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Signature:

Kimberly A. Jensen

Date

Trachoma Education in Amhara, Ethiopia: Making it Work for Teachers and Students

By

Kimberly A. Jensen
Master of Public Health

Hubert Department of Global Health

_____

Deborah A. McFarland, MPH, PhD
Thesis Committee Chair

_____

Amy E. Patterson MHS, PhD
Thesis Committee Member

_____

Aisha E. P. Stewart, MPH
Thesis Committee Member

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By

Kimberly A. Jensen

B.A. Journalism & Mass Communications
University of Wisconsin-Madison
2007

Thesis Committee Chair: Deborah A. McFarland, MPH, PhD

An abstract of
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Rollins School of Public Health of Emory University
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Abstract

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By Kimberly A. Jensen

Background: Trachoma is a preventable blinding disease that is responsible for the blindness of over 2.2 million people. In Amhara, Ethiopia, The Carter Center assists in implementing the WHO-endorsed SAFE strategy (surgery, antibiotics, facial cleanliness, and environmental improvement) for trachoma. With the 2020 target date for global elimination of blinding trachoma near, there exists a need to accelerate progress, especially as it relates to "F" and "E". In 2013, the Amhara Regional Health Bureau and The Carter Center desired to better understand the current situation of trachoma health education through which "F" and "E" components are addressed in Amhara.

Objectives: Considering the finite quantity of available drug and districts nearing the 5% TF_{1-9} threshold, it is necessary to prioritize activities related to "F" and "E". This project aimed to identify current trachoma education practices, challenges and opportunities of the existing trachoma health education program, and perceptions held by the target population related to trachoma messages in order to establish program recommendations.

Methods: The project was conducted in six woredas in South Wollo, Amhara, Ethiopia. In-depth interviews (IDIs) were conducted with 24 educators, one teacher and one director from 12 selected schools. Twelve gender-specific focus group discussions (FGDs) were conducted with students aged 7-12 years in six school catchment areas.

Results: Educators and students possessed knowledge of trachoma and prevention, though conflation of messages occurred, especially related to transmission. Challenges associated with educational materials and implementation of the trachoma curriculum included: lack of time to incorporate lessons, deficiency of materials, need for grade-specific activities, shortage of trained teachers, and insufficient follow-up to establish accountability.

Discussion: It is recommended that trachoma be incorporated into the government-regulated curriculum to ensure implementation. The trachoma curriculum should be modified to include: necessary materials for trachoma lessons; short, grade-specific lessons that can be easily incorporated; and basic messages, focusing on action before knowledge. Teacher training workshops should be held yearly to reinforce trachoma prevention in schools, enhance teacher confidence to teach trachoma, and act as a platform to discuss best practices. Messages should be developed using positive and negative comparisons and should be pre-tested before implementation.

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1.0 Introduction

Trachoma, caused by the bacteria *Chlamydia trachomatis*, is the leading cause of infectious blindness in the world (World Health Organization, 2014). This preventable disease, which starts in childhood, affects the most impoverished, usually rural, communities of the world, causing disability and dependency, and limiting economic development. Currently, an estimated 2.7% of the population is confirmed to be living in areas where they are at risk of going blind from a preventable disease—that equates to more than one in every 37 people in the world that is at risk from going blind from a preventable disease (World Health Organization, 2014).

The economic impact of blinding trachoma is experienced when an individual is unable to work due to the debilitating pain or potential blindness that has resulted from the trachomatous trichiasis (TT) and corneal opacity. The economic impact that trachoma may have on the loss of productivity worldwide has been quantified with totals ranging from $3.5 to $5.3 billion (Callahan, K., et al., 2014). Families may also be affected economically as children cannot complete household tasks when they must often accompany and lead family members experiencing visual impairment, as they are unable to properly see and navigate the difficult terrain. The education of school-going children is at risk if they must remain at home to care for a family member afflicted with blinding trachoma; girls are particularly affected when elders fall ill to the debilitating disease as they are pulled from school in order to assist with household duties (Callahan, K., et al., 2014).

Beyond the economic hardship resulting from trachoma, there exists the potential emotional burden that trachoma can cause. As witnessed in a quality of life study of women in Niger, people who suffer from TT, the painful, pre-blindness stage of trachoma, are at risk of social isolation, either self-imposed or otherwise. Women struggled with feelings of embarrassment and fear of stigmatization from others due to TT and as such, they retreated from the situations and social interactions. Some women even discussed instances when men had, in fact, abandoned wives or maltreated them due to their cases of TT, further reinforcing the fear of stigmatization experienced by individuals. This constant fear and anguish

burdens the physical and emotional state of those suffering from TT, decreasing the quality of life that one may experience (Palmer, S.L., et al., 2014).

1.1 SAFE Strategy and GET 2020

The control and elimination of trachoma has been a focus of the World Health Organization (WHO), especially since it formed the Alliance for Global Elimination of Trachoma (GET 2020) in 1997 and established WHA resolution 51.11, calling attention to the need to address the preventable blinding disease (Edwards, T., et al., 2006; World Health Assembly, 1998). The WHO endorses the full SAFE strategy— **S:** Surgery, **A:** Antibiotics, **F**: Facial Cleanliness, and **E**: Environmental improvement—in an attempt to eliminate blinding trachoma as a public health problem by the year 2020 (World Health Organization, 1997).[1]

The "S" component of this strategy can slow the progression towards blindness due to trachoma by operating on those who suffer from TT, the condition where at least one eyelash touches the globe of the eye. Entropion, or the in-turning of the eyelid, occurs after repeated infection of trachoma. The surgery, which takes a mere 15 minutes per eye, can halt further damage caused by the in-turned eyelashes, decreasing the potential for irreparable corneal opacity. In many trachoma-endemic countries, the TT surgery can and is conducted by individuals who are not surgical ophthalmologists or other types of medical doctors, but rather health professionals who receive a 2-4 week training to conduct the sight-saving procedure (World Health Organization, 2006).

The "A", or antibiotic, component of the SAFE strategy consists of distributing an annual dose of Zithromax®, donated by Pfizer Inc, used specifically to treat and prevent trachoma infection, to the entire population of an endemic district. As designated by the WHO guidelines, if a district reports a prevalence of trachomatous inflammation-follicular (TF) in children aged one to nine years (TF_{1-9}) 10% or above,

[1] WHO indicators for achieving elimination of blinding trachoma as public health problem include: **(1)** <1 case of TT "unknown to the health system" per 1,000 population, and **(2)** a prevalence of trachomatous inflammation-follicular in children aged 1-9 years (TF_{1-9}) below 5% (World Health Organization, 2014)

mass drug administration (MDA) for trachoma is suggested for at least three years (Table 1) (World Health Organization, 2006).

Thresholds for MDA	
10%+	*Mass distribution for entire district for 3+ years*
5-9.9%	***Previous guideline:*** *Survey at sub-district level and conduct mass distribution in sub-districts with TF_{1-9} ≥10% for 3+ years* ***New guideline:*** *Mass distribution in districts with TF_{1-9} 5-9.9% for 1 year*
< 5%	*No antibiotic distribution*

Table 1. Thresholds for determining treatment with MDA
World Health Organization, 2006; International Trachoma Initiative, 2014

The promotion of facial cleanliness, the "F" component, aims to decrease the ocular and nasal discharge present on the face of an individual. The absence of ocular and/or nasal discharge decreases the likelihood that *Musca sorbens* (the eye-seeking fly that transmits trachoma) will carry the infectious discharge from one individual to the next. Face washing is consistently promoted by national trachoma programs as a strategy to prevent trachoma transmission, yet there are no standard indicators that can be used to assess facial cleanliness, a gap that results in the inability to objectively assess progress and comparisons between countries, and know how to best address the promotion of "F" and "E" (King, J.D., et al., 2011; Stocks, M.E., et al., 2014).

Similarly, the "E" component, specifically the use of latrines, lacks standard indicators, even though latrines are a key component referenced in trachoma prevention strategies. The use of latrines decreases the potential for transmission due to the fact that *M. sorbens* prefer to breed in exposed human feces, but not in latrines (Emerson, P.M., et al., 2004). However, there is dissent as to how latrines, or "E", should be measured—some determine that the presence of a latrine is sufficient while others consider the quality or use of the latrine (Montgomery, M.A., et al., 2010). The lack of objective, standard indicators to assess activities and outcomes make it difficult to measure the impact of "F" and "E" interventions.

This project focused specifically on "F" and "E", the behavior change components, that are the most challenging for the global trachoma program to implement, but are necessary for achieving and sustaining elimination. The geographic focus of this project was Amhara, Ethiopia since The Carter Center assists trachoma efforts there and it is has the highest known prevalence of trachoma globally. Of

the 1,181 districts that requested Zithromax® for treatment in 2016, for a total of 165 million treatments, 578 districts (48.9%) totaling over 71 million treatments (43.0%) were requested for Ethiopia (International Trachoma Initiative data, 2015). Further, of the 128 districts that conducted impact assessments in 2013, 58 (45%) of which occurred in Ethiopia, only one had fallen below the 5% TF_{1-9} threshold for elimination in Ethiopia, as compared to 61% of districts that had fallen below the threshold worldwide (International Trachoma Initiative data, 2015). There is a demonstrated need for continued, and possibly modified, approaches to deliver the SAFE strategy in Ethiopia in order to track towards elimination.

1.2 SAFE Strategy and The Carter Center

The Carter Center assists national trachoma programs in implementing the SAFE strategy in Mali, Niger, South Sudan, Sudan, Uganda, and in Ethiopia, the country known to have the highest burden of trachoma in the world. Since 2001, The Carter Center has been assisting the Amhara Regional Health Bureau (ARHB) of the Amhara National Regional State, the most known trachoma-endemic region within Ethiopia, to implement the full SAFE strategy. This involvement included supporting training for surgeons to conduct surgery, assisting in training for MDA, promoting of latrine construction, and assisting with health education in schools (Table 2). Since the commencement of Carter Center assistance in 2001, the partnership with the ARHB has achieved the distribution of over 110 million doses of Zithromax®, the completion of 384,421 surgeries, the construction of 2,914,235 latrines, and provision of health education in over 7,000 schools (The Carter Center Program data, 2015).

Carter Center-assisted SAFE Implementation 2001-2014	
Surgeons Trained	979
Surgeries Conducted	384,421
Azithromycin Distributed	110,043,051
Latrines Constructed	2,914,235

Table 2: Summary program data of Carter Center assistance of SAFE Implementation in Amhara, Ethiopia

Source: The Carter Center Program data, 2015

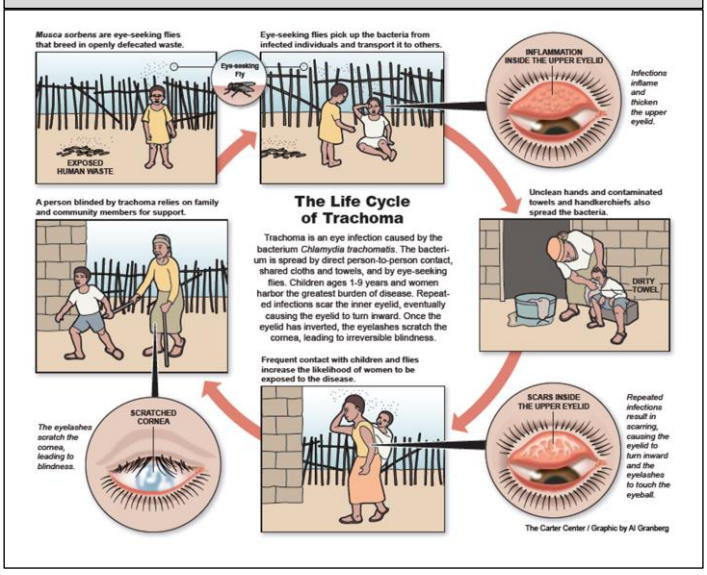
1.3 "F" and "E" Impact on Elimination

The promotion of the "F" and "E" elements of the SAFE strategy may be more challenging to implement and track than the "S" and "A" components as the former pair lack standardized indicators.

Evidence demonstrates that antibiotics for trachoma can reduce trachoma infection and thus mass distribution is suggested to control trachoma (Burton, M.J., et al., 2005). In some low- to medium-prevalence areas, antibiotic treatment alone has been sufficient to significantly decrease trachoma infection (Solomon, A.W., et al, 2004). Mass treatment can decrease the level of infection and transmission, though it may not be sufficient for the elimination of blinding trachoma in certain areas as the decrease due to antibiotic treatment may not maintain a lasting effect (Emerson, P.M., et al., 2000). In hyper-endemic areas, like Amhara, Ethiopia, interrupting transmission is "logistically impractical [by means of] surgery and antibiotic therapy alone", increasing the importance of robust and sustainable "F" and "E" interventions (Emerson, P.M., et al., 2000).

It has been demonstrated that *M. sorbens* serves as a vector for transmission of trachoma and breeds in human feces, but not latrines (Emerson, P.M., et al., 2004). The provision of latrines, the "E" component of the SAFE strategy, may decrease the amount of flies in the environment, thus decreasing the number of flies that can transmit trachoma infection from the ocular discharge from on individual to the next. The "F" component too can decrease the risk of infection by limiting the amount of infected ocular discharge present on the face of an individual that can be transmitted via *M. sorbens* by means of promoting facial cleanliness (Figure 1). Therefore, if elimination of trachoma is going to be achieved and maintained, behavior change, namely the "F" and "E" components of the SAFE strategy, is essential to decrease the likelihood that infection returns after treatment has stopped (House, J.I., 2009).

