92.9	95.5	59.9	*75.3	**91.6	71.0	*84.4	90.3	72.5	*84.2	85.4	71.6	*83.0	**90.4
Blood pressure measured	88.4	*93.7	**96.0	62.4	*80.4	**93.1	72.7	*79.1	**90.6	78.5	*83.0	**87.8	74.7	*83.0	**91.7
Urine sample given	25.8	23.9	**81.8	16.0	*23.9	**71.6	18.2	*27.3	**60.3	12.6	*7.0	**40.3	18.1	20.4	**62.8
Blood sample given	38.3	*60.5	**89.2	25.7	*54.1	**83.9	22.6	*36.1	**70.9	29.8	*23.5	**59.1	28.7	*42.6	**75.5
Iron supplement given	35.2	*67.3	**91.6	23.9	*53.4	**87.0	8.1	*30.5	**55.4	16.0	*39.0	**67.9	20.5	*46.2	**75.2
Given drugs for malaria	12.3	*7.8	**14.5	9.0	7.4	7.6	6.9	8.2	7.3	14.0	*8.6	**3.6	10.3	8.0	7.6
Intestinal parasite drug given	2.3	2.2	**14.5	3.2	1.7	**14.0	10.1	7.0	4.0	12.0	*3.6	4.2	6.5	3.5	**9.1
No. of women received ANC	521	650	718	242	644	927	331	715	938	345	770	891	1,439	2,779	3,474
% received complete ANC	15.3	17.2	**73.4	3.4	*9.5	**59.2	5.2	*15.7	**45.6	4.6	3.9	**29.4	5.9	*10.8	**50.4
% told about danger signs	20.0	*31.5	**78.8	4.4	*18.3	**69.8	4.2	*23.0	**52.6	6.3	*20.7	**55.6	7.1	*21.9	**63.2
% told about breast feeding	17.6	*34.8	**71.9	4.6	*21.9	**60.1	6.4	*31.2	**54.3	11.9	*30.6	**56.9	8.4	*28.2	**59.5
% told about birth preparedness	25.8	*34.4	**83.3	5.1	*21.0	**71.2	3.6	*25.6	**64.6	11.2	*24.9	**61.4	9.0	*25.0	**68.8
No. of women	648	755	760	600	1,068	1,044	600	1,056	1,055	552	1,008	1,024	2,400	3,887	3,883

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

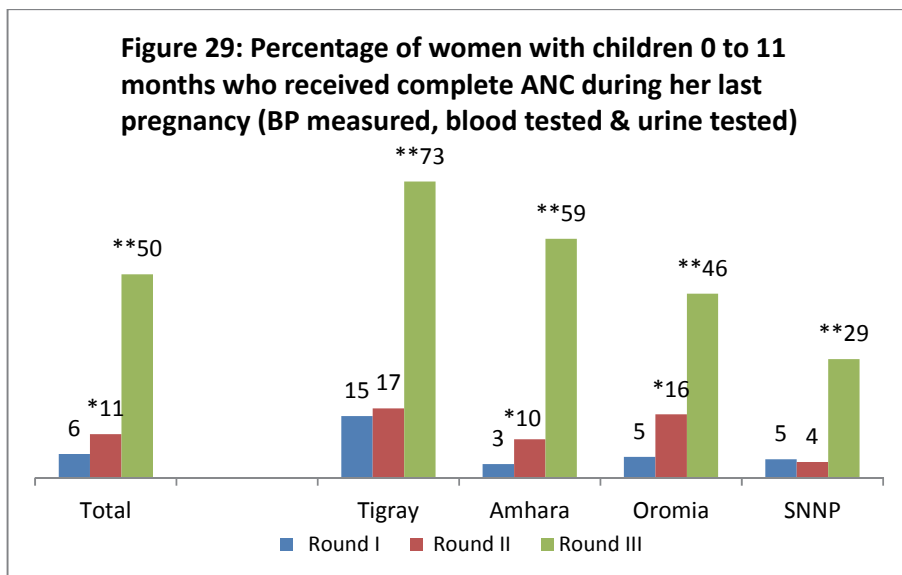
**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Major improvements in counseling for danger signs of pregnancy during ANC between Round II and Round III were observed in all four regions with highest increase in Amhara (52 percentage points) and Tigray (49 percentage points), followed by SNNP (35 percentage points) and Oromia (30 percentage points) (Table 24). The proportion of pregnant women who were told about danger signs was 79 percent in Tigray, 70 percent in Amhara, 53 percent in Oromia, and 56 percent in SNNP during Round III.

Increase in counseling for birth preparedness during ANC between Round II and Round III has also been observed in all four regions. The gains were highest in Amhara (50 percentage points) and in Tigray (49 percentage points) followed by Oromia (39 percentage points) and SNNP (36 percentage points). The proportion of pregnant women using HPs for ANC increased from 32 percent in Round I to 50 percent in Round II, and then decreased to 36 percent in Round III. This decreasing trend in the utilization of HPs between Round II and Round III has been observed regionally as well. The utilization of HPs for ANC decreased from 50 to 27 percent in Tigray, from 36 to 23 percent in Amhara, from 54 to 41 percent in Oromia and 62 to 55 percent in SNNP.

A pregnant woman was said to have complete ANC coverage if her weight was taken, blood pressure was measured, and urine and blood were tested at least once during pregnancy. Coverage of complete ANC has increased significantly from 11 percent in Round II to 50 percent in Round III with Tigray and Amhara showing the most improvements (from 17 to 73 percent in Tigray, and from 9 to 59 percent in Amhara). Completeness of ANC was highest in Tigray in Round III (73 percent), followed by Amhara (59 percent), Oromia (46 percent), and 29 percent in SNNP (Figure 29 and Table 24). Important components of ANC include whether pregnant women are informed about danger signs of pregnancy, breastfeeding of newborn, and birth preparedness. The coverage of all these three topics increased from earlier surveys. The percentage of women counseled about danger signs at an ANC visit during their last pregnancy increased nearly two fold between Round II and Round III (from 22 to 63 percent); the percentage counseled about breastfeeding increased from 28 to 60

percent; and the percentage of women counseled about birth preparedness increased from 25 to 69 percent during that period.



*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Birth Preparedness

Table 25 presents the birth preparedness measures taken by women with children 0-11 months old during their last pregnancy. The percentage who reported taking any birth preparedness measure during their last pregnancy has been steadily increasing (69 percent in Round I, 77 percent in Round II and 90 percent in Round III). The highest improvement in birth preparedness between Round II and Round III was observed in Amhara (19 percentage points), followed by Oromia (13 percentage points), SNNP (11 percentage points) and Tigray (7 percentage points). At Round III, the coverage of birth preparedness was highest in Tigray 95, followed by Oromia (91 percent), Amhara (89 percent) and SNNP (87 percent).

Women’s recall of the specific birth preparedness measures taken during their last pregnancy improved between Round II and Round III for most of the components except for two (Table 25). Making financial arrangements improved from 34 to 45 percent with highest improvement in Tigray (19 percentage points) and between 8 to 11 percentage points in other regions. Preparedness for transportation increased from 11 to 15 percent with highest increase in Oromia (6 percentage points). Food preparedness increased from 70 to 84 percent with highest increase in Amhara (22 percentage points). There was a huge improvement between Round II and Round III in identifying health facilities for delivery (6 to 23 percent). Major increase on this indicator was observed in Oromia (26 percentage points) and in Amhara (20 percentage points), followed by Tigray (10 percentage points) and SNNP (8 percentage points). Increase in the preparation of delivery material was also considerable across the rounds (10 percent in Round I, 33 percent in Round II and 49 percent in Round III) with all regions gaining substantially. Identifying a blood donor remains almost non-existent as it was in the earlier two rounds of surveys.

Table 25: Percentage of women with children 0 to 11 months who took any birth preparedness measure; and percentage spontaneously recalled taking a particular birth preparedness measure during their last pregnancy, by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III
Took any birth preparedness measure	79.4	*87.6	**95.3	63.2	*70.2	**88.9	66.9	*78.0	**90.9	73.2	77.9	**87.1	68.6	*76.6	**89.9
Birth preparedness mentioned															
Financial	14.3	*30.8	**49.6	17.3	*37.3	**45.4	21.7	*35.1	**46.1	28.7	28.9	**38.4	20.2	*33.8	**44.5
Transport	4.4	3.9	*13.3	7.0	*16.2	**19.7	5.6	*10.6	**16.0	3.0	5.5	8.1	5.5	*10.5	15.0
Food	73.3	*82.7	83.0	56.7	*61.5	**83.5	61.7	*71.9	**86.1	67.4	72.4	**84.6	62.6	*69.8	**84.4
Arrange birth attendant	6.5	*16.1	**7.5	12.2	12.8	11.7	7.1	11.9	**5.9	2.4	0.9	*4.7	8.1	10.2	7.9
Identify health facility for delivery	3.1	*9.6	**20.3	2.8	5.1	**25.3	3.5	*7.3	**32.9	1.0	2.9	**11.2	2.7	*5.8	**23.1
Prepare delivery materials	34.0	*45.0	**65.7	13.4	*22.3	**46.1	24.5	**42.5	41.2	12.5	*30.3	**50.9	19.3	*32.7	*48.8
Identify blood donor	0.4	0.1	0.4	0.4	0.4	0.1	0.1	0.5	0.0	0.0	0.1	0.0	0.2	0.3	0.1
No. of women	648	755	760	600	1,068	1,044	600	1,056	1,055	552	1,008	1,024	2,400	3,887	3,883

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Institutional Delivery

Fatal complications of pregnancy usually take place during childbirth or immediately afterwards. Thus, institutional deliveries and deliveries attended by skilled professionals are key to reducing maternal morbidity and mortality [14, 15]. In the last three years to encourage women to give birth at facilities, FMOH has taken a number of initiatives namely mobilizing communities to encourage pregnant mothers to give birth in health facilities; creating effective supportive and referral linkages within the primary health care units; staffing HCs with midwives to ensure continuous availability of basic emergency obstetric care services, and the provision of ambulances to *woredas* to mitigate transportation barriers.

