



Trachoma Elimination: Approaches, Experiences and Performance of Interventions in Amhara Regional State, Ethiopia

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Abstract

Background: Trachoma is caused by conjunctival infection with a Bacteria, *Chlamydia trachomatis*. According to WHO grading system trachomatous trichiasis (TT), leads to irreversible blindness. Amhara national state of Ethiopia has the highest burden of TT. Despite huge efforts the region has big backlog and far from the target.

Methodology/Principal findings: We carried out a review and trend analysis on previous years of Trachoma intervention in the region. We also designed a logical frame work, which bring all actors together. Then the new approach of TT surgery intervention frame work "The MUST" was implemented. The regional total TT backlog as of June 2017 was found to be 245,504. From all the surgeries carried out between 2012 and mid-2017, 32% (11687) was done only in 2016. All the ten zones of the region showed dramatic performance than ever after the new approach implemented in the region. East Gojjam [31.9% (73742)] followed by South Gondar [12.3% (28491)] zones took the highest share of TT surgery performances of the national regional state (NRS) during in the era of new approach reporting periods (2015-mid 2017). From the total of 23 districts (woredas) of the region which clear their TT backlog, eight of them are found to be in East Gojjam zone. South Gondar perform 36.4% (14,978) in 2016 from all the reporting periods of TT surgeries conducted during 2012-mid 2017. Facial cleanliness coverage among school children was found to be 90.4% and 90.8% in 2016 and mid 2017 respectively. Household latrine ownership coverage was 68.2% (6,805) and 68.5% (6772) during the same reporting periods respectively.

Conclusions: Amhara national state has still huge TT backlog. The new approach showed an assurance of clearing TT backlog before 2020. The sustainable intervention (hygiene and environmental) are not yet strong like treatment-based interventions.

Keywords Trachoma; Trachomatous trichiasis; Follicular; Blinding trachoma

Background

Trachoma causes blindness through repeated conjunctival infection with *Chlamydia trachomatis* [1]. Blinding trachoma is endemic in many of the poorest and most remote areas of 51 countries in Africa, Asia, Central and South America, Australia and the Middle East. Worldwide, an estimated 2.2 million people are visually impaired as a result of trachoma, of whom 1.2 million are blind. An estimated 232 million people living in trachoma-endemic districts are at risk. More than 21 million have active trachoma and about 7.3 million require surgery for trachomatous trichiasis [2]. With different estimates of scholars, the economic cost of trachoma is very high; productivity lost estimated US\$ 2.9 billion and economic loss estimated as high as US\$ 5.3 billion [3,4].

Africa is the worst affected continent: 18 million cases of active trachoma (85% of all cases globally) and 3.2 million cases of trichiasis (44% of all cases globally) are thought to exist in 29 of the 47 countries in WHO's African Region. Ethiopia and South Sudan have the highest

prevalence of active trachoma: in some areas of these countries, active disease is present in more than 50% of children aged 1-9 years and trichiasis affects more than 10% of adults [2].

According to the 2005-6, Ethiopian national survey, prevalence of active trachoma (either TF or TI) for children in the age group 1-9 year was 40.14%. Considerable regional variations are observed in the occurrence of active trachoma; the highest prevalence was in Amhara (62.6%), Oromia (41.3%), SNNP (33.2%), Tigray (26.5%), Somali (22.6%) and Gambella (19.1%). The rural prevalence of active trachoma is almost fourfold compared to the urban (42.5% rural vs. 10.7% urban). The national prevalence of trachomatous trichiasis (TT) is 3.1% with the highest prevalence (5.2%) in Amhara national regional state [5].

The World Health Organization (WHO) recommends surgery to reduce the risk of sight loss [6]. In the last decade, only about 50% of the annual global surgical targets have been achieved [7]. At the current rate, it has been estimated that the trichiasis backlog would not be adequately addressed until 2032, twelve years after the Global Elimination of Trachoma (GET) 2020 target date to eliminate blinding trachoma [8].

Since the establishment in 1998 of the Global Elimination of Trachoma by 2020 (GET2020) initiative, an increasing number of endemic countries have implemented national programmes incorporating the SAFE strategy of Surgery to correct trichiasis, Antibiotic to clear *Chlamydia trachomatis* infection, Facial cleanliness and Environmental improvement to reduce transmission. Morocco was one of the first countries in Africa to implement SAFE at the national level and achieved its Ultimate Intervention Goals (UIG) in 2006 [9]. The ultimate intervention goal (UIG) for trachoma control, defined by the World Health Organization (WHO) as “elimination as a public health problem”, is achieving a transmission target: reducing trachomatous inflammation follicular in children aged 1–9 years (TF1–9) to less than 5%, and a morbidity target: less than 1 case of trachomatous trichiasis (TT) per 1,000 people [10,11].

