Executive Summary

The Nuru Ethiopia (NE) Healthcare Program (HC) achieved significant progress towards improving maternal and child health through household adoption of key healthy behaviors in 2016. The HC Program also established systems for implementation, including Nuru cooperative care groups that work with the community and government on community-level activities. This report provides a snapshot of the progress over the first year of Nuru Ethiopia's Healthcare Program implementation.

The Healthcare Program worked directly with 969 Nuru households and indirectly with 7 kebele communities. On average, the Nuru intervention group experienced a 40% increase in healthy behavior adoption rates over the comparison group who saw a 21% change.

- After one year of Nuru's healthcare intervention, the Nuru families experienced a 33% increase in deliveries at a health facility compared to the comparison group's 15%. The monitoring target for births at a health facility was reached and then surpassed by 44%.
- The percentage of mothers on track for at least 4 antenatal care visits increased by 14% in the intervention group and decreased by 1% in the comparison group. The monitoring data number was below target in the first half of the year and then exceeded the target by 16% at the end of 2016.
- Immediate breastfeeding saw great gains across the board with a 45% increase in the intervention group and 37% in the comparison group. Exclusive breastfeeding, which is a more complex behavior to change, saw an 11% positive change in the intervention group and 2% change in the comparison group.

Interventions related to safe pregnancy and childbirth were the primary focus for the the Nuru HC team in the first year of the implementation. As a result, the behavior change messaging around malaria prevention, hand washing, and drinking clean water was minimal in comparison. In 2017, the team will turn a great focus to those behaviors next.

Introduction

With the intent of improving maternal and child health, the Nuru Ethiopia Healthcare Program works with Nuru farmer households to adopt eight healthy behaviors. The chosen health promotion behaviors have been proven by technical research to decrease unnecessary disease and death, particularly for mothers and young children.

NE Healthcare impact is assessed by measuring the adoption rate in three areas:

- Healthcare Overall Healthy Behaviors
- Safe Pregnancy and Childbirth
- Safe Water, Sanitation and Malaria Prevention

The Nuru HC Program utilizes evidence from the World Health Organization,[1] which identifies the need to focus on maternal and child health (MCH). USAID's best practices on how to efficiently and effectively improve MCH through behavior change also guides the Healthcare Program implementation.[2] The tailored interpersonal communication approach involves employing observation and in-depth discussions to understand the specific needs of each household and where they fall in the stages of change continuum (precontemplation, contemplation, preparation, action, and maintenance phases[3]). Nuru Ethiopia delivers healthcare services via the cooperative care group model. Small women's groups and elected volunteer leaders are trained to provide Nuru family households with information about maternal and child health behaviors and ways to put them into practice.

Objective

The following presentation of individual level data provides an update on the progress Nuru farmer households are making in adopting healthy behaviors. Subsequent follow-up assessments will be taken in future years to track the longitudinal behavior change of households over time.

Nuru M&E supports this work by conducting an annual assessment towards the evaluation question: *What is the impact of the Nuru Ethiopia Healthcare Program on Nuru farmer households?*[4]

Methodology

Table 1: Survey timeline and sample sizes

Sample	# of Households	# of children 0-23 months	# of Enumerators	Training Dates	Survey collection dates	Data entry and quality control
Nuru	706	177	35	Sept 2016	Oct - Dec 2016	Oct - Dec 2016
Non-Nuru	536	140				

[1] WHO. Children: reducing mortality. Updated September 2013. Retrieved 2013 January 14 from http://www.who.int/mediacentre/factsheets/fs178/en/index.html
[2] USAID: Acting on the Call: Ending Preventable Child and Maternal Deaths, June 2014;Technical Approaches to Proven Interventions by USAID, Ensuring Healthy Behaviors p107-110. Retrieved 2017 January 17 from https://www.usaid.gov/sites/default/files/documents/1864/USAID_ActingOnTheCall_2014.pdf
[3] Boston University http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories6.html
[4] The evaluation survey is available upon request

Scorecards

NE M&E and HC developed three scorecards to measure household health behaviors (Table 2). NI M&E's approach to counting the number of healthy behaviors a person engages in is a modified version of the Center for Disease Control and Prevention's methodology which shows that people live longer as they engage in a greater number of healthy behaviors.[5]

With the exception of handwashing[6], each healthy behavior is scored on a binary scale. In other words, there is a total possible score of 1 for each behavior successfully adopted. The **Overall Healthy Behaviors Scorecard** represents the summation of the other two scorecards.