Among women with children 0-11 months, the percentage of institutional deliveries (for the last birth) increased substantially between Round II (9 percent) and Round III (53 percent) (Table 26). This huge improvement has been observed in all four regions. Highest gain has been observed in Tigray where the percentage of institutional delivery increased from 14 percent to 77 percent. In other regions, the increase was more than 30 percentage points. In Round III, the prevalence of institutional deliveries was 77 percent in Tigray, 47 percent in Amhara, 56 percent in Oromia and 45 percent in SNNP.

Deliveries Assisted by Trained Professional

As institutional delivery and delivery assisted by a health professional are closely related, given the rise in the institutional delivery, it is no surprise that a substantial increase is being observed in delivery by health professionals between Round II (10 percent) to Round III (53 percent). Like institutional delivery, the rate increase in deliveries assisted by trained professionals was also highest in Tigray (56 percentage points). Rates of change in other regions were also substantial, more than 30 to 40 percentage points (Table 26).

The proportion of deliveries assisted by an HEW remained the same over Round II and Round III (7 percent) after seeing a slight increase from 4 percent in Round I. Between the last two survey periods, the percentage of HEW assisted deliveries dropped in Tigray (from 11 to 6 percent) and in Oromia (from eight to 6 percent), increased marginally in SNNP (from eight to 10 percent), and remained the same in Amhara (5 percent).

Clean Umbilical Cord Care

Table 26 indicates that cutting the umbilical cord with clean/sterile blades during last pregnancy among women with children 0-11 months who delivered at home was high (88 percent) in Round III. However, the practice decreased from the earlier two rounds (95 percent in Round I and 94 percent in Round II). The indicator decreased in all four regions. Tying the cord with clean or sterile thread decreased from 66 percent (Round II) to 61 percent (Round III). The rate of decline in the practice of tying the cord between the last two rounds was highest in SNNP (10 percentage points). In other regions the changes between Round II and Round III were non-significant. The decline in clean cord care among home deliveries can be explained by the fact that with more women delivering at a health facility during Round III, the women who are delivering at home are the high risk groups who have lower knowledge on appropriate newborn care.

The practice of applying nothing to the stump of the umbilical cord showed a steady improvement across the rounds of surveys (Table 26). Seventy-five percent in Round III reported that they did not

Table 26: Percentage of women with children 0 to 11 months whose last delivery took place at home, at an institute, assisted by health professional (doctor/nurse/midwife), assisted by HEW, received PNC; average no. of PNC components, by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
% institutional delivery	10.7	*13.8	**76.8	2.7	*9.3	**46.6	5.1	*10.0	**56.4	5.2	6.4	**45.2	5.0	*9.4	**53.1
% delivered by health professional	13.8	14.4	**70.8	3.0	*9.4	**46.6	8.6	*11.6	**57.4	6.3	7.3	**45.4	6.8	*10.2	**52.5
% HEW assisted deliveries	5.6	*11.2	**5.9	3.8	4.5	4.9	2.4	*7.8	5.7	3.9	*7.7	10.3	3.7	*7.1	6.6
No. of women	648	755	760	600	1,068	1,044	600	1,056	1,055	552	1,008	1,024	2,400	3,887	3,883
% cut cord with clean/sterile blade (among home deliveries)	96.1	*92.2	84.9	93.8	94.7	89.9	95.6	93.5	**86.8	95.8	94.8	**85.8	95.0	94.1	*87.6
% tied cord with clean/sterile thread ^β	85.7	86.7	83.8	41.0	*54.9	55.5	47.7	*59.8	56.0	53.9	*79.1	**68.6	51.5	*66.4	**61.3
% applied nothing to cord	48.5	*57.5	**72.3	55.3	*66.7	**69.4	78.2	74.8	**84.8	82.4	83.1	**75.9	65.9	*71.6	**75.1
% applied butter to cord	46.4	*38.0	**16.2	39.3	*28.3	**15.4	18.9	*20.8	**6.9	14.6	13.7	13.0	30.0	*24.2	**12.8
% took clean cord care	41.3	44.1	51.6	17.2	*36.1	31.7	36.1	43.0	42.0	40.6	*61.8	**36.7	30.3	*45.4	**36.9
No. of home deliveries	569	646	188	580	962	552	560	940	442	506	917	524	2,215	3,465	1,706
Postnatal period															
% received any PNC	20.7	*33.9	**54.8	8.2	*23.5	**40.3	6.3	*26.9	26.1	11.7	*26.8	**21.4	10.2	*26.6	**34.1
% received PNC in 7 days	14.8	*29.3	**45.7	3.3	*16.1	**33.1	3.1	*17.7	**21.6	4.6	*21.3	19.0	5.3	*19.6	**28.5
% received PNC in 2 days	8.4	*16.8	**13.0	1.9	*8.2	**13.1	1.7	*6.9	9.3	2.2	*11.6	**5.6	2.9	*9.9	10.3
% received postnatal vitamin A	21.4	*45.4	**61.0	7.0	*17.5	24.4	23.5	27.8	**13.7	16.1	19.4	21.8	15.4	*24.6	26.3
No. of women	648	755	760	600	1,068	1,044	600	1,056	1,055	552	1,008	1,024	2,400	3,887	3,883
PNC components ...															
Examined body	24.8	27.6	29.4	9.4	17.2	**28.2	28.6	*11.5	**18.0	8.8	6.7	10.0	17.1	15.1	**23.7
Checked breast	8.2	14.1	19.5	5.7	8.3	**16.7	12.9	9.9	8.8	12.5	*1.8	**12.4	9.1	8.2	**15.1
Checked for heavy bleeding	13.1	*21.3	18.6	10.4	7.1	**16.5	16.1	8.6	**17.3	1.8	4.0	**11.2	10.3	9.3	**16.3
Counseled on danger signs	7.3	6.9	**21.0	5.7	4.6	12.5	9.2	11.5	8.1	0.6	2.6	**12.1	5.7	6.3	**13.5
Counseled on family planning	9.9	5.2	**11.5	2.9	10.6	**5.9	7.0	18.6	**7.5	4.2	3.0	**8.3	6.0	9.9	7.9
Counseled on nutrition	15.3	15.2	20.1	0.8	*16.1	17.2	23.9	29.9	**17.6	4.8	7.0	**19.0	9.9	*17.4	18.2
Referred to HC/hospital	1.2	0.7	1.9	0.8	1.2	0.9	3.8	4.0	0.9	1.1	0.0	0.2	1.5	1.5	1.0
No. of received PNC	155	254	380	59	243	410	37	271	285	57	275	221	308	1,043	1,296

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

apply anything to cord which is slightly up from 72 percent in Round II and 66 percent in Round I. The improvement between Round II and Round III was highest in Tigray (15 percentage points), followed by Oromia (10 percentage points). The practice actually decreased in SNNP between that period.

The practice of applying butter to the stump of the umbilical cord also decreased over time (from 30 percent in Round I, to 24 percent in Round II and to 13 percent in Round III). Major improvements were seen in three regions except in SNNP where the prevalence of this harmful practice remained same as Round II.

A composite indicator for *clean cord care* is defined if umbilical cord was cleanly cut and cleanly tied, and if nothing was applied to the cut stump. Among women whose delivery was not attended by a skilled health professional, the proportion who followed all three guidelines, and thus, took clean care of the umbilical cord declined between Round II and Round III (45 to 37 percent). Except for Tigray, where this composite indicator increased from 44 to 52 percent, all other regions saw decline with SNNP falling about 24 percentage points (Table 26).

Postnatal Care

Early PNC (i.e., with 48 hours of childbirth) is crucial for both the mother and the baby. The percentage of women with children 0-11 months whose last birth took place at home and who visited a health facility, or were visited by an HEW at home for check-up within 7 days (i.e., PNC in 7 days) increased from 20 percent in Round II to 29 percent in Round III. The increase in the proportion of mothers who received postnatal care between Round II and Round III was highest in Tigray and Amhara (18 percentage points). The highest coverage of PNC within 7 days in Round III was observed in Tigray (46 percent), followed by Amhara, Oromia and SNNP (Table 26).

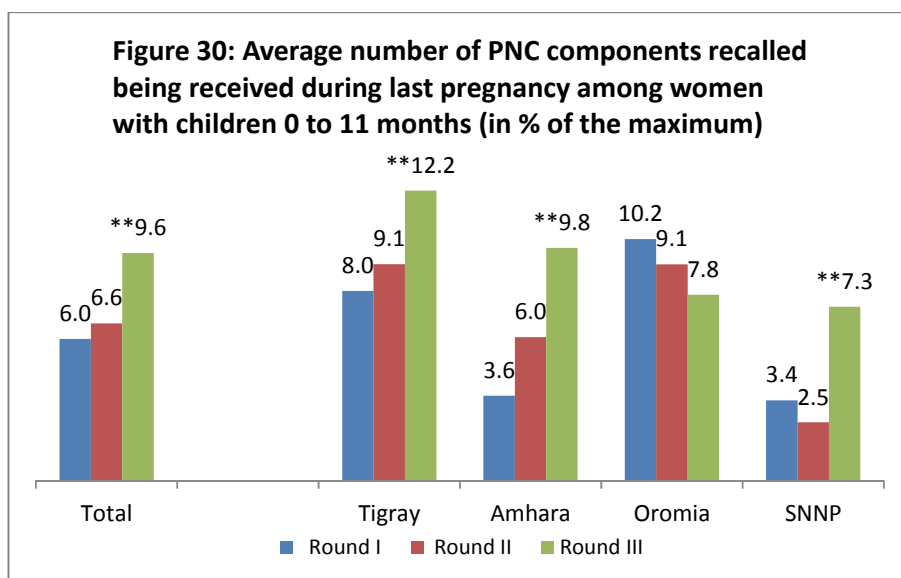
The percentage who received PNC services within two days of birth (i.e., early PNC) increased from 3 percent in Round I to 10 percent in Round II and remained unchanged between Round II and Round III. The rate of increase in proportion of PNC within two days of birth between Round II and Round III was highest in Amhara (5 percentage points). The rate dropped between Round II and Round III in from 4 percentage points in Tigray and 6 percentage points in SNNP. The coverage of PNC in Round III was highest in Tigray and Amhara at 13 percent.