Ethiopia has also made important progress in the elimination of trachoma. The annual number of azithromycin treatments administered has increased from year to year. The SAFE strategy is being implemented in full in many endemic areas. By 2013, a cumulative total of 855,491 trichiasis surgeries had been done; 133,940 surgeries were done in 2013 alone. Since the inception of mass drug administration (MDA) in 2006 with 400,000 antibiotic treatments, a cumulative total of 119,697, 067 treatments have been administered [12].

Close to 71% (184,192 number of people operated for trachomatous trichiasis) of the 2016 global output of trichiasis surgery was performed in Ethiopia [13]. Of the ten states in Ethiopia, Amhara National Regional State is disproportionately affected by trachoma, bearing an estimated minimum of 45% of the national trichiasis burden with approximately one in twenty of all adults suffering from trichiasis. This region has been known for the highest prevalence of active trachoma (62.6%) and Trachomatous trichiasis (5.2%) as mentioned above [5]. After tremendous efforts of different interventions, the 2013-2014 district-based trachoma survey of the region showed active trachoma became 26.3%. However, trachomatous trichiasis prevalence showed no progress (around 4%) rather slightly increased after the 2006 national trachoma survey which was 3.8%.

The difference of performance of TT surgery among administrative zones (provinces) of the region found very wide; with least in South Gondar [28% (16,970)], North Gondar [13% (5,666)] and Awi zone [29 (4,931)] and best in East Gojjam [177% (2,3814)] zone of the 10 zones in the state. This difference has been also shown in other related activities; for example; the Amhara Regional State Education Bureau baseline census in all primary schools revealed that only 68% of primary schools of South Gondar zone had functional latrine. Of these schools, only 20.8% of them had water in their compound for face and hand washing.

Based on the above-mentioned evidences, the Amhara NRS health bureau designed a new approach TT intervention-the 'MUST' framework (Multisectoral coordination, Universal and consistent support, Insure Sustainability, Test the performance) to solve the staggering problem and step the regional state in to the elimination target.

Objective

- To establish a platform of coordination among the different government sectors and supporting partners on trachoma intervention
- To clear the TT-Backlog

- To learn from lessons and new approaches during the processes of interventions

Methods

First, we reviewed previous Trachoma elimination performance of 10 zones of Amhara national regional state in Ethiopia; such as trends by time, availability of Trachoma program officers at zonal and district levels and trained health professionals at health facility level for TT surgery implementation. According to the 2016 update of planning unit of the Amhara health bureau, the the regional state has 10 zones, 3 city administrations, 169 woredas, and 3,437 kebeles with a total population of 21,134,999. It has also 68 hospitals, 838 health centers and 3,336 health posts, 9 secondary eye care units and 313 primary eye care units, 8,611 primary schools, 106 program officers for Trachoma and other neglected tropical diseases (NTD), 391 TT surgeons and 1,688 TT sets.

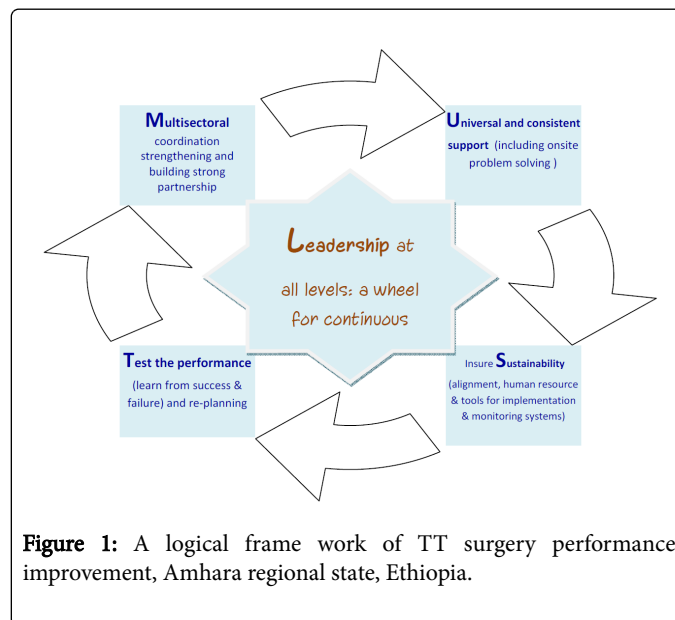


Figure 1: A logical frame work of TT surgery performance improvement, Amhara regional state, Ethiopia.