Table 2: Nuru Healthcare Scorecards

Overall Healthy Behaviors Scorecard (*8 out of 8 healthy behaviors*)	
Safe Pregnancy and Childbirth Scorecard (*5 out of 8 healthy behaviors*)	4 or more ANC visits
	Delivery in a health center
	Immediate breastfeeding
	Exclusive breastfeeding
	Contemplentary breastfeeding
Safe Water, Sanitation, and Malaria Prevention Scorecard (*3 out of 8 healthy behaviors*)	Appropriate handwashing with soap
	Safe drinking water
	Sleep under LLIN

For the **Safe Pregnancy and Childbirth Scorecard**, there are a total of five indicators representing the eight healthy behaviors that are measured through a survey at the household level. Mothers of children ages 0-23 months responded to questions related to antenatal care visits, childbirth and nutrition for each of their children in this age bracket. At the individual behavior level, each child in the 0-23 month age group received a score of either 1 or 0 for indicators related to breastfeeding, antenatal visits, and childbirth.

For the **Safe Water, Sanitation and Malaria Prevention Scorecard**, 3 possible points can be achieved on the survey. The first question, regarding water treatment and hand washing with soap, is calculated for a possible score of 2. These household scores are then averaged by each group surveyed. Next, the average percent adoption of handwashing with soap (all households) and sleeping under long-lasting insecticide treated bed nets (LLIN) are added to the scorecard for a total possible score of 3.

[5] See https://www.cdc.gov/media/releases/2011/p0818_living_longer.html for further detail.
[6] For the handwashing indicator, calculations consider washing hands at three critical times: after defecation, before cooking and before eating. Therefore, each critical handwashing time has a possible score of 0.33, for a total score of one (.33+.33+.33) if all three times are positively identified by a household.

The analysis section that follows presents scorecard averages and incidence rates for the eight specific indicators. Where applicable, proportions tests for statistical significance were performed to denote statistical differences between the intervention and comparison groups.

There are a few limitations to consider for this evaluation. First, the Healthcare Program is a systems approach which requires a strong partnership with the government and their resources. Next, with a systems approach, there is a spillover effect. For example, the comparison kebeles are inside the clusters that Nuru works in which means that they are getting the Ministry of Health-level capacity building support as well as access to maternal waiting homes and water sources that were repaired for the intervention areas.

Monitoring

In addition to yearly impact evaluations, the NE HC team collects monitoring data (Table 3) throughout the year. While evaluations focus on a sample of farmers, program teams monitor the entire Nuru farmer population. Overall, the HC team exceeded all monitoring targets. Through intensive demand creation, the HC team surpassed its 800 household target with 969 Nuru families participating. The 2016 data shows a positive uptake of the key performance indicators for attending antenatal care (ANC) and giving birth in a health facility, with a significant change between Q2 and Q3 after these topics were covered by the care groups.

The monitoring target set for 2016 antenatal care was a stretch in the beginning of the year, but by Q3 the target was surpassed by more than 20% in the intervention group and continued on an upward trend through the end of the year. The target for percentage of babies delivered in a health clinic was narrowly met early in the year and improved significantly in Q3 with a more than 27% jump above Q2. Another 12% jump occurred in Q4, thus ending the year 44% over the original target.

