

## **HEAL TB Annual Report PY2**

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HEAL TB

October 1, 2012 – September 30, 2013

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**USAID** Heal TB  
FROM THE AMERICAN PEOPLE



**Management Sciences for Health  
HEAL TB Project  
Progress Report for  
October 1, 2012–September 30, 2013**



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## List of Acronyms and Abbreviations

AFB	acid-fast bacilli
AIDS	acquired immune deficiency syndrome
ALERT	All Africa Leprosy, TB, Rehabilitation, Research and Training Centre
ART	antiretroviral treatment
CDR	case detection rate
DST	drug susceptibility testing
EHNRI	Ethiopian Health and Nutrition Research Institute
EQA	external quality assurance
FMOH	Federal Ministry of Health
GDF	Global Drug Fund
HeaL TB	Help Ethiopia Address the Low TB Performance Project
HEW	Health Extension Worker
HF	health facility
HIV	human immunodeficiency virus
HMIS	health management information system
IC	infection control
IPLS	Integrated Pharmaceutical Logistics System
IPT	isoniazid preventive therapy
KAPTLD	Kenya Association for the Prevention of Tuberculosis and Lung Disease
MDR-TB	multidrug-resistant tuberculosis
MOH	Ministry of Health
MSH	Management Sciences for Health
NTP	National Tuberculosis Program
OPD	outpatient department
PEPFAR	President's Emergency Plan for AIDS Relief
PFSA	Pharmaceutical Fund Supply Agency
PMP	performance monitoring plan
PTB	pulmonary tuberculosis
QA	quality assurance
RHB	Regional Health Bureau
RRL	Regional Reference Laboratory
SS+	sputum-smear-positive
TB	tuberculosis
TB CARE I	Tuberculosis Care I program
TRAC	TB Research Advisory Committee
TSR	treatment success rate
USAID	US Agency for International Development
WHO	World Health Organization
ZHD	Zonal Health Department

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Last but not least the Heal TB team would like to express our deepest appreciation to Dr. Yared Kebede , Dr. Helina Worku and Dr. Endalkachew Melese of USAID (Agreement officer's technical representative /AOTR and Co-AOTR's respectively of HEAL TB project) for their guidance and assistance in implementing the project smoothly. We feel you are always part of our project implementation team and we would not have reached to this stage without your involvement.

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## General Project Information

<b>Program/Project Title</b>	<b>Help Ethiopia Address the Low TB Performance (HEAL TB) Project</b>
<b>Prime partner</b>	Management Sciences for Health
<b>Cooperative agreement (contract) number</b>	AID-663-A-11-00011
<b>Program/project start date</b>	July 15, 2011
<b>Program/project end date</b>	July 14, 2016
<b>Life of project budget</b>	\$41,996,319.00
<b>Reporting period</b>	Year 2 (October 1, 2012–September 30, 2013)

## Background and Introduction

Through the Help Ethiopia Address the Low TB Performance (HEAL TB) Project, Management Sciences for Health (MSH) supports a comprehensive package of tuberculosis (TB) interventions to provide quality DOTS, strengthen referral linkages to the community, and assist the Federal Ministry of Health (FMOH) in implementing comprehensive TB project in 10 zones of Amhara and Oromia regions. **Table 1** on page 4 shows a profile of the project zones. HEAL TB is working with three other partners:

- PATH supports a comprehensive package of TB interventions at the community level;
- All Africa Leprosy, TB, Rehabilitation, Research and Training Centre (ALERT) supports the training of trainers in comprehensive TB and leprosy services; and
- the Kenya Association for the Prevention of Tuberculosis and Lung Disease (KAPTLD) implements gender mainstreaming in TB activities.

The Global Health Committee also recently joined the team to assist with implementation of MDR-TB activities in two hospitals in Amhara Region.

United with Ethiopian universities and other local institutions, our team is poised to make and help to maintain a significant difference in the health of Ethiopians in a way that fosters national ownership and sustainability. Through this assistance, the Regional Health Bureaus (RHBs), Zonal Health Departments (ZHDs), and *woreda* (district) primary health care units are improving program management of TB and multidrug-resistant TB (MDR-TB), improving TB/HIV collaboration, and strengthening the health system by assisting with *woreda* planning, drug supply management, and infection control. HEAL TB is focusing on increasing case detection and decentralizing DOTS in communities through Health Extension Workers (HEWs) and expanding to more health facilities in rural and urban areas.

MSH and its collaborators offer not only their expertise in TB, health systems strengthening, and successful experience at all levels in Ethiopia but also the local and regional partnerships and country operating platform to rapidly and cost-effectively scale up TB control—and sustain this progress with Ethiopian capacity. The HEAL TB project collaborates closely with the other partners working on TB and HIV in Amhara and Oromia. HEAL TB is building on existing partnerships and working relationships with the FMOH, Ethiopian Health and Nutrition Research Institute (EHNRI) and other agencies, RHBs, ZHDs, the nonprofit and private sectors, and civil society. The project works in the high-TB-prevalence regions and communities of the two regions.

## DATA COLLECTION METHODS

This report is organized using data from five different sources: (1) the case notification, treatment success, and cure rates and TB/HIV data are collected from ZHDs (and channeled from health facilities and compiled by *woreda* health offices using the HMIS); (2) data related to treatment of multidrug-resistant TB (MDR-TB) is collected from the treatment centers; (3) culture, drug susceptibility testing (DST), and external quality assurance (EQA) results are collected from regional laboratories; (4) HEAL TB–developed sources on standards of care (see **Box 1**) provide

information about data quality, stock-outs, smear positivity rate, and others; and (5) training data is collected from the Training Information Management System and trainers' reports.

**Box 1: Use and measurement of standards of care**

The standards of care were developed as a tool for the field mentors to identify gaps in TB clinics, outpatient departments, and laboratories. The mentors use the standards of care to identify gaps and discuss their causes with health facilities and woredas, to plan improvements, and to measure changes. The mentors visit every health facility for one day per quarter, and the data on standards of care presented here cover three months (the previous quarter).

**Table 1: Profile of the project zones, Sept. 2013**

No.	Zone	Population	Woreda	Hospital	Health Center	Health Post
<b>Phase I HEAL TB–supported zones(started on July 15, 2011)</b>						
<b>Amhara Region</b>						
1	North Gondar	3,018,326	24	3	133	522
2	South Gondar	2,278,555	15	1	93	393
3	East Gojam	2,397,876	20	2	101	402
4	North Wollo	1,535,744	13	2	61	248
5	South Wollo	2,797,445	24	4	134	502
	<b>Total</b>	12,027,946	96	12	522	2,067
<b>Oromia Region</b>						
6	Arsi	3,106,289	26	3	100	506
7	East Wollega	1,442,416	22	2	61	316
8	Jimma	3083421	18	3	99	545
9	West Hararghe	2,210,879	19	2	79	448
10	East Hararghe	3,215,513	16	3	110	550
	<b>Total</b>	13,058,518	101	13	449	2365
	<b>Project total</b>	25,086,464	197	25	971	4,432
<b>Phase II expansion zones (started in August 2013)</b>						
<b>Amhara Region</b>						
11	North Showa	2044127	27	4	90	408
12	Awi	1,098,652	11	1	41	185
13	West Gojjam	2,618,132	19	2	112	356
14	Oromia	510,295	7	0	26	104
15	Waghimra	464,575	7	1	29	125
<b>Oromia Region</b>						
16	Borena	1,137,081	14	3	67	259
17	Guji	1,642,810	15	2	70	352
18	West Wollega	1,610,609	21	3	63	518
19	West Showa	2,315,782	19	3	88	561
20	North Showa	1,388,617	14	2	61	269
21	Hour Gourd	705,507	10	1	50	195
	<b>Amhara total</b>	18,763,727	167	20	820	3,245
	<b>Oromia total</b>	21,858,924	194	27	848	4,519
	<b>Project total</b>	40,622,651	361	46	1,618	7,764

**Table 2** shows the periodicity of the data collection for indicators not captured by the national health information system (HMIS).

**Table 2: Periodicity of data collection for indicators not captured by the national health information management system**

<b>Indicator</b>	<b>Period of Measurement</b>	<b>Reported</b>
Percentage of suspects screened at OPD	Last completed quarter	Quarterly result <sup>1</sup>
Quality of lab indices	Quarterly performance	Quarterly result
Stock-out rate	Quarterly performance	Quarterly result
Training	Quarterly performance	Reporting quarter
Data quality	Quarterly performance	Quarterly result

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<sup>1</sup> The quarterly result reflects the fact that data is collected every three months (for the previous completed quarter).

## Summary of Key Accomplishments and Successes

The project started in July 15, 2011, and is covering 10 zones with a population of 25 million in Amhara and Oromia regions to build the capacity of the health care system. In these zones, HEAL TB supported 691 health facilities, and 4,432 health posts for community TB services. The following list presents the project's major achievements, and more details appear in the summary:

- **Improving DOTS coverage:** at baseline only 65% of health facilities were providing DOTS services, versus 94% currently;
- **Increasing the treatment success rate (TSR) for smear-positive cases:** the TSR has also improved, from 88% at baseline to 95%, and the cure rate has risen from 71% to 87%;
- **Strengthening the community TB component of the national strategy:** Over 4,432 health posts in the project zones have the capacity to implement community TB services, and there are good results, but this area requires more focused support in the coming years;
- **Expanding treatment:** the project supported bringing 34,168 new cases of all forms of TB to treatment;
- **Improving the quality of acid-fast bacilli microscopy:** Concordant results (95%) have reached 97.3% (versus a target of 70%);
- **Assisting in MDR-TB case identification, treatment initiation, and follow-up:** HEAL TB was able to identify 211 new MDR-TB patients and contributed about 40% of the new MDR-TB cases identified in the country;
- **Improving TB drug management:** The stock-out rate, which was 22% at baseline, is currently below 0.5%;
- **Strengthening health systems:** the major achievements were in TB infection control, capacity building of TB managers, biomedical engineering, and improvement of the TB data quality system.

Since August 2013 (per the cooperative agreement year calendar), the project has expanded to cover 11 more zones, bringing the total population coverage to 40.5 million. The total health facilities to be supported by the project will be 1,301 and the health posts, 7,764.

In the second year, a total of 34,168 TB cases (all forms) were notified in the 10 project zones. This figure represents a decline of 5% from the previous year and nationally of 8%. While the case number is still high, the declining trend is positive for the country, since the national survey showed that the prevalence and incidence of TB in Ethiopia are lower than the World Health Organization (WHO) had estimated. The reasons could be that the country's health care system has improved significantly, such that there is now, on average, a health center for every 15,000–25,000 people. This improved health service coverage has dramatically increased access to TB services, as well as early diagnosis and treatment, which has reduced the infectiousness of cases and ultimately decreased the incidence and prevalence of TB. Improved TB/HIV services and free antiretroviral treatment (ART) for all eligible people have also decreased the number of TB cases among co-infected patients. Another contributing factor could be having two HEWs for every 3,000–5,000 people in all rural areas for education and screening for TB at the community

level. These favorable conditions should continue to be supported to further lower TB incidence and prevalence in the country.

Per the new WHO incidence estimate of TB for Ethiopia (247/100,000), the case detection rate for all forms for the year was 55.8%. We have reservations about the incidence estimate, since it does not accord with the country's declining trend. While there are certainly undiagnosed cases in the community, screening practices are much improved from last year—all health facilities screen outpatients, although the yield of positive TB cases is low—and the quality of services has improved, yet the number of cases continues to decline. HEAL TB will investigate this area further in the coming year. Meanwhile, the TSR has increased from 88% at baseline to 95.0% at the last quarter of this year. The cure rate has also improved, from 71% at baseline to 87% at the end of the fourth quarter. The reasons are that health workers are trained on TB, laboratory personnel are trained on AFB microscopy, and internal and external quality assurance programs (EQA) have been established. HEAL TB has also supported more health facilities to offer diagnostic services.

For laboratories, the main achievement in the last two years was improving the quality of AFB microscopy, in part by introducing a decentralized AFB EQA system through which hospitals conduct EQA for health centers in their catchment areas. Regional reference laboratories (RRLs) previously performed quality assurance for AFB microscopy, but it was not implemented fully except for sporadic on-site checks. In the past year, 607 of the 691 health facilities participated in quarterly EQA. The rest of the health facilities did not have enough slides for EQA; for those facilities, our field team conducted on-site checks. Although most of the health facilities had no history of EQA, we gradually brought EQA to all. The concordance rate for negative and positive slides has improved dramatically, and the proportion of health facilities with > 95% concordant results has reached 97.3% (versus a target of 70%). All health facilities now have trained personnel and can perform diagnosis, except for a few facilities that had malfunctioning microscopes. In addition, 115 health facilities in the Amhara Region have begun using iLED microscopy, and 240 will start in Oromia Region. HEAL TB has already trained the laboratory professionals in iLED and provided reagents.

In the drug management area, there was no major stock-out of medicines in the year, except for a few days in November 2012. HEAL TB supported the government in implementing the Integrated Pharmaceuticals Logistic System, which is well established in the project areas. The Global Drug Facility, drug kits for TB was recently introduced in Ethiopia, and HEAL TB is part of the taskforce that is designing the implementation strategy and its roll-out in the selected zones.

In the area of community TB training, the FMOH delayed the training of HEWs for two years because of other priority trainings. But in the middle of this year, the Ministry asked HEAL TB to train trainers for HEW training, and the project trained 1,660 of them. Cascade training for HEWs in the two regions was completed in the last quarter of year 2, and HEAL TB supported the organization and facilitation of trainings. Although the training was delayed, our field team had developed checklists for HEW supervision, provided various job aids, and conducted on-site orientations. By the end of the year, 22,867 TB suspects had been referred by HEWs to health centers or hospitals for diagnosis. More suspects might have been referred, but the HMIS does

not capture HEW reports. This data is collected during our team supervisions. HEW reporting is on our agenda to discuss with the FMOH in the coming year.

In MDR-TB, HEAL TB supported the opening of two MDR-TB initiating centers; supported transport of 1,278 MDR-TB suspects' sputum samples to Regional Reference Laboratories (RRLs) for culture; and helped the RHBs to admit 211 patients to treatment-initiating centers. HEAL TB also helped to decrease the length of hospital stays because it facilitated the discharge of sputum-smear-converted patients to the nearest health center or hospital for follow-up to make beds in the treatment-initiating hospitals available for new patients. The pressing challenges for MDR-TB currently for the country are sample transportation, patient support, and expansion of services to more hospitals, in addition to assuring good treatment outcomes.

By the end of the second year, 93% of newly diagnosed TB patients were tested for HIV, up from a baseline of 70%. The average co-infection rate was 6.6% (10.3% for Amhara zones and 3.1% for Oromia zones). All health facilities practice TB infection control, based on a template for planning provided by the project. Our assessment showed that 217 health facilities were able to show their written plan.

In biomedical engineering, a consultative meeting was held with the FMOH, EHNRI, the Amhara and Oromia RHBs, and partners. The current status of and gaps in biomedical engineering are discussed in this report, and strategies proposed for future development. In addition, the HEAL TB biomedical engineer conducted maintenance and repairs in Amhara Region and saved equipment worth US\$250,000.

Finally, the HEAL TB Project published 3 articles in major peer-reviewed journals and presented 13 abstracts in national and international forums. Another 7 joint operational research studies are underway with Oromia RHB and Gondar and Jimma universities.

In conclusion, HEAL TB has achieved all of its performance indicators. The following are gaps that we will address in the future: improving community TB services, improving awareness and diagnosis of childhood TB, and strengthening MDR-TB services. Since TB diagnosis is highly dependent on equipment, the health facilities need a strong biomedical engineering service for equipment maintenance and repair. But since there is no clear strategy, human resource development plan, in-service training plan, inventory of available equipment, or annual planning for equipment maintenance in RHBs, this area requires more support.

## ACCOMPLISHMENTS AND SUCCESSES DURING THE REPORTING PERIOD, WITH AN EXPLANATION OF UNDER- OR OVER-PERFORMANCE

### Technical Area 1: Strengthening and Expansion of DOTS (Improved Case Detection Rates and Treatment Success Rates)

#### Case detection

- ✓ *In year 2, a total of 34,168 new TB cases (all forms) were diagnosed and put on treatment. This reflects a case detection rate of 55.8%.*

There was no target for the case detection rate (CDR) for all forms of TB in our Performance Monitoring Plan (PMP); it was for smear-positive TB. Because of the change in this indicator by WHO, we calculated the CDR for smear-positive TB. Case finding over the last three years seems to have reached a plateau, with a declining trend at both the national level and in the project implementation zones, despite improved screening and diagnostic capacity. During the last year, notified cases declined by 5.03% in the HEAL TB Project area and 8% nationally.<sup>2</sup> There are three main reasons for this decline, which represents a success in TB control. First, declining case detection could be due to the expansion of health facilities in the last 7–10 years in the country, which has increased access to TB diagnosis and treatment.

The expansion of health care services in the last 10 years has increased primary health care coverage from 77% in 2005 to 92% in 2012.<sup>3</sup> Currently there is one health center for every 15,000–25,000 population, which has increased timely diagnosis and treatment of TB. Because many patients start treatment earlier than in the past, they infect fewer other people. In the long term, this expansion will definitely bring down the incidence of TB. **Figure 1** depicts this trend.

