Addis Ababa University, College of Health Sciences,
School of Public Health

Ethiopian Field Epidemiology and Laboratory Training Program (EFELTP)

Compiled Body of Works in Field Epidemiology

By

TILAHUN TAFESE

Submitted to the School of Graduate Studies of Addis Ababa University in partial fulfillment for the degree of Master of Public Health in Field Epidemiology

February 2011
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Advisors

Dr Richard Luce

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Approval by Examining Board

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Examiner	

Acknowledgments

I would like to thank to Dr Richard Luce, EFELTP advisor, for his engagement in supporting, guiding and reviewing field works of residents with his magnificent talent and consistent hospitality. Not mentioning his role might put me in a moral captivity.

I am really very grateful all the staffs of SPH, EPHA and PHEM who work directly or indirectly with EFELTP for their wisdom and conscientiousness in realizing the desired goals of the program. I would also like to acknowledge all individuals from CDC Atlanta for their excellent transfer of skill and knowledge of field epidemiology.

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List of Abbreviations

AMREF …… African Medical Research and Education Foundation

ANGT ..... Adult Naso Gastric Tube

APDA ……..Afar Pastoralist Development Association

ARWRB ……..Afar Regional Water Resource Bureau

AWD ……...Acute Watery Diarrhea

CARE ……. Cooperative for America Relief Everywhere

CFR …… Case Fatality Rate

CSA …… Central Statistic Agency

CTC …… Cholera/Case Treatment Center

EFY …….Ethiopian Fiscal Year

EHA …… Emergency and Humanitarian Action

EHW ……Environmental health Workers

EOS……..Enhanced Out Strategy

EPI ……...Expanded Program on Immunization

EPRP ……Emergency Preparedness and Response Plan

EWWCE ……..……. Ethiopian Water Works Construction Enterprise

EWWDSE ……... Ethiopian Water Works Design Supervision Enterprise

FGD ……. Focus Group Discussions

FMoH/HPDP ……..…… Federal Ministry of Health/ Health Promotion and Disease Prevention

FMoH/PHEM ……..…… Federal Ministry of Health/ Public Health Emergency Management

FMoWR …….. Federal Ministry of Water Resources

JSM……...Joint Support Mission

HA ……..……..Housing development Agency

HEW …… Health Extension Workers

HH ..... Households

IDSR …… Integrated Disease Surveillance and Response

IEC/BCC ……..Information Education and Communication/ Behavioral Change Communication

IRS ……Indoor Residual Spray

ITN …….. Insecticide Treated Net

NGO ……. None Governmnetal Organization

OPD …….. Out Patient Department

ORS …….. Oral Re-hydration Salt

PHEM ……...Public Health Emergency Management

PNGT ..... Paediatric Naso gastric Tube

PSNP …… Productive Safety Net Program

RL …… Ringer Lactate

SC-UK----------Save the Children –United Kingdom

SNNPR----------Southern Nation Nationalities Peoples Region

UNICEF …….. United Nations Children Fund

WASH ……..Water, Sanitation and Hygiene

WHO ……World Health Organization

Preface

The Field Epidemiology and Laboratory Training Program is a competency-based training and service program in applied epidemiology and public health that builds the capacity to strengthen the surveillance and response system in countries where they are implemented. It is co-sponsored by The Federal Ministry of Health, Addis Ababa University School of Public Health, Ethiopian Public Health Association, and U.S. Centers for Disease Control and Prevention.

The program is dedicated, through a combination of classroom and on-the-job training and service, to applied field-oriented public health practice. The goal of this program is to improve the health of Ethiopia's population through a cadre of public health workers who will work on priority issues in the country, strengthening public health capacity and infrastructure and providing essential public health services to country.

This compiled body of works has nine main chapters which all of them were done during the residency time of the program. The first eight sections are expected outputs during the residency time; such as outbreak investigation, report of analysis surveillance data, surveillance system evalution, description of a health profile report, writing of finalized scientific manuscript for peer review journals, abstract submit ion in scientific conferences, writing protocol/proposal of epidemiologic research project and a summary of disaster situation visited/risk assessment.

In order to accomplish all the above eight outputs of residency and other additional works, different techniques and methods were utilized during an outbreak investigation in the field situation It was not always easy to conduct an investigation or study in well representative and probability sampled population within a limited time period, human and financial resources, So convenient sampling, secondary data and suspected case definitions were applicable for some outbreaks. In surveillance data analysis and system evaluation, it is crystal clear that data or databases at different levels are necessary and we tried our best to write on these two outputs.

However, accessing data at national level was very challenging and time consuming because of many procedures and unclear reasons.

The overall outputs of the two years field residency in the program are presented in a summarized way as follows; in the outbreak investigations chapter or section two outbreaks were investigated and well documented. These were an acute watery diarrhoea outbreak in Dasenech Woreda, South Omo zone, SNNPR from 11-20/3/2002EC (November 20-29 ,2009GC), and Shigellosis Outbreak Investigation at AAU Technology Campus,March□April, 2010, Surveillance data analysis on Descriptive Epidemiology of Under-Five Malnutrition in Ethiopia, 2000 And 2005

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A measles surveillance system evaluation and a Health profile description report was also done in Sidama zone, SNNPR, 2010. Finalized scientific manuscripts submitted for peer reviewed journals February, 2011. And abstract was also prepared and submitted for scientific conferences accepted for oral presentation in EPHA conference, and APHINET/TEPHINET conference 2010. A report on health nutrition needs assessment (risk assessment) on prioritized districts of Afar regional state was also conducted with other team members from the food security center, WHO, UNCEF and EHNRI. A finalized epidemiologic research project proposal on a title; Assessment of Risk Factors and Trends of Measles Outbreak in Sidama zone, SNNPR, 2010 was also prepared.

Under the other additional works/outputs section (chapter) Report on Acute Watery Diarrhea (AWD) outbreak response supportive supervision in Oromia Region, West Harage Zone, 14□29/12/2001EC and Follow up Visit, Situational Analysis and Need Assessment on the AWD Outbreak Preparedness and Response *(April 10 to 27, 2010)* was undertaken in Afare Regional State after the occurrence of outbreaks of acute watery diarrhea (AWD) in different districts of the region.

Chapter I – Outbreak/Epidemic Investigations

1.1Acute Watery Diarrhoea outbreak in Dasenech Woreda, South Omo Zone, SNNPR From 11-20/3/2002EC (November 20-29, 2009GC)

Executive summary

Acute Watery diarrhea /AWD/ has been reported from regions in Ethiopia since 2006 GC. One of the regions reporting the case is Southern Nation and Nationalities People (SNNP) from different Zones and Special woredas and cities.

AWD was not reported from South Omo Zone of SNNPR as there was no AWD out break. Currently South Omo Zone, reported AWD outbreak with index case Tikimt 26/02/2002 EC (Oct, 2009) from one of its Woreda called Dasenech which have 40 villages and 56,176 residents.

The Woreda is one of the remotest sites from the center, bordered with Kenya sharing Lake Turkana (L.Rudolf) and have poor access to infrastructure (Road, electricity, telecommunication, Health facility etc).

Thus, the Public Health Emergency Management Center/Ethiopian Health and Nutrition Research Institution recommended a joint team mission to the Zone/Southern Nation and Nationality People Region/ for outbreak verification/investigation, to give technical assistance and support the Multi sectoral response coordination mechanism and PHEM/FELTP team mobilized from 11-20/3/2002EC (November 20-29 ,2009GC).

The team Reviewed secondary data from Woreda Health office ; the only Health center in the Woreda and CTCs ; Interviewed patients and relatives visited the treatment sites, conducted field rapid laboratory investigation/stool sample) using RDK and done culture and sensitivity; investigated the water source for contamination; called and led Woreda Coordinating body meetings.

Analysis of case reports, interviews with health workers indicates AWD outbreak existed in Dasenech Woreda where the index case was treated on 27/02/2002 in the Omorate Health Center from one of the remotest village called Delerele which is located on the border of Kenya where it is sharing the Lake Turkana as one of the fishery area for both countries. The Epi-curve depicted also propagated character of transmission. The outbreak affected 47% of Dasenech Woreda from its 40 kebeles. From 27/02/2002-18/03/2002 EC reported 1426 cases and 23 deaths/including community death) making 2.54 % attack rate and 1.6%case Fatality rate.

Laboratory investigation revealed that 90%(N=20) of the investigated stool sample revealed V.Cholera 01 positive (Rapid Diagnostic Kit) (higher than the result observed in Guinea Bissau which was 72% positivity rate using Crystal VC RDT- Tropical Medicine and International Health, volume 14 no 10 pp 1–5 October 2009) and 71.4%(N=7) samples became culture positive for the same pathogen with resistance for Bactirum and sensitive for other antibiotics like TTC,Docy and others.

Water sample investigation (from the river and pipe) result showed also not potable due to bacterial contamination.

Risk factor investigation revealed that ORs, of latrine access, Washing hands before preparing and eating food VS illness has protective effect (OR=0.799 and 0.469 respectively) but there is no significant association as the CI of 0.146 - 4.3256, 0.075 -2.9402 & P-value of 0.545 and, 0.355 respectively. The OR of Association between water sources VS Illness is calculated to be 1.306 which might be one of the risk factor. But still it is not significantly associated.

The observed outbreak expanded to-ward the Northern, Eastern and western as well as central part of the Woreda.

Investigating the rumours, using lab results , considering the possible incubation periods, and the existence of AWD outbreak in the Kenyan side, taking into account the movement of people in the border area and expansion route of the outbreak, the AWD out break confirmed, and the outbreak is not likely expanded from the nearby Woreda of Ethiopian side. Based the investigation findings, the Woreda was advised to strengthen its surveillance and case management, improve safe and adequate water access, provision of safe latrine access ,strengthen health education, strengthen the Woreda coordinating of multi sectoral response.

Background

Dasenech Woreda is one of eight woredas of South Omo Zone in SNNPR. It is bounded in the North with Hamer Woreda of South Omo Zone, in the south with Lake Turkana and Kenya, in the east with Gniagatom Woreda and Kenya, and in the west with Hmaer and Kenya. It is found 370 meters above sea level. It has average temperature of 39 degree centigrade. The Woreda is found 208 kms away from the Zonal capital Jinka ,655 kms from Hawassa regional capital and 885 kms away from Addis Abeba.The Woreda has total population of 56,178 among which 27,526 (48.9%) are males and 28,650 (51,1%) are females and it is administratively divided in to 40 kebeles . The capital of the Woreda is Omorate.

The Woreda has least infrastructure such as roads, water, telecommunication, and electricity as compared to sister woredas found in the zone. Use their own language. The dwellers are said to be pastoralists. The people have strong relationship with Turkana (Kenyans) and their source of water is the second largest river of the country, Omo River. Omo River dissects the Woreda in to two major parts and making "Island" after the bifurcation before entering Lake Turkana. More than 50% of the people who are residing near the bank of the river and around the lake depend entirely on fishery for their lively hood, so, fish is part and parcel of Dasenech people. Movement of Kenyans, Somalians and people of Dasenech is freely and frequently across the border for different reasons is a routine life.

Currently, there is one health center and 15 health posts in the Woreda, out of which three are non-functional for different reasons. In terms of man power, there are two health officers, five clinical Nurses, one midwife, two lab. technicians, three public health Nurses, one pharmacy technician and two environmental health professionals. In addition to this, the Woreda has 5 health extension workers, 26 pastoralist HEWs, 1 trained traditional birth attendant and 1 front line health worker. Health service coverage of the Woreda is <5% and sanitation coverage is < 5%.

Introduction

Acute watery diarrheal disease is characterized by painless, profuse watery diarrhea and effortless vomiting resulting in severe dehydration. Of the many causative agents of Acute Watery Diarrhea, there are more than 60 serogroups of vibrio cholera, but only sero-group 01 causes cholera.

Vibrio cholera 01 occurs as two biotypes: classical and Eltor. Each biotype also occurs as two serotypes Ogawa and Inaba. The Eltor biotype has caused almost all of the recent cholera outbreaks, although cases caused by the classical biotype still occur on the Indian sub continent. The Eltor biotype also causes a higher proportion of asymptomatic infections than the classical biotype and survives longer in the environment. It can live in association with certain aquatic plants and animals, making water an important reservoir for infection.

Vibrio cholerae serogroups O1 and O139 are associated with epidemic Watery Diarrhea. Nearly 80% of infected population will be asymptomatic while 20% develops Acute Watery Diarrhea out of which 10-20% will end to be severely ill (WHO, Geneva 2004)

In April 2006 (GC) cases of acute watery diarrhea were reported initially from Gambella region. The total duration of the outbreak was 2 ½ months in which time a total of 2,300 cases with 18 deaths and CFR of 0.78% were reported from four Woreda. Similar cases were reported end of June, 2006 from West Arsi Zone of Oromiya Region which harbors one of the busiest business centres, the town of Shashemene. Shashemene town and Arsi Negele are points for junction from major cities like Addis Ababa in the North and Wolayta, Hawassa and others in the South.

From the time of the second outbreak in the country to date reported more than 110,000 cases reported from all regions except Benishangul Gumuz.

SNNPR is one of the regions which reported AWD cases and responding accordingly. Thirteen zones, Cities and special Woreda reported AWD cases in the last four years. South Omo didn't report in the past four years. However , there were reports indirectly cholera from Kenyan side were managing cases in the Cases Management Centers /CTC's/ in the bordering wereda of Dasenech in the past two months prior the current outbreak in Dasenech. Now they closed the CTC as AWD is said to be controlled in their side. The team from WHO, EHNRI and E-

FELTP-Resident requested to investigate to identify the causative agent, identify the source, and control the outbreak and to recommend on prevention of future occurrences.

Objectives

- To investigate and verify AWD outbreak in Dasenech Woreda ,S.Omo Zone,SNNPR
- To identify risk factors for AWD infection and establish/strengthen the overall co-ordination
- To give technical support and make recommendation to contain the outbreak

Methodology

- Reviewing secondary data (Registry books, case based reports, line list records, surveillance data and related documents), were done from health center and CTCs
- Interview using structured questionnaire and conducted case control study
- Stool samples were collected and on the site investigated using RDK and also sent to EHNRI using cary Blair for culture and sensitivity. Water samples were collected and sent to EHNRI
- Making site visit, treatment sites on job orientation/training and Re-activation of Woreda AWD prevention and control task force
- Communicate findings and in corporate comments of the feedbacks and Data analysis was done using Epi.Info 3.3.2 version and Excel

Results

Rumor

The first community report reached Dasenech woreda on Nov 9,2009 (29/02/2002) indicating 10 patients with 2 community death in Derelere kebele. And the Woreda Health office mobilized health team & investigated the situation and started to respond as AWD cases.

During the investigation process the community informed the Woreda that cases with acute diarrhea were managed in Delerede Kebele, Fishery Area on 26/2/2002 and 27/2/2002E.C. One patient /fisher man/ came from Arbamich City who started his Journey on 23/2/2002E.C.Spent one night in Konso Special Woreda on 24/2/2002E.C and went to Dasenech Woreda passing through Omorate, the capital city of Dasenech and arrived in Delerele Village of Dasenech on 27/2/2002.The same day he was sick of diarrheal diseases and was treated himself with antibiotics and cured. The Next day on 28/2/2002E.C his friend was sick with the same complaint was also treated by the same way as the first patient and was cured.

Until the first report of the cases on 29/2/2002E.C there was no case report in Dasenech, Konso and Arbamich.

But document review showed there were 2 cases from Derelere kebele were managed at Omorate Health Center on 27/2/2002 as AWD by AWD protocol but not reported to Woreda Health office. Detailed history and document review showed that the index case most likely was on 27/2/2002

A total of 19kebles out of 40 (47.5%) of the Dasenech Woreda had reported. A total of 1426 cases and 23 deaths (including community death) were reported from the affected kebeles during 27/2/2002 to 18/3/2002 making the case fatality rate 23/1426 (1.61%)including the Community death report) and the Woreda attack rate was 1426/56,178 (2.54%)

Table 1.1 AWD out break report by kebele and date, Dasenech Woreda

Kebele/Date	26/2/2002	27	28	29	30	01/03/2002	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Delerale		X																					
Gnemmemery			X																				
Doshe					X																		
Omorate						X																	
Fejeji								X															
Kelewi									X														
Lobet									X														
Delegnimur												X											
Bubua												X											
Nayeka													X										
Hado													X										
Torongole														X									
Ocholoch															X								
Bayo																X							
Rate																				X			
Bandira																						X	
Alketekech																						X	
Siremiret																							X
Lokoro																							X

In this outbreak from the line listed cases 51.9% males patients and 49.1% females patients were affected .Mean age of males was -19.8 years, median age is 18 years old and the age range is between 3 month and 90 years. The Mean age of females was 21.1 years, Median age 22 years and age range 4 month and 77 years.

Among the total Woreda cases case load, 1110 (77.8%) were from Delerele kebele .While Fejeji, Ocholoch, Bubua and Omorate reported 6.9, 6.1,3 and 1.9 percent respectively. Other kebeles reported less than 1 %.

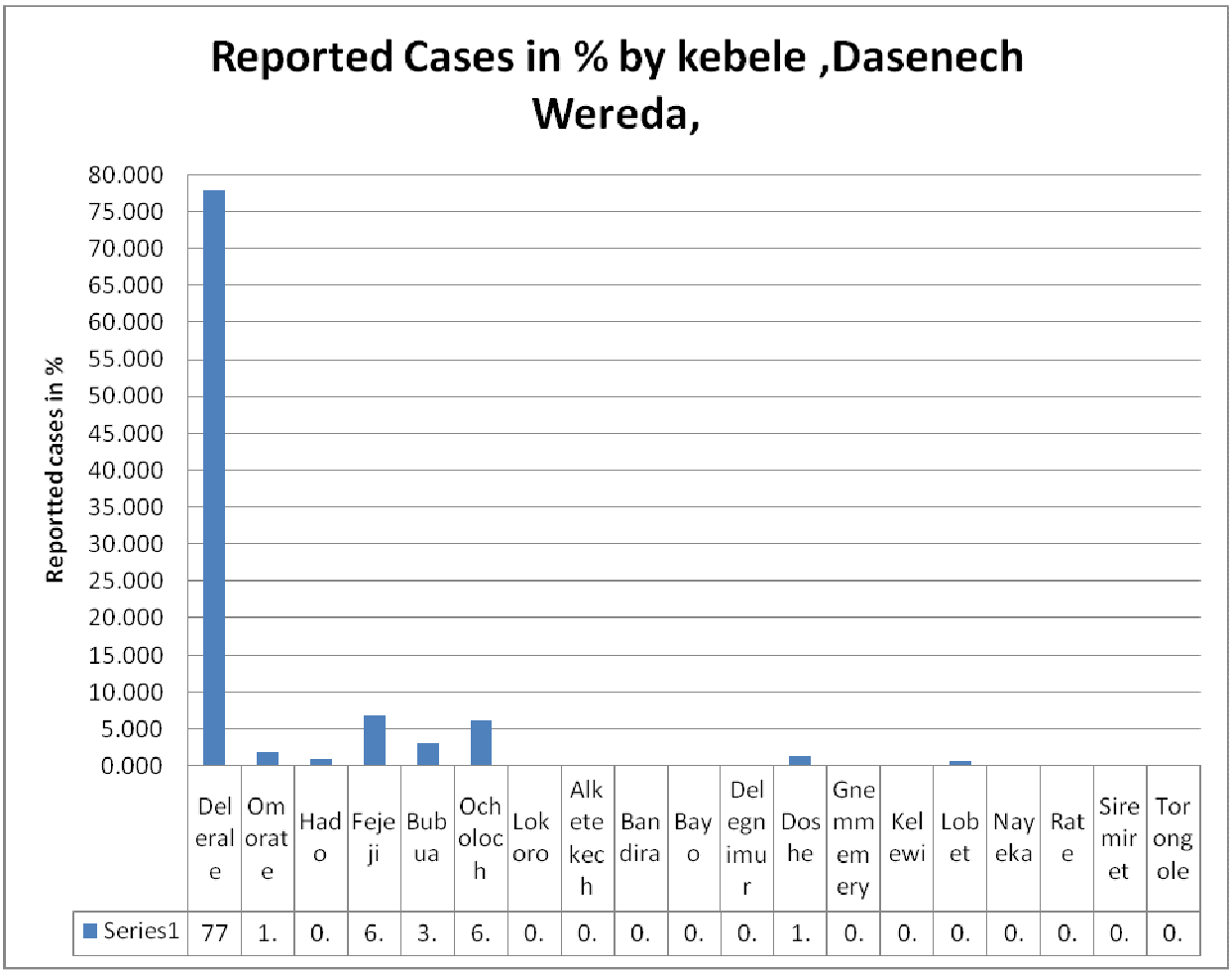

Figure 1.1 Case loads in percentage by Kebele, Dasenech Woreda

Case fatality rate and attack rate differs from kebele to kebele.Case fatality rate is ranging from Zero to 50%,as Attack rate is ranging from 0.08 Nayeka village to 105.7% of Dalerele. The

Delere's village attack rate increment more than 100% is due to population influx in the village from the surrounding villages and difficult to set the baseline population for the Woreda.

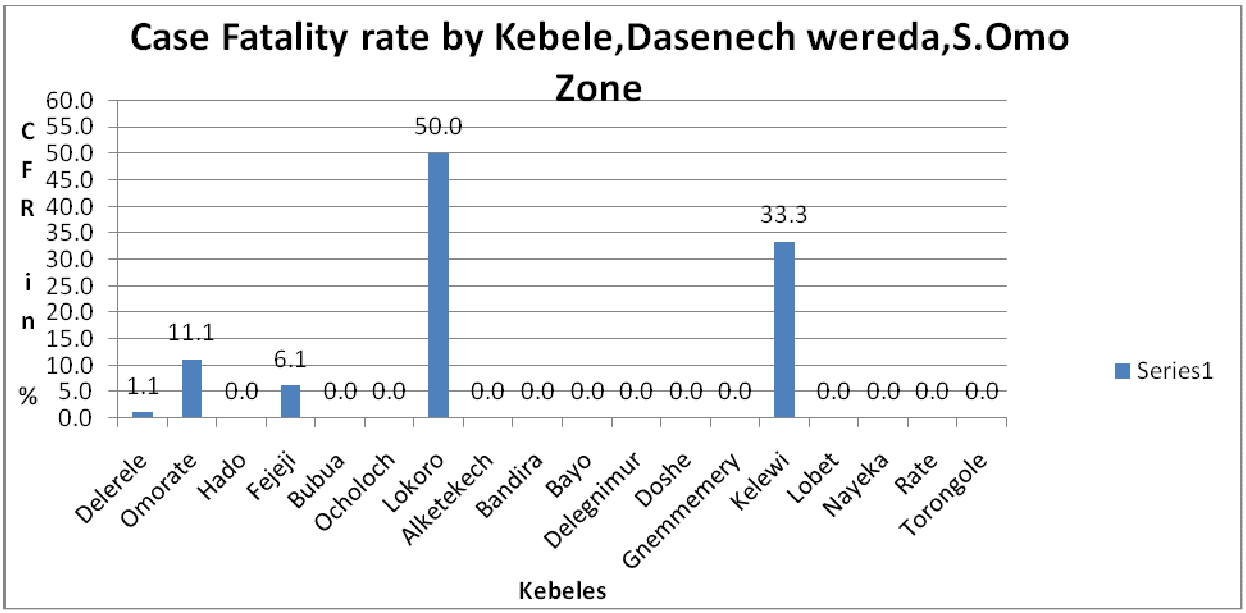

Figure 1.2 Case fatality rate by kebele

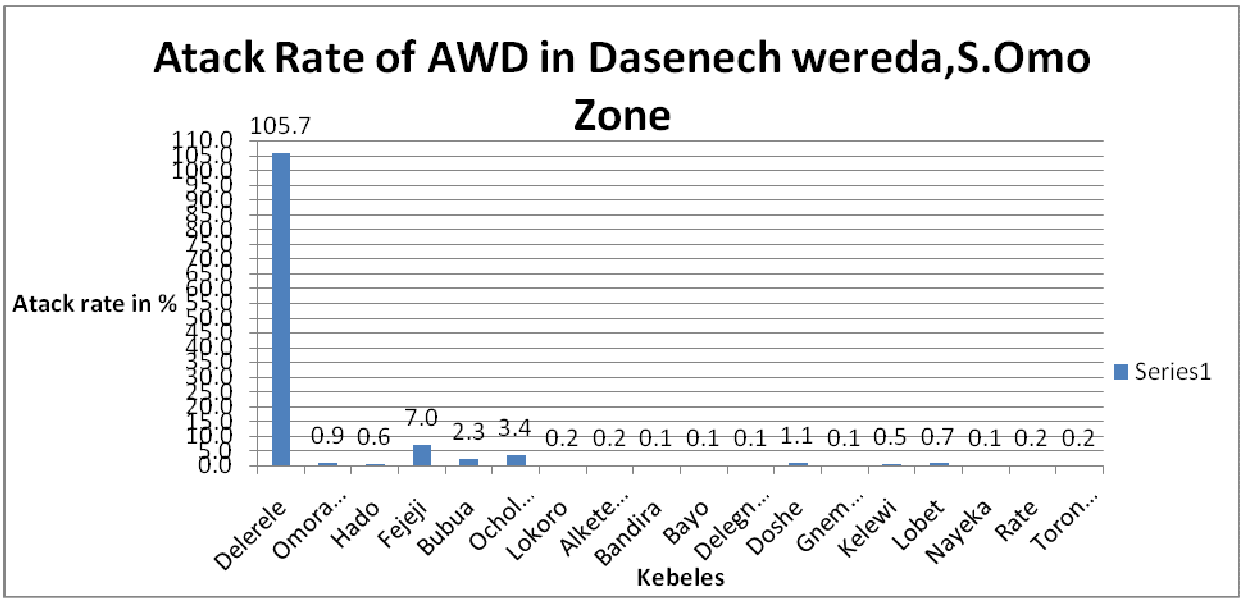

Figure 1.3 AWD outbreak Attack rate by Kebele, Dasenech wereda, S.Omo Zone

The EPI curve shows the index case to be 27/2/2002 while cases on 3/3/2002 were found cumulative case of some villages, which is difficult to disintegrate by date of admission. After

3/3/2002 the increment of case on 9 and 15/3/2002 was observed which implies some propagated type.

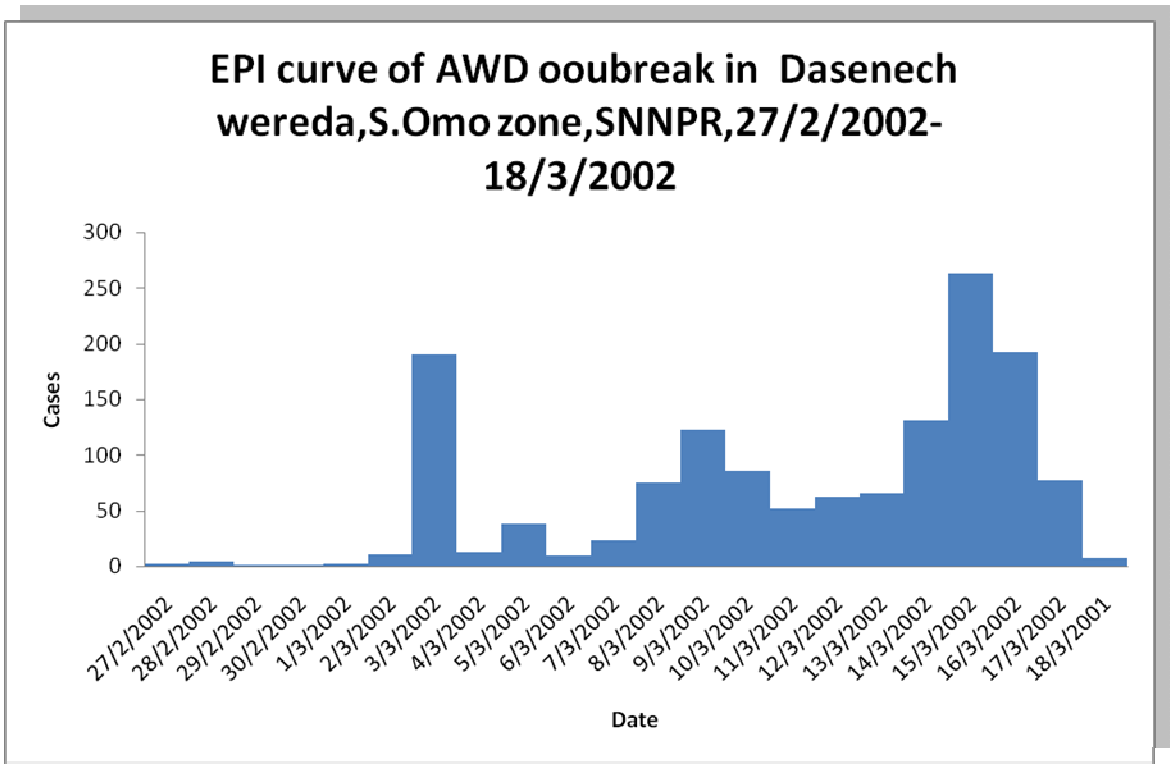

Figure 1.4 Epi curve of AWD Outbreak in Dasenech Woreda, S.Omo Zone 27/2/2002-18/3/2002

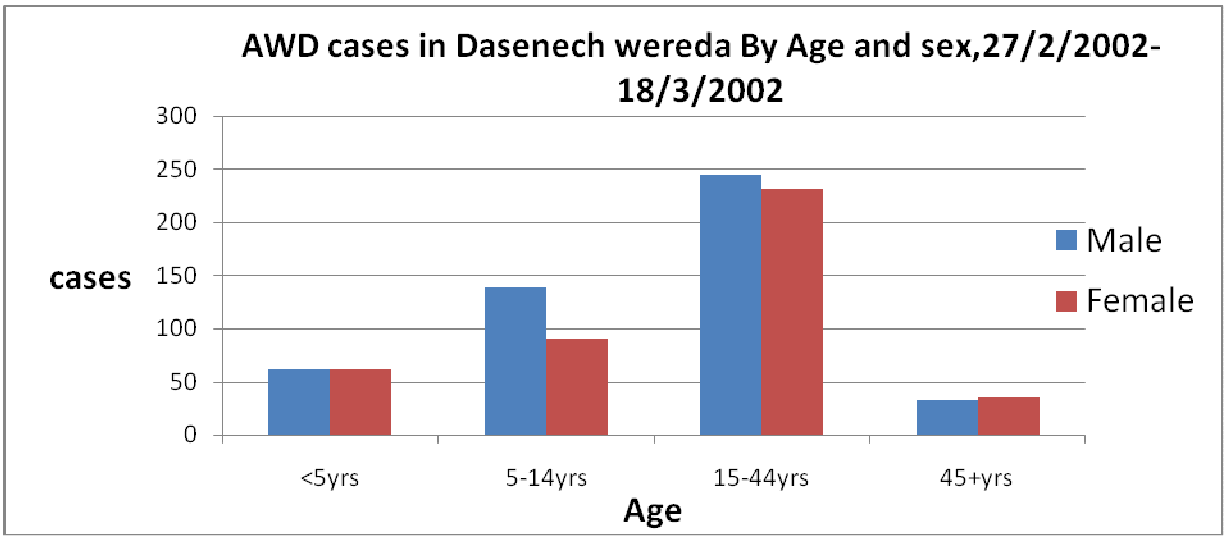

Figure 1.5 AWD cases by age and sex in Dasenech Woreda, S.Omo Zone, 27/2/2002-18/3/2002

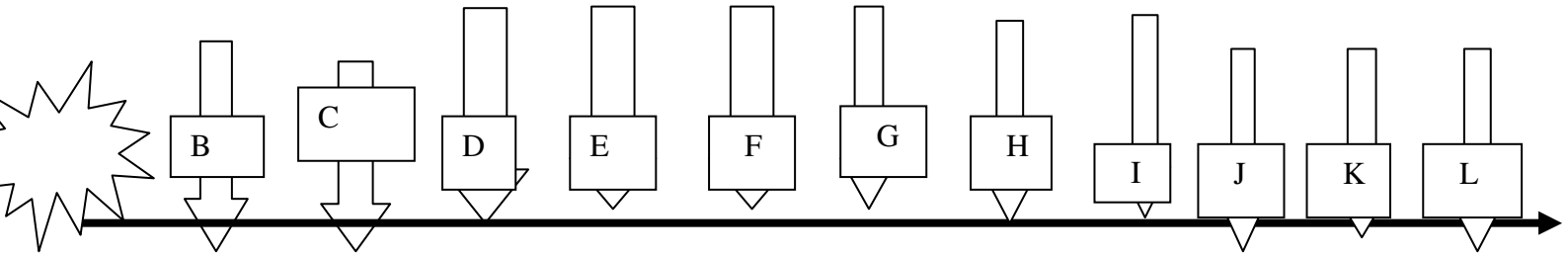

Figure 1.6 Time line of the response of the Woreda and the Zone to out break

A. Two AWD cases were managed in Dassenech HC on November 6,2009
B. Nov 8,2009 AWD reported from near by village called Derelere to the Woreda and same day Zonal Offices communicated
C. Nov 9,2009,1st Woreda/Zonal coordination Meeting held, Investigation /Case management/ team deployed
D. Nov 10,2009 Field report verified existence of AWD out break and submitted to the Woreda and AWD out break management initiated
E. Federal level/PHEM and partners/ communicated through e mail on----by partners working in Addis
F. Nov 12,2009 The Omo Zone Health office sent requirement giving information that Dasenech is affected by AWD with more than 200 cases and 6 deaths on 4/3/2002
G. Nov12-Nov16,2009 PHEM started communication/Called Zonal and Woreda Health office, and also The Regional Health Bureau getting different information
H. Nov 15, 2009 SNNPR reported that regional team is deployed. No concrete information received at Federal level
I. Nov17,2009 PHEM decided to mobilize one Team to verify the situation and give technical assistance & preparation initiated
J. Nov 19, 2009 National AWD TWG met and discussed on the issue, PHEM informed them that Federal Team will be mobilized as of Friday. And they also informed the participants that UNICEF and WHO will send experts to the area
K. Nov 21, the team from PHEM/FELTP left Addiss to the area
L. Nov 23, 2009 Teams comprising PHEM, WHO, UNICEF and IRC arrived at the epidemic site.

Key Findings

1. Coordination

The Woreda coordination meeting and activities started to be implemented with in 72 hours/had meetings and mobilized Health workers and started activities. But after 5-7 days there was no regular meetings, no specific task shared, no organized activities in resource mobilization and utilization, no schemes in safe water distribution and daily reporting and monitoring of the cases.

2. Surveilance and Case Management

Acute watery diarrhea was one of the diseases to be reported on immediately basis. While the index case which was managed in Omorate Health Center on 27/2/2002 and 28/2/2002 were not reported to the Woreda Health office. As described in the above the Woreda received information on 29/2/2002 from the Derelere indicating 10 case and 2 deaths(see Time Line) .Observed delayed report of the Woreda and the region to federal office.

During the epidemic phase reporting and registering was not at the expected level/not reporting on daily bases, no information on the incidence date and other variables/.There was no system to gather daily case report and Zero Case report from affected and non affected kebeles respectively.

Case management

The AWD case management protocol is found in the Woreda Health office and Health center. The observation and the registry revealed that 8.6 % of cases managed were not managed as per the case management protocol. (Observed Mass treatment, treatment with co -trimoxazol.) Classification of dehydration was as per the guideline.

In most of the kebeles cases were managed under shelters &small Hut/tukuls-in Derelere, some kebeles uses school infrastructure some has small tents.

All treatment centers didn't qualify the protocol for case management center/has difficulty for disinfection, separation of patients, not suitable for over all hygiene and sanitation intervention, no cholera beds etc. There is no active disinfection procedure. The observed most sites didn't have place for the health workers/working place, resting rooms etc. /

There is no acute shortage of medication.

3. Social Mobilization and community participation

The Woreda started to mobilize the community and also initiated activities to ensure the community participation. Through Kebele administrators/sent information, messages etc).Despite the ongoing effort, there was no strong mechanism to involve the community which hampers their involvement.

4. Multi sectoral involvement

Involvement of Ministry of Education and Ministry of Agriculture is ensured. In every affected kebeles teachers and development agents were mobilized to support the over all activities of Health sectors (participating in social mobilization, support in information dissemination and also safe water distribution. Detail discussion revealed there is no specific task given to the deployed manpower as per the AWD management guideline.

5. Community safe water and water treatment chemicals supply

The Woreda started to distribute small amount water treatment chemicals. There is only one water treatment plant at the capital city Omorate, getting treated water buying one jerican by 50 cents and majority of them fiches water from the River. All most all people in the Woreda uses water from Omo River, Turkana Lake and pond called chirosh

As the community is pastoralist there is shortage of safe water keeping materials. Water thankering is initiated in small scale by the Woreda Water office which didn't have the capacity/Financial, Logistics like vehicles, finance/ to cover the whole affected kebeles and the city.