The quality of PNC counseling by HEWs or HDAs was measured with an index created by summing the number of PNC checkup components that are spontaneously recalled by the women (Table 26 and Figure 30).¹⁷ The quality of the PNC index is expressed as the percentage of the maximum considered (in this case 7), with a higher score indicating better quality of the PNC. The quality of the PNC improved 3 percentage points between Round II (7 percent) and Round III (10 percent). Improvement in the quality of PNC was around 3 to 4 percentage points for Tigray, Amhara and SNNP, but there was a bit of a decline on this index for Oromia.

Most of the components of PNC recalled by the respondents have increased between Round II and Round III as illustrated in Table 26. Health workers performing body examinations increased from 15 to 24 percent, breast checkups increased from 8 to 15 percent, heavy bleeding checkups increased from 9 to 16 percent, and danger sign counseling increased from 6 to 14 percent between Round II

¹⁷ The Cronbach's reliability alpha of the PNC quality index was 0.60

and Round III. Other components, such as counseling for family planning or nutrition dropped slightly or remained the same.



*Statistically significant difference ($p < 0.05$) between Round I and Round II surveys

**Statistically significant difference ($p < 0.05$) between Round II and Round III surveys

Newborn Check-up

PNC coverage was also used as a proxy for newborn check-up coverage. Mothers were also asked to recall components of newborn checkups, and changes in these components are reported in Table 27. Though the proportion of women recalling a specific component increased for five of the nine items, the increase was not statistically significant. The components that increased between Round II and Round III were examining baby’s body (21 percentage points), checking cord (8 percentage points), weighing babies (3 percentage points), checking and counseling of danger signs (2 to 3 percentage points). The components that declined between Round II and Round III were counseling of keeping baby warm (9 percentage points), health workers observing breastfeeding (8 percentage points), breastfeeding counseling (5 percentage points), and referring to a HC (1 percentage point). As with quality of PNC, the quality of newborn checkups was measured with an index that summed the components of the check-up, which was then expressed as a percentage of the maximum possible score.¹⁸ The index increased only marginally from 21 percent in Round II to 23 percent in Round III after a 7 percentage point increase between Round I and Round II (Table 27).

Newborn Health Care

Simple newborn health care practices at the HH level can avert significant neonatal morbidity and mortality (16). Thus, the L10K project promotes hygiene during delivery, such as keeping the newborn warm and initiating early and exclusive breastfeeding. Coverage of hygienic delivery has already been discussed earlier in this chapter. Table 28 illustrates the changes over time in the newborn health care practices.

¹⁸ The Cronbach’s reliability alpha of the PNC quality index was 0.47

Table 27: Components of newborn check-up, by region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III
Newborn care components ...															
Examined baby's body	39.0	46.5	55.7	4.7	*43.8	**65.1	16.7	21.2	**38.2	24.0	13.6	**34.8	24.0	*33.5	**54.4
Weighed baby	29.7	28.7	28.1	15.4	10.4	**21.5	11.3	20.9	15.5	26.7	18.2	13.5	21.6	18.6	21.6
Checked cord	23.0	*40.7	34.0	0.0	*34.4	**47.0	11.6	*35.8	**38.1	6.7	12.8	**40.3	12.7	*33.3	**40.9
Counseled on breastfeeding	29.9	*49.2	**31.9	4.7	*42.4	**49.6	26.5	*70.2	**51.3	23.5	26.1	**50.8	23.2	*50.2	44.6
Observed breastfeeding	13.7	18.8	20.1	4.7	*38.6	**21.6	9.4	*30.4	17.4	1.8	8.3	**29.3	8.7	*27.8	21.4
Counseled on keeping baby warm	4.5	*19.5	**8.6	20.1	16.6	**9.7	10.4	24.9	**7.0	1.8	*11.0	**17.8	8.4	*19.1	**9.9
Checked on danger signs	8.9	5.6	**19.7	0.0	14.9	13.0	6.0	*18.6	**6.3	0.0	*5.7	**21.0	4.8	*12.8	15.0
Counseled on danger signs	12.1	4.7	**15.9	0.0	8.7	11.2	7.2	14.4	10.6	0.0	11.9	21.0	6.4	10.0	13.7
Referred to HC/ hospital	1.8	1.2	2.4	0.0	*2.6	3.6	0.0	*7.5	**1.6	0.0	*0.9	*2.1	0.6	*3.6	2.7
Average number of newborn check-up components (in % of the maximum)	18.6	*22.0	22.1	9.6	*21.7	24.5	12.9	*25.0	19.5	8.9	11.4	**23.8	13.6	*21.4	22.9
No. of women	155	254	380	59	243	410	37	271	285	57	275	221	308	1,043	1,296

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Table 28: Prevalence of selected newborn care behaviors; and the percentage of women with children 0 to 5 months who is currently giving only breast milk to their baby, according to region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III
Dried & wrapped baby after delivery	66.2	*75.6	**86.8	74.5	69.3	**79.5	69.8	*85.7	84.6	67.2	66.2	**75.7	70.6	73.7	**81.0
Always/frequent skin-to-skin contact	51.7	*81.8	**90.3	67.6	*54.6	**74.2	88.6	*94.9	**87.9	76.0	81.4	79.3	72.4	75.3	**81.3
Delay bathing newborn for >6 hours	27.2	*38.6	**84.6	39.0	*50.5	**78.0	12.6	*38.4	**85.9	25.4	*43.5	**76.4	27.6	*44.0	**80.6
Took thermal care	10.4	*27.1	**67.1	17.8	19.5	**49.5	7.5	*32.6	**66.2	9.4	*27.5	**44.1	12.3	*25.9	**55.0
Baby put to breast within an hour after delivery	40.0	*58.1	**92.8	20.2	*36.6	**64.1	64.7	64.3	**81.9	59.3	*69.0	**78.9	42.6	*54.5	**76.4
First milk (Colostrum) given to baby	47.4	*69.5	**87.9	32.6	*48.3	**70.9	50.1	*60.8	**77.5	54.4	*58.0	**65.8	43.7	*56.8	**73.8
Fed only breast milk during 1st 3 days of life	81.8	*89.4	**96.0	40.9	*62.5	**85.3	92.5	95.1	96.1	86.8	90.8	**95.4	69.7	*81.5	**92.1
No. of women with children 0 to 11 months	648	755	760	600	1,068	1,044	600	1,056	1,055	552	1,008	1,024	2,400	3,887	3,883
Exclusively breast fed baby	67.3	*87.5	92.6	77.4	84.1	**96.8	55.2	*76.4	**91.6	57.9	*85.4	88.3	66.4	*82.8	**92.8
No. of women with children 0 to 5 months	322	359	374	276	505	512	258	545	487	241	531	524	1,097	1,940	1,897

*Statistically significant difference (p<0.05) between Round I and Round II surveys; **Statistically significant difference (p<0.05) between Round II and Round III surveys

Keeping the Baby Warm

Thermal protection of the newborn includes a series of measures at birth and during the first days of life, all of which ensure that the baby does not become either too cold or too hot, but rather maintains a normal body temperature. At birth, the newborn should immediately be dried and covered, before the cord is cut. While the baby is being dried, she or he should be on a warm surface such as the mother's chest or abdomen (skin-to-skin contact). Bathing the baby immediately after birth should be postponed (17).

The percentage of women with children 0 to 11 months who reported that they *dried and wrapped the baby* before the placenta was delivered or immediately after birth increased about 7 percentage points between Round II and Round III (74 to 81 percent). There was not major regional variation in the rate of increase. In Tigray, Amhara and SNNP, the practice improved by 10 to 12 percentage points between Round II and Round III and remained nearly the same in Oromia.

The practice of *always skin-to-skin contact* improved about 6 percentage points between Round II (75 percent) and Round III (81 percent). The proportions of women who reported practicing *always skin-to-skin contact* to keep the newborn warm during Round III were 90 percent in Tigray, 88 percent in Oromia, 80 percent in SNNP and 74 percent in Amhara. Highest improvements in this indicator between Round II and Round III have been observed in Amhara (19 percentage points), followed by Tigray (8 percentage points). In the other two regions, the practice of *skin-to-skin contact* declined between Round II and Round III, especially in Oromia where the decline was substantial (7 percentage points).

Delaying bathing of the newborn by 6 hours or more has increased substantially across the years; 28 percent in Round I, 44 percent in Round II and 81 percent in Round III. Highest increase in delaying bathing of the newborn between Round II and Round III has been observed in Tigray and Oromia (46 percentage points) followed by SNNP (32 percentage points) and Amhara (28 percentage points). The prevalence of delayed bathing of newborn at Round III were 86 percent in Oromia, 85 percent in Tigray, 78 percent in Amhara and 76 percent in SNNP.

The percentage of women who reported that they *took thermal care of the newborn* (i.e., dried and wrapped the baby before the placenta was delivered or immediately after birth, delayed bathing the baby more than 6 hours, and always maintained skin-to-skin contact) increased more than twofold between the rounds (12 percent in Round I, 26 percent in Round II and 55 percent in Round III). Major improvement in thermal care was observed in all four regions with Tigray improving the most (40 percentage points), followed by Amhara and Oromia (30-34 percentage points) and SNNP (17 percentage points).

Early Initiation of Breastfeeding

Putting the baby to breast immediately after delivery increased between the surveys (43 percent in Round I, 55 percent in Round II and 76 percent in Round III). All four regions have shown major improvement between Round II and Round III with the highest gain in Tigray (34 percentage points), followed by Amhara (27 percentage points), Oromia (18 percentage points), and then SNNP (9 percentage points). During Round III, the indicator was 93 percent in Tigray, 83 percent in Oromia, 79 percent in SNNP and 64 percent in Amhara (Table 28).

The proportion of respondents giving first milk (i.e., colostrum) to the baby increased across the rounds of survey (44 percent in Round I, 57 percent in Round II and 74 percent in Round III). All four regions have shown improvements of this indicator. The rate of change between Round II and Round III was highest in Amhara (23 percentage points) and lowest in SNNP (8 percentage points). At Round III, highest prevalence of colostrum feeding was reported in Tigray (88 percent), followed by Oromia (78 percent), Amhara (71 percent) and SNNP (66 percent) (Table 28).