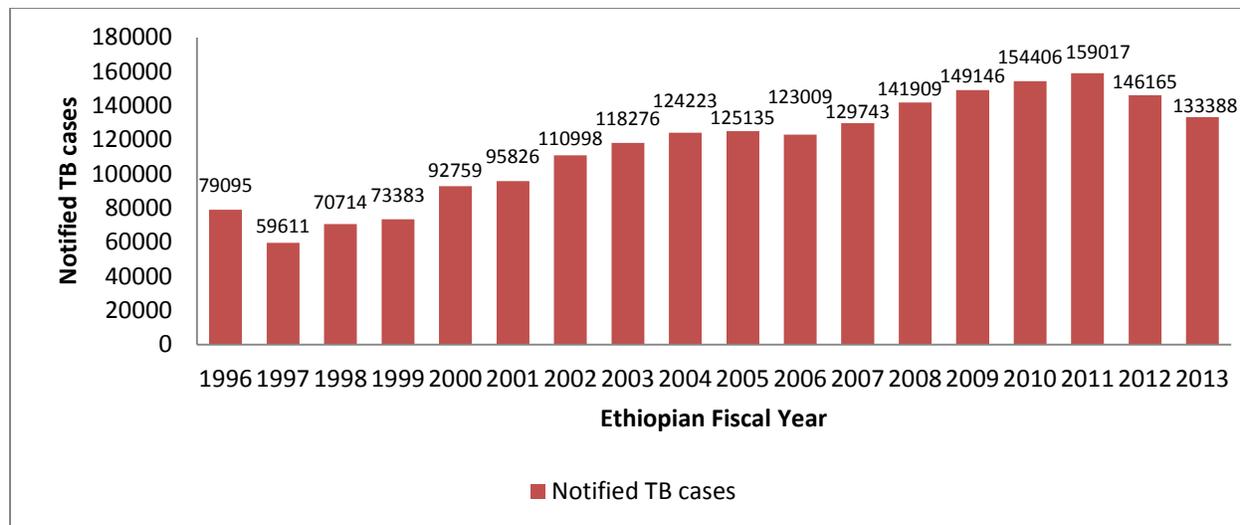


Figure 1: Trend in notified cases over 17 years, Ethiopia, 1996–2012

The expansion of antiretroviral treatment (ART) and decline in HIV incidence also explain the decline in TB. The high rate of good treatment outcomes of TB represents another major success in curtailing TB transmission. A declining trend in actual TB burden in Ethiopia also explains the

<sup>2</sup> FMOH, Ethiopia, Annual TB Bulletin, 2012.

<sup>3</sup> FMOH, Health and health related indicators, 2011/2012.

decline in the CDR in the past three years. The incidence and prevalence estimates were found to be lower than the previous estimates.<sup>4</sup> The national program review conducted in 2013 noted this decline and considered it a positive impact of TB control efforts. The number of TB cases diagnosed per year is still very high, however, and the review team suggested sustaining and prioritizing control efforts and providing tailored support to regions where TB rates remain high and program performance is suboptimal.<sup>5</sup>

Per the national TB guidelines, every outpatient should be screened for TB no matter what the presenting or chief complaint. These guidelines have not been systematically operationalized, however. HEAL TB developed standard operating procedures for TB screening and monitored their implementation in all outpatient departments of project-supported health facilities. Since reporting on this result does not come from the HMIS, the HEAL TB project team collected data on screening quarterly in some of the visited facilities. In the last quarter, for example, of 250 health facilities visited, about 92% of outpatient department visitors were screened for TB, 2.8% of whom had presumptive TB. A total of 5.4% were diagnosed as smear-positive TB.

Contact screening has also been introduced, and in the health facilities where we collected data among contacts of TB index cases, 2.1% of contacts were diagnosed as having smear-positive TB. Note that all health facilities screen contacts, but since no report comes through the routine HMIS, HEAL TB collects the data from health facilities that are visited in the quarter and we cannot reach all of them to collect the data. Engagement of HEWs in TB case finding has also improved. The number of individuals with presumptive TB has increased at the community level.

Despite all these efforts in TB screening, as shown in **Technical Area 1.3 below**, the number of new cases notified reached a plateau in the last year and started to decline this year. See **Figure 2**, in which the blue arrow represents the baseline when HEAL TB started in October 2011, and **Figure 3** for the data by quarter and by fiscal year.

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<sup>4</sup> EHNRI, National Prevalence Survey, Ethiopia, 2012.

<sup>5</sup> FMOH, Ethiopia, Report of Comprehensive Joint External Mid-Term Review of the Ethiopia National TB Control Program, August 2013.

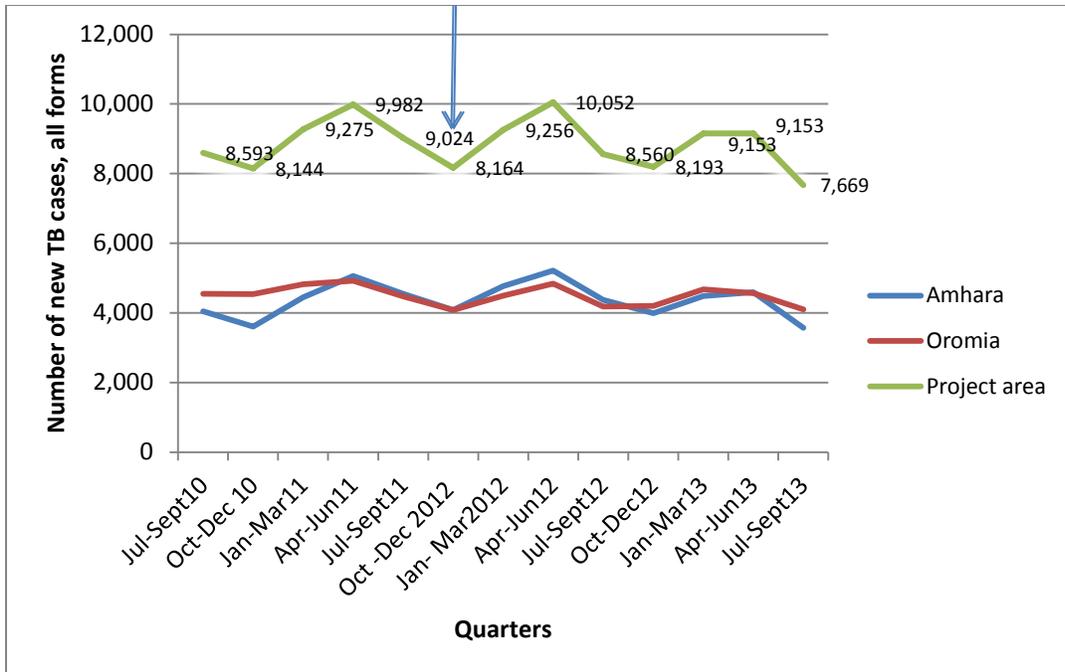


Figure 2: Trends in new TB cases diagnosed in HEAL TB-supported zones, July 2010–Sept. 2013

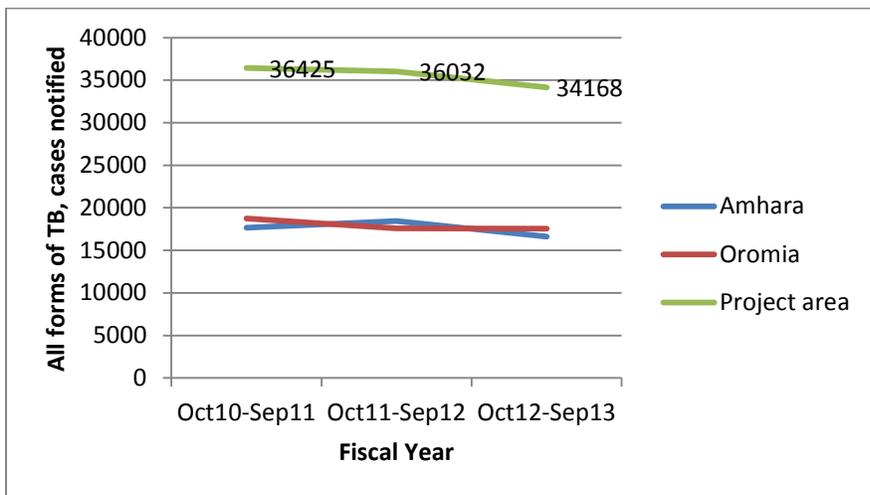


Figure 3: Trends in new TB cases diagnosed in HEAL TB-supported zones, Oct. 2010–Sept. 2013

Of the 34,168 TB cases (all forms) detected in the year, 9,910 (29%) were pulmonary TB sputum-smear-positive (PTB SS+) cases. The number of PTB SS+ cases has declined by 3.94 % from the last year (**Figure 4**). The proportion of smear-positives is lower than the proportion that would be expected according to international experience. The reasons could be that the diagnosis of extrapulmonary and smear-negative TB is usually empirical; there may be overdiagnosis of extrapulmonary TB and smear-negative TB; or the actual epidemiological pattern may be that the proportion of smear-positive TB is low in Ethiopia.

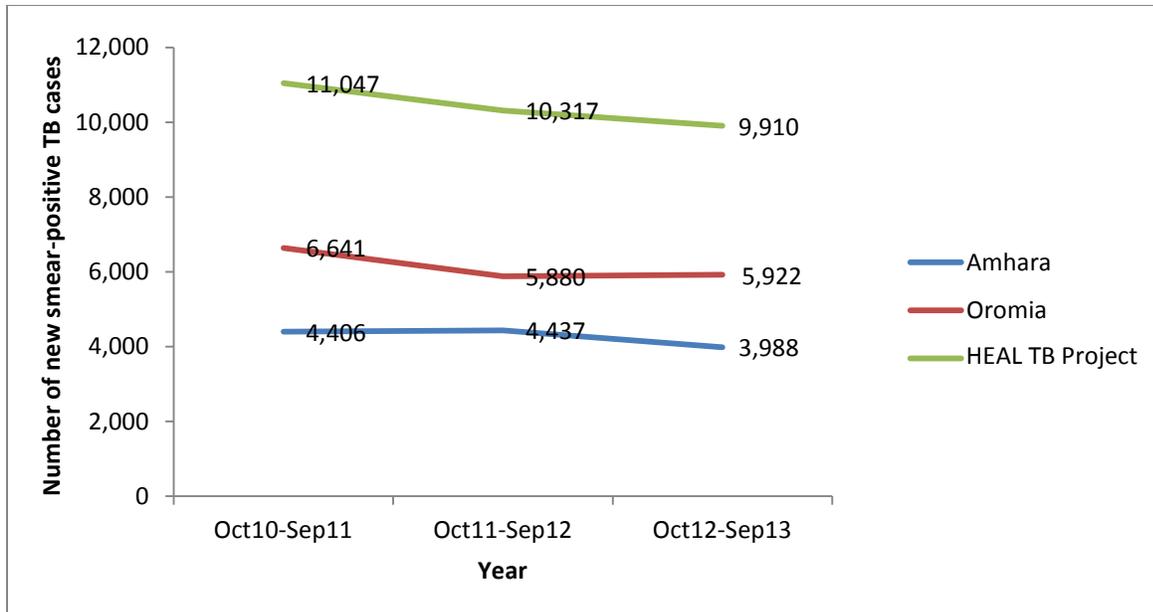


Figure 4: Trends in new smear-positive pulmonary cases in HEAL TB-supported zones, Oct. 2010–Sept. 2013

The average case detection rate **for all forms** was 55.8% (Figure 5 and Table 3). The decline in the case detection rate shown in Figure 4 is due to the change in the estimation of the incidence of TB from 261/100,000 to 247/100,000, which is not related to project performance. One comment on case detection is that the incidence estimate of WHO needs to be looked at again, because with all the TB control efforts the CDR calculated is low.

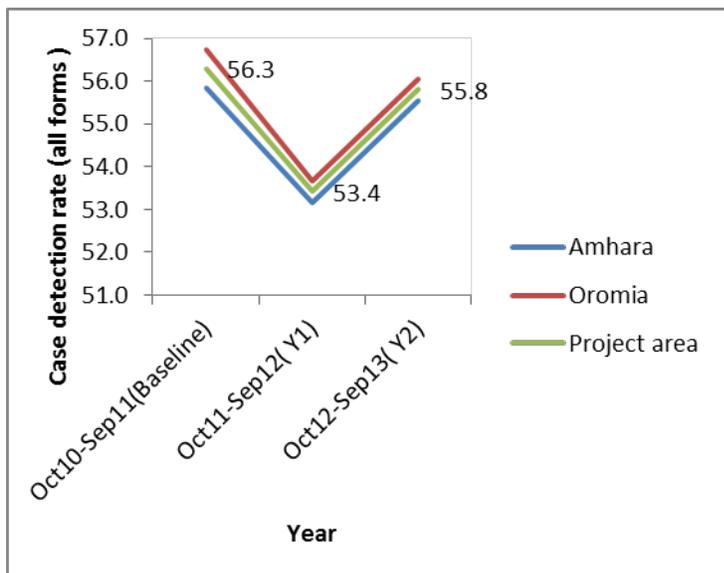


Figure 5: Trend in case detection rate in HEAL TB Project zones, Oct. 2010–Sept. 2013

CDRs vary across zones and woredas. We used the national incidence estimate provided by the WHO to calculate these rates. There is no zonal-based incidence rate estimate, so the calculation is based on the national estimate, which changes every year. The application of a single estimate

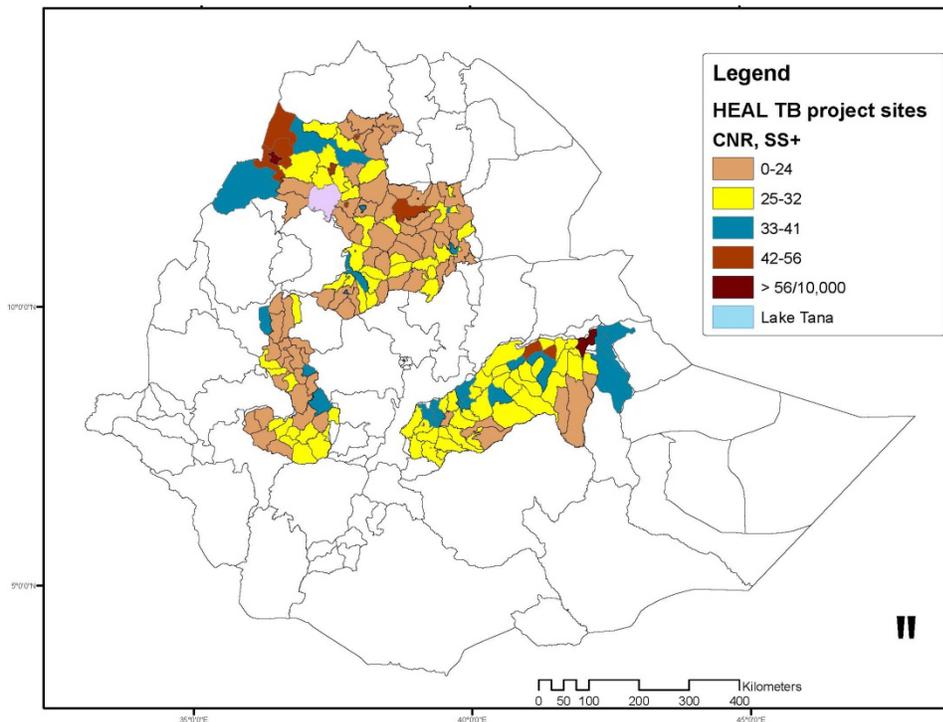
to various geographical areas might lead to reporting under- or overachievement, and it also affects all the planning and resource allocation for TB control. There are also wide differences in TB prevalence by zone. For example, with equal effort and investments, case detection is high in some zones, such as North Gondar, but low in North Wollo. The data in Table 3 should be understood in the context of these limitations.

**Table 3: Case detection rate (all forms) by zone, Oct. 2010–Sept. 2013**

Name of Zone	Oct. 2010–Sept. 2011*	Oct. 2011–Sept. 2012**	Oct. 2012–Sept. 2013***
Arsi	64.2	57.3	59.8
East Gojam	56.2	50.1	52.4
East Hararghe	56.7	60.2	62.9
East Wollega	65.4	63.6	66.4
Jimma	44.4	40.7	42.5
North Gondar	78.2	71.6	74.8
North Wollo	32.3	37.8	39.5
South Gondar	43.0	44.1	46.1
South Wollo	54.0	50.9	53.2
West Hararghe	57.0	49.8	52.1
Amhara	55.8	53.2	55.5
Oromia	56.7	53.7	56.0
<b>Project area</b>	<b>56.3</b>	<b>53.4</b>	<b>55.8</b>

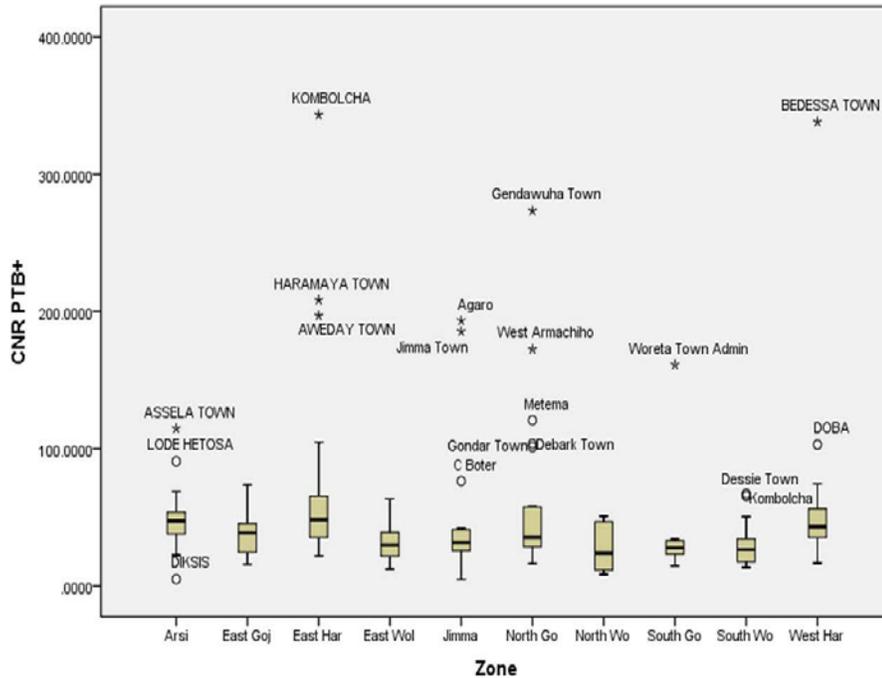
Notes: \*Incidence estimate = 261/100,000; \*\*Incidence estimate = 257/100,000; \*\*\*Incidence estimate = 247/100,000

Reasons for the differences among zones could include population density, HIV prevalence, and, in some areas, such as in North Gondar and urban areas, a large number of migratory laborers (see **Figure 6**).