6. Laboratory investigation

A total of 20 stool sample collected from admitted patients in different Treatment centers for rapid stool examination using RDK. Eighteen (90%) samples were found to be +ve for V.Cholera 01. Seven positive stool samples were sent to EHNRI as a control for culture and sensitivity of which five samples (71.43%) were culture positive for V.Cholera o1 (Inaba). Culture and sensitivity result revealed resistance to Co-trimoxazol (all isolates) and sensitive to TTC and Doxycycline (EHNRI Bacteriology Lab section).

More over from water samples from Omo river and water treatment point were taken and sent to EHNRI .The result revealed both not potable as samples contains more than the acceptable range of Fecal Coli form both sample and E .Coli type one from the river(*EHNRI public Health Lab).

7. Analysis results of case and control investigation

A total of 102 cases and 33 controls* were interviewed. The following results were obtained.

Among cases 64 (62.7%) were females where as 38 (37.3%) were males. Mean age females was 17.4 years , median age was 18 years and the age range was found to be between 2 years and 45 years . Mean age of males was 17.4 years, median was 10 years and the age range was between 2 years and 60 years.

Age Distribution <5 were 17(16.7%), 5-14 were 34(33.3%), 15-44 were 47(46.1), 45 and above were 4(3.9%)

Regarding occupation of respondents 97% were pastoralists and the remaining 3% were Fisher Men and Government employee.

Case distribution of the respondents by kebele revealed 40 (40.4 %) cases were from Delerele kebele , 27 (27.3%) respondents were from Ocholoch kebele ,10 (10.1%) from Fejej kebele(Which also observed from the overall case reported) and remaining 22 % of respondents were from other 9 kebeles of Dasenech woreda .

Clinical Manifestation revealed 101 cases (99%) had diarrhea, 99 (97.1 %) had vomiting, 44 (43.1 %) had lethargy/altered state of consciousness, 32 (31.4%) had fever

Level of dehydration

The assessment from the respondents revealed 32 (31.4 %) had severe dehydration, 61 (59.8%) had some dehydration, 9 (8.8%) had no dehydration others are severe dehydration.

Level of treatment during interview

86 (84.3%) of cases were on treatment and 16 (15.7%) of cases did not get treatment.

Source of water

83 (81.4 %) get water source from pond/chirosh**, 13 (12.7%) from river, 3 (2.9%) from well, 1 (1%) from spring and remaining two cases get water from other sources.

50 (50.5 %) of cases reported water source interruption and 49 (49.5%) of respondents had no water source interruption. Alternative source of water was from Lake Turkana for 46 (93.8%) respondents.

5 (4.9 %) of cases had access to latrine the rest 97 (95.1 %) had no latrine access.

Only 5 (4.9%) of cases had history of travel and the rest 97 (95.1%) had no history of travel to other localities.

48 (47.1%) of cases reported that they new others with similar illness like them and the rest 54 (52.9%) did not know. 41 (40.2%) of cases had close contact with cases and 61 (59.8%) had no contact. 24 (58.4%) had contact while attending patients and 17 (41.5%) those who had contact were by sharing food with cases. 43 (42.2%) of cases reported presence of drought in their locality and 59 (57.8%) reported no climatic change. Among respondents 4 (3.9%) wash hands after latrine usage and 98 (96.1%) did not.

From respondents 3 (2.9%) reported washing hands before preparing/eating food and 99 (97.1%) were not washing their hands before preparing and eating food.

Table 1.2 Risk factors analysis for possible association with acute watery diarrhea

Risk Factors	**Odds Ratio(95% CI)**	**P□value**
Latrine Access	0.799(0.146□4.3256)	0.545
Hand washing before preparing and eating food	0.469(0.075□2.9402)	0.355
Hand washing after latrine	1.306(0.1408□12.151)	0.644
Interruption of water source	0.7519(0.339□1.6648)	0.245
Water sources	1.306(0.141□12.1151)	0.645

Discussion on the risk factor association

Even though the above mentioned selected risk factors were pertinent to be probable conditions to increase vulnerability to AWD infection/illness results obtained did not show association (OR of protective value for three possible risk factors and) .

In addition there occurred narrow confidence interval range and the values (all) crossed 1 which is cut off point for determining status of association no (1) , protective (<1) , there is association some/moderate/strong (>1) .

More over P-value /Fisher exact tests were higher than P-value at 95% (p-value= 0.05) demarcating point for level of significance.

This was most probably due to late arrival, possible risk factors were identical for cases and controls, and taking delayed out break investigation communication of results and implementation of intervention activities.

If early active case searches, detection, prompt out break investigation, result communication and pertinent intervention measures were taken the level of association and statistical significance could have increased markedly when these selected exposure variables of risk factors effects analysed and compared with outcome variable in this case Illness.

Action taken by the team

1. Co-ordination
   - Re-activation of multi-sectoral response co-ordination committee
     - ✓ Daily meeting reactivated with daily monitoring of the report and response
     - ✓ Sectors officially communicated shared specific activities
     - ✓ Official communication with kebeles done for daily reporting
     - ✓ The Members of Coordinating committee started to supervise the most affected kebles
     - ✓ Neighbouring Woreda communicated for preparedness and active surveillance
       - Zonal Admistartion head started to lead the Multi Sectoral response
       - Co-ordination of multi-sectoral response became stronger than that was present before
       - Level of undertaking monitoring and evaluation of intervention activities was undertaken on daily basis

Social Mobilization and community participation

✓ Participated in organizing one social mobilization team in the Capita/ City Omorate. Started to clean the surroundings, identify the food and beverage establishment with poor sanitation situation

✓ Kebele leaders communicated and advised to take action given by the Coordination bodies

2. Surveilance and Case Management

✓ Oriented health workers on the use of registry with sufficient variables daily reporting

✓ Oriented the Woreda Health team on the importance of surveillance and how to compile, interpret and report on the daily meetings for action as well as sending to the Zone, Region and Federal

✓ Oriented the team how to strengthen the Zero report from Non affected kebeles /distributed reporting formats/

Case management

- ✓ On site orientation given to health workers on treatment protocols
- ✓ Identified organization to support with CTC sites/UNICEF brought 5 CTC materials ,IRC started to cover the overall Hygiene and sanitation activities, UNICEF &IRC started to supply safe water to the sites
- ✓ Insured provision of ORS, water guard, PUR, Ringer lactate solutions and essential drugs including materials required for infection prevention precaution purpose. (required logistics which were supported from regional health bureau and partners were distributed to affected kebeles to effect better case management and prevention and control purposes)
    - Tasks of constructing latrines in CTCs centers where severely affected patients admitted were accomplished.
    - CTCs establishment /strengthening and application of National/WHO 's AWD management formulation s and guide lines became stronger than that of which practiced before
    - Case management using protocol improved

WASH activities

- ✓ Organized WASH team
- ✓ Discussed with partners/UNICEF, IRC, Dasenech private farm organization on the resource mobilization
    - IRC with Water sector installed two additional water treatment machines, availed one pick-up vehicle with running cost and 2000 jericans ,2000 soaps availed also nearly 130,000 sachet of pure
    - Local organization availed vehicles for water tinkering
    - Reduced the Que time to fetch water in the city
- ✓ Woreda Water office and IRC agreed and started to supply free safe water to the community

- ✓ Regional, Zonal and Woreda water bureaus started joint effort in identifying the amount of safe water needed and water treatment chemicals distribution initiated with community education
- ✓ Together with WASH group actively participated and initiated in awareness creation on issue of personal/family hygiene protection

  - Status of provision of adequate and safe water to affected kebeles showed improvement even though not sufficient
  - Supervision activities on food/drink establishment sites/houses/latrines/ market places, schools and other areas where mass dinning/gatherings

Logistics and Medical supplies

- ✓ Co-planned with Woreda task force and partners to avail required materials and medical supplies
- ✓ Secured transport to needy kebeles
- ✓ Provided support on appropriate utilization of available materials and medical supplies

Challenges Encountered

- ✓ Relatively weak co-ordination and multi-sectoral response
- ✓ Inadequate and poorly constructed CTCs and difficult to get CTC materials on time
- ✓ Infection prevention precaution was not maintained
- ✓ Inadequate safe and adequate water supply
- ✓ No/inadequate access of safe latrine
- ✓ Some of the kebeles were geographically inaccessible and there was transport problem
- ✓ No/poor communication facility/telephone or radio/ between kebeles, kebele and Woreda, Woreda and center
- ✓ Cultural and Taboo barriers in keeping personal and environmental hygiene ,close family home care giving and reporting
- ✓ No electric power in all kebele and also the capital using generator for short time
- ✓ No houses or shelters for the team to do field work in kebele.
- ✓ Allowed duration of actual field investigation day is very short
- ✓ Mix up of assignment/investigation, coordination, surveillance &Case management

Conclusion

Registry books of the Omorate Health center and case management centers, pattern of the diseases report in each kebele, observation of patients in treatment sites suggested the existence of AWD out break. Further more stool examination from the patients using the Rapid Diagnostic Test kit confirmed Cholera 01 strain of Inaba. Verification supported with culture and sensitivity.

As investigation revealed cases were reported from the village called Derelere which is bordering with Kenya (South of the Woreda) spread to other villages (Northern, Eastern and Western part of the Woreda), additional to this there was no recent outbreak in neuboring Woreda or zones like Konso and Arbamich which will not incriminate them to be the site of source for this outbreak.

Identifying the index case, incubation period of the disease and spread of the infection the outbreak has propagated character.

In addition , the fact that more than 80% of cases get their drinking water from unprotected water sources , inappropriate personal hygiene practice (no developed culture of washing hands after latrine use/before eating and preparing food) ,very low sanitation coverage (<5%)and related factors were the most probable risk factors .

Gap in early preparedness (knowing Kenyan side were managing cases), undertaking active surveillance to search, detect and manage cases ,weak prompt report/delayed notification/and limitations to take strong and coordinated intervention measures to prevent and control further spread of the out break were among influencing factors which were incriminated to effect the spread of the outbreak.

Recommendation

Based on the assessment findings of reports and records, discussions made with AWD prevention and control task forces partners and communities, site visits, observations, supportive supervision and case/control survey results following recommendations were made

- Close follow-up of the Woreda Co-ordination of multi-sectoral response must be on place not to be weaken again in the context other priorities
- Continuous In-service AWD management training and Strengthening of social mobilization focused on improving personal and environmental hygiene practice is warranted
- Improve close monitoring of active surveillance activities by the Woreda and ensure strengthening Ethio-Kenyan cross border communication on cross border health related issues.
- Avail CTC materials and maintaining standard of CTCs and case management as per guide line and Continuous restocking of adequate amount of AWD treatment medications (ORS, ringer lactate solutions, Antibiotics and disinfectants) and provide adequate amount safe water
- Increase public awareness with regard to AWD prevention and control issue and Construct and avail adequate number of safe latrine in affected and vulnerable households/villages
- Prepare systematic contingency plan and make unreserved efforts to solicit necessary and adequate logistics, supplies and Undertake periodic monitoring and evaluation activities
- Avail vehicles at least two vehicles with running cost and additional finance support and field equipment for PHEM/FELTP team members in the future

Acknowledgement

We thank FMOH /PHEM, SNNPR Regional health bureau, AAU/SPH/EFLTP, and Partners: WHO, UNICEF, IRC for their support in our investigation. We would like to extend our appreciation to Dasenech Woreda Health Office,Dasenech Woreda, S.Omo zone and Communities residing in villages of various affected and vulnerable kebeles of Dasenech Woreda ,S.omo zone , For their unreserved support with out which our efforts of conducting AWD outbreak investigation, participation in intervention activities , undertaking supportive supervision ,collect data, analyse and finalize ad bring this report into reality.

1.2 Shigellosis Outbreak at Addis Ababa University, March-April, 2010.

Abstract

Background: Addis Ababa had average rate of 204 cases of diarrhea with blood /100,000 population / year from 2005 to 2008. Cluster of cases of diarrhea were reported from Technology Campus of Addis Ababa University in March 2010. We investigated to identify the causative agent, identify the source, and control the outbreak and to recommend on prevention of future occurrences.

Methods: We conducted descriptive with matched case-control study, and laboratory and environmental investigations. Using structured questionnaire, we collected data regarding risk factors since the preceding 5 days prior to onset of the outbreak. Data were analyzed using Epi-info version 3.3.2 statistical software and excel sheet.

Results: There were a total of 104 patients, with overall attack rate was 6.8%. Stool culture [45% (5/11)] grew *Shigella flexneri* species. Shortage of water (Odd Ratio OR: 2.65 and 95% confidence interval, CI: 0.987-7.108), lack of habit of hand washing with soap or detergent after using the toilet (OR: 2.4 and CI: 0.872-6.604) increased the risk of being ill; moreover, with the foods served on 26Friday, Mar.2010 lunch time and on 27Saturday Mar.2010 dinner (OR: 3.59, CI: 1.011- 12.731 and OR: 2.89 CI: 1.021- 8.173) were also associated. The hygiene and sanitary conditions in the cafeteria, kitchen, living area was poor; and the stored water was faecal contaminated (faecal coliform count >161 Mpn /100ml)

Conclusion and Recommendations: regular supervision of the food facilities and food hygiene and sanitation; correcting the water shortage and the latrine facility with promotion of hand washing and provision of safe water could reduce further outbreak.

Key words: Shigellosis, ***S****higella flexneri,* Addis Ababa University

Background

Diarrheal disease continues to be a leading cause of morbidity and mortality worldwide, and is ranked fourth as a cause of death[1]and second as a cause of years of productive life lost due to premature mortality and disability.[2]Several of the common gastrointestinal infections characterized by diarrhea are diseases like cholera, shigellosis, salemonelosis, campylobacter enteritis, Escherichia coli infections, yarsenosis, gardiasis, cryptosporosis, and viral gastroenteropathy[3].

Diarrheal disease outbreaks are common in the overcrowded communities and in poor hygiene and sanitary conditions of the environment. The common causes of such outbreaks are food and water borne diseases which are transmitted by feco –oral route. In developing countries, poor sanitation and substandard living conditions create an environment in which diarrheal pathogens exact a terrible toll, especially among children. The acquisition of diarrheal pathogens through the food supply is a major problem both in the developing world and in the United States, where 400-600 documented food-borne outbreaks and millions of cases are estimated to occur each year. [4]

Bloody diarrhea is wide spread globally and occurs in outbreaks. Shigellosis is the most common cause of outbreak of bloody diarrhea worldwide with high rate of secondary infection as high as 40% in the household ([3]) and case fatality rate up to 15-20% ([3],[5]). Outbreaks are most common in overcrowded, impoverished areas with poor sanitation, inadequate hygiene practices, and unsafe water supplies. Refugees and internally displaced persons are at especially high risk. As seen in Africa, South Asia, and Central America in the recent past(5) killing as high as 20,000 people in one month alone among Rwandan refugees in Zaire in 1994 due to *Shigella dysenteriae* type 1(Sd1) [(5)].

Shigella has very low infectious dose as low as 10- 200 viable bacteria (3, 5) with incubation period of 12-96 hours (3). It usually manifests as diarrhea with blood and mucus in the stools.

Patients may, however, present only with acute watery diarrhea without visible blood or mucus, and without the other symptoms described above, especially at the beginning of their illness (5) .The bacteria transmitted by ingestion of contaminated food or water, or through person-to-person contact. Flies can breed in infected feces and then contaminate food; vegetables can become contaminated if they are harvested from a field with sewage in it (3, 5). Shigella bacteria are present in the stools of infected persons while they are sick and for up to a week or two afterwards Most Shigella infections are passed through the fecal-oral route (3).

The annual number of Shigella episodes throughout the world was estimated to be 164.7 million, of which 163.2 million were in developing countries (with 1.1 million deaths) and 1.5 million in industrialized countries. The estimated annual number of cases of shigellosis among persons aged above 5yrs living in developing countries is roughly 50.0 million cases per year ([5]). The median percentages of isolates of S. flexneri, S. sonnei, S. boydii, and S. dysenteriae were, respectively, 60%, 15%, 6%, and 6% (30% of S. dysenteriae cases were type 1) in developing countries including Ethiopia[6.7.,8]. Shigella flexneri is the dominant serogroup in developing countries[9,10].

In Ethiopia, as in other developing countries, there is limitation of data (6, 7, 8), but taking ***diarrhea- with blood*** as proxy-indicator, the national figure from the year 2005/06 to 2007/08 was on average 75,531 cases per year at the outpatient (about 98 cases per 100,000 population per year); and average number of admission was 1901patients and 72 deaths per year. And Addis Ababa took the major share with average rate of 204 cases per 100,000 population per year in this period ([11,12,13]). There was a report of epidemic in 2005/06 in Southern Nations

Nationalities Peoples Region (SNNPR) with a total of 209 cases and 1 death([11]); and in December 2008, a total of 566 cases of shigellosis were seen in Jimma City outbreak ([14]). In Ethiopia, from the limited data available, *S. flexneri* and *S. dysenteriae* comprise over 80 % of total Shigella isolates [6], and the prevalence of S. flexneri alone from isolates has been reported to be between 50% [6] and 70% [7,[15]] and as high as 99%[16].

On 29 March 2010, a report came from the AAU technology campus students' clinic as unusual increased number of patients- students complaining of diarrhea, fever and abdominal cramp with generalized weakness and some are referred to hospital for inpatient care. This is very unusual to the campus in its long history. As preface, in the past few years, the campus's intake of students has tripled and quadrupled, without expansion of student services facilities; with an overcrowded and unhygienic living condition. Conversely, diarrheal diseases occurred in the campus occasionally and in few students but with unknown incidence, and were managed by the Campus Clinic (*briefings from the Students Dean's Office*[17]).We investigated this cluster of cases to identify the causative agent, identify the source, control the outbreak and propose recommendations to prevent future occurrences.

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Methods

We conducted descriptive epidemiology, laboratory investigation, case-control study and environmental investigations.

Study population:

The study was in a source population of 1554, including the technology campus students in AAU and the student cafeteria workers- like the food handlers and cooks.

Descriptive Epidemiology:

We collected the surveillance data using the epidemic linelisting formats of the PHEM from the time of outbreak onwards. We defined the suspected case of Acute Diarrheal Disease Syndrome as any person who has sudden onset of abdominal cramp, diarrhea (with or without vomiting), fever, joint and muscle pain, OR Diarrhea with any of the above symptoms since Sunday, March 28, 2010. After we prepared the case definition, we notified the campus community to report early to the campus clinic by posting it on the notice board of the campus. We interviewed each of the suspected case patients and reviewed medical records to collect information regarding identification, sign and symptoms, and laboratory investigation and the outcome.

Laboratory investigations:

The first cases of the outbreak were sent to Black Lion Hospital. Blood, and stool specimens were collected for culture. All 54 student cafeteria workers were also sent to the regional Laboratory, Zewuditu Memorial Hospital, and Yekatit 12 Hospital to be evaluated and give stool samples for culture.

Case- Control study:

We conducted a matched case control study involving suspected case patients in the first 4 days of the outbreak. We tried to include all cases in the first 4 days of the outbreak with a total of 34 cases; we compared each with one other control recruited from the same living room (dormitory), selected at convenience. These students are of similar age group and sex and share the same room services. We designed structured questionnaire and collect information regarding demography, drinking water information, latrine and hygiene, contact history with a suspected case, food menu served over the past 5 days; after we got oral consent from the

subjects. Data were entered, cleaned and analyzed using Epi-info version 3.3.2 statistical software and excel sheet.

Environmental Investigation:

A team moved to inspect and collect information regarding the overall conditions, hygiene and sanitation of the living areas, the water supply, kitchen (structure, food preparation, handling and storage), and the cafeteria and interviewed the cooks and the administrators. And sample of poorly stored meet and water served in the cafeteria (from the pipe and collection tank) were collected for laboratory investigation.

Operational Definition:

Working case definition: after analysis of the collective sign and symptoms from the patient medical records, we defined the case as:

Probable case: Any person who has sudden onset of abdominal cramp, diarrhea (with or without vomiting), fever, joint and muscle pain, OR diarrhea with any of the above symptoms since Sunday, March 28, 2010.

Results

Descriptive Epidemiology:

The first cases of acute diarrheal disease syndrome were reported to the campus clinic on 29 March, 2010. And the first date of onset of symptoms was on 28 March, 2010. The majority of patients presented with the symptoms of diarrhea, abdominal cramp, and fever (table 1).Total number of patients' was 104(over a period of two weeks) with median age of 20 yrs and age ranging 17-30 yrs. Among them 95% (99/104) were males. The overall attack rate is 6.8%. Six percent of cases came for second time for they did not improve, 11.5% (12/104) of patients were referred to the hospital for inpatient care, and there was no death.

All these cases are from different departments in this campus, different years of study and different living buildings. But all of them have cafeteria and water source in common. All case patients ate at the cafeteria nearly the whole 5 days prior to the onset of the outbreak.

The overall time pattern of the epidemic showed that significant number of cases presented in the first 4 days based on onset of symptoms (figure 1).

Table1.2.1 Clinical Symptom of Cases of Acute Diarrheal Disease (ADD) in the Technology Campus, AAU, Addis Ababa; Mar- April 2010.

Symptom (Reviewed from fully recorded individuals' Medical Cards)	Percent(n= 80)
Diarrhea	94%
Abdominal cramp	72%
Fever	41%
Chills	25%
joint pain	16%
Vomiting	5%

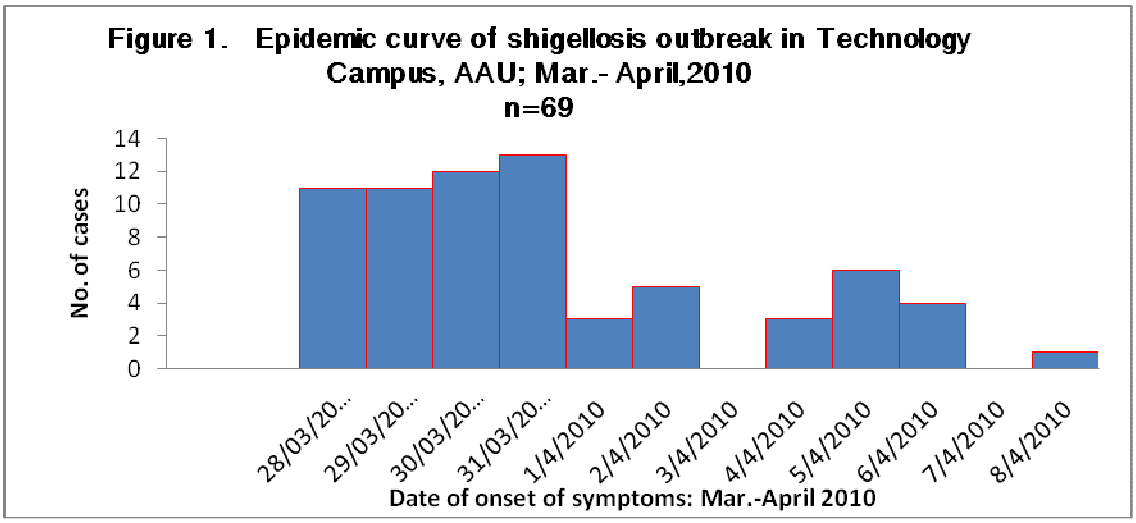

Figure 1.2.1 Epidemic Curve of shigellosis outbreak in Technology campus, AAU; March April, 2010

Based on the distribution of cases over time and their common points are the cafeteria and the water sources, and their overcrowded living condition, common point epidemic is suspected; and we generated the hypothesis that the epidemic could be due to polluted water, contaminated food, or person-to-person contact.

Laboratory Investigation:

From the medical records, 21 stool samples were collected for direct microscopic evaluation revealed inflammatory diarrhea in 47.6 %(table 2); and 45% (5/11) of stool samples collected for culture in Black Lion Hospital grew Shigella flexneri species. And nothing found from the blood specimens.

Table 1.2.2: Direct Microscopy examination Results of Stool samples collected from Case-Patients of ADD Outbreak, AAU Technology Campus, Addis Ababa, March- April 2010.

n=21	%(n)
RBcs and/ or Pus cells	47.6 (10)
E. histoletica	14.3 (3)
E. histoletica with RBCs and Pus cells	4.8 (1)
G. lamblia	4.8 (1)
H.nana	4.8 (1)
Ascaris lambricoids	4.8 (1)
Strongloid stercoralis	4.8 (1)
Tricuris tricuria	4.8 (1)
No ova or Parasites	9.5(2)

Case Control Study:

We recruited 34 suspected cases (median age: 20 years) and 34 controls (median age: 19 years, P=0.11) for the case-control study. The major risk factors or vehicles for such ADD outbreak like contaminated water, food and /or direct contact from person to person or factors related to the basic hygiene and sanitation were assessed.

Overall, 66.2% (45/68) of the respondents pointed that there is no functional hand washing facility in the latrine area and even 39% of respondents with functional tabs do not always wash their hands with soap or other detergent after using the toilet. There was close contacts with the patients in 60.3% (41/68) of respondents living in the same room, attending the patient, sharing utensils, or eating together. 81.5 % (53/65) of the respondents were served up in the campus cafeteria, and 89.7% (61/68) drank nothing outside the campus during the study periods (since five days before the outbreak).

Suspected cases were more likely than controls to experience from shortage of water (Odd Ratio OR: 2.65 and 95% confidence interval, CI: 0.987-7.108), lack of habit of hand washing with soap or detergent after using the toilet (OR: 2.4 and CI: 0.872-6.604); moreover, the analysis of the menu served over 5 days prior to the onset of the outbreak showed that the odds of being ill was associated with the foods served on 26Friday, Mar.2010 lunch time and on 27Saturday Mar.2010 dinner (OR:3.59, CI: 1.011- 12.731 and OR: 2.89 CI: 1.021- 8.173) (table 3). These were foods served for both the fasting and non-fasting students.

Table 1.2.3. Risk factors Analysis for possible association with Acute Diarrheal Disease Outbreak in Technology campus, AAU, Mar- April,2010

Risk factors (as assessed since 5 days prior to the onset of the outbreak)	Cases(N=34) No. (%)	Controls (N=34) No. (%)	Odds Ratio (95% Confidence interval)	p-value
Food served on:				
• 26/03/10-Friday lunch, Misir Key wot	30(88.2%)	23(67.6%)	3.59(1.011-12.731)	0.0406
• 27/03/10- Saturday dinner Alcha keke wot	26(76.5%)	18(52.9%)	2.89(1.021- 8.173)	0.0423
Eating outside the campus(anything)	5(15.2%)	7(21.9%)	0.638(0.179-2.267)	0.2535
Drinking outside the campus (anything)	4(11.8%)	3(8.8%)	1.378(0.28- 6.68)	0.5000
Contact history with the patient	19(55.9%)	22(64.7%)	0.69(0.26- 1.83)	0.4570
Latrines with malfunctioning water tabs	23(67.6%)	22(64.7%)	1.141(0.321-2.396)	0.2020
Shortage of water in the campus	19(55.9%)	11(32.4%)	2.649(0.987-7.108)	0.0507
Lack of Soap or detergent use after latrine use	16(50%)	10(29.4%)	2.4(0.872-6.604)	0.0871

Further multivariate analysis of the risk factors with p value of less than 0.1 showed no significant difference from the bivariet analysis (table 4). And the risk factors still associated with are the food items and the shortage of water.

Table1.2. 4. multivariate Analysis of risk factors (with p-value <0.1) of shigellosis Outbreak in Technology campus, AAU, Mar- April,2010

Risk factors (as assessed since 5 days prior to the onset of the outbreak)	Odds Ratio (95% Confidence interval)	p-value
Food served on:		
• 26/03/10-Friday lunch, Misir Key wot	3.12 (0.701- 13.89)	0.135
• 27/03/10- Saturday dinner Alcha keke wot	2. 95 (0.84 – 10.35)	0.0915
Shortage of water in the campus	3.03 (0.963 – 9.54)	0.058
Lack of Soap or detergent use after latrine use	1.92 (0.628 - 5.87)	0.253

Environmental Survey Findings:

Food Hygiene: almost all students, who were sick, had eaten food in the student cafeteria for at least 5 days prior to the occurrence of the outbreak. The cafeteria was found to be lacking in basic hygiene. The store and kitchen are not properly handled (floors were dark, not well cleaned,) and lacking shelves, the no proper monitoring of the refrigerators. There did even smell meet from the deep freezer.

Water Source: Students' water source is the pipe water. But the water served in the cafeteria with meal is stored in the barrel and the caps were not well washed. It was found grossly contaminated with visible oily film in the caps. There is lack of water in the campus even for hand washing. There was shortage of running water in the food preparation and service rooms.
Latrine and Latrine Use: the Latrines are all water carriage systems; but the lack of water makes cleaning very difficult. The hand washing facilities are not functional and dirty. This makes the latrines unsafe.

Housing: the living room is very substandard with overcrowding and poor in basic hygiene and sanitation; about 15 students per room. Hygiene and sanitation: refuse disposal was poor with dispersed rubbish particularly around the kitchen, which is potential site for breeding of flies. The cafeteria workers were complaining about shortage of soap and detergent in their working areas and the latrine.

There was no regular medical checkup or training of the food handlers and cafeteria workers. The laboratory results of stool samples collected from all 54 Cafeteria workers showed no growth (negative); water specimens collected from the pipeline was potable (faecal coliform count <1 Mpn18 /100ml which is considered as not detected) but the sample collected from the collection tank was positive for coliforms (faecal coliform count >161 Mpn /100ml) and commented as not potable. Samples which were taken from the meat (both the Christian and Muslim) showed coliform count 3.2x106 cfu19/gm and 2.4x106cfu/gm respectively and too many colonies of staphylococcus spp. in both (see annex-1).

Discussion

Bloody diarrhoea has been ranked among the top 10 causes of morbidity in under five children in Ethiopia. Its occurrence is widespread throughout Ethiopia and is associated with outbreaks ([20]). Shigella infections are not usually fully reported to the health facilities, only less than 1%

is expected to be reported (5,21). But despite this limitation in the surveillance system, the Ethiopian Public Health Emergency guideline put the threshold for epidemic detection and action as a cluster of acute bloody diarrhea cases in the same settlement in one week. [22]And hence, detection of a cluster of more than 30 cases of shigellosis in 3 days (with total of 104 patients in 2 weeks) in the campus was declared as outbreak. Further investigation of this outbreak pointed out as common source epidemic: first the pick of the epidemic curve at or near the beginning of the outbreak and the sudden fall down within the first few days (4-5 days) of the outbreak (which is about 1 incubation period or extended exposure in one incubation period), and second the low attack rate suggested the epidemic was from common source with minimal person-to-person contact transmission. The attack rate of 6.8% was not as such significant in such closed, overcrowded community where secondary attack rate can be as high as 40% at the house hold level (3, 5). This may be due to the accessibility of the health facility with prompt case management, awareness created to the campus community and factors related to the etiologic agent. The most virulent and epidemic prone serogroup of shigella is S.dysenteriae type 1(sd1), (3, 4, 5) but S. flexneri (in 45.5% (5/11) culture result) was proved to be the cause of the epidemic like the epidemic in Jimma, Ethiopia, Dec.2008. Though the sample taken from the meat showed contamination with staphylococci, the absence of characteristic short incubation period (minutes to hours) of staphylococci with abrupt onset of intoxication (not infection), no isolates from the clinical samples and there was no meat served raw helped us to exclude this differential diagnosis.

The cases were from different living blocks, different study area, and years of study with only limited common points like the cafeteria, and their indoor interaction; suggesting these were the potential sources of the outbreak. The assessment of these common points revealed that the hand washing practice and hand washing facilities were very poor worsen by the shortage of water and soap for both the students and the cafeteria workers[23]. The association of the odds of being ill with both the shortage of water and the menu served further strengthens that the foods

and utensils may be under washed or washed with stored water in the tank which was with faecal contamination (faecal coliform count >161 Mpn /100ml). Infections may be acquired from eating contaminated food, although contaminated food usually looks and smells normal. Food may become contaminated by infected food handlers who don't wash their hands with soap after using the bathroom. Vegetables can become contaminated if they are harvested from a field with sewage in it (5). Water may become contaminated with Shigella bacteria if sewage goes into it or if someone with shigellosis swims in or plays or come in contact with the water (especially in splash tables, untreated wading pools, or shallow play fountains used by day care centers). Shigella infections can then be acquired by drinking, swimming in or playing with the contaminated water (3, 5).

Significant numbers of cases were also found infested with intestinal parasites, and with the current hygiene and sanitation situation the risk of transmission to susceptible hosts is very high and needs further evaluation and a sort of deworming campaign and regular checkups, for the students and the cooks and suppliers.

The limitations of this study were due to the late notification of the outbreak and early leaving of the students from the campus. Investigation began 2 days after start of outbreak making difficult to find the real index case and to further study exposure; to find leftover food for laboratory investigation; to control recall bias to do the 'dose – response' evaluation of the risk factors; and early leaving of the students from the campus for Easter Holiday, limiting the sample size.

Measures to control the outbreak were started side by side with the investigation and the case management. The investigation team recommended immediate corrective measures to the students services office and notifies to the campus community about the disease and early treatment and control measures. But there were significant delay in the environmental sample laboratory results.

In general, the investigation team conclude that current outbreak was due to the contamination of water and food items (particularly the Friday lunch and the Saturday dinner); but the team

could not conclusively determine what source and how the infection was introduced to the campus. But there hygiene and sanitation, and the living condition were/ are good fertile grounds for this and other food borne outbreak in the future.

Recommendations

The investigation team recommended the needed of change of the water tank and the water supply to cafeteria should be direct from pipe line with limited use of stored water. Water storage barrel need to be narrow mouthed, closed and with faucet and regular cleaning and regular check up for chlorine residual. The campus latrine and latrine facilities should be urgently corrected and improved with water supply and hand washing after defecation should be promoted. Monitoring and regular supervision of the food preparation, storage condition, washing and drying facilities of the utensils of the food establishments of the suppliers and the student cafeteria should be ritual. Regular medical checkups of the food handlers and suppliers, with regular training on food hygiene and safety should be mandatory. The student services and the crowded living conditions should be improved. Additionally, the burden of intestinal parasites in the campus community needs to be studied further.

Acknowledgements:

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References

1. Murray CJ, Lopez AD. Mortality by cause for eight regions of the world: Global Burden of Disease Study. Lancet, 1997, 349: 1269±1276
2. Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. Lancet, 1997, 349: 1436±1442.
3. Mintz E. Shigellosis. In: David L. Haymann(ed.) control of communicable diseases Manual, Washington, American Public Health Association, 2008, 19th ed. 556-560.
4. Wilson, WR, Lawrence, W, Drew, N K, Henry, MA, Sande, DA, Relman, JM, Steckelberg, JL, Current Diagnosis & Treatment in Infectious Diseases, 1st edition, Gerberding Publisher: McGraw-Hill/Appleton & Lange, June 22, 2001
5. World Health Organization Guidelines for the control of shigellosis, including epidemics due to Shigella dysenteriae, 2005.
6. Kotloff, KL, Winickoff, JP, Ivanoff,B , Clemens, JD, Swerdlow, DL, Sansonetti, PJ, Adak, GK, Levine, MM, Global burden of Shigella infections: implications for vaccine development and implementation of control strategies, Bulletin of the World Health Organization, 1999, 77 (8)
7. Gebre-Yohannes A, Drasar BS. Shigella dysenteriae and Sh. flexneri: serotypes prevalence and seasonal distribution in Addis Ababa, Ethiopia (1978-85). Ethiop J Hlth Dev 1987; 2: 51-8. 4.
8. Gedebou M, Tassew A. Shigella species from Addis Ababa: frequency of isolates and in vitro drug resistance. J. Hyg 1982; 88: 47-55.
9. Mutanda LN, Kaviti JN, Wamola IA. Patterns of Shigella species and serotypes in East Africa. East Afr Med J 1979; 56: 381-7.
10. Khan AM, Curlin GT, Huq I. Epidemiology of Shigella dysenteriae type 1 in Dhaka urban area. Trop Geog Med 1979; 31: 213-23.
11. Federal Ministry of Health, Ethiopia; Health and Health Indicators, 2005/2006
12. Federal Ministry of Health, Ethiopia; Health and Health Indicators, 2006/2007
13. Federal Ministry of Health, Ethiopia; Health and Health Indicators, 2007/2008
14. Fessehaye, A. et al. Investigation of Dysentery outbreak and its causes, Jimma city, Southwest Ethiopia, Ethiopian J Health Sciences, 2009, 19:147- 154.

15. Moges T. Serodiversity and Antimicrobial Resistance pattern of Shigella isolates at Gondar University Teaching Hospital, Northwest Ethiopia (2006- 2008). J. Infect. Dis., 2009: 62, 93-97.
16. Belay R. et al. Antimicrobial Susceptiblity Pattern of *Shigella* Isoltes in Awassa, (1997-1998). Ethiop J Health Dev.2000; 14(2): 149-154
17. Briefing given by Technology Faculty students' dean for the investigation team on its arrival
18. Chompook, P. et al, Estimating the burden of shigellosis in Thailand: 36-month population-based surveillance study. Bulletin of the World Health Organization, October 2005, 83 (10)
19. Federal Democratic Republic of Ethiopia Ministry of Health, Ethiopian Public Health Institute Process Implementation Manual Public Health Emergency Management Core Process November 2008, Addis Ababa
20. John T. and et al. Epidemiology of Sporadic Bloody Diarrhea in Rural Western Kenya. Am. J. Trop. Med. Hyg., 2003; 68(6), pp. 671–677

Chapter II – Surveillance Data Analysis Report

2.1 Descriptive Epidemiology Of Under-Five Malnutrition in Ethiopia, 2000 And 2005

Introduction

In recent years, Ethiopia had one of the highest rates of chronic malnutrition among countries sub-Saharan Africa. On the basis of a 2005 survey report indicated that 47% of children under five were suffering from chronic malnutrition. Similarly, 27% of all women of child bearing age were found to suffer from chronic energy deficiency.