The proportion of women who reported feeding the baby only breast milk during the first three days of life increased across the surveys (70 in Round I, 82 in Round II and 92 in Round III). Major gain between Round II and Round III was observed in Amhara (23 percentage points), followed by Tigray and SNNP (5 to 7 percentage points, respectively). During Round III survey, the coverage of this indicator was around 96 percent in Tigray, Oromia and SNNP and 85 percent in Amhara.

Exclusive Breastfeeding

For infants between 0 to 6 months, the rate of exclusive breastfeeding increased considerably between Round I (66 percent) and Round II (83 percent), and a modest 10 percentage point increase between Round II and Round III (93 percent) (Table 28). The coverage of exclusive breastfeeding was nearly universal in Amhara (97 percent), followed by Tigray (93 percent) and Oromia (92 percent), and then SNNP (88 percent).

Knowledge of Danger Signs

A woman's knowledge of maternal and newborn danger signs—during pregnancy, childbirth, and the postnatal period—can be attributable to her interaction with the HEP frontline worker as they provide maternal and newborn services (Table 29).

Danger Signs During Pregnancy and Childbirth

Knowledge of pregnancy and childbirth danger signs among women with children 0-11 months was measured with an index created by summing the number of danger signs spontaneously recalled by women.¹⁹ The index is expressed as the percentage of the maximum possible score (11 in this case). The list of danger signs during pregnancy and childbirth that were recalled by women with children 0-11 months is listed in Table 29. The aggregate index of danger sign knowledge remained unchanged between Round II and Round III (20 percent) after a 3 percentage points increase from Round I. Knowledge of danger signs was highest in Tigray (24 percent), followed by 21 percent in Amhara, 19 percent in Oromia and 17 percent in SNNP in Round III. Individual knowledge components of danger signs showed that knowledge has increased in certain areas while dropping for others (Table 29). For example, identifying excessive vaginal bleeding and high fever as danger signs has increased substantially between Round II and Round III, but knowing prolonged labor as an impending danger has declined more than 30 percentage points.

Danger Signs During Postnatal Period

Knowledge of danger signs during the postnatal period was measured with a similarly constructed index, created by summing danger signs recalled for women, then expressing the index as a percentage out of a maximum possible score of six (Table 29).²⁰ The index of knowledge of danger signs during the postnatal period increased from 27 percent in Round I to 33 percent in Round II to

¹⁹ The Cronbach's reliability alpha of the knowledge of danger sign during pregnancy and childbirth index was 0.35

²⁰ The Cronbach's reliability alpha of the knowledge of danger sign during postnatal period index was 0.21

Table 29: Percentage of women with children 0 to 11 months who spontaneously recalled danger signs and complications of childbirth, during postnatal period, and during neonatal period, according to region, L10K Round I (2008-9), Round II (2010-11) and Round III (2014-15) surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
	Danger signs during pregnancy & childbirth	52.9	*66.3	**85.3	28.7	*40.3	**71.8	36.3	41.0	**62.4	22.2	*34.4	**56.8	33.2	*42.8
Excessive vaginal bleeding	1.0	2.2	**29.5	0.9	*4.5	*8.0	1.7	*9.6	8.5	1.6	2.1	*7.6	1.3	*4.9	**11.1
Foul-smelling discharge	16.7	*23.4	**51.9	13.6	19.7	**27.1	33.3	34.1	**41.6	11.5	*23.2	**38.4	19.0	*24.8	**37.1
High fever	3.9	*8.2	**14.0	4.6	7.6	4.7	4.0	6.8	4.1	3.0	5.8	*1.9	4.0	*7.0	**5.2
Baby's hand or feet come first	9.2	*16.6	**11.0	11.5	13.9	9.9	12.4	17.7	**9.8	6.2	*10.8	**14.1	10.4	*14.5	**11.0
Baby's in abnormal position	68.7	73.4	**24.1	76.9	75.0	**55.0	77.9	80.5	**48.6	70.9	66.9	**33.7	74.8	74.3	**43.7
Prolonged labor (>12 hours)	57.7	60.7	**37.1	40.4	44.5	45.1	39.5	35.8	**23.4	24.1	31.8	**23.0	39.7	41.5	**33.0
Retained placenta	5.2	3.4	**6.8	3.4	5.1	6.6	1.8	2.9	2.8	1.0	*4.8	4.9	2.8	*4.2	5.2
Rupture uterus	1.3	2.1	1.8	0.4	1.3	1.1	1.8	0.9	1.1	0.0	1.1	1.3	0.9	*1.3	1.3
Prolapsed cord	1.4	1.3	0.5	0.2	1.0	1.1	1.8	0.7	0.6	0.4	0.4	0.1	0.9	0.8	0.7
Cord around neck	1.9	2.1	3.3	2.0	2.4	3.9	2.6	3.4	4.8	2.2	1.6	2.6	2.2	2.4	**3.7
Convulsions	19.7	*23.3	23.9	16.3	*19.3	21.1	19.1	*21.0	18.7	12.7	*16.4	16.6	16.9	*19.6	19.8
Danger sign during pregnancy and childbirth knowledge score															
Postnatal danger signs recalled	70.5	*83.4	85.8	45.9	*60.0	**82.3	45.2	*59.7	**68.6	34.6	*48.3	**62.4	47.3	*60.5	**74.4
Excessive vaginal bleeding	0.5	*9.4	**31.5	1.2	*6.4	**9.0	1.6	*12.7	**6.5	2.9	*6.0	9.0	1.5	*8.4	**11.6
Foul-smelling discharge	33.4	*42.1	**55.3	22.0	27.5	**35.8	46.6	*54.7	**44.1	24.6	*45.1	45.7	30.8	*40.8	**43.1
High fever	51.4	*37.2	37.3	39.7	43.1	**47.0	53.2	51.1	**45.1	42.7	47.7	53.4	45.7	45.4	46.7
Severe abdominal pain	11.7	13.7	10.8	6.6	3.5	**8.7	7.9	11.7	17.2	5.1	5.2	6.4	7.4	7.5	**10.6
Convulsion	33.5	*37.1	44.1	23.1	*28.1	**36.6	30.9	*38.0	36.3	22.0	*30.5	**35.4	26.5	*32.5	**37.3
Danger sign during postnatal period knowledge score															
Neonatal period danger sign (n)	3.5	*11.6	**33.9	47.0	47.8	**2.1	60.8	*73.9	**11.8	42.3	*52.3	**2.6	43.2	50.5	**9.3
Vomiting	88.5	*83.4	**90.2	79.9	80.6	**92.4	91.1	*95.0	**89.2	75.3	*87.6	**91.7	83.3	*86.4	**91.1
Fever	36.6	44.2	47.2	21.7	*35.2	**42.4	36.6	42.1	**53.9	23.0	20.9	**40.1	28.2	*34.9	**45.5
Poor sucking or feeding	23.7	22.1	**31.8	18.8	18.2	**38.0	23.7	20.5	**27.1	27.7	15.8	**45.0	22.6	*18.8	**36.0
Difficulty in breathing	3.9	*8.8	*14.4	1.5	1.5	**3.8	5.3	*9.7	**7.7	1.9	3.3	1.7	3.0	*5.1	5.8
Baby feels cold	1.6	1.6	*8.0	1.1	1.3	0.9	0.7	2.1	1.9	0.8	0.5	1.5	1.0	1.4	2.3
Baby too small/early birth	1.2	85.5	8.5	0.3	1.1	**6.3	0.3	1.4	**4.7	0.4	1.2	1.8	0.4	1.8	**5.1
Redness/discharge on cord	4.5	*9.6	8.2	3.4	3.9	5.2	4.1	3.8	2.0	1.6	2.2	2.2	3.4	4.3	4.1
Red swollen eye/discharge	3.6	0.9	**4.4	0.4	0.7	1.4	0.6	0.6	1.8	0.0	0.7	0.5	0.8	0.7	**1.7
Yellow palm/sole/eye	0.7	2.9	1.6	1.4	0.9	**2.4	1.2	2.7	2.1	0.4	1.4	0.7	1.1	1.8	1.8
Lethargy	3.4	4.4	1.8	1.0	2.4	1.0	2.0	2.3	2.5	0.8	1.6	1.0	1.6	2.4	1.5
Unconscious	15.4	17.5	22.4	15.7	17.3	17.2	20.4	*22.8	**18.2	15.6	16.7	16.9	16.9	18.6	18.2
Neonatal period danger sign knowledge score	648	755	760	600	1,068	1,044	600	1,056	1,055	552	1,008	1,024	2,400	3,887	3,883
No. of women															

*Statistically significant difference (p<0.05) between Round I and Round II surveys; **Statistically significant difference (p<0.05) between Round II and Round III surveys

37 percent in Round III. Between Round II and Round III the index increased in Amhara (9 percentage points), Tigray (7 percentage points), SNNP (5 percentage points), and declined slightly in Oromia (2 percentage points). Knowledge of danger signs during postnatal period was 44 percent in Tigray, and around 36 percent for the other three regions during Round III.

Danger Signs During Neonatal Period

Table 29 presents the neonatal period danger signs spontaneously recalled by women with children 0-11 months. A neonatal danger sign knowledge index was constructed by summing up all danger signs and expressed as the percentage of the maximum (11 in this case).²¹ The neonatal danger signs knowledge index remained unchanged between Round II and Round III at 18 percent, after improving only marginally between Round I and Round II. Regionally, the knowledge index increased only in Tigray (5 percentage point increase from 17 to 22 percent), remained unchanged in Amhara and SNNP at 17 percent, and declined 5 percentage points in Oromia (from 23 to 18 percent) between Round II and Round III.