Table 3: Nuru Ethiopia Healthcare Quarterly Numbers

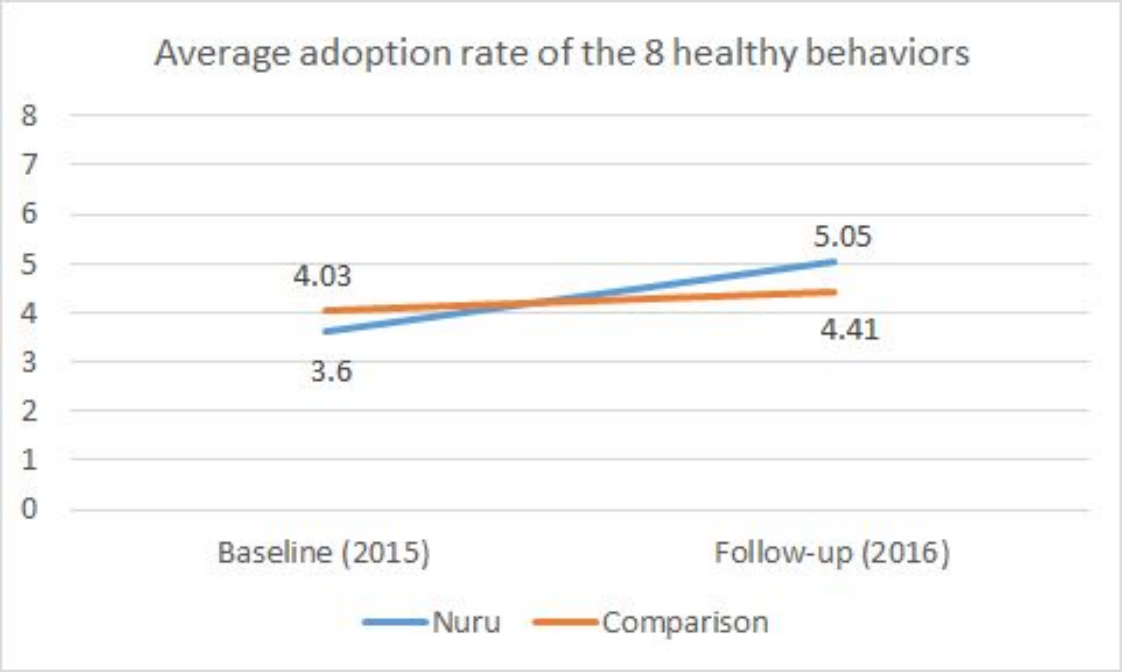
2016 Healthcare					
Indicator	2016 Target	Q1	Q2	Q3	Q4
Total Nuru women participating in cooperative care groups	*800*	-	969	--	--
Percent of women who are on track to attend at least 4 antenatal care visits per quarter	*70%*	-	60%	84%	86%
Percent of deliveries in a clinic per quarter	*50%*	-	55%	82%	94%
Number of trainings given to community health workers per quarter	*4*	3	5	6	6

Results

Scorecard 1: Overall Healthy Behaviors

The Overall Healthy Behaviors Scorecard (Figure 1) shows that the Nuru intervention group made significant gains in healthy behavior adoption as compared to their own baseline and to the comparison group. The difference in difference change is statistically significant, 1.45 in the Nuru intervention group and 0.76 in the comparison group in the annual evaluation data. The Nuru group has been more willing and able to change their habits to adopt healthy behaviors.

Figure 1: Overall Healthy Behaviors Scorecard



Essentially, the comparison group demonstrated impact on the community-level Nuru activities including: health staff training, government integrated supportive supervision accountability, maternal waiting homes creation, water source repair, and counseling corners creation. These activities partner with the government for sustainability and with the community to improve the enabling environment. The intervention group shows the impact of the additional cooperative based care group activities which includes: peer to peer support and tailored interpersonal communication (TIC) to help overcome barriers and drive demand for the community level services.