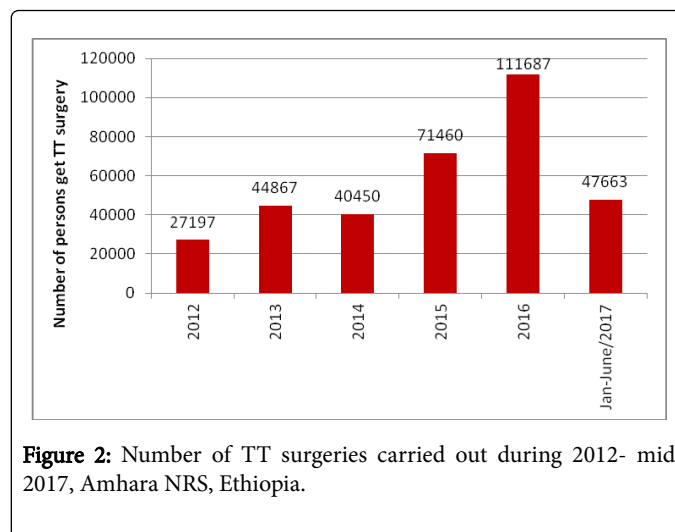


Figure 2: Number of TT surgeries carried out during 2012- mid 2017, Amhara NRS, Ethiopia.

After reviewing series of performances of TT burden of the regional state, the bureau developed a conceptual framework or a model (Figure 1) to intensify activities to rapidly decrease the burden of the disease.

The frame work pillars include multisectoral coordination and governance, universal and consistent support, insuring sustainability, test the performance and re-plan for TT surgery implementation. Term of references (TOR) were developed and provided for each actor with orientation. A field visit also carried out to support and observe

each actor's engagement, daily performance reports were reached at bureau level. Gaps of poor performer zones and districts were identified, and support provided. Then, we summarized both the qualitative and quantitative data.

S. No	zone	2012	2013	2014	2015	2016	Jan-June/2017	Total
1	Awi	1369	1096	1746	1312	2686	3788	11997
2	East Gojjam	1970	6152	6846	31083	31050	11609	88710
3	West Gojjam	3270	6121	4775	5090	8468	6558	34282
4	North Gondar	4895	4547	3298	5624	6787	3729	28880
5	South Gondar	1354	5623	5712	6550	14978	6963	41180
6	North Shoa	5115	7687	5541	5899	15841	1997	42080
7	North Wollo	4545	4684	5149	6014	11229	5454	37075
8	Oromia	596	612	579	738	1523	602	4650
9	South Wollo	2998	5848	5663	6898	14658	4315	40380
10	Waghemira	1085	2497	1141	2252	4467	2648	14090
Regional Total		27197	44867	40450	71460	111687	47663	343324

Table 1: Number of TT surgery performance during 2012 to mid-2017 by zones of Amhara NRS, Ethiopia.

Results

A total of 343,324 TT surgeries had been performed in Amhara National Regional State of Ethiopia during 2012 to mid-2017. Of these 32% (111, 687) of the TT surgeries carried out in the region were the 2016 fiscal year performance (Figure 2). East Gojjam [25.8% (88,710)] followed by North Shoa [12.3% (42,080)] zones took the highest share of TT surgery performances of the national regional state (NRS) during the reporting periods (Table 1).

South Gondar showed dramatic increment of TT performance in 2016 (Figure 3). During 2015 and 2016 a total of 21,528 TT surgeries were carried out in South Gondar zone and 69.6% of them were achieved in 2016 alone.

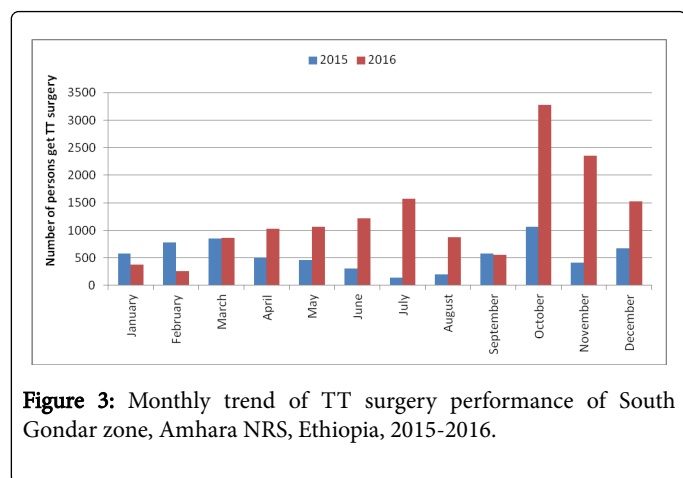


Figure 3: Monthly trend of TT surgery performance of South Gondar zone, Amhara NRS, Ethiopia, 2015-2016.