Figure 1: Life Cycle of Trachoma
Source: The Carter Center, 2014



1.4 Problem Statement

MDA has been shown to decrease TF, but it is not a sustainable, long-term solution for programs, due to the high costs associated with

conducting distribution activities (time, money, and human resources). Further, it has been shown that trachoma infection returns, even after intensive antibiotic treatment (recrudescence observed in both annual and biannual treatment cycles), thus requiring non-antibiotic strategies to keep TF prevalence low (Gebre, T., et al., 2012). As the threshold for the elimination of trachoma as a public health problem is 5% TF_{1-9} (and 0.1% TT in the population), it is possible for a district to no longer be eligible for antibiotic treatment as the prevalence has fallen below 5%, even if it is surrounded by endemic districts with $TF_{1-9} \geq$ 5% (World Health Organization, 2006). For such districts, "F" and "E" are the only options for trachoma control. Finally, since each of the "A", "F", and "E" components independently have demonstrated to have a positive effect on TF when practiced, it is reasonable to believe that "F" and "E" are reliable approaches to decrease trachoma (Ngondi, J., 2008). With the goal for elimination of blinding trachoma by 2020, additional focus in planning and conducting "F" and "E" activities are required.

1.5 Project Purpose

The purpose of this project was to assess current programmatic activities related to health education and behavior change communication for trachoma in schools within Carter Center-assisted areas in Amhara, Ethiopia, and provide recommendations for modifications to program activities and materials. In order to enhance health education and behavior change communication to target "F" and "E", the project identified and documented current practices, challenges and opportunities of the existing trachoma health education program, and perceptions held by the target population regarding trachoma prevention messages. The information was then collated and analyzed in order to establish recommendations for curricular modifications. Specific objectives of the project that led to program recommendations include:

Objective 1: To determine what is currently being done in schools in Carter Center-assisted areas in Amhara, Ethiopia to encourage and support trachoma prevention behaviors

1. Explore how the ARHB curriculum is currently being implemented in schools (frequency, consistency, and completeness).

2. Define what resources are available, such as visual aids, to support the trachoma education and behavior change messaging in schools.
3. Identify what role, if any, student clubs play in encouraging and supporting trachoma prevention behaviors in schools.

Objective 2: To explore what messages should be used to encourage the desired trachoma prevention behaviors in school-aged children in trachoma program areas of Amhara, Ethiopia.

1. Identify what children currently know as well as any gaps in knowledge about trachoma and its prevention.
2. Define what drivers/motivators exist that may encourage school-aged children to adopt desired behaviors for trachoma prevention.
3. Determine what barriers may impede the adoption of the desired preventive behaviors.

Objective 3: To identify how trachoma education and behavior change messages should be delivered in Amhara, Ethiopia.

1. Explore what images should be used to deliver each of the key messages about trachoma.
2. Assess preferences for message format and appearance.
3. Identify influential role models who might persuade children to adopt desired behaviors.

2.0 Background

2.1 Trachoma in Ethiopia

Of the 91.7 million people who live in Ethiopia, an estimated 18.9 million live in the Amhara region (United Nations Statistics Division, 2012). Of this population, 18.8 million people live within districts that meet the WHO-established threshold for implementing the full SAFE strategy, TF_{1-9} prevalence greater than 10% (World Health Organization, 2010). This means that 99.4% of the population in the Amhara region is at risk for blindness if the risk factors for trachoma are not addressed.

2.2 Health Extension Program (HEP)

The Amhara region, as is true for all regions in Ethiopia, is divided into woredas (counties), which are then divided into kebeles (towns). As seen in Figure 2, which depicts the estimated population per administrative unit, a kebele consists of an estimated 5,000 people or 1,000 households. Addressing health issues in Ethiopia is particularly challenging due to the remote areas of population density, which results in a vast difference between urban and rural populations as it relates to access to healthcare facilities (Tesfa, B. & Jibat, N., 2014). Ethiopia is challenged with a highly burdened and undersupplied healthcare system that has a low physician to population ratio (0.3 to 1,000 people) and a lower than average hospital bed to patient ratio (1.9 to 10,000 patients) than may other sub-Saharan African countries, which average nine beds per 10,000 patients (Caglia, J., et al., 2014). In order to address the problem of the limited number of health professionals to address the needs of the population, the Health Extension Program (HEP) was developed, to specifically reach the underserved rural population of the country (Federal Ministry of Health of Ethiopia, 2007).

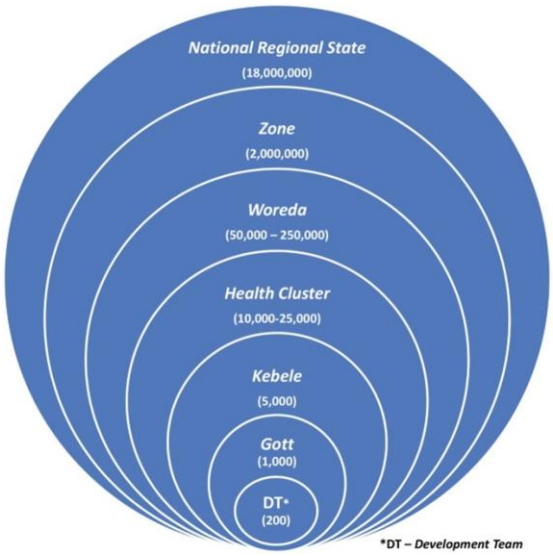


Figure 2. Administrative levels and respective population structure of Amhara National Regional State, Ethiopia
Source: King JD et al., 2014

The HEP was introduced in 2003 and launched in 2004 by the Ethiopian National Government. The purpose of the program was to address the challenges related to health care coverage by expanding and improving primary health care services. The HEP uses a community-based approach to behavior change, which is based on the strategy to first train early adopters and then move towards other groups as they become more open to the behavior: the diffusion model (Banteyerga, H., 2011). The government established the HEP to increase access at the kebele level, the smallest administrative unit of the government (Tesfa, B. & Jibat, N., 2014).

The HEP's main purpose, when established, was to address the maternal and child health issues that greatly affect at-risk communities in the rural areas of the country. Key objectives of the program include: (i) to improve access and equity to preventive essential health interventions at the village and household levels in line with the decentralization process to ensure health care coverage to the rural areas; (ii) to ensure ownership and participation by increasing health awareness, knowledge, and skills among community members; (iii) to promote gender equality in accessing health services; (iv) to improve the utilization of peripheral health services by bridging the gap between the communities and health facilities through Health Extension Workers (HEWs); (v) to reduce maternal and child mortality; and (vi) to promote a healthy lifestyle (Caglia, J., et al., 2014). The intention was that communities would have the ability to maintain their own health, if given the right knowledge and skills, though using local and familiar practices and resources (Ethiopian Federal Ministry of Health, 2007).

Women who have completed at least 10th grade of secondary school are eligible to participate in the one-year HEW training program, which includes field practice. Two of these newly-trained HEWs are trained to staff each health post, one of which is located in every kebele. Upon conception of the program, the Ethiopian government aimed to train and deploy enough HEWs to achieve a ratio of one HEW per every 2,500 population; by 2010, over 30,000 HEWs, all women, had been trained (Banteyerga, H., 2011).

Table 3. Table of HEW Training Packages
Source: Caglia, J., et al., 2014

Health Extension Worker Training Packages		
Main Theme	**Number of Modules**	**Topics**
Health Education and Communication	1	*Health Education*
Hygiene and Environmental Sanitation	6	*Personal Hygiene, Healthy Home Environment, Food Hygiene and Safety Measures, Water Supply and Safety Measures, Solid and Liquid Waste Disposal, Excreta Disposal*
Disease Prevention and Control	3	*First Aid Emergency Measures, Malaria Prevention and Control, HIV/AIDS & Other STIs, TB Prevention and Control*
Family Health	5	*Maternal and Child Health, Family Planning, Immunization, Nutrition, Adolescent Reproductive Health*

The HEW is responsible for disseminating 16 health packages (Table 3) within four main themes (hygiene and environmental sanitation, family health services, disease prevention and control, and health education and communication) to her

community (Global Health Workforce Alliance, 2008).

2.3 The Carter Center and Amhara Regional Health Bureau

The Carter Center has been collaborating with the ARHB to assist trachoma prevention activities in the region, which includes utilizing the HEWs for activities related to community sensitization for MDA and surgical campaigns as well as to promote preventive behaviors such as facial cleanliness and latrine construction in the schools and communities. The involvement of the HEWs is imperative for the success of Amhara's program, especially as modifications to current health education strategies are considered. HEWs conduct education sessions in schools and surrounding communities, and as such, they should be considered when planning new interventions.

2.4 Schools as a Means to Bring Change

The ARHB recognized the potential of school-based programs for reaching school children and has thus used schools as a platform for delivering the trachoma program since 2003. Due to the ease with which many children from different communities can be reached simultaneously with drug distributions and health interventions using the school system, schools have been a frequently used strategy for program dissemination for many health outcomes (Montresor, A., 2013). In 2004, the ARHB developed a school-based trachoma education curriculum for implementation in primary school for grades one through four. The curriculum, which was revised in 2006, consists of nine units that are intended to be incorporated into the science lessons presented in the Government of Ethiopia's school curriculum. The printed document provides suggestions to teachers for activities that range from writing stories, to pretending to be blind, to drawing the anatomy of the eye and understanding its functionality. In 2008 the ARHB reprinted the revised curriculum and conducted training sessions, for the selected teachers, on the use of the curriculum. Two educators from each school in the region, usually the director and a science teacher, were invited to participate in the training sessions. The goal was that these trained educators would then return to their respective schools and conduct training sessions for all other teachers.

An evaluation was conducted in December 2012 in the Amhara region of Ethiopia by members of The Carter Center with the ARHB to identify innovative practices for trachoma health education in schools, community, and mass media where The Carter Center had actively assisted trachoma control programs. Key conclusions from the assessment demonstrated that (i) the trachoma curriculum developed by ARHB and assisted by The Carter Center was not present in all schools (only four of the eight schools visited continued to use the curriculum) and had not been revised since 2006; (ii) there were potential opportunities for collaboration with the water, sanitation and hygiene (WASH) sector as WASH manuals and some WASH best practices were observed in schools; (iii) few or no visual aids were available to support trachoma education in classrooms; and (iv) few schools had electricity, and without it, CDs and DVDs would not be appropriate health education materials (Dickman, L. & Ogden, S., 2012).

One of the aims of this current health education assessment project was to further the previous assessment and identify factors associated with continued use or non-use of the educational materials. We also aimed to determine if improvements could be made to the curriculum based on teachers' feedback in order to improve implementation. Teacher buy-in and proper (consistent and correct) implementation of the curriculum are necessary for the health education materials to be effective since the impact of school programs will be diminished without adequate teaching of concepts (Resnicow, K., et al., 1998). The assessment of implementation is also necessary for the impact evaluation stage—if process data are not available, it will be difficult to determine whether the interventions are appropriate as it will be uncertain as to whether the lack of impact is due to a poor intervention or poor implementation.

It was due to the continued uncertainty as to what strategies may be effective for promoting behavior change as it relates to facial cleanliness and environmental improvement as well as the need for revision of the trachoma curriculum that required this project to be completed. The intended purpose of the project was not to develop a new curriculum or related materials for the program but rather provide programmatic recommendations for ARHB's Carter Center-assisted trachoma control program.

3.0 Methods

3.1 Setting and Study Population

The Amhara region is divided into ten zones and then sub-divided into 167 woredas, or districts. The project was conducted in eastern Amhara, in the zone of South Wollo (Figure 3), with a population of 2.5 million (International Trachoma Initiative data, 2015). The zone was selected for the study because it is one of ten areas receiving assistance from the ARHB and The Carter Center. Additionally, South Wollo had been receiving "F" and "E" interventions as part of the SAFE strategy since 2006 and yet had not achieved its elimination goal—after almost a decade of prevention and treatment, it was important to determine if improvements to the strategy could be made. Further, the MDA campaign was being conducted in western Amhara where, according to Carter Center program plans, staff from the ARHB and The Carter Center would be occupied distributing over nine million doses of Zithromax®; this made it logistically necessary to select an area where MDA was not taking place. The potential for bias was also taken into consideration as it related to MDA activities as health education is conducted during MDAs, and such education received during distribution could have skewed the results of the study. Therefore, therefore, South Wollo in eastern Amhara was deemed more appropriate for the project site.

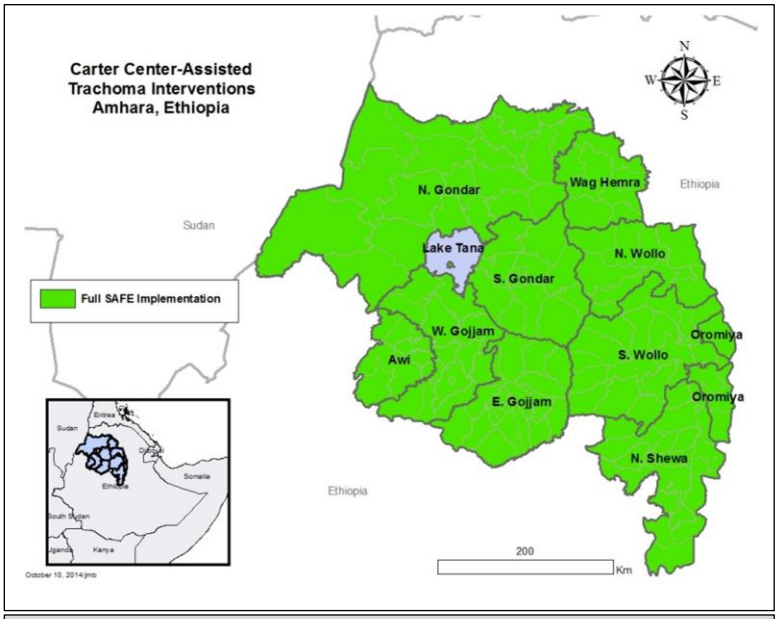


Figure 3: Map of the coverage of SAFE implementation in Amhara, Ethiopia
Source: The Carter Center Program data, 2015

Woredas were determined to be eligible for participation with the help of The Carter Center's Zonal Project Coordinators (ZPCs). Criteria for inclusion of woredas (districts) and schools for the project included:

- **Schools within the woreda had been visited by the ZPC within the last two years.** This was done to enhance the experiential knowledge that ZPCs had as it related to the performance of the schools while also limiting the bias that recently visited school may have displayed—schools that were most recently visited by ZPCs may practice more preventive behaviors or recall trachoma issues more than usual.
- **Rural kebele.** This was preferred as previous prevalence surveys indicate that there is a higher prevalence of blinding trachoma in rural areas (Federal Ministry of Health of Ethiopia, 2006).
- **Within a three-hour drive from Dessie, the zonal capital of South Wollo**. Due to the logistical considerations and time constraints, it was necessary to limit the distance that was required to reach project sites.