**Figure 6: Heterogeneous disease transmission among districts of project zones**

Analysis of routine data showed that more patients are enrolled in urban areas than in rural health centers (**Figure 7**). This data should be interpreted with caution, because patients from rural areas could have been included in the urban figures, since many patients choose major urban areas for health care because of the quality of services. Despite the lack of a reliable denominator, the number of patients in some urban areas still seems high. The relatively high TB burden in urban areas could be attributed to crowded living conditions and high HIV burden.



**Figure 7: Variation in case notification rate of sputum-smear-positive pulmonary TB cases in HEAL TB-supported zones, Sept. 2013**

*Note:* The outlier towns do not correspond to their respective zones in the graph.

### Treatment success

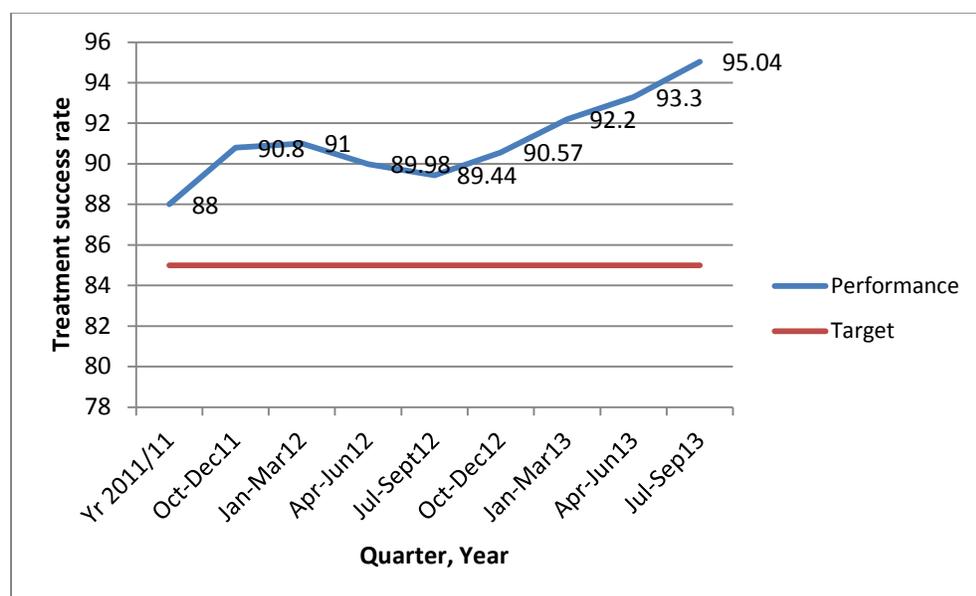
The PMP target for the treatment success rate was 85%, and the estimated TSR at baseline was 88%.

✓ *The estimated TSR exceeded the target, reaching 92.5% in the project's second year, a 5% increase.*

**Table 4** details treatment outcomes, while **Figure 8** shows the quarterly increases in the TSR.

**Table 4: Treatment outcomes of SS+ patients evaluated from Oct. 2012 through Sept. 2013, HEAL TB Project zones**

Zone	SS+ TB Cases Enrolled Prev. Year	Completed	Cured	Defaulted	Failed	Died	Transferred Out	TSR (%)	Cure Rate (%)
Arsi	1493	47	1368	14	12	31	21	94.8	91.6
East Wollega	453	51	368	6	2	9	5	92.5	81.2
East Hararghe	1484	89	1361	6	1	16	11	97.7	91.7
Jimma	1233	113	996	22	6	25	39	89.9	80.8
West Hararghe	1202	99	1068	5	8	8	14	97.1	88.9
Oromia	5865	399	5161	53	29	89	90	94.8	88.0
East Gojjam	878	82	735	18	7	28	8	93.1	83.7
North Gondar	1584	223	1163	27	22	48	97	87.5	73.4
North Wollo	331	39	247	8	8	13	16	86.4	74.6
South Gondar	915	130	690	10	16	31	38	89.6	75.4
South Wollo	948	66	799	7	10	34	32	91.2	84.3
<b>Amhara</b>	<b>4656</b>	<b>540</b>	<b>3634</b>	<b>70</b>	<b>63</b>	<b>154</b>	<b>191</b>	<b>89.6</b>	<b>78.0</b>
Total	10521	939	8795	123(1.2%)	92(0.9%)	243(2.3%)	281(2.6%)	92.5	83.6

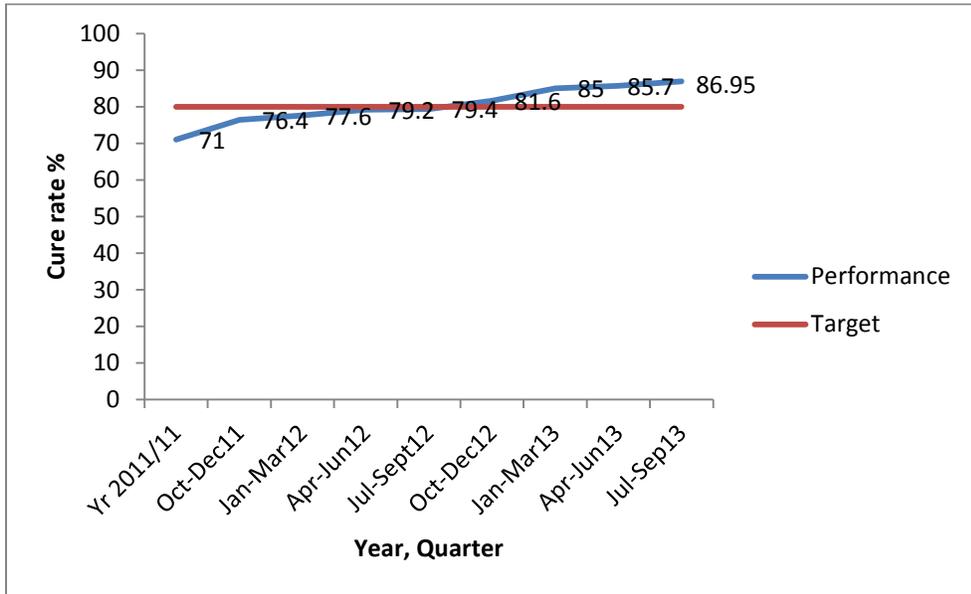


**Figure 8: Trend in TSR per quarter for smear-positive TB in HEAL TB-supported zones**

### Cure rate

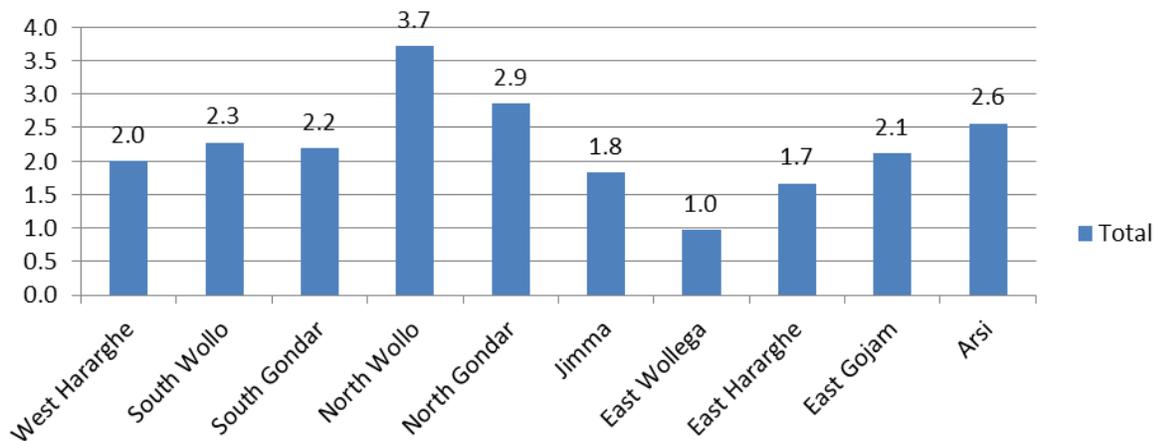
The cure rate was also higher than the target set for the project target, which was 80%. At the beginning of this project, the rate was 71% and at end of the second year, it reached 87%. The

average for the four quarters is 83.6%. The improvement is attributable to improved microscopic services, training of clinicians, and lab professionals on diagnosis and follow-up of patients, the mentoring of health workers on the importance of the cure rate, and the provision of microscopes and reagents and the involvement of HEWs in patient follow up (**Figure 9**). Because the death rate is low, we plan to analyze this trend next year and provide the possible causes for this achievement.



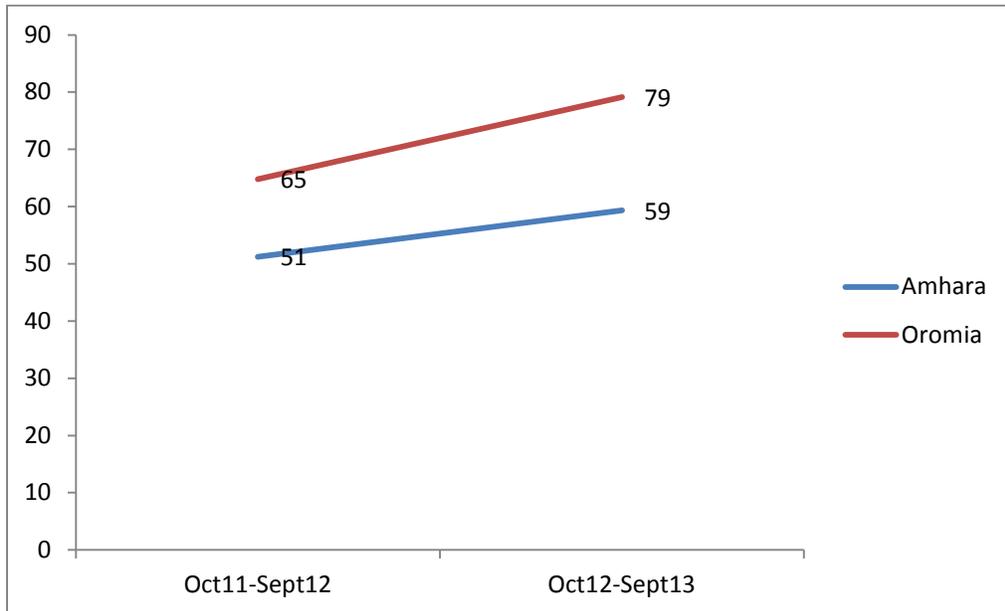
**Figure 9: Trend in cure rate of smear-positive TB cases from baseline through Sept. 2013**

We collected information through our standards of care indicators in some health facilities during quarterly supervision and found that the relapse, treatment after loss-to-follow-up, and treatment failure retreatment rates among the cases started on treatment ranged from a low of 1.0% in East Wollega to a high of 3.7% in North Wollo (**Figure 10**). These defaulters are candidates for testing as MDR-TB suspects, so health facilities send their sputum samples for MDR-TB culture.



**Figure 10: Patients' rate of default from treatment for smear-positive TB in the 10 project zones**

The treatment outcomes of the returnees after default have also improved because of the strict follow-up of patients by health facilities. As shown in **Figure 11**, the cure rate has improved from 64.8% last year to 79.1% this year in Oromia zones and from 51.2% to 59.3% in Amhara zones. The variation in cure rate between the two regions is a subject for investigation in the future.



**Figure 11: Trends in the cure rate of SS+ returnees after default, HEAL TB Project zones**

**Box 2: The way forward in case notification**

HEAL TB has implemented activities that will help to increase the case notification rate in the long run. The project implemented standard operating procedures for case finding focused on contact screening and in TB hot spots such as urban slums, commercial farms, and mining areas. Introducing new diagnostic tools such as GeneXpert, improving x-ray services, and using iLED will improve diagnostic capacity. HEAL TB will reinforce community TB initiatives to better reach the rural population for TB screening, contact screening, DOT, and isoniazid preventive therapy.

## Technical area 1.1: Improved capacity of health managers to administer TB programs

### ✓ *On-site training was conducted for health managers/TB focal persons at different levels.*

HEAL TB improved the capacity of health workers through on-site mentorship and support, as the photo at right shows. The project developed zonal implementation guidelines, which include approaches to how the zonal and woreda TB focal persons support health facilities and HEWs, expected deliverables for each thematic area, and planning and monitoring guidelines. Ten zonal and 188 woreda TB focal persons were trained in the guidelines, and all are implementing them (Table 5). The woredas are the front-line government offices that support health centers, and the community TB care and HEAL TB role is providing on-site support for woredas, demonstrating mentoring and supervision skills, and routine data collection, analysis, and use for decision-making. In the last quarter, the number of health facilities visited decreased because we launched the new zonal-based approach to support (see the section on the implementation of the project in the expansion zones for details of the new strategy).



**Table 5: Health facilities visited for mentoring and supportive supervision**

Quarter	No. of Health Facilities Visited
Jan.–Mar. 2012	497
Apr.–Jun. 2012	633
Jul.–Sept. 2012	562
Oct.–Dec. 2012	594
Jan.–Mar. 2013	638
Apr.–Jun. 2013	665
Jul.–Sept. 2013	204

### ✓ *The HEAL TB team participated in National Technical Working Groups and Regional Taskforces.*

At the national level, HEAL TB experts are permanent members of the national TB, TB/HIV, MDR-TB, and drug management technical working groups led by the FMOH. In the laboratory area, HEAL TB is also a member of the laboratory technical working group, which is led by the Ethiopian Health and Nutrition Research Institute (EHNRI). In Amhara and Oromia regions, the regional HEAL TB experts are members of the national equivalent taskforces.

### ✓ *The HEAL TB team participated in national TB program evaluation.*

HEAL TB was a member of the national TB program review team led by the FMOH to develop review protocols, preparation of tools for the review, and field visits. HEAL TB experts were also

assigned to different teams across the country to evaluate the program. The Global Fund, USAID, WHO, and other partners also participated in the evaluation.

✓ ***HEAL TB participated in the national TB program review meeting.***

HEALTB actively participated in the national program review meeting called by the FMOH. The primary purpose of the meeting was to share the national TB program evaluation results with the RHBs and discuss strategies to address the findings of the evaluation. HEAL TB also participated in the costing of the national TB strategic plan as part of the preparations to finalize a proposal to be submitted to the Global Fund to Fight AIDS, Tuberculosis and Malaria.

✓ ***HEAL TB supported annual World TB Day.***

HEALTB was part of the technical working group to develop the World TB Day celebration and contributed funding for the celebration. We were also active participants in the TB Research Advisory Committee (TRAC) annual abstract presentations. The HEAL TB team presented two posters and one oral presentation at the conference (see the section entitled Publications for the abstracts).

✓ ***HEAL TB supported woreda-based planning in 187 woredas.***

As part of support for TB program management, HEAL TB provided technical and financial assistance to the woreda-based planning for 187 woredas. The HEAL TB team provided evidence about the current status of TB program implementation in the country and helped the planning team to give adequate attention to TB prevention and control in their respective woredas.

✓ ***HEAL TB supported review meetings in 10 zones of Amhara and Oromia regions.***

HEAL TB supported semi-annual zonal review meetings in 10 zones. The purpose of the zonal review meetings was to discuss the progress of zonal TB program implementation, discuss challenges, and design the way forward in addressing the gaps identified. The review meeting is also one of the capacity-building efforts to strengthen the program management capacity of the zones and Woreda Health Offices. The participants in the review meetings were leadership teams from ZHDs, Woreda Health Offices, and health facility TB focal persons. During the last day of the review meetings, each team developed an action plan for the next semi-annual period.

**Technical area 1.2: Improved capacity of laboratories**

✓ ***A total of 870 laboratory professionals were trained on acid-fast bacilli microscopy and external quality assurance.***

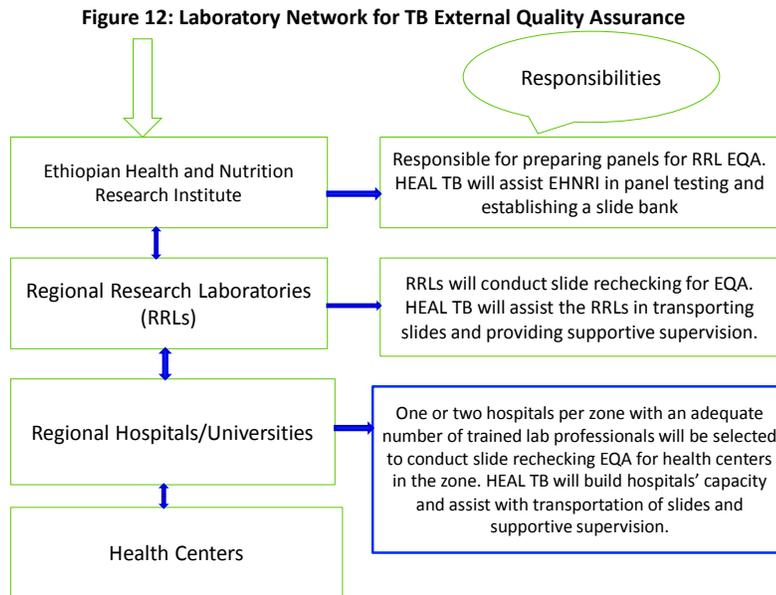
During the second year, a total of 870 laboratory professionals were trained on acid-fast bacilli (AFB) smear microscopy and AFB external quality assurance (EQA). The training was provided to laboratory personnel who are working in hospitals and health centers.