Gondar, South Wollo, West Gojjam and South Gondar zones of the State has high number of TT backlogs (Figure 4). As of June 2017, a

total of 23 woredas of the regional state achieved clearing of TT backlog. East Gojjam and North Wollo zones perform the highest by having eight and six woredas cleared TT backlog respectively. No single woreda of West Gojjam, Oromia and South Wollo zones could clear TT backlog as of June 2017 (Figure 5).

TT surgery validation achievement of the regional sate during 2016 was 99.5% (6,230) and 98.6% (297) during Jan-June 2017. All zonal validation performance was found to be more than 90% (Table 2).

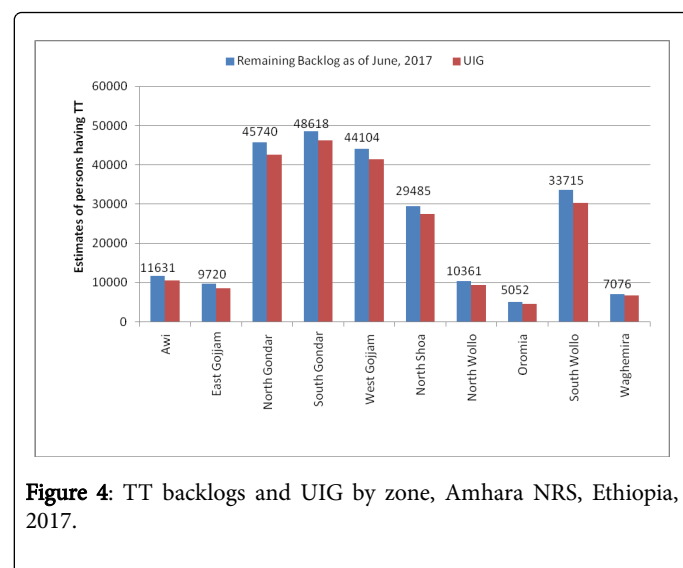


Figure 4: TT backlogs and UIG by zone, Amhara NRS, Ethiopia, 2017.

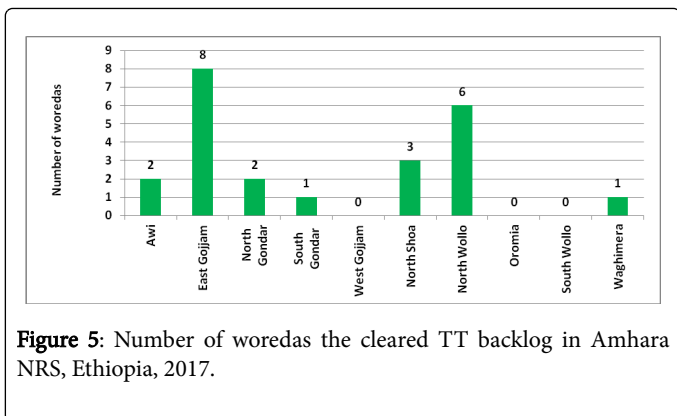


Figure 5: Number of woredas the cleared TT backlog in Amhara NRS, Ethiopia, 2017.

S. No.	Zone	Annual-2016			January-June, 2017		
		Persons interviewed	Persons operated		Persons interviewed	Persons operated	
		No.	No.	%	No.	No.	%
1	Awi	201	201	100	249	242	97.2
2	East Gojjam	2949	2925	99.2	182	169	92.9
3	North Gondar	359	357	99.4	239	238	99.6
4	South Gondar	578	576	99.7	471	468	99.4
5	West Gojjam	325	325	100	578	570	98.6
6	North Shoa	437	435	99.5	726	721	99.3
7	North Wollo	677	677	100	95	90	94.7
8	Oromia	189	188	99.5	53	53	100
9	South Wollo	372	370	99.5	230	230	100
10	Waghimera	176	176	100	126	126	100
Total		6263	6230	99.5	2949	2907	98.6

Table 2: Distribution of TT surgery validation findings by zone, Amhara NRS, Ethiopia, 2016-2017.