A total of 62 eligible primary schools within 15 woredas were determined to be eligible for inclusion in the project. From the list of eligible woredas, six woredas were selected. Two kebeles were selected from each woreda for a total of 12 kebeles. Each kebele had one school in its catchment area and two HEWs assigned to the kebele.

The project was conducted in two phases, due to time constraints and availability of project participants. As the project began in June when the school year had come to an end, teachers were not available throughout the project as they had returned to their homes for the summer. Therefore, it was necessary to conduct the key informant interviews with teachers and directors first, which were then followed by the focus groups of students, who could be located in the villages within the school catchment areas. Information collected during interviews with school staff that was relevant and in need of further discussion with students was incorporated into the FGD guide for discussion with schoolchildren.

Non-probability criterion sampling was used to recruit participants for the project activities, as the purpose of the project was to obtain rich descriptive information rather than to be able to make

generalizations across populations. In phase one of the project, a total of 24 teachers and directors (one director and one teacher per school) were selected from the 12 selected schools. In phase two of the project, a total of 96 children, ages 7-12 years, participated in the gender-specific focus group discussions (FGDs).

3.1.1 Selection of Participants: Teachers and Directors

The project included key informant interviews with the school director and one teacher at each of the two schools within each woreda. The key informants were purposively selected from the school within the kebele. It was desirable to select a director and teacher so that both overall school considerations as well as classroom-specific issues could be discussed. If the school director was not available, the sub-director was selected to participate in the interview. Teachers were selected if they were trained on the trachoma curriculum in 2008-2009 or, if not available, a science teacher was eligible to participate as the curriculum was intended to be taught during science modules. Due to the timing of the interviews (which occurred after the academic session had ended for the summer), some eligible teachers were no longer present for interviews and a convenience sample was taken. The HEWs in each of the selected kebeles assisted in contacting the school directors and setting up the school visit and key informant interviews.

3.1.2 Selection of Participants: Students

Student participants of the focus groups were selected based on their place of residence. A village in the catchment area of each designated school was selected for the student focus groups, which were conducted after the completion of director and teacher interviews. As the HEWs were acquainted with the residents within the school catchment area, they played an integral role in locating students eligible to participate in the FGDs. Children between the ages of 7-12 years were selected to participate; this five-year age range was selected so that students would have the capacity to discuss during the focus groups—by the age of seven children develop key thinking and conceptual skills that would assist in the discussion process. Additionally, as the trachoma education curriculum, designated for grades one through four, was

updated in 2006 and reprinted in 2008, there would be students within the focus group that should have received it over the past few years as well as those who were new to the program.

3.2 Research Design

The two-phased project was conducted June 9 – July 19, 2013 with the assistance of three Amharic-speaking consultants who provided logistical and project support. Data were collected using IDIs and FGDs. IDIs and FGDs were conducted by two of the field team members: IDIs were conducted by the male team member and FGDs were facilitated by one of the female team members. Both IDI and FGD activities had the third field team member act as the note taker for all interviews and discussions.

The Emory Institutional Review Board (IRB) classified this project as non-research given that it was to be used for program improvement and would not be generalized to a larger population outside of the Amhara region (Appendix A). The protocol was reviewed and approved by the ethical review board of the Amhara National Regional State Health Bureau. Due to low levels of literacy in the rural areas of Amhara, consent and assent were provided on a verbal basis for both adults and minors, respectively, and parental consent was received for students participating in the FGDs.

3.3 Research Procedures

The information from teachers and directors as well as the primary school students was collected using trained field team members, utilizing IDI guides as well as FGD facilitation guides. The data were collected, transcribed, analyzed, and used to make programmatic recommendations for program improvement.

3.3.1 Assessment Tools

The interview guides for teachers and directors were similar in nature, though not identical. The different guides were used to better understand activities that took place within the classroom, throughout the entire school, and where the overlaps occurred (Appendix B). The interview guides included closed-ended, quantitative questions to collect basic demographic information about the participant as well as information about the school and students. The quantitative data collected included age and years of

experience of participants, number of teachers per school, total school population, and teaching subject of teachers.

The FGD facilitators guide was developed using participatory action research methodologies, incorporating activities in which students could participate while providing relevant information for the project (Appendix C). The activities utilized during the FGD included a community mapping exercise, image critique, and poster creation activity. In addition to engaging the students in conversation, the purpose of such activities was to elicit information regarding: access to trachoma education messaging, knowledge of trachoma and its prevention, barriers and facilitators to practicing preventive behaviors, and image preferences.

The interview and facilitation guides were developed through multiple iterations, considering strategies to elicit elaborate discussion without committing common errors such as leading or binary questions. The key objectives were consistently reviewed to ensure that all answers would be addressed by the completion of both phases of the project.

3.3.2 Training of Field Team

Prior to project commencement, the project team received initial training, which included a review on ethics of human subjects' research, qualitative research methods, interview and data collection strategies, and note-taking skills. IDI and FGD simulations were utilized to familiarize the field team with the project tools as well to uncover areas for improvement, including the formulation of questions, use of open-ended, non-leading questions, and implementation of probing and follow-up questions. In additional to training, the interview team also participated in daily debriefing and refresher sessions to discuss any issues, missed opportunities, ineffective questions, and other topics that arose. In response to outcomes of debrief sessions, modifications to survey tools and strategies to improve questions and opportunities for further probing were discussed.

3.3.3 Teacher and Director Interviews

The school director from the selected school was offered participation in an interview and he/she then selected a teacher to participate in a separate interview; as many schools had ended and many teachers had departed to their homes, a convenience sample was required. After providing verbal consent, each key informant was interviewed by a field team member. Participants first responded to the basic, closed-ended questions as a way to allow the participant to become more comfortable with the situation and more willing to discuss more elaborately as required. Collection of responses to open-ended questions then followed to better understand current practices within each selected school. Each IDI, lasting between 45 minutes to 65 minutes, was conducted in Amharic and audio recorded before it was later transcribed into English.

3.3.4 Student Focus Groups

Parents of school-going children were informed of the FGDs and provided verbal consent that their children were permitted to participate in the discussion; children provided assent for their participation. Gender-specific FGDs were conducted with eight students per group, between the ages of 7-12 years. The separation of boys and girls was done in an effort to limit any discomfort on the part of the participants. The FGDs, lasting between 60-75 minutes, were conducted in Amharic by a female team member and were audio recorded and transcribed into English. During the FGDs, students were asked to complete participatory activities, which included:

1. **Community mapping exercise.** During the mapping exercise, students were asked to draw and discuss their normal routines, the places where they spent time and enjoyed visiting, and the activities/behaviors that took place at each location. The potential association of trachoma was not prompted by the facilitator; the topic was only discussed after it had been raised by the participants.
2. **Image critiques.** Students were presented with existing images used for trachoma education in Amhara and in other Carter Center-assisted country programs. They were

asked to discuss the messages they received from existing materials and their preferences for images to be used in future materials.

3. **Individual trachoma prevention poster creation.** Student participants were also instructed to create individual posters that displayed what they thought were influential images and messages to educate the public; the purpose of this was to assess the issues related to trachoma prevention that most resonated with students.

3.4 Data Analysis

Transcripts from IDIs and FGDs were completed using a process of transcribing audio recordings from Amharic directly into written English. Translators were provided with and instructed how to use the transcript template (Appendix D); they were instructed to transcribe verbatim what was discussed, though considering the intended meaning of the commentary. When literal translations did not convey the intended meaning, translators were instructed to translate the intended meaning rather than the literal translation so as to maintain essence of the discussion. Transcripts were uploaded to the software program MAXQDA 2014 (VERBI Software, Berlin, Germany) in order to systematically review and analyze qualitative data.

To analyze the data collected during the interviews and focus groups, an iterative process was used. First, transcripts were reviewed to achieve a general understanding of the key themes of the interviews and FGDs. MAXQDA was used to create memos and highlight topics of interest that arose within transcripts. Key concepts were highlighted throughout the transcripts and assessed for common themes. Key themes were selected across IDIs and FGDs to inform recommendations for programmatic application.

4.0 Results

A summary of quantitative data collected for director and teacher participants, school composition (attendance, teacher to student ratio, grade levels, etc.), as well as information regarding presence of latrines and hand washing stations are included in Table 4. Most of the respondents (of whom

only one was female) lived within the school community (three directors and two teachers lived elsewhere.

Table 4: Summary Table of Quantitative Information

	Teacher				Director		School				
School ID	Age	Years Experience	Grade level taught	Subject Taught	Age	Years of Experience	Grade levels in school	Population	Number of children per teacher	Latrine present on school grounds	Hand washing station present on school grounds
001	28	8	4th	All	30	12	1 to 4	328	41	Y	N
002	26	5	6th-8th	Math	45	14	1 to 8	906	45.3	Y	Y
003	23	6	7th-8th	Biology Chemistry Physics	33	10	1 to 8	748	34	Y	N
004	35	10	2nd	All	39	15	1 to 8	562	31.2	Y	N
005	40	14	1st	Civics	33	13	1 to 8	557	30.9	Y	Y
006	44	11	5th-8th	Biology Chemistry Physics	28	13	1 to 8	552	27.6	Y	Y
007	27	7	7th-8th	Social Science	35	13	1 to 8	814	37	Y	Y
008	50	25	4th	Math	33	10	1 to 8	503	29.6	Y	Y
009	52	29	3rd	English Math Science	36	15	K to 4	173	34.6	Y	Y
010	43	20	6th-8th	Science	42	15	1 to 4	215	30.7	Y	N/A
011	52	31	4th	English Science	N/A	N/A	N/A	N/A	N/A	Y	N
012	26	6	6th	Science	28	7	1 to 8	1004	40.2	Y	Y

4.1 Trachoma knowledge

4.1.1 Personal Hygiene

Awareness about trachoma and its link to the practice of personal hygiene was widely demonstrated in responses by teachers and students, though differing in the degree of understanding. Students aged 7-12 years demonstrated dissimilar levels of knowledge about trachoma and other health issues; some children showed complete comprehension of trachoma, its transmission, and even germ theory, while others only partially knew the basic concepts. Even some teachers demonstrated fluctuating levels of knowledge as it relates to the cause of trachoma. Two teachers believed that trachoma was due to using chalk, one of whom believed it was due specifically to the use of colored chalk. He believed that "*Colored chalk can cause trachoma. In the city, people have more trachoma because they use more colored chalk. In the rural areas trachoma is caused because of lack of hygiene*". This demonstrated the varying levels of knowledge, even within an individual—the teacher did not have an accurate

understanding of the relationship between colored chalk and trachoma, but he was able to reference lack of personal hygiene as a cause of trachoma, although specific to the rural areas.

Many participants discussed the link between facial cleanliness and trachoma and other diseases, while others identified the presence of dirt, dust, and smoke as causes of trachoma. They acknowledged the need to practice frequent hand washing, though that was frequently related to the need to wash prior to eating in order to avoid intestinal parasites and other illnesses. Personal hygiene was frequently mentioned as a way to maintain one's health and avoid disease, but it is not clear whether participants had a clear understanding of what that meant. "*Keeping personal hygiene*" was frequently discussed, especially as it related to avoiding disease, but details as to what that entailed for trachoma prevention were less clear. Students described personal hygiene as key for preventing trachoma, but when discussing what actions were required, students mentioned behaviors that were not specific to trachoma behaviors (i.e. hand and face washing)—clean nails, clean hair, and clean clothes were examples listed as important for keeping personal hygiene and preventing trachoma. Though these behaviors may be important, some are not directly related to trachoma prevention, and as such, it is unknown whether students understand what they need to do to prevent trachoma specifically.

4.1.2 Transmission and Prevention

Students discussed health issues, such as trachoma, HIV, and TB, with familiarity which demonstrated that they had been taught about such issues. However, their complete understanding of each of the issues, including transmission, prevention, and treatment was questionable. Students responded with names of illness or diseases that they were taught to avoid, but the manner in which it was caused or how they may avoid it were less clear. In response to the interviewer's question regarding why a child in the picture was washing his face, an eight-year-old girl responded: *"So he can be clean, if he doesn't wash the flies will come…And if he eats without washing he might get HIV"*. Similarly, a nine-year-old girl discussed the importance of hand washing by stating, *"If we touch dirt, they tell us we might get HIV"*. Children are able to restate messages that have been shared with them, but not accurately recall and understand the messages.