✓ ***A total of 691 health facilities were capacitated to improve AFB microscopy.***

All health facilities providing diagnostic services were visited one day per quarter during the reporting period by HEAL TB lab experts and the woreda TB focal persons. The total number of diagnostic health facilities in the year was 691, but the number of diagnostic health facilities fluctuated from quarter to quarter because of breakage of microscopes. At the end of the fourth quarter, there were 659 health facilities providing diagnostic services. This figure was achieved

because we purchased and distributed 238 microscopes to non-diagnostic health centers in addition to providing trainings and mentorships.

As described in the previous year’s plan and report and shown in **Figure 12**, EHNRI has designed a decentralized model of EQA for AFB slides whereby EHNRI conducts panel tests for Regional Reference Laboratories (RRLs), RRLs conduct a blinded EQA reading for hospitals, and hospitals provide EQA reading in the same blinded fashion for health centers. The first step taken by HEAL TB in its first year of project was to train all laboratory professionals on AFB reading and internal and external quality assurance procedures. The HEAL TB field laboratory professional team then conducted on-site mentorship to make sure all AFB slides are properly registered, labeled, and stored and to institute appropriate internal quality assurance steps. Then, over time, hospitals with good EQA results in their work were identified as EQA centers to serve the catchment health centers. Currently 37 health facilities in the project zones serve as EQA reading centers, in addition to the 4 RRLs. A standard operating procedure was developed with the two regions, and the RHBs set a minimal fee for EQA slide reading that can be sustained after HEAL TB.





In addition to training of laboratory professionals, in the first year HEAL TB trained all woreda TB focal persons on randomly selecting AFB slides from their catchment health facilities. Every quarter, the woreda TB focal persons visit the health facilities, supervise clinical activities, randomly select slides for EQA, and deliver the slides to the EQA sites for reading. In the national guidelines, the sample size is determined based on the annual AFB slide load of each facility, so the woreda TB focal persons use the predetermined sample size for each facility.

The laboratory mentors apply a standard-of-care tool to improve the quality of TB-related laboratory services in the health facility. The mentoring team assesses the status of laboratory performance using indicators of standards of laboratory services. Based on the results, the team provides on-the-job training to the laboratory personnel in the facility. The supported facilities have improved all the key indicators of standards of care. See the success story in Annex 2.

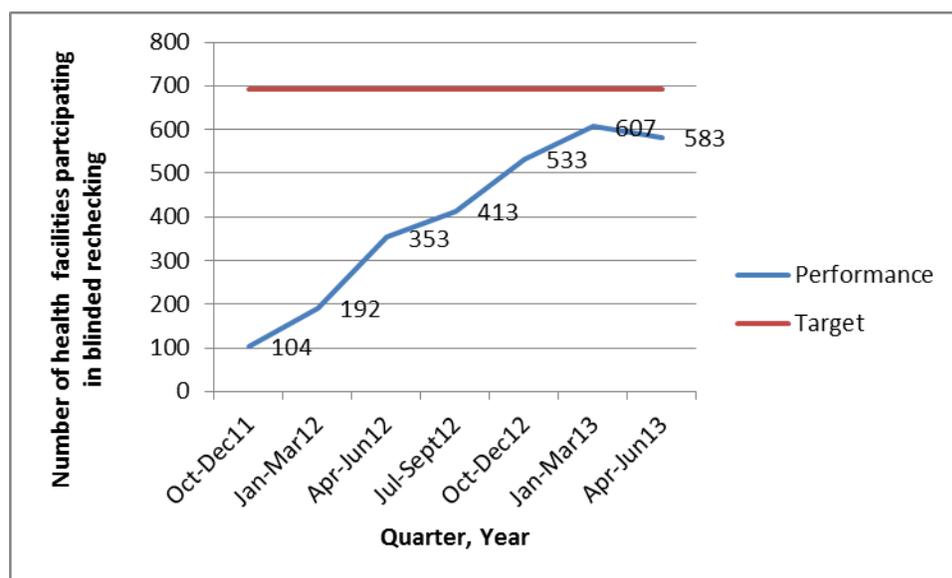
✓ ***Thirty-seven health facilities continued to function as EQA centers.***

Thirty-seven health facilities and regional laboratories are currently serving as EQA centers in Amhara and Oromia regions. Twenty-three hospitals, 10 high-patient-load health centers in Amhara, and four RRLs that fulfilled the selection criteria are working as EQA centers. The EQA centers are supported by their respective RRLs.

✓ ***During the year, 607 health facilities participated in blinded rechecking for EQA.***

The results of EQA do not fall in the same quarter, because slides are collected at the end of the quarter and the reading takes a month. As a result, EQA is reported for the previous quarter.

The number of health facilities participating in EQA increased steadily, as shown in **Figure 13**, reaching 607 in the second quarter. The number declined to 583 health facilities in the third quarter because health facilities with high patient loads in Amhara started to use iLED microscopes, and EQA for iLED has not been implemented yet. However, the coverage of EQA (blinded rechecking) has increased by 42% from previous year, and this was the first experience for the country to have blinded EQA implementation in such large numbers.



**Figure 13: Trend in number of health facilities participating in external quality assurance in HEAL TB-supported zones, June 2013**

As shown in **Table 6**, the false positive and negative EQA results are decreasing because of the trainings, mentorships, and corrective measures taken when slides are found that are discordant with those of the EQA readers. In the third quarter of year 2 of the project, 97.3% of the health facilities had a concordance rate of 95% or above, compared to a rate of 90.3% in June 2012. Additionally, the percentage of agreement of positive and negative slides has improved. The average false negativity rate has met its target of less than 0.5%.

**Table 6: External quality assurance performance in HEAL TB-supported zones, April 2012–June 2013**

Indicators	Apr–Jun 12	Jul–Sept 12	Oct–Dec 12	Jan–Mar 2013	Apr–June 2013
Total number of slides collected for EQA	13,354	16,184	21,682	27,450	23,507
Number of positive slides collected	912	994	1,189	1,308	1,147
Percent agreement of positive slides	92.4%	91.05%	93.4%	93%	94.1%
Number of negative slides collected	12,442	15,190	20,493	26,142	22,318
Percent agreement of negative slides	99.47%	99.41%	99.66%	99.8%	98.3%
Number of HF's with results	353	411	533	607	583
HF's with > 95% concordant result	319 (90.3%)	387 (94.2%)	508 (95.4%)	589 (97%)	567 (97.3%)
Target (PMP): HF's with > 95% concordant result	70%	70%	70%	70%	70%

- ✓ ***HEAL TB assisted regional labs technically and financially to mentor health facilities with poor EQA performance.***

As an active member of EHNRI and regional laboratory technical working groups, HEAL TB participated in producing standard operating procedures, guidelines, and implementation modalities for EQA. Staff from the RRLs visited the health facilities with discordant results to diagnose the reasons and fix the problems.

- ✓ ***A total of 115 health facilities started using iLED microscopes.***

In Amhara, 115 high-load health facilities started using iLED microscopes, which offer better diagnostic capacity as compared to AFB Ziehl Neelsen stain microscopy. In Oromia a training on iLED was scheduled for 240 lab professionals but could not take place because of a delay in distributing the iLED microscopes by the RHB. HEAL TB purchased iLED reagents and gave this supply to EHNRI for national distribution and provided eight scales to health facilities to assist in preparation of the reagents.

- ✓ ***Light microscopes, slides boxes, potassium permanganate, auramine, and reagent plastic bottles were purchased.***

The following items were purchased and distributed to the respective health facilities:

- 238 light microscopes
- 2,234 slide boxes
- 90 starter kits, including 30,000 plastic bottles for reagents
- 60 kilograms each of potassium permanganate and auramine O for iLED microscopes.

- ✓ ***TB laboratory management systems and ordering of laboratory reagents were improved.***

To improve laboratory management and ordering of laboratory reagents, the HEAL TB team held a series of discussion with the Pharmaceutical Fund Supply Agency (PFSA). The following issues were discussed during these sessions:

- consumption-based reagent supply
- quality control of reagents
- distribution of reagents.

HEAL TB had a budget to assist PFSA in establishing a reagent reconstitution and bottling plant, but PFSA decided to outsource this function to private firms and asked to use the budget for purchasing drugs and quality control equipment. After approval from USAID, the drugs and equipment were purchased and are in the process of being shipped.

### **Technical area 1.3: Ensure that standard TB regimens are administered correctly**

- ✓ ***A total of 691 health facilities were capacitated to provide standard DOTs services.***

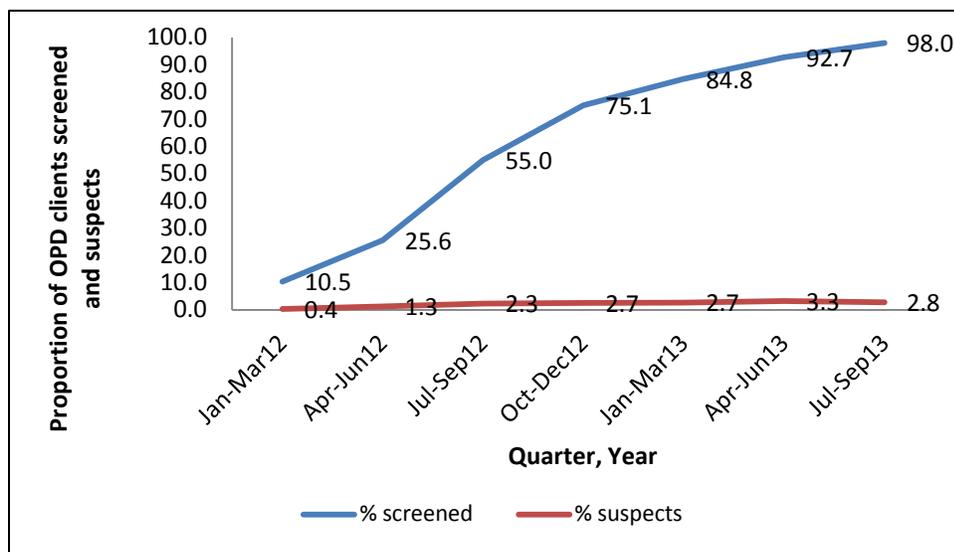
The HEAL TB target was to build the capacity of 691 HFs to provide comprehensive DOTs services. Per the plan, all 691 HFs can diagnose and treat TB. As mentioned in the laboratory section, the number of AFB microscopy sites is fluctuating because of microscope breakage, but the capacity in terms of the system is in place and microscopes will be provided in the coming year.

- ✓ ***A total of 75 health workers were trained in the national comprehensive guidelines for management of TB, TB/HIV, and leprosy in the year.***

In the first year, an average of 2 health workers per health facility were trained in TB, TB/HIV, and leprosy management. In the second year, 75 health workers were trained to fill the gaps identified because of transfers and other attrition.

- ✓ ***The percentage of patients screened for TB reached 98% in the health facilities visited.***

The project designed indicators of standards of care that guide the implementation of standard operating procedures and the national TB guidelines. Standard operating procedures for TB case detection were implemented in 691 health facilities. Based on data acquired through a performance monitoring system, the proportion of outpatients screened for TB has reached 98% among the 205 facilities visited in the last quarter (Figure 14). The proportion of presumptive TB cases was 2.8%. Note that this data cannot be captured through the HMIS, so the figures come from the health facilities in the quarters.



**Figure 14: Percentage of outpatients screened for TB and percentage of suspects in HEAL TB zones, Jan. 2012–Sept. 2013**

- ✓ ***Contact investigation was introduced systematically in all health facilities.***

HEAL TB has started to implement contact investigation in all health facilities. A family matrix contact register was developed in consultation with the RHBs and distributed to all 691 health facilities. Health workers in these facilities were also oriented on contact screening. Although contact screening has been implemented in all health facilities, reporting on contact investigation is not part of the HMIS report, and we could not obtain data on this area from all health



facilities. **Table 7** summarizes the data that HEAL TB experts collected from the health facilities that we visited. The preliminary results for one quarter are promising: the TB positivity rate was 2.1%, and suspects were 8.1%, which are much higher than the figures for outpatient screening in Figure 14. We are discussing with the RHBs how we can obtain a report on this area outside of the HMIS reporting.

**Table 7: Contact investigation of patients who have close contact with smear-positive TB patients, April–Sept. 2013, preliminary results**

Indicators	Total
No. of health facilities from which data was collected	275
Smear-positive TB index cases	944
Number of contact family members registered	2,498
Number screened for TB	2,339 (93.6%)
Number of TB suspects identified	190 (8.1%)
Number of TB cases diagnosed out of the suspects	48
TB cases among suspects (%)	25.2
Smear-positive TB cases (%)	27 (56.2%)
Percentage of TB cases out of all contacts screened	2.1%

#### Technical area 1.4: Drug management

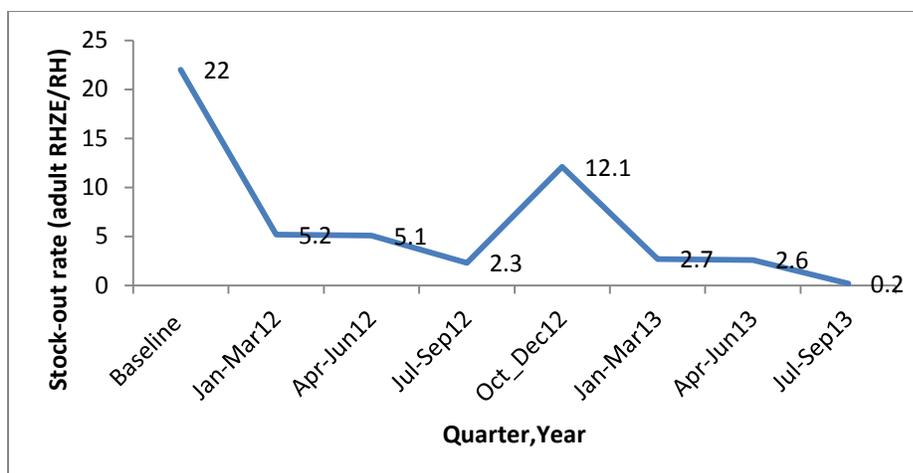
✓ *Mentorship support improved and strengthened the implementation of the Integrated Pharmaceuticals Logistics System.*

The HEAL TB team followed up on the Integrated Pharmaceuticals Logistics System (IPLS) implementation in all 691 health facilities. The team provided timely feedback using the indicators of standards of care. As a result of this follow-up, the implementation status of the IPLS is steadily increasing.

The inventory management and control system for anti-TB drugs is improving as the number of health facilities using and updating bin cards has greatly increased. At the end of the fourth quarter of year 2, stock-outs of RHZE and RH (for adult preparations) reported in the sampled health facilities was 0.2% (**Figure 15**). Again, these data were collected in health facilities visited in the quarter by our team, since there is no report from the HMIS.



Between October and December 2012, there were a few days of delay in importation of drugs, and stock-outs were reported.



**Figure 15: Stock-out rate of adult RHZE and RH, baseline–Sept. 2013**

✓ ***HEAL TB provided IPLS recording and reporting tools.***

All health facilities in HEAL TB–supported zones received a continuous supply of IPLS recording and reporting tools. About 1,200 pads of combined Reporting and Requisition Forms for facilities were printed through HEAL TB support and distributed through PFSA’s central office to health facilities. HEAL TB has also been working with PFSA in the revision of IPLS recording and reporting formats so that they include updates and developments such as the TB drug kits.

✓ ***The project supported the FMOH, PFSA, and other partners in the implementation of GDF TB drug kits in Ethiopia.***

HEAL TB has played an active role as a member of the core national technical working group for the introduction and implementation of TB patient kits in Ethiopia. Interim guidelines for the introduction and implementation of GDF patient kits were developed and translated into Amharic. The guidelines were distributed to all RHB, ZHDs, and health facilities that have been selected to start TB drug kit implementation.

HEAL TB has also been actively involved in the introduction and implementation of TB drug kits in its supported regions of Amhara and Oromia since the preparatory phase. The project facilitated and led the communications for and orientation to the interim guidelines for the TB patient kits in Oromia Region in nine zones. The project sensitized 195 professionals from nine zones, six town administrations, 143 Woreda Health Offices, PFSA hubs, and partners about the guidelines. A similar briefing was also provided for five HEAL TB–supported zones in Amhara region.

HEAL TB also supported the central PFSA in the quantification of TB drug kits to those zones selected to implement the TB drug kits and in the phased distribution of the kits to the respective PFSA hubs in the country. Before the distribution of the TB drug kits, a stock-taking exercise was done in the health facilities selected for TB drug kit implementation.

The project conducted supportive supervision in selected health facilities and Woreda Health Offices in the catchment area of the Dessie PFSA Hub, in collaboration with PFSA Dessie Hub and South Wollo ZHD. During this visit, seven health facilities and seven Woreda Health Offices

were visited, in order to support and guide them in initiating the implementation of TB drug kits. A similar assessment was conducted in selected health facilities and Woreda Health Offices in South Gondar Zone and in Bahir Dar City Administration.