Malnutrition in Ethiopia, like in most developing countries results from the interaction between poor diet, inadequate food intake and disease, leads to most of the anthropometric deficits observed among children. Even though various preventive and promotive efforts have been introduced in order to improve the health situations in the country, malnutrition still remains one of the major and most pressing health problems implying that the progress made so far in the reducing child malnutrition in the past 20 years is practically inadequate. The major factors that have contributed to the high prevalence of malnutrition include, apart from insufficient food production, infectious diseases, recurrent drought and famine, the civil wars that have lasted over a quarter of a century, falling gross national product per capita and political instability.

There are high levels of micronutrient deficiencies in Ethiopia. The adverse effects of micronutrient deficiencies on health include, but are not limited to impaired resistance to infection, chronic fatigue, poor mental and physical development, blindness, and complications in pregnancy, delivery and low birth weight. On the basis various nutrition survey reports, most important form of malnutrition in Ethiopia are protein-energy malnutrition and micronutrient deficiency disorders.

Statement of Problem

Malnutrition has been a serious obstacle to economic development in Ethiopia. The continuing human costs for the many malnourished people are enormous-shortened lives filled with illness and reduced physical capabilities and compromised mental performance. It is reflected through deterioration of welfare of a population and reduction in human productivity and creativity, which are a vital for economic development of a nation.

The country seeks sustainable human and economic development. The realization of sustainable human and economic development requires sustainable improvement in nutritional status of the population.

Objective

- To provide due attention to malnutrition vulnerable groups of society, particularly under five children.
- To ensure the under five children are free from malnutrition related health problems.

Methodology

Based on literature review from Ethiopia demographic health and survey (EDHS) and data collected from FMOH

.

Malnutrition and Its Causes

Malnutrition is a disease caused by not getting enough of right food to eat or enough quantity of food. Causes of malnutrition are multi-factorial and can be divided into immediately, underlying and basic.

Immediate Causes

The immediate causes are:

Low dietary intake that is either not providing the right nutrients or the required amounts of food.

Recurrent infection: The occurrences of repeated infections in children reduce their appetite and affect the bodies' ability to utilize food and further reduce resistance to infections.

Underlying Causes

Food insecurity: When families are unable to produce or purchase their own food or when there is unbalanced intra-household food distribution. (For example priority is often not given to children and women though they are at higher risk of malnutrition).

Lack of appropriate care: Due to negative social beliefs, attitudes, and cultural practices, children mothers usually get less attention and care. As a result of this lack of care and reduced food intake they are exposed to malnutrition.

Lack of basic health service delivery: The unavailability or low utilization of basic health services, poor personal and environmental sanitation, and inadequate water supplies are the main causes for the prevalence of disease. Children whose health status is compromised by different infectious diseases are at greater risk of malnutrition. Similarly, children who are malnourished will have a reduced resistance to infection.

The Basic Causes

The basic causes of food insecurity include political, economic, social factors, and their inter-relationship. These are the major determinants in the area of food and nutrition in any country.

Types of Malnutrition

-Protein energy malnutrition: The main forms of protein energy malnutrition include kwashiorkor and marasmus. These conditions mostly occur in children under-five years of age where children are greatly deprived of protein and calorie rich foods.

Micronutrient deficiency: The main deficiencies in this category include vitamin A deficiency, Iodine, and Iron deficiency. Children under five years, as well as pregnant and lactating mothers are at most risk.

Child Malnutrition

Several studies in past have indicated various degrees of growth retardation among Ethiopian children. On the basis of the 2005 demographic and health survey (DHS) chronic malnutrition among Ethiopia children is very high, with (47%) stunted and (24%) severely stunted. Eleven percent (11%) of children under-five years of age are wasted (thin for their height), and 2% are severely wasted. 38% of children are under weight (low weight for age) and 11% are severely under weight.

Stunting

Stunting is apparent even among children less than 6 months of age (8%). Stunting increase with age of the child, this is evidenced by increase in stunting from 27%amongchildren age 6-8 months to 62% among children age 18-23 months. The level then declines slowly to between 51 and 54 percent among children age two years and older. Regional variation in nutritional status of children in substantial. Stunting level are above the national average in the Amhara (57%) and SNNP (52%) regions.

Wasting

The prevalence of wasting is higher than the national average among children age 9-23 months. Wasting is higher than the national average in Somalia (24%), Benishangul-Gumuz (16%), Amhara (14%), Tigray (12%) and Dira dawa (11%).

Under Weight

The percentage of children under weight increases sharply from 4% among children under age 6 months to 19% among children age 6-8 months, doubles among children age 9-11 months and peaks at 48% among children age 12-23 months with very small decreases thereafter. The percentage of under weight children in Somalia (51%), Amhara (49%) and Benishangul-Gumuz (45%) are above national average.

Table2.1.1: Percentage of children under-5 years classified as malnourished according to three indices of nutritional status: by age group, Ethiopia, 2005 Nutritional status of children under age five**.**

S.No	Age in months	Ht-for-age		Wt-for-Ht		Wt-for-age	
		%of severe stunted	% 0f stunted	% of severe wasted	% of wasted	% of severe under weight	% of under weight
1	under 6	1	8	1	6	0	4
2	6to9	4	27	2	10	5	19
3	9 to 11	12	33	1	14	14	38
4	12 to 17	19	46	4	19	15	48
5	18 to 23	31	62	3	17	15	48
6	24 to 35	28	51	2	9	13	42
7	36 to 47	31	53	2	9	13	41
8	48 to 59	31	54	2	9	10	43

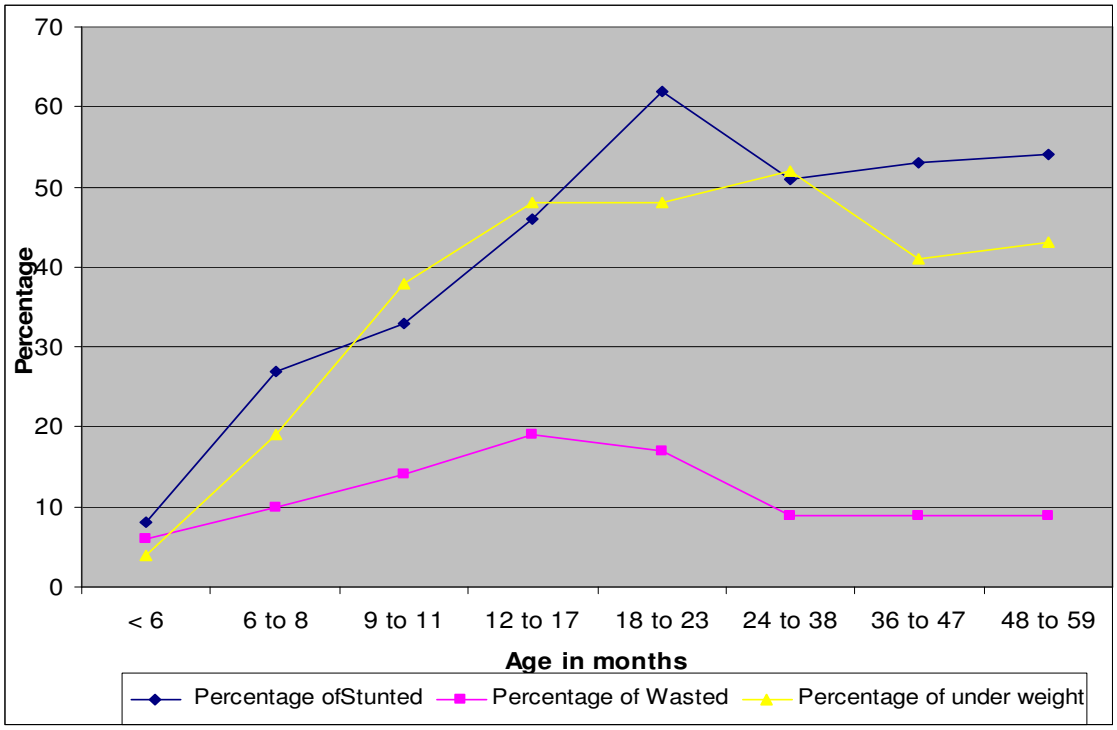

Figure2.1.1: Percentage of children under-5 years classified as malnourished according to three indices of nutritional status: by age group, Ethiopia, 2005 Nutritional status of children under age five

Table2.1.2: Percentage of children under-5 years classified as malnourished according to three indices of nutritional status: by region, Ethiopia2005.

SN	Regions	Height- for- Age		Weight-for-Height		Weight -for-Age	
		% of Sever Stunted	% of Stunted	% of Sever wasted	% of Wasted	% of Sever under weight	% of under weight
1	Tigray	17	41	2	12	11	42
2	Afa	22	41	3	10	13	34
3	Amahara	27	57	3	14	15	49
4	Oromia	22	41	2	10	8	34
5	Somali	30	45	5	24	18	51
6	Ben_Gumz	20	40	4	16	15	45
7	SNNRP	19	52	1	7	12	35
8	Gambela	13	29	4	7	4	27
9	Hareri	17	39	0	9	6	27
10	Addis Ababa	5	18	0	2	2	11
11	Dire Dawa	14	31	4	11	8	30
	National	24	47	2	11	11	38

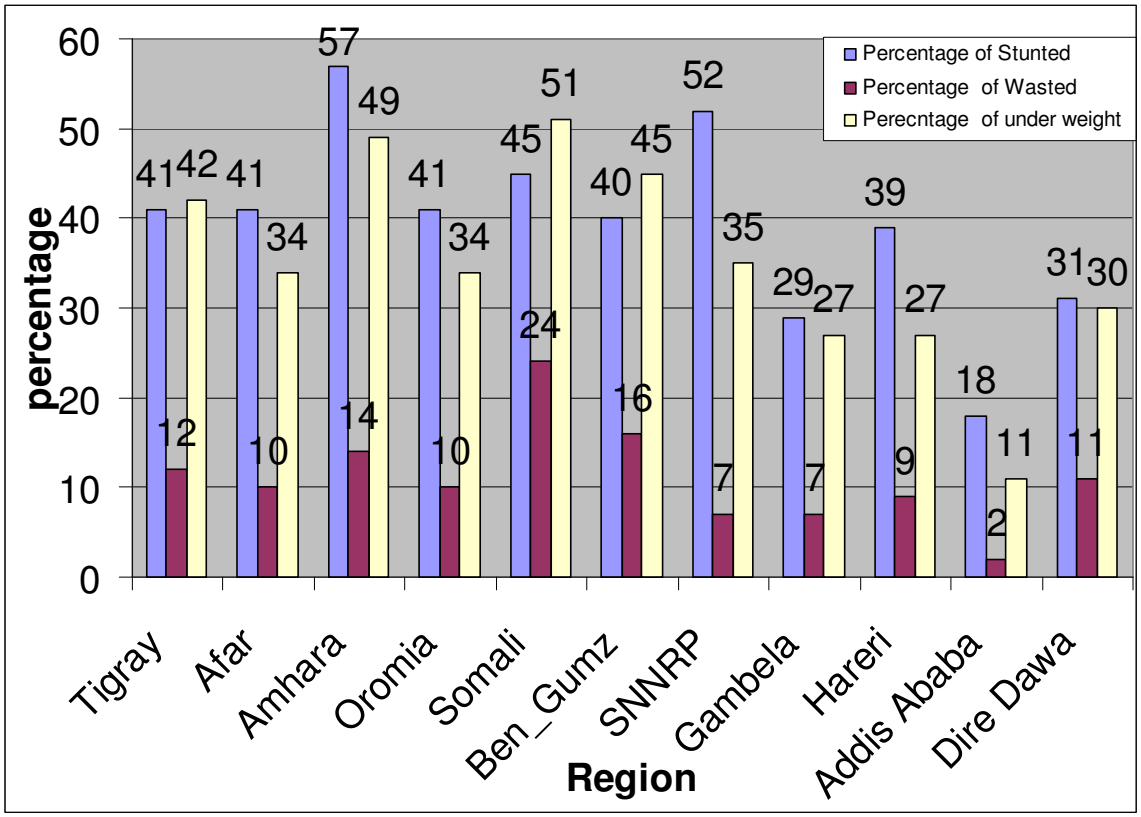

Figure2.1.2Percentage of under-5 classified as malnourished by region in Ethiopia, 2005

Trends in Children's Nutritional Status

Data from the 2005 EDHS can be compared with similarly collected data from the 2000 EDHS. A comparison of the data shows that there have been some improvements in the nutritional status of children in past five years. The percentage of children stunted fell from 52% in 2000 to 47% in 2005. Similarly, the percentage of children under weight declined from 47% in 2000 to 38% in 2005. There was, however, no change over the five years period in the percentage of children wasted.

In addition data from FMOH, 2007 EOS program can be compared similarly collected data from 2008 EOS program. The percentage of acute malnutrition increased from 6% in 2007 to 9% in 2008.

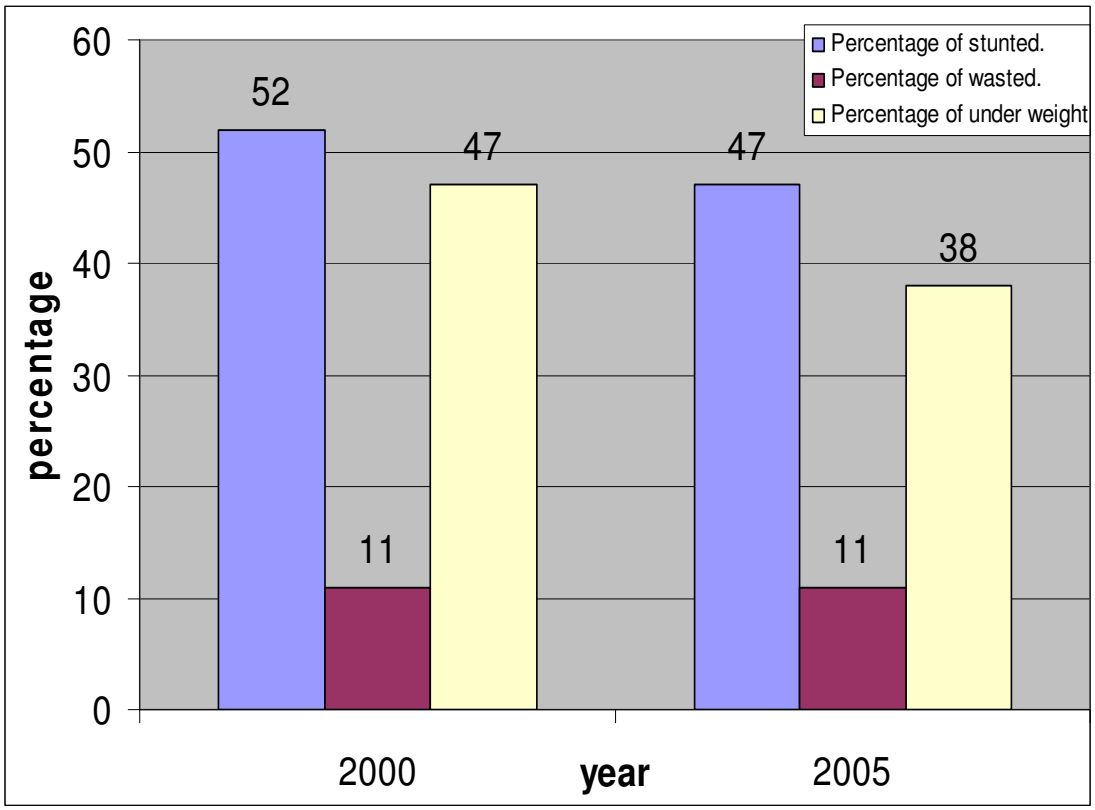

Figure 2.1.3 Trends of Malnutrition in Ethiopia

Table 2.1.3 Percentage of under-5 years screened as acute malnutrition by region in Ethiopia, EOS program 2007 and 2008

S.No	Region	2007		2008	
		% of severe malnutrition.	% of acute malnutrition.	% of severe malnutrition	% of acute malnutrition
1	Afar	5	23	NA	NA
2	Amhara	1	5	1	6
3	B-Gumuz	2	6	1	5
4	Dire Dawa	2	6	NA	NA
5	Gambella	2	4	NA	NA
6	Oromia	2	4	3	7
7	SNNP	2	5	4	13
8	Somalia	1	20	NA	NA
9	Tigray	1	9	1	9
10	Harare	2	3	NA	NA
	National	2	6	2	9

NA= Not Available

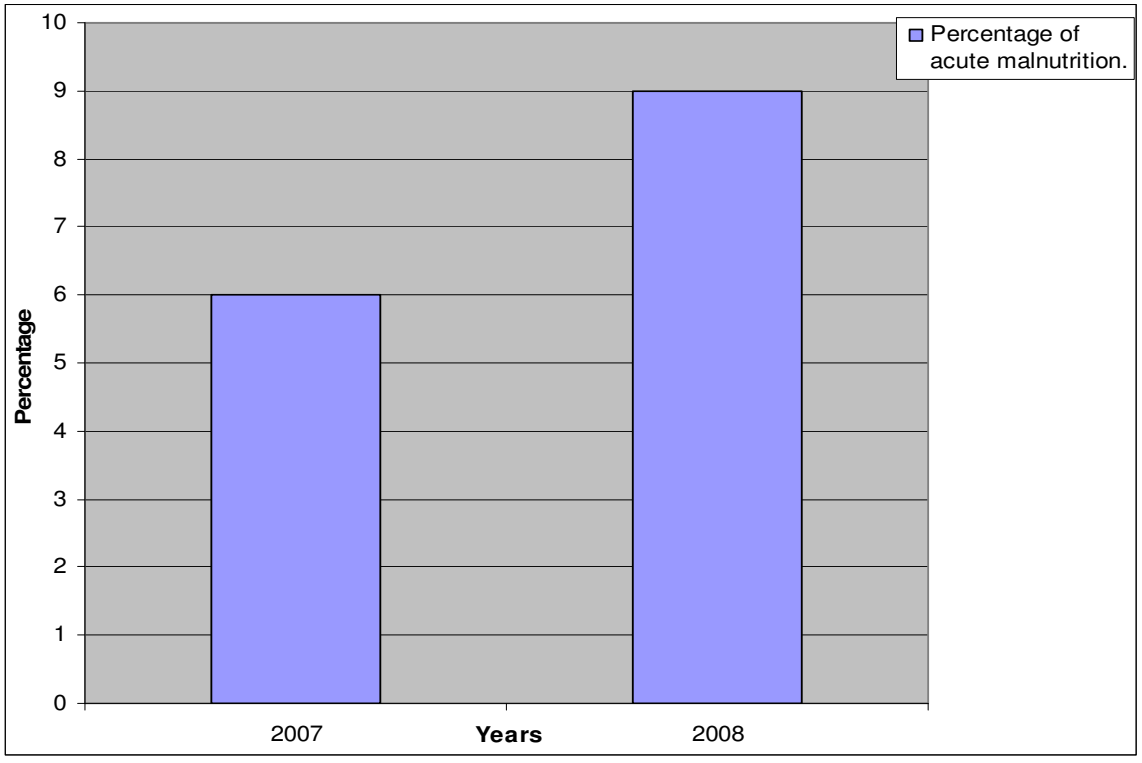

Figure 2.1.4 Trends of Acute Malnutrition in Ethiopia, EOS Program

Conclusion and Recommendation

The prevalence of child malnutrition in Ethiopia is high. This is due to low dietary intake, recurrent infection, food insecurity, lack of appropriate care, and lack of basic health service delivery and so on.

To improve the nutritional status of children, the following recommendations were made:

- The women/Mather should adhere to exclusive breast feeding during in the first 6 months of his life is important to help protect babies from dangerous illnesses.
- Build knowledge, attitude and practice of women to put the babies on breast within one hour of birth and they are fed the first milk or colostrums which is full of nutrients and antibodies
- The child should be introduced to appropriate complementary foods and also they be breastfed until 24months of age and
- Child growth monitoring and promotion.

Chapter III – Evaluation of Surveillance System

3.1 Evaluation of Measles Surveillance in Sidama Zone, SNNP, Region, Ethiopia, 2010,

Background:

Ethiopia experiences a heavy burden of diseases with a growing prevalence of communicable infections. Many Ethiopians face high disease morbidity and mortality largely attributable to potentially preventable infectious diseases and nutritional deficiencies (1). Most communicable diseases are caused due to poor environmental hygiene practices and nutritional deficiencies. The most common cause of death and illness in the country are acute respiratory infections, diarrheaal diseases, malaria, tuberculosis, HIV/AIDS, and vaccine preventable disease (2).

The changing trends of epidemic prone diseases coupled with unstable climatic conditions and increasing population movement have posed serious challenges in prevention and control of diseases. These conditions clearly showed the need to have timely, reliable, and complete information for effective responses. However, efforts to collect, organize and utilize data from health services have not been successful for a long time due to inadequate trained personnel, poor data collection and processing system, and inadequate laboratory services. In addition lack of regularly updated guidelines, lack of coordination, lack of feedback system and inadequate utilization of data for action have made disease surveillance a meaningless exercise(3).

Public health surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data about a health-related event for use in public health action to reduce morbidity and mortality and to improve health(2,3) and it is essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know"(3) Health surveillance is an essential component of evidence-based decision making practices (4).

A well-functioning disease surveillance system therefore provides information for planning, implementation, monitoring, and evaluation of public health programs. It includes case detection and registration, case confirmation, data reporting, data analysis, outbreak investigation, response and preparedness activities, feedback, and communication (5).

Public health surveillance activities are generally authorized by legislators and carried out by public health officials. Public health surveillance systems have been developed to address a range of public health needs. In addition, public health information systems have been defined to include a variety of data sources essential to public health action and are often used for surveillance. These systems vary from a simple system collecting data from a single source, to electronic systems that receive data from many sources in multiple formats, to complex surveys (6).

A public health surveillance system is dependent on a clear case definition for the health-related event under surveillance. The case definition of a health-related event can include clinical manifestations (i.e., symptoms), laboratory results, epidemiologic information (e.g., person, place, and time), and/or specified behaviors, as well as levels of certainty (e.g., confirmed/definite, probable/presumptive, or possible/suspected). The use of a standard case definition increases the specificity of reporting and improves the comparability of the health-related event reported from different sources of data, including geographic areas. Case definitions might exist for a variety of health-related events under surveillance, including diseases, injuries, adverse exposures, and risk factor or protective behaviors (6).

Strong surveillance and response systems are critical for effective communicable disease Control. Unfortunately resources available for building national capacity for communicable disease surveillance and response are often inadequate, so that efficient use of these resources must be made. Better coordination and integration of surveillance functions will contribute to the effectiveness and efficiency of these systems. This concept is currently applied to communicable Diseases, through the systematic assessment of national surveillance and response systems, leading to the development of national plans of action (7).

The evaluation of surveillance systems should promote the best use of public health resources by ensuring that only important problems are under surveillance and that surveillance systems operate efficiently. Insofar as possible, the evaluation of surveillance systems should include recommendations for improving quality and efficiency, e.g., eliminating unnecessary

duplication. Most importantly, an evaluation should assess whether a system is serving a useful public health function and is meeting the system's objectives (8).

Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness. Evaluation of a public health surveillance system focuses on how well the system operates to meet its purpose and objectives. A public health surveillance system should emphasize those attributes that are most important for the objectives of the system. Efforts to improve certain attributes (e.g., the ability of a public health surveillance system to detect a health-related event [sensitivity]) might detract from other attributes (e.g., simplicity or timeliness). An evaluation of the public health surveillance system must therefore consider those attributes that are of the highest priority for a given system and its objectives (6, 8).

In 1996, the Government of Ethiopia introduced Integrated Disease Surveillance (IDS) strategy focusing on 17 priority communicable diseases. Two years later, in 1998, the 48th WHO Regional committee for Africa adopted a resolution on integrated disease surveillance of communicable diseases. Recognizing and addressing the problem of vertical disease surveillance systems, member states adopted IDS as a regional strategy for early detection and efficacious response to priority communicable diseases in the African region (9).

Therefore, Measles Surveillance is the cornerstone of public health decision-making and practice, thus, evaluation of surveillance systems vital for ensuring that it monitored efficiently and effectively. Thus evaluation of core and, supportive function and system attributes such as simplicity, flexibility, stability, timeliness, sensitivity, and predictive positive value, quality of data and usefulness of measles surveillance system at districts, community /case detection level will be conducted in Sidama zone SNNP REGION.

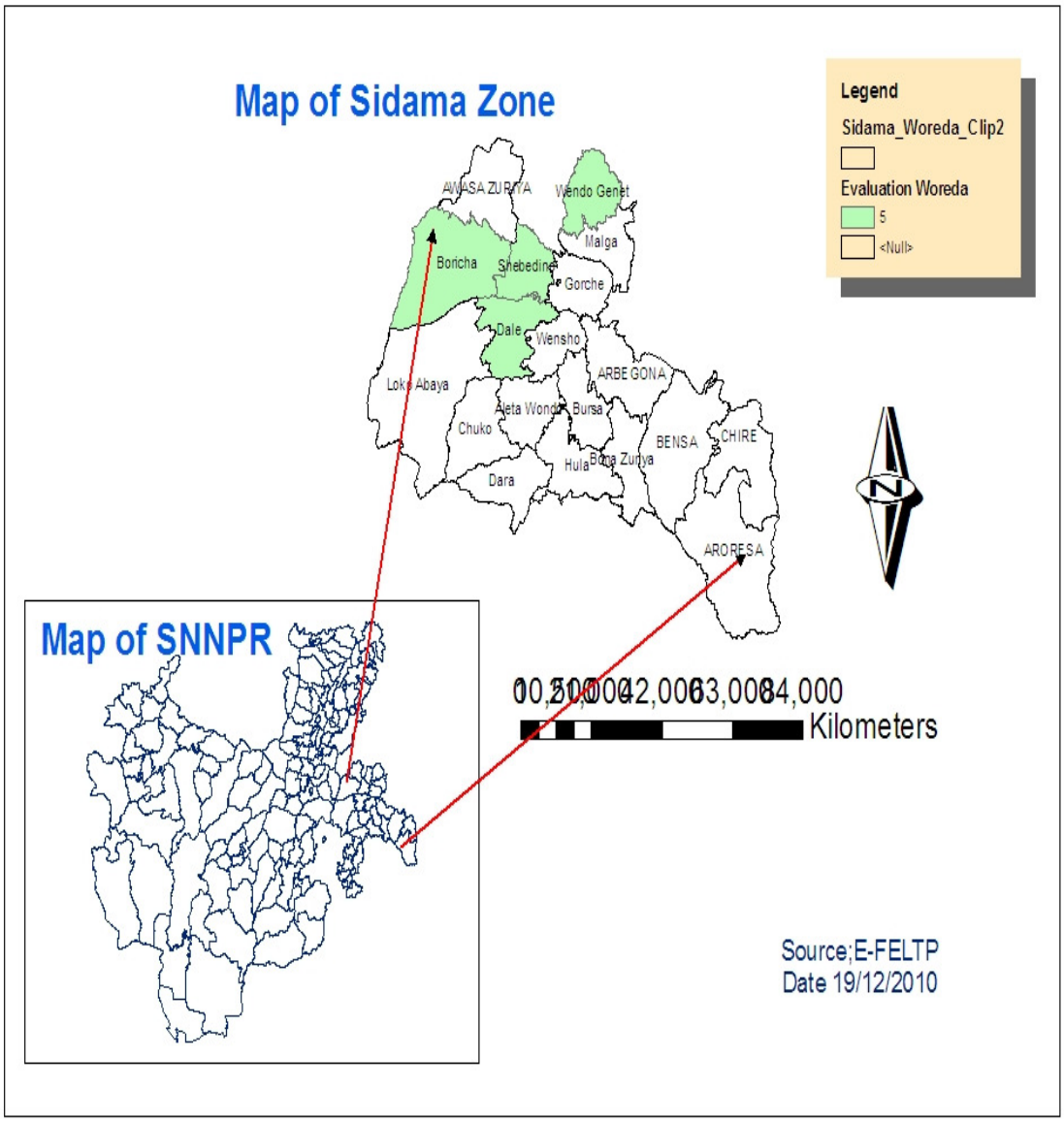

Figure 3.1.1 Map of Sidama zone

Literature Review

Measles is a leading vaccine preventable childhood killer. In each year measles currently kills nearly 454,000 people worldwide. Of these, 410,000 deaths are among children under the age of five years. Global deaths due to measles fell by 48% in 2004 from 871,000 in 1999. The largest reduction occurred in sub Saharan Africa where estimated measles cases and deaths dropped by 60%. These statistics make measles one of the single leading causes of death among children in most developing countries despite the availability of a safe and effective vaccine for more than 40 years. In 2000, a WHO/UNICEF strategic plan was developed with the objective of reducing measles deaths by half by 2005. In 2003, the World Health Assembly passed a resolution to reduce global measles deaths by half by 2005 compared to the 1999 level (10).

During 2001 to 2005, 213 million children were reached with measles vaccination in Africa and a 60% reduction in measles deaths was achieved by the end of 2004 (10).

Measles is widely known in Ethiopia. It has many names in various ethnic languages, e.g., Kufign, Ankelis or Shifto. Traditionally, all children were expected to be infected with measles during their lifetime. Therefore, mothers did not typically seek medical care for their children with measles unless the illness was followed by complications. For this reason, the primary diagnosis recorded by health workers is not usually measles, but rather the complications of measles such as pneumonia, otitis media, diarrhea, or croup (11).

In developing countries with low vaccination coverage, epidemics often occur every two to three years and usually last between two and three months, although their duration varies according to population size, crowding, and the population's immune status .
Outbreaks last longer where family size, and hence the number of household contacts, is large. In the absence of measles vaccination, virtually all children will have been infected with measles by the time they are 10 years old (12).

Study done at national level on evaluation of surveillance system showed as due to high turnover of staff informants may lack some of the key information; in Ethiopia the practice of documentation and handover of documents to the successor is very weak and the resulting lack

of institutional memory may have obscured some of the key successes and challenges in the course of IDSR implementation at various levels (14) .Study done on Assessment of the national communicable disease surveillance and response system showed that while the measles case definition was found in only 30% of them. Standard case definitions for tuberculosis were available in 22% of those facilities where the system existed (14) and also showed that as there's no shortage of reporting forms in the last 6 months prior to the assessment. The completeness of reporting was 91% (10 out of 11) for the regional health bureaus, and 54% (6 out of 11) for the Zonal health departments. Timeliness of reporting was 75% and 45% respectively.

All the systems required reports to be passively sent to the next higher levels except for tuberculosis/leprosy that required district-level staff to travel to the health facilities to carry out active surveillance. Data analysis at regional and Zonal levels for the Epidemiological Surveillance System and other surveillance systems was variable for different systems at different levels. For example, trend analysis was available in 36% of the regional health bureaus for IMCI, and 82% for the Epidemiological Surveillance System. It was available in 33% of Zonal health departments for tuberculosis and 67% for the Epidemiological Surveillance System. Only 39% of the sampled health facilities analyzed data collected for the Epidemiological Surveillance System.

Strengthening core and support functions of surveillance at all levels of the health system. Although vast improvements have been recorded over the years in communicable disease surveillance and response systems in Ethiopia, there still remains a need to strengthen core surveillance activities and support functions. Health workers often have difficulties in providing timely reports of the first cases of epidemic-prone diseases, leading to delayed identification of and response to outbreaks. Surveillance data are often not adequately analyzed or used to evaluate the effectiveness of intervention programmes. Furthermore, the involvement of laboratories in the surveillance and response system has been inadequate (14).

Objective of Evaluation

General Objectives: To evaluate whether measles surveillance system is achieving its objectives.

Specific objectives:

1. To assess system attributes of measles surveillance system.
2. To assess usefulness of measles surveillance system.
3. To gather evidence regarding performance of the surveillance system
4. To assess effectiveness and efficiency of core components of measles surveillance (process, input, output and outcome of Measles surveillance system in IDSR implementation with regard to detection, reporting, analysis, preparedness, response, and feedback) at community to district levels.
5. To assesses supportive components of IDSR implementation such as training, supervision, human, financial and material resources provided for surveillance.

Expected Outcome of the Evaluation

The expected outcome of the evaluation will be;-

1. To document lessons learned.
2. To make recommendations for strengthening or improving surveillance system.

Materials and Methods

Study Area**:-**Sidama zone is one of zone in SNNPR which is located 273 Km south to the capital Addis Ababa. Sidama zone administratively divided into nineteen Woreda and two city administration. According to the 2007 Federal Central Statistics Agency (CSA), the total population is estimated to 3,232,308 by considering 2.9% as rate of natural increase, total male population is1, 606,457 and total female population is1, 625,851, the total number of under-five children in the zone were estimated to be 504,240 based on the assumption that 15.6% of the total population is under-five children.

Study period**:-**The study was conducted from NOV to DEC, 2010.

Sample size and Sampling strategy**:-** In order to collect representative data of surveillance system at each level and for understanding of common problems 5 Woreda ,5 health centre ,1 hospital, 1 Zonal health office and 1 regional health bureau were included in study sample. The qualitative and quantitative data in all aspects of measles surveillance collected from health workers at health facility staff at health centre/hospital working as IDSR focal person, Head of health facility because they are the first to detect, record and reports cases and epidemics.

Data source and collection**:-**primary data and information on measles surveillance system will be collected from district health office and health facility key stake holder, and secondary data will be collected by reviewing of medical records from health centers and Hospitals.

Data collection instruments and techniques**: -** review of the measles surveillance records and documentation at all levels. Observation: of measles work-plans, data collection instrument, out puts of core function.

Study design**: -** A descriptive Cross Sectional qualitative and Quantitative approach study was conducted The system was evaluated by Centers for disease control and prevention (CDC) updated guidelines for evaluating surveillance system identified usefulness of the system and nine attributes as criteria to evaluate the performance of a surveillance system such as simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness, and stability and the usefulness of the system.

1.1, Acceptability: Will be measured quantitatively through reviewing completeness of report forms for the past three months and timeliness of data reporting.

1.2 The representativeness will be evaluated by comparing DHS and National measles indicator survey and the number of health facilities actually covered by system compared with expected number of health units.

1.3 Sensitivity of measles surveillance will be assessed at the level of case reporting in health facilities through reviewing records in health facility including Government, private and NGO, preceding two months and compared with cases detected by the surveillance system .In district

1.4, predictive positive value will be analyzed data collected by districts, zones from 2008-2009 and will be compared them with data collected from health facilities records considered as gold standard.

1.5,Timeliness :-will be Measured compared the actual reported with recommended reporting timeliness and by comparing the number of days/weeks taken from the onset of measles outbreak , date reported to the surveillance system and action taken with recommended time frame

1.6, usefulness and acceptability will be assessed through self administered questionnaires to the surveillance focal persons participating to this system and head of health administrators between NOV16 and DEC 30, 2010.Usefulness of measles system operation will be assessed through how surveillance objectives achieved, and reasons for not achieving the anticipated objectives. Its usefulness to public health staff in taking actions as a result of interpreting and analyzing its data, detect diseases, estimates of the magnitude of morbidity and mortality, detect trends, detection of epidemics and permit assessment of the effect of prevention and control programs. Then surveillance system considered being useful if it is contributing to performance measures or detect epidemics and action taken or achieved at least one of its objective.

Data quality;- To improve the validity and reliability of the study data collection tools developed based on CDC guideline, FMOH measles guideline and we will be validated by conducting pilot study in one of the district, and also during date entry and analysis, we will be checked for its consistency coded and cleaned

Data management and analysis plan: After the data checked in specific set coded and enter into EPI Info version 3.2.2 and analysis done by using EPI Info. Finally result will be presented by table and graphs and findings will be communicated to responsible organization.

Ethical Clearance: Institutional ethical clearance for acceptance of the study will be taken from, an ethical review board in Addis Ababa University, SNNPR Health Bureau (Sidama Zone Health Department), and letter will be requested from selected Health department and districts Health office selected for the study.

Operational Definition

Acceptability
Willingness of persons, and organizations to participate in the surveillance system. (CDC updated guidelines for evaluating public health surveillance systems.

Accessibility
Ease which statistical information can be obtained from the Agency. This includes the ease with which the existence of information can be ascertained, as well as the suitability of the form or medium through which the information can be accessed. The cost of the information may also be an aspect of accessibility for some users.

Accuracy
Degree to which a measurement or an estimate based on measurements represents the true value of the attribute that is being measured.

Simplicity**;** Structure and ease of operation.