Conclusion and Recommendations

Interaction between HEWs of the HEP with women during their pregnancies have shown mixed results with Tigray and Amhara showing major gains, and other two regions either remaining same or declining compared to 2010-11. The proportion of HHs visited by HEWs remained unchanged or even declined in Round III compared to Round II across the regions. Coverage of ANC, completeness of ANC (i.e., ANC components), women counseled on danger signs, and birth preparedness have increased substantially between Round II and Round III, with Tigray faring better than other regions. Major improvements from 2010-11 have also been observed in delivery related practices. More than half of women opted for facility based deliveries and sought assistance from health professionals in 2014-15 compared to less than 10 percent in 2010-11. Again, Tigray's performance was clearly better than other regions. ***To improve and sustain this trend focus should also be given to the monitoring quality of services along with strengthening the strategies that impacting the results.***

While coverage of postnatal care within 7 days have increased compared to the earlier survey, the gains in PNC in Round III compared to Round II are not as remarkable as those observed for ANC and delivery care. There was no change in PNC in 48 hours between the last two survey rounds. Newborn health care practices have shown improvements, and some components such as delay in bathing the newborn and thermal care showed substantial gains. An increase in good newborn health care practice reflects the impact of increasing utilization of four or more ANC visits, birth preparedness and better understanding of family health cards. The newborn care practices that are simple to conceptualize and implement have been adopted by the community. The question may be raised how such improvement happened in the context of low coverage of early PNC and limited knowledge of danger signs. PNC within 48 hours, knowledge about danger signs and acting immediately upon emergencies are pertinent for identifying life threatening conditions like neonatal sepsis, and post-partum hemorrhage.

The major gap in the current strategy is to ensure early PNC where the bulk of maternal and newborn mortalities take place. Currently, most deliveries are taking place at HCs. PNC among those delivering at HCs is also low. Strategies will be required to inform HEWs to follow-up women for PNC, especially those delivering at the HC; perhaps through the use of mHealth. Strategies will

²¹ The Cronbach's reliability alpha of the knowledge of neonatal period danger sign index was 0.98

also be needed to ensure early PNC among those delivering at home (women may be ostracized for delivering at home and thus, become fearful to inform the HEW for PNC). The 'birth notification' strategy L10K is currently implementing to ensure early PNC is not achieving the desired coverage; reasons for this needs to be sought and addressed possibly through operation research.

Priorities also need to focus on improving women's knowledge on maternal and newborn health related danger signs, which is currently low for sustainable practice.

CHILD HEALTH

Key Findings

- The coverage of fully vaccinated children increased from 45 percent in Round I, to 55 percent in Round II, and to 62 percent in Round III. The coverage was the highest in Tigray (67 percent), followed by Oromia (66 percent), Amhara (63 percent) and then SNNP (53 percent).
- The dropout rate between pentavalent (PENTA) 1 and PENTA 3 dropped from 26 percent in 2008-9 to 15 percent in 2014-15.
- The coverage of vitamin A in was 90 percent in Round III.
- The prevalence of childhood illnesses is declining over time. The prevalence of ARI declined from 10 percent in Round I to 6 percent in Round III; the prevalence of diarrhea declined from 23 in Round I to 13 percent in Round III; and the prevalence of fever declined from 22 percent in Round I to 10 percent in Round III.
- Although there was no change in the management of sick children between Round I and Round II; there was significant improvements between Round II and Round III. ARI case management increased from 35 percent in Round II to 69 percent in Round III; diarrhea management with ORT improved from 44 percent in Round II to 51 percent in Round III; and management of fever increased from 41 percent in Round II to 66 percent in Round III.
- There was no change in the caretakers' knowledge of childhood illness danger signs between the last two survey rounds. It was 18 percent in Round I, 23 percent in Round II and 22 percent in Round III.

This section describes the trend in the awareness and understanding of childhood illnesses and danger signs, as well as the trend in the prevalence of common childhood illness and coverage of preventive practices.

Childhood Immunization, Vitamin A and De-worming

Table 30 presents changes in immunization, vitamin A and de-worming coverage among children 12 to 23 months across the three surveys. Women with children 12-23 months were asked whether they had a vaccination card for the child. If a card was available, the vaccination information from the card was recorded. If the card was not available then the mother was asked whether the child had received BCG, PENTA, poliomyelitis (Polio), and measles vaccines. For PENTA and Polio, the number of injections or oral doses given was also obtained. Estimation of immunization coverage was based on either the information obtained from the card (if available) or mother's recall (in absence of a card). The proportion of women with children of 12-23 months with immunization cards was 36 percent, which is lower than Round I (40 percent).

Table 30: Immunization and vitamin A coverage among children 12 to 23 months, by region, L10K Round I, II & III surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
% retained immunization card	66.6	66.4	**47.8	40.4	*38.4	**44.9	34.4	34.5	34.2	25.1	*20.3	18.8	39.8	37.1	36.2
% received BCG	96.1	97.4	97.9	84.2	81.9	**88.6	78.4	*87.6	87.1	80.3	81.3	79.2	83.7	85.4	87.2
% received DPT1/PENTA1	93.7	95.9	**98.9	84.4	83.4	**93.6	76.1	*87.2	**91.8	85.0	83.6	**86.0	83.7	86.2	**92.0
% received DPT2/PENTA2	93.2	93.5	**98.5	74.6	75.3	**83.9	65.7	*80.3	**85.9	76.5	*73.6	**77.6	75.4	78.8	**84.9
% received DPT3/PENTA3	87.5	90.6	**94.1	61.0	*65.5	**78.3	53.5	*72.5	**78.7	59.7	*61.5	**67.5	62.7	*69.9	**78.0
% dropped out between PENTA1 & PENTA3	8.7	*6.4	**4.8	28.9	*22.0	**16.3	31.8	*17.1	**14.2	29.9	*26.5	**21.5	26.4	*19.3	**15.2
%received polio1	94.6	94.9	**96.6	89.6	89.5	**95.2	89.0	*94.2	94.1	90.2	89.6	**92.3	90.3	91.5	**94.4
%received polio2	90.9	92.6	92.5	82.1	80.1	**84.1	81.0	*85.9	**89.2	81.7	*78.1	**82.3	83.1	82.9	**86.1
%received polio3	83.3	86.8	**71.7	64.6	65.6	**72.6	72.7	*74.8	**79.3	65.4	64.6	**69.3	69.8	70.7	73.4
% received measles	84.0	*90.3	**96.8	67.1	*72.9	**85.1	64.8	*74.9	**79.5	67.1	*76.9	74.3	69.0	*76.8	**82.7
% received all vaccine	68.1	*79.8	**68.6	43.0	*48.8	**62.9	37.7	*55.8	**66.2	40.6	*47.2	**53.4	44.9	*54.6	**62.2
% have immunization diploma	9.6	*47.9	**59.0	12.2	*20.1	**42.7	5.2	*25.5	26.5	18.2	*24.4	**33.3	11.1	*26.5	**38.5
% received vitamin A during last cycle	85.8	*88.5	88.6	83.3	*91.9	91.8	92.5	*87.4	**90.7	89.0	*82.6	**85.4	87.2	88.1	89.5
No. of women	540	756	750	500	1,068	1,067	500	1,056	1,056	460	996	1,030	2,000	3,876	3,903

* Statistically significant difference (p<0.05) between Round I and Round II surveys

** Statistically significant difference (p<0.05) between Round II and Round III surveys

Immunization coverage for BCG did not show any statistically significant changes across the rounds; the coverage of BCG was 87 percent in Round III. BCG coverage in Round III was highest (98 percent) in Tigray, followed by Amhara (89 percent), Oromia (87 percent), and lowest in SNNP (79 percent). The coverage of PENTA1, PENTA2 and PENTA3 increased between Round II and Round III reaching 92 percent for Penta 1 and 85 percent for Penta 2 and 78 percent for Penta 3 in Round III. The dropout rate between first and third dose of PENTA declined from Round I (26 percent) to Round II (19 percent) and from Round II to Round III (15 percent). The dropout rate was lowest in Tigray (5 percent) and highest in SNNP (21 percent) during Round III. Measles vaccine coverage (one of the MDG monitoring indicators) increased from 69 percent in Round I to 77 percent in Round II. Between Round II and Round III, there was a modest increase (83 percent in Round III). Measles vaccine coverage was highest at Round III in Tigray (97 percent), and lowest in SNNP (74 percent).

The percentage of children who are fully vaccinated increased about 10 percentage points between Round I and II (45 to 55 percent) and 7 percentage points between Round II and III (55 to 62 percent). The percent of children who received all vaccines fell in Tigray by nearly 11 percentage points between Round II and Round III to the Round I's level (67 percent). The analysis shows that in Tigray, while the percentages of children receiving different vaccines in general were high (over 90 percent) at Round III, there was a sharp fall in the percentage who received the third dose of Polio in Round III (72 percent) compared to Round II (87 percent). The percentages of fully vaccinated children were 63 percent in Amhara, 66 percent Oromia and 53 percent in SNNP at Round III.

The L10K project encourages distribution of immunization diplomas to the HH if their children complete all vaccines in due time (e.g., measles by 9 months). The diplomas do not only act as incentives by recognizing responsible parents, it is also expected to encourage other parents with infants to do the same. The percentage of women who received an immunization diploma showed a positive trend over the survey rounds (11 percent in Round I, 26 percent in Round II and 38 percent in Round III). This indicator was highest in Tigray (59 percent), followed by Amhara (43 percent) and SNNP (33 percent) and then Oromia (27 percent) in Round III.

Among children aged 12 to 23 months, vitamin A coverage during the last distribution cycle remained unchanged between the survey periods (currently at Round III it was 89 percent). During the Round III survey, the vitamin A coverage was highest in Amhara at 92 percent followed by Oromia at 91 percent, Tigray at 87 percent and SNNP at 85 percent.

Reasons for not immunizing children are presented in Table 31. Reasons related to lack of knowledge declined considerably from Round I (60 percent) to Round II (47 percent) and continued to decline in Round III (37 percent). However, one out of ten mothers who did not immunize their children was still unaware during the Round III administration that they need to return for next dose of vaccine. The improvement in lack of knowledge was observed in Tigray, Amhara and SNNP and remained the same in Oromia. In Round III, lack of knowledge as a reason for not immunizing the child was highest in SNNP at 41 percent, followed by 36 percent in Oromia, 34 percent in Amhara and 29 percent in Tigray.