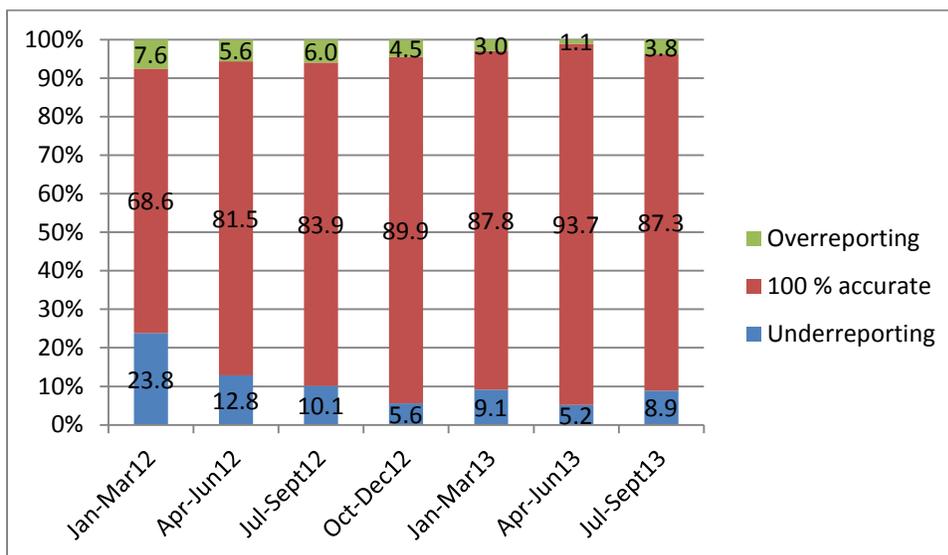
✓ *The project supported and participated in national TB, TB/HIV, and pharmaceutical logistics technical working groups and related partners' meetings.*

HEAL TB participated in the national partners' technical working group for the logistics master plan every other month in order to align the HEAL TB plan in the area of IPLS/TB DSM. HEAL TB also participated in the USAID-led logistics partners' meeting, in which participants discussed the possibility of aligning and integrating supportive supervision to health facilities supported through USAID funding mechanisms.

**Technical area 1.5: Recording and reporting**

✓ *On-site support was provided to health workers to improve data quality as an integral part of overall mentoring and supervision.*

The quality of data (under- or overreporting) and timely reporting were issues at the start of the project. Mentorship efforts have produced a great improvement. As shown in **Figure 16**, a recount of the TB HMIS indicators was done by the HEAL TB field team, which found that only 68.6% of health facilities had a 100% correct reading. In the fourth quarter of this year, 87.3% of the health facilities visited had a 100% correct reporting. Please note that there was a slight decrease in the last quarter in terms of data accuracy because the health facilities visited were poor performers. In addition, because of the new zonal arrangement, HEAL TB's direct support to health facilities has decreased and data was not collected from as many strong facilities as in the previous quarters.

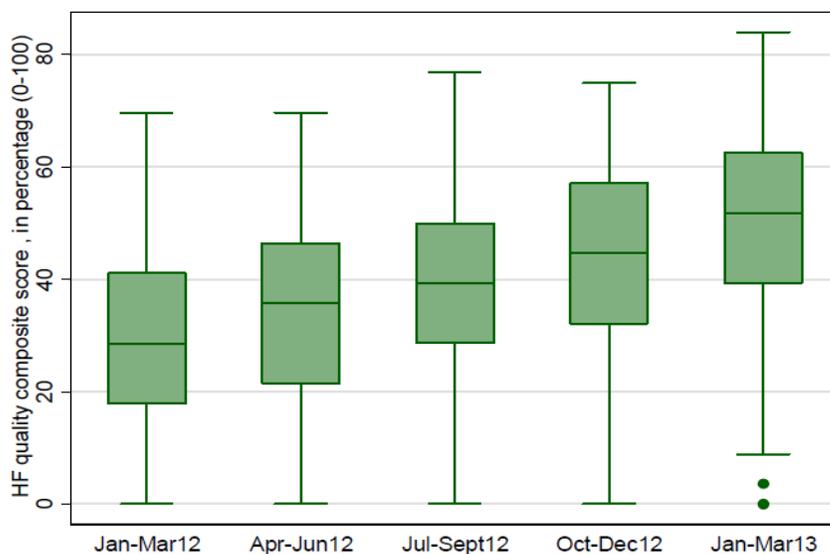


**Figure 16: Data quality assurance results among health facilities visited**

HEAL TB also developed 28 standard quality TB care indicators based on international standards of TB care. Case detection, diagnosis, treatment outcome, TB/HIV collaboration, uninterrupted drug supply and availability, data quality, and laboratory quality indicators were the focus areas of these indicators. All facilities were visited quarterly by a team composed of

clinical, community, and laboratory officers. The woreda TB focal persons from the government side also formed part of the team. HEAL TB developed a composite scale using the 28 indicators, which the team monitored quarterly, and took action based on the gaps identified. For each indicator the highest possible score was 2 points. Zero was assigned for poor performance. The highest possible score was 56 when computing the total of the 28 indicators. Finally the total score was converted into a percentage.

The analysis shown in **Figure 17** was done to see progress in quality of care, using one-way analysis of variance to assess the statistical significance among mean scores in the reporting periods at a 95% confidence level. The composite scores for health facilities improved steadily and significantly over five quarters. The median value increased from 28 to 51.7 over the five quarters, with an improvement of 84% in the quality of the data. There was a statistically significant difference in the mean scores of the composite scale for the consecutive quarters ( $F = 141.82$ , and  $P = 0.000$ ). In this way, both quality of service and data capturing are improved.



**Figure 17: Composite scores for indicators of standards of care**

✓ ***A total of 2,717 health workers were trained in monitoring and evaluation.***

There is no separate training for recording and reporting, but it is part of the laboratory, clinical, and HEW training. A total of 2,717 professionals were trained in recording and reporting. Most of the trainings were provided as training of trainers so that integrated refresher training could be cascaded to HEWs. HEWs are also trained in community TB monitoring indicators.

✓ ***The project provided registers and reporting formats.***

HEAL TB provided registers and formats for project implementation during the past year.

**Technical area 1.6: Strengthened referral linkages**

The main activities for the referral linkage strengthening were strengthening the referral of presumptive TB cases from the community by HEWs to health facilities (addressed in Technical area 1.7), implementing case detection (addressed under Technical area 1), and strengthening

intra-facility referrals. Intra-facility referrals—e.g., between outpatient departments, laboratories, TB clinics, and ART—are working well, and there is a proper referral mechanism in every health facility.

#### **Technical area 1.7: Improved community TB care**

✓ ***A total of 1,660 trainers were prepared to train HEWs in TB and TB/HIV integrated refresher training.***

In the second year, HEAL TB's plan was to train more than 3,300 HEWs in the TB and TB/HIV integrated refresher trainings. But the FMOH requested that we train trainers and offered to cover the cost of cascading this training to the HEWs. Based on this understanding, HEAL TB trained 179 master trainers nationwide and trained 1,660 trainers for Amhara and Oromia regions.

After completion of the training of trainers, the HEAL TB team assisted the Amhara and Oromia RHBs in scheduling trainings and providing training materials and participated in the trainings. In total, 13,839 HEWs were trained in the two regions, which is about 95% coverage.

✓ ***The project printed and distributed TB treatment follow-up cards.***

At the request of the FMOH, HEAL TB printed 40,000 copies of TB treatment follow-up cards for HEWs. The materials were distributed to all regions of the country.

✓ ***More than 22,800 suspects were referred to health centers.***

In the year, a total of 22,867 presumptive TB cases were referred by HEWs, out of which 747 (3.2%) were diagnosed as TB cases. The reported numbers of people with presumptive TB by HEWs is underestimated because there is no mechanism for HEWs to report to health facilities. In the coming years, a regular quarterly reporting mechanism from HEWs to health facilities and then to woredas will be introduced.

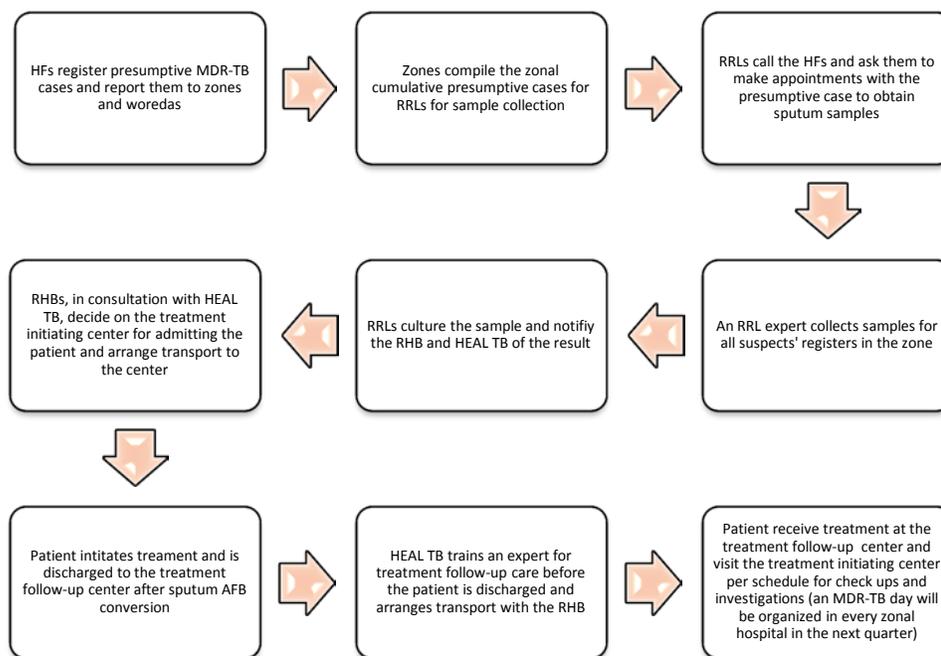
✓ ***The results of a TB knowledge, attitudes, and practice study were disseminated.***

The TB KAP study was conducted to explore gaps in knowledge, attitudes, and practice in the HEAL TB Project-supported zones. The project disseminated the preliminary results of this study in a workshop at which all stakeholders were present. The main findings were that more than 79% knew that cough is the main symptom of TB and 92% said that TB is treatable, while 73% said that TB is transmitted through the air from a coughing person. The study also revealed misconceptions: 51% of respondents said that TB is transmitted by eating or sharing the same dishes with a person who has TB (see Annex 1 for the abstract presented at the Union Conference). The results will enable stakeholders, especially the Oromia and Amhara RHBs, to design advocacy, communication, and social mobilization strategies.

## Technical Area 2: Strengthen MDR-Suspect Identification and Treatment

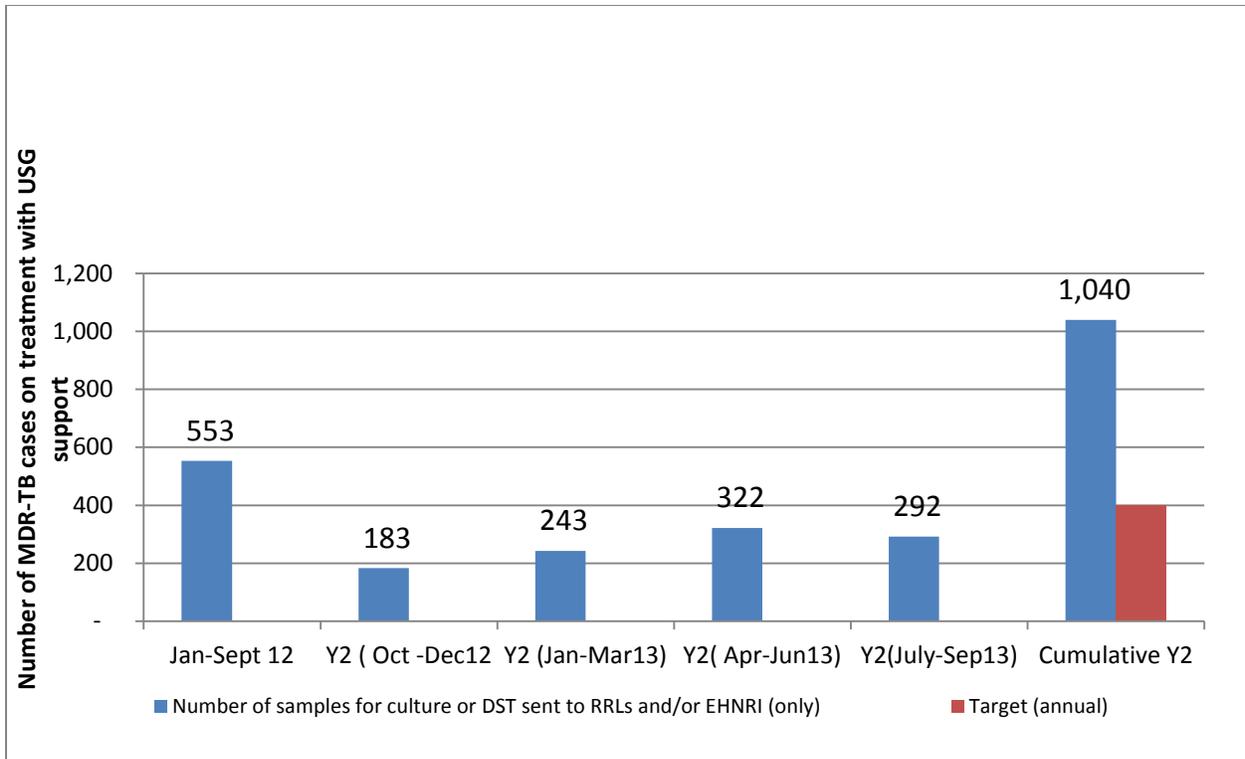
✓ *HEAL TB designed a registration and reporting system for presumptive cases of MDR-TB and supported the transportation of sputum samples from 1,593 suspects for culture.*

HEAL TB developed a registration log book for presumptive MDR-TB cases and distributed it to all health facilities throughout Amhara and Oromia regions. In addition to the registration log book, criteria for MDR-TB suspects were printed in the form of wall charts and distributed to all health facilities in the two regions. Project staff conducted an orientation for woredas and health facilities on the presumptive MDR-TB case definitions and reporting mechanisms for sample collection. When a presumptive case is identified, the health facilities report to ZHDs and Woreda Health Offices. The zones then report to the RRLs, and the RRLs coordinate transport for sample collection. The health facility makes an appointment for the suspect on the sputum collection date. Then the RRL collects the sample. HEAL TB provided support for the design of this system and to cover for the transport cost for the RRL. Next, the culture result is communicated to the RHB, and an arrangement is made with HEALTB to admit the patient for MDR-TB treatment. The patient is then contacted by the health facility, which registers the patient and transports him or her to the treatment initiating center for admission. **Figure 18** shows the flow chart for sample collection and treatment initiation.



**Figure 18: Presumptive MDR-TB case registration, reporting, sample collection, and patient follow-up in HEAL TB-supported regions**

The cumulative number of samples transported for MDR-TB suspects has reached 1,593 (see **Figure 19**). This success is because HEAL TB, with the RHBs, introduced a suspect registry and sample transport, and the RRLs were able to perform TB cultures for the first time.



**Figure 19: MDR-TB suspects' sputum samples sent for drug susceptibility testing, Sept. 2013**

For the coming year, the government has decided to use the postal system for sample transportation and HEAL TB will support the registration of suspects, facilitate the suspect reporting mechanism for the post office, and support the treatment initiation process for MDR-TB diagnosed cases.

✓ ***Two new MDR-TB centers were opened in Amhara and Oromia through HEAL TB support.***

During Year 2, two new MDR-TB treatment initiating centers were opened in Amhara and Oromia regions. The centers were opened at Boru Meda and Nekemte hospitals. The opening of these centers contributed to the increase in the number of MDR-TB patients who initiated treatment.

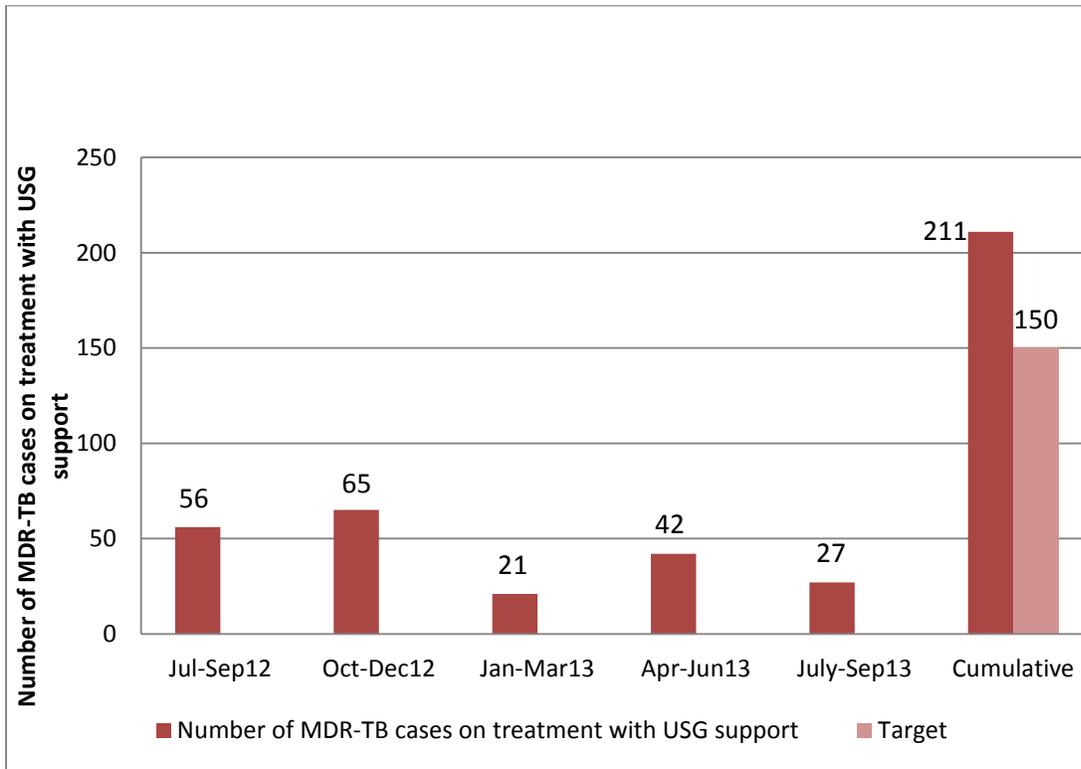
✓ ***Renovation of MDR-TB centers in Boru Meda, Debre Markos, and Nekemte hospitals was completed.***

The renovation of three MDR-TB centers in these hospitals was completed in the year. The design of the renovations followed engineering requirements for TB infection control. The architect is trained in TB infection control, and all concerned partners commented on the design. The furniture for the centers has been purchased, and some items are being shipped from abroad. The centers can start admitting patients anytime in the next year.