Specificity; Measure of how infrequently a system detects false positive health events, i.e., the number of individuals identified by the system as not being diseased or not having a risk factor, divided by the total number of all persons who do not have the disease or risk factor of interest.

Stability; Reliability (ability to collect, manage and provide data properly without failure) and availability (ability to be operational when it is needed) of the public health surveillance system.

Timeliness; Interval between the occurrence of an adverse health event and (i) the report of the event to the appropriate health agency, (ii) the identification by that agency of trends or outbreaks, or (iii) the implementation of control measures also "The variance between planned and actual dates for a product's availability for a particular user audience. Multiple dates, each later one with increasingly

Accurate information, are possible

Usefulness; How helpful the system is to public health staff in taking actions as a result of interpreting and analyzing its data.

Validity; Degree to which statistical information correctly describes the phenomena it was designed to measure. It is usually characterized in terms of error in statistical estimates and is traditionally decomposed into bias (systematic error) and variance (random error) components. It may also be described in terms of the major source of error that potentially causes inaccuracy (e.g., coverage, sampling, non-response, response).

Positive Predictive Value; - Proportion of reported cases that actually have the health-related event under surveillance.

Flexibility; - Ability of the surveillance system to accommodate changes in operating conditions or information needs.

Completeness; - Proportion of all expected data reports that were actually submitted to the public health surveillance system.

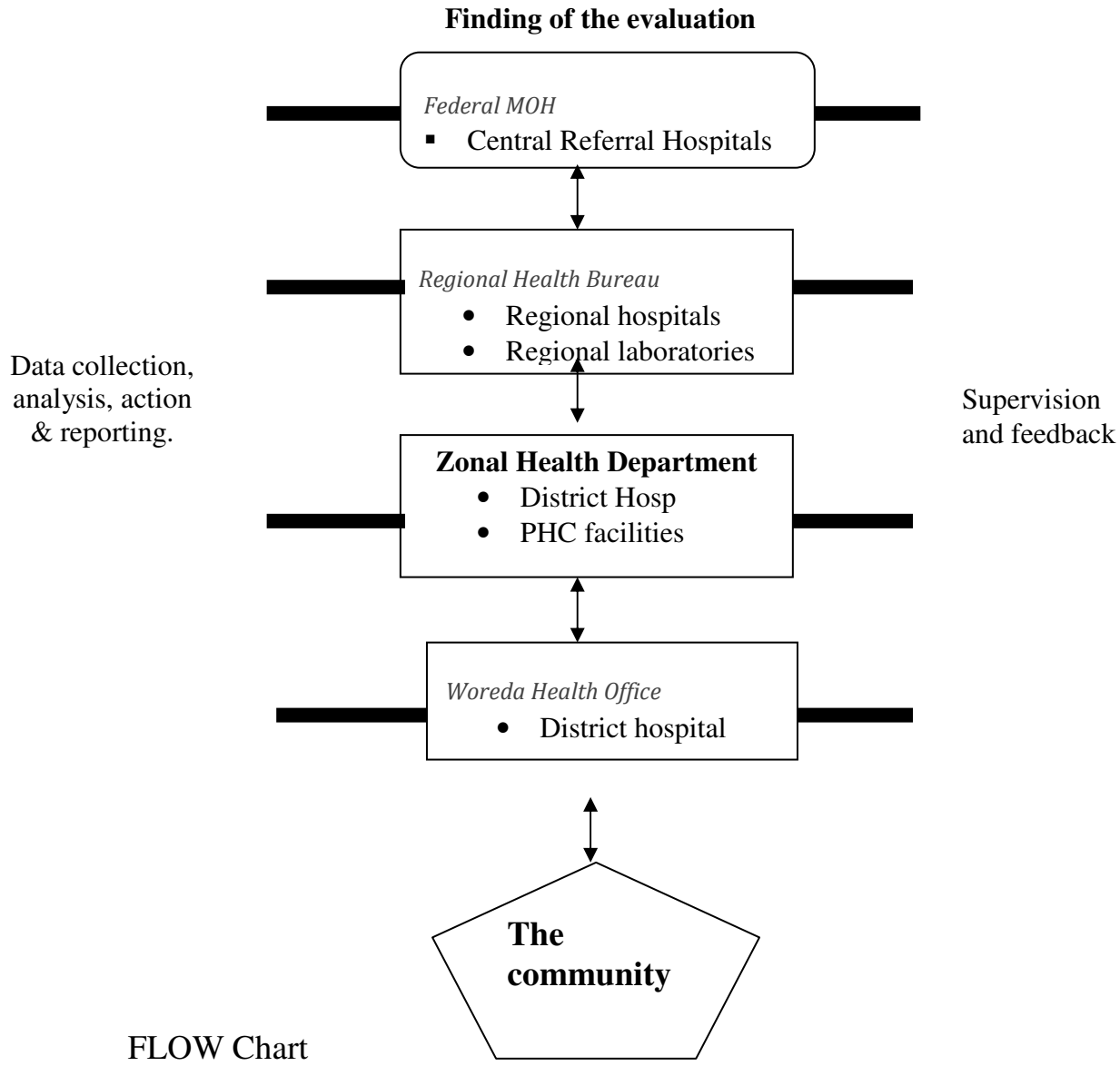

Figure3.1.2 Data and information flow in IDSR indicating varying cycles at various levels.

This is Flow chart of the system show as, 48 hours after notification of any measles case from the community, an investigation is conducted by health workers, who fill out case investigation forms, and collect blood specimens. Then Specimens are transported to central laboratory in EHNRI for confirmation.

Standard case definition

A suspected measles case is defined as:

i. Any person with **generalized maculo-papular rash and fever** plus one of the following: **cough** or **coryza (runny nose)** or **conjunctivitis (red eyes)** ii.

ii. Any person in whom a clinician suspects measles cases

- **Confirmed Case:** IgM+ or epidemiologic link to a confirmed

System Description

MEASLES surveillance is integrated with 20 other priority diseases

- Active and Passive surveillance

•Laboratory support

Respondents/Interviewees for measles surveillance Evaluation

Table 3.1.1 Respondents/Interviewees for measles surveillance Evaluation

Level	Respondent Unit
Regional Health Bureau (RHB)	DPCD/ IDSR Team
Woreda Health Office	PHEM STAFF/IDSR Focal Person
Health Facilities	Head of Health Facility/ IDSR Focal Person
Zonal health office	PHEM STAFF/IDSR Focal Person

The evaluation teams visited a total of 6 health facilities(5 health centers and 1 hospitals) and 1 zonal health bureau ,1 regional health bureau and 5 district health offices. Responsible and relevant professionals from Woreda to regional level responded to the qualitative and quantitative provided the required information.

Information obtained using the quantitative data collection tools are shown in Tables 1-4. These findings indicate the overall performance of IDSR at various levels of the health system.

Finding of the assessment

The findings were compiled from analysis of the data gathered by the assessment teams. This was through interviewing surveillance focal persons at various levels of the health System, including observations and discussions with key informants. Generally measles surveillance system was found to be functioning at all level.

However, in some areas the quality of information generated needs improvement. The measles data was not being collected, analyzed or reported on time. Inadequate coordination and supervision of the surveillance activities could have contributed to some of these shortcomings. Below are some the major findings of the assessment. Corrected knowledge of epidemic threshold of measles. The measles surveillance system has been useful in the zone. It has detected outbreaks in most districts of the zone.

The measles surveillance system has been useful and detected outbreaks in most districts of the zone

Diseases	HF level	%	District level	%	Zonal level	%	Regional level	%
measles	6	80	5	80	1	100	1	100

Case detection

In order to detect cases of priority diseases, health workers require adequate training on Clinical diagnosis and be equipped with appropriate case definitions. The MOH has distributed disease specific case definitions for use by the health facility staff. When asked to name the priority diseases in assessed site , over 50% of the respondents mentioned malaria, measles, diarrhea, dysentery, and Acute watery diarrhea ,neonatal tetanus .

The assessment found that majority of the health facilities (90 %) had national IDSR surveillance guidelines. These guidelines contain case definitions for priority diseases.80% of the districts said that they had a mechanism to capture information on outbreaks from the community. This is mainly through health extension worker and volunteers.

Only four (8.7%) of the health facilities reported shortage of weekly and monthly reporting in the last 12 months.

Cases detection

Table 3.1.2 the availability and knowledge of standard case definition

parameter	Performance# (%)
Standard case definition material availability (cross checked) (HC, DHO ZONE, RHB)	13(90)
Knowledge about standard cases definition (HC,DHO)	11(90)

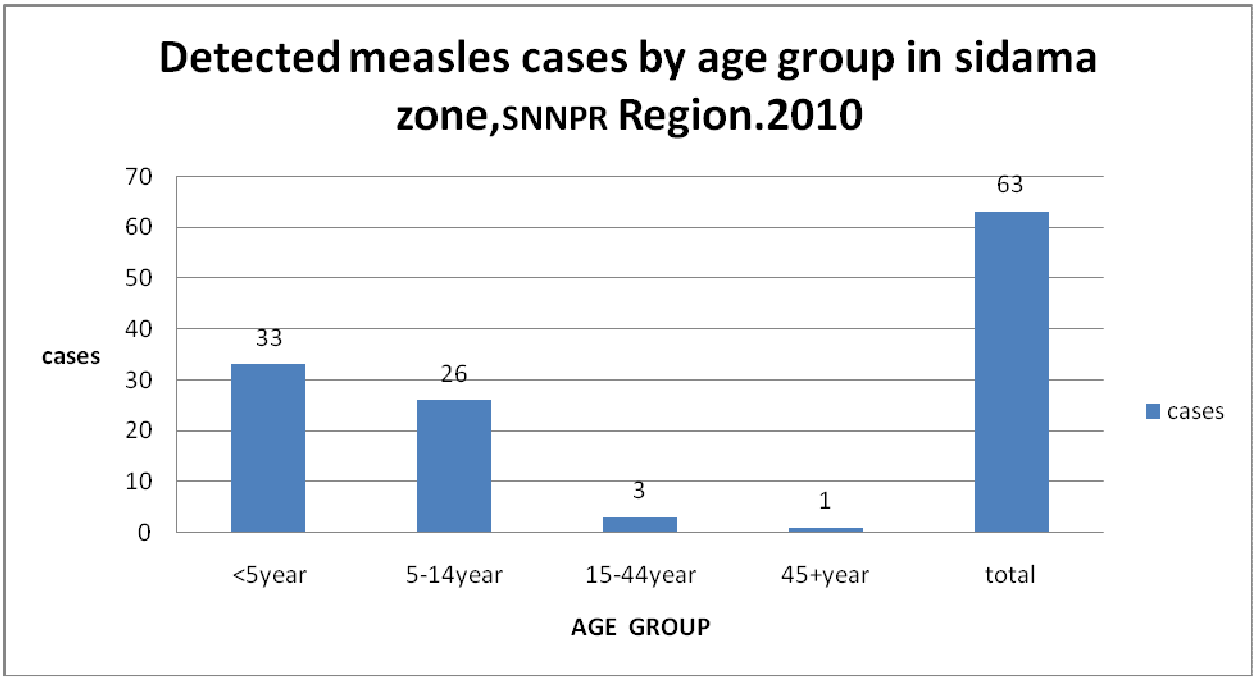

Figure 3.1.3 Detected measles cases by age group in Sidama zone, SNNPR, 2010

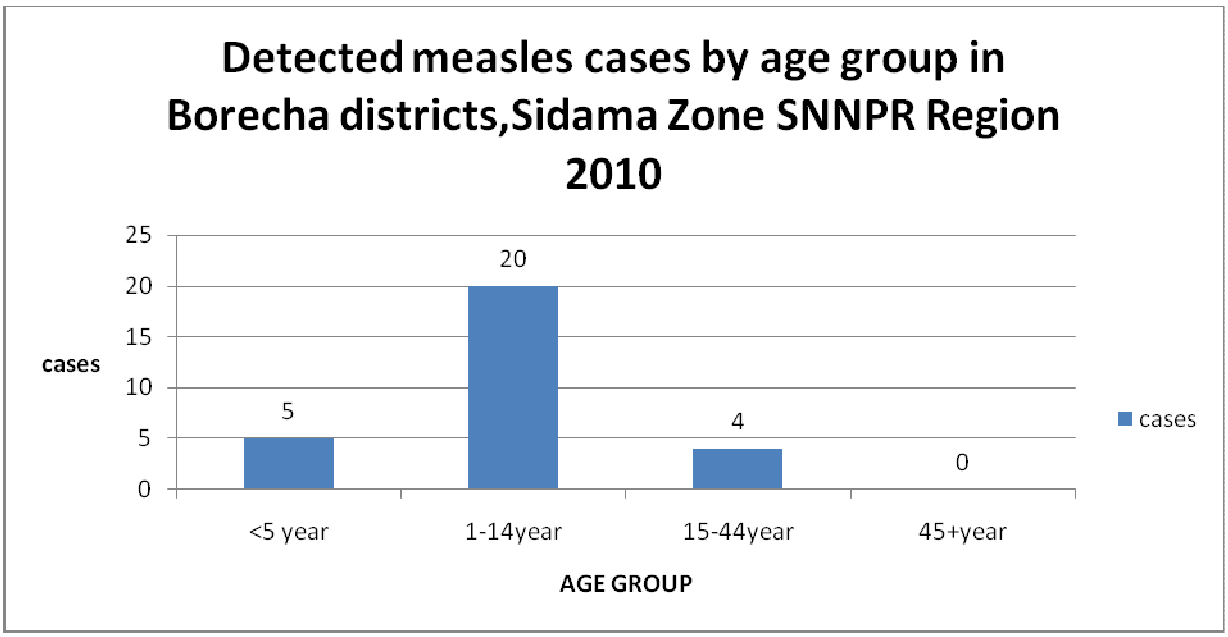

Figure 3.1.4 Detected measles cases by age group in Borecha Districts, Sidama zone, SNNPR, 2010

Case confirmation

Specimens could be collected and transported to central labs. At Zonal level from 63 suspected measles cases blood sample were sent to central lab for confirmation out of this 63 cases 31 were positive ,16 negative 1 discarded the rest 15 cases were not known.

At the health facility level, there is no problem of specimen containers, transport equipment, and no problem on skills to collect specimens.

Case confirmation at various levels in Sidama zone SNNPR Region 2010

Table 3.1.3 the capacity to collect and availability of specimen containers

parameter	Performance # %
Capacity present to collect blood specimen(HC,DHO Zone, RHB)	11(85)
Equipments availability for specimen transportations	13(100)

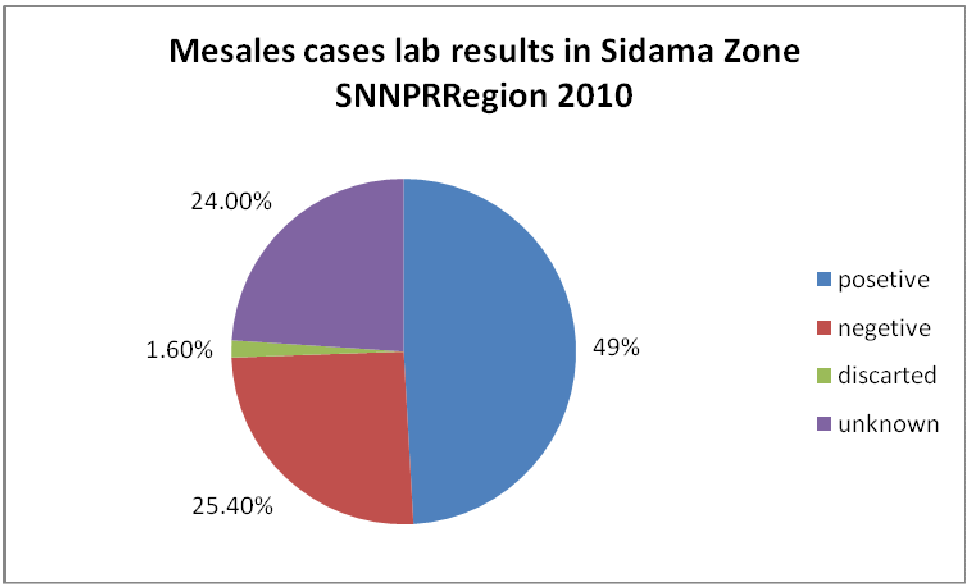

Figure 3.1.5 Measles Cases lab results in Sidama zone, SNNPR, 2010

Case registration and Reporting

Registration and reporting of priority diseases is important in surveillance. All the health facilities visited had an outpatient register and inpatient register (where appropriate) for recording cases. For example, the team counted the number of measles cases in all the registers facility and compared the number to those found in the cases based report format as an indicator of data quality.

Timeliness and Completeness of Reports

Table 3.1.4 Timeliness and completeness of reports at health facility level in Sidama Zone SNNPR Region 2010.

name of HF	Completeness'%	Timeliness%
Yirgalm Hosp	97	80
Borcha HC	96	50
Mesenkela	80	70
Yirgalm HC	94	77
Leku HC	92	52
W.Gent HC	90	70

Table 3.1.5 Timeliness of Reports by Woreda in Sidama Zone, SNNPR Region 2010

WOEDA	EXPECTED	REPORTED	LAT	NOT REPORTED	%
BORECHA	25	23	1	1	92
SHEMEDINO	25	24	0	1	96
DALLE	25	18	0	3	72
W.GENT	25	22	0	3	88
YIREGALM	25	15	2	8	60

The weekly reports sent on time shows that except Della (72%) and yiregalm (60%) which is below standard. The rest three districts were sent weekly report on time. This disparity will hamper the quality of work towards disease surveillance as the reporting weekly itself tells the sensitivity of surveillance system. But feedback from districts to the health facility is very weak.

Data analysis and management (usefulleness)

The integrated disease surveillance strategy recommends that data collected should be analyzed and used for action. The assessment found that very little analysis of measles surveillance data is done at the health center (17%) , at district level (20%) Zonal level were organized which is 100% and regional level 0%. The reasons given by health facility staff for not drawing graphs were: Lack of knowledge (3) lack of computer (1) and multiple responsibilities.

Table 3.1.6 Presence of epidemic curves or line graph (observed)

visited sit	≠ of respondent	evidence of graph	percentage%
regional	1	0	0%
Zonal	2	yes	100%
Woreda	5	1	20%
Health center	6	1	17

Epidemic preparedness and Response

Epidemic management committees should provide guidance and mobilize resources during outbreaks. On the other hand the rapid response teams are the fire fighters during disease outbreaks. Therefore both should be part of an epidemic preparedness plan.

90 % of the district and 80 % of the health facility said that they had epidemic management committees but only 1/5 (20%)% of the districts and 0 % of the health center could produce minutes of the committees meetings.

Table 3.1.7 Epidemic preparedness in Sidama Zone SNNPR Region 2010.

Variables	RHB n=1	Zone n=1	Districts=5	HF n=6
Observed written reports in %	0	100	20	0
Availability of emergency stock drug &supplies	100	100	50	17
Experienced shortage of drug during recent epidemic	0	50	70	80
Presences of budgets line for epidemic response in %	100	100	60	0
Observed epidemic mgt meeting minutes in % reports in %	0	100	20	0
Have raped epidemic response team in%	100	100	100	70

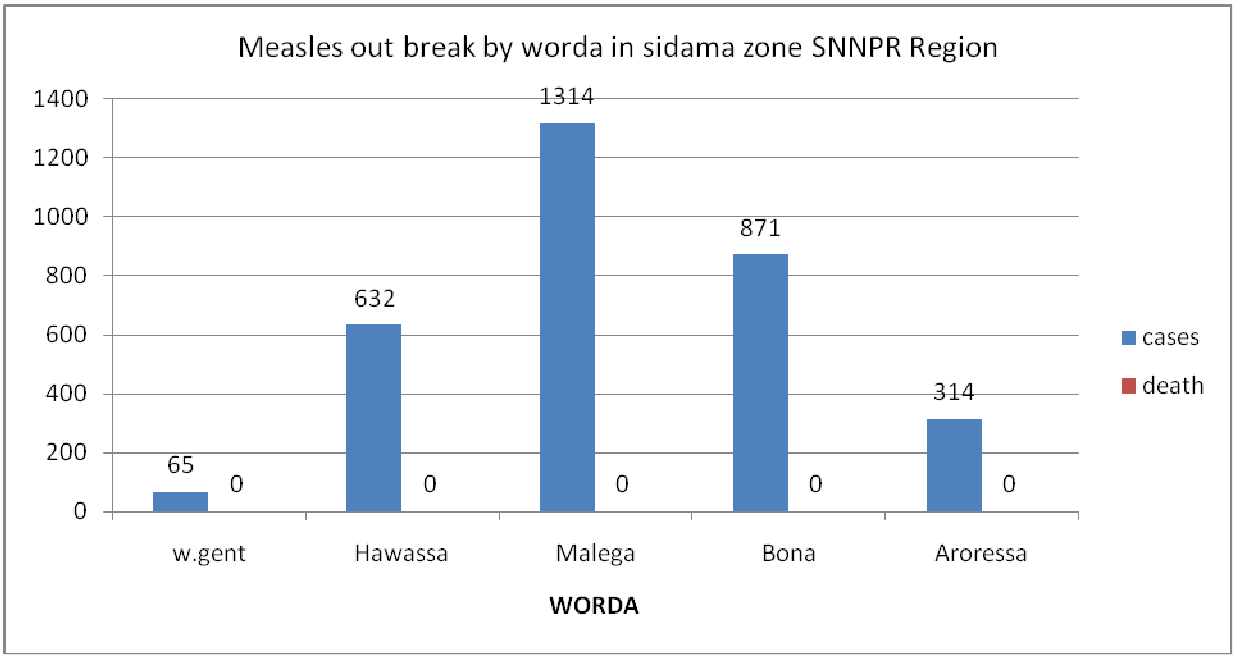

Figure 3.1.6 Measles outbreak by Woreda in Sidama zone, SNNPR, 2010

Feedback

Giving feedback is one of the ways to motivate staff. This also serves as an assurance that what they are doing is appropriate and is being continuously monitored. It is recommended that feedback be provided at all levels. 22 % of the district provided written feed back in the next LEVEL in the last 12 months. No health facility provided written feedback on measles surveillance to the community.

Acceptability

Acceptability is quite high. The participation rate is high, almost all the facilities in the region are part of the system

Table 3.1.8 Acceptability of Measles Surveillances by Woreda in Sidama Zone, SNNPR Region2010

NAME OF WOREDA	POPULATION	PLANNED	ACHIEVED	PERCENT %
W.GENT	130,117	3	6	200
SHEMBDINO	253,769	4	8	200
Borecha	274,349	5	5	100
DALLE	234,497	5	0	0
YIREGALM	34,286	0	1	

In accessing acceptability, we found that 5 districts (100%) and above. All suspected cases had completed CIF surpassing national target of 80%

Simplicity

Forms are easily to complete by 95 % of the respondent and also the flow of information most of them are used telephone and hard copy, few of them are used fax

Satisfaction with the Performance of measles surveillance

90% of the respondents were satisfied with the performance measles surveillance at all level.

Supervision

Support supervisory visits are very crucial especially for the staff. It is an opportunity to orient health staff on new developments and reinforce good practices. The interaction motivates the staff and builds their capability. 70 % of the zone and 50 % of the district had at least two supervisory in the last 12 months. . Similarly, 50% of the districts and 60% health facilities had

received a supervisory visit from a higher level. No checklists were available or used during the supervisory visits.

Various reasons were given for the inability to conduct supervision visits to the lower

Levels the main ones were that there were no vehicles dedicated for surveillance activities but pool transport is provided on request but the process takes a long time and depends on the availability of the vehicle

Human resources

The staff that assigned as IDSR focal persons or acting as focal persons for disease surveillance at the various level most of them are nurse ,health officer and 1 information and technology (IT)person .

Training

In order to perform efficiently surveillance focal person needs to have some basic Epidemiological knowledge. Most of the health personnel providing services at the peripheral health facilities have basic training .Out of the # 6 respondents at the peripheral health centre, 90% had in service training on IDSR, and only 17.3% have had training on data management and on epidemic management.

Communication

Good communication is essential for the surveillance system to be effective. However, communication is poor in some districts. Weekly reports, monthly and other reports are sent from health facilities by hard copy and telephone and few by fax.

Table 3.1.9 Availability of resource for surveillance at various level in Sidama zone SNNP Region, 2010

types of resources	RHB n=1	zone n=1	districts=5	HC=6
Site having the following in %				
Electricity	100	100	100	100
Motor cycle	100	100	70	60
Vehicle	90	80	60	30
Adequate stationary	100	100	100	80
Calculator	100	100	60	40
Computer	100	100	40	17
printer	100	100	40	17
Telephone	100	100	90	80
Fax	100	100	0	17
Radio call	100	100	0	0
Poster	100	100	100	80
Megaphon	0	100	70	50
Flip chart	100	100	80	70
TV set	100	100	60	30
Generator	100	100	40	17

Discussions and Recommendations

Based on the on the findings of the assessment and taking into consideration the need to Strengthen measles surveillance and response in the zone, the following is Recommended:

Case detection and reporting

Collection, analysis and reporting of surveillance data for action are very important. Some information should be acted upon immediately therefore sent using the case based reporting form as recommended above. The current weekly BES reporting system is very important and should be retained but the quality of the data should be verified through regular supportive supervision and training of the staff

Data analysis, management and communication

The assessment showed measles surveillance data is hardly analyzed at the peripheral health facility level. The peripheral staff should be able to manually organize, summarize and display data in tables and graphs as appropriate. Those in the district, Zonal and regional directorates should be able to manually and electronically (using computers) manage surveillance data

Recommendation

Conduct training on disease surveillance and response at the district and health facility levels.

- Strengthen supervision at all levels to ensure that health workers acquire and retain the necessary skills

Train health personnel on data management at the health facility and district focal personnel using the appropriate software

Epidemic preparedness and response

Epidemic management committees where available were only meeting during epidemics

I.e. ad hoc and in most case there were no records of their meetings. There are no obvious how frequent the meetings should be held

Recommendation

-Revitalize these committees at central, provincial and district levels by providing guidelines for their operations.

- Provide guidance on membership and the regularity of the meetings.

Rapid Response Teams (RRTs) are the technical arm of the Epidemic management committees. These were not operational at all levels and therefore need to be reactivated.

Establish and make operational RRTs at central, provincial and district levels.

- Conduct training for national, provincial and district Rapid Response Teams

Feedback

There are no strong feedback mechanisms from the districts to peripheral health facilities and also from Zonal to districts.

1.4.1 Recommendation

The surveillance focal persons at the Zonal and district directorates should ensure regular transmission of feedback to the health facilities

Supervision

Supervisory visits by surveillance focal persons to all levels were found to be irregular and few. This should be reviewed to ensure that whoever goes to the facility can also asses the performance of the staff and advise accordingly.

Recommendation

Initiate regular supportive supervision using a checklist for the supervisors at the district and provincial levels.

- A Supervisor should visit each health facility at the least twice every year.

Human resource and training

The assessment team noted a high turnover rate trained staff or of health workers at all levels of the health system, but the Government is addressing this issue through pre service and in service training.

1.6.1 Recommendation

-Conduct in- service training of health workers on disease surveillance and response using appropriate training materials should conducted

Generally the assement team concluded and recommended:-

The major positive findings during the evaluation include:

- IDSR is successfully introduced in Sidama zone at all levels of the health system.
- Availability of IDSR trained focal person at all level.
- IDSR Implementation has shown as strengthen a remarkable progress since the start of its implementation BPR.
- National Technical Guideline and Posters for Standard case definitions are available in most visited sites
- A multi-sectoral emergency Prevention and Preparedness Committee (EPPC) exists in many Woreda in which the health sector is a member.
- Data Analysis is practiced by some Woreda health offices and health facilities. This was evidenced by tables and graphs.
- Feedback to lower level is provided, mainly verbally.

Weakness

- Evidence of data analysis was not observed in some Woreda Health Offices and Health Facilities
- In all visited health facility and Woreda they have epidemic preparedness committee but not well functional.
- There is no proper filing of documents like reports, guidelines, reference materials, etc. making retrieval of documents like reports, guidelines, very difficult. This, combined with high staff turnover threatens quality & sustainability of IDSR.
- Computers, communication equipments and other essential items for improved implementation of IDSR are not consistently available in all areas
- Contingency stocks of recommended drugs, vaccines and other medical supplies are not uniformly observed in many Woredas There is no budget earmarked for epidemic response

Recommendation

Sustainability of IDSR requires strengthening the coordination and integration mechanisms, establishing continuous staff training mechanisms, developing simplified guidelines and engaging the lower level health system, placing mechanisms to update IDSR technical tools including the guideline, strengthen multi-sectoral response teams at all levels, strengthen emergency preparedness at all levels with the necessary resources including minimum stocks of drugs and vaccines; strengthening data processing capacity at all levels by providing necessary computing facilities where needed; strengthening feedback system at lower levels; strengthening laboratory facilities and network system; strengthen documentation and document retrieval system at all levels; and creating mechanisms for retaining trained staff with appropriate incentive/motivation.

REFERENCE

1. Ethiopian ministry of health .Health and Health Related indicators. Ethiopian ministry of health.2000

2. James W. Buehler, Richard S. Hopkins, J. Marc over hage, Daniel M. Sosin, Van Tong Framework for Evaluating Public Health Surveillance Systems for Early Detection of Outbreaks

3. Federal ministry of health in collaboration with WHO Evaluation of the Implementation of Integrated Diseases Surveillance and Response in Ethiopia.2005

4. Health Surveillance Coordinating Committee (HSCC) Population and Public Health Branch Framework and Tools for Evaluating Health Surveillance Systems. March 2004

5. Sathyanarayana.An Evaluation of Integrated Diseases Surveillance Project Bellary Unit Karnataka state, India

6. Centers for disease control and prevention Updated Guidelines for Evaluating Public Health Surveillance Systems Morbidity and mortality weekly report. 2001, 50(13)

7. Assessment of the national communicable disease surveillance and response system, Ethiopia. 2001, 76, 9–16

8. Guidelines for Evaluating Surveillance Systems Morbidity and mortality weekly report .1988, 37(S-5), 1-18 11.

9. Guideline for enhanced outreach strategy (EOS) for child survival interventions june2004

10. National guide line for measles surveillances and outbreak investigation, 2007

11. Ruth J., Samuel G.Evaluation of reporting timeliness of public health surveillance systems for infectious diseases. BMC Public Health .2004, 4:2

12. World health organization .WHO–recommended standards for surveillance of selected vaccine-preventable.2003

13**,** protocol to evaluate integrated diseases surveillance and response (IDSR) implementation in Ethiopia in 2005; page 28

Chapter IV – Health Profile Description Report

4.1 Health Profile of Sidama Zone, SNNPR, 2010

Introduction

This is an overview of the profile of Sidama zone in SNNPR Region in terms of geography and climate; population; education; administrative structure; socio-economic environment, health status and health system organization.

Objectives

The purpose of this document is to assess and describe health related issues, like health status, health indicators and to identify problems for priority setting pack and simplify complex health information and communicate the local burden of disease and other health related information in a practical, accessible format.

Methods

From Nov 09-12, 2010 health and health related data were collected in Sidama zone. Interview and standard check list were the main tools used for data collection. The data source were the district health office, Hospital, health centre other district sectors like district education sector and reports from national census and research articles. Finally data was compiled and analyzed manually and using Microsoft excel.

Location

Sidama zone is one of 13 zones and 8 special Woredas in SNNPR, located 273 km in the south to capital Addis Ababa , With a total area of around 6981.8 thousand square kilometers, it borders with Oromia region in the north, Oromia region in the east, wolayeta zone in the west, Gedeo zone and Oromia region in the south.

Weather Condition

Its topographic features range from peaks as high as 3300m above sea level (at tip of Garamba Mountain, Arebegona district) to 1200m below sea level. . In general, the highlands receive more rain than the lowlands with annual rainfalls of 800mm to over 1600mm .Mean annual temperatures range from 10-32^{0}c

Climate

There are three broad ecological zones that follow the above topography, “Kolla.” or hot lowlands, the “Weyna Dega”, and “Dega” or cool temperate, highlands.

Transport, Communication and Power Supplies

The main means of transport are roads. All district capital towns are connected with district capitals by road. Sidama Zone is also connected by road with capital city and other cities. .

The zones have good communication facility like telephone, mobile and internet services including the districts and also it has a 24 hours electricity power.

Administration Structure

The Sidama zone has a total 21 Woredas, 2 City Administration and 19 woredas, the zone have a total of 558 Keble, 527 rural Keble and 31 urban Keble.

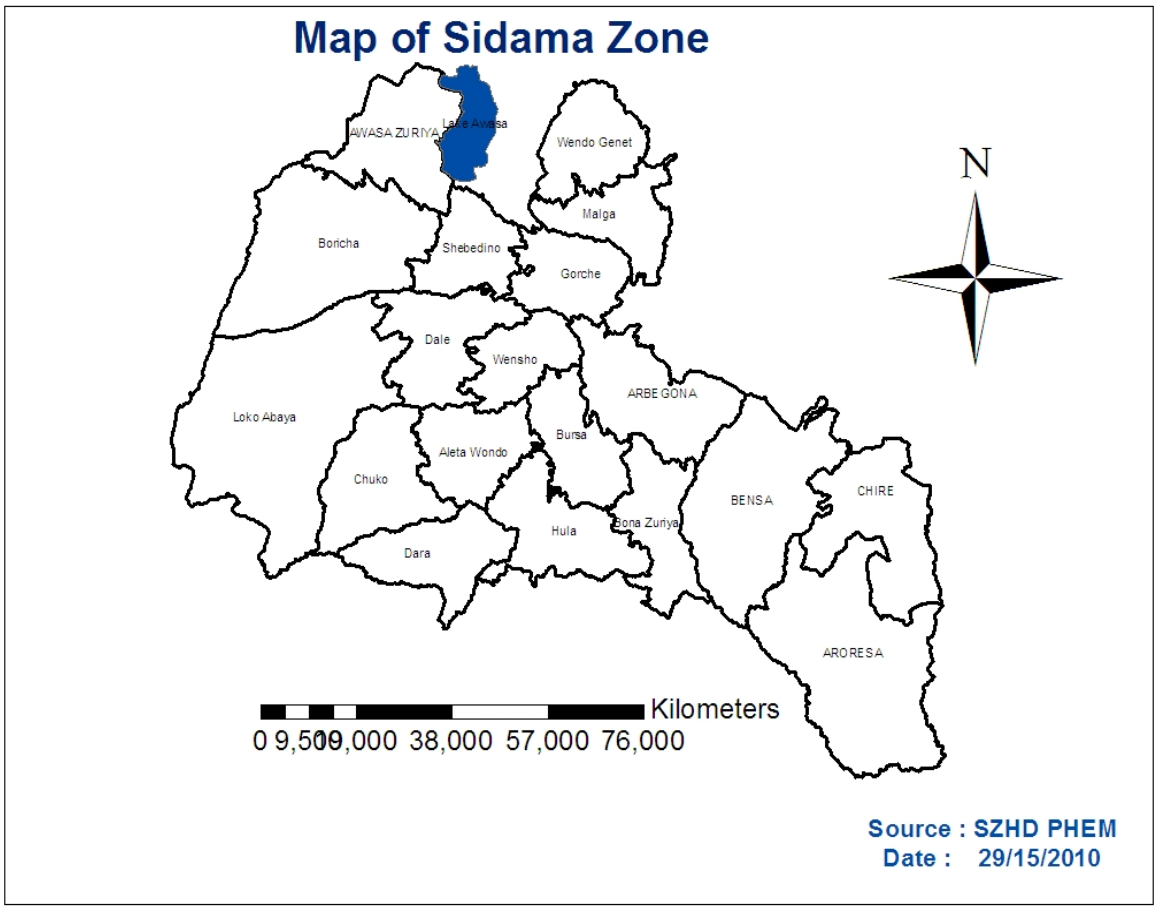

Figure 4.1 Map of Sidama Zone

Table 4.1.1Administration structure of the Sidama Zone, SNNPR 2010.

Woreda	urban	rural	Total
Sidama	2	19	21
Keble	31	527	558

Population

Sidama zone is one of densely populated zones in SNNPR with in 1 square Km 463 peoples live. According to Statistics Agency (CSA), the total population of Sidama zone is estimated to 3,232,308 by considering 2.9% as rate of natural increase, total male population is1, 631,559and total female population is1, 606,457. Nearly half of the population (49.2%) is female. The average household size is 4.9, 94.3% of the total population lives in rural areas.

Table 4.1.2 Population distribution by sex, age and by resident Sidama Zone, SNNPR 2010

S/No	Descriptions	%	Total Population	Remark
1	Total Population		3,232,308	
2	Male	50.8	1,631,559	
3	Female	49.2	1,600,757	
4	Urban Population	5.1	183,312	
5	Rural Population	94.9	3,049,003	
6	Under 1 years	3.9	126060	
7	Under 3 years	8.31	268605	
8	Under 5 years	13.94	3232316	
9	Pregnant Women	3.9	126060	
10	Non Pregnant women	18	581817	
13	Number of house hold	-	158383	4.9 person/HH

Economic Aspects

The major economy of the zone is depending on cash crop like coffee and chat.