Flies were almost unanimously discussed during all interviews and focus groups as a cause of disease, and many related flies with trachoma—"*they have trachoma and are going to go blind…because of flies"*. Participants seemed to be familiar with the link between flies and trachoma as flies were frequently named as the culprit of disease transmission, though few discussed pathways of transmission beyond flies carrying dirt and sickness from trash, latrines, or any dirty places to individuals. One student described the risk of disease that all individuals experience due to the noxious fly that transmits disease from *"the latrine or any other dirty places [and] maybe the fly is in the family now [and] then goes from him to him and him to him and transmits everything through everyone"*. However, this understanding of the person-to-person mode of transmission was not commonplace. Though some health education strategies have addressed the "fingers, flies, and fomites" ways of transmission, in which infection transmission between individuals is explained, correct understanding of the true relationship between trachoma transmission and the fly's role in transmission was vague, if not absent. A female student demonstrated her understanding, though incorrect, regarding flies and disease as she stated, *"the [flies] are in his mouth. When the flies are in his mouth, he will get trachoma"*.

The accuracy of knowledge as it relates to the involvement of flies in disease transmission was further represented when students described their personal drawings. Students described flies as causing disease, but not all understood how the fly caused disease; as demonstrated by the description a ten-year-old boy's drawing, the man had trachoma because the *"flies [were] eating him"*. People were aware that flies were bad and should be avoided, but how the disease was transmitted was less clear. Further, students also discussed that flies were bad and that flies were found in latrines. It is uncertain as to whether the disgust related to flies and the presence of flies in/around latrines led children to believe that latrines were also bad or if they were considered two unrelated issues.

The conflation of messages continued when discussing preventive measures to avoid such diseases that had been mentioned. When discussing prevention of washing as the method by which to prevent flies, it was frequently linked to eating—*"[we wash our hands] so that when we eat, flies don't*

get on our face". The mixing of messages related to the benefits of preventive behaviors, like hand washing, was not limited to trachoma; a female student stated that she must wash her hands before eating because if she does not, she will *"[get] malaria, TB, or worms will get inside us"*.

4.2 Challenges in Including Trachoma in Schools

4.2.1 Lack of Teacher Training

Some teachers demonstrated a discomfort with teaching trachoma as they had not received the formal training for trachoma education. The training had been disseminated to two staff members per school, usually the school director and one (science) teacher. Though "cascade training" has shown to be successful in other geographical areas, the intended dissemination of similar trainings conducted by "trainer of trainers" to fellow school colleagues was infrequently practiced (Hayes, D., 2000). Those who had received the training were designated to be the experts for the school and tasked with the role of trachoma teacher. As the directors infrequently taught lessons in the classroom, this equated to having a maximum of one teacher trained to present trachoma prevention in classroom lessons.

Though the model of cascade training has been utilized as a popular strategy to reach many people in a short amount of time, and cost effectively, it has been criticized in its delivery of effective training (Leu, E., 2004; Fiske, E.B. & Ladd, H.F., 2004). Even if the challenge to require teachers to conduct additional trainings without pay for their schools was overcome, the quality of the training would still be in question. There is a risk that the information received in the official training would not be presented to the second-tier in its authentic form, resulting in the "watering down and/or misinterpretation of crucial information" (Fiske, E.B. & Ladd, H.F., 2004).

Participating in training opportunities was almost unanimously described by teachers as necessary in order for them to be able to present trachoma concepts. There is a sense that the education related to trachoma prevention is complex and requires elaborate training, which resulted in teachers believing that they *"don't have enough knowledge about trachoma"* and therefore they are not qualified to teach even the most basic lessons related to trachoma.

4.2.2 Lack of Materials

Teachers commonly mentioned that they didn't have materials (posters, books, and flipcharts) to explain specific concepts to the children, such as trachoma prevention. This was true for lessons beyond trachoma or even general health education; teachers were required to develop their own visual materials to present concepts to students. Some teachers were creative in developing such materials and posters for use in the classroom, though it required additional time dedicated to do so. As it specifically relates to trachoma materials, some individuals did not feel comfortable trying to draw educational diagrams, such as the diagram of the eye, which is included in the trachoma curriculum (Figure 4). The fear of drawing it inaccurately, which would cause difficulties with children learning the concepts accurately, kept them from presenting the image at all. Though some teachers used the ARHB, Carter Center-assisted curriculum as a guide, they desired a more colorful curriculum for use in the classroom.

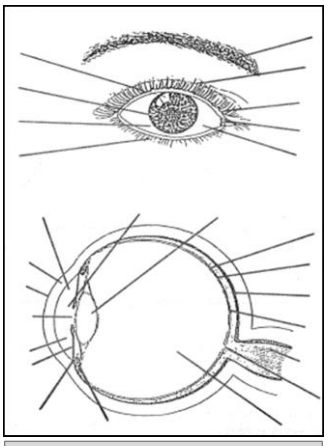


Figure 4: Reference diagram of eye provided in existing trachoma curriculum

4.2.3 Time Constraints

Teachers found it challenging to complete the required lessons included in their performance assessments (those that they are required to teach, as directed by the Ministry of Education), and even more challenging to incorporate supplemental activities. As teachers are required to deliver the complete, government-mandated curriculum, it leaves little room to incorporate supplemental lessons into the standard curriculum. If the full, supplemental ARHB trachoma curriculum were to be presented as it is intended, the amount of time required to present all lessons would be upwards of 28 supplemental hours per year. It is unlikely that teachers will be able to present the full supplemental lessons to students, as there are so many competing interests that teachers are asked to conduct and *"…[because of the] amount of work, things like [the ARHB]curriculum can be forgotten"*. Due to the insufficient time available to present the curriculum fully, it is up to the individual teachers to determine what is presented in the classroom lessons, in the allotted time that is available.

There is also a lack of consistency between teachers regarding the amount of time they may dedicate to health education in general. Some conducted a daily five-minute lesson about the topic of their choosing while others included trachoma lessons sporadically during the health or science unit; some did not incorporate any trachoma prevention messages at all. Though inclusion of trachoma education varied, all confirmed that there was insufficient time to adequately address such issues.

The inconsistency of teaching/promoting trachoma prevention was not only present between teachers, but between schools as well. There were clear observed differences in school quality and the amount of effort that is placed on the promotion of facial cleanliness or environmental improvement of the school. It was up to the individual school and leadership team to determine the importance of trachoma prevention and the extent of effort that would be dedicated to promoting "F" and "E" concepts.

4.2.4 Accountability

In order for trachoma education to continue in schools, teachers recommended more frequent follow-up session by officials and/or HEWs. Teachers stated that, upon receipt of the curriculum and training, they had taught lessons to their students, but as nobody followed up to ensure that they were implementing the lessons, and the teachers trained on the trachoma supplemental curriculum had transferred, the trachoma education "*gets forgotten after a while".* It made it difficult to continue to ensure that he/she taught something that was additional to the regular, required materials. As the teachers are assessed on the performance of students as it relates to the lessons housed within the government-regulated curriculum, teachers cannot spare the additional time they imagine it would take to teach a lesson. A primary school director commented that, *"the reason why trachoma teaching has been decreasing is because there is no training support, follow-ups. There used to be a report required but now they stopped so it's decreasing"*.

4.2.5 Grade-specific Activities

Since the trachoma supplemental curriculum currently is designated for first through fourth grades, there are no specific activities or lessons targeted for the respective grade. Teachers of younger children struggle with the complexity of the lessons. An activity that asked students to create and write a

story was viewed as too complex by one first grade teacher who stated that he would not be able to get through the activity with his students, especially in the time allotted. A third grade teacher determined that it was during or after third grade when some of these activities might start being possible for inclusion in the lesson plan. With insufficient time to modify the materials so that they would be age appropriate for students to complete and understand activities were not utilized by teachers.

4.3 Opportunities for Trachoma in Schools

4.3.1 School-wide Activities

Schools demonstrated varying levels of preventive behavioral practices related to WASH behaviors. Some schools were faced with the challenges of having no water on-site and few latrines whereas others had both a hand washing station and newly-built latrines (which, of note, were completed with the help of the community). The lack of water was listed as a significant challenge by some teachers as it was described as a hindrance to the education—it is difficult to teach about proper behavior without having the necessary tools to practice such behaviors. Some schools with no water had either established a system in which students took turns bringing water to the school while others sent the children who needed to wash a dirty face to one of the teachers' nearby homes. Such behaviors, however, were not consistent throughout and it was up to the school director and staff to make these behaviors a priority.

4.3.2 School Health Clubs

School health clubs were common in all schools visited. Though the clubs varied in their level of involvement in the school and the focus of the club (different clubs included sanitation and hygiene, HIV/AIDS, and general health clubs), every school visited had a health club that was charged with conducting activities to educate the school, and at times the community, about relevant health issues. Health club leaders were frequently science teachers who worked with students to organize activities and discuss health issues that should be taught at the flag raising ceremonies or other special events. The activities tended to be question and answer competitions or simple lectures, as that is what was most comfortable for students, and teachers had little guidance and no resources to conduct other activities.

4.3.3 Flag Raising Ceremony

The flag raising ceremony was another consistent practice across all groups; every school participated in the daily flag raising ceremony and many discussed the opportunities for health education that take place during that period when all students were together. One 35-year-old teacher described the lessons taught during the flag raising ceremony: *"during anti-AIDS and health we teach about the proper use of the toilet, about trash for example we have people that clean the schools and so we teach about how trachoma is transmitted, we invite health professionals so the students can get a wider understanding of health. Also because of this during line ups the school teaches about how trachoma is transmitted and how HIV/AIDS are transmitted".*

Assessment of facial cleanliness and personal hygiene of students (including cleanliness of clothes, nails, and hair) was conducted in every school; assessments generally took place once per week, usually on Mondays, during the flag raising ceremony. Students and teachers alike discussed the practice of children being assessed on the basis of cleanliness, though the actions resulting from these assessments varied between schools. The involvement with the parents of students was not consistent across schools. Some teachers suggested that parents were contacted and/or asked to visit the school to discuss the issue while other parents only did so after repeat offenses and/or if the child was deemed too young to receive that guidance and in turn, share the information with his/her parent(s).

Some schools addressed the lack of cleanliness on an individual basis, simply advising the child of the need to wash, or specifically sending the child to do so either at hand washing stations on the school compound, at a teacher's home nearby, using water that students had brought from home, or sending the student home to wash. Other educators presented it as a lesson to other students, as an example of behaviors that are unacceptable, employing the concept of public shaming that is employed in both schools and communities.

4.3.4 Shame and Social Responsibility

The practice of shaming was practiced by many teachers, though the extent of such shaming ranged from one-on-one shaming, to utilizing the child's friends to discuss why his/her behavior was

unacceptable, or public shaming in front of the entire school. Shame appeared to be a tactic that was familiar to students as it was also an emotion that was present in the community. The social pressure to behave according to expectations was pervasive, and some schools used the practice of shaming to ensure positive behaviors at school. The manner in which shaming was used included: (i) using student monitors who would report back to the school about the behaviors of specific students on their watch; (ii) displaying a public list of individuals who did not have and/or did not use a latrine at home; and (iii) employing a system of green, yellow, and red cards, with each student receiving a different color card, depending on their individual practice of hygiene and sanitation. The possibility of receiving criticism was sufficient to encourage the students to practice certain behaviors. One female student described the potential outcome if she did not wash her face—"*if we go to school dirty, they will laugh at us*".

Public shaming in schools may be utilized since it is a familiar concept that was also observed in the community. Displayed outside of the health post the HEW listed the names of households that did not have a functioning latrine—they were viewed as households that were putting the rest of the community at risk because of their behaviors.

Other schools did, in fact, practice positive reinforcement and reward students for consistent cleanliness, though this was much less frequently practiced. The sensation that individuals would be punished or feel ashamed if caught practicing a negative behavior, like open defecation, was more pervasive than the possibility of receiving praise for positive behaviors. As described by a boy in primary school, the reason for using latrines may be because "*people are scared to pollute the area"* and *"we will be ashamed if visitors come"*.

4.3.5 Inclusion in School Curriculum

Teachers unanimously stated that the inclusion of trachoma into the government-regulated curriculum would have the greatest impact and would ensure that trachoma was taught in schools. The greatest challenge identified by teachers was the lack of available time to devote to lessons that were additional to the required curriculum. It was suggested that it be included as an entire unit, as part of a

larger health unit, or incorporated into the science curriculum so that adequate time would be available to devote to the topic and ensure that all teachers would present the material.

4.3.6 HEW Involvement

Interview participants confirmed the involvement of HEWs in the school and their support with health education, though this was not consistent across schools. The level of involvement of HEWs differed for each school; some teachers and/or directors reported having regular visits with the HEWs, others requested that HEWs visit the school more to discuss specific issues of interest, while others reported that HEWs only attended during health campaigns, such as MDA for deworming or child vaccinations. Though some schools desire more involvement from the HEWs, the respect for HEWs was apparent across interview groups. The HEWs appeared to be the main disseminators of health information to the community. In the existing structure, HEWs, along with school-going children, exist across schools and communities so can be used as a means to bridge the learning that should be taking place at school and that which should take place in the community.