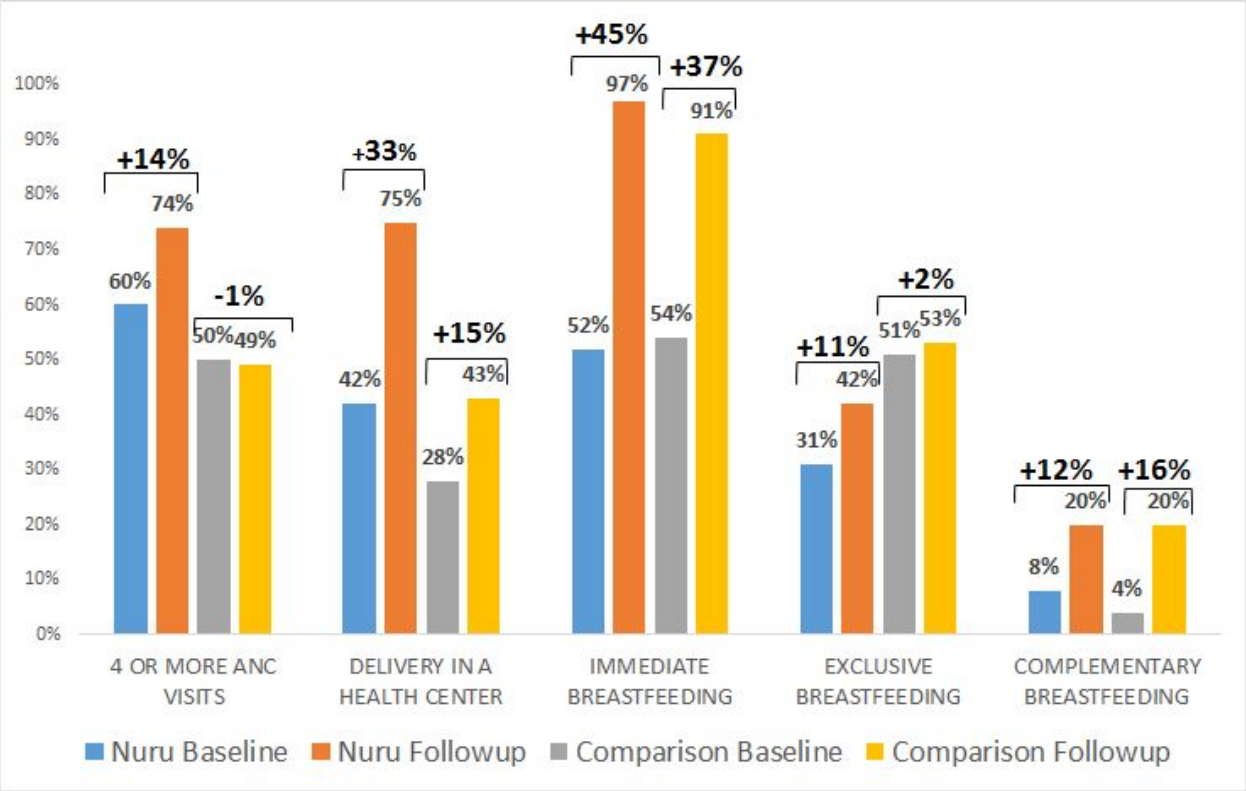
Within the program design, behavior change activity roll out is staggered. The behaviors strategically focused on at the beginning of 2016 saw significant gains. Those that were not, hand washing, use of LLIN, and water treatment, experienced less change for both comparison

and intervention groups. Behavior change is hard and it takes time, but the combination of the community and cooperative level healthcare activities have a positive correlation, but not necessarily causation.

Scorecard 2: Safe Pregnancy and Childbirth

In Figure 2, all five indicators in the treatment group have a positive statistically significant change compared to baseline, and all indicators except complementary feeding have a greater percent change than the comparison group. The topics the Nuru cooperative care groups focused on in 2016 show stronger behavior change above the community level interventions as is seen in the difference in the difference, for example: 15% for antenatal care, 18% for delivery on a health facility.

Figure 2: Safe Pregnancy and Childbirth



A combination of factors likely contributed to the positive impact trend across this scorecard. Maternal waiting rooms constructed in Nuru communities alleviated transportation barriers to health facilities for women who live a long distance away or for women battling complicated deliveries. This, along with nutrition counseling corners and training on pre- and postnatal care assists in improving maternal and child health. The Ministry of Health, the local community, and Nuru collaborated strongly on these interventions. Nuru also worked with the government to improve the training for health center staff involved in maternity.

Prenatal care: on track for four antenatal care visits (ANC) during pregnancy

The Nuru group saw a 14% increase as more expectant mothers prioritized ANC visits, whereas the comparison group saw a 1% decrease from baseline. Monitoring data also showed positive uptake of this behavior in 2016. In the monitoring data, the initial data collected showed 60% of women attending antenatal care, which was below the 2016 target of 70%. After care groups covered this subject, there was a significant uptick in the behavior, and Q4 ended with 86% of the intervention group attending antenatal care as recommended, thus surpassing the target by more than 10%.