Since over 94% of Sidama people live in rural area agriculture is major means of subsistence. Various sorts of cereals, vegetables and fruits are being produced in the zone. Enset, teff, barley, wheat, sorghum, cabbage, carrot, beetroots, costa, tomatoes, potatoes, beans, peas, papaya, mango, avocado, banana, etc are among some of agricultural products. Coffee and chat grow abundantly in many of the Woredas found of in the zone and remain major cash crop products. Enset (false banana) is staple diet of Sidama people. Mixed farming is common practice in the zone. Cattle (cows, bull) sheep, goats, hens and other products are used for consumption as well as income generating means. Other domestic animals reared(donkeys, mules, horses) are used as a means of transporting people from one place to other and if razed in excess they are used for sell to generate income for families to cover their health, education, tax and other social and related services.

Education

Sidama zone is also home to one of the notable universities of Ethiopia; the HAWASA University. The university is spread over across of land outside the city and is a small village in itself. .

The general level of education has marked influence on the spread of diseases, the acceptability of health practices and utilization of modern health services. However, the literacy status of the population is low. The total adult literacy rate is 38% (50% for males and 26.6% for females). The gross enrolment ratio in primary schools at Zonal level is 74.2% (67.6% for girls).

Table 4.1.3 Educational Statues by Zone/Woreda in Sidama Zone SNNPR Region 2010.

YEAR	Number of Institutions/ educational statues								
	KG			1—8Grade			9—12Grade		
	M	F	Total	M	F	Total	M	F	Total
2002E.C/2010	5832	4784	10606	391782	349749	741517	27336	11293	38629

Table 4.1.4 Total number of schools in Sidama Zone, SNNPR Region 2010

S/No	Descriptions	Quantity
1	1st Cycle(grade 1-4)	363
2	2nd Cycle(grade 5-8)	2
3	1st & 2nd cycle(1-8)	280
4	Grade 1-10	0
5	Grade 9-10	15
6	Grade 9-12	5
	Total	**665**

Social Services

Health System Organization

Functional Health facilities in the zone include 2 hospitals (1 Zonal hosp and 1 districts hosp, 101 health centers, and 432 health post

Table 4.1.5 Types of Health intuition found in Sidama zone, SNNPR 2010

S/No	Description	Quantity	Remark
1	Hospital	2	1Zonal&1 District
2	Health center	101	
4	Standard health post	432	
6	Drug store	5	
7	Pharmacy	11	
8	Rural Drug vendor	2	
9	Private clinics	6	

Human Resources

General practitioners, 22, 64 public health officers, 744 nurses, 85 laboratory technicians, 31 environmental workers and 1332 Extension Health Workers. health professional to pop ratio Doctors ratio 1: 161,615,Nurse Diploma 1:4345, Nurse Bsc 1:10,101 ,Health Officer 1:50, 505 Psychiatry Nurse 1:32,322 and Health Extension Worker 1 :3132 , according to world health organization(WHO) one doctors for 10,000

Table 4.1.6 Human resource distribution by type of profession Sidama Zone, SNNPR 2010

Category of Profession	No
physician	22
Health officer	64
pharmacist	3
Pharmacies Techn	82
Nurses BSC	32
Nurses Diploma	744
Certificate nurses	155
Env. Health W. BSC	1
X-ray techn	6
Anesthetist	22
Health assistant	20
Health extension worker	1032
Dentist	2
Ophthalmic nurse	3
TOTAL	2188

Health Care Coverage and Utilization

The potential health service coverage and Outpatient visits per capital is 90.9% and0.2% respectively.

Table 4.1.7 Health Care Coverage and Utilization Sidama Zone, SNNPR 2010

ZONE	POPULATION	Potential service coverage (%)	Outpatient visits per capital
SIDAMA	3,232,308	90.9	0.2

Health service Performance

In Zone, there are different health services are provided to the community such as, in patient and out patient, maternal and child health, TB and Leprosy, HIV/AIDS prevention and control, laboratory services and environmental health activities.

Maternal and child health activities in Sidama zone2002E.C/2010.

Table 4.1.8 Maternal and child health activities in Sidama zone2002E.C/2010.

S/NO_	Activities	Coverage %
1	BCG	96
2	$Penta_3$	99
3	Measles	104
4	Fully Immunized	93
5	TT2+ PW	102
6	TT2+ NPW	44
7	Family planning	86
8	ANC	71
9	Delivery	41
10	PNC	43

HIV/AIDS Prevention and Control Programme

It is now more than two decades since the HIV/AIDS epidemic started in Ethiopia. HIV/AIDS was recognized as top priority The National HIV/AIDS Policy supporting disease prevention and case management (including home-base care), strengthen IEC/BCC, mobilization of resources and coordinating multisectoral effort to ensure proper containment of the spread of the disease and reduce its adverse socio-economic consequences.

The priority intervention areas in the country in relation to HIV/AIDS to date are IEC/BCC, condom promotion and distribution, voluntary counselling and testing (VCT), management of sexually transmitted infections (STIs), blood safety, infection prevention/universal precaution, prevention of mother to child transmission of HIV (PMTCT), management of opportunistic infections, care and support to the infected and affected, legislation and human rights and surveillance and research.

HIV/AIDSs prevention and control activities of the zone.

A total 364259(10%) person were counselled and tested , and were positive 921(2.5%)and out of 1101 suspected around 430 (39%) positive and PMTCT service also given in the zone based on this 1499 Pregnant women were received the service out of this 330 (2.2%) is positive .

Adult HIV/AIDS Prevalece of the Zone is 2.2%and childern less than five HIV/AIDS prevalece were 0.15%. Anti retrovirus (ART) programe from yiragalem hospital we found that males 471, females 885 a total of 1620 which is 35% and HI V/AIDS orphan were 2144.

Malaria and Other Vector-borne Diseases Prevention and Control

Malaria is one of the country's foremost health problems ranking top in the list of communicable diseases. Three quarters of the landmass of the country is malarious and around two-thirds of the population is at risk of infection. Considerable attention has been given to malaria from the very inception of HSDP in order to reduce the overall burden of the disease. Malaria is the leading cause of morbidity in the Zone and most of the Woredas are of Zone are malarious.

Number of Malaria case seen and examined in the health facility.

Table 4.1.9 Number of Malaria case seen and examined in the health facility.

Total malaria cases	Total examined	Total positive	PF	PV	P.Malaria	Malaria Admit ion	Malaria death
240,121	159,728	55,196	NA	NA	NA	NA	NA

Table 4.1.10 Malarious Kebele and ITNS coverage by Woreda

S/No_	Woreda	Total kebele	Malarias Kebele	Malarias Kebele Popn_	No_of HH	Six month ITN Disributed 2/HH	Coverage
1	Awassa	23	23	105256	21051	6000	28.5
2	W/Genet	18	12	113240	22648	5000	22
3	shebedino	32	19	171795	34359	4000	11.6
4	Borcha	42	42	248553	49711	5650	11.3
5	Dale	31	24	185183	37037	4000	10.8
6	A/wondo	27	12	164470	32894	4000	12
7	Chuko	27	20	180584	36117	6000	6.6
8	Bensa	38	17	134862	26972	3500	13
9	Dara	35	8	49104	9821	4500	45.8
10	Loka Abaya	25	25	95926	19185	4750	24.7
11	Bona	28	8	78490	15698	3000	19
12	Aroressa	32	9	80775	16155	3500	21.6
	Total	**358**	**219**	**1,479420**	**295884**	**53900**	**18.2**

- 1998 ITN Coverage **28%**
- 2001 ITN six month Coverage **18.2%**
- Total Coverage **46.2%**

The above table showed as Woredas found in the zone and Kebele are malarus area or malaria prone area and also, even though there were problem to get the recent information about the ITNS coverage in 2008 it was 46.2%.

Environmental Health

One of the targets was increasing access to toilet facilities, increased access to sanitation, and also increasing Access to safe water. The coverage of Sidama Zone access to safe water supply is 31%, latrine coverage also 65% and sanitation coverage is 87%.

- Coverage of access to safe water supply----------31%
- Latrine coverage----------65%
- Sanitation Coverage----------87%

TB and Leprosy Control Programme (TLCP)

The general objective of the TLCP is to reduce the incidence and prevalence of TB and Leprosy as well as the occurrence of disability and psychological suffering related to both diseases and the mortality resulting from TB to such an extent that both diseases are no longer public health problems. The general objective has been specified for the various TLCP activities as follows:

Case detection: to diagnose TB and Leprosy patients at an early stage of the disease to the extent that the case detection rate of new smear positive pulmonary TB patients is at least 70% of the estimated incidence and the proportion of disability grade II among new leprosy patients is less than 10%.

Treatment: to achieve and maintain success rate of at least 85% of newly detected smear positive pulmonary TB patients (PTB+) and extra pulmonary TB patients treated with DOTS. For Leprosy, treatment should achieve a treatment completion rate of at least 85% and prevention of Leprosy related disability during chemotherapy should be below 3%.

Generally performances of TB prevention and control activity done in 2001 E.C by the zone are the total new smear positive were 1823 , smear negative PTB case 675 and Extra pulmonary TB were 743 in number. The treatment outcome total TB patient registered 1823, total positive TB cured, treatment completed 1591 and Cases detection rate 48.9.

Disease Statistics

53 %(431867/820880) and 120 %(33268/27754) of out patient and in patient services were given in different health facilities of Zone respectively.61 %(3313/5462) and 31% (1343/4334) miner and major surgery were also done respectively.

Table 4.1.11 Ten Top Cause of Morbidity Sidama Zone 2002E.C/2010.

S/no	DX	CASES	%
1	Malaria	45,574	36.9
2	I.P	20,739	16.4
3	Pneumonia	14,835	11.7
4	UTI	11,952	9.4
5	Gastritis	9024	7.1
6	Fighting	7032	5.5
7	Typhoid fever	5178	4.1
8	Diarrhea diseases	4491	3.5
9	URTI	4334	3.4
10	Skin infection	3624	2.9

Table 4.1.11 Under Five Causes of Morbidity in 2002E.C/2010

S/No	Dx	No Cases	%
1	Malaria	15391	49.5
2	Pneumonia	8058	25.9
3	Intestinal Parasites	3281	10.6
4	Diarrheal Disease	2224	7.2
5	URTI	2127	6.8

Health Priorities and Programming

The burden of disease (BOD) in SNNPR, measure by morbidity and premature death from all cases, comes primarily from preventable causes and is dominated by communicable diseases. The leading causes of morbidity and mortality in the zone are mostly attributed to lack of clean drinking water, poor sanitation, and low public awareness of environmental health and personal hygiene practices.

Communicable diseases, particularly Malaria Acute Watery Diarrhea (AWD), Measles and Meningitis occur repeatedly in the region and cause considerable morbidity and mortality. The control interventions such as early detection and treatment of cases, selective and mass vaccination, community mobilization, and vigilant surveillance of the situation are crucial in saving lives and preventing further dissemination.

The Main Positive Finding of the Heath Profile Assessments

Accessibility, it has very good road even inside the city and also there is transportation facility in every direction.

Availability of communication facility like Telephone, mobile and internet is very good

The health serves coverage of the zone it is around 90%.

The health performances like maternal and child health activities' are in a good condition

Problem Identified

Eventhogh encouraging developments in every aspect in Sidama are seen the following points are still limitations.

On communicable diseases prevention and control activity like malaria prevention activity done even though the information we get that the 2001E. Based on this data we see that all Keble found under the zone is prone to malaria but the intervention done to prevent malaria epidemic is very weak. For example ITNS distribution and its coverage is around 48%which is very low.

Based on the ten top leading diseases, malaria is the first but the activity done to prevent this malaria is very low.

According world health organization (WHO) standards, Tuberculosis detection rate of the zone is very low.

Prioritized Health Problem

Based on the data we collected like the ten top leading cause of outpatient, Kebele that prone to malaria, the coverage of ITNs and also according to our observations. Assessment team reaches on conclusion that the main health problem of the zone is malaria, AWD and measles.

Chapter V – Scientific Manuscripts for Peer reviewed Journals

5.1. Shigellosis Outbreak at Addis Ababa University, March-April 2010

(Submitted for possible publication in the (EMJ) Ethiopian Medical Journal)

Abstract

Background: Although available data on ABD are limited, the rate of diarrhea with blood in Ethiopia has been reported as 98/100,000 persons per year. In Addis Ababa a mean annual rate of 204 cases/ 100,000 persons was reported from 2006 to 2008. In March 2010, cluster of cases of bloody diarrhea were reported from the Technology Campus of Addis Ababa University. Investigation was done to identify the causative agent, identify the source, and to control and prevent future occurrences.

Materials and Methods: Active case finding and review of medical records were undertaken to characterize the outbreak. The investigation consisted of a matched case-control study with laboratory testing and environmental assessment. A structured questionnaire was used to collect data. Data were analyzed using Epi-info (v3.3.2) and Microsoft Excel.

Results: A total of 104 suspected cases were identified with an attack rate of 6.8%. Stool culture confirmed *Shigella flexneri* species in 5/11 (45%) of specimens tested. Risk factors associated with illness included eating specific foods at specific meal times. Food items served on Friday, March 26, at lunch time (OR: 3.59, CI: 1.0- 12.7, p=0.04) and on Saturday March 27, during dinner (OR: 2.89 CI: 1.0- 8.2, p=0.04) were significantly associated with increased odds of illness. Water stored in a tank in the cafeteria had evidence of faecal contamination (faecal coliform count >161 Mpn /100ml) and the hygiene and sanitary conditions in the cafeteria, kitchen, living area were unsatisfactory.

Conclusion and Recommendations: Unhygienic food preparation and water contamination were suspected as the sources of infection. Regular supervision and inspection of the campus' food handling facilities and practices were recommended to improve food hygiene and sanitation. Improved water storage, correcting periodic water shortages in the latrine facility and promotion of hand washing could reduce potential future outbreaks.

Background

Diarrheal disease continues as a leading cause of morbidity and mortality worldwide, and is ranked fourth as a cause of death and second as a cause of years of productive life lost due to premature mortality and disability. Several of the common gastrointestinal infections characterized by diarrhea include cholera, shigellosis, salmonellosis, campylobacter enteritis, Escherichia coli infections, yersenosis, gardiasis, cryptosporosis, and viral gastroenteropathy. (1, 2, 3)

Diarrheal disease outbreaks are common in overcrowded communities and in developing countries where poor hygiene, unsanitary conditions, and unsafe water supplies are present and such living conditions create an environment in which diarrheal pathogens are easily transmitted, Refugees, internally displaced persons, and children are at especially high risk. The common transmission causes of such outbreaks are food and water-borne transmission via the fecal–oral route. The transmission of diarrheal pathogens through the food supply is a major problem both in the developing world and in the United States, where 400-600 documented food-borne outbreaks and millions of cases are estimated to occur each year. (4)

Shigellosis is the most common cause of outbreak of bloody diarrhea worldwide with secondary infection rates as high as 40% in the household and case fatality rate of 15-20%. Outbreaks may result in large scale mortality as occurred when an outbreak of *Shigella dysenteriae* type 1(Sd1) caused 20,000 in one month among Rwandan refugees in Zaire in 1994. Shigella has very low infectious dose; ingestion of as few as 10- 200 viable bacteria resulting in clinical disease after an incubation period of 12-96 hours. Patients may, however, present only with acute watery diarrhea without visible blood or mucus, and without the other symptoms described above, especially at the beginning of their illness. The bacteria can be transmitted by ingestion of contaminated food or water, or through person-to-person contact. Flies can breed in infected feces and then contaminate food; vegetables can become contaminated if they are harvested from a field irrigated with untreated sewage. Shigellae bacteria are present in the stools of infected persons while they are sick and for 1-2 weeks after resolution of symptoms. A majority of Shigella infections are transmitted via the fecal-oral route (2, 4, and 5).

Globally the annual number of Shigella cases is estimated to be 164.7 million, of which 163.2 million were in developing countries (with 1.1 million deaths) and 1.5 million in industrialized countries. The median percentages of isolates of S. flexneri, S. sonnei, S. boydii, and S. dysenteriae were, respectively, 60%, 15%, 6%, and 6% (30% of S. dysenteriae cases were type 1). In developing countries including Ethiopia Shigella flexneri is the dominant serogroup (4, 6 - 10).

Comprehensive surveillance data on laboratory confirmed cases of Shigella is limited in Ethiopia (5, 6). However, bloody diarrhea can be used as an indicator of shigellosis cases. From the year 2006 to 2008 a mean of 75,531 outpatient cases of bloody diarrhea were reported per year (approximately 98/100,000 persons per year); the mean number of admission was 1901 patients and 72 deaths per year by the surveillance system of the government. Addis Ababa reported the highest mean rate of 204 cases/100,000 population per year in this period (11-13). There are also some reports of shegella outbreaks in the country. In 2005/06, there was a report of a bloody diarrhea outbreak in Southern Nations Nationalities Peoples Region (SNNPR) with a total of 209 cases and 1 death (9). In December 2008, 566 suspected and confirmed cases of shigellosis were reported in an outbreak in Jimma City (14). From the limited data available, *S. flexneri* and *S. dysenteriae* comprise over 80 % of total Shigella isolates, and the prevalence of S. flexneri alone from isolates has been reported to be vary from 50% to 70% and in some studies as high as 99%. (5, 15, 16)

On 29 March 2010, the AAU technology campus students' health clinic reported an unusual increase in the number of students complaining of diarrhea, fever and abdominal cramp with generalized weakness. Some students were referred to local a hospital for inpatient care. In recent years, the campus's intake of students has expanded massively without increasing student housing or facilities leading to overcrowded and unhygienic living condition. Clusters of diarrheal illnesses were reported to occur on the campus previously in limited number with unknown incidence, and were managed by the health clinic (17). A team of residents from the Ethiopian Field Epidemiology and Laboratory Training Program, staff from Addis Ababa Health Bureau, Black Lion Hospital, and Addis Ababa University School of Public Health

investigated this cluster of cases to identify the causative agent, identify the source, control the outbreak and propose recommendations to prevent future occurrences.

Materials and Methods:

Descriptive epidemiology, Case Control Study with clinical laboratory and environmental investigations were done.

Study population:

The study was in a source population of 1554, including the technology campus students in AAU and the student cafeteria workers- like the food handlers and cooks.

Descriptive Epidemiology:

Data was collected using the Ministry of Health Public Health Emergency Management (MOH/PHEM) epidemic line listing format from the time we were involved in the investigation. For the purpose of identifying suspected cases related to the outbreak a definition of acute diarrheal disease syndrome was created. Any person (from AAU Technology campus community) with sudden onset of abdominal cramp, diarrhea (with or without vomiting), fever, joint and muscle pain, or Diarrhea with any of the above symptoms since Sunday, March 28, 2010 was considered to be associated with the outbreak. To encourage those affected to present at the student health clinic, notices were posted on notice boards around the campus with information regarding the situation and where treatment was available. Investigators interviewed each of the suspected case patients who presented at the student health clinic. Medical records were also reviewed to identify cases who had presented at the clinic prior to the start of the investigation.

Laboratory investigations:

Blood and stool specimens were collected for culture from initial cases in the outbreak after admission as in patients at Black Lion Hospital. All 54 student cafeteria workers were also sent to the regional Laboratory, Zewuditu Memorial Hospital, and Yekatit 12 Hospital to be evaluated and give stool samples for culture.

Case- Control study:

A 1:1 Case-Control study was conducted by finding suspected individuals who had visited the clinic in the first 4 days of the outbreak with a total of 34 suspected case patients. A convenience sample of controls was recruited from students in the same living room (dormitory). These students were similar in age and gender and utilized the same living and cafeteria services. A structured questionnaire was designed to collect data regarding demographic characteristics, drinking water, latrine and hygiene, contact history with a suspected case, food items consumed over the past 5 days. Data were entered into an electronic spreadsheet, cleaned and analyzed using Epi-info version 3.3.2 statistical software and Excel.

Environmental Investigation:

A team of investigators inspected the hygiene and sanitation of the student living areas, their water supply, the student cafeteria kitchen including its equipment, food storage, handling, and preparation, and water system. Cooks, cafeteria workers and school administrators were interviewed. Water samples from the pipe and the collection tank as well as food samples of stored meat were collected for laboratory testing.

Results:

Descriptive Epidemiology:

In the first day, 11 cases of acute diarrhea were reported to the campus clinic (Figure 1). And the first date of onset of symptoms was on 28 March, 2010. Total number of patients was 104 from 29 March to 16 April 2010, with median age of 20 yrs and age ranging 17-30 yrs. The majority of patients presented with the symptoms of diarrhea (94%), abdominal cramp (72%), and fever (41%) (Table 1). Among cases 95% (99/104) were males. The overall attack rate was 6.8%. Six percent of cases came for second time for they did not improve, 11.5% (12/104) of patients were referred to the hospital for inpatient care, and there was no death.

All cases were students, and they were from different departments, years of study and living areas (blocks) in the campus. The overall time pattern of the epidemic showed that significant number of cases presented in the first 4 days based on recorded onset of symptoms (Figure 1).

Laboratory Investigation:

Of 21 stool samples collected for direct microscopic evaluation, evidence of inflammatory diarrhea was present in 10 (47.6 %) (Table 2); 45% (5/11) of stool samples collected for microbiological culture were positive for *Shigella flexneri; and* blood culture showed no growth using the standard laboratory method. The laboratory results of stool samples collected from all 54 Cafeteria workers showed no growth (negative); water specimens collected from the pipeline was potable (fecal coliform count <1 Mpn /100ml; Mpn: Most probable number). The water sample collected from the kitchen collection tank was positive for coliforms (fecal coliform count >161 Mpn /100ml) and commented as not potable. Samples of meat (both the Christian and Muslim students menu) taken from refrigerated storage had fecal coli form count $1.6x10^6$ cfu /gm and $2.4\ x10^5$cfu/gm respectively and too many colonies of staphylococcus spp. in both (Cfu: colony forming unit).

Case Control Study:

The median age of suspected cases was 20 years and 19 years for controls. A majority of cases and controls 81.5 % (53/65) ate all their meals in the campus cafeteria, and 89.7% (61/68)

drank nothing outside the campus during the study periods (since five days before the outbreak).

Suspected cases were more likely to experience from shortage of water (Odd Ratio OR: 2.65 and 95% confidence interval, CI: 0.987-7.108), this may be due to some of the students store water with 5- 10 lt *Jerikans* in their dormitories. Lack of habit of hand washing with soap or detergent after using the toilet (OR: 2.4 and CI: 0.872-6.604)was also another risk factor; moreover, the analysis of the menu served over 5 days prior to the onset of the outbreak showed that the odds of being ill was associated with food items *Misir Key wot with injera* served on 26Friday, Mar.2010 lunch time (OR:3.59, CI: 1.011- 12.731) and *Alcha keke wot served* on 27Saturday Mar.2010 dinner (OR: 2.89 CI: 1.021- 8.173) (Table 3). These were foods served for both the fasting and non-fasting students.

Environmental Survey Findings:

Food Hygiene: The kitchen facilities in the student cafeteria were found to be substandard. Equipment was old and not well cleaned, food handling and storage techniques were inadequate and refuse disposal practices were poor; workers reported a shortage of soap and detergent in their working areas and the latrine. Running water was not always available in the food preparation areas. Refrigerators and freezers did not have temperature monitors and there was no regular medical checkup or training of the food handlers and cafeteria workers on standards of hygiene and sanitation.

Water Source: Water served in the cafeteria was found to be stored in a big plastic barrel and the caps used for drinking in the cafeteria were not well washed. It was found grossly contaminated with visible oily film in the caps. There is lack of water in the in the cafeteria, in the dormitories even for hand washing.

Latrine: the latrines in the cafeteria, dormitories are all water carriage systems; but the lack of water makes cleaning very difficult. The hand washing facilities are not functional and dirty. This makes the latrines unsafe. Overall, of the interviewed students in the case control study, 66.2% (45/68) reported that there is no functional hand washing facility in the latrine area in the

dormitories. Besides, 39% (27/68) of them do not always wash their hands with soap or other detergent after using the toilet even when hand washing facilities are functional.

Discussion:

Bloody diarrhea occurs widespread throughout Ethiopia and is associated with outbreaks. Shigella infections are not usually fully reported to the health facilities, with less than 1% typically reported (4, 18). The MOH/PHEM guideline sets the threshold for epidemic detection and action as a cluster of acute bloody diarrhea cases in the same settlement in one week (19). Therefore, detection of a cluster of more than 30 cases of shigellosis in 3 days (with total of 104 patients in 2 weeks) in the campus was declared an outbreak. Infections may be acquired from eating contaminated food, although contaminated food usually looks and smells normal. Food may become contaminated by infected food handlers who don't wash their hands with soap after using the bathroom. Vegetables can become contaminated if they are harvested from a field with sewage in it (4). Shigella infections can then be acquired by drinking, swimming in or playing with the contaminated water (2, 4)

Investigation of this outbreak suggested a common source outbreak. The cases were from different living blocks, different fields of study, and years of study with limited shared exposure points such as the cafeteria, and their indoor interaction suggesting these were the potential common sources of the outbreak. Additionally, the peak of the epidemic curve occurred near the beginning of the outbreak and rapidly declined within 4-5 days of the first cases and comparatively low attack rate of 6.8% suggested minimal person-to-person contact transmission; considering that attack rates can be as high as 40% in some overcrowding situations-refugee camps (2, 4). Furthermore, the identification of specific foods eaten at specific meals identified as having significant associations with illness implicates food contamination as a likely source of the outbreak. The majority (85%) of ill students had eaten all their meals in the student cafeteria for at least for 5 days prior to the occurrence of the outbreak. Fecal coliform contamination of meat samples taken from the refrigerator confirms that hygiene was poor and consistent with transmission of Shigella. Poor hand washing practices and inadequate hand washing facilities with shortages of water and soap for the both the students and the cafeteria workers (20) may have also contributed to contamination of food

items. The association of illness with the shortage of water might mean that kitchen utensils were under-washed or washed with contaminated water stored in the kitchen tank.

The comparatively low attack rate in this outbreak may be attributed to the accessibility of the student health facility, prompt case management and referral, and heightened awareness around the campus community after information about the outbreak was posted and circulated. Additionally, most students departed the campus for a holiday weekend shortly after the outbreak started

As an anecdotal finding several cases were also found to have intestinal parasites, needs further evaluation of students, the cooks and suppliers.

There were several limitations to the investigation. Due to a 2 day delay in notification of the outbreak it was not possible to identify the index case, to obtain samples of food items consumed in the cafeteria for laboratory testing, and to determine if there was a dose – response relationship between food items consumed. Additionally many students had left the campus for a holiday weekend limiting the number of student-cases and control who could be interviewed.

In summary, the investigation team concluded that this shigellosis outbreak was due to fecal contamination of a water storage tank in the campus' student cafeteria and 2 food items served at 2 particular meals, however, it was not possible to conclusively determine which the primary source of exposure was and how the infection was introduced to the campus.

Recommendations:

Measures to control the outbreak were initiated concurrently with the investigation and case treatment. The investigation team recommended immediate corrective measures to the students' services office and notified the campus community about the disease and early treatment and control measures. The team recommended the university change the water tank in the kitchen and the water supply to cafeteria should be directly from a water supply pipeline with limited use of stored water. Any water storage barrel should be narrow mouthed, closed and with faucet and regular cleaning and regular check up for chlorine residual. Latrine facilities should be

made operational with functional water supply and hand washing after defecation should be promoted. Monitoring and regular supervision of the food preparation, storage condition, washing and drying facilities of the utensils of the food establishments of the suppliers and the student cafeteria should be strengthened. Regular medical checkups of the food handlers and basic training on food hygiene and safety should be mandatory. Additionally, the burden of intestinal parasites in the campus community warrants further investigation.

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References

1. Murray CJ, Lopez AD. Mortality by cause for eight regions of the world: Global Burden of Disease Study. Lancet, 1997, 349: 1269±1276

2. Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. Lancet, 1997, 349: 1436±1442.

3. Mintz E. Shigellosis. In: David L. Haymann(ed.) control of communicable diseases Manual, Washington, American Public Health Association, 2008, 19th ed. 556-560.

4. Wilson, WR, Lawrence, W, Drew, N K, Henry, MA, Sande, DA, Relman, JM, Steckelberg, JL, Current Diagnosis & Treatment in Infectious Diseases, 1st edition, Gerberding Publisher: McGraw-Hill/Appleton & Lange, June 22, 2001

5. World Health Organization Guidelines for the control of shigellosis, including epidemics due to Shigella dysenteriae, 2005.

6. Kotloff, KL, Winickoff, JP, Ivanoff,B , Clemens, JD, Swerdlow, DL, Sansonetti, PJ, Adak, GK, Levine, MM, Global burden of Shigella infections: implications for vaccine development and implementation of control strategies, Bulletin of the World Health Organization, 1999, 77 (8)

7. Gebre-Yohannes A, Drasar BS. Shigella dysenteriae and Sh. flexneri: serotypes prevalence and seasonal distribution in Addis Ababa, Ethiopia (1978-85). Ethiop J Hlth Dev 1987; 2: 51-8. 4.

8. Gedebou M, Tassew A. Shigella species from Addis Ababa: frequency of isolates and in vitro drug resistance. J. Hyg 1982; 88: 47-55.

9. Mutanda LN, Kaviti JN, Wamola IA. Patterns of Shigella species and serotypes in East Africa. East Afr Med J 1979; 56: 381-7.

10. Khan AM, Curlin GT, Huq I. Epidemiology of Shigella dysenteriae type 1 in Dhaka urban area. Trop Geog Med 1979; 31: 213-23.

11. Federal Ministry of Health, Ethiopia; Health and Health Indicators, 2005/2006

12. Federal Ministry of Health, Ethiopia; Health and Health Indicators, 2006/2007

13. Federal Ministry of Health, Ethiopia; Health and Health Indicators, 2007/2008

14. Fessehaye, A. et al. Investigation of Dysentery outbreak and its causes, Jimma city, Southwest Ethiopia, Ethiopian J Health Sciences, 2009, 19:147- 154.

15. Moges T. Serodiversity and Antimicrobial Resistance pattern of Shigella isolates at Gondar University Teaching Hospital, Northwest Ethiopia (2006- 2008). J. Infect. Dis., 2009: 62, 93-97.
16. Belay R. et al. Antimicrobial Susceptiblity Pattern of *Shigella* Isoltes in Awassa, (1997-1998). Ethiop J Health Dev.2000; 14(2): 149-154
17. Briefing given by Technology Faculty students' dean for the investigation team on its arrival
18. Chompook, P. et al, Estimating the burden of shigellosis in Thailand: 36-month population-based surveillance study. Bulletin of the World Health Organization, October 2005, 83 (10)
19. Federal Democratic Republic of Ethiopia Ministry of Health, Ethiopian Public Health Institute Process Implementation Manual Public Health Emergency Management Core Process November 2008, Addis Ababa
20. John T. and et al. Epidemiology of Sporadic Bloody Diarrhea in Rural Western Kenya. Am. J. Trop. Med. Hyg., 2003; 68(6), pp. 671–677

Chapter VI – Abstracts for Scientific Presentation

6.1. The Ethiopian Public Health Association 21st Annual Public Health Conference

OUTBREAK OF SHIGELLOSIS AT THE TECHNOLOGY CAMPUS, ADDIS ABABA UNIVERSITY; MARCH- APRIL 2010, Mer'Awi Aragaw, MD [*], Tilahun Tafese[*], Zeyda Beyene[*,*] Addis Ababa University, Ethiopia,Field epidemiology and Laboratory Training Program. Richard Luce, DVM, MPhil, CDC Ethiopia, Ethiopia Field Epidemiology and Laboratory Training Program.

Background: Addis Ababa had an average rate of 204 cases of diarrhea with blood /100,000 population / year from 2005 to 2008. A cluster of illnesses due to diarrheal disease were reported from the Technology Campus of Addis Ababa University in March 2010. We investigated to identify the causative agent and source, control the outbreak, and to recommend prevention and control measures

Methods: We conducted a descriptive and matched case-control study, and laboratory and environmental investigations. Using a structured questionnaire, we collected data regarding risk factors and exposures during the 5 days preceding the onset of the outbreak. Data were analyzed using Epi-info v3.3.2 and Excel.

Results: There were a total of 104 suspected cases; the attack rate at the campus was 6.8%. Stool culture confirmed *Shigella flexneri* species in 5/11 (45%) of specimens tested. Shortage of water (OR 2.65, 95% CI: 0.99-7.11), lack of hand washing with soap or detergent after using the toilet increased the risk of being ill (OR: 2.4 and CI: 0.872-6.604); moreover, the foods served at lunch time on 26 March and at dinner on 27 March (OR: 3.59, CI: 1.01- 12.73 and OR: 2.89 CI: 1.02- 8.17) were also statistically significant risk factors for illness. The hygiene and sanitary conditions in the cafeteria, kitchen, and living area were poor; and the primary water storage vessel in the cafeteria had evidence of fecal contamination (fecal coliform count >161 Mpn /100ml).

Conclusion and Recommendations: The outbreak was caused by *Shigella flexneri* likely through contamination of food or drinking water. Deficiencies in food handling and sanitation were noted and improved food hygiene and sanitation in the campus cafeteria were recommended to school authorities. Regular supervision and maintenance of the food facilities, promotion of hand washing and provision of safe water could further reduce the potential for future outbreaks.

Key words: Shigellosis, ***S****higella flexneri,* Addis Ababa University

Chapter VII – Narrative Summary of Disaster Situation Visited

7.1 Sugum Pasteural / Agro-Pasteural Health And Nutrition Need Assessment Report, Afar Region, 21 June-09 July 2010

Executive Summary

The livelihoods of the Afar communities have been affected by recurrent drought, and associated health and nutrition emergencies and have resulted in sufferings and lose of life. Belg (Sugum) non-food humanitarian need assessment is conducted in 22 selected Woredas by Afar National regional state government in collaboration with concerned Federal ministries and the partner organizations and has identified potential risk for the occurrence of public health emergencies, current preparedness status and response capacity of the region.

Analysis of occurrence and distribution of epidemic prone diseases and associated potential risk factors in different Woredas (zones) of the region during the past two to four years have indicated that, there is the likelihood of the occurrence of public health and nutrition emergencies such as outbreaks of AWD, Measles, malaria, meningitis and SAM in hot spot Woredas of the region. On the other hand, the preparedness and response capacity of the Woredas and the region was identified to be limited. Critical shortage of emergency drugs and medical supplies, lack of contingency budget, weak coordination, shortage of skilled /trained professionals, weak surveillance and improper management of health data, are among the preparedness and response capacity gaps.

Analysis of the existence of potential/immediate risk factors for each of epidemic prone diseases and regional capacity gaps to adequately provide response have been used as a basis for the preparation of plan for future preparedness and response needs. The plan encompasses activities such as provision of drugs and medical supplies, items for early detection and reporting, prevention of the spread of the outbreak, strengthening the surveillance system, and health systems capacity building through provision of in-service training on public health emergency management (PHEM) for health workers, revitalizing multi-sectoral emergency coordination, and provision of communication and data management equipments.

In sum, the regional state government requires a total of ETB11, 620,892.00 (USD 860,390.00) so as to adequately provide response to predicted AWD, Measles, Malaria, and Meningitis outbreaks.

Acknowledgement

The assessment team would like to thank the Head of the departments and officers at regional health and water resource bureaus and heads of the respective offices of the 22 selected Woredas and health workers for providing valuable information during our field visits.

We would like to extend our thanks to WHO and UNICEF Ethiopia Country Offices for providing vehicles, covering fuel and other related costs during the field work.

Section I. Assessment Of Public Health And Nutrition Emergency Situation

1. Introduction

Ethiopia faces a number of hazards which affect lives and livelihoods. These include cycles of drought, famine, flooding, epidemics and conflicts. Disasters in Ethiopia are often chronic and move to becoming acute, as was seen in the recent drought of 2007/8 and the recent AWD outbreaks since 2006. Disasters may result in food insecurity, poor nutrition, lack of water availability, increased morbidity or mortality or other. However, disaster prevention, preparedness and response have largely been focused on the institutions and activities related to emergency food management.

Since 2004, there have been increasing efforts to broaden the understanding of the nature of humanitarian crises in Ethiopia to also include the impacts of non-food issues, such as water, sanitation, hygiene, health and nutrition. With this regard, Meher health, nutrition, water, sanitation and hygiene assessment has been conducted before six months (December 2009) in all National regional states and has been used as input for planning of humanitarian requirements for the first half of the year 2010. Based on past experiences, this Belg (Sugum) assessment was conducted to investigate the current situation and make prediction with respect to humanitarian needs and plan preparedness and response actions.

This Belg emergency need assessment was conducted by a multi-disciplinary team of professionals represented from Federal MoH and FMoWR, Regional Health Bureau and RWRB, and WHO and UNICEF.

2. Regional Background Information

Afar regional state is one of the nine national Federal States in Ethiopia. It is among the four merging region in Ethiopia located in northeastern part of the country. Administratively, the region is divided in to five administrative zones, which are further subdivided in to 32 Woredas and 358 Kebeles. As of July 2010, the regional population is estimated to be 1.52 million of which 90% are pastoralists and 10% agro-pastoralists. While female population accounts for 44.3% of the total population, 10% are children under-five year of age.