Reasons for not immunizing children associated with barriers to access decreased 7 percentage points from 40 percent in Round II to 33 percent in Round III. Major barriers identified during Round III were place for immunization being too far (13 percent), vaccinator's absence (6 percent), vaccines unavailable (6 percent), and time of immunization inconvenience (3 percent). In Round III, barrier to

Table 31: Reasons for not vaccinating their child, by region, L10K Round I, II & III surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
Lack of knowledge	28.6	*20.5	**28.9	70.5	*55.8	33.7	54.2	*35.1	35.9	65.3	*53.2	**41.4	60.3	*47.4	**36.6
Place and time not known	11.5	*3.6	**9.1	18.5	18.8	8.7	9.0	*7.1	5.4	11.2	*13.8	14.1	12.8	13.3	**9.7
Unaware of the need	3.4	*7.1	9.9	23.4	*10.2	6.3	13.4	*9.3	7.9	19.1	*10.2	9.0	17.3	*9.8	7.9
Unaware of need to return	4.8	*1.8	**5.8	7.5	*10.0	9.3	22.9	*15.4	**8.5	23.9	*18.6	**13.8	16.8	*13.5	10.4
Postponed until another time	0.0	0.0	0.0	14.2	*10.4	4.4	3.9	1.1	1.4	7.0	*2.5	1.6	7.8	5.1	**2.4
Fear of side reactions	1.3	0.0	0.4	11.6	*6.4	3.7	3.4	*5.0	1.9	4.2	4.1	0.5	6.2	5.0	**1.9
Wrong ideas about contra- indications	9.4	10.8	7.8	14	*6.4	6.3	8.3	*3.9	**12.6	5.4	*8.5	6.0	9.7	*6.4	**7.9
No faith in immunization	1.1	1.1	0.4	2.6	1	1.6	1.1	0.2	0.5	0.8	1.5	0.3	1.6	0.9	0.8
Rumors	0.7	0.0	0.0	1.0	0.0	0.4	0	0.1	0.6	5.8	0.8	0.2	1.6	0.2	0.3
Barriers to access	15.6	*24.4	**13.1	35.8	33.5	32.7	46.1	48.7	46.6	36.7	*41.3	**26.7	38.8	39.6	**32.9
Mother too busy	0.0	*2.4	1.6	0.4	*2.7	0.2	9.2	*3.0	8.1	1.6	2.5	2.4	4.1	*2.7	3.0
Vaccinators absent	0.6	0.0	1.3	6.2	*2.9	**5.6	3.8	4.2	7.4	5.1	1.3	6.5	4.7	*2.7	**6.1
Vaccine not available	0.5	*5.9	1.6	3.7	1.7	**5.0	5.9	6.6	**8.7	4.6	*8.9	5.7	4.6	5.3	5.9
Time of immunization inconvenience	0.6	1.8	1.6	5.2	*1.8	**3.7	3.8	*8.7	**3.5	6.4	7.6	**3.5	4.6	5.4	3.5
Place of immunization too far	4.1	*1.5	**5.3	17.3	*19.2	**16.1	25.9	27.8	**16.3	16.6	*21.1	**9.5	19.7	22	**13.2
Child ill, did not bring immunization	10.0	*0.8	1.3	4.0	5.2	3.4	5.8	5.9	4.5	5.5	*3.5	1.4	5.4	4.7	**2.8
Child ill, brought but not given immunization	0.0	0.4	0.0	0.9	0.0	0.5	0.5	1.6	0.7	0.3	1.4	1.0	0.5	0.9	0.7
Long waiting time	0.0	0.0	0.8	0.9	0.5	0.0	1.2	0.1	2.9	0.6	0.1	0.4	0.9	0.2	0.9
No. of children	99	81	108	164	336	339	266	346	319	177	339	459	706	1,102	1,225

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

access as a reason for not immunizing the child was highest in Oromia at 47 percent followed by Amhara at 33 percent. Neither of these regions improved from the earlier surveys. Barriers to access were 13 percent in Tigray and 27 percent in SNNP.

Management of Sick Children

Table 32 presents changes in the prevalence of childhood illnesses and related care-seeking behaviors across the surveys. The prevalence of childhood illnesses during the two weeks preceding the survey among children aged 0-23 months declined between Round II and Round III. Prevalence of acute respiratory infection (ARI) declined from 10 percent in Round I to 7 percent in Round II, and to 6 percent in Round III. Similarly prevalence of diarrhea dropped from 23 percent in Round I to 16 percent in Round II and then to 13 percent in Round III. Prevalence of bloody diarrhea declined from 4 percent in Round I to 2 percent in Round II and Round III. Prevalence of fever declined considerably from 22 percent in Round I to 13 percent in Round II and 10 percent in Round III.

There were no improvements in care-seeking behaviors for ARI, fever and diarrhea between Round I and Round II; however, improvement in the care-seeking behaviors were observed between Round II and Round III. A sharp increase in the treatment practice from any provider for ARI from Round II (around 35 percent) to Round III (69 percent) was observed. Similarly 66 percent reported to have sought treatment from a provider for fever during Round III—and increase from 41 percent in Round II. About 36-38 percent of the respondents mentioned receiving treatment from HCs for fever and ARI, and only 17 percent mentioned taking their children to HPs. Similar trend has been observed regionally. In Round III, 52 percent of children aged 0-23 months with ARI received antibiotics, while only 3 percent received any anti-malarial drugs for fever.

Fifty-one percent of children of 0-23 months of age with diarrhea were taken to health providers during Round III. Twenty-nine percent sought treatment from a HC and 15 percent from a HP. Consequently, 34 percent of children with diarrhea received oral rehydration solution in Round III, a modest increase from 28 percent in Round II. The practice of giving zinc for diarrhea has also increased from 3 percent in Round II to 13 percent in Round III. The improvement in care-seeking behaviors for ARI, diarrhea and fever can be attributable to the iCCM strategy the HEP adopted in 2010 and expanded in 2011.

Knowledge of Danger Signs of Childhood Illnesses

Mothers of children aged 0-23 months were asked to spontaneously recall signs and symptoms of illnesses that require the child to be taken to a health facility or to a health worker (Table 33). An index was constructed from the number of danger signs spontaneously reported, where total score is expressed as a percentage of a maximum of 19 danger signs.²² Though this knowledge index improved from Round I (18 percent) to Round II (23 percent), the index remained the same in Round III (22 percent). Regional analysis reflected similar findings. Improvement in the knowledge of childhood illness related danger signs were not observed between Round II and Round III in any of the four regions

²² The Cronbach's reliability alpha was 0.53

Table 32: Trend in the prevalence of ARI, diarrhea and fever and associated care-taking behaviors (in percentages), among children 0 to 23 months, by region, L10K Round I, II & III surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
Prevalence of ARI	13.6	*4.7	3.1	5.0	4.3	3.3	13.8	10.1	**6.0	13.1	*8.9	9.5	10.2	*6.8	8*5.5
Number of cases with ARI	162	69	53	62	97	65	138	216	104	143	191	182	505	573	404
ARI case management															
Taken to any provider	40.8	*35.2	**61.1	27.9	25.8	**61.5	19.5	*34.8	**82.7	54.3	*43.1	**64.4	33.9	34.8	**68.7
Taken to appropriate provider	39.0	33.2	47.3	19.6	*23.2	**58.1	11.1	*21.0	**66.7	38.3	*34.2	**48.1	25.0	26.2	**55.4
Taken to hospital	0.0	*3.7	5.5	0.7	0.0	0.0	0.0	0.9	**15.7	0.5	0.0	2.3	0.3	0.8	5.8
Taken to HC	27.9	30.7	33.1	17.6	*22.5	**36.2	4.1	*17.1	**43.4	35.0	30.4	**37.2	19.1	23.2	**38.4
Taken to HP	12.1	*2.0	**15.2	2.9	*0.7	**21.9	7.0	5.0	**23.2	7.5	3.9	**11.7	7.3	3.4	**17.4
Taken to other providers	2.6	2.0	**14.8	9.6	*2.6	5.8	10.7	16.7	16.0	16.5	11.5	**17.5	10.3	10.5	**14.3
Given antibiotics	28.5	23.9	34.8	12.2	*17.5	**46.6	11.8	*27.7	**52.3	40.4	33.9	**56.5	22.3	*26.5	**51.5
Prevalence of diarrhea	22.0	*14.2	**6.8	17.7	*13.1	**8.9	27.5	*15.7	16.0	30.2	*23.1	**18.5	23.3	*15.9	**12.8
Prevalence of bloody diarrhea	6.0	*2.5	1.8	2.4	1.2	1.5	4.4	*2.2	2.7	5.5	3.4	**1.8	4.1	*2.1	1.9
Number of diarrhea cases	251	191	111	193	250	176	273	313	306	306	469	366	1,023	1,223	959
Diarrhea case management															
Taken to any provider	39.4	*44.1	**51.6	29.8	*36.2	**40.3	35.4	*47.5	**57.1	35.7	*50.0	52.5	34.4	*44.3	**50.8
Taken to hospital	0.4	0.0	5.1	1.1	0.8	0.0	0.9	1.1	4.8	0.0	0.1	0.5	0.7	0.6	2.1
Taken to HC	26.6	*34.4	32.0	19.8	20.8	22.0	8.0	*20.1	**29.8	20.2	*31.2	31.4	17.1	25.4	**28.6
Taken to HP	13.2	10.9	**29.9	7.0	9.1	**18.8	18.6	*10.3	**13.4	7.0	8.0	**11.1	11.6	9.4	**15.2
Taken to other providers	4.6	4.5	1.7	5.4	*9.9	5.8	12.4	*22.3	**17.6	14.3	17.1	15.2	9.7	*14.6	12.6
Given ORS	35.2	*33.7	**52.8	23.0	24.6	25.7	21.7	26.5	31.9	15.4	*28.9	**37.2	22.5	27.6	**33.8
Given ORT	61.6	54.0	**66.6	37.1	*40.9	42.6	40.8	40.4	41.1	31.9	38.4	**50.6	40.5	41.8	46.8
Given zinc	0.9	0.0	17.0	0.0	8.0	18.5	2.9	4.5	6.0	0.0	0.0	**14.6	1.5	2.9	**12.9

Table 32 continued to the next page ...