Safe delivery: giving birth in a health facility

Typical challenges for safe childbirth in Ethiopia are centered around transportation difficulties. To help women overcome the transportation challenge, Nuru is working on a major initiative with local communities and the Ethiopian government to create maternal waiting homes located next to health facilities. These waiting homes are available for women who live far away or have complex pregnancies.

Given the challenges in Ethiopia with maternal death[7], it is positive to see both the intervention and comparison group significantly increase their percentage of mothers giving birth in a health facility. The Nuru group is making gains in behavior change twice as fast as the comparison group. Monitoring data on this behavior shows a positive increase in this behavior as well, meeting and then exceeding the targeted percentage change. That said, overall uptake of this behavior is still dangerously low for mothers; 1 in 4 women in the intervention group and 43% in the comparison group do not give birth in a health facility.

Immediate Breastfeeding

Immediate breastfeeding behavior adoption often parallels safe delivery in a health facility if the health facility is following best practices. Immediate breastfeeding is measured as a one time activity that gives the baby nutritionally important, habit forming, and autoimmune boosting colostrum. There is large jump in recorded uptake of this behavior for both the intervention and comparison groups. A 45% change for the Nuru group and 37% change for the comparison group brings the behavior adherence up to the 90% range overall.

Given this large change in both groups, it would be beneficial to conduct further inquiry to note government activity on this behavior during this time to determine how much the spillover effect of the community level intervention may have affected this. Nuru community interventions that facilitate immediate breastfeeding include: training Ministry of Health staff, ensuring cascading of this training to lower level health staff, completing maternal waiting

[7] "The maternal mortality ratio in Ethiopia is 676 per 100 000 live births, which is one of the highest in the world and is mainly a result of lack of access to healthcare, and socioeconomic and demographic factors. This maternal mortality rate remains a major public health challenge facing the country. Every year, 22 000 women and girls die during childbirth or as a result of complications of childbirth." World Health Organization
http://www.aho.afro.who.int/profiles_information/index.php/Ethiopia:Analytical_summary_-_Maternal_and_newborn_health

homes and creation of hands on counseling corners with behavior change communications materials.

Exclusive Breastfeeding: in the first 6 months of life

Exclusive breastfeeding and complementary feeding are successively more difficult behaviors than immediate breastfeeding. Exclusive breastfeeding happens over 6 months and therefore has many more possible challenges. For this indicator, the Nuru group was behind at baseline and made a significant stride to catch up to the comparison group's baseline behavior profile which they maintained with only a 2% increase. Across the study, the percentage of mothers that stay with exclusive breastfeeding is still low at 50% or less, but behavior change takes time and it is encouraging to see an 11% gain for the treatment group.

Appropriate Complementary Feeding

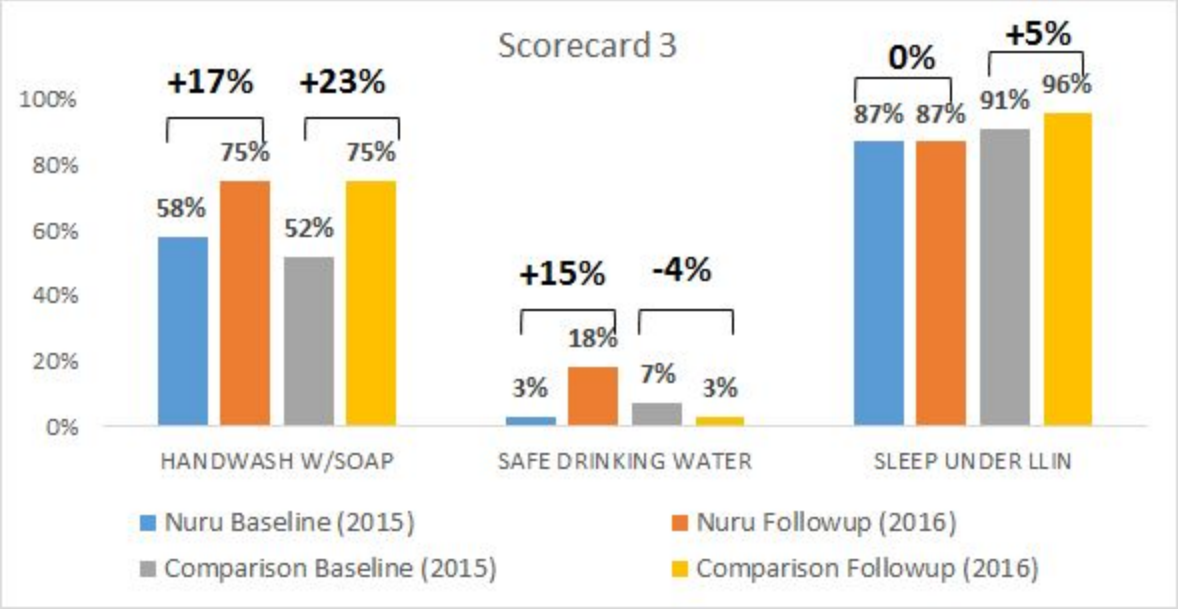
The intervention and comparison group both have 20% of families using appropriate complementary feeding practices which is low overall, and is concerning for under 5 nutrition. However, both groups did have significant increases in this behavior. Complementary feeding requires access to a variety of foods beyond breast milk and is therefore a more complex behavior to affect. In addition, this indicator is tracked over a longer period of time.