4.4 Diffusion of Information and Children as Agents of Change

Since children are those who gain the education, they are viewed as potential sources of information for their families and communities. School teachers and directors indicated that the children can be utilized for influencing the community. One director confirmed the impact that teaching students can have on the community when he said, "*we believe that if we educate the children they can change the mentality of the farmers and bring about change"*. As many communities have little to no access to media such as television or radio, the education of children seemed to be one of the strategies that could be used to reach the community. As described by a 28-year-old school director, *"the biggest medium that exists [to share information] is in the schools through the students. By using the students, the wider population listens to what their children have to say. The father cannot ignore what his child practices and therefore…schools should be emphasized…[for] preventive health education…".*

Students themselves also view it as their duty to share the information with their network; as demonstrated by a nine-year old boy, *"we go to school so we can be beneficial to our mom and dad…[and] after we learn, we can explain to our mom and dad and our neighbors"*. The information shared at schools, if adequately understood by students, can be disseminated throughout the community by the students as they return home. This can enhance the work that the HEWs and Women's Health Development Army (WHDA) do in that HEWs will reinforce messages that students have learned in school, which will be a benefit to students who receive the needed repetition and reinforcement of lessons. Students also act as additional "experts" in the community as HEWs describe similar messages to what is learned at school.

4.5 Materials Assessment

4.5.1 Positive vs. Negative Comparison

Student participants demonstrated a strong inclination toward comparing the positive and the negative. When discussing images to promote facial cleanliness, the view of a fly-laden face was not preferred by students as the response to such images was frequently one of dislike. However, the use of such images was considered necessary to teach others about face washing, and thus a comparison between the clean and dirty face was suggested. As one boy recommended while reviewing two trachoma prevention pictures (one with a clean face and one ridden with flies), "*There is the guy with the flies on his eyes, in order to be like the clean face, he should be careful. We should show this picture and this picture, to be like 'you should do this*."

Such an affinity for comparison frequently arose when students were provided the opportunity to develop their own materials for trachoma education. Side-by-side images comparing behaviors and their outcomes were frequently employed as strategies to teach others to practice preventive behaviors (Figure 5). A female student expanded the comparison of the positive and negative outcomes as

Figure 5: Drawings completed by primary school students

she depicted the positive consequences beyond being free of flies—*"there are flies all over her, [but] the other girl is clean and reading a book"*.

4.5.2 Familiarity

In addition to the comparisons that resonate with student participants, children seemed to respond positively to images that appear to be similar to themselves—the use of images that appear to be too unrealistic and like a caricature are unfamiliar to students. Students were distracted by elements that seemed to be extreme and over-exaggerated, such as a child whose smile was determined to be too big, or *"his teeth [are] crooked and his eyes are very big"* one student said with laughter. Elements of the messages that were seemingly innocuous to the developers and artists of the images were disruptive and detracted from the intended message.

4.5.3 Message (Mis)interpretation

Misinterpretations of images occurred when students were presented with actual trachoma prevention materials. Images that were intended to demonstrate a blind man being led by a younger individual resulted in different and unintended interpretations by the children. This demonstrates Hall's encoding and decoding model of communication in which the encoded meaning of the message was not interpreted, or decoded, in the way that it was intended (Hall, S., 1993). The following two figures demonstrate such a concept. The first (Figure 6) shows a drawing of a blind man being led by a younger individual, intended to raise awareness of the serious potential outcomes of trachoma. Children's interpretations of the message varied, including one response from a student who said, *"The boy and his dad are walking while carrying woods" to "this one doesn't have shoes…[and] is naked"*.

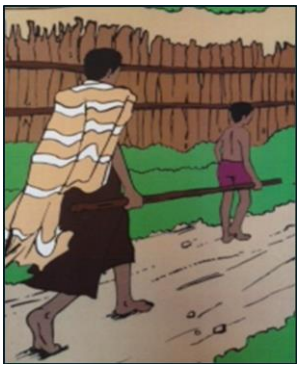


Figure 6: Image from Trachoma Education Flipchart (Sudan)
Source: The Carter Center, 2002

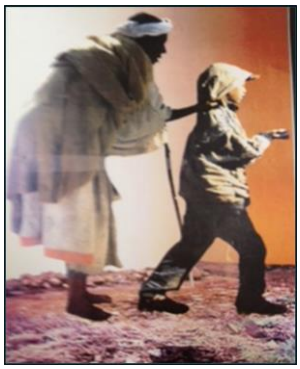


Figure 7: Image from Trachoma Education Flipchart (Ethiopia)
Source: Amhara Regional State Trachoma Control Program, 2004

The interpretation of the second, photographic image (Figure 7) with the same intended message resulted in some children interpreting the image

in a similar fashion as one primary school boy who stated, *"This boy got into a fight and he wants to kill someone with a gun. His mom is holding him from the back"*.

Even when the discussion of the images included reading the accompanying message written on the image (in this case, "take care of our eyes carefully"), when students were asked again what was happening in the pictures, the responses included "*carrying a wood somewhere"* and *"fighting".*

Even the slightest details in an image led some students to interpret the image in a contradictory manner. When students were shown images of boys washing their faces, a positive behavior, they interpreted elements of the image as negative. The poster demonstrated a boy washing his face, promoting the importance of face washing, but the poster was viewed as incorrect since the boy was using a bowl to wash his face. "*If his hands are dirty*" stated one male primary school student, "*now he is using dirty water to wash his face*" (Figure 8). Another image of a group of boys washing their face elicited discussion related to the potential illnesses they could contract due to the fact that they were shirtless and wet (as they washed their face) (Figure 9). The same image with the three boys washing their faces was interpreted to be bad behavior by another student since one of the boys was "*covering his mouth and laughing*" and to improve the picture, the boys should be drawn "*stand[ing] up and wash[ing] without laughing*".

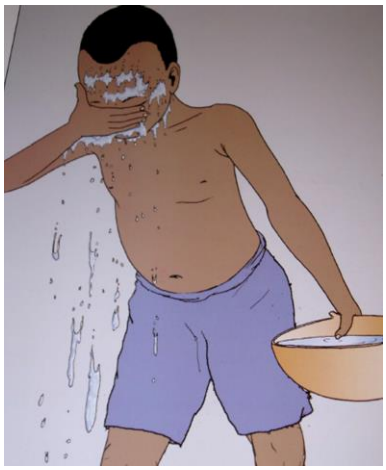


Figure 8. ***Image from Trachoma Education Flipchart***
Source: Federal Ministry of Health Sudan, 2002

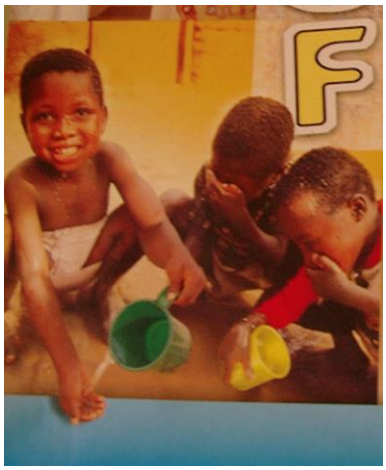


Figure 9. ***Image from Trachoma Education Poster***
Source: Ghana Ministry of Health, 2006

4.5.4 The Challenge of Using SAFE/MaMeN

The SAFE strategy is frequently referenced when discussing trachoma prevention and elimination—it has been discussed since its inception as necessary to achieving public health goals. The concept of SAFE, or the Amharic word used to represent SAFE, "MaMeN", meaning "believe", was not a familiar concept with children. When asked about MaMeN, no child recognized what it represented, and when presented with the visual depiction of the four elements of the SAFE/MaMeN strategy (Figure 10), students did not interpret the various images as a collection of a whole message. Children did not readily connect the act of receiving surgery or antibiotics to preventing blindness, or recognize that the different images were actually part of a larger message. Instead, children described each of the four images separately, focusing on specific elements within each picture, infrequently making the connection with trachoma prevention, though such behaviors had been the topic of discussion prior to displaying the images.

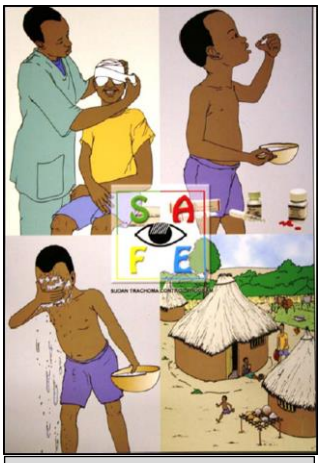


Figure 10. ***SAFE poster***
Source: Federal Ministry of Health Sudan, 2002

One element of the translation of SAFE to MaMeN was particularly worrisome for one teacher. The use of the word *maskoret*, an Amharic word that has been used to represent TT surgery, literally means "to cut" (Figure 11), but if used in a specific context it could be interpreted as to cut out, or correct something. When presented to the teacher, the word was interpreted as to cut as it relates to negative cultural practices that students are taught not to do, like uvulectomy. Further assessments with the children revealed that they too interpret "maskoret" in a way that was much different from the intended meaning. Some interpreted "maskoret" to mean cutting hair or nails while others represented the beliefs that had been suggested during a teacher interview:

Figure 11: SAFE poster highlighting "maskoret" (Ethiopia)
Source: Amhara Regional State Trachoma Control Program, 2003

Facilitator*: What is "maskoret"?*

P3*: Cut…throat or nail*

P5*: Cutting a girl's part*

P1*: [Cutting] throat or tonsil*

P2*: Eye or head cutting*

P6*: [Cutting] hair*

5.0 Discussion

The Carter Center-assisted work of the ARHB has reached millions of people with Zithromax®, hundreds of thousands of people with surgery, and over 7,000 schools annually in an effort to eliminate blinding trachoma. The trachoma elimination program in the Amhara region of Ethiopia has made great progress since its beginning in 2001, though as evident from the findings of this project, there are opportunities to improve the trachoma curriculum and move the efforts forward to increase the rate of decline of trachoma.

Knowledge about trachoma, its causes, prevention, and outcomes are apparent, based on the findings of the assessment; many people know the importance of personal hygiene and abstaining from open defecation, and the risk of transmission caused by flies. Though such knowledge appears to be relatively widespread, there is a need to continue to improve the efforts to achieve behavior change as Amhara is not advancing towards the elimination target as quickly as necessary to achieve the 2020 elimination goal. The ARHB faces significant challenges as it relates to health education and behavior change in Amhara, Ethiopia—communities are spread out, HEWs are overextended, teachers have limited resources (both materials and time), and schools may lack water and/or latrines, which makes it a challenge to insist that children use a latrine or wash their hands. When considering approaches to health education and alternative means of reaching the community, we must acknowledge those challenges and work within them.

The existing supplemental school curriculum contains nine units within which elements of trachoma prevention can be disseminated to students. Though relevant information regarding trachoma

prevention was included and can be helpful for trachoma education, some key issues related to the current design are impeding the impact that trachoma education in schools could have. These are included below as a summary review of key issues that should be addressed.

- The curriculum is very text-laden. Key objectives are highlighted in the trachoma curriculum, but there is still a lot of information that teachers are required to interpret and determine what activities are the most important. This allows for a lot of variation between classrooms regarding what children are being taught about trachoma prevention.
- It is stated in the curriculum summary page that different types of activities are well-received by students, including songs and poems. The curriculum does include suggestions for such activities, though it does not include the text, such as song lyrics about face washing. The activities, though possibly well-received, require significant preparation either by teachers prior to the commencement of the lesson or by both teachers and students during the lesson in order to write the text for the suggested song, story, or poem.
- The amount of information included in each unit is too much for the classroom. In a unit about transmission, the curriculum suggests the presentation of myths and facts about trachoma transmission. The lesson includes numerous pieces of information related to transmission as well as incorrect pieces of information related to transmission. Though this information may be helpful, the number of messages that are shared with young students in one activity begs the question as to whether they will internalize that message.
- The additional materials suggested for use in each lesson are not included within the printed trachoma curriculum. The “trachoma storybook”, is referenced as a possible activity, throughout the book yet no teachers had the storybook. When activities required supplemental materials are not available, those lessons have to be discarded as they do not have the materials necessary.
- Finally, the organization of the curriculum does not focus on the outcome behaviors as the key to trachoma education and prevention. The current curriculum begins with the overview of importance of eyesight and the anatomy of the eye and does not discuss face washing until unit

four. This does not provide the students guidance and empowerment to take action themselves to be healthy and free from trachoma.

6.0 Program Recommendations

6.1 Executive Summary of Recommendations

There is great potential to accelerate the progress toward elimination of blinding trachoma, specifically if the "F" and "E" components of the SAFE strategy are improved. This can be achieved by improving health education materials and focusing on the existing school structure to influence the entire community. Since parents acknowledge that their children are gaining wisdom that can be shared with them, children can be the source of information for the community members who don't go to school. Though attendance in Amhara is low (53.9% (CI: 53.0-54.9)), schools continue to appear to be the best and most efficient place to regularly reach the majority of the school-aged children (King, J.D., et al, 2013). Considering this, the following recommendations will focus on activities related to improving the existing trachoma curriculum developed by the ARHB with assistance from The Carter Center in order to improve the health education that occurs in schools. Specific recommendations are listed in the estimated order of when they should take place in relation to one another.

Recommendation 1: The Regional Trachoma Program, the Ministry of Health, and Ministry of Education may consider incorporating trachoma education into the government-regulated, national and regional primary school curriculum.

Recommendation 2: The Regional/National Trachoma Program should discuss with WASH partners working in the Amhara Region to determine how to coordinate health education efforts for similar outcome behaviors.

Recommendation 3: With the help of education, health communication, and social marketing experts, the Regional/National Trachoma Program should develop new trachoma education

materials, including a trachoma education activities guide, and visual aids, that will be used in the primary schools.

- The curriculum will include short, all-inclusive, grade-specific activities that are ready to use.
- The messages presented in the health education materials should be simplistic for improved comprehension.
- The materials developed should include a school-wide trachoma prevention guide for school leaders, which includes "best practices" for promoting the "F" and "E" components in the school and which contains a guide for leaders of the school's trachoma-related health club.
- The messages taught within the produced materials should focus on action rather than concepts or strict knowledge of trachoma and trachoma prevention.