Table 32 continued

	Tigray			Amhara			Oromia			SNNP			Total		
	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III	RI	R II	R III
Prevalence of fever	24.5	*11.6	**5.9	14.1	*10.4	**6.4	27.9	*15.0	**11.0	27.4	*17.4	16.2	21.9	*13.2	*9.9
Number of cases with fever	283	161	91	163	224	129	289	320	203	280	375	317	1,015	1,080	740
Taken to any provider	40.1	*48.3	**62.7	34.6	34.5	**56.6	22.6	*36.7	**77.4	50.6	49.2	**63.3	35.3	40.9	**65.7
Taken to hospital	0.7	2.2	**5.3	2.1	0.4	0.0	0.0	1.0	7.7	0.9	0.9	0.9	0.9	1.0	3.0
Taken to HC	24.4	36.3	**27.5	21.3	21.1	**26.7	3.8	*18.0	**41.0	28.8	*32.0	**39.5	17.6	*25.1	**36.0
Taken to HP	12.1	*9.0	**25.2	7.6	*3.1	**20.1	8.2	*5.6	**19.8	9.9	*5.3	**11.3	9.1	*5.2	**17.0
Taken to other providers	4.7	4.3	**12.1	6.2	*12.0	13.9	11.7	*16.3	18.3	15.9	*13.0	**16.2	10.1	*12.6	**15.9
Given anti-malarial	2.0	1.8	2.0	5.3	*3.1	**6.0	2.5	2.7	3.0	6.5	6.1	**1.6	4.1	3.6	3.1
Number of children	1,188	1,511	1,510	1,100	2,136	2,111	1,100	2,112	2,111	1,012	2,004	2,054	4,400	7,763	7,786

* Statistically significant difference (p<0.05) between Round I and Round II surveys

** Statistically significant difference (p<0.05) between Round II and Round III surveys

Table 33: Trend in the percentage of women with children 0 to 23 months who spontaneously recalled danger signs of childhood illnesses, by region, L10K Round I, II & III surveys

	Tigray			Amhara			Oromia			SNNP			Total		
	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III	R I	R II	R III
Childhood illness danger sign															
Repeated watery stools	29.7	*51.8	61.1	49.6	*72.4	**45.5	36.3	*65.5	**33.5	35.0	*66.8	**36.4	40.3	*66.3	**42.4
Any watery stools	63.5	60.6	67.5	32.6	41.0	44.3	43.5	37.8	**57.0	31.2	*27.1	**46.1	39.9	*40.3	**51.3
Repeated vomiting	52.5	*70.5	**64.7	41.0	*54.5	**39.2	38.6	*59.0	**27.4	23.7	*42.2	**37.0	38.8	*55.7	**39.2
Any vomiting	15.5	*28.7	**38.9	22.9	*27.7	26.2	30.9	*36.1	**52.2	17.5	*17.1	**26.7	22.9	*28.0	**34.8
Blood in stools	12.0	*22.5	21.5	7.4	*26.5	**8.9	8.2	*17.1	**9.5	4.2	*7.1	5.0	7.7	*19.4	**9.9
Fast breathing	9.4	*16.4	16.1	10.2	*12.5	**19.5	11.3	*18.0	**10.5	10.1	*5.8	**18.7	10.4	13.2	**16.5
Difficult breathing	8.4	*13.2	9.8	13.2	12.0	**20.4	12.8	*17.0	**12.5	14.6	*8.9	**13.3	12.7	12.9	**15.1
Noisy breathing	3.0	*6.8	6.3	1.6	*6.2	*0.9	3.8	*7.0	**5.6	1.7	2.0	0.8	2.4	*5.7	2.8
Fever	85.6	84.6	**81.9	75.3	*73.7	**87.7	71.8	*79.2	**86.4	71.6	*81.0	**84.9	75.2	*78.3	**85.9
Convulsion	5.1	*7.4	8.7	1.3	*4.8	3.7	2.8	*11.6	15.4	9.9	*5.0	3.1	3.9	*7.1	7.3
Stiff neck	0.2	*3.4	2.0	1.2	*3.2	**0.8	0.4	*4.0	**2.4	1.7	0.8	1.3	0.9	*2.9	1.5
Marked thirst	0.6	*3.1	3.8	1.1	*2.5	1.1	1.7	*4.1	**1.8	1.1	2.0	1.3	1.2	2.9	1.7
Unable to drink	2.5	*7.6	**2.9	2.8	*8.0	**12.0	7.2	8.7	10.8	3.4	5.1	7.5	4.0	*7.5	**9.3
Not eating/drinking well	20.1	*14.6	9.5	16.9	*20.0	**29.8	25.5	25.4	23.2	9.9	14.9	20.7	18.4	19.6	**23.0
Getting sicker/very sick	10.0	10.7	2.8	4.9	*10.5	10.1	13.6	*8.7	**5.2	2.2	*6.6	**2.9	7.5	9.2	6.1
Not getting better	1.5	*7.3	**1.5	4.2	*7.8	8.8	4.1	*6.3	**2.0	1.9	3.3	**1.3	3.3	*6.4	4.2
Sick for a long time	3.7	5.7	**1.2	5.3	*8.8	**12.3	8.1	*9.6	**3.0	1.6	3.0	2.0	5.1	*7.4	5.8
Sunken eyes	2.3	1.9	1.6	1.1	*3.5	3.1	3.0	*4.5	**2.8	2.0	0.9	0.8	2.0	3.0	2.3
Cough	63.8	*68.0	**44.8	22.9	*35.1	**45.4	39.8	*49.6	**62.0	44.9	*52.1	**56.5	37.8	*47.5	52.3
Index score for knowledge of childhood danger signs (% of the maximum)															
Number of women	20.6	*25.6	**23.6	16.7	*22.8	22.2	19.2	*24.9	**22.3	15.3	*18.7	19.4	17.7	*23.0	21.7
	1,188	1,511	1,510	1,100	2,136	2,111	1,100	2,112	2,111	1,012	2,004	2,054	4,400	7,763	7,786

*Statistically significant difference (p<0.05) between Round I and Round II surveys

**Statistically significant difference (p<0.05) between Round II and Round III surveys

Conclusion and Recommendations

The coverage of child immunization is showing an increasing trend, though still nearly 40 percent children are not fully immunized and dropout rates are still of a concern. Both lack of knowledge and barriers to access have improved since Round II. Though there was a major improvement in the availability of vaccines as shown in the *kebeles* situation analyses, the supply of the vaccine at the HP was less than optimum at 66 percent. There was regional variation in the coverage of childhood immunization. SNNP lagged behind other regions. Dropout rates between PENTA 1 and PENTA 3 was 21 percent in SNNP. Tigray's coverage of immunization is better than other regions for most of the vaccines except for Polio 3, which declined substantially in Round III. **Strategies to improve vaccination coverage including finding ways to reduce dropout rates need to be implemented.** The prevalence of four major childhood illnesses (ARI, diarrhea, bloody diarrhea and fever) have declined in Round III and care-seeking behaviors for these illnesses have improved significantly which is most likely due to the effect of iCCM strategies adopted by the HEP. Utilization of antibiotic for ARI treatment has increased substantially.

It is interesting to note that while the care-seeking behavior improved, the knowledge of danger signs actually remained low and unchanged. Efforts should be channeled toward improving knowledge and awareness of the women about the danger signs related to pregnancy and childhood illnesses to sustain the trend observed in this study in care-seeking behavior.

While utilization of services for the common childhood illnesses increased, seeking services from the HPs is still low. Earlier in the report where we discussed interactions between respondents and HEWs and HDAs, it has been shown that referral to HPs has also declined. These two trends indicate that women are relying and choosing HCs over HPs to seek treatment of their sick child. **Strategies should focus on informing mothers/caretakers about HEWs' roles in clinical services for common childhood illnesses. Building communities' trust and confidence in HEWs' clinical services also need to be improved.**

WAY FORWARD

The HEP has evolved since 2005 and has supported the achievement of impressive milestones in RMNCH outcomes in Ethiopia. In the last three years, an unprecedented percentage of women are seeking antenatal care, choosing institutional deliveries, and choosing long term family planning methods. Implants is gaining popularity; and service utilizations for common childhood illnesses, including use antibiotics have improved substantially, among others. Having met MDG 4 and on the track of reaching MDG 5 with emerging demand for institution based deliveries, priorities need to focus on monitoring and ensuring quality of services provided at the PHCUs. Next generation priorities should address transforming the PHCU as a whole to ensure time and quality care. A stronger linkage and better communication between the community (including HDAs), HPs and HCs will be required to ensure timely referral from the communities and HPs and to HCs and to ensure continuity of care from HCs to the community. This will be critical to elevate Ethiopia's health sector from the current level to a state-of-the-art community sensitive health system providing preventive and curative services. L10K as has been a key partner in the HEP's endeavor and will be contributing to the process of this transformation of the PHCUs to set-up to achieve the Sustainable Development Goals (SDGs).

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APPENDIX 1

The L10K Project (2007-2012)

The community strategies from 2007 to early 2012—the initial project period—are presented in Figure A1. The L10K *platform* (Objective 1) was implemented during this period in all the 115 *woredas* (which included 571 PHCUs and 3,070 *kebeles*). This platform improved the skills of the HEWs including their interaction with HHs and communities to improve HH RMNCH care behavior and practices; and to organize and utilize a geographically spread network of Community Health Promoters (CHPs) to extend their reach in providing services to the community. The CHPs were selected by the community to volunteer and help the HEWs promote healthy behaviors and practices to their catchment population of 25 to 30 HHs. To monitor, motivate and sustain support of the CHPs, L10K ‘anchored’ the CHPs to existing community structures, organizations or institutions (e.g., *idirs*, churches, mosques, and women’s and youth associations). In addition, L10K tested four distinct innovative community strategies—*Community Based Data for Decision Making* (CBDDM), *Participatory Community Quality Improvement* (PCQI), *Community Solutions Fund* (CSF), and *Non-Financial Incentives* (NFI)—to augment its primary objectives. Each of the community-based strategies was implemented in 14 *woredas* to evaluate their added value to the platform. The CBDDM activities were initiated in August 2009 while the other three community strategies were initiated in September 2010. All four community-based strategies were implemented by *woreda*-based public administration or CSOs, also known as tier 2 L10K grantees, through the technical and financial support from the tier 1 L10K grantees.