Scorecard 3: Safe Water, Sanitation, and Malaria Prevention

In general, the changes in behavior for this scorecard (Figure 3) are positive for both intervention and comparison groups. There was an uptake in the adoption of washing hands with soap in both groups. The intervention group increased drinking clean water while the comparison group saw a small decline. Rates of drinking clean water are low overall and adoption of sleeping under mosquito nets is high overall. These behaviors are both complex to measure as noted below.

In the time period between baseline and follow-up, the Nuru cooperative care groups did not focus on the topics in Scorecard 3. Greater focus given to the safe pregnancy and childbirth activities was in accordance with the program implementation plan. It follows expectations that Scorecard 3 did not see the level of gains scorecard 2 did in 2016. Nuru International did not set monitoring targets for these indicators in 2016.

Figure 3: Safe Water, Sanitation, and Malaria Prevention



Sanitation: washing hands with soap at all appropriate times

Evaluation data shows both intervention and treatment groups had a significant increase, 17% and 23% increase respectively, to bring them both up to 75% at follow up across all key hand washing times.

Hand washing is key to health, but deceptively difficult to maintain. Research shows that if everyone washed their hands appropriately, it could prevent 1 million deaths a year globally.[8] It is an area the Nuru Healthcare team can focus on more in year two of Ethiopia operations.

Safe Water: treating drinking water

The Nuru group made a significant increase in use of safe drinking water, with a 15% improvement, where the comparison group experienced a significant decrease. Both groups come in with very low percentages, under 20%.

Drinking clean potable water and handwashing with soap are important for the prevention of diarrheal disease, which is the second highest cause of death in children under five.[9] Nuru Ethiopia works to improve demand and access to potable drinking water both through repair of existing water sources with community leadership, and use of point of source water purification called Waterguard. The evaluation data measures how people treat the water they drink.

[8] Curtis V, Camicross S. Effect of washing hands with soap on diarrhoea risk in the community: A systematic review. Lancet Infect Dis. 2003;3(5):275-81. https://www.cdc.gov/healthywater/hygiene/fast_facts.html

[9] Diarrhoeal disease is the second leading cause of death in children under five years old. It is both preventable and treatable. Each year diarrhoea kills around 525 000 children under five. A significant proportion of diarrhoeal disease can be prevented through safe drinking-water and adequate sanitation and hygiene. -World Health Organization http://www.who.int/mediacentre/factsheets/fs330/en/

The Waterguard activity (accessibility and demand creation for a chlorine based additive for water purification at the household level) was introduced late in 2016. It is not immediately popular as Ethiopians are accustomed to water treatment at the reservoir level rather than on the household level. There is a cultural bias to believe water is safe regardless of the source, leading people to not value Watergaurd enough to spend money on it without further demand creation.

Malaria Prevention: use of long lasting insecticide treated mosquito nets (LLIN)

There was no significant change in LLIN behavior for the intervention group. The comparison group had a small significant increase. Both groups are close to saturation with 87% and 96% using LLIN. However there are still documented issues with malaria. The industry norm is to measure use of LLIN, but many Ethiopians prefer indoor residual spray above bed nets.