Recommendation 4: During the development process and prior to producing and implementing any materials, the Regional/National Trachoma Program should pre-test all documents to ensure that the intended message is properly received by target audience.

Recommendation 5: Once the new trachoma curriculum and supporting materials have been pre-tested and finalized, the Regional/National Trachoma Program should collaborate with zonal and woreda health offices to organize teacher workshops, at the designated administrative level, to conduct training sessions on the curriculum and strategies for use.

Though not listed as an individual recommendation, educators should be involved in the development and testing of activities and materials during development. Previous research has shown that teachers have higher job satisfaction when their input for school improvements is considered, and that teachers who work together to make decisions show increased buy-in for such decisions, thus enhancing students' learning (Turnbull, B., 2002). Since teachers and HEWs are those who understand what would

be effective given the school and community contexts, their involvement is likely to enhance the product and potentially increase the investment that they feel for the materials.

6.2 Rationale for Recommendations

Include Trachoma in the Regional Curriculum

Though incorporating trachoma education into the school curriculum would be challenging as it would require a modification of the entire national curriculum and coordination with many stakeholders, it could be the most sustainable solution that addresses many challenges that were uncovered during the project. Inclusion of trachoma into the curriculum would ensure that teachers are held accountable for teaching specified concepts as they would be required to do so under the guidelines of the Ministry of Education. This would ensure that time was allotted to address trachoma prevention education throughout all schools. Though the extent to which trachoma prevention was presented in schools would vary, inclusion into the curriculum could better standardize the trachoma education so that all students received at least a basic level of trachoma education. Further, it could decrease the demand on others, such as HEWs, to conduct follow-up visits to ensure that trachoma is taught in the schools; as trachoma would be a lesson within the mandated curriculum, the follow-up would be included in the Ministry of Education's assessment. The work that HEW's conducted in schools could enhance and reinforce the messages presented rather than being responsible for presenting the entire concept.

The inclusion of trachoma into the school curriculum would also address the perception that only trained trachoma teachers can present topics related to trachoma prevention. All teachers would be considered "trachoma teachers" and able to teach lessons on trachoma prevention rather than just those that had been formally trained on the supplemental curriculum. This would also address the issue of teacher turn-over as everyone, whether a new or veteran teacher, would teach the standardized curriculum, which would include trachoma.

When considering the extent of health issues that impact the community, it would be beneficial to consider advocating for a health unit that addresses relevant health issues that impact the region. This

could increase the likelihood that students understand the various health issues, how they are related, treated, and prevented as they would be presented in an organized manner with dedicated time to each concept. One could consider the possibility that clear and well-organized lessons within a health unit could decrease the message confusion revealed in the project. Further, there are many health issues that impact the Amhara region, and teachers lack sufficient time to address them all separately, in addition to the standard curriculum. By incorporating trachoma into a health unit in the standard curriculum, it could decrease the additional work that is required of teachers to find time and activities to present lessons for health topics not included in the government-established curriculum. Including additional lessons into the standard curriculum would be challenging as time would have to be taken from another existing lesson; however, inclusion of trachoma and health as a unit in the regional curriculum should be considered as it could have a great impact.

Coordinate with WASH Partners

Ethiopia not only boasts the highest burden of trachoma worldwide, many other debilitating neglected tropical diseases (NTDs) affect Ethiopia as well (Deribe, K., et al., 2012). Many of the NTDs, including trachoma, are associated with poor water, sanitation, and hygiene (WASH) and can be prevented (Bartram, J. & Cairncross, S., 2010). Though the communities that are affected by WASH-related diseases, typically associated with diarrheal disease, and NTDs are frequently the same communities, the two sectors have historically worked in parallel rather than coordinating efforts (Ogden, S., et al., 2013). This is partially due to the focus on the differing health outcomes rather than targeting preventive behavior outcomes. The strategies have historically been presented as distinct messages to promote a similar behavior, but for a different disease; this may create confusion associated with the justification for practicing hand washing, as was observed in the FGDs. Students recognized WASH-related behaviors as important, but the reasons for doing so were not consistently accurate.

If a collaborative approach was taken to promote WASH behaviors, the quantity of messaging could decrease and the quality of understanding of such messages increase. The “E” component of the SAFE strategy, for example, could impact more than just trachoma prevention. By reducing open

defecation, increasing latrine coverage, and promoting the maintenance of latrines, not only would trachoma be impacted, but rather soil-transmitted helminthiasis and schistosomiasis as well (Ogden, S., et al., 2013). If these efforts were not coordinated, that would result in additional messages to disseminate and additional work for those who must relay the messages, all for the same target behaviors.

When developing trachoma education materials, the goal should be that the communities practice designated behaviors that will prevent the disease, not that the preventive behaviors are practiced because of knowledge about that specific disease. It is recognized that knowledge does not (necessarily) mean behavior change, but it could also be said that incorrect knowledge does not (necessarily) prevent behavior change. If an individual practices a behavior due to a believed linkage, though biomedically wrong, it could still encourage practice of the preventive behavior (Muella, S.H., et al., 2002). Following the similar logic, if a person decides to wash her face as she believes that this will reduce intestinal parasites, should that be deterred? Or would it not be a success if an individual practiced proper latrine use based on correct knowledge, but did so in order to prevent schistosomiasis rather than trachoma? The trachoma health education efforts should not limit messaging to preventing trachoma with designated behaviors, but rather should coordinate with WASH partners to promote designated behaviors that prevent trachoma along with other ailments.

Modify Curriculum with Easy-to-incorporate Lessons, Messages, and Visual Aids

Considering the time constraints described by teachers, activities should be simplistic in nature, short in duration, and include easy-to-remember messaging that will be repeated in the community messaging via the HEWs and WHDA. Lessons should be limited to 5-15 minutes so that teachers are able to easily incorporate the lesson into the existing schedule, and more regularly. As repetition and reinforcement are important in knowledge retention and behavior change, it would be preferred to limit the duration of the lessons and increase the frequency with which they are presented.

The complexity of the lessons should be modified and grade-specific lessons should be developed so that they are acceptable for the developmental age of each grade-level and focus on the behaviors

themselves rather than the knowledge or reason behind the behavior. The complexity of the messages and concepts can increase throughout the grade levels so that it may fit within the educational requirements, though the basic, fundamental concepts and messages should be mentioned at every level for reinforcement. Initially, students will learn about the behaviors they must practice and some simple explanations of why; as they gain more knowledge and understanding, the background information becomes more complex and issues such as germ theory, the transmission cycle, and the full SAFE strategy can be incorporated, as desired to fulfill educational milestones.

Though teachers stated their interest in conducting different activities with students, due to the time constraints, they could not devote the time to develop such activities. When new materials are developed, they should go beyond including activity suggestions. If activities like poems, songs, and stories to engage the learner are suggested, the materials should include the actual text, script, lyrics, or other relevant information that is needed to lead the activity. Teachers do not have the time to create such text for their students and the creation of a story or poem in class would occupy more time than the teachers are able to dedicate to the topic. Materials provided for classroom use should include ready-made activities which contain all necessary visual aids and guidance for the teacher. The visual aids should be colorful and large enough so that they can be used to teach the entire class, which may be as large as 45 students. The current curriculum is not intended to be shared with children but rather specifically as a teacher's guide, though it should be developed as requested by teachers so that students can look at stories and visual aids, increasing their exposure to trachoma prevention messages.

Create Appealing and Understandable Visual Aids for Target Audience

When developing visual aids for trachoma prevention, it is suggested that side-by-side comparisons be utilized to address concepts. The comparison between preferred behaviors and outcomes or positive and negative practices would allow individuals to see what should be done and what should be avoided. The type of images eligible for inclusion should be photographs or drawings that appear to be realistic. Images that appear to be too much like a cartoon or caricature are unfamiliar to some individuals and do not resonate with children; there is also a risk that such extreme images will be a distraction for

children, detracting from the intended message. Images should be simple and understandable with little to no words so that those who are illiterate or have a low reading comprehension can understand the images. As the literacy rate is low in Ethiopia, key messages should be understood using the image and not require that the message be read in order to understand the concept. This is also important for those who are literate—as experienced in the assessment, literate students misinterpreted the intended meaning of an image even after reading the textual description.

Develop Guide for School-wide Strategies to Promote Trachoma Prevention

Schools should be provided with specific strategies that can be employed in the school that promote behavior change related to "F" and "E" concepts. Such strategies must consider the varied and challenging contexts of schools as some have accessible water while others don't. For example, strategies to ensure students are washing their hands must address issues related to schools that have a handwashing station on site as well as issues related to those that don't have access to water. Guidance specific to the different contexts should be provided so that behavior change promotion can take place, whether a school is fully-equipped to do so or faces struggles such as water availability, latrine quality, or poor community involvement. One strategy that exists, but could be strengthened is the involvement of the school health clubs.

All schools have a health club, albeit with varying intensity of involvement and different focus topics. The Regional Trachoma Program should take advantage of this existing structure and enhance the opportunities for trachoma prevention messages. It is recommended that a health club manual be developed and presented to the health club leader that includes activities that can be conducted in the school, during flag raising assemblies or coffee ceremonies, and in the community. By creating a health club leader guide, the time that is required for health club leaders to support the club will be limited as activities and suggestions are already provided. This will further enhance the messaging strategy of the entire trachoma prevention program as the messaging throughout will be consistent and will reinforce what is presented in classrooms and the community.

Teach Actions, Not Just Concepts

Teaching general concepts will not have the intended outcome of achieving behavior change in a population. The SAFE strategy is just that, a strategy, a strategy to address trachoma prevention and elimination. Teaching the concept of SAFE, or MaMeN in Amharic, may not have the intended outcome of encouraging people to practice the behaviors that are described by MaMeN. Further, attempting to find a suitable translation for SAFE that is meaningful is a challenge that may cause more confusion. The more suitable word to represent TT surgery, according to children, was operation, though it was not used. As the connection of MaMeN is not currently helping with the promotion of the preventive behaviors for trachoma, the current use of MaMeN in educational materials should be reconsidered. The specific behaviors should be taught, but the required combination of the elements into the SAFE/MaMeN acronym, or teaching the concept of SAFE rather than the behaviors, should be assessed to determine their usefulness.

The focus of trachoma education should move away from ensuring that people know the facts about trachoma and focus more on the behavior, providing clear and specific actionable messages. Though background information about trachoma and the SAFE strategy can be important and may get someone to act, it is essential to provide the actionable information to those that are receiving the trachoma prevention messages so that they can do something about the information they have been provided (Centers for Disease Control and Prevention, 2014). There are many reasons why someone may practice personal hygiene, one of which could be to prevent trachoma. However, it should not be determined a failure if an individual practices regular personal hygiene in order to prevent a different disease or simply because of personal pride in one's appearance—regularly washing one's face because she feels beautiful prevents trachoma equally as well as a person who's washing his face to prevent disease. Messages should focus on determining what would convince people to practice behaviors, not simply focus on trachoma prevention. For example, as social responsibility and pride emerged as important community values in the project, concepts that convey feelings of pride and social responsibility should be included in the messaging strategy. Additional assessments should be conducted

to uncover the personal drivers and values, or internal beliefs and desires that direct an individual's behavior, as it relates to "F" and "E" behaviors, so that they may be incorporated into the messaging strategy.

There should be a focus on providing explicit examples and strategies that can be used to address designated behaviors so that concepts are not nebulous and ultimately ignored. For example, messaging should avoid phrases like "keeping personal hygiene" and be specific about the actions that are required to follow such a recommendation. Since *M. sorbens* have been shown to be more active in the morning and evening, a clearer message for facial cleanliness promotion would be to wash one's face in the morning and the evening in order to avoid disease, or promote health (depending on the framing that is determined more effective for the population) (King, J.D., et al., 2011). Providing a specific recommendation with a time orientation could be more actionable than a general recommendation to wash one's face at some point during the day. By developing messages that are clear and actionable, there may be less of a risk of misinterpretation by target participants regarding what they are being instructed to do (Borra, S., et al., 2001).

Conduct Teacher Workshops

As teachers feel unprepared to teach trachoma lessons, teacher trainings should be conducted on a yearly basis. If teachers are instructed on how to present the information to their students, they may feel a greater motivation to find the time to teach the lessons (Lewallen, S., et al., 2008). Due to logistic and economic constraints, it may be difficult to include all teachers in teacher trainings. If it is necessary to utilize the cascade method, additional teachers from each school should be included in the training so that more teachers can share information upon return to their respective schools. Further, as evidenced by past successes, teacher "trainer of trainer" workshops should not only include a dissemination of content related to trachoma, but also provide opportunities for experiential learning and reflection as it relates to content and strategies for training fellow educators (Hayes, D., 2000). The training should include school-wide strategies, including the "best practices" and health club platform to promote behavior change, so

that the workshop is not limited to health education within the classroom but rather throughout the entire school, for all grade levels.

Workshops could provide benefits beyond addressing concepts presented in the trachoma curriculum and school-wide strategies. Some participants stated that the end of the school year is preferred as it is when teachers develop the lesson plans for the following school year while others stated that it should be at the beginning so that the trachoma concepts would be recent and could serve as a reminder to include trachoma in lesson planning. By determining when the workshop could most greatly impact the program planning for teachers, we could increase the potential for trachoma to be included into the planned lesson. Yearly training opportunities could also address the issue of follow-up and accountability of teachers and directors; if educators are consistently reminded of trachoma education and their yearly activities reviewed, it could increase the quantity and perhaps quality of the implementation. Training workshops could serve as the platform for collecting process data to ensure that implementation is being conducted.