The main livelihood of the Afar communities' livestock raring and large scale private investment farms and mining are also among the major economic activities which attracted large number of migrant labour forces from other regions of the country.

Topography of the region is plainly with altitude ranging between 1500masl in the western high lands to 120meter below sea level in Dalol (Danakel) depression. Annual average precipitation is very low ranging from 150mm-500mm and average annual temperature ranges between 20ºC and 48ºC.

The livelihoods of the Afar communities have been affected by recurrent drought, and associated health and nutrition emergencies and have resulted in sufferings and lose of life. For instance, AWD and Measles outbreaks have been repeatedly occurred in different Woredas of the region, which caused morbidities and mortalities.

To minimize the impacts public health and nutrition emergencies, several mitigation measures have been taken by the regional state and Federal governments in collaboration with humanitarian partners. Emergency Preparedness and Response Plans (EPRP) based on the findings of the seasonal emergency need assessments are noted to be among various mitigation measures taken by regional government.

Hence, the Belg (Sugum) non-food humanitarian need assessment is conducted in 22 selected Woredas by Afar National regional state government in collaboration with concerned Federal ministries and the partner organizations and has identified potential risk for the occurrence of public health emergencies, current preparedness status and response capacity of the region.

Finally, public health and nutrition emergency preparedness and plan is prepared based on the findings of the emergency need assessment.

3. Purpose and Objectives of the Assessment

The **overall purpose** of the assessment process is to contribute to ensuring appropriate and effective humanitarian planning and responses, which will lead to reducing morbidity, mortality and acute malnutrition in the most vulnerable areas of Ethiopia.

The **objectives** of the WASH, Health, and Nutrition components of the assessment are:

1. To assess the extent, types, magnitude, severity and likely of the different hazards (drought, human epidemics, water supply shortage, and sever and acute malnutrition, etc) and risks to the populations in the most vulnerable *Woredas* (including to identify the most vulnerable populations) for WASH, Health, and Nutrition.
2. To assess the existing capacity of the health services to address health and nutrition emergencies likely to occur during the coming six months of 2010;
3. To determine the shortcomings (gaps) in the capacity of the existing health services to address health and nutrition emergencies likely to occur between July and December 2010;
4. Based on the findings on the assessment of risks for, and the need to address, potential WASH, health, and nutrition emergencies during July through December 2010, to devise workable mechanisms and develop necessary plans for fostering preparedness of the WASH, Health, and Nutrition sectors for adequately addressing the potential emergencies;
5. To identify areas where emergency assistance (WASH, health, and nutrition) might be needed during the coming six months of 2010 due to acute problems and come up with reasonable estimates of the size of the population needing emergency assistance.

4. Methodology

The Belg (Sugum) Public Health and Nutrition emergency need assessment has been conducted in 22 selected hotspot Woredas of all Zones of Afar region from 21 June 2010 to 09 July 2010. Existing records and reports are reviewed to obtain data on leading causes of morbidities and mortalities, health human resources, immunization and ITN coverage epidemic prone diseases, malnutrition, current stocks emergency drugs and medical supplies using data collection checklists. Formal interviews was made with Woreda officials and health professionals to

obtain in-depth understanding about major health problems, occurrence, distribution, and duration of the disease outbreaks, current preparedness status, and response capacities.

5. Key Findings

5.1 Disease Burden

Reviews of morbidity records and reports of the studied Woreda health offices, and regional health bureau indicate, communicable diseases such as malaria, respiratory tract infections, diarrheal diseases and malnutrition have been identified to be the five leading causes of morbidity and mortality. Furthermore, Acute Watery Diarrhea and Measles have been reported in epidemic proportion in all zones of the region.

5.1.1 Acute Watery Diarrhea (AWD)

Since 2006, a cumulative total of 17,179 suspected AWD cases and 353 deaths with cumulative CFR 2.05% have been reported from 22 Woredas of Afar region. About 52% of the cases and 43% of deaths were reported in 2007, followed by in 2009 (6583 cases). Majority (89.7%) of the cases were reported from zone one and three with small to large sale investment farms, mainly from Amibara, Gawane, Buremudaitu, Asayita, Dubti and Elidar Woredas (Fig7.1.1).

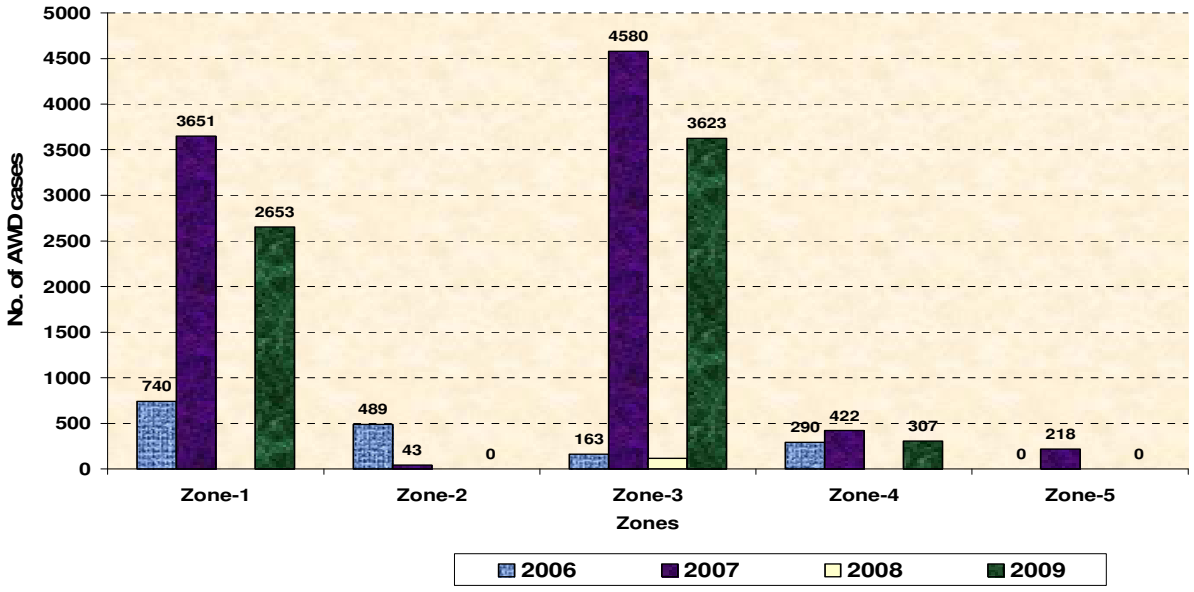

Fig7.1. 1 Distribution of AWD cases by Zone, 2006□2009, Afar Region

(Figure7.1.2).In 2009, the outbreak period was extended for nine months (April to December 2009). The peak months of AWD outbreak reached a peak in June 2009 with slow declining tend and interrupted in month of December. Review of previous assessment reports and observation current situation WASH service coverage have shown that, the main risk factor for spread of AWD out break were shortage safe drinking water and poor hygiene practices which further aggravated by the massive labour migrant population movement and lack of awareness on contagiousness of the disease.

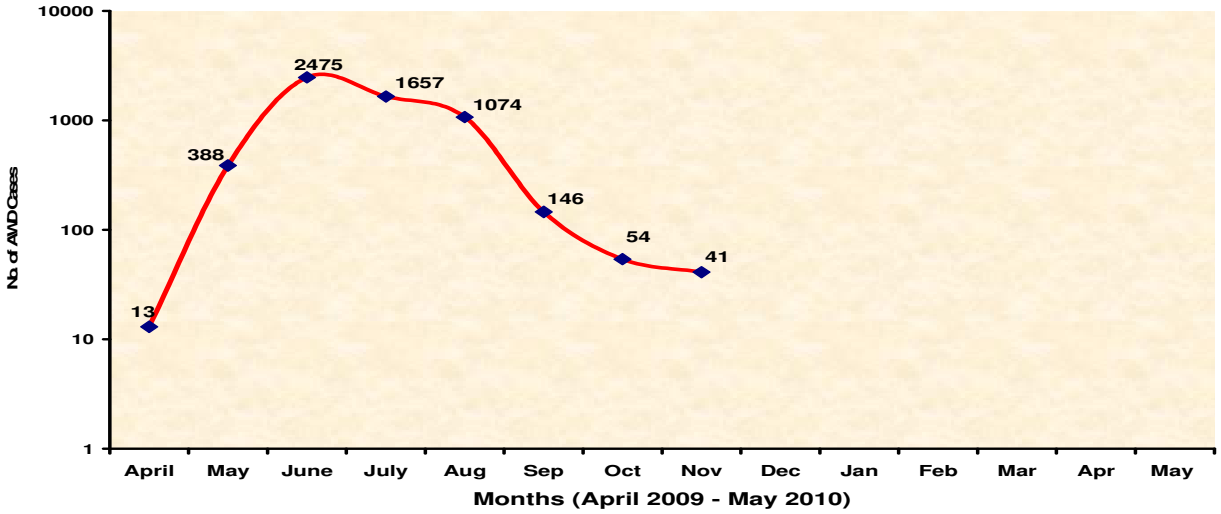

Figure 7.1.2 Monthly Distribution of reported AwD Cases (April 2009-May2010), Afar Region,July 2010

Possible explanation for high case load in zone one and three compared to other zones include, movement of migrant labor workers from other regions with overcrowded living condition which have increased cross contamination /contact with cases, lack of safe water for drinking and domestic use, poor hygiene, lack of emergency medical care.

There is observed increasing trends of CFR over the past four years. The annual cumulative CFR rate was 1.05% in 2006 and increased to 1.7%, 2.6% ad 2.8% for 2007, 2008 ad 2009, respectively. The reason behind an increase of rate of fatality might be associated with late treatment seeking of infected cases, which might arise from inadequate awareness about contagiousness of AWD, poor quality of case management as a result of low knowledge and

skills from the side of health care providers. However, currently there is no ongoing AWD outbreak in all hot spot Woredas of the region.

5.1.2 Measles

Measles is one of the vaccine preventable diseases that have been repeatedly reported in epidemic proportion in the region. In 2008, six Woredas reported measles outbreak and in 2009 10 Woredas reported outbreak. A cumulative total of 494 suspected cases of measles have been reported in 2008 and 2009. Majority (54.7%) of the cases were from zone 4 followed by zone one (23%), and the remaining cases were from zone two and zone five of the region (Fig7.1.3). Among the reported cases, 45 of them were reported since September 2009 from zone 1, 2, 3 and 4.

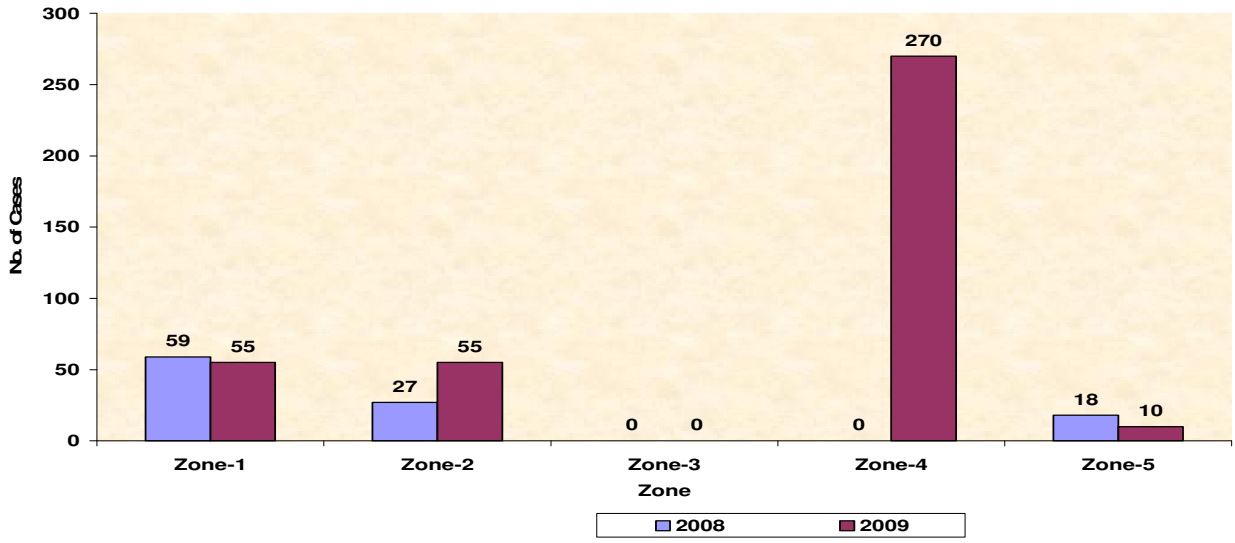

Fig7.1. 3 Reported Measles cases by Zone 2008□2009, Afar Region

Among cases reported in 2008/2009, large proportion of case were among unvaccinated Children compared to those vaccinated (98% Vs 2%) and was very high among under-five aged children. In areas with low measles vaccination coverage, there will be accumulation of susceptible population in the community and the higher likelihood of measles outbreak. On the contrary high number of measles cases was reported from zones with high measles vaccination coverage. Further epidemiological investigation is required together with assessment of the vaccine cold chain system and storage practices.

5.1.3 Malaria

Malaria is the top leading causes of morbidity in the region in general and currently assessed Woredas in particular. Even though cases are reported throughout the year from all zones, case load vary from zone to zone. A total of 99,867 cases of malaria were reported from the visited Woredas in the last nine months. Majority of the cases (45780 cases, 45.8%) were reported from zone 3 followed by zone 5 (22230 cases, 22.3%) and zone 1 (11940 cases, 12%), respectively.

The reported high case load in zone 3 and 5 of the region could be associated with large scale irrigation lead investment farms, that created favorable environment for malaria vector breading throughout the year and probably due to large number migrant labor workers from other regions and/or might be affected by the quality of information management (either over or under reporting of cases) of the zones.

Monthly distribution of malaria varies from zone to zone. There was a fluctuation in the monthly distribution of malaria cases over the past nine months (Fig7.1.4) characterized by an increase in the number of cases from September to November 2009, and following the same trend in January and February 2010

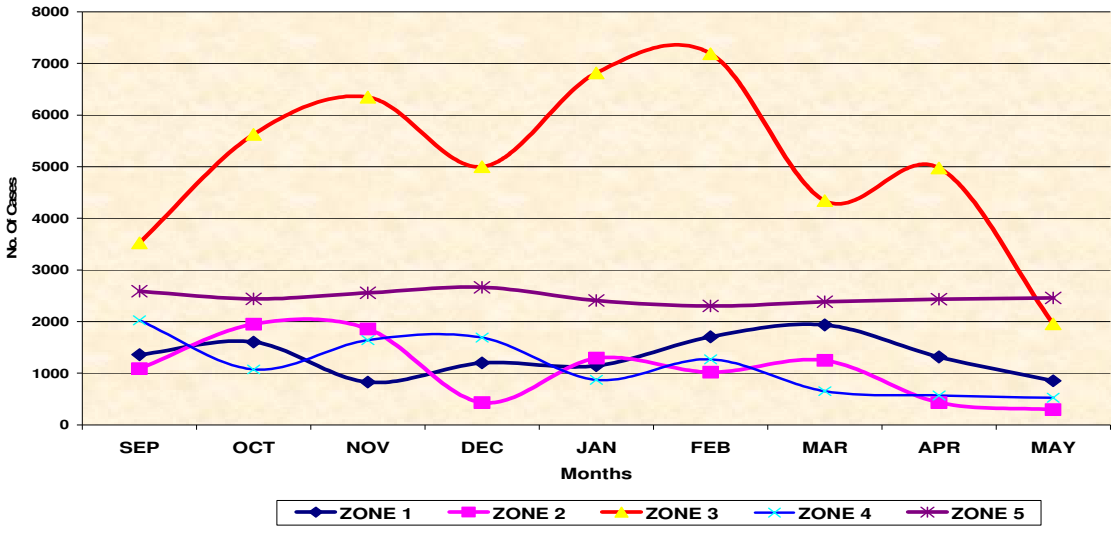

Figure 7.1.4 Monthly Malaria cases by zone, Afar Region (Sept2009□May2010)

On the other hand utilization of preventive measures likely to be affected by low replacement rate of ITN, which might increase the vulnerability of children and pregnant women those who have consistently used the treated bed net for the last three to four years ad low coverage of indoor residual spray (IRS). Furthermore, presence of favorable environment for reading of malaria mosquitoes, ad movement of migrant labor workers from other region with different malaria epidemiology could contribute to the occurrence of malaria outbreak in the region.

5.2 The Status of EPI Program

Immunization against childhood killer diseases reduces transmission of outbreaks of vaccine preventable diseases including measles. As shown in Figure7.1.5, the overall vaccination coverage in the year 2001 EFY was very low (Penta3 = 56.4% and measles = 70.1%). Compared to others, zone one achieved better coverage and very low in zone 2 of the region. In general, the current coverage level does not provide adequate protection for non-immune children against measles outbreak. Therefore, intensifying routine immunization through supplementary immunization, monitoring of outbreaks and strengthening of outbreak response is indicated.

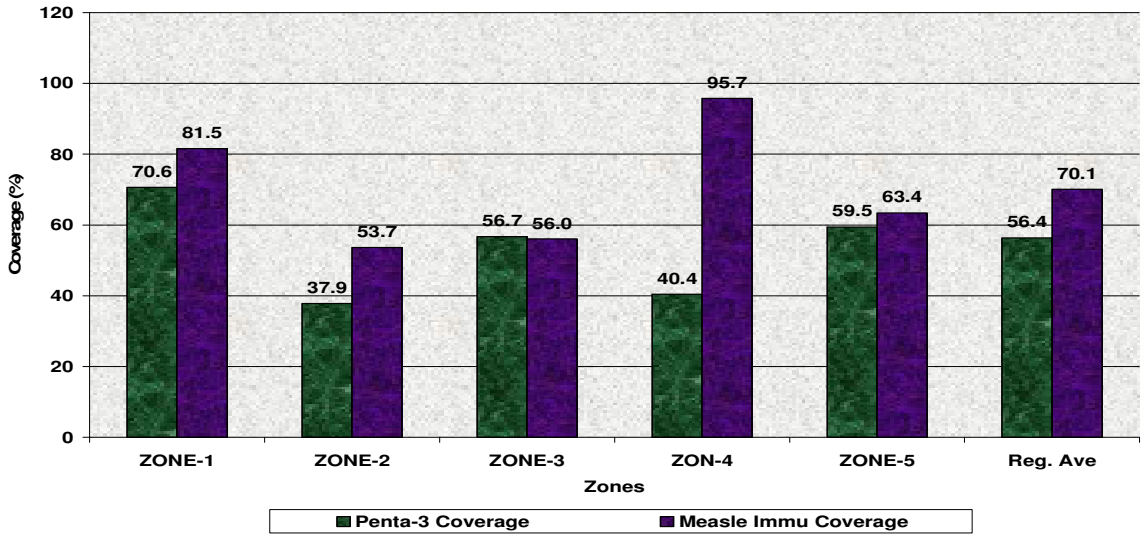

Fig7.1. 5 Measles and penta-3 immunization coverage by Zone, Afar Region, 2001 EFY

6. Preparedness and Response Capacity of the Region

Management of public health emergencies like disease outbreaks requires strong coordination system at all levels. All studied Woredas have reported to have organized epidemic prevention and control committee lead by the chief Woreda administrator and rapid response team composed of mix of health professionals. However, in all visited Woredas, the committee and teams have never been made meetings recently, and become active only whenever epidemic is reported.

Availability of contingency drugs, medical supplies, logistics and budget has an effect on the effectiveness of outbreak control/response actions. Reviews of the Woredas' drugs and supply stocks have shown that, there is no emergency stock to respond to outbreaks of epidemic prone diseases. Shortage of life saving emergency drugs and medical supplies for management of AWD, Measles complication, Malaria and meningitis out breaks are common problem across all the studied Woredas.

A total of 14 Health Officers, 208 Nurses, 49 Lab technicians, 15 Environmental Health Workers and 86 Health Extension workers have been reported to be working in the visited Woredas. Of these, only 179 (50.14%) Health workers have received training on either of the emergency response areas (Table 1). The data have shown that, there are shortage skilled/trained health workers on public health emergency management. In addition, lack of contingency budget and absence of communication means in remote Woredas for timely reporting are some of the identified capacity gaps.

Table:7.1,1 Distribution of health workers by professional category in selected Woredas, Afar region, July 2010

Zone	No. Woredas visited	Professional category					Trained health workers on:				
		HO	Nurse	Lab	EHW	HEW	PHEM	IDSR	EPI	Malaria	Nutrition
Zone 1	6	6	73	17	5	15	0	6	23	26	4
Zone 2	3	0	29	5	2	ND	0	2	6	3	4
Zone 3	6	6	64	16	7	71	0	10	16	13	6
Zone 4	4	1	25	6	ND	ND	0	10	14	5	2
Zone 5	3	1	17	5	1	ND	0	7	8	11	3
Total	**22**	**14**	**208**	**49**	**15**	**71**	**0**	**35**	**67**	**58**	**19**

Note: ND = no data

7. Malnutrition Situation

Malnutrition is one of the leading causes of health problem in the region. In addition, Woreda health offices have reported that, health facilities used to diagnose some cases malnutrition at out patient department (OPD) and refer to hospitals. According to the data from the visited Woreda health offices, Since January 2010, a total of 1129 SAM cases are registered by Asayita (147 cases), Gawane (247 cases), Amibara (460 cases), Dulecha (21 cases), Dalol (254 cases) Woredas. Currently, nutrition interventions are ongoing in Gawane, Amibara and Dulecha Woredas by humanitarian partners such as CARE Ethiopia, in Bidu and Kori Woredas by Mobile Health team with the support of UNICEF. Limited data precluded the team come up with detail description of the magnitude ad future prospects of malnutrition I the region. Therefore, further in-depth assessment is recommended.

8. Conclusion

- In 2009, 11 Woredas have been affected by AWD and 10 Woredas affected by Measles outbreaks with corresponding case load of 6583 and 3921 cases, respectively. The outbreak extended for consecutive nine months from April to Dec2009 with high case load in June, July, August months. Two hundred and fourty-one cases of AWD and 45 measles cases were reported in the last four months of 2009.

- Increasing trends of malaria case from September to November in 2009 and January to March months of 2010 in zone 2, 3 and 4; relatively high case load has been observed in zone 3 followed by zone 5 of the region.
- There was no data on timeliness of IDSR report and the regional average completeness of IDSR report in 2001 EFY was 20% lower than the recommended level and very low in zone 1, 2, and 3 of the region.
- Low immunization coverage ($Penta_3$ = 56.4% and Measles = 70.18%)
- Poor access to safe water supply and sanitation, and un hygienic practices, both in native communities and investment camps favoring the occurrence and distribution of AWD in hot spot Woredas of the region.
- Malnutrition is also a prevailing and seems acute in three of the visited Woredas in the region.
- Shortage emergency drugs, medical supplies, trained health workers and contingency budget.
- Poor management of health information and late/irregular reporting of IDSR report, absence data analysis mainly due to lack of skills, communication and data analysis equipments
- Weak multi-sectoral coordination at Woreda level.

9. Risk Factor Analysis

Table7.1.2 Health and Nutrition emergencies likely to occur, observed immediate risk factors and population at risk in Afar Region, July 2010

Possible Hazards	Identified Immediate Risk	Likelihood to occur	At risk population	Remarks
Measles outbreak	• Low measles vaccination coverage and high accumulation of susceptible population groups in the community • Malnutrition as a result of food shortage • Experience of measles outbreak in the past 2 years	Very High	• Children aged 6 month -14 years • Children affected by Malnutrition	All Woredas where outbreaks not reported in the last 2 years
AWD outbreak	• Low safe water supply and sanitation coverage • Poor hygiene practices • Population movement (Labour migrants) living in poor overcrowded shelter, with no access to safe water, food, latrine facility, health services • Previous year repeated attacks by AWD outbreak	Very High	All population	All 22 Woredas reported AWD outbreak since 2006, refugees, migrant labor workers
Sever acute malnutrition (SAM)	• Food shortage as a result of drought and lose of animals or unproductiveness of animals • Current ongoing malnutrition problem • Measles outbreak	High	• Children Under five years of age, • lactating and pregnant women	Asayita, Amibara, Dullecha, Gawane, Dalol Woredas
Malaria outbreak	• Presence of malaria vector breading sites throughout the year (large scale irrigation, banks of rivers with intermittent flow) • Low replacement rate of ITN as result those who used to sleep under net will be re-exposure to vector • Low coverage of Indoor Residual Spray (IRS) • Population movement (migrant labor workers from other region)	Very High	• Pregnant women • Children under-five years of age • All population residing following Awash river course • Migrant labour workers and refugees	Woredas wit Investment farms and localities with intermittent river flow
M. meningitis outbreak	• Accumulation of susceptible (non-immune) population • Favorable environmental condition (dusty, windy and dry season) • Population movement (labour migrants, cross region social and trade inter-course) • Overcrowded living (labour migrants, refugees) • High trade and social interaction between neighboring zones of Amhara region	Medium to High	• Age-group 2-70 years • Migrant labor workers • Refugees	All Woredas of the region

10. Possible Hazards and Recommended Emergency Response Actions

Table 7.1.3 Possible Hazards and Recommended Emergency Response Actions in Afar Region July 2010

Possible hazard	Emergency response actions	Strengthening of the routine health programs
AWD outbreak	• Strengthen surveillance system (case detection, confirmation and reporting) • Strengthen /establish coordination mechanism and resource mobilization among humanitarian partners • Provision of drugs, medical supplies and equipments for management of AWD cases and infection prevention • Build technical and management skills of health workers on case management, infection prevention, surveillance, communication and community mobilization • Intensify community awareness creation on AWD prevention and control • Provide point-of-use water treatment chemicals and hygiene supplies	• Increase coverage of safe water supply and sanitation • Increase KAP of native community and labour workers and management of the investment farm on prevention and control of water borne diseases
Malaria outbreak	• Strengthen surveillance system (case detection, confirmation and reporting) • Strengthen /establish coordination mechanism among humanitarian partners • Provision of drugs, medical supplies and equipments for management of malaria cases • Build technical and management skills of health workers on case management, surveillance, vector control, communication and community mobilization • Intensify community awareness creation on malaria prevention and control • Focal Indoor residual spray	• Increase ITN coverage and its consistent utilization • Increase communities KAP about ITN
Measles outbreak	• Strengthen surveillance system (case detection, confirmation and reporting) • Strengthen /establish coordination mechanism among humanitarian partners • Provision of drugs, medical supplies and equipments for management of complication of measles infection	• Increase routine immunization coverage using different strategies • Ensure EPI cold chain system • Increase community awareness on and their

	• Build technical and management skills of health workers on case management, surveillance, communication and community mobilization • Intensify community awareness creation on measles outbreak prevention and control • Focal measles vaccination and vitamin A supplementation in areas with high risk of outbreak (with low immunization coverage, overcrowded population, affected with SAM)	involvement in child immunization
Meningitis outbreak	• Strengthen surveillance system (case detection, confirmation and reporting) • Strengthen /establish coordination mechanism among humanitarian partners • Provision of drugs, medical supplies and equipments for management of complication of meningitis infection • Build technical and management skills of health workers on case management, surveillance, communication and community mobilization • Intensify community awareness creation on meningitis outbreak prevention and control during outbreak • Focal immunization of high risk population	Strengthen routine surveillance
SAM	• Strengthen SAM surveillance and referral system • Provision of Supplementary feeding for severely affected population (using feasible strategies)	• Increase coverage of measles immunization • Improve KAP on proper nutrition

Section II. Public Health Emergency Preparedness And Response Contingency Plan

Regional Health Emergencies Preparedness and Response Contingency Plan

General

Belg assessment findings and analysis of primary and secondary data from selected Woredas and regular health programs have been used as an input to identify regional humanitarian response needs. In sum, the regional government needs a total of **11,623,875.00** Ethiopian Birr (**USD 860,390.00**) to respond to predicted (possible) public health emergencies.

This need will have paramount importance to save the life of at risk and vulnerable population (IDPs, refugees, malnourished children and lactating women, and drought affected populations, communities with no access to safe water supply and sanitation facilities), i.e., to adequately respond to outbreaks of AWD, measles, malaria and meningitis. The need also addressed local emergency response capacity building and strengthening the health service delivery system in high-risk Woredas through provision of in-service trainings, radio-communication equipment, and water quality monitoring equipment (residual chlorine comparator), and strengthening/establishment of inter-sectoral emergency response coordination mechanisms.

1. AWD Outbreak Response

AWD has been affected significant number of population in the second half of year 2006, 2007, 2008, and 2009 and anticipated to occur in similar season in 2010. The existence of immediate risk factors such as low coverage of safe drinking water supply and sanitation facilities and poor hygiene practices, migration of labour workers from different regions of the country to Afar region, overcrowd living conditions of labour workers will aggravate the likelihood of AWD outbreak. An estimated total of 24,160 AWD cases are expected to occur in the 22 hot spot Woredas. Serious shortage of emergency drugs and medical supplies, budget, shortage trained human resources and weak multi-sectoral coordination at Woreda level is some of factors that negatively affect prevention and response to the possible outbreaks/emergencies.

The AWD prevention and response plan encompasses activities such as provision of items for early detection and reporting, prevention of spread of the outbreak, as well as essential drugs, medical supplies,

CTC kits, strengthening case management, infection prevention, surveillance system, capacity building and coordination in most at risk Woredas at an estimated cost of ETB 5,115,515.00 and about 24,160 at risk population will be benefited.

2. Measles Outbreak Response

Child malnutrition and inadequate/low measles immunization coverage is identified to be some of the risk factors that increase the likelihood of occurrence of measles outbreak in the region. Four zones have ever been experienced outbreaks of measles in the past 2008, and 2009. The outbreak has affected mainly children under-five years followed by 5-14 years and above 15 years. With an attack rate of 2%, about 13,658 measles cases are likely to occur in 32 hot spot Woredas of the region. To interrupt the occurrence and distribution of measles out break in at risk Woredas, and to reduce its undesirable outcome, the plan addressed focal supplementary measles immunization, provision of drugs and supplies for measles case management, improving technical capacity of the health workers on case detection, confirmation, reporting in an integrated manner with other outbreak prone diseases such as meningitis and malaria. A total of 13,658 measles cases and 696,989 children aged 6 month to 14 years will be benefited from the case management services and supplementary immunization, respectively, with an estimated cost of 720,891.00 ETB.

3. Meningitis Outbreak Response

There was no reported outbreak of meningitis in the past three years and none of the population at risk has taken meningitis vaccination. Migrant labor movement from other regions like Amhara, SNNPR, and Oromia regions together with overcrowded living condition, dry and windy weather of the region are identified to be some of the risk factors that favor the propagation of the outbreak. With an attack rate of 0.3%, a total of 4,654 cases are likely to occur in the region. Therefore, this response plan covered activities including strengthening of the case detection, confirmation and reporting, provision of essential drugs and supplies for case management, and meningitis vaccination for at risk population and case management. In general, a total of 4,654 meningitis cases and 1,108,845 at risk population will be benefited from case management services and vaccination, respectively, at an estimated cost of 1,309,023.00 ETB.

4. Malaria outbreak Response

All Woredas of the region are malarious with varying endemicity level. Population residing in Woredas in zone one and three with small to large scale irrigation farm development are identified to be highly at risk of malaria outbreak. Pocket areas/localities in other zones with intermittent/interrupted river flow are also considered. Further more, low coverage of ITN in most of the Woredas compounded with low utilization due to inconvenient housing structure and poor awareness about the benefit of the ITN. Similar to other epidemic prone diseases, this preparedness and response plan addressed provision drugs and supplies for case management, epidemic detection/confirmation, and items from vector control. A total of 31,682 malaria cases and 316,813 biologically vulnerable populations (U-5 children and pregnant women) will benefit from epidemic case management with an estimated cost of 3,308,626.00 ETB.

5. Summary of Public Health Emergency Response Requirements

Intervention areas	Activities	Number of Beneficiaries	Requirements in Birr	Remarks
AWD case management and infection prevention	Improve quality of AWD case management and infection prevention through prompt provision of drugs and medical supplies	24,160	5,115,515.00	
Malaria outbreak prevention and response	Improve quality of malaria case management through prompt provision of drugs and medical supplies	31,682	3,308,626.00	
Measles outbreak prevention and response	Improve quality of measles case management through prompt provision of drugs and medical supplies Improve immune status of highly at risk population groups (children 6 month – 14 years)	13,658 696,989	720,891.00	Cost of measles Vaccine, AD syringe and safety box not included
Meningitis outbreak prevention and response	Improve quality of meningitis case management through prompt provision of drugs and medical supplies Improve immune status of highly at risk population groups (population age 2 -70 years)	4,654 1,108,845	1,309,023.00	Cost of Meningitis Vaccine, AD syringe and safety box not included
Strengthening inter-sectoral coordination	Organize monthly multi-sector and inter-regional coordination meetings	-	64,470.00	
Strengthening of the Health system	Provision of capacity building trainings on AWD case management and infection prevention, PHEM, Communication and community mobilization, and reporting	-	553,350.00	
Community capacity building	Intensify health education in native community and labor workers to increase awareness on prevention and control of epidemic diseases using multiple media	-	42,000.00	
Strengthen IDSR system	Procure and provide communication (Radio) to 8 remote Woredas and surveillance data management equipment To 21 hot spot Woredas	Hot spot Woredas	510,000.00	
Total			11,623,875.00	

Total Cost = USD 860,390.00, (USD1 = ETB1

Chapter VIII – Protocol/Proposal for Epidemiologic Research Project

8.1 Assessment Of Risk Factors And Trends Of Measles Outbreak In Sidama Zone, SNNPR, 2010

Summary

Introduction - Measles is a leading causes of childhood morbidity and mortality in the world. Before measles vaccine became available, individuals contracting measles were estimated 130 million annually. Despite the remarkable progress made in measles control with the introduction of measles vaccination, it is estimated that each year measles kills nearly 454,000 people worldwide. Of these, 410,000 deaths are among children under the age of five years. Global deaths due to measles fall by 48% in 2004 from 871,000 in 1999. The largest reduction occurred in sub Saharan Africa where estimated measles cases and deaths dropped by 60%.However outbreaks of measles continue to occur even in highly vaccinated populations.

In Ethiopia between 2002 and 2004, a series of emergency and catch-up measles immunization and vitamin A supplementation campaigns were conducted to accelerate the control of measles and reduce measles mortality. According to 2007/08 estimates (FMoH), a national measles vaccination coverage is approximately 72.2%, SNNPR had the highest measles coverage at 91.3%. There are very few studies conducted to assessing risk factors regarding to measles outbreak. Therefore, reasons and associated factors for outbreaks were not adequately identified. Thus this study will embark upon to assess the reasons for measles outbreak in Sidama zone.

Methods: A case-control study design will be employed between Octobers to November 2010. Data will be collected from health facility and community using medical record review (line list) and interview checklist and pre-tested structured questionnaire will be utilized. Data will be entered and analyzed using Epi-info version 3.3 and SPSS-15 for windows statistical packages. Bi-variate and multivariate logistic regression will be employed in order to infer associations.

Ethical Consideration: Addis Ababa University Medical Faculty Institutional Review Board(IRB-MF) and Sidama zone health department (SNNPR health bureau) will provide ethical clearance, approval

and Permission for the study. Oral Informed consent will be obtained from each study participant's before making the interview.

Work-plan and Budget: The study (overall) is conducted starting from OCT 2010 and will be completed on Dec2010, with a total cost of 30,327.40Birr including personnel, equipment/ supplies and transportation costs.

Introduction

Statement of the problem

Measles is a leading vaccine preventable childhood killer. (1, 2, 5) In each year measles kills nearly 454,000 people worldwide. Of these, 410,000 deaths are among children under the age of five years. Global deaths due to measles fall by 48% in 2004 from 871,000 in 1999. The largest reduction occurred in sub Saharan Africa where estimated measles cases and deaths dropped by 60%. (1) Ethiopia contributes to 46% of cases and 51% of the deaths from measles among eight eastern Africa countries.(21)

Measles is widely known in Ethiopia. It has many names in various ethnic languages, e.g., Kufign, Ankelis or Shifto. Traditionally, all children were expected to be infected with measles during their lifetime and homemade remedies are available to facilitate rapid recovery and relieve some symptoms. Therefore, mothers did not typically seek medical care for their children with measles unless the illness was followed by complications. For this reason, the primary diagnosis recorded by health workers is not usually measles, but rather the complications of measles such as pneumonia, otitis media, diarrhea, or croup. (1, 3) The 3 major causes of high case fatality are pneumonia, diarrhoea and croup. Measles can lead to lifelong disabilities including blindness, brain damage and deafness. Low Vitamin A status is associated with a higher rate of complications and death from measles. (4)

Rational Of Study

In 1980, Ethiopia introduced measles vaccination as part of the Expanded Programme on Immunization (EPI). One dose of measles vaccine is recommended at 9 months of age. Measles vaccine coverage in the country varies by region. According to 2007/08 estimates (FMoH), SNNPR had the highest measles vaccination coverage at 91.3%. On the other hand, Somali Region had the lowest routine measles coverage at 26.2%. Measles immunization is with a national measles vaccination coverage is approximately 72.2%. (1)

There are very few studies conducted to assessing risk factors regarding to measles outbreak in Ethiopia. Therefore, reasons and associated factors for outbreaks were not adequately identified. A proper identification of determinants of measles outbreak is essential in order to guide, planning and organizing programs .There were 13,441 measles cases in zone 2002EC/2010, Thus this study will embark upon to assess the reasons for measles outbreak in Sidama zone.