In the end, the desired outcome of reducing malaria infection is discussed holistically with prevention methods including LLIN, indoor residual spray and clearing the environment of mosquito breeding sites, but malaria is still challenging to control. Culturally many families believe it is like the common cold, a normal part of life.

Conclusions and Recommendations

The Nuru Ethiopia Healthcare Program achieved its goal of increasing healthy behavior adoption rates to mitigate preventable disease and death in mothers and young children. All of the monitoring targets were met and then exceeded as 2016 progressed. Nuru households showed progress toward the ultimate goal through their ability to overcome barriers and create healthy changes in their lives.

- After one year of Nuru's healthcare intervention, Nuru families experienced a 33% increase in deliveries at a health facility compared to the comparison group's 15%.
- The percentage of mothers on track for at least 4 antenatal care visits increased by 14% in the intervention group and decreased by 1% in the comparison group.
- Immediate breastfeeding saw great gains across the board, with a 45% increase in the intervention group, and 37% in the comparison group. Exclusive breastfeeding, which is a more complex behavior to change, saw an 11% positive change in the intervention group and 2% change in the comparison group.

Difference in difference analysis shows that there is a statistically significant change in the the magnitude of positive behavior change in the safe pregnancy and childbirth scorecard between the Nuru intervention and comparison group. For Scorecard 3, however, the difference in difference is not statistically significant. There is still plenty of room for growth as Nuru moves into its second year of the healthcare intervention. Even with great gains made in the percentage of women delivering in a health facility, it is still the case that less than 50% of women are exercising this key life saving behavior. Now that progress has been made on some

of the safe pregnancy behaviors, more emphasis can be given to the supporting behaviors for improving health, like malaria prevention, proper hand washing with soap, and drinking clean water.

Nutrition behaviors for children under 5 will continue to be very important. Particular support in nutrition can be focused on the more difficult behaviors like appropriate complementary feeding, which takes access to nutritious food over a long duration of time. In year two, more emphasis can be given to exclusive breastfeeding and complementary feeding (the more difficult behaviors in scorecard 2) because of the progress already made in prerequisite behaviors that are key to healthy childbirth and first 10 days of life.

According to care group research,[10] the key to grass roots behavior change is in peer-to-peer support. Empowering volunteer care group leaders to support their neighbors to overcome the real challenges that only they can really understand can make a sustainable difference. Building trust in small groups does not happen automatically, but it is happening in year one of the Nuru Ethiopia Healthcare Program and it seems to be driving demand toward healthy behaviors for this generation and the next.

In July 2017, Nuru Ethiopia completed an intensive review of program activities using evaluation and monitoring data to question assumptions and make improvements to the program. The following recommendations come from the NE Program Review.

1. NE is planning to increase the malaria intervention activities in new scaling areas where secondary data shows high malaria incidence rates. This would include working with government partners to provide training for the government indoor residual spraying initiative to control mosquito populations.
2. Consider potential additions to the water access activities based on secondary data on existing water sources in scaling areas.
3. Given current food security challenges, NE will further research potentially supporting Community Management of Acute Malnutrition trainings in partnership with the government based on secondary data for expected need in the new intervention areas.
4. Nuru Ethiopia will consider piloting an area without cooperative care groups, using government health workers instead, and training them in care group methodology community wide. This would test if similar impact could be made through existing sustainable government systems instead of setting up a Nuru cooperative care group system.
5. The NE Healthcare Program will slim down program activities for greater efficiency. This includes discontinuing support of two government health worker capacity building trainings and removing direct support of two government meetings.

Evaluation, monitoring and secondary data were utilized extensively during these strategic forward looking conversations. The Healthcare team is looking forward to test new ideas and make concrete changes to improve the Healthcare Program's impact, sustainability, and

[10] Perry, H., Morrow, M., Borger, S., Weiss, J., DeCoster, M., Davis, T., & Ernst, P. (2015). Care Groups I: an innovative community-based strategy for improving maternal, neonatal, and child health in resource-constrained settings. *Global Health: Science and Practice*, *3*(3), 358-369. http://www.ghspjournal.org/content/3/3/358.full

scalability over the long term.