The regional facial cleanliness assessment among children during 2016 and mid 2017 was 92.4% (42621) and 90.8% (74866) respectively. East Gojjam achieved the highest [97.3% (8847)] and Waghimra zone found to be the least [83.1% (2069)] achiever in facial cleanliness (Table 3).

Regarding, the household latrine ownership, the regional performance with the above similar reporting periods was 68.2% (6,805) and 68.5% (6,772) respectively. North Gondar zone

performance was found low (41%, 537) and Awi zone performed the highest (81%, 629) during mid 2017 (Table 4).

S. No.	Zone	Annual-2016			Jan-June 2017		
		Children assessed	Children with Clean face		Children assessed	Children with Clean face	
			N	%		N	%
1	Awi	3748	3474	92.7	6252	5824	93.2
2	East Gojjam	5533	5346	96.6	9090	8847	97.3
3	North Gondar	9481	8797	92.8	10585	9129	86.2
4	South Gondar	3987	3284	82.4	8542	7410	86.7
5	West Gojjam	5107	4784	93.7	8712	7854	90.2
6	North Shoa	4508	4300	95.4	18808	17922	95.3
7	North Wollo	2670	2465	92.3	3100	2742	88.5
8	Oromia	1503	1441	95.9	913	867	95
9	South Wollo	6990	6631	94.9	13965	12202	87.4
10	Waghmare	2577	2099	81.5	2490	2069	83.1
Total		46104	42621	92.4	82457	74866	90.8

Table 3: Facial cleanliness assessment finding among children, Amhara NRS, Ethiopia, 2016-2017.

S. No.	Zone	Annual-2016			Jan-June 2017		
		HHs visited	HHs with Latrine		HHs visited	HHs with Latrine	
			No.	%		No.	%
1	Awi	833	671	80.6	777	629	81
2	East Gojjam	1396	1107	79.3	1413	1133	80.2
3	North Gondar	1714	951	55.5	1311	537	41
4	South Gondar	907	714	78.7	1225	924	75.4
5	West Gojjam	902	689	76.4	1336	845	63.2
6	North Shoa	1060	643	60.7	1134	796	70.2
7	North Wollo	441	250	56.7	306	211	69
8	Oromia	702	307	43.7	484	277	57.2
9	South Wollo	1174	811	69.1	1287	975	75.8
10	Waghimera	852	662	77.7	614	445	72.5
Total		9981	6805	68.2	9887	6772	68.5

Table 4: Household latrine assessment finding in Amhara NRS, Ethiopia, 2016-2017.

Strategic pillars	Major/main activities	Outputs	Outcomes
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<p>Multisectoral coordination strengthening and building strong partnership</p>	<p>The regional health bureau launched the fast track initiative to eliminate TT backlog in the region, allocated budget to each zone, assigned health workers responsible for eye care service to all districts, engage all political leaders to lead and monitored the TT and over all eye care service Leaders well advocated and communicated the burden of TT and TT surgery campaigns Multisectoral and multiagency Wash Taskforce established, Performance monitoring of each zone and district conducted Engagement of sectors and NGOs also monitored and guided Prioritization and clustering of districts carried out</p>	<p>Leaders chaired and reviewed performances, Allocated Budget for activities, Communities well involved and showed great interest in all campaigns. Taskforce meeting carried out regularly with good multisectoral representation. Sectors like communication and mass media agency successfully provided awareness creation through radio and television spots, healthy school program addressed students on eye care health promotion, safe water supply provided such as construction of hand dug wells construction & Term of references and implementation manuals produced.</p>	<p>All over burden of TT decreased across the region although still backlog are persistent, Least performing zones in TT surgery like South Gondar showed dramatic improvement in 2016, Quality data base established kept at NRS health bureau level, which never existed before.</p>
<p>Universal and consistent support (including onsite problem solving)</p>	<p>Support has been provided to all zones and districts/woredas such as allocating budget, hiring qualified professionals, providing training, etc</p>	<p>Most Zones and districts developed Self learning and innovation on problem solving capabilities (find a way to hire and train health workers to implement TT surgery)</p>	
<p>Insure Sustainability (alignment, utilization of human resource & tools for implementation & monitoring systems)</p>	<p>Monitoring and evaluation sustained throughout the year (regular weekly and monthly report of TT surgeries submission from each zone and district/woreda and timely feedback provided). Facial cleanliness and latrine utilization continuously advocated</p>	<p>All zones and districts keep-up continuous work on TT surgery and other eye care services to improve eye health of the community. Coverage of facial cleanliness improved.</p>	
<p>Test the performance (learn from success & failure) and re-planning</p>	<p>Each zone and district/woreda review its performance every quarter, biannually and annually. Regional health bureau points out the challenges, weakness and success of activities. Tremendous effort done to take off the ownership, political commitment at all levels (regional, zonal, district/woreda, health facility and kebele/village levels, & Re-plan for further better performance.</p>	<p>All zones and woredas performance on TT surgery improved during 2016 and 2017 than the previous years. Validation of surgeries for quality carried out in each district after all campaigns. Lessons well documented and evidence based plan produced.</p>	