Literature Review

Measles is a highly infectious viral disease caused by a Morbillivirus and for which humans are the only reservoirs. Transmission is primarily person-to-person via aerosolized droplets or by direct contact with the nasal and throat secretions of infected persons. In a non-immune person exposed to measles virus, after an incubation period of about 10 to 12 days (range 7-18 days), prodromal symptoms of fever, malaise, cough, coryza (runny nose), and conjunctivitis appear. Within 2 - 4 days of the prodromal symptoms, a rash made up of large, blotchy red spots (maculo-papular rash) appears behind the ears and on the face accompanied with a high fever. The rash spreads to the trunk and extremities and typically lasts 3-7 days. Individuals with measles are infectious 2 - 4 days before through 4 days after rash onset. (6,9)

The case-fatality rate in developing countries is estimated to be 3%—5% but may reach 10%—30% in some localities.(7) The case fatality rate of measles for Ethiopia is 4%.(1) In children whose nutritional status is borderline, measles often precipitates acute kwashiorkor and exacerbates vitamin A deficiency that may lead to blindness. Very rarely (in about 1/100,000 cases), subacute sclerosing panencephalitis (SSPE) develops several years after infection; over 50% of SSPE cases had measles diagnosed in the first two years of life.(7, 9)

Measles illness during pregnancy increases fetal risk. Most commonly, this involves premature labor and moderately increased rates of spontaneous abortion and of low birth-weight infants. Results of 1 retrospective study in an isolated population suggest that measles infection in the first trimester of pregnancy was associated with an increased rate of congenital malformation. (8)

Infants born to mothers who have either had measles or been vaccinated are protected by transplacentally acquired maternal antibodies; that is they have passive immunity. This protection lasts six to nine months on average, after which the child becomes susceptible to measles infection. A person is naturally immune if he or she has had contact with the measles virus and has developed antibodies against it. Persons who have taken measles vaccine and have formed antibodies in response to the vaccine are also immune.

Measles vaccines contain live, attenuated virus. In the African Region, it is recommended that the vaccine be administered at 9 months – the age when most children have lost their maternal antibodies. There is virtually no contra-indication to measles vaccination. When correctly administered at 9 months of age, measles vaccine confers life-long protection to approximately

85% of those vaccinated. Childhood immunization programmes have led to a dramatic decrease in measles morbidity and mortality.(5,6)

Epidemics of measles occur when the number of susceptible individuals in a population reaches a critical threshold. Outbreaks may occur in pockets of low coverage, which are likely to occur in certain geographic areas, such as urban slums, remote rural areas or islands, and in certain population groups with habitually low vaccination coverage rates such as ethnic and racial minorities, nomadic peoples, or persons with religious or philosophical objections to immunization. As immunization coverage increases, the size of epidemics decreases. In addition, the inter-epidemic period lengthens, and the proportion of cases among older children increases.(6)

Even with high routine measles vaccine coverage (1st opportunity) at nine months of age, susceptible individuals (un-vaccinated children within the community and children who have failed to develop antibodies following immunization since measles vaccine efficacy is only 85% at 9 months of age) will accumulate with time leading to the occurrence of periodic outbreaks.(1,6)

The provision of a second opportunity is necessary to reach children that have never been vaccinated and children not protected after the first dose. In the African Region, this is provided through supplemental immunization activities (SIAs). The second opportunity serves to reduce the proportion of susceptible in a given population. It therefore helps to prevent measles outbreaks and, with high routine immunization coverage, favors the elimination of indigenous measles transmission.(6)

All regions in Ethiopia have conducted catch-up campaigns. "Catch-up campaigns are supplemental immunization activities covering a wide age cohort in a one-time activity. It aims to achieve a high-level of community immunity with a view to interrupting measles virus transmission over a large geographic area. During mass immunization campaigns, a single dose of measles vaccine should be given, irrespective of immunization status or disease history to all children in the targeted age group (6 months to 14 years). Vitamin A supplementation and deworming activities may be conducted with the measles campaigns.(1)

Follow up vaccination (for children 9 months to 59 months) campaigns (conducted every three or four years) are implemented to provide measles protection to susceptible children who have accumulated over time following the "catch-up" campaigns and those not protected through routine immunization. Children may be susceptible both because the efficacy of measles vaccine is less than 100%, and because it is not possible to vaccinate all children through routine immunization.(1,6)

Socio Demographic Factors

Case–control analysis using neighbourhood control showed that Of the 206 measles cases, six were removed from hospital by their families or consent was withdrawn, and for two cases no neighbourhood controls could be found. The remaining 198 cases and 783 matched neighbourhood controls were retained. Cases were more likely than controls to be male, nonimmunized, have a less educated or working mother, a household head other than the father, and more than one child in the household. Household income was slightly lower among cases than controls. (10)

Outbreak investigation conducted In Germany, the federal state of North Rhine-Westphalia (NRW), showed that 1749 cases were notified over a 48-week period. Compared with 2001, the distribution of cases shifted to older age groups (especially the 10–14 year group). Despite the lower incidence in children less than 5 years , the incidence among infants (i.e. children less than 1 year of age) was higher in 2006 than in 2001 (82 and 25/100 000 infants, respectively). Most cases (n = 614) occurred in Duisburg. Of these, 81% were interviewed; 15% were hospitalized and two died. Of the 464 for whom information was available, 80% were reported as unvaccinated. Common reasons for non-vaccination were parents either forgetting (36%) or rejecting (28%) vaccination.(11)

Study conducted in the Netherlands started with an outbreak in an orthodox reformed elementary school with 7% vaccine coverage. The overall attack rate was 37%: 213 clinical cases among the 255 participating pupils (response 62%) and 327 household members. The attack rate ranged from 0%— 88% for the oldest pupils to for the youngest. None of 25 vaccinated pupils had clinical symptoms. (12)

Other study conducted in Vientiane, Laos showed that the proportion of children with complete immunizations was significantly lower in the group with clinical measles compared to the controls [13/50 (26%) vs 34/50 (68%), $P < 0.001$). The percentage of children who had received measles vaccine at 9–23 months of age was significantly lower in the group with clinical measles compared to the healthy controls [12/50 (24%) vs 24/50 (48%), $P = 0.01$). (13)

Study conducted in Eastern Niger showed that of 945 case patients identified, 900 (95.2%) were aged <15 years, 114 (12.3%) were vaccinated, and 789 (83.5%) sought treatment at a health care facility. A total of 92 deaths were attributed to measles (CFR, 9.7%; 95% confidence interval, 7.9%–11.5%). The CFR was highest in infants aged <1 year (15.6%). Households with ≥2 case patients had a higher CFR (10.8%) than that of households with only 1 case patient (6.0%).

Households consisting of ≥8 members had a CFR of 12.8%, whereas the CFR of smaller households was 7.1 %.(14)

Other study conducted in Bulgaria showed that, 68 of the total of 79 measles cases should have been immunised with at least one dose of measles vaccine. However, in the majority of cases (n=43, 54.4%) the vaccination status was unknown because of the lack of documentation. Twenty-two cases were known not to have been vaccinated (including 11 below the age of one year). Only seven cases (10.3%) have received one dose and another seven (10.3%) both doses of the measles vaccine. Of note is that among those immunised with two doses, three cases received the second dose during the catch-up campaign organised in response to the outbreak in May 2009.(15)

A case control study among preschool children and a cohort study among primary school children were conducted to estimate vaccine effectiveness and to identify risk factors for measles. Both studies found that measles vaccine was highly effective. Single-dose vaccine effectiveness was 89% and double-dose vaccine effectiveness was 96%. Case-control study indicated that being unvaccinated and being born of itinerant parents were significant risk factors for measles among preschool children. (16)

On February 19, 2009, 505 measles cases were reported in twelve provinces in the North of Vietnam, with Ha Noi accounting for 160 cases. A high rate of complications including meningitis & encephalitis. (17)

Study conducted in a Periurban area of Chandigarh 283 measles cases were reported with an attack rate of 4.5% and male to female ratio of (M:F) 5.3%:3.6%. Among the measles cases, 48.8% had received measles vaccination. (18)

Other study conducted in Tamil Nadu, India, 101 measles cases were reported from tsunami-affected (n = 71) and unaffected villages (n = 30) with attack rates of 1.3 and 1.7 per 1000, respectively. 42% of cases in tsunami-affected villages had an onset date within 14 days of the tsunami. The median ages of case-patients in tsunami-affected and un-affected areas were 54 months and 60 months respectively (p = 0.471). 36% of cases from tsunami-affected areas were above 60 months of age. (19)

Study conducted in an area of rural India, 318 matched pairs and suggested that children aged 12–59 months who did not receive measles vaccination in infancy were three times more likely to die than those vaccinated against measles. Children from lower caste households who were not vaccinated in infancy had the highest risk of mortality (odds ratio, 8.9). A 27% increase in child mortality was attributable to failure to vaccinate against measles in the study population.(20)

Objectives

General Objective:

- To assess risk factors and trends of measles out breaks in Sidama zone, SNNPR,2010

Specific objectives:

- To describe the disease burden in Sidama zone
- To identify risk factors for measles outbreak in Sidama zone
- To show trends of measles outbreak in Sidama zone

Methology

8.1.1 Study Area

The study will be conducted in Bensa Woreda of Sidama zone. Sidama zone is one of zone in SNNPR which is located 273 Km south to the capital Addis Ababa. Sidama zone administratively subdivided into nineteen Woreda and two city administration. According to the 2007 Federal Central Statistics Agency (CSA), the total population is estimated to 3,232,308 by considering 2.9% as rate of natural increase, total male population is1, 606,457 and total female population is1, 625, 851, the total number of under-five children in the zone were estimated to be 504,240 based on the assumption that 15.6% of the total population is under-five children.

8.1.2 Study Design

A case-control study design will be employed to determine risk factors for measles morbidity and mortality. This study will be conducted between Octobers to November 2010. The facility (medical) records (linelist of out break) will be reviewed to identify cases and secondary data of measles cases from 2006□2010 to determine the trend.

8.1.3 Study Population

Based on the information obtained from health facility register (linelist) study subjects will be identified as cases and controls will be identified from the community where cases exist (neighbor control technique)

Cases: All cases diagnosed and recorded as measles cases in Bensa health facilities.
Cases: Definition of suspected case of measles (clinical case):
A person in whom a health professional suspects measles
OR
A person with:

- Fever **and** maculo-papular rash (non-vesicular) **and**
- at least one of the following:
  - cough
  - coryza (runny nose)
  - conjunctivitis (red eyes)

Control: A person who didn't diagnose and recorded as measles cases and neighbor in a community where cases are identified.

8.1.4 Study variables

8.1.4.1 Outcome (Dependant) variable

- The outcome variable measured will be a measles case.

8.1.4.2 Explanatory (Independent) variable

- The exposure variables measured will be:
    - socioeconomic status: - age, sex, marital status, religion, educational status, place of residence, number of children, employment status, average monthly income

8.1.5 Sample Size

The sample size for this case-control study will be determined by using Epi info statistical software.

- ratio of controls to cases=> 2:1
- the desired power: 80% power
- the desired level of statistical significance: 95%

Sample size is calculated based on a significance level of 0.05, with a power of 80% and an expected odds ratio of 2. Based on these criteria, the estimated sample size, is 137cases and 274 controls. The sample size is based on 80% measles vaccination coverage.

Selection of Cases: All cases (diagnosed and recorded as measles cases) will be included in the study until the required sample size is accrued.

Selection of Controls: As control to case ratio is 2:1, two non diagnosed and recorded as measles cases at the time of data collection and from the same area (community) will be included in the study.

8.1.6 Data collection and Data quality

Procedure

Cases will be selected from health facilities record (linelist) and neighbourhood controls will be selected. The questionnaire will be pre-tested at similar community, during the training of data collectors. The pretesting will also serve as a practical session for the data collectors so as to be well acquainted with the data collection instrument. Based on the findings from the pre-testing the questionnaire might be modified.

Data will be collected through face to face interview in house to house visit and medical record review. Interviews will be made using structured questionnaire, prepared in English and translated into Amharic. Data will be collected by health workers (nurses and health extension worker) who will take a standardized training on interview techniques and other data collection methods.

In order to assure the quality of data the following measures will be undertaken:-

- Training of data collectors,
- Pre-testing of questionnaire,
- Supervisor and the Principal investigator will review filled questionnaire

8.1.7 Data processing & Analysis

Data will be described and summarized using tables and graphs. It will be edited, cleaned, coded and entered using EPI-INFO version 3.3.2 and SPSS-15 for windows statistical software package and Excel sheet. Bi-variate and multivariate logistic regression will be employed in order to infer associations.

8.1.8 Dissemination of Results

After the data is analyzed, based on the findings obtained, conclusions and recommendations will be made. The findings of this study will be circulated to Sidama zone health department and AAU school of public health. The result will be presented during thesis defense in the school of public health, as a partial fulfillment of MPH and in different seminars, meeting, conferences and workshops. Moreover, the findings will also send for publication in reputable journals and scientific publications.

8.1.9 Ethical Considerations

Addis Ababa University (AAU), Medical Faculty Institutional Review Board (IRB-MF) will provide ethical clearance and approval for the study. Permission will be obtained from Sidama zone health department.

Oral Informed consent will be obtained from each study participant's before making the interview. The objectives of the study will be explained to the study participants. The respondents will told that they have the right to be involved or not to be involved in the study.

Work Plan And Budget Proposal

Work Plan Of The Study

NO	ACTIVITIES	AUG	SEP	OCT	NOV	DEC	
1	Proposal writing and submission for the graduate coordinator						
2	Ethical clearance and resource securing						
3	Recruitment and training of data collectors and supervisors						
4	Pre testing						
5	Data collection						
6	Data entry and cleaning						
7	Data analysis						
8	Report writing (1st and 2nd draft)						
9	Final reporting						
10	Thesis defense						
11	Submission of the final thesis report to school of public health						

8.2 Budget Proposal

	Quantity	Rate pay/day	Duration of work/ day	Total	
				birr	cent
I. Personnel (predim)					
A. **Training and pre test**					
1. Trainees					
1.1 Data collectors	7	70	3	1470	00
1.2 Supervisors	3	70	5	1050	00
2. Tea/ Coffee for trainees	20	10	3	600	00
3. Training Hall rent	1	200	3	600	00
B. Data collection					
1.Data collectors Nurses +HEW	7	70	20	9800	00
2.Supervisors	3	70	30	4200	00
3.Principal investigator	1	180	30	5400	
Personnel total				**23,120**	00
II. Equipment And Supplies					
1. Photo copy (questionnaire)	6*848= 5088	0.40cents/ page		2,035	20
2. Printing (proposal & final research paper)	6*69= 414	1.00birr/ page		414	00
3. Pen	15	3.00		45	00
4. pencil	50	0.60		30	00
5. Eraser	30	0.60		18	00
6. Sharpener	30	0.50		15	00
7. Note Book	15	5.00		75	00
8.Flash Disk	1(4GB)	250		250	00
9. CD recorder	10	6:00		60	00
10. Mobile card	6	100		600	00
11. Bag	1	550		500	00
12. Hard disc	1	2000		2000	00
13. clip board	11	15birr		165	
Supplies total				**6207**	20
III. Transport					
From A.A to Awassa to woreda	2	500		**1000**	00
Grand total				**30,327**	

Reference

1. Federal Ministry of health(FMoH) and WHO Ethiopia: National guideline for measles surveillance and outbreak investigation, April2007
2. WHO guideline epidemic preparedness and response to measles outbreaks; Geneva, Switzerland May 1999
3. Yemane Berhane, et al: Epidemiology and Ecology of health and disease in Ethiopia,2006
4. WHO regional office for Africa: measles SIAs field guideline, revised january2006
5. WHO, field guideline for measles elimination,2004
6. WHO regional office for Africa: guidelines for measles surveillance, revised December 2004
7. David L. Heymann,MD, Editor: control of communicable disease manual,19th edition ,2008
8. Recommendation of immunization practices advisory committee (ACIP) measles prevention: MMWR 31(17);217-24, publication date:05/07/1982
9. Gustavo H. Dayan MD; et al : VPD surveillance Manual, 4th edition,2008
10. Syed M. Akramuzzaman; et al: measles vaccine effectiveness and risk factors for measles in Dhaka, Bangladesh
11. Ole wichmann, Anette Siedler, et al: further efforts needed to achieve measles elimination in Germany: results of an outbreak investigation, published online: 6 January 2009
12. Susan Vanden Hof, et al: measles outbreak in a community with very low vaccine coverage, the Netherlands, Vol.7, No.3 supplements,june2001
13. Mayfong Mayxay, et al: Factors associated with a measles outbreak in children admitted at Mahosot hospital, Vietiane, Laos: published:4 August 2007

14. Robin Nandy, Thomas Handzel, et al : case-fatality rate during a measles outbreak in Eastern Niger in 2003: published 19 December 2005
15. L Marinova, M kojouharova, Z Mihneva: An ongoing measles outbreak in Bulgaria: Euro surveillance, Vol14,issue 26, 02 July2009
16. Hennessey KA, et al: measles epidemic in Romania, 1996—1998: assessment of vaccine effectiveness by case-control and cohort studies
17. Measles Research Today, a free monthly online journal: measles outbreak in the 2000s
18. Thakur js, et al: Measles outbreak in a periurban area of Chandiagarh: need for improving vaccine coverage and strengthening surveillance
19. Arumugam Mohan, et al: measles transmission following the tsunami in a population with a high one-dose vaccination coverage, Tamil Nadu, india2004—2005: published online September 2006
20. Zubair Kabir, et al: Non-specific effects of measles vaccination on overall child mortality in an area of rural India with high vaccination coverage: a population based case-control study, Bulletin of the WHO Vol-81 No 4, Genebra 2003
21. Federal Ministry of Health-UNICEF-MOST: Guideline for the Enhanced outreach Strategy(EOS) for child Survival Interventions. Revised version- July 2005

Chapter IX – Other Additional Output Reports

9.1 Report on Acute Watery Diarrhea outbreak response supportive supervision in Oromia Region, West Harage Zone, 14-29/12/2001EC

Introduction

West Hararge zone is one of the the Oromia regional government zone which is located in the eastern part of the country. West Hararge has 13 Woredas. Oromifa is the official language and spoken in almost all Woredas. More than80% of the population residing in the rural area and are farmers producing Maize,Sourgum,Chat and other cash crop products. Some Woreda population are considered to be pastoralist like miesso Woreda.

West Harerge has been affected with AWD recently with index case from one of the Woreda called Guba qoricha11/11/2001.After two days cases reported from the nearby Woreda called Mieeso and later on three additional Woredas reported the case.

From the start of the epidemic the Woreda with the Zonal EPR coordination body started to respond accordingly.

Twenty eight Kebeles (16%) in Five affected Woreda namely Mieso, Guba Koricha Chiro, Anchar, Gemechis are affected.

From the start of the outbreak Zonal EPR started the intervention making its commanding post in the most affected Woreda called Miesso and cascading its intervention to other neighboring Woredas as the outbreak progressed to cover others.

The ORHB has been supporting from early onset of the epidemic with financial, material, capacity building (training) & technical support by assigning teams and has close follow up and working with the Zonal Health Office in strengthening of coordination efforts, surveillance and case management, support in availing safe & adequate water, social mobilization etc.

To ensure the above mentioned tasks, ORHB is conducting supportive supervision in epidemic affected zones like West Harage. Thus ORHB decided to mobilize team for supportive supervision in West Harage

Objectives of the supervision

- To support the emergency (AWD) technically
- To ensure quality service delivery
- Strengthening knowledge & skills those who work in AWD prevention & control
- To assist the task force in ensuring by giving building ideas

Methodology

- Use secondary data
- Interview of the coordinators, service providers, Patients , care takers & community
- Visit the affected Woreda and Case management centers
- Attending task force meeting

Finding

Surveillance and Case Management

The index case was male reported on 11/11/2001 from Woreda called Guba Qoricha. After two days cases reported from the nearby Woreda called Mieeso and later on three additional Woredas reported the cases. The Most affected Woreda is Mieeso Woreda reporting 531 case and 10 death with AR 0.38% & CFR 1.9% respectively. But the Attack rate of kebeles with in the Woreda differs from 3% to less than 1%. Zonal Health office identified that all cases reported after the index case were from villages who are using the water source from a river which is crossing most of the affected Woreda. Highest case fatality rate observed in G/qoricha (3.4%) while Gemechis and Anchar Woreda have the lowest CFR and Attack rate.

Daily AWD case monitoring result showed the first pick was on 13/11/2001 after two days of the index case and maintained to be reported more than 20 case /day which shows propagated character and started to decline on mid of August (EC)

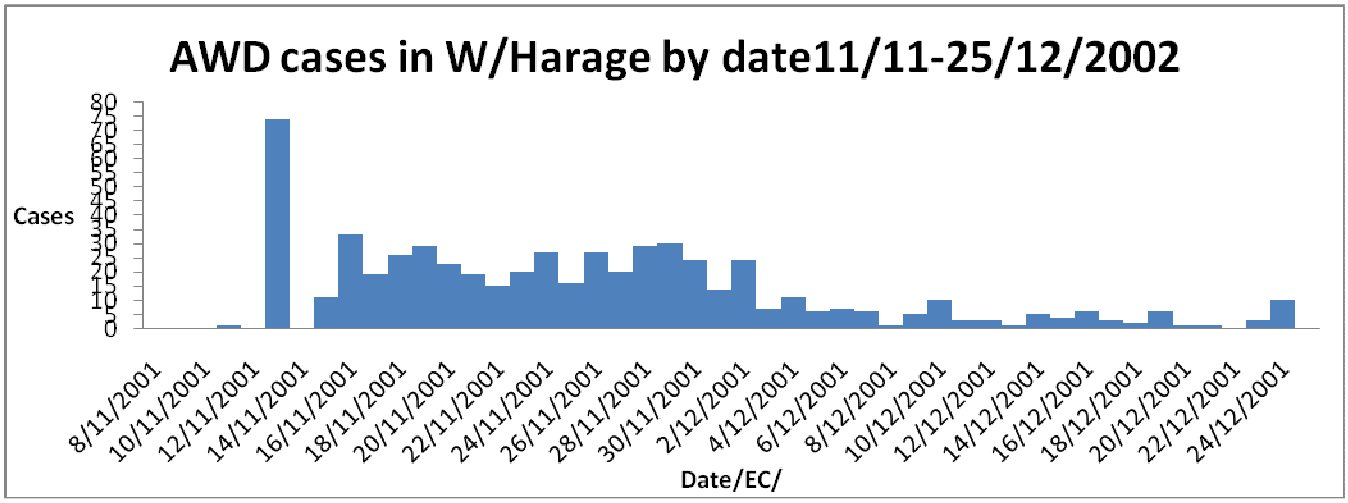

Figure 9.1.1 EPI curve of AWD outbreak in W/Hararge Zone Oromia region 11/11-25/12/2001

Total case build up observed in wk 30 after the first case reported on wk 29.Over all case decrement observed after the 33 rd epidemic wk.

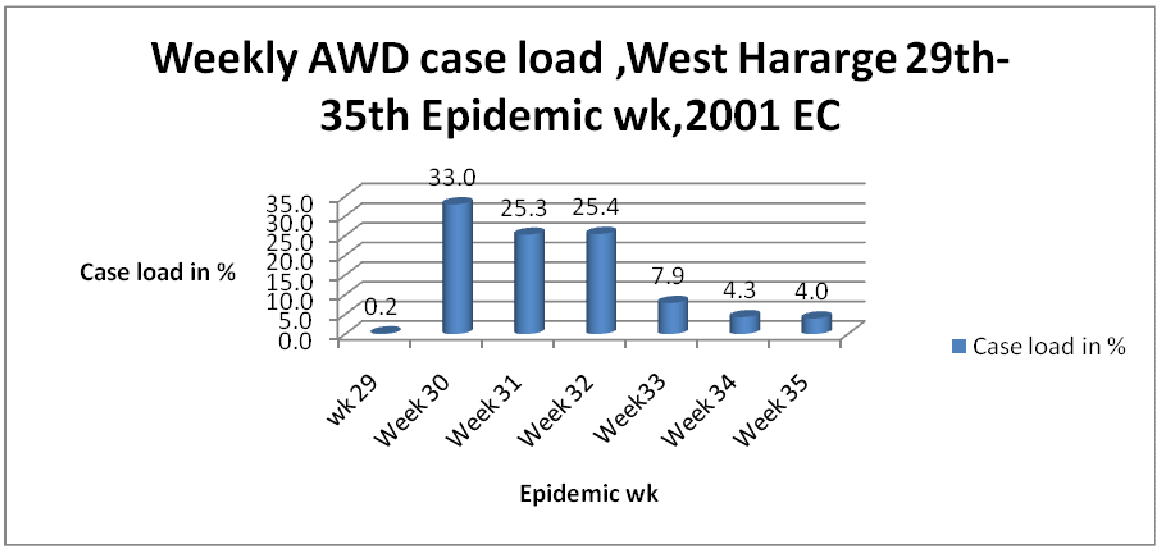

Figure 9.1.2 Weekly AWD case load in W/Harage Zone Oromia Region wk29-35

From the start of the out break (11/11/2001) until 25/12/2001 West Harage Zone reported 583 AWD cases and 11 deaths from five Woreda (38% of the total Woreda in the Zone).

Table 9.1.1 AWD affected Woreda in W/Hararge by CFR and AR, 11/11-25/12/2001

Woreda	Population	Case	Death	CFR	AR
G/qorica	130,384	29	1	3.4	0.02
Miesoo	138,018	531	10	1.9	0.38
Ciroo	180,177	16	0	0.0	0.01
Gemacise	194,697	1	0	0.0	0.00
Anchar	89,337	6	0	0.0	0.01

Attack rate in the kebeles of the affected Woreda differs from kebele to kebele. In the most affected Mieso Woreda twenty one kebeles reported the attack rate from 3.6% to less than 1%.The case fatality rate also differs from kebele to kebele. The observation reviled that kebeles with the highest attack rate located near by the flow of the river which is crossing the Woreda and also late reports from the remotest kebeles which resulted in increasing of the Case fatality rate.

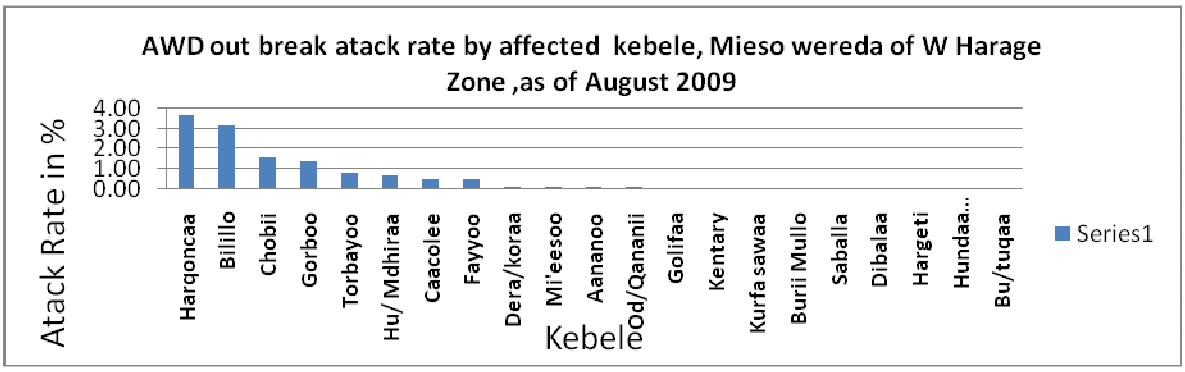

Figure 9.1.3 Attack rate by kebele in Miesso Woreda, W/Harrge Zone, and Oromia Region

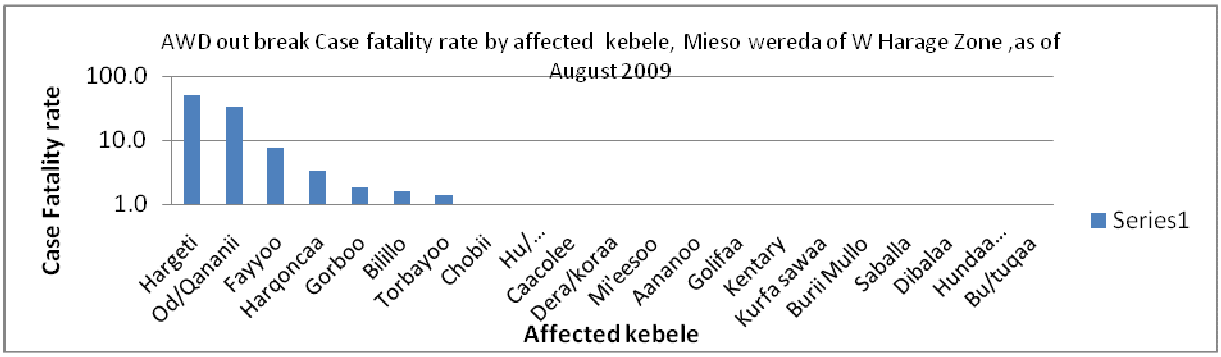

Figure 9.1.4 Case fatality rate by kebele in Mieso Woreda

The most affected age group in this out break is age from 5-14 years age while the list one is age of greater than 45 years while Male to Female ratio was 1.14.

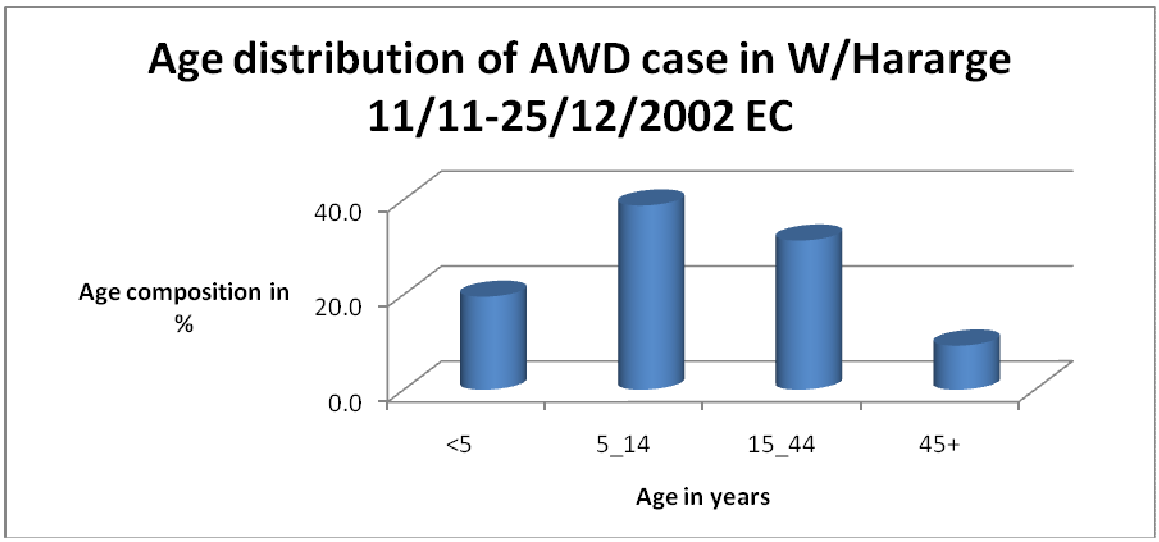

Figure9.1.5 Age distribution in W/Hararge AWD outbreak 11/11-25/12/2001

Geographic distribution with in the affected Woreda showed 16.5% (N=170) of the total kebele in the affected five Woredas reported cases while 45.7% of kebeles in miesso affected by AWD.

Table 9.1.2 Affected kebeles by Woreda in West Harage as of 25/12/2001

Woreda	Total kebele	Affected Kebele	Non Affected Kebele	percentage of affected Kebele by Woreda
Miesoo	46	21	25	45.7
Ciroo	39	2	37	5.1
G/qorica	30	3	27	10.0
Gemacise	32	1	31	3.1
Anchar	23	1	22	4.3
Total	170	28	142	16.5

Sanitation status: The Zone is reporting low sanitation coverage with very minimal latrine utilization before the outbreak. Mieso Woreda had the least coverage before the outbreak (16%). After the outbreak, the Zone mobilized the community and started to build latrine (reached nearly 70% and above in all affected Woreda) and convince the community for proper utilization

The Zonal Task force as well as the Woreda task forces identified focal points for the flow of information. Almost all information gathered through telephone. At the Zonal office data entered using x cell and analyzed. At Woreda level the data managed manually

Good Practice

- Monitoring charts used for daily follow up and Spot map developed by the zonal health office helped the EPR task force to identify the Woredas at risk and direct its intervention accordingly
- The Case based report utilized at all level as well and Focal points at the visited sites are trained and oriented
- Zonal and Woreda Health offices conducted case management and surveillance training for Health workers and presence of case management protocol in CTCs
- Disinfection of the CTC site and also patients homes conducted and continuously assignment of staff at CTCs in all affected Woreda/minimum 2 HW, Guard, Cleaner, and spray man
- Presence of drugs & supplies at least at minimum level at each Case management centers
- Case management Centers established and management was ongoing by the protocol and Referral established to Chiro Hospital for complicated cases.
- Availability ORS at HP which will encourage the availability of Oral Rehydration Points(ORP)

Draw back

- The hard copy of reports at some Woreda level didn't compiled and kept separate
- Data not entered in to the computer in most Woreda.
- Some data's/variables not registered in the Case based report form.
- Report forms and Guidelines are misplaced
- Confounding health problems additional to AWD didn't followed during case management process
- Health workers assigned for a longer duration
- Reports at all level collected only cases and deaths but not the daily activities conducted

Action taken

- On Job Orientation Given in considering AWD with other concomitant diseases
- Shared with the daily monitoring of the situation at the kebele level/ensuring at least 3-5 staff at kebele level, ensuring the existence of HEW weekly plan ,the activities of sectors specially water, Education and Agriculture, the need of intensive supervision and feed back
- Tried to discussed the need of completeness of reporting and also filling the documents at CTCs and also Woreda Health offices
- Given advice to evaluate the stock and refill the gap requesting the Zonal Health office.
- Discussed with the CTC,s staffs on the two death reports of Nehase 23,2001 from Miesso and Harkoncha CTCs
- After debriefing the zone decided to replace health workers working at Miesso and Guba Koricha CTCs

Coordination

The Zonal EPR reactivated immediately after the report of AWD from Mie'sso on 13/11/2009.

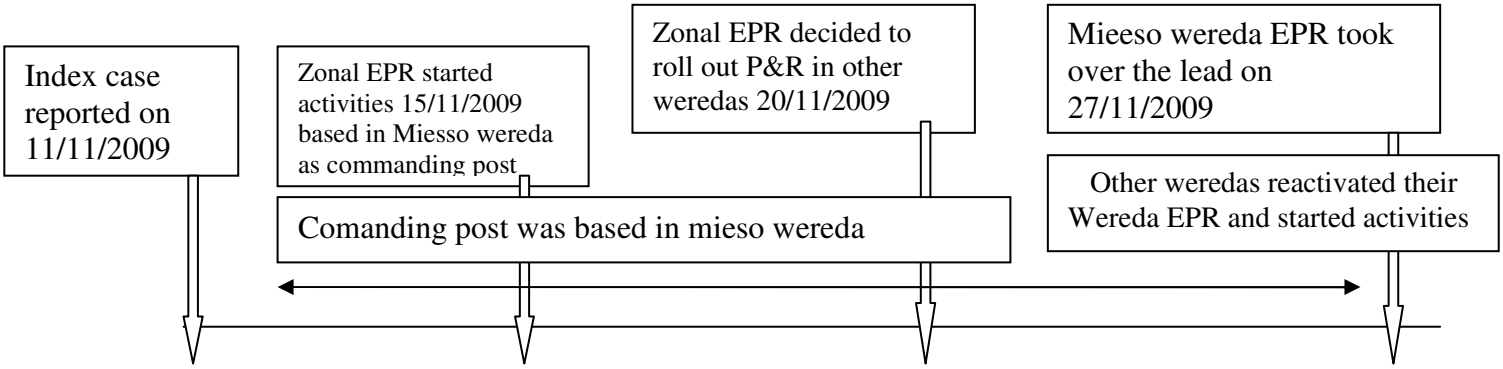

Figure 9.1.6 The Zonal EPR reactivated immediately after the report of AWD from Mie'sso on 13/11/2009

Zonal and Woreda EPR intervention by date

Zonal EPR committee/task force/ convened a meeting on 13/11/2001 at Zonal administrative office and decided to coordinate the preparedness and response for the outbreak in Mi'esso Woreda in which the incidence case reported and also the most affected Woreda.