Further assessments should be conducted related to the preferred method of conducting the workshops; as it was mentioned during an IDI with a school director that *"information sharing between schools should happen [so that] those that aren't practicing will learn from what we do"*, it should be considered whether such collective discussions regarding challenges and opportunities and experiences at each school would be a benefit to the respective programs. Each school is different and faces specific challenges, though many schools could learn strategies that can be applied in order to promote WASH behaviors even when faced with limited water supply or an unsupportive community.

A teacher's manual should be developed so that teachers have additional materials that they may use to increase their level of knowledge and comfort related to trachoma; if each teacher has this resource, he/she may get more in-depth information regarding the topic, as desired. This information will not be required to teach students but rather to allow teachers to go beyond the key messages that will be presented, repeated, and reinforced.

Pretest all Materials

It is imperative that all materials produced for use in schools or the community be pre-tested with both the target population to receive the messaging and those that will present the information. Due to the efforts that would be required for such a large-scale implementation project, it is imperative to ensure that the materials produced are effective (Whittingham, J.R.D., et al., 2008). It is difficult to know how a message will be interpreted, as was seen in the evaluation of existing materials, which could lead to misconceptions about preventive behaviors. The target audience cannot be viewed as a passive recipient of messages if we are to achieve intended interpretation of messages; the target audience should thus be involved in the pre-testing of such messages (Hall, S., 1993). Pre-testing materials should also include the activities to be taught in the classroom as some activities may not be suitable for the target population. The current supplemental trachoma curriculum intended to develop life skills, one of which was empathy, and as such, developed an activity for students to interview a blind person to find out what their life was like. When discussing the activity with one school director, he discussed the inappropriateness of such an activity. He stated that, *"[due] to the culture and practice, it's hard to ask blind people to explain things; they will hate you and might sue you or beat you"*. Program materials must be pre-tested to ensure that the activities, messages, and images are appropriate for the context and are interpreted in the way they were intended.

7.0 Limitations

Logistic constraints limited the target population from which we were able to select participants for teacher and director interviews. Due to the timing of the project, school had already ended for the semester and therefore, we were unable to directly observe any trachoma education that may have been presented by teachers or trachoma-prevention related behaviors practiced by students. Further, many teachers had already returned home for the summer holiday and were not available for interview. Though the project had determined that a trachoma or science teacher be interviewed, when no such teacher was available, the interview was conducted with another teacher selected by the school director. Since trachoma is frequently taught during science, a non-science teacher may not have been able to provide as

quality of information related to trachoma education as desired; such interviews more closely resembled interviews conducted with directors during which overall school activities were discussed.

Though the FGD facilitator aimed to be neutral in questioning and not lead students to ask questions directly related to trachoma, there is a possibility that expectancy bias was observed by the students. Since questions asked were related to hand washing, face washing, and other target behaviors, students may have established a suspicion of what responses were desired, and therefore, answered questions according to that suspicion.

8.0 Conclusion

Trachoma is a debilitating disease that affects many people worldwide with the heaviest burden of suffering occurring in Amhara, Ethiopia. National programs have different needs and focus areas for trachoma control and elimination. Some national programs need to focus on completing TT surgeries as the prevalence of TF_{1-9} is below the MDA threshold, other programs need only complete limited rounds of MDA to decrease trachoma to below the elimination threshold. After receiving more than ten rounds of Zithromax®, completing hundreds of thousands of TT surgeries, promoting health education in over 7,000 schools, and constructing millions of latrines, the regional prevalence of trachoma in Amhara remains above the elimination threshold. The systems and strategies currently in place for surgery and antibiotics are effective and efficient with clear indicators and guidelines for interventions. The "F" and "E" elements, however, have faced many challenges and need additional focus due to the lack of standardized indicators, intervention approaches, and the fact that they require behavior change.

As we are quickly nearing the 2020 goal, the time to implement change is now. In order to achieve greater impact of "F" and "E" in Amhara, effective health education strategies are needed. This project uncovered key suggestions to begin the necessary process. Even though the human resource capacity in Ethiopia is great, but so are the needs and challenges. As the ARHB moves forward with enhancing the health education efforts in Amhara, they should consider the importance of simplicity. We should not oversimplify programs to a point that they don't have the intended outcome, but there is a need

to simplify approaches and adopt realistic expectations of what is possible. By limiting the number of messages that are presented, the frequency of repetition and understanding may be increased and the demands on those who must disseminate the information will be decreased—the program should strive for quality, not quantity.

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Appendix A: Emory IRB Exemption Letter

EMORY UNIVERSITY | Institutional Review Board

DATE: May 31, 2013

RE: **Determination:** No IRB Review Required
Research Project: *What Works for Schoolchildren? Assessing the Trachoma Control and Prevention Health Education in East Amhara, Ethiopia*
PI: Paul Emerson, MD

Dear Dr. Emerson:

Thank you for requesting a determination from our office about the above-referenced project. Based on our review of the information you provided, we have determined that it does not require IRB review because it does not meet the definition of "research" as set forth in Emory Policies and Procedures or federal regulations. In particular, this project is a quality improvement measure which aims to evaluate and enhance the trachoma curriculum established by The Cater Center in Amhara, Ethiopia. This project will help to evaluate what future strategies may be effective for school-aged children, in the areas where The Carter Center is present, by determining preferences, goals and hobbies that may influence their behaviors. The noted goals for this project include:

- To determine what is currently being done in schools that have adopted The Carter Center trachoma curriculum to encourage and support trachoma prevention behaviors.
- To explore what messages should be used to encourage the desired trachoma prevention behaviors among children who attend schools that have adopted The Carter Center trachoma curriculum.
- To identify how messages should be delivered within schools that have adopted The Carter Center trachoma curriculum and to what target audience, which will include messaging strategies, appropriate media channels, message format and content.

Please note that this determination does not mean that you cannot publish the results. If you have questions about this issue, please contact the IRB.

This determination could be affected by substantive changes in the study design, subject populations, or identifiability of data. If the project changes in any substantive way, please contact our office for clarification.

Thank you for consulting the IRB.

Sincerely,

Kevin Wack, MA, MTS
Analyst Assistant
Education and Quality Assurance
Emory University Institutional Review Board
1599 Clifton Rd, Atlanta, GA 30322

Appendix B: In-depth Interview Guides for Teachers and Directors

School Director Interview

School ID:

Date of interview: **Time of Interview:**

1. Can you describe what your school is like?

- How do teachers interact? How do they collaborate?
- What behaviors/routines are practiced in your school?

***Interviewer**: I want to ask you a few brief questions about the health education conducted at your school and then we will go into a more in-depth discussion about it.*

Health Education

2. How much time is allotted for health education?

- Per week? Per month?

3. What health topics are taught at the school?

- What health topics do you think are the most important?
    - Why?
    - Which topics are included in the national curriculum?

4. What is your opinion of the various curricula, outside of the national curriculum, that teachers are asked to teach?

- Is the quantity of materials/curricula acceptable?
- Are they helpful?
- What do teachers think?
    - Is it a welcome assistance?

Trachoma in schools

5. How is trachoma prevention taught/promoted in school? If nothing is currently being done, feel free to state that.

If not being taught, skip to question # 10

6. Why does your school teach about trachoma?

- What is considered when deciding what to teach/promote it in the school?

7. How often is trachoma taught?

- **By whom?**

8. What does the school use when presenting information about trachoma?

- Is The Carter Center curriculum or additional curriculum used?
- Are there pamphlets, books or other materials that are used?

9. What would make schools more willing to teach/promote trachoma education or increase the amount of trachoma education activities?

- What would make teaching about trachoma more feasible for teachers?
    - Why may some find it difficult to promote?

***Skip to number 12**

10. Why is trachoma education not being taught/promoted in the school?

- What is considered when deciding what to teach/promote in the school?
- What makes it difficult for teachers to present the information?

11. What would make your school able to participate in trachoma education and prevention promotion?

- What would make it easier to promote trachoma prevention in your school?
- What would make teaching about trachoma more feasible for teachers?

***Skip to number 16**

<u>Behavior Change Facilitators/Health Clubs</u>

12. What health clubs exist at the school? If there are no health clubs, please state.

****Interviewer: if there are no health clubs, skip to question #14.***

13. What are the health clubs like?

- What do health clubs do at the school?
- Which students participate? (age, gender, etc.)
- Who leads/supervises the clubs?
- How often do they meet?

14. Why was the club started?

- What were the motivators to creating the club?

15. What seem to be the most successful strategies, if any, to promote behavior change and trachoma prevention?

- **Which strategies/activities have come from the curriculum?**

16. How can The Carter Center curriculum be involved with the health clubs?

<u>Support by HEW</u>

17. What is the relationship between the school and the HEW?

- What do they do when they visit?
    - What do they teach?
    - How topics do they teach?
        - What is the format? Where do they present the material?
- What support/guidance do teachers receive regarding health topics?
- How often do they come?

18. What do you think of their participation/guidance?

- Is it helpful?
- How do the children respond?
- What do teachers think of their involvement?

19. How could the work of the HEWs have a greater impact on your school's trachoma education program?

<u>Closeout questions</u>

20. When were you trained on The Carter Center curriculum? If you were not trained, please specify.

***If not trained, go to #22**

21. What was the training like?

- Who trained you? Where?
- How did you feel about the preparation that was provided?
- Did you feel prepared enough to present the material?
- What did you initially think of the curriculum?
- What do you think of the curriculum now?

22. Is there anything else you would like to add regarding the trachoma curriculum? Perhaps you have additional suggestions that we did not ask or concerns about the trachoma education program that you may have that we may take into consideration?

We'd like to thank you for showing us your lovely school and learning about how your students learn.

Trachoma Teacher In-depth Interview

School ID:

Warm-Up Questions

1. How long have you been teaching?

- How long have you been at this school?

2. What is the school environment like?

- How do you interact with other teachers? How do the classrooms interact?
- What is expected of teachers?
    - What do you think of what is expected/demanded of you?

3. How are the parents/guardians involved in the schooling of the student?

- Does the child inform parents of the daily activities?
- Does the parent(s) assist with homework?

4. What behaviors/routines are promoted in your classroom?

- How?
- What rules are imposed?

***Interviewer**: I want to ask you a few brief questions and then we will go into a more in-depth discussion.*

5. What health topics to you teach?

6. What health topics do you think are the most important to teach?

- Why?
- Does this differ from what others may think is important?

7. How often do you teach health topics?

- Per week/Per month
- What do you think of the amount of time that is allotted for health topics?

8. How much time are you able/willing to spend to prepare classroom activities?

9. What is your opinion of the various curricula outside of the national curriculum that you are asked/encouraged to teach?

- What do you think of the amount of materials/curricula that you are given?
- How are they helpful?
    - Is it a welcome assistance?
- What assessment is conducted to see what topics you are teaching?

10. Which students do you teach about health topics?

- Which grade levels do you teach?

- Do you teach different topics depending on age/grade level?
    - Which topics? Why?

11. How often do you teach about trachoma? If you are not currently including it in lessons, feel free to state that.

For those who don't teach, skip to question 19

12. Why do you teach about trachoma?

- Why do you think it's important?
- How does trachoma affect your students?
- What do you consider when deciding what to teach during the health lesson?
    - School mandate
    - Presence/quality of materials
    - Children's interest/ability

13. What do your students understand/misunderstand about trachoma?

- Why?

14. What do you use when creating lessons to teach about trachoma? If you don't use anything, feel free to specify.

- Have you ever looked at/used The Carter Center curriculum to teach about trachoma? Do you currently use The Carter Center curriculum or other stand-alone curriculum for guidance?

15. What do you think of the trachoma curriculum?

- What are the most helpful elements of the trachoma curriculum?
- What is not helpful/pertinent to you?
- How easy/difficult is this curriculum to use?
- For whom is this curriculum suited?
    - Age appropriateness of activities
    - Complexity of concepts
- How does this curriculum compare to others that you use?

16. If the trachoma curriculum is to be changed, what should we consider?

- What could be helpful for classroom use?
    - Additions & eliminations of curriculum elements
- What materials seem to be the most useful in the classroom—pamphlets, flipcharts, books, etc.?
- Which activities work best with the students—songs, role-plays, etc.?
- How long should activities take to complete in the classroom?
    - What is the attention span of your students?
- What would make others who may not teach about trachoma more willing to teach trachoma lessons?
    - What complaints may they have about the current curriculum?

- What types of materials/activities would they want to use?

Closeout questions

17. When were you trained on The Carter Center curriculum? If you were not trained, please specify.

***If not trained, go to #18**

18. What was the training like?

- Who trained you? Where?
- How did you feel about the preparation that was provided?
- Did you feel prepared enough to present the material?

19. Is there anything else you would like to add regarding the program? Perhaps you have additional suggestions that we did not ask or concerns that you may have that we may take into consideration?

For those who answer NO, ask the following questions:

20. Why don't you teach about trachoma?

- What makes it difficult to teach about trachoma?
- Why is it not important to teach about trachoma?
- How does trachoma affect your students?

21. What do you consider when deciding what concepts to teach during the health lesson?

22. Curriculum Evaluation Activity

We are going to take a look at a few of the activities in The Carter Center Curriculum and we would like to get your feedback. This may help determine why teachers prefer not to the curriculum and how we can make it better.

A. How would this activity work in your classroom?

- What problems could arise?
- What may work well?

B. How does this activity compare to others that you use?

- What do you like about it?
- What do you like not like about it?
- What kinds of activities/materials do tend to use with students?
    - Books, flipcharts, writing, songs, etc.?

C. Why would someone choose to use the activity or opt not to?

- What could be changed/improved?