Table 5: Strategies, major activities, outputs and outcomes, 2016-2017.

Discussion

When we look at the yearly trend of the regional TT surgery performance, the case of 2016 performance urge us to question why it became unique? TT surgery of 71,460 persons in 2015 vs. 111,687 persons in 2016; which has 64% difference in the same region and same health care system. We can find also a similar dramatic shift, when we look the monthly trends of 2015 and 2016 TT surgery performance of South Gondar zone (Figure 3). It also indicated that October 2016 performance alone competes to the half year performance of the past 10 years (Figure 3). Moreover, it is more than the 2008 annual performance. This could be due to the frequent field support of senior program managers and the establishment of intensified daily performance reporting system during the beginning of October 2016. This could be explained by the paradigm shift due to the fast track initiative of the federal ministry of health which alarmed the Amhara NRS health bureau leadership to take and design a unique framework which never be in its working desk. District level Trachoma and NTD program officers found to be key in improving the performance of trachoma intervention. During this exercise program managers and leaders well understood the gabs and 62.7% of district positions became fulfilled in the state. However, TT surgeons and other eye care professionals are also scarce. A study conducted in the same region indicated retention of trichiasis surgeons could improve productivity in TT clearing backlog [14], which supports the idea of looking in to retention mechanisms in line with training of new professionals.

East Gojjam zone uniquely perform huge backlogs compared from other zones of the regional sate almost equally both in 2015 and 2016 (31,083 and 31,050 surgeries respectively). This could be due to the launching of regional fast track initiative at Debre Markos town, a capital of East Gojjam zone during early 2015 which strengthened the ownership and political commitment. The other issue could be due to the fact that East Gojjam zone had the highest burden of trachoma prevalence in the regional state. Because of this remarkable success, irrespective of its big population size and highest prevalence of Trachoma, East Gojjam zone became one of the zones having the least number of TT backlog in the regional state (Figure 4).

Trachoma Elimination through sustainable interventions:

More than 80% of communicable diseases in Ethiopia are believed to be preventable using hygiene and environmental health interventions. Our framework faced challenges related to environmental health interventions. We know in the framework/ model that multisectoral and/or multiagency coordination, leadership, governance and partnership are vital pillars of implementation processes to secure the issue of Trachoma Elimination through sustainable interventions. Water, sanitation and hygiene (Wash) related interventions were difficult to successfully implement during all the cycles of our logical framework ("The MUST model"). The coverage of facial cleanliness among children (Table 3) seems good, but coverage of latrine ownership based on the rapid assessment found low (Table 5). But, we get a lesson that political leadership and senior program managers of different sectors role found to be vital in realizing the intervention at community level. From previous experiences and with

the current understanding; Safe surgery and Mass Antibiotic provision components could not smoothly embrace Facial cleanliness & Environmental intervention components to build technical confidence on trachoma elimination.

In conclusion, Amhara national regional state of Ethiopia has still huge TT backlog. The regional health bureau's new approach (The MUST frame work) showed an assurance of clearing TT backlog as quick as possible before 2020. The Multisectoral coordination and governance, Universal and consistent support at all levels, Insuring sustainability with effective implementation of intervention, Testing the performance and learn from lessons (The MUST framework) dramatically improved TT surgery performance throughout the region. Therefore, the following recommendations better be considered to continuously improve achievements.

The regional sate health bureau has to strengthen reviewing of performances, regular supportive supervision, the daily, weekly and monthly reporting systems at each level. Political leaders at all levels (regional sate, zonal, district and village/kebele) should fully involve to clear TT backlog and work closely on sustainable interventions. The regional state health bureau should also intensify the training of mid-level eye care workers and Wash professionals and strengthen the coordination for integration of Trachoma with other NTDs Taskforce. This lesson could be scalable to other disease control and prevention programs with further development.

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