Figure A1: L10K community-based strategies from January 2009 to September 2012

Note: Community Based Data for Decision Making (CBDDM), Participatory Community Quality Improvement (PCQI), Community Solutions Fund (CSF), and Non-Financial Incentives (NFI)

CBDDM (Objective 2) fostered partnerships between the grassroots public administration, HEWs, local institutions, and CHPs in order to gather information to identify gaps in the utilization of RMNCH services and to facilitate community actions for solutions. To do so, the CHPs kept the HHs within their catchment area under surveillance using maps to prioritize and ensure targeted RMNCH services. Accordingly, the HHs in the CHP map were marked with symbols to indicate the services they need (e.g., family planning, latrine construction, and/or maternal and newborn health). HHs were then given health education by the CHP using the Family Health Card, and actively referred to the HEW for appropriate RMNCH care. The surveillance data maintained by CHPs were collected and analyzed by the HEWs to identify barriers to the access of RMNCH services. The community then used this information to identify and implement solutions.

PCQI (Objective 3) encouraged partnerships between communities and service providers to create shared responsibility in the ownership of MNH services provided by the HEP; these partnerships aimed to improve service quality from the provider, client and community perspectives. PCQI ensured continuous quality improvement through a cyclical process that involved identifying barriers

to quality of services (from the three perspectives), developing an action plan to address barriers, implementing the action plan, and assessing the quality of improvement solutions.

CSF (Objective 3) provided small funds to *kebele*-level institutions in order to empower them to identify and prioritize barriers to delivering quality MNH services, and to propose and implement innovative strategies to address these barriers.

NFI (Objective 4) ensured the sustained engagement of CHPs by motivating and strengthening volunteerism among them through NFIs. The NFIs are the support the CHPs obtain from HEWs in the form of ongoing mentoring, training and follow-up; recognition of CHPs' work through certification, performance review, and celebration organized by *kebele* and *woreda* leaders.

There were three more objectives of the L10K during the initial period. These include: Objective 5: Strengthening the capacity of the tier 1 L10K grantees; Objective 6: Measurement, learning and evaluation; and Objective 7: Information and experience synthesis workshop to improve maternal health outcomes.

APPENDIX 2

Baseline survey

With statistical power set at 80 percent and a two-sided alpha error set at 0.05, the sample size for the women of reproductive age interviews during baseline was determined based on the assumption that the contraceptive prevalence rate would increase from 23 percent at baseline to 30 percent at the end of the project (in September 2012); for the women with children 0 to 11 months the baseline sample size assumption was that tetanus toxoid injection coverage during pregnancy would increase from 50 to 60 percent during the same period; and, for women with children 12 to 23 months the sample size assumption was that the children fully immunized would increase from 34 to 45 percent. The expected changes in the indicators were based on the trends observed by the ESHE (2008). The cluster sampling design effect was assumed to be 1.5 for all the estimates. Accordingly, the sample size estimates (rounded) for the women of reproductive age sample was 1,000; for the women with children 0 to 11 months sample it was 600; and for the women with children 12 to 23 months it was 500. The analytic domains for the baseline survey were the four regions, as such, the estimated sample size was obtained from each region of the regions. During the first-stage of the cluster sampling, 50 *kebeles*, each from Amhara, Oromia and SNNP, were selected as the PSU with the PPS. Populations of *kebeles* were obtained from each respective *woreda* administration because these data were more recent than the 2007 census.

In the course of another evaluation (the USAID funded Integrated Family Health Program [IFHP]), all *woredas* of Tigray, L10K and non-L10K, were included in the sampling frame and stratified into four domains (i.e., non-IFHP & L10K, non-IFHP & non-L10K, IFHP & L10K, and IFHP & non-L10K). The required number of clusters (i.e., *kebeles*) from each domain were selected using PPS, which yielded 54 *kebeles* from the 15 L10K *woredas*. During the second-stage of the cluster sampling the WHO 30 by 7 cluster sample strategy, described by Lemeshow and Robinson (1985), was used to obtain information from 20 women of reproductive age (i.e., in ages 15–49 years), 12 women of reproductive age with children 0 to 11 months, and 10 women of reproductive age with children 12 to 23 months from each of the primary sampling units. The sample sizes according to sampling stage and domain are presented in Table A1.

The interviewers first went to the middle of the *kebele* where they randomly selected a HH, then visited every fifth HH and interviewed all the women in these HHs if they were within the target population. Accordingly, if a woman of reproductive age had a child between 0 to 11 months of age, she was interviewed for the women of reproductive age questionnaire as well as the questionnaire for women with children 0 to 11 months. However, after completing the quota for women of reproductive age in a given *kebeles*, the interviewers only sought to complete interviews for the other target groups. Interviewing at least one HEW and reviewing the documents from the HP completed the community questionnaire, one per *kebele*.

During the baseline survey 204 *kebeles* or clusters from the 115 L10K *woredas* were visited, from which 203 community questionnaires were completed and 6,292 women were interviewed (i.e., an average of 31 respondents per *kebele*). These included 4,080 women of reproductive age, 2,448 women with children 0 to 11 months, and 2,040 women with children 12 to 23 months. The sample sizes reported here vary slightly from those reported in the baseline survey report (L10K, 2009) because the baseline report included five urban *woredas* in Tigray. These urban *woredas* were

subsequently replaced by rural *woredas* as the L10K foundational community strategies were rolled out during the second phase of program implementation.

Table A1: Frequency distribution of *kebeles* and women respondents, during baseline (Dec 2008–Jan 2009) and midterm (Dec. 2010) surveys, according to sampling stage and sampling domain

		Primary sampling units			Ultimate sampling units			
		No. of <i>kebeles</i> revisited	No. of new <i>kebeles</i>	Total No. of <i>kebeles</i> / cluster	Total No. of respondents	Women 15-49 yrs	Women with children 0-11 months	Women with children 12-23 months
Sampling domain according to program phase & strategy								
Phase 1	Baseline	NA	NA	50	1,518	1,000	600	500
	Midterm	50	26	76	2,253	912	912	900
Phase 2	Baseline	NA	NA	39	1,181	780	468	390
	Midterm	39	37	76	2,305	912	912	912
CBDDM	Baseline	NA	NA	27	843	540	324	270
	Midterm	12	64	76	2,321	912	911	912
PCQI (phase 1)	Baseline	NA	NA	20	620	400	240	200
	Midterm	3	34	37	1,124	444	444	444
PCQI (phase 2)	Baseline	NA	NA	9	280	180	108	90
	Midterm	2	12	14	404	168	168	168
CSF (phase 1)	Baseline	NA	NA	27	889	540	324	270
	Midterm	10	12	22	654	264	264	264
CSF (phase 2)	Baseline	NA	NA	5	153	100	60	50
	Midterm	1	5	6	193	72	72	72
NFI (phase 1)	Baseline	NA	NA	13	377	260	156	130
	Midterm	4	8	12	369	144	144	144
NFI (phase 2)	Baseline	NA	NA	14	431	280	168	140
	Midterm	8	3	11	344	132	132	132
Sample sizes according to analytic domains								
Phase 1	Baseline	NA	NA	110	3,404	2,200	1,320	1,100
	Midterm	67	80	147	4,400	1,764	1,764	1,752
CBDDM	Baseline	NA	NA	27	843	540	324	270
	Midterm	12	64	76	2,321	912	911	912
Phase 2	Baseline	NA	NA	67	2,045	1,340	804	670
	Midterm	50	57	107	3,246	1,284	1,284	1,284
Sampling strata according to administrative regions								
Tigray	Baseline	NA	NA	54	1,557	1,080	648	540
	Midterm	36	27	63	1,925	756	755	756
Amhara	Baseline	NA	NA	50	1,724	1,000	600	500
	Midterm	33	58	91	2,999	1,092	1,092	1,092
Oromia	Baseline	NA	NA	50	1,527	1,000	600	500
	Midterm	33	55	88	2,501	1,056	1,056	1,056
SNNP	Baseline	NA	NA	50	1,484	1,000	600	500
	Midterm	27	61	88	2,542	1,056	1,056	1,044
TOTAL	Baseline	NA	NA	204	6,292	4,080	2,448	2,040
	Midterm	129	201	330	9,967	3,960	3,959	3,948

Midterm survey

The initial plan for any follow-up survey was to revisit the *kebeles* surveyed during the baseline to explore programmatic changes within a *kebele* with the changes in the outcome measures to assess dose-response relationship between program exposure and the outcomes of interest. However, the number and location of the *woredas* for the L10K second-generation community strategies (i.e., CBDDM, PCQI, CSF & NFI) were not confirmed before the baseline survey. Moreover, the second-generation community strategies are limited to about half (usually 10) of the *kebeles* of an intervention *woreda*. As such, the baseline sample sizes within a second-generation community strategy area were not sufficient to measure their added value, and some of the *kebeles* that were surveyed from the second-generation community strategy *woredas* during the baseline were not selected for the second-generation activities. Therefore, for the midterm survey, we had to increase the sample size within each of the second-generation community strategy areas and replace the *kebeles* surveyed during baseline that did not include the second-generation community strategy *woredas* with those that were. Selection of the replacement *kebeles* were done randomly from the list of *kebeles* with second generation activities. Accordingly, the midterm survey of the L10K areas had six main strata, which were 1) the phase one *woredas* with only the foundational community strategy (31 *woredas*), 2) the phase two *woredas* with only the foundational community strategy (28 *woredas*), 3) the CBDDM *woredas* (14 phase one *woredas*), 4) the NFI *woredas* (6 phase one and 8 phase two *woredas*), 5) the PCQI *woredas* (9 phase one and 5 phase two *woredas*), and 6) the CSF *woredas* (11 phase one and 3 phase two *woredas*). Therefore, the sampling strategy of the first-stage of the two-stage cluster sampling during the midterm survey differed from the first-stage sampling strategy of the baseline survey.

Like the second-stage sampling strategy of the baseline survey, the second-stage sampling strategy during the midterm survey followed the WHO 30 by 7 cluster sampling technique in combination with the parallel sampling technique. The midterm survey interviewed 12 respondents from each of the three target populations in each *kebele* so that there was at least 80 percent power to detect at least an 8 percentage point difference in the changes over time of an indicator between two programmatic domains (with baseline point estimates at the project level set at 50 percent, two-sided alpha error set at 0.05 and cluster survey design effect assumed to be 1.5).