D. What do you think of the format of the curriculum?

- What do you think of the presentation of information?
- How do you like to teach information to your students?
    - How much time do you spend on an activity?

- What is the attention span of the students?

E. What could be changed so that you would be willing to teach about trachoma? If no change to the curriculum would convince you to teach about trachoma, please state.

- What kind of information should be included?
- What types of materials/activities would be most helpful?
  - Writing activities, songs, role-plays, etc.
- How would you like the activities to be presented?
  - Flipcharts
  - Books
  - Flashcards
  - Written explanations of classroom activities
- How much preparation time are you able to devote to activity planning?
- How much class time are you able to devote to a trachoma activity?

Closeout questions

23. When were you trained on The Carter Center curriculum? If you were not trained, please specify.

***If not trained, go to #25**

24. What was the training like?

- Who trained you? Where?
- How did you feel about the preparation that was provided?
- Did you feel prepared enough to present the material?
- What was your initial impression of the curriculum?
  - And now?

25. Is there anything else you would like to add regarding the program? Perhaps you have additional suggestions that we did not ask or concerns that you may have that we may take into consideration?

We'd like to thank you for showing us your lovely school and learning about how your students learn.

Appendix C: Student Focus Group Facilitation Guides

Activity 1: Community Mapping

Estimated Duration: 45 minutes

Students will work together to draw a map of their community. During the activity, children will indicate what they do on a regular day and elements that may influence behaviors related to trachoma control.

Moderator instructs children to draw elements of their community (i.e. school, places to play, etc.). Children will be asked subsequent questions about what they have drawn or instruct them to draw another element of the map. During the community mapping exercise, investigators will establish the activities in which the students participate, hobbies, aspirations and potential facilitators and barriers to specific trachoma preventive behaviors. The exercise will also serve to acknowledge who are those that may influence the behaviors of students and may be targeted for interventions. By establishing existing hobbies, aspirations and influential people, we may attempt to identify drivers that may be addressed in educational materials.

What to draw

Draw where your house is

*Note to moderator: Each child should have the opportunity to draw his/her house

Draw where the school is.

*Note to moderator: Try to involve all children in the drawing activity. If one/two children are drawing, have all children discuss where it should go and "directing" the drawers. When you are drawing the school, use the time to ask why they go to school. How going to school will help them in the future.

Let's draw all of the places where you like to play/hang out.

What do you like to do there? Draw (image representing activity) in the places that you like to do that.

**Note to moderator: You can tell children to draw all of the places where they like to play, it doesn't have to be limited to school or home. If they draw something outside of those two "zones", make sure to ask them what is there (and perhaps draw it for the reference.*

**Note to moderator: Keep asking until they have mentioned all of the areas and activities that they do and where.*

Question: Where do you spend most of your time?

Where are your favorite places to go?

Why are those preferred?

What do you usually do at/near home?

Where can you learn/get information?

From whom? (Who do you trust? Who gives the best information? Etc.)

What kind of information?

**Note to moderator: We want to know who/what are the sources of information for these kids. If the mention a specific person, ask about the reasons why that person is a good source of information for them, what kind of information they provide, etc. We can explore if there are avenues that we have not established that can be sources of information for these kids. If health is not mentioned, it can be explicitly asked as a follow-up.*

With whom do you share information?

What kind of information? From school (about homework, activities, etc.)?

**Note to moderator: Segway into the school; if the children don't mention school as a place that they learn (about health), ask them specifically "but what about school"? Or if they have, reference what they mentioned and continue on in the discussion about school.*

Question: What do you learn at school?

Related to health?

What are your favorite activities and why?

**Note to moderator: Feel free to ask them to remember a specific activity that was their favorite and why. What was your least favorite activity (and why)? If they can't think of a specific health activity, ask them to talk about a specific activity in general. To describe what a health lesson/trachoma lesson in their school is like.*

**Note to Moderator: After completing school questions, segway into drawing about latrines and handwashing facilities. Example: Now that we know where we play and learn, we need to know how we can take care of ourselves—we want to draw on this map where we can go to the bathroom, wash our hands and wash out face. Let's start with go to the bathroom.*

Draw all of the places that you can you go to the bathroom—draw a box for a latrine and a tree/bush where it is an outside location.

Draw a star by the places that people usually go.

Why do people go there?

If you wash your hands, draw the places where you usually wash your hands (draw a hand).

- Draw a star by the places that people usually go.
- When do you wash your hands?
    - Why do you do that?

- How often?
- After (activity) do you wash your face/hands? Before you eat?

If you wash your face, draw the places where you usually wash your hands (draw a hand).

- Draw a star by the places that people usually go.
- When do you wash your face?
  - Why do you do that?
  - How often?
  - After (activity) do you wash your face/hands? Before you eat?

Areas of Interest

- What is life in the village like?
- What occurs during an average day?
  - Where do students go?
  - With whom do they spend their time?
  - What do they do (hobbies)?
- To what messages could students be exposed?
- What affects their behaviors?
  - Who are influential people in students' lives?
  - Who do they seek out for information?
  - What degree of access do they have to facilities?
  - Barriers/facilitators to preventive behaviors
- What goals and aspirations do students have for their future?

Activity 2: Message Critique

Estimated Duration: 25-35 minutes

Students will view existing materials relating to trachoma preventive behaviors and discuss their opinions and understanding of various images. The critique will use materials that are used by The Carter Center as well as materials created to promote WASH behaviors. This participatory activity will allow for the evaluation of message understanding by children as well as their preferences for visual materials.

Moderator: *Now we are going to look at a couple of pictures—you get to be the experts and tell me what it means, create a story about one of them and vote for the best ones. There is something different in each of these boxes, and your storytelling and votes will determine which box we open to see what's inside. Are you ready? Remember that we have to take turns talking because all of your answers are SO important and we want to hear all of them.*

IMAGE #1: Child/children washing his/her face:

Moderator*: You get to be the storytellers for this picture. But first, which picture should we use? Which picture do we like better? Why?*

Let's make a story about this boy.

- *What is his name?*
- *What does he like to do?*
- *What is he doing in this picture?*
    - *Why is he doing this?*
    - *When does he do this?*
        - *What was he doing before washing his hands/face?*
        - *What will he do after he washing his face?*

IMAGE #2 (Sudanese boy—flies in his eyes)

Moderator*:* What do you think that this picture is trying to tell us? What is going on with this boy? Why does his face look like that? What may happen to him? Where do the flies come from? What can he do so that he can get better? Which picture do you prefer? Which would you pick to tell about trachoma?

**Note to moderator: Allow the children the option to NOT select an image. If they do not like either, ask them WHY.*

IMAGE #3 (trichiasis sufferer/blindness…and other Ethiopian flipchart)

Moderator: *What is happening in this picture? What happened to this person?*

- *How did that happen?*
- *Who may this affect?*

- *How can people make sure that this doesn't happen to them or their family? What would you tell them?*
    - *If you had to show your mom, sister, etc., a picture about blindness, which would you show them? Why?*

IMAGE #4 (Juma and trachoma and latrine/hand washing pictures)

Teacher teaching: Does this look like your school? What is the same/different? How do you learn in school? What do you think the teacher is talking about here? How do you learn about that at school?

Latrine: Does this look like your school? What is the same/different? What does your school's look like? Do you use it? Why/why not? Do you know how it helps you to be healthy?

IMAGE #5 (trachoma transmission): This is an interesting one…let's see who can figure out what it is trying to say to us.

- What do you think about this picture? Do we like it? What do we like? Not like? What is important for us to remember from this poster about trachoma? How could you explain it to your mom?

IMAGE #5 WaterAid

What do you think of this poster? Who is this person? Who might like this poster? Where should we see this poster? What is this poster telling you? Why would they want you to do that?

Areas of Interest

- What images/types of images do students prefer?
    - Behaviors vs. outcome
    - Pictures vs. drawings
- What messages do students understand?
- What causal links are understood about trachoma?
    - Latrines/Open defecation
        - Hand washing
            - With soap
    - Face washing
        - With soap
    - Individual/Shared towel
- What is the perceived severity of trachoma?
    - What is the importance of trachoma prevention?
    - What types of activities do students prefer?
        - What engages them in the activity?
- What materials could students prefer to see in the classroom?

Activity 3: Poster Creation

Estimated Duration: 25 minutes (until student has finished)

After discussing trachoma and correcting any misconceptions regarding trachoma and its causal links (that arose during the poster critique), children will have the opportunity to make their own posters. If time permits, the moderator should allow for the students to show their poster to the group.

Moderator: *You've seen some posters that may be used to tell people about trachoma? Washing face, good, using a latrine…. What about things that we can't do if someone has trachoma or trichiasis? Well now it's your turn to make your own poster that you will be able to take home, so you want to make it the very best you can and make sure that it's what you like. On your poster you should put what you think would be a good reminder for you, your family and your friends about trachoma, how to prevent it, bad outcomes because of trachoma, things you can do because you don't have trachoma, etc. Like you saw in the other posters, you can draw with different colors, you can draw people, you don't have to draw people, you can have different characters or draw people in your family, whatever you think will make you and your family and friends look at the poster and remember trachoma and how to prevent it.*

Each child will explain his/her poster to the moderator. The moderator should ask specific questions about the picture and the reasons for the inclusion.

Moderator: *Who is this poster for? Who do you want to see the poster? Why is it for them? What are you drawing for them? What does this mean to you? Why did you draw this? What do you think you can do to help your family stay safe from trachoma? Where do you want to put your poster when you're done with it?*

Areas of Interest

- What causal links are understood about trachoma?
- What elements are of importance in child's perception of trachoma?
    - Latrines
    - Face washing
    - Hand washing
    - Blindness
- What colors do students prefer?
- What type of images do children like?
    - Factual vs. Emotional
    - Prevention vs. Outcome
- Are characters appropriate for inclusion in future materials?
- How is trachoma perceived to affect the life of students/students' families?

Appendix D: Transcription Template

Transcription Key

I	Interviewer
P	Participant
…	Ellipses indicate pause/silence
-	Dash = unfinished word
Italics	Emphasis on a word
((*sound***))**	Indicates sound, like laughter, cough, sigh, inhale. This may include outside sounds that are heard over the recording (i.e. car horn, etc.)
(/*comment/***)**	Used to provide intended meaning of word or phrase or include time stamp of inaudible response
?(*text***)?**	Shows uncertainty by the transcriber
[INAUD**]**	Inaudible/Unclear speak *(include timestamp where inaudible)*
{{*text***}}**	Interjections by the interviewer during the participant's speech: {{Int; Oh}}
[ ]	Square brackets = beginning ([) and ending (]) of overlapping talk*

**Example: Overlapping Talk*

I: Whether it is right or wrong, but you are the one, who know as a resident of this community.

P: Yes, yes.

I: So if there are questions, which you feel that you are not comfortable to answer, [feel free…

P: Okay]

Recording #:

Folder:

Length of Recording:

Date Transcribed:

Transcribed by:

I:

P:

I:

P:

P:

Appendix E: Executive Summary of Programmatic Recommendations for The Carter Center

Programmatic Recommendations for The Carter Center and Amhara Regional Health Bureau
There is great potential to accelerate the progress toward elimination of blinding trachoma, specifically if the "F" and "E" components of the SAFE strategy are improved. This can be achieved by improving health education materials and focusing on the existing school structure to influence the entire community. Since parents acknowledge that their children are gaining wisdom that can be shared with them, children can be the source of information for the community members who don't go to school. Though attendance in Amhara is low (53.9% (CI: 53.0-54.9), schools continue to appear to be the best and most efficient manner to regularly reach the majority of the school-aged children (King, J.D., et al., 2013). Considering this, the following recommendations will focus on activities related to improving the existing trachoma curriculum developed by the ARHB with assistance from The Carter Center in order to improve the health education that occurs in schools. Specific recommendations are listed in the estimated order of when they should take place in relation to one another.
Recommendation 1: The Regional Trachoma Program, the Ministry of Health, and Ministry of Education may consider incorporating trachoma education into the government-regulated, national and regional primary school curriculum.
Recommendation 2: The Regional/National Trachoma Program should discuss with WASH partners working in the Amhara Region to determine how to coordinate health education efforts for similar outcome behaviors.
Recommendation 3: With the help of education, health communication, and social marketing experts, the Regional/National Trachoma Program should develop new trachoma education materials, including a trachoma education activities guide, and visual aids, that will be used in the primary schools. • The curriculum will include short, all-inclusive, grade-specific activities that are ready to use. • The messages presented in the health education materials should be simplistic for improved comprehension. • The materials developed should include a school-wide trachoma prevention guide for school leaders, which includes "best practices" for promoting the "F" and "E" components in the school and which contains a guide for leaders of the school's trachoma-related health club. • The messages taught within the produced materials should focus on action rather than concepts or strict knowledge of trachoma and trachoma prevention.

Recommendation 4: During the development process and prior to producing and implementing any materials, the Regional/National Trachoma Program should pre-test all documents to ensure that the intended message is properly received by target audience.
Recommendation 5: Once the new trachoma curriculum and supporting materials have been pre-tested and finalized, the Regional/National Trachoma Program should collaborate with zonal and woreda health offices to organize teacher workshops, at the designated administrative level, to conduct training sessions on the curriculum and strategies for use.
Though not listed as an individual recommendation, educators should be involved in the development and testing of activities and materials during development. Previous research has shown that teachers have higher job satisfaction when their input for school improvements is considered, and that teachers who work together to make decisions show increased buy-in for such decisions, thus enhancing students' learning (Turnbull B, 2002). Since teachers and HEWs are those who understand what would be effective given the school and community contexts, their involvement would not only enhance the product, but could potentially increase the investment as they were involved and considered during the development process.