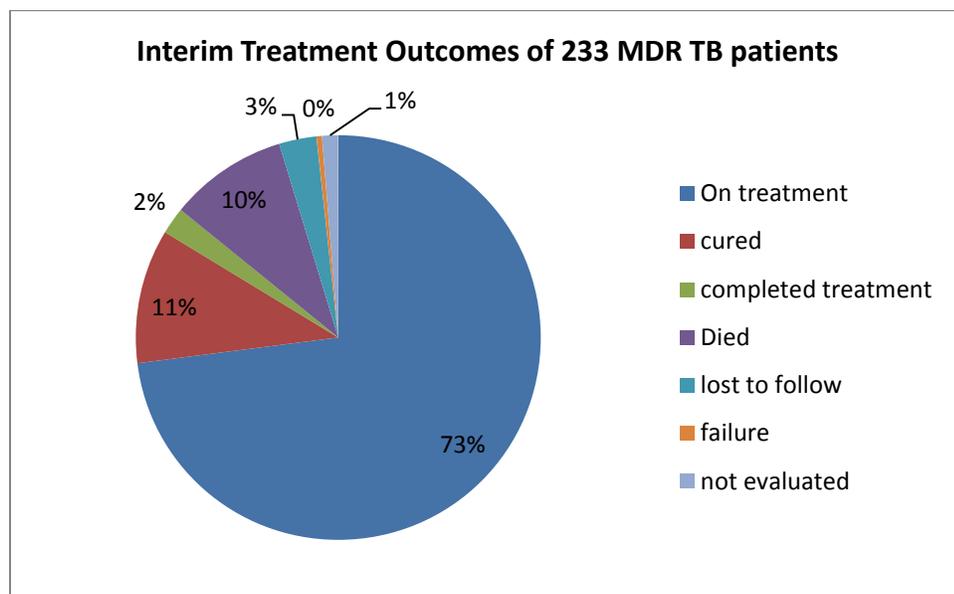
**Boru Meda MDR-TB treatment center, Oct. 2013. The other two treatment centers are similar.**

✓ *A total of 211 new MDR-TB patients were receiving treatment through HEAL TB support.* A total of 211 new MDR-TB cases started treatment through HEAL TB support (**Figure 20**). Fifty-six of them started during July-September 2012, and the remaining 155 MDR-TB patients started in year 2. The plan was to enroll 150 new patients, and we have achieved 103% of the annual target.



**Figure 20: MDR-TB patients enrolled and supported for treatment through HEAL TB, July 2012 –Sept. 2013**

Interim results for patients on treatment in Gondar, Nekemte, and Boru Meda hospitals are presented in **Figure 21**. The death rate was 10% for those who started treatment, and the lost-to-follow-up rate was 3%. The failure rate was 0%.



**Figure 21: Interim results of 233 MDR-TB patients ever enrolled for treatment in Gondar, Nekemte, and Boru Meda hospitals**

✓ *A total of 112 health workers were trained in MDR-TB diagnosis and treatment.*

A total of 112 health workers were trained in program management of MDR-TB from both regions, and the participants were selected from treatment initiating centers and treatment follow-up centers in the respective zones. In addition to the local training, HEAL TB co-sponsored an international training on MDR-TB clinical management. A total of 30 health workers participated.

### **Technical Area 3: TB/HIV Collaborative Activities**

✓ *A total of 75 health workers were trained on comprehensive TB TB/HIV modules.*

As part of the comprehensive TB, leprosy, and TB/HIV training, 75 health workers were trained. Our mentorship team also mentor health care personnel on TB and HIV co-infection.

✓ *More than 93% of newly registered TB cases were tested for HIV.*

The proportion of TB patients tested for HIV has reached 93.3 %, versus 70% at baseline (**Figure 22**). We attribute this improvement to trainings and frequent mentoring provided to the respective health facilities, as well as the uninterrupted supply of test kits by other projects. TB/HIV patients in non-ART health facilities were also linked to ART-providing health facilities for ART services.

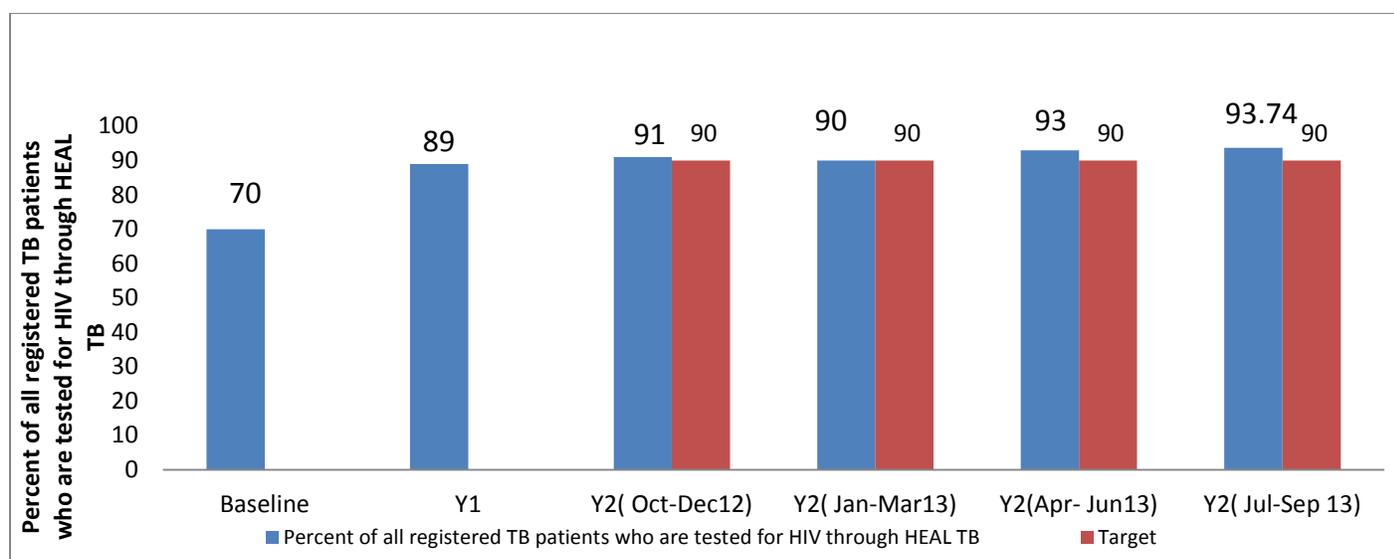


Figure 22: Registered TB patients tested for HIV through HEAL TB, Oct. 2012–June 2013

The HIV positivity rate among TB patients was 6.6%, with wide variation among zones. The average for Amhara zones was 10.3% and that for Oromia zones was 3.1%. Generally the Amhara zones had higher rates, as high as 15.4% in North Wollo Zone, and the lowest rate was in East Hararghe, 0.9% (Table 8).

Table 8: Annual performance, TB patients tested for HIV in the HEAL TB Project zones, Oct. 2012–Sept. 2013

Zone	TB patients with unknown status at entry	TB/HIV co-infected	% tested	Co-infection rate
Arsi	4,260	203	94.8	4.8
East Wollega	2,392	127	102.7	5.3
East Hararghe	4,853	44	98.9	0.9
Jimma	2,955	83	97.8	2.8
West Hararghe	2,480	62	89.0	2.5
Oromia	16,940	519	96.6	3.1
East Gojjam	2,796	229	92.3	8.2
North Gondar	5,234	521	89.1	10.0
North Wollo	1,472	227	92.2	15.4
South Gondar	2,204	134	86.9	6.1
South Wollo	3,253	395	90.4	12.1
Amhara	15,802	1,630	95.0	10.3
<b>Total</b>	<b>32,742</b>	<b>2,149</b>	<b>95.8</b>	<b>6.6</b>

Although we did not conduct a death audit to identify the cause of death, as shown in Figure 23 below, those zones with high rate of HIV have a high death rate. The main explanation for the high death rate could be co-infection.

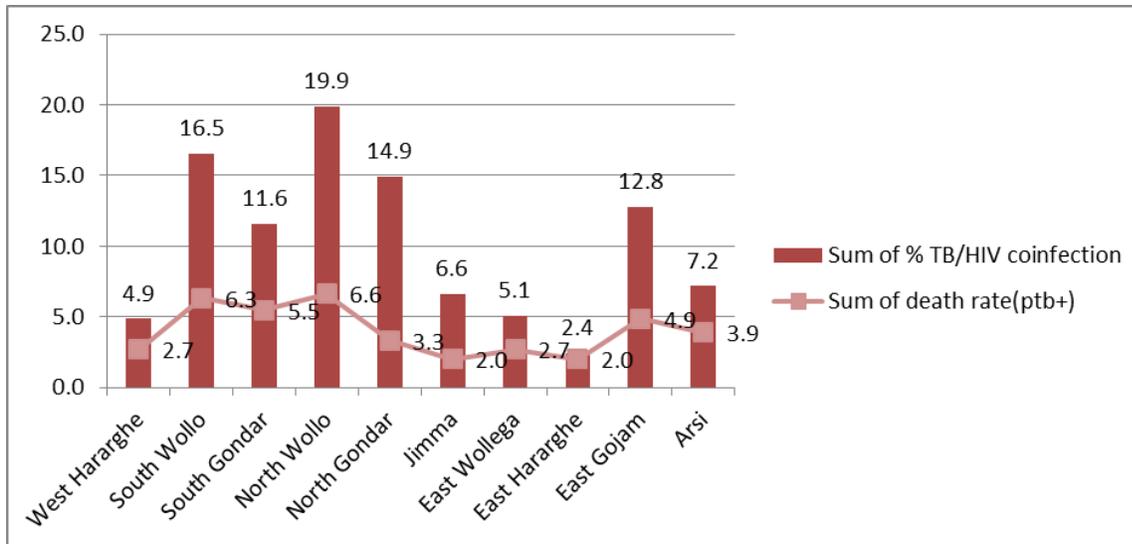


Figure 23: Death rate among smear-positive TB patients, in relation to TB/HIV co-infection, by zone

## Technical Area 4: Health Systems Improved

### Technical area 4.1: Improve infection control

A TB infection prevention committee has been established in 691 health facilities and 217 of the health facilities developed a plan. Our technical team mentors staff on-site to create awareness of TB infection control measures, and all health facilities have implemented basic infection control in at least TB clinics and laboratories. An MSH engineer was also trained in TB infection control engineering in a training organized by TB CARE I. The MDR-TB renovated centers are designed to address TB infection control needs.

### Technical area 4.2: Support operational research

HEAL TB is providing active support to operations research in the country. Three research papers have been published in major peer-reviewed journals to date. Four research studies are in progress with the University of Gondar and Oromia RHB. Another two research studies with Jimma University have been designed and the Institutional Review Board has approved their design. Those two studies will begin next year (see **Table 9** for the details of the operational research).

**Table 9: Research projects in progress, HEAL TB, Sept. 2013**

No.	Research Topic	Main Objectives
1	Contact Investigation of Smear Positive MDR-TB, XDR-TB, and Non-MDR-TB patients in Amhara Region, Northwest Ethiopia, Ethiopia	<ol style="list-style-type: none"> <li>1. To determine the magnitude of active TB among nuclear family and neighbor contacts of smear-positive TB patients.</li> <li>2. To assess the prevalence of MDR-TB and XDR-TB among smear-positive index cases and their contacts in the study area.</li> <li>3. To investigate the risk factors for active TB, MDR-TB, and XDR-TB among contacts of smear-positive TB patients.</li> <li>4. To investigate the association between serum vitamin D level and active TB among contacts of smear-positive TB cases.</li> <li>5. To assess the effectiveness of isoniazid preventive therapy (IPT) in preventing active TB among under-five children of contacts of smear-positive TB cases (IPT will be an integral part of DOT).</li> </ol>
2	Assessment of the Performance of Medical Laboratory Professionals in Fine-Needle Aspiration (FNA) Cytology to Diagnose TB Lymphadenitis	<ol style="list-style-type: none"> <li>1. To compare the FNA cytology readings of medical laboratory professionals to diagnose TB lymphadenitis with that of pathologists' readings.</li> <li>2. To compare the readings of medical laboratory professionals and pathologists with the results of culture/GeneXpert.</li> <li>3. To determine the yields of Ziehl-Neelsen stains and cytology from FNA material and compare them with those of culture/GeneXpert.</li> </ol>
3	Magnitude of Diabetes Mellitus in Tuberculosis Patients in Ethiopia	<ol style="list-style-type: none"> <li>1. Determine the prevalence of diabetes mellitus among TB patients</li> <li>2. Assess the role of diabetes mellitus /TB co-morbidity on the clinical presentation of TB</li> </ol>
4	Assessment of Health Professionals' Compliance with National TB Diagnostic Algorithms in Jimma Zone, South West Ethiopia	<ol style="list-style-type: none"> <li>1. To determine the level of compliance [adherence of health professionals] to the national TB diagnostic algorithms</li> <li>2. To assess the extent of TB diagnostic delays during the diagnostic work-up</li> <li>3. To determine the rate of lost cases of TB suspects during the diagnostic work-up</li> <li>4. To identify factors contributing to compliance and non-compliance to the national TB diagnostic algorithm</li> </ol>
5	Assessment of Diagnostic and Treatment Delays of TB patients in Oromia Regional State	<ol style="list-style-type: none"> <li>1. To determine the length of time from first start of TB symptoms/cough until first visit to medical providers (patient delay) in Oromia Regional State, Ethiopia</li> <li>2. To determine the length of time from first visit to medical providers to first start of treatment among newly diagnosed TB patients (health system delay) in Oromia Regional State, Ethiopia</li> <li>3. To analyze the factors associated with delay in seeking diagnosis and treatment of TB among newly diagnosed TB patients in Oromia Regional State, Ethiopia</li> </ol>
6	Magnitude of Smear-Positive Pulmonary TB in Public Health Facility Visitors (Medical Service Seekers and Their Companions) in Bahir Dar Town, Amhara, Ethiopia, December 2012–January 2013	<ol style="list-style-type: none"> <li>1. To determine the magnitude of smear-positive PTB cases among public health facility visitors (medical service seekers and their companions) in Bahir Dar Town</li> <li>2. To compare the proportion of smear-positive pulmonary TB among medical service seekers and their companions</li> </ol>

		in public health facility visitors in Bahir Dar Town
7	Improving TB Control Programs in Ethiopia: Analysis of TB Program Performance and Estimates of the Prevalence of Pulmonary TB and MDR-TB in Arsi Zone	<ol style="list-style-type: none"> <li>1. To estimate the prevalence of pulmonary TB and characterize the strains of Mycobacterium TB circulating at community level</li> <li>2. To estimate the prevalence of MDR-TB among newly diagnosed (primary) and previously treated pulmonary TB cases</li> <li>3. To estimate the incidence of pulmonary TB in the community (<i>optional</i>)</li> <li>4. To determine factors in the spread of pulmonary TB and MDR-TB among the study community</li> <li>5. To define who is a contact for the rural setup, considering the relationship issues in rural families</li> </ol>

### Technical area 4.3: Biomedical engineering

✓ *HEAL TB is providing equipment maintenance to Regional Health Bureaus.*

HEAL TB sent senior biomedical technicians to Amhara RHB upon request to provide maintenance support to selected hospitals in the region. In total, 15 high- and 41 mid-level pieces of equipment were maintained. In addition, five new pieces of equipment were installed. An estimated 5 million birrs' worth of equipment was maintained in the region (**Table 10**).

**Table 10: Summary of equipment maintenance in Amhara region hospitals**

Hospitals	High-Level Equipment	Mid-Level Equipment	Lower-Level Equipment	Installation	Diagnosis	Total
Felege Hiwote	7	22	2			30
Woledia	2	7				9
Dessie	3	7		3	7	20
Debre Brehan	3	5		2	1	11
Total	15	11	2	5	8	



**Cell-Dyn 1800 hematology analyzer maintained and delivered to lab staff**

✓ ***A consultative meeting on biomedical engineering implementation in Ethiopia was held.***

At the request of the RHBs and as approved by USAID, HEAL TB started a biomedical engineering activity on a small scale. A consultative meeting was held in this year to discuss the status of implementation of biomedical engineering in the country. The conclusions from the presentations of the two regions and EHNRI showed that the biomedical engineering component of the health care system has not been addressed, and capacity in this area is weak in the country. The RHB recommends that commitment at all levels (from facility to RHB) be mandatory to avert the medical equipment maintenance and management challenges in the region. All health institutions in the region need to develop comprehensive inventories of all the biomedical equipment that they currently own. Moreover, adequate funding should be made available to implement the program and to facilitate the establishment of a regional biomedical equipment maintenance workshop. Finally, an equipment management and maintenance strategy for the country is a first step to address the huge challenges that Ethiopia is facing in this area.

✓ ***Other activities related to biomedical engineering were carried out.***

The HEAL TB team discussed with the RHBs, EHNRI, human resources department, and the Public Health Infrastructure Directorate of the FMOH the establishment of a biomedical engineering system that fits with the levels of the health care system. The level of biomedical technicians needed in each tier of the system was discussed, and the main gaps were identified. These gaps include the lack of technicians, who are also not well trained, and their lack of tools and workspace. In the long run, the country needs schools for technicians to train new cadres.

HEAL TB has purchased 90 toolkits for the existing technicians and is planning to organize trainings.

### **Partnership and coordination**

HEAL TB is collaborating with all partners that are working in TB/HIV program areas. The project actively participates in the technical working groups and taskforces for TB/HIV and MDR-TB. The project is also participating in joint planning meetings with RHBs and RRLs to improve coordination and collaboration. HEAL TB also participated in and supported supportive supervision that was organized jointly with the RHBs.

## **THE SECOND PHASE OF THE PROJECT**

Per the initial cooperative agreement, the second phase of the HEAL TB Project was designed to start on July 15, 2013. According to this timeline, HEAL TB held a discussion with USAID to decide on the expansion regions and zones. USAID decide to expand in the same phase I implementation regions of Oromia and Amhara. Five zones in Amhara and six in Oromia are included in the expansion, bringing the total number of zones to be supported by the project to 21. The total population in these two zones is 40.6 million (of Ethiopia's 84 million people). The number of health facilities in these zones exceeds 1,600, and the DOTS to be supported will be decided after the baseline assessment. The initial cooperative agreement foresaw expanding to only five zones in the second phase (Table 1).

Between July and September 2013, HEAL TB started preparing for expansion to new zones, in consultation with the RHBs and the FMOH. HEAL TB has also redesigned its implementation approaches. In the first phase of the project, a team of clinical, laboratory, and community experts were mentoring every health facility one day per quarter. After lessons learned in the first phase, in the second phase the project designed a new structure, in which a zonal coordinator and laboratory experts will be assigned to the ZHD and perform the following tasks:

- Assist in the preparation of annual and quarterly plans;
- Organize trainings in the zone;
- Train ZHD and woreda experts on mentoring the health facilities, which was done by HEAL TB team in the first phase of the project;
- Demonstrate mentoring and supervision to woreda TB focal persons. The standards of care indicators piloted and tested in the last two years will be used as mentoring supervision tools;
- Hold quarterly meetings, during which the woreda TB focal persons sit with HEAL TB zonal experts and the ZHD TB and HIV experts to analyze the data collected by woredas, compare the achievements with the plan, identify gaps, and make recommendations for the woreda TB focal persons to address the gaps;
- Supervise poor-performing health facilities and health posts, together with the zonal and woreda TB experts;
- Organize semi-annual review meetings and discuss progress against the plan;
- Integrate MDR-TB activities along with the zonal and TB focal experts.

After the zonal restructuring, experts will be assigned and the ZHDs will be provided with an office free of charge for HEAL TB zonal teams so that they will work closely with their government counterparts.

✓ *The baseline assessment for the expansion zones is well underway.*

The baseline assessment tools that were used in the beginning of the project were revised and used to assess the health facilities in the 11 new expansion zones that will be included in phase II of the project. By the end of September 2013, the assessment had been conducted in 462 health facilities (66%) of the 696 health facilities to be included in the expansion phase. Information from the remaining health facilities will be collected and the baseline results will be reported by the end of the first quarter of project year 3 (see the details in **Table 11** below).

**Table 11: Status of baseline assessment for expansion zones, Sept. 2013**

Region	Assessed Unit	Target	Covered	%
Amhara	Woreda Health Office	65	65	100
Oromia	Woreda Health Office	94	75	79.78
Amhara	Health facility	288	240	83.33
Oromia	Health facility	408	222	54.41
All	Health facility	696	462	66.37
All	Woreda Health Office	159	140	88.05

- ✓ *Program management tools and zonal implementation guidelines for zonal and district level TB focal persons were developed.*

HEAL TB team then developed a program management tool that will guide the RHBs, ZHDs, and Woreda Health Offices to assist in planning, implementation, monitoring, and evaluation of TB and TB/HIV activities. A training will be organized for the zonal and woreda experts in the first quarter of the third year of the project.

### **CROSS-CUTTING AREA: MAINSTREAMING GENDER IN THE HEAL TB PROJECT**

In the first year, a gender mainstreaming strategy was developed by KAPTL D and a dissemination workshop was conducted. In the second year, an officer was hired for Oromia RHB to assist in the implementation of the strategy. Although a clear strategy exists and activities are integrated at the health facilities and community level, obtaining gender-disaggregated data was not possible because the national HMIS has no such indicators. We hope that the FMOH will include these indicators in the future.



## Annex A.

### TECHNICAL ASSISTANCE

Name of Person Who Provided Technical Assistance	Date/Duration	Type of Technical Assistance	Remarks
Dr. Pedro Suarez	October 2012	To assist with implementation of the year 2 plan	
Dr. Pedro Suarez	Feb. 18–26, 2013	To discuss the progress of project implementation during year 1 and assist with the second-year plan and budget implementation	
Dr. Pedro Suarez	August 2013	To discuss the progress of project implementation during year 1 and assist with the second-year plan and budget implementation	

### PUBLICATIONS AND CONFERENCE POSTERS AND PRESENTATIONS

#### Peer-Reviewed Journal Articles Published

Full Title	Authors	Publication Date	Publisher and URL
1. Predictors of Mortality among TB-HIV Co-Infected Patients Being Treated for Tuberculosis in Northwest Ethiopia: A Retrospective Cohort Study	Balewgizie Sileshi, Nigussie Deyessa, Belaineh Girma, Muluken Melese, Pedro Suarez	1 July 2013	<i>BMC Infectious Diseases</i> 13:297. <a href="http://www.biomedcentral.com/1471-2334/13/297">http://www.biomedcentral.com/1471-2334/13/297</a>
2. Determinants of Multidrug-Resistant Tuberculosis in Patients Who Underwent First-Line Treatment in Addis Ababa	Selamawit Hirpa, Girmay Medhin, Gobena Ameni, Belaineh Girma, Alemayehu Mekonen, Pedro Suarez, Muluken Melese	28 August 2013	<i>BMC Public Health</i> 13(1): 782 <a href="http://www.biomedcentral.com/1471-2458/13/782">http://www.biomedcentral.com/1471-2458/13/782</a>
3. Determinant Factors Associated with Occurrence of Tuberculosis among Adult People Living with HIV after Antiretroviral Treatment Initiation in Addis Ababa Ethiopia: A Case Control Study	Kelemu Tilahun Kibret, Alemayehu Worku Yalew, Belaineh Girma Belaineh, Muluken Melese Asres	21 May 2013	<i>PLOS One</i> . <a href="http://dx.plos.org/10.1371/journal.pone.0064488">http://dx.plos.org/10.1371/journal.pone.0064488</a>

#### Abstracts Accepted/Presented

	Title	Type of Presentation	Place of Presentation	Remarks
1	The Integrated Pharmaceuticals Logistics System (IPLS) Reduces Drug Stock-Outs in Ethiopia's Amhara and Oromia Regions	Poster	Union Conference Kuala Lumpur, Malaysia 2012	
2	Case for Decentralization: Health Centers Surpass Hospitals in Tuberculosis Outcomes within Two Ethiopian Regions	Poster	Union Conference, Kuala Lumpur, Malaysia, 2012	
3	Decentralization Improves the Coverage of External Quality	Poster	ASLM Conference, Cape Town, South Africa, 2012	

	Assessment: A Case from HEAL TB Supported Zones in Ethiopia			
4	Heterogeneous TB Case Notification Rates in Ethiopia: What Is the Implication for TB Control	Poster	Union Conference, Paris, 2013	
5	On-Site Staff Mentoring and Assessment Improved Laboratory Service Quality and Microscopy Diagnostic Accuracy in Ethiopia	Poster	Union Conference, Paris	
6	Prevalence of Smear-Positive Pulmonary Tuberculosis among Health Facility Patients and Their Escorts in Bahir Dar, Ethiopia	Poster	Union Conference, Paris, 2013	
7	Routine Supportive Supervision Guided by Standard-of-Care Indicators Improves TB Service Quality in Ethiopia	Poster	Union Conference, Paris, 2013	
8	Expansion of Microscopic Service, Staff Training, and Supportive Supervision Improves Smear Microscopy Follow-Up for Smear-Positive TB Patients	Poster	Union Conference, Paris, 2013	
9	Predictors of Mortality among TB-HIV Co-infected Patients for Tuberculosis in Northwest Ethiopia: A Retrospective Cohort Study	Poster	Union Conference, Paris, 2013	
	Assessment of Knowledge, Attitudes, and Practices on TB in Ten Zones of Amhara and Oromia Regional States, Ethiopia	Oral	Union Conference, Paris, 2013	
10	Improving TB Case Detection through Strengthening of Health Systems in Ethiopia: From Pilot to Scale-Up	Oral	Union Conference, Paris, 2013	
11	Predictors of mortality among TB-HIV co-infected patients Being Treated for Tuberculosis in Northwest Ethiopia: A Retrospective Cohort Study	Poster	TB Research Advisory Committee annual event, Addis Ababa, 2013	
12	Determinant Factors Associated with Occurrence of Tuberculosis among Adult People Living with HIV after Antiretroviral Treatment Initiation in Addis Ababa Ethiopia: A Case Control Study	Poster	TB Research Advisory Committee annual event, Addis Ababa, 2013	
13	Determinants of Multidrug-Resistant Tuberculosis in Patients Who Underwent First-Line Treatment in Addis Ababa	Oral	TB Research Advisory Committee annual event, Addis Ababa, 2013	

## INTERNATIONAL TRAVEL

<b>Traveler's Name</b>	<b>Country</b>	<b>Dates</b>	<b>Purpose</b>	<b>Recommendations</b>
Dr. Yewulsew Kassie	Milan, Italy	April 29, 2013– May 11, 2013	Training course on Stop TB strategy	
Dr. Belaineh Girma	Milan, Italy	April 29, 2013– May 11, 2013	Training course on Stop TB strategy	
Mulu Legesse	Kuala Lumpur, Malaysia	Nov. 2012	Union Conference attendance	
Muluken Melese	Kuala Lumpur, Malaysia	Nov. 2012	Union Conference attendance	
Mitiku Ensermu	Kuala Lumpur, Malaysia	No., 2012	Union Conference attendance	
Mekedes Gebeyehu	South Africa	Dec. 2012	Laboratory conference attendance	

### **IR 1.1 Improved Capacity of Health Managers to Administer TB Programs**

#### *Challenge*

- No training or course endorsed for TB program managers

#### *Action taken*

- HEAL TB developed on-the-job training guidelines to assist the RHB, zonal, and Woreda TB experts in their planning, monitoring, and evaluation. We recommend developing a national TB program management manual.

### **IR 1.2 Strengthening Laboratory Services and Systems**

#### *Challenges*

- Although PFSA has taken a big step in designing a reagent bottling system through private companies, it has not reached all health facilities yet and we see poor-quality reagents. We expect that this issue will be fully resolved as the bottling companies start producing at full capacity.
- No efficient and effective transport system for MDR-TB sputum samples
- High staff turnover and lack of a national training register
- Lack of microscope repair and maintenance services

#### *Actions taken*

- The reagent bottling is being well handled by PFSA, and the problem is expected to be solved in the short term.
- The FMOH and EHNRI have decided to link the transportation of sputum samples with the Ethiopian postal system. We will assist in the information exchange between the health facilities and postal system, but we have doubts about whether the postal system will deliver the samples on time and maintain their quality.
- Training and turnover issues are discussed below in IR 1.3.
- Microscopic maintenance: see biomedical engineering below.

### **IR 1.3 Ensure That Standard TB Regimens Are Administered Correctly**

#### *Challenges*

- High staff turnover and lack of clear guidelines about who should be trained as well as lack of national registry of trainings
- IPT is not provided to under-five children who have a household contact with smear-positive TB.
- The yield of TB screening in health facilities doesn't correspond to the level of effort.

#### *Actions taken*

- Training is basically a means to fill the skill or knowledge gaps of health workers. It is a necessary capacity-building tool, if it is planned and delivered well, to fill identified gaps. In many ways, this aim has been achieved, but there is a tendency to over indulge training requests without even doing a needs assessment. There is also a tendency to ask for more trainings or workshops than even for drugs or equipment. At times, the right person does not

come for training; rather everyone takes turns going to training. It is not rare to encounter people coming for the same training more than once. Trainings are expensive, disrupt daily work, and lead health workers to focus on looking for more trainings. It should be stressed here that we are not saying that well-planned trainings are not important. But there is no proper evaluation of workers by health facilities to identify strengths and training needs.

- Performance-based career development is also lacking. If a health worker is not performing the basics based on what s/he has qualified for, there is an incentive for more trainings, whereas trainings should be for additional new skills and knowledge. For example, if a laboratory expert is unable to do AFB microscopy, then there is a problem with the pre-service training. The solution should not be re-training but improvement of pre-service training. We recommend designing a training strategy and investing more in the current FMOH-designed model of blended learning (classroom with distance training), linked with the license renewal system. With HEAL TB/ALERT, the FMOH, and the Food, Medicine and Health Care Administration and Control Authority (FMHACA), the blended training model will be piloted in the third year.
- There should be also a cost-sharing mechanism for all trainings, even if it is small, to encourage health workers to read when they have enough knowledge and skill in a given technical area and to request training only when they need to develop new skills. There should be good support for pre-service trainings, because in-service training needs could be reduced if pre-service training is of high quality.
- IPT for children under five is almost nonexistent. HEAL TB is planning to strengthen contact screening, which is performing well, and make IPT part of the DOTS strategy. If one of the parents is on DOTS, the child also should come for IPT. This will be easier, especially when DOTS is decentralized to the health post level, where it will be nearer to the community.



### **Child suspected of having TB**

- The yield of TB screening in health facilities does not match the level of effort: As described in the main body of the report, screening for TB in outpatient departments is becoming universal, but the yield is very low. A study on the quality of screening and the algorithm for TB diagnosis will be conducted in the third year to develop recommendations.

## **IR 1.5: Recording and Reporting**

### ***Challenges***

- The HMIS does not capture important indicators such as gender-disaggregated data, TB/HIV indicators, and community TB indicators.
- No laboratory management information system (LMIS) exists in the country.

### ***Actions taken***

- Having complete indicators is beyond the scope of the project, but the issue has been raised in the national technical working group.
- Concerning the LMIS, it is in the agenda of the EHNRI and some work has started. HEAL TB will be part of the group developing the LMIS.

## **Technical Area 2: Strengthen MDR-TB Suspect Identification and Treatment**

### ***Challenges***

- Identifying MDR-TB presumptive cases
- Sample transportation
- MDR-TB patient support

### ***Actions taken***

- Registration of presumptive cases is well underway and we have developed a system, but the challenge is the lack of a fast system to report the suspect, obtain transportation for the sputum sample, and alert the postal system to collect the sample. We are recommending that SMS-based presumptive case reporting be established for the next higher level and postal system in the third year. This is an inexpensive and simple technology. HEAL TB will monitor the actions taken by the postal system and report the result of the culture or GeneXpert to the health facility. Although we have reservations about the postal system's capacity, it will be evaluated as we go along. Having more GeneXpert capacity in the coming years will solve some of the transport issues.
- MDR-TB patients require nutritional support. Providing nutritional support requires different staffing and a system for purchasing, storing, and distribution, which is beyond the organizational capacity of HEAL TB. We propose that USAID help us to link this service to one of the food aid support projects, since they have the capacity to handle food distribution.

## Annex C. Environmental Compliance

No.	Indicator	Status
1	Program support and supervision checklists were developed to ensure that environmental mitigation measures are in place.	The HEAL TB checklist includes mitigation measures, an infection control plan in the clinics, MDR-TB centers, laboratories, and the presence of triage in health facilities. The MDR-TB renovations have addressed TB infection control engineering and design. N95 and surgical masks are given to all MDR treatment initiating centers.
2	Health education on cough etiquette and proper ventilation of rooms.	More than 60% of HFs were practicing triage.
3	TB infection control plans	All health facilities practice infection control measures, per the data collected by our experts, and 31.4% had a written plan.
4	Availability of training manuals that address proper and safe disposal of used materials	Included in the training manuals

## Annex D. Financial Accomplishments

Total project expenditure up until September 30, 2013, including both home office accruals (\$103,021) and field office accruals (\$345,907), was \$10,834,615. This accounts for 26% of the total project budget or 61% of the current obligated balance. With intensive project activities, we anticipate the upcoming quarters' monthly burn rate will be more than \$850,000. Based on this projected burn rate of \$850,000, the remaining obligated balance will take the project for eight months.

<b>Life of Project Budget</b> <b>(a)</b>	<b>Obligated to Date</b> <b>(b)</b>	<b>Expenditure to Date (Accrual + Disbursement)</b> <b>(c)</b>	<b>Remaining Obligated Balance</b> <b>(d) = (b) – (c)</b>
\$41,996,319	\$17,784,000	\$10,834,615	\$6,949,385

## Annex E. Issues Requiring the Attention of USAID Management

The new approach for the third year is to depend on district TB focal persons to mentor and supervise health facilities, unlike in the previous year, when HEAL TB experts were mentoring and supervising. It should be noted that these personnel have different backgrounds and qualifications and at times may be engaged with other assignments, all of which might affect the project's results.

## Annex F. Data Sharing with the Host Government

Although most of the data for this report came from the FMOH's HMIS, we will share this final report with the RHBs and FMOH after we receive USAID's concurrence.

**Annex G. HEAL TB Performance Monitoring Plan for Phase I (Years 1 and 2) and Phase II (Years 3, 4, and 5)**

Indicator	Indicator Definitions	Targets	Source of Data	Means of Data Collection	Frequency of Reporting	Oct–Dec 2012	Jan–Mar 2013	Apr–June 2013	July–Sept. 2013	Annual
<b>TECHNICAL AREA 1: STRENGTHENING AND EXPANSION OF DOTS (IMPROVED CDR AND TSR)</b>										
<b>Result 1:</b> HEAL TB performance shall assist the regional/zonal TB programs to reach a minimum CDR of 70% and TSR of 90% of detected cases in the respective zones within two years.										
<b>Technical Area 1.1: Program support and management</b>										
Number of people covered by USG-supported health financing arrangements(US funds)	DOTS center per 50,000 pop	25.7	National census data	Census data; HF's provide data	Annual	25.7	25.7	25.7	25.7	25.7
Number of woreda annual operation planning meetings conducted	Number of woreda plans developed	187	Woreda reports	Direct HEAL TB participation reports	Annual	NA	NA	188		188
<b>Technical Area 1.2: Strengthening laboratory services and systems</b>										
Total number of HF's capacitated to provide TB microscopy diagnosis	HF's laboratories provide AFB diagnosis	691	HF's reports	Routine quarterly data collection	Quarterly	691	691	691	691	691
Percent of USG-supported laboratories performing TB microscopy with over 95% correct microscopy results	% of HF's labs with EQA result of $\geq$ 95% concordance	95%	EQA center reports	EQA reports from hospitals and RRLs performing EQA	Quarterly	94%	95.2%	97%	97.2%	

Indicator	Indicator Definitions	Targets	Source of Data	Means of Data Collection	Frequency of Reporting	Oct–Dec 2012	Jan–Mar 2013	Apr–June 2013	July–Sept. 2013	Annual
TB microscopy coverage in USG-supported areas	Microscopic Center per 50,000 Population	100%	HEAL TB DOTS expansion report			100%	100%	100%	100%	100%
TB laboratory quality assurance for smear microscopy in USG-supported areas	Facilities whereby slides collected for EQA and EQA done	691	EQA reports of RRLs and hospitals	EQA result reports of RRLs and hospitals	Quarterly	413	533	607	583	NA
<b>Technical Area 1.3: Ensure the standard TB regimens are administered correctly</b>										
Number of health centers and hospitals providing DOT	HFs providing treatment for TB	691	HEAL TB quarterly visit report	Visit reports	Quarterly	691	691	691	691	691
Number of medical and paramedical practitioners trained in evidence-based clinical guidelines (HEWs)	# of HEWs to trained	2000	Training reports	Training reports	Quarterly	1660	0	0	0	1660
Case notification rate of new sputum-smear- positive pulmonary TB cases per 100,000 population in USG-supported areas	Number of new smear-positive TB cases reported in the past year per 100,000 population	65	HF reports	Reported to be collected through woredas	Annual	NA	NA	NA		40/100,000 pop.

Indicator	Indicator Definitions	Targets	Source of Data	Means of Data Collection	Frequency of Reporting	Oct–Dec 2012	Jan–Mar 2013	Apr–June 2013	July–Sept. 2013	Annual
Percent of the registered new smear-positive pulmonary TB cases that were cured and completed treatment under DOTS (i.e., treatment success rate) in USG-supported areas	Percentage of a cohort of new smear-positive TB cases registered in a specified period that successfully completed treatment confirmed bacteriologically	85%	Woreda reports	Report to be collected through the HMIS system	Annual	90%	92%	93%	95.5%	92.5%
<b>Technical area 1.4: Drug management</b>										
Number of USG-assisted service delivery points experiencing stock-outs of specific trace drugs(percent)	Number of HFs reported stock for at least a week	Less than 2%	HF reports	Reported to be collected by mentors	Quarterly	12%	2.70%	2.7%	0.2%	0.2% <sup>6</sup>
Number of HFs practicing TB Drug Kits	Number of HFs implemented TB drug kits	Number as per PFSA supply	HF reports	Reported to be collected by mentors	Quarterly	Prep stage	Prep stage	Prep stage	Prep stage	Prep stage
<b>Technical Area 1.5: Recording and reporting</b>										

<sup>6</sup> Projected based on data from 204 health facilities.

Number of HEWs trained in monitoring and evaluation (Para-medics)	Number trained	2000	Training report	Trainer report	Quarterly	1779	154	94	690	2717
Number of Regional Annual reports, disaggregated by zone, Woreda and HF, developed	Reports by Regional	2	Report	Report prepared by RHBs	Annual			1		1
<b>Technical Area 1.6: Strengthened referral linkage</b>										
Number of TB suspects referred to health facilities from HEWs	Number of referrals registers in HFs	20,000	HEW reports	Reports from health centers to be collected by mentors	Quarterly	2343	8642	9586	2355	22867
Number of health posts providing DOT for TB patients	Number of HPs administer treatment prescribed from HFs	2500	Quarterly reports of HPs	Trainer report	Quarterly	NA	NA	NA	NA	NA
Number of TB patients referred to health posts for community DOTS from hospitals, health centers and private health facilities	Patient who follow their DOT at HPs	4000	HF reports	Reports to be collected at health facilities and HPs	Quarterly	143	849	1013	61	2066

<b>Technical Area 1.7: Community TB care</b>										
Number of paramedical practitioners trained in evidence-based clinical guidelines (HEWs)	Number trained	2500	Training report	Trainer report	Quarterly	1660	0	0	0	1660 <sup>7</sup>
Number of health posts able to screening for TB	Number of HPs	2500	HP reports	Report to be collected from HP	Annual	NA	NA	NA	NA	2004 <sup>8</sup>
<b>Technical Area 1.8: Engaging private health sector in DOTS (Public-Private Mix DOTS)</b>										
Number of TB cases reported to NTP by USG-assisted non-MOH sector	This area was removed from HEAL TB's role.									
<b>TECHNICAL AREA 2: RESPONSE TO EMERGENCE OF MDR-TB</b>										
<b>Result 2: Identify re-treatment, expedite sputum for culture and DST and map location of MDR-TB cases.</b>										
Number of MDR-TB cases on treatment with USG support	Number put on treatment	150	Hospital reports	Routine hospital data	Quarterly	65	21	42	27	155
Number of samples for Culture or DST send to the Regional labs and/or EHNRI (Cumulative the year)	Sputum samples sent to culture labs	400	RRL reports	Reports of RRLs	Quarterly	183	243	322	292	1040
<b>TECHNICAL AREA 3: TB/HIV COLLABORATION</b>										
<b>Result 3: Improved the TB/HIV collaborative activities</b>										

<sup>7</sup> The remaining HEWs were trained in July–Sept. 2012.

<sup>8</sup> Proxy indicator used. It is not based on direct assessment of the health post. This is tracked at health center level.

Percent of all registered TB patients who are tested for HIV through USG-supported programs	Tested for HIV	90	HF reports	Reports from HFs to be collected by our mentors	Quarterly	90%	89%	93%	93.74	93.25
<b>TECHNICAL AREA 4: HEALTH SYSTEM STRENGTHENING</b>										
<b>Result 4:</b> Health systems are improved										
Number of information gathering or research activities	ORs done and published	6	Researcher report	Research papers						3
<b>Technical area 4.1 Improved infection control</b>										
Number of health care facilities with TB IC plans implemented	Plans available	150	Reports of HFs		Quarterly	56	164	32%		32% <sup>9</sup>
<b>Technical area 4.2 Capacity building of health care providers</b>										
<b>Technical area 4.3 Support proper TB and TB/HIV planning</b>										
<b>Technical area 4.4 Support implementation of Global Fund TB grants in the region</b>										
Number of medical and paramedical practitioners trained in evidence-based clinical guidelines (Global Fund supported)	This TA area is canceled from HEAL TB as per the first year discussion with USAID.									

<sup>9</sup> Percentage is calculated among health facilities visited during the period

## Annex H. HEAL TB Success Stories

### Referral Networks and Staff Trainings Improve Multidrug-Resistant TB Control in Ethiopia By Kinde Alamir (HEAL TB Clinical Officer) and Dr. Yohannes Molla (HEAL TB Sub-regional Coordinator)



*HEAL TB-supported health facilities helped Azmara and her three-year-old son, Feseha, recover from MDR-TB.*

Azmara Ashenafi, a 35-year-old woman from the Amhara region of Ethiopia, was recently diagnosed with tuberculosis (TB) and placed on treatment. Although she took this medicine for months, her symptoms persisted and eventually became so severe that she sought further treatment at the Muja Health Center.

The Muja Health Center is supported by the PEPFAR-funded, USAID project, Help Ethiopia Address Low TB Performance (HEAL TB), and its implementer, Management Sciences for Health (MSH). Since 2012, HEAL TB has been training the health center's staff to screen patients like Azmara for multidrug resistant TB (MDR-TB), a strain of TB that infects 6,000 Ethiopians each year and cannot be treated with the two most common anti-TB drugs.

In addition to patient screening, HEAL TB has also helped the Muja Health Center improve its diagnostic referral network and staff capacity to effectively use this network. These interventions enabled Azmara to receive her diagnosis and begin treatment at Borumeda Hospital in less than four months. In the past, the process may have taken up to six months or been delayed for years, as staff did not know how or where to send samples for MDR-TB testing or patients for MDR-TB treatment.

To prevent the spread of MDR-TB in Ethiopia, HEAL TB trains health workers to screen those who have been in close contact with the MDR-TB patients. Thanks to this training, the staff at Borumeda Hospital tested all of Azmara's family members and found that her three-year-old son, Feseha, was also infected with MDR-TB. The team immediately began treating the child and both Azmara and Feseha are now stable and in good health.

"I thank the Borumeda Hospital staff and other partners for diagnosing our MDR-TB and providing treatment and other support to save my life and my child's life," said Azmara.

Since the project began in 2011, HEAL TB has trained 84 health workers in the Amhara region to diagnose and treat MDR-TB patients.

## Simple Family Matrix Improves TB Case Detection in Rural Ethiopia

By Dr. Abel Helebo, Technical Associate, HEAL TB



*Silenat with her husband, her three-year-old child, and Tadele, a TB focal Person at the Keraniyo Health Center*

Silenat Yihune, a 40-year-old house wife, lives in a remote region of Huletejuenesie District, Ethiopia, which is approximately 20 kilometers from the closest health facility. For nine months Silenat suffered from a cough, chest pain, fever, and weight loss but was unable to receive treatment. As is common among Ethiopian families, Silenat was economically dependent upon her husband and he refused to pay for her travel to the distant health facility. Several months later, Silenat's husband, Yirga, started to show similar symptoms and visited the Keraniyo Health Center, where he was diagnosed with tuberculosis (TB).

Keraniyo Health Center is one of the funded health facilities in Huletejuenesie district supported by the PEPFAR-funded, USAID project, Help Ethiopia Address Low TB Performance (HEAL TB), led by Management Sciences for Health (MSH). Last year, HEAL TB trained two health workers at the Keraniyo Health Center to use a family matrix system to prioritize TB screening for family members of TB patients. One of these health workers, Tadele, diagnosed Yirga with TB and helped him to start treatment. He then recorded all of his family members' names onto the family matrix and advised Yirga to bring them to Keraniyo for TB screening. Having personally experienced the benefits of TB treatment, Yirga complied with this recommendation. Upon testing Yirga's family members, Tadele discovered that Silenat was also suffering from TB. The health care team at Keraniyo immediately started her on TB treatment.

Now, two months later, Silenat is no longer coughing and she has gained weight. "If it wasn't for the effort of Tadele and the health team, I would have continued to suffer. I cannot imagine what could have happened if we had stayed home and did not seek treatment. I am happy now that I can be there for my children," she said.

The family matrix system has benefited many women in Ethiopia who are often not supported by their male partners to access health care. In the past year, health workers in the Huletejuenesie District have used the family matrix to conduct TB tests for 283 family members of TB patients. Among these, nine individuals have been diagnosed and treated for TB and are no longer suffering.

Over the past five months, HEAL TB has trained an additional 631 health workers from 348 health centers to use the family matrix. These health workers continue to receive technical support and mentoring from HEAL TB as they incorporate the family matrix into their clinical practice. HEAL TB also encourages trained staff to teach their colleagues to use the family matrix so that this TB outreach strategy will continue to expand throughout Ethiopia.

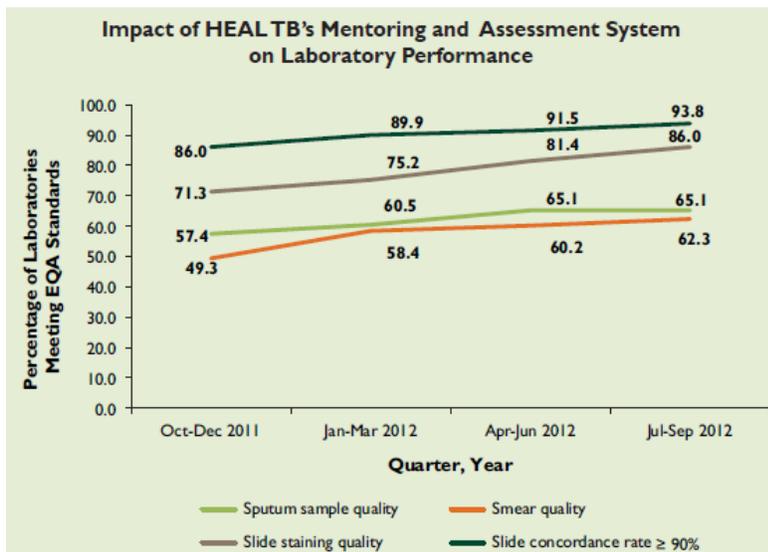
## On-Site Staff Mentoring and Assessments Improve Laboratory Service Quality and Microscopy Diagnostic Accuracy in Ethiopia

**Background:** Acid-fast bacilli (AFB) microscopy is the main tuberculosis (TB) diagnostic tool in Ethiopia. Ethiopia has external quality assurance (EQA) guidelines for AFB microscopy, adopted from the World Health Organization's (WHO) guidelines. Although the WHO recommends quarterly EQA for all diagnostic facilities, this has not been possible in Ethiopia due to resource limitations. In response, the USAID-funded Help Ethiopia Address the Low TB Performance project (HEAL TB) and its implementer, Management Sciences for Health, designed an on-site mentoring and assessment system and implemented it in 659 health facilities. The system was based on the national EQA guidelines and designed to help ensure that laboratory professionals follow the correct AFB procedures and have internal quality measures in place.

**Implementation:** From October 2011 to September 2012, 15 of HEAL TB's laboratory experts conducted quarterly on-site mentoring at 659 health facilities in Ethiopia. During these visits, the experts distributed job aids, provided staff training, and checked that staff were properly registering all TB suspects, correctly labeling all slides, and safely storing the slides. They also checked that staff were implementing internal quality measures. To assess the accuracy of AFB diagnosis, the experts selected and examined five slides that the staff had diagnosed as negative and five that they had diagnosed as positive. The experts then tailored their staff mentoring and technical assistance, based on the identified gaps. HEAL TB had collected performance data from all the 691 health facilities and the results of 129 are presented for this abstract.

**Results:** At baseline, 111 (86%) of the health facilities' slides had a concordance rate of 90% or above with the HEAL TB experts' slide reading. At the end of the fourth quarter, 121 (94%) of the health facilities' slides had a concordance rate of 90% or above with the HEAL TB experts' slide (see graph). The health facilities did not have fully implemented internal quality measures at baseline but, by the end of the implementation period, 100% of the 129 health facilities had fully implemented internal quality measures. At baseline the staining quality was 70% and at the end of September 2012 it had reached to 86%. For the rest of the internal quality indicators, see the figure.

**Conclusion:** Quarterly on-site assessment and staff mentoring contributed to improved AFB slide accuracy. This approach should be implemented at all AFB diagnostic facilities in Ethiopia to further improve the quality of laboratory services and the accuracy of AFB microscopy.



## Microscopes and Technical Training Enhance Health Centers' Diagnostic Capacity and Increase TB Case Detection in Ethiopia

By Eskindir Degu, HEAL TB Laboratory Officer



*Left:* Endiros Tadiswal after completing two months of TB treatment

*Right:* Ato Tadiswal Abebe after completing three weeks of TB treatment

When the community health worker knocked on his door, Endiros Tadiswal was relieved. The 19-year-old boy had been suffering from a terrible cough, chest pains, fever, and weight loss for nearly six months and had become too weak to attend school. After inquiring about his health, the health worker told Endiros that his symptoms indicated a possible tuberculosis (TB) infection and referred him to the Yekoso Health Center for testing. Although this seemed hopeful, when Endiros arrived at the health center he learned that the facility did not have a microscope for TB testing. The staff referred Endiros to the next closest diagnostic health center but he was far too weak to walk the 15 kilometers to this facility. Out of options, Endiros returned home, discouraged and afraid.

Fortunately, soon after these events, the PEPFAR-funded, USAID project, Help Ethiopia Address the Low TB Performance (HEAL TB), led by Management Sciences for Health (MSH), began working in Endiros' community in South Wollo Zone, in the Amhara Region. Because the project has been providing technical and material support to health facilities in Amhara and Oromia since 2011, the team was able to quickly assess operations at the Yekoso Health Center and determine its equipment needs. HEAL TB then donated a microscope and diagnostic starter kits to the facility. The project also trained two laboratory technicians from the health center to correctly use the microscope and conduct quality assurance exercises to ensure efficient and accurate TB diagnoses.

As soon as the microscope had been secured and the technicians trained, the health center staff informed community health workers that their facility was now equipped for TB diagnostics and encouraged them to refer residents with TB symptoms to the facility for testing. Endiros was among the first patients to be tested and, as expected, results showed that he was infected with TB. Trained by HEAL TB to conduct contact screening, the clinician asked Endiros if he had any friends or family members with similar symptoms. Endiros shared that his father also had a terrible cough and fever, and the clinician encouraged him to bring his father to the health center for TB testing. Within days, Endiros' father also tested positive for TB and began receiving treatment.

Today, Endiros and his father are feeling stronger and have gained weight. In the coming month, Endiros will be healthy enough to return to school. "The relief we feel now surpasses the suffering we have been through. We are so happy and, at the same time, grateful to have TB diagnostic services at the nearest facility," said Endiros.

In the eight months since HEAL TB's training and microscope donation, Yekoso Health Center has diagnosed 32 patients with TB and enrolled them in treatment.