The Task force identified subcommittees like Surveillance &Case management, Logistic and finance, Social Mobilization and Awareness Creation, Hygiene and Sanitation.

The Zonal Task force includes all sectoral ministries and NGO, working in the zone.

Good practice:

- Zonal EPR task force reconvened its activities within 72 hours
- NGO,s like IMC, IRC, Care and Goal involved in the response
- The same structural arrangement cascaded also up to Woredas
- Identified priority Woreda/Woreda at risk from the start of outbreak/
- Zonal and Woreda Water offices responded as expected/potable water supply by water tankering specially for miesso Woreda; water treatment chemical supply,
- Development Agents of Agriculture involved in social mobilization and working toward house to house education
- Involvement of kebele administrator
- Monitoring done by task forces using checklists
- The Zonal and the Woreda Health offices enrolled activities as per the Zonal Plan/Woreda plan

- Partners were found responsive to all calls
- Continuity of the taskforces observed in some Woredas like Anchar, Gemechis ,Guba Koricha & Chiro Woreda
- The Zonal Health office is working proactively in respect to the coordination activities
- Water sector involvement stated to be strong/took responsibility of the ensuring of potable water supply and water treatment chemicals/
- All the visited and affected Woreda's Task forces through their Woreda Cabine allocated Fund for the response of the emergencies

Draw backs

- Woreda Coordination Task force didn't meet for the last 2 wks before the federal team arrival and didn't keep its meeting regularity
- No inter Woreda coordination form or communication like Mieso of W harage and Somali region
- Some subcommittee's like logistic and finance didn't update its plan and coordinate the resources and also the education sector involvement is found not strong enough/as it is preparation to start its academic year

Solution given

- After discussion with Zonal administration and also with Mi'esso Woreda Administration the Taskforce revitalized, agreed to meet by every Wednesday and share the minute and also agreed to institute inter Woreda /with Somali region/ coordination forum which will be conducted every week by Monday
- Discussed on sectoral responsibilities with emphasis Water, Agriculture and Education sectors.

Hygiene, Sanitation and Isolation aspects CTCs and in the communities

Good practice

- Presence of guard in 24 hrs , cleaners for 24hrs, sprayer for 12 hrs and at least one tents at CTC levels
- In three CTCs there were private bathing units and separate latrine for cases at CTCs
- The staff is knowledgeable on how to prepare the chlorine solution for specific purpose/For hand washing, waste disposal, etc
- In most CTCs water is available and presence of hand washing facilities with chlorinated water at key points
- The medical staff employed only to work in the CTCs and only one care taker principle is on place and at patients closes and utensils were disinfected
- Disinfection process is well organized at CTCs and at the house hold level of infected patients and also Vehicles in which patients travel disinfected
- Latrine construction is encouraging in all visited Woredas
- In Miesso Woreda villages & kebeles were identified by their water source and ensured potable water supply through water tankering in most affected villages
- In Miesso Woreda water treatment chemicals (wuha agar,Pur andAquatab)distributed to the most affected villages & kebele and chlorination of water source Miesso city and also the closed water pipe lines were opened and functional like in Torboyo, Gorbo and Chobi

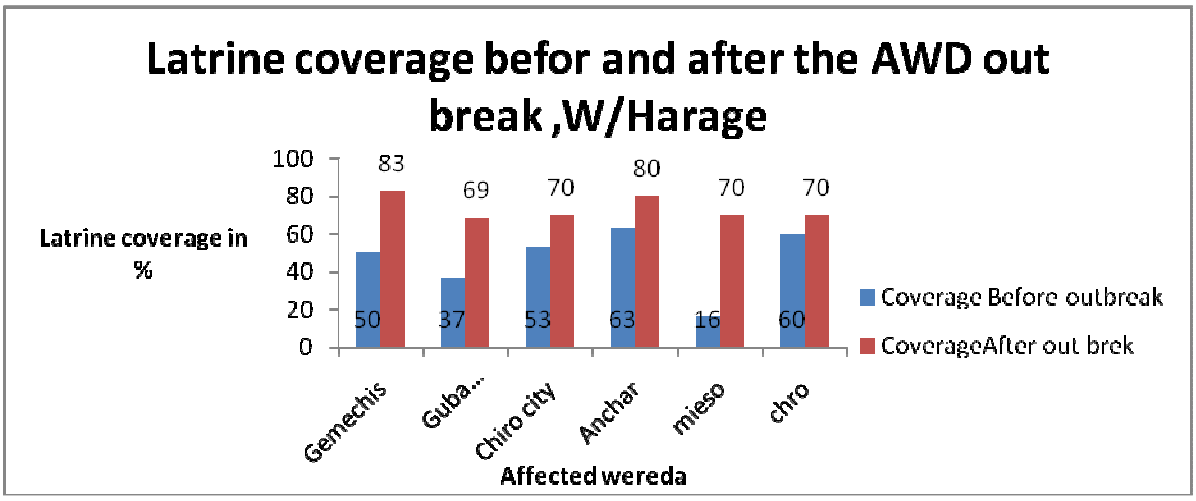

Figure 9.1.7 Latrine coverage of the AWD affected Woredas before and after the outbreak

Drawback

- In appropriate distribution of Cholera Beds/In Mieeso CTC we found one functional and one not functional bed while in Harkonch CTC-----we found 7 functional and two with mild problems.
- Cholera beds were not kept in store
- Delayed response to the request of refilling water treatment chemicals or Pure water supply
- Difficulty in disinfecting some house holds due to shortage of Vehicles and also poor communication with neighboring Woreda

ADVOCACY AND COMMUNICATION

Good practice

- Copies of key messages for AWD prevention & control have been using to kebeles
- Most of the community are aware of about AWD prevention and control methods
- Epidemic management committee is organized at kebele level
- All visited Woredas have been using check list during their field movement

Drawback

- House to house education not yet started

Conclusion

The Woreda and Zonal Health bureau coordinated response was encouraging (started with in 48-72 hours but the weakening of the coordinated response effort was observed.

Zonal health an office monitoring of the situation is encouraging/has data entered and analyzed by computer, Map was done and identified the possible risk factor-usage of the river water. The case management system is in good shape but all the Woreda has shortage of safe and adequate water, poor latrine utilization (by observation).

All Woreda activities are encouraging in latrine construction. After getting solutions for the drawbacks, the case load is decreasing (see the Epi curve)

Recommendation

The Zonal and Woreda coordinated response must be continued, Community advocacy and health education focused on latrine utilization, keeping personal hygiene, safe water utilization should be continuous.

Rotation of health workers from CTCs should be done timely so as to avoid overwhelming in handling cases Referral system for complicated cases must be strengthened. As most of the affected kebeles in the affected Woredas are hard to reach and also due to shortage of financial capacity, the concerned body should assign vehicles (like for Anchar Woreda) and support with finance. Active case search and disinfection activities should be strengthened. Safe and adequate water supply must be ensured. Recommended to strengthen Inter regional/Between Somali and W/Haraged) and Intra Zonal coordination in the prevention, surveillance and response

Pictures

Figure 1 Mieso Woreda Map

Figure 2, Latrine in Gemechis Woreda, W/Harage

Figure 3 Meeting with Mieso Woreda technical committee

9.2 Follow up Visit, Situational Analysis and Need Assessment on the AWD Outbreak Preparedness and Response (April 10 to 27, 2010)

Executive Summary

Since 2006, Afar Regional State Health Bureau has put forth great efforts on prevention and control of AWD outbreaks in collaboration with Regional Government, Sector bureaus, Federal Ministry of Health, Ministry of Water Resource, UN agencies such as UNICEF and WHO, and NGOs like MSF Greece, AMREF, SC-UK, etc. Joint support mission (JSM) is one of the Inter-governmental support mechanism through which regional situations are assessed and priority needs are jointly identified and acted accordingly by establishing partnership among stakeholders. Joint support mission also brings all potential partners onboard and intensify their participation throughout all stages of AWD prevention and control.

During the first JSM to Afar Region (July 2009) various needs have been identified and the recommended action points were implemented by the region and by the second joint support mission. During its stay in the region, the second joint support mission has provided technical support and has played facilitation roles and finally recommended actions to be taken by the region (Oct 2009).

Based on the recommendations given by the second joint support mission, the third support mission was planned to monitor the implementation status of the recommended action points, and further to make situational analysis and need assessment in AWD hot spot Woredas and cotton farms and salt mining investment sites, and to revitalize regional and Woreda AWD prevention and response coordination committees. In order to achieve the planned objectives, with the leadership of the Federal Ministry of Health (FMoH), third joint support mission comprising multidisciplinary team formed from Federal Ministry of Water Resource (FMoWR), World Health Organization (WHO) and UNICEF and deployed to Afar region to provide technical support and assess the situation.

The monitoring visit and need assessment was conducted in seven selected hot spot Woredas (5 Woredas from zone one and 2 Woredas from zone three) of the region. The assessment employed both qualitative (formal and informal discussions and onsite observations) and quantitative (review

of records and reports) and semi-structured interviews with investment farm owners and labour workers.

A total of 10 discussions sessions were held with regional and Woreda outbreak coordination committees (seven at Woredas and one at region), with technical task forces (in two Woredas) and with representatives of the cotton farms/salt mining investors and labour workers. Observations were also made to shelters of the labour workers, sources of water supply, defecation sites, food preparation places, sleeping places, and water and food containers.

Regarding implementation status of the previous recommendations, compilation and analysis of data on completeness of IDSR reports, EPI coverage, and analysis of AWD cases and deaths by zone/Woreda have been done. In addition, supervision to active CTCs, on-job orientation to health workers on infection prevention, information exchange between partners, mobilization of resources, preparation of Sample integrated WaSH plan, AWD active case searches, formation of Woreda technical taskforces in three Woredas, periodic monitoring to investment farms, working with APDA to create awareness among rural communities in Woredas with AWD outbreak, and technical support to Woreda technical taskforce on planning of AWD prevention interventions were some the activities implemented by the region in collaboration with WHO and UNICEF based on the second joint mission recommendations.

Currently, there is no AWD outbreak in the Afar region. Information exchange between Woredas and region using telephone, frequent supervision to Woredas by WHO EPI/surveillance officer, as well as supervision to investment farms by Woreda technical taskforces, Presence emergency stocks of drugs and medical supplies as well as stocks of point-of-use water purification/disinfection chemicals in some of the visited Woredas, AWD prevention interventions through increasing community awareness about latrine use and safe water supply, motivation of communities to construct latrine and maintenance of water supply schemes by strengthening partnership with NGOs working in the Woreda, initiation of CLTSH, in some of the hot spot Woredas are some of the efforts made by the region to prevent and control occurrence of acute watery diarrhoea.

Provision of feedback on IDSR report to Woredas and technical guidelines on IDSR, health education/communication, CTC and AWD case management, and on point-of-use water disinfection together with in-service trainings on the guidelines. Ensuring the stocks of emergency drugs, medical supplies and CTC kits, as well as stocks of water purification/disinfection chemicals at Woreda and regional levels, maintenance of non-functional water supply schemes, alerting all Woredas on AWD preparedness issues, revitalization of Woreda coordination committees, and continuous monitoring of investment farms and taking corrective measures on investors firmly resisting to implement plans on improvement of workers living conditions are identified to be priority areas which need coordinated action.

Acknowledgements

We would like to thank the top management of the Woreda Administrative council, Health, Water Resource, Education, Investment, Disaster Prevention and Preparedness Office, Labour and Social Affairs for their commitment to assign relevant professionals to take part in assessment and for providing the JSM with valuable information.

We extend our deep appreciation to the representatives of the investment farms/sites and labour workers for their willingness to provide us with necessary information.

Active participation of WHO and UNICEF Country and Afar field office on serial discussions, providing technical support on the preparation of the assessment tools, field data collection, analysis and preparation of reports; and providing vehicles, covering fuel and other related costs during the field work is highly appreciated.

We appreciate the willingness of AMREF and CARE Awash to take part in the situational assessment by assigning relevant professionals as well as for active participation on Woreda level discussions and on emergency stock planning exercise orientation sessions in Amibara and Gawane Woredas

The cooperation of Afar region WHO EPI/Surveillance and UNICEF Health and Nutrition officers were significant.

1. Introduction

The Afar National Regional State is located in the northeast part of the country. Administratively, the Region is divided in to five zones, which are further subdivided into 32 Woredas and 404 Kebeles. According to 2007 CSA the total number of the region's population is 1,411,092; of which 92% are pastoralists and 8% agro-pastoralists. Afar region is affected with recurrent drought. Besides, access to food and nutrition, water supply and sanitation, financial income, and health services are inadequate. The major health risks in the region are AWD, Measles, Malaria and Meningitis. Among these epidemics AWD outbreak was affecting the region in 2006, 2007, 2008 and 2009.According to Regional Health Bureau /IDSR report in 2009 eleven Woredas were affected by AWD outbreak with a total of 6,583 suspected cases and 183 deaths reported with CFR of 2.76%. Transmission season and outbreak coincide with land preparation for cotton farming and harvesting.

The National Health and Nutrition Task Force formed a multidisciplinary joint support mission from FMoH, MoWR, WHO and UNICEF and deployed to Afar Region to provide technical support, monitor the implementation status of the recommended action points by the second joint support mission, to conduct an assessment on the current situation of AWD preparedness in the region, to identify the major risk factors together with the regional taskforce and finally to recommend alternative and complementary solutions.

Up on arrival, the joint support mission team made a discussion with the Regional Health Bureau on the objectives of the mission and on expected outcomes. Eight hot spot Woredas (5 from zone one and 3 from zone three) were selected by the region by considering potential for AWD outbreak occurrences. Two sub-teams were formed that comprise professional from the Federal and regional taskforce and assigned to make an assessment at selected Woredas. Finally, a total of seven out of eight Woredas (namely; Elidar, Asayita, Afambo, Dubti and Adda'ar from zone one and Amibara and Gawane from zone three) were assessed.

2. Objectives

- To monitor the implementation status of the recommended action points by the second joint support mission
- To review and revise the Emergency Preparedness and Response Plan (EPRP) of the Afar Regional State Government
- To strengthen the regional and Woreda coordination committees in response to AWD
- Initiate Woreda emergency drugs, medical and wash supply contingency planning in five Woredas

3. Approaches /Methodologies

- Formal discussions/consultation with top management of the Regional Health Bureau, Regional coordination committee, Woreda top management, Woreda AWD prevention and control committees and Woreda Health Offices, African Medical Research and Education Foundation (AMREF) and CARE to seek their participation, and informal discussion with representatives of investment farms and labour workers.
- Observation to Health facilities to obtain information on emergency preparedness status of the Woredas, including stocks of drugs and supplies, and to assess the knowledge of the health professionals on AWD case management and prevention. Observations to water schemes were also made to observe their condition.
- Interviews with farm owners, on-site observation of the current conditions of AWD risk factors (sources of water for drinking, excreta disposal practices, handling practices of water at home, food hygiene, and shelters) to ascertain whether previous recommendations are being implemented or not in previously visited farms. Similarly, discussions were made with salt mining investors and with workers to assess their level of awareness about AWD and observation to the sources of water and shelters.
- Discussion was made with Ethiopian water works construction enterprise (EWWCE); Ethiopian water works design supervision enterprise (EWWDSE) and housing development agency (HA) to work actively with the Woreda AWD prevention and control task force.
- Debriefing to RHB top management on the gaps identified, action taken and future action points

4. Organization of the Report

This report has seven Chapters. Chapter one provides brief regional profile, Chapter two describes objectives of the follow up visits, Chapter three describes the methodologies/approaches employed to assess the status of implementations of the recommended actions and chapter five provides information on key findings and discussions.

Issues regarding AWD cases reporting and response, availability of resources for AWD case management and infection prevention, current status of the WaSH services, community awareness creation activities and coordination and resource mobilization are discussed in detail under section five. Results of investment farm supervision are separately described under section 5.4 of this report. Review and revision of the regional EPR plan and Strengthening of the regional and Woreda AWD outbreak coordination and response are stated under section six and seven, respectively.

Finally, challenges, actions taken by the joint support mission, and recommended action points are described under section eight, nine and ten, respectively.

5. Findings and Discussions

5.1 Implementation Status of the Second Joint Support Mission Recommendations

Following the second joint support mission to Afar region, the Afar Region Health Bureau identified priority issues from the recommended action points in collaboration with WHO Consultant. The priority action points focuses on the strengthening of AWD reporting and response; case management and infection control; Water, Sanitation and Hygiene promotion (WaSH); Social and community mobilization; coordination and capacity building.

Accordingly, data on IDSR timeliness, EPI coverage, and AWD cases and deaths were compiled, analyzed by Woreda, and has been used during Karma (Meher) assessment. Furthermore, malaria morbidity data was collected from epidemic prone Woredas such as from Gawane and Adda'ar Woredas, analyzed and communicated with Woreda health offices and regional health bureau to take preventive actions. Timely reporting and AWD active case search to investment farms.

Technical and logistic gaps were identified during supervision to Active CTC (Amibara, Gawane, and Elidar), discussed with Woreda health offices and based on the findings orientation on infection prevention procedures to health staff as well as drugs and supply mobilized.

To devise mechanism to increase communities' access to safe water and sanitation services, sample integrated WaSH plan was prepared and submitted to regional health bureau (sanitation and Hygiene unit). However, this document is not communicated among the core stakeholders such as Education and Water resource offices.

Regarding coordination, the regional coordination committee established multi-sector technical task force to periodically monitor the activities of the Woreda coordination committees and situation in the investment farms. Similarly, Woreda technical task force (team) was formed in Amibara and Gawane Woredas to carry out AWD prevention and control activities in their respective Woredas in collaboration with partners.

The regional technical task force conducted joint supervision to investment farm camps in collaboration with Woreda Health offices. In order to increase community awareness on AWD prevention and control, APDA has rigorously worked on community sensitization and education together with HEWs and Woreda health offices.

Woreda technical task forces were given orientation on their duties and responsibilities and on how to prepare joint action plan. In both Woredas, the technical task forces have organized regular meeting and prepared multi-sectoral plan on AWD prevention. The technical task forces have conducted repeated supportive supervision to investment farms camps, identified gaps and have provided health education to labour forces in collaboration with partners such as AMREF, SC-UK and CARE Awash.

Task forces in the two Woredas further worked on AWD prevention and control focusing on community awareness creation, provision of WaSH materials and supplies to households, construction of latrines, provision of drugs and medical supplies to health facilities and strengthening of community based health structures.

5.2 Current Situation of AWD Prevention and Response in the Studied Woredas

5.2.1 Status of the WaSH Services in the Studied Woredas

To interrupt the transmission of diarrheal diseases including AWD, due attention has to be given to ensure the communities' access to safe water source for drinking and other domestic use and sanitation facilities, and increasing communities awareness on safe management of water at home, consistent latrine use and hand washing at all critical times. However, consistent supply of drinking water is affected by factors such as availability of potable water sources, and management of water supply schemes/systems and by individual households' awareness/knowledge about importance of domestic and environmental hygiene and actual practices.

Available data from Woreda Health and water resource offices indicate that, the overall coverage of potable water supply and latrine facility in the seven studied Woredas is calculated to be 28.9% and 14.6%, respectively. The coverage of potable water supply ranges from 3.5% in Afambo Woreda to 56.6%, in Asayita Woreda. Unlike water supply, the sanitation coverage ranges from

2.3% in Adda'ar Woreda and 33.4% in Dubti, respectively and the team could not find sanitation data from Elidar and Afambo Woredas (Table9.2. 5.2.1a).

Table 9.2.5.2.1a Access to potable water supply and latrine facilities in seven studied Woredas, Afar Region (April 2010).

Zone	No. Kebeles	Woreda Population	Pop. With access to potable Water	No. of HHs	HH With latrine	Water supply and Sanitation coverage (%)		Remarks
						Water	Sanitation	
Amibara	18	67,748	28,351	11,886	3,347	41.8%	28.2%	
Gawane	9	33,542	4,250	5,885	391	12.7%	6.4%	
Adda'ar	13	58,425	24,500	10,250	232	43.9%	2.3%	
Elidar	17	85,103	7,825	14,930	***ND***	9.1%	***ND***	
Asayita	13	50,543	28,731	8,867	1944	56.8%	21.9%	
Afambo	7	25,832	900	4,532	***ND***	3.5%	***ND***	
Dubti	15	69,925	18,575	12,268	4102	26.6%	33.4%	
Total	92	391,118	113,132	68,618	10,016	28.9%	14.6%	

Source: Review of records of Woreda Health and Water Resource offices, April 2010, ND = No data, HH = Households,

In the absence of latrine facilities and low coverage of potable water supply, it would not be possible to expect hand washing after latrine visit. Majority of the communities use water from unsafe sources and practice open defecation that increase the risk of infection and have been an immediate risk factors for occurrence and re-occurrence of AWD outbreak for the last three to four consecutive years (Figure9.2.1).

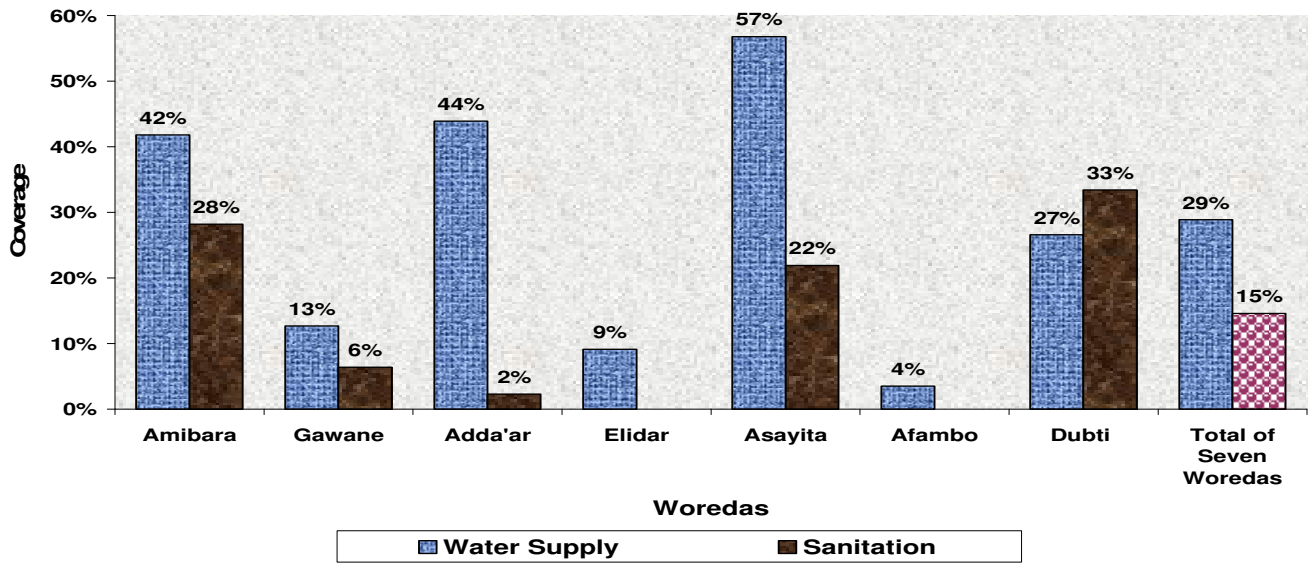

Figure 9.2.1 Coverage of potable water supply and sanitation in seven studied woredas, Afar Region (April 2010)

Therefore, there is a need to work strongly on improving access and utilization of latrine facilities through continuous provision of health education/information in native communities and in investment farm camps so as to bring about change in hygiene behavior, and thereby increase coverage of latrine and its' utilization. Linking household latrine promotion with productive safety net program (PSNP) will be an opportunity to increase the coverage of latrine in rural communities.

Sustainable supply of drinking water is also affected by operation and maintenance status of the schemes. Data from Woreda water resource offices have shown that, 41 out of 115 (35.6%) of the existing water supply schemes are reported to be non-functional mainly due to either lack of spare parts, drying of wells, and/or due to high salt concentration (salinity) (Table 9.2. 5.2.1b). Such problem needs urgent response from the regional water resource bureau to make a rapid technical assessment and maintain the water supply schemes. Therefore, maintaining of 41 non-functional water supply schemes in the seven Woredas will have significant contribution to increase communities' access to improved water sources by 32.3%, and thereby would have significant contribution to reduce the risk of AWD transmission.

Table 9.2.5.2.1b Distribution of the status of water supply schemes in the seven studied Woredas, Afar Region (April 2010)

S. No	Woreda	No. of ***functional*** water supply schemes by type				No. of ***non-functional*** water supply schemes by type			Remarks
		Hand dug well	Shallow/ Deep Well	Total		Hand dug well	Deep Well	Total	
1	Amibara	0	12	12		0	7	7	
2	Gawane	10	1	11		0	4	4	
3	Adda'ar	0	7	7		0	7	7	
4	Elidar	11	1	12		0	2	2	
5	Asayita	2	17	19		1	9	10	
6	Afambo	5	0	5		1	1	2	
7	Dubti	1	7	8		3	6	9	
	Total	**29**	**45**	**74**		**5**	**36**	**41**	

Source: Review of records of the Respective Woreda Water Resource Offices, April 2010. ND= No data. HDW = Hand Dug Well, DW = Deep Well

5.2.2 Current Status of the Contingency Stocks of Emergency Drugs and Medical Supplies

Ensuring stocks of contingency emergency drugs and medical supplies would have paramount importance to promptly respond to AWD outbreaks and thereby to reduce undesirable disease outcomes. The current status of emergency drug stock in the seven studied Woredas is very low. For instance, record reviews have shown that, only 5.5% of the required quantities of ringer lactate, 14.3% of the required ORS, and 8.8% of Doxycyclline were reported to be available in stocks of the seven Woredas (Table9.2. 5.2.2). It can be deduced that, there is a shortage of emergency drugs at Woreda level and needs urgent action by FMoH and RHB to mobilize resources in collaboration with core partners.

Table 9.2. 5.2.2 Current status of the contingency stocks of emergency drugs and medical supplies in seven studied Woredas, Afar Region (April 2010)

S. No	Description of essential emergency drugs	Unit	Quantity			Remarks
			Required	Available*	***Gap***	
1	Ringer lactate bag 1000ml	Bags	22,683	0	21,430	2143 CTNs of 10
2	Ringer lactate bag 500ml	Bags	-	2,506	-	
3	Oral Re-hydration Salts (ORS)	Sachet	70,208	10,060	60, 260	60 CTNs of 1000
4	Doxycycline 100 mg tablet	Tablet	11,341	1000	10,341	12 tins 0f 1000
5	Pediatric Naso-Gastric Tube (PNGT)	Each	227	0	227	3 Boxes of 100
6	Adult Naso-Gastric Tube (ANGT)	Each	302	0	302	3 Boxes 0f 100
7	Cannula	Each	3,024	0	3,024	61 box of 50
8	Scalp vein	Each	680	300	380	4 boxes of 100
9	Amoxacilline bottle of 250mg/5ml	Bottle	1,512	0	1,512	Box
10	Complete CTC kit	Kit	16	0	16	

** Details about emergency drugs and medical supplies stock is annexed to this report*

5.2.3 Determining future needs of contingency drugs, medical supplies CTC kits and WaSH supplies

Ensuring availability of contingency drugs and supplies at Woreda level is one of the elements of emergency preparedness which facilitate pooling of resources (supports) and for prompt response to reported outbreaks. During the previous visits it has been identified that all hot spot Woredas do not have such plan and in order to fill the gap, third joint mission planed to provide on job orientation and to initiate contingency planning exercise in the five selected Woredas.

Regarding the contingency plan, one day orientation was given to the professionals working at Woredas health offices and health centers, which was supported by practical exercise in the three out of five selected Woredas, namely in Asayita, Amibara and Gawane Woredas. Consequently, Woreda specific life saving drugs, medical supplies, and WaSH supply contingency plans prepared using assumptions and the estimated stocks of emergency drugs and WaSH supplies as shown in table 9.2.5.2.3a and 9.2.5.2.3b, respectively.

The assumptions used are described as follows:

Table 9.2.5.2.3 the assumptions used for contingency drugs and medical and waSH supplies

Assumptions for contingency drugs and medical supplies

- At risk population (experienced AWD in 2008/10) projected for July 2010 with population growth rate of 2.5% (base population CSA 2007)
- Attack rate = 2% of the population
- Sever case = 35% of the attack rate (worst case scenario)
- Adult cases = 80%
- Child cases = 20%
- Ringer Lactate (RL) = average 6 bags per sever case
- ORS = Average 6.5 sachets per case
- Cannula = 80% of the sever cases
- PNGT = 30% of sever child cases
- ANGT = 10% of sever adult cases
- Scalp vein = 9% of sever child cases
- CTC = one CTC with 10 beds, bed occupancy 3 days, 10beds serve 100 cases per month, and serve 600 cases in six months

Assumptions for contingency WaSH supplies

- Projected population for July 2010 with population growth rate of 2.5% (base population CSA 2007)
- In Woredas with investment farm (expected number of labour force added on the projected population)
- Water consumption (drinking) = average 5 litters per day
- Water PUR = one sachet purifies/disinfects 10 litters of water
- Water Guard = one bottle treats 1000 litters of pure water
- Jerry can of 20 litter = 10% of the population at risk will be provided with one jerry can
- Laundry soap = 5% of the households at risk will be provided with 4 pieces of soap per household per month
- Bucket of 10 litters = two buckets per household

Table9.2. 5.2.4a Estimated quantities of drugs required for AWD outbreak preparedness and response, seven studied Woredas, Zone one and three of Afar region (April 2010)

Woreda	July2010 population	Labour population	Total at risk pop	Expected cases/AR	Sever case	RL/NS bags of 1000 ml	ORS(sachet)	Doxycycline of 100 mg	IV Cannula	PNGT	ANGT	Scalp vein	Amoxicillin syrup	CTC	CTC opr. Cost	Remarks
Amibara	67,748	24,000	91,748	1,835	642	4,431	13,716	2,216	591	44	59	13	295	3	17,340	
Gawane	33,542	16,000	49,542	991	347	2,393	7,407	1,196	319	24	32	7	160	2	9,363	
Adda'ar	58,425	0	58,425	1,169	409	2,822	8,735	1,411	376	28	38	8	188	2	11,042	
Elidar	85,103	3,500	88,603	1,772	620	4,280	13,246	2,140	571	43	57	13	285	3	16,746	
Asayita	50,543	0	50,543	1,011	354	2,441	7,556	1,221	325	24	33	7	163	2	9,553	
Afambo	25,832	0	25,832	517	181	1,248	3,862	624	166	12	17	4	83	1	4,882	
Dubti	69,925	35,000	104,925	2,099	734	5,068	15,686	2,534	676	51	68	15	338	3	19,831	
Total	391,118	78,500	469,618	9,392	3,287	22,683	70,208	11,341	3,024	227	302	67	1,512	16	88,758	

Table 9.2.5.2.4b Estimated quantities of drugs required for AWD outbreak preparedness and response, seven studied Woredas, Zone one and three of Afar region (April 2010)

					Point of use water purification/disinfection chemicals		WaSH materials			
Woreda	July2010 population	Estimated Labour pop	Total Pop	Water for drinking (5lt/p/d)x 90 days	Sachets of Water PUR	Bottles of Water Guard	Jerry can of 20lt	Soap	Bucket (2/HH)	Remarks
Amibara	67748	24000	91748	41,286,600	4,128,660	41,287	1,610	9,658	3,219	
Gawane	33542	16000	49542	22,293,900	2,229,390	22,294	869	5,215	1,738	
Adda'ar	58425	0	58425	26,291,250	2,629,125	26,291	1,025	6,150	2,050	
Elidar	85103	3500	88603	39,871,350	3,987,135	39,871	1,554	9,327	3,109	
Asayita	50543	0	50543	22,744,350	2,274,435	22,744	887	5,320	1,773	
Afembo	25832	0	25832	11,624,400	1,162,440	11,624	453	2,719	906	
Dubti	69925	35000	104925	47,216,250	4,721,625	47,216	1,841	11,045	3,682	
Total	**391,118**	**78,500**	**469,618**	**211,328,100**	**21,132,810**	**211,328**	**8,239**	**49,434**	**16,478**	

5.2.4 Availability of skilled (Trained) Human Resources

In October 2009, The Afar regional health bureau in collaboration with UNICEF and WHO provided in-service trainings for a total of 102 professionals from 21 Woredas on AWD case management, prevention and infection prevention (Second Joint mission report, October, 2009).

Even though majority of the health professionals reported to be participated on AWD case management and response during the previous outbreaks, available data indicated that, only 28.2% of the professionals in the studied Woredas reported to have had attended the trainings. While two third of the professionals from Amibara and about 50% from Asayita have been trained, very low proportion from Elidar, Gawane, Adda'ar Woredas (Table 9.2.5.2.4). Only 33 out of 93 clinical staff (40.8%) reported to have ever trained (annex 5). Turnover of professionals could have negative effect on the availability of the trained professionals and therefore, actual number of the trained professionals might be less than aforementioned figure. Therefore, continuous in-service training and on job training could solve shortage of skilled human power. In addition, further assessment has to be made to identify push and pull factors and devise feasible retention mechanisms.

Table 9.2. 5.2.5 Distribution of trained professionals on AWD outbreak prevention and control in seven studied Woreda (Zone 1 and 3), Afar region, April 2010

S. No	Woreda	Total number of health workers	Number of existing trained staff**	Percent trained	Trained by RHB*	Additionally trained by partner	Remark
		A	**B**	**C= B/A*100**	**D**	**E**	
1	Amibara	71	48	67.6	7	41	
2	Gawane	52	3	5.8	1	2	
3	Adda'ar	35	4	11.4	4	0	
4	Elidar	72	2	2.7	5	0	- 3
5	Asayita	47	23	48.9	6	17	
6	Afambo	25	6	24.0	4	2	
7	Dubti	49	13	26.3	10	3	
Total in Seven Woredas		**351**	**99**	**28.2**	**37**	**65**	

Source: Review of records of Woreda Health Offices, and Training reports of RHB, April 2010

* = Only clinical staffs

** = Both clinical and non clinical staffs

5.3 Current Status of the Woreda Outbreak Prevention and Response Coordination

Prevention and control coordination of AWD at Woreda and Kebele levels has paramount importance in mobilizing existing community resources and capacities. After the containment of AWD outbreak in the region, no regular coordination committee meetings at Woreda level in general and not recently happened at regional level since November 2009.

Unlike other Woredas, in Amibara and Gawane, APDA, SC UK, AMREF and CARE Awash have been implemented various AWD response interventions in collaboration with Woreda technical committees.

Woreda technical committees reported that, the committee have been conducted follow up visits to investment farm camps and have provided technical advices to farm representatives and hygiene education to the labour force on latrine use, home management of water, and on personal and environmental sanitation.

In addition, native communities residing in twelve selected Kebeles (eight from Amibara and four from Gawane Woreda) have been benefited from collaborative actions taken by the aforementioned NGOs and Woreda technical committees. For instance, a total of 513 households constructed latrine and started to use (305 in Amibara and 209 in Gawane), 399 latrine slabs distributed (190 in Amibara and 209 in Gawane), 601 jerry cans (400 in Amibara and 201 HHs in Gawane), 52000 Soaps (15 peaces of soap/HH) i.e., 46000 in Amibara and 6000 in Gawane, plastic buckets (1 per HH), and 10 sachets of water PUR/ bottles of water Guard per HH has been distributed to households. Existing health committees strengthened and new health committees established in selected Kebeles.

In Gawane Woreda, four schools and four health posts have been provided with hand washing facilities and locally produced solid waste incinerators, respectively. With the support of the partners seven communal latrines (2 by AMREF and 5 by CARE Awash) constructed in rural areas of Amibara Woreda.

In both Woredas different types of IEC/BCC materials on prevention and control of AWD have been produced in local language and distributed in urban and rural communities which include erecting of the billboards, T-shirts, posters and leaflets.

However, technical committees from Gawane Woreda reported that, absence of Woreda coordination meetings have resulted in absence of corrective measures on resistant investors are some of limitations observed.

5.4 Situational Assessment in the Investment Farms

5.4.1 Follow up Visit to the Investment Farms in the Zone Three

Visits were made to five investment farms (3 from Amibara and 2 from Gawane) to monitor the implementation of the farm improvement plans. Special focus of the supervision is to verify activities so far done by the owners of the farm so as to improve the living environments of the labour workers aimed at reducing the risk of AWD occurrence and its spread among labour forces and to the surrounding communities.

During supervision, focus was given to the current status of the sources water for drinking and other domestic use, home management of water, disposal of human excreta, hand washing practices at critical times, safe handling of food, access to descent shelter and medical services.

5.4.1.1 Access to Potable Water for Drinking and Domestic Use

While Sheleko (Gawane sefer), D-3, Fere-Selam and Arore (Wondimamachoch) farm camps use raw water from unsafe source (directly from Awash River), Asoba farm camp water source is from public water supply. Even though, Gawane sefer farm camp has a pipe connection from safe source, poor water supply scheme management was reported to be the main problem for the interruption of the supply and have forced the workers to use raw water directly from Awash River.

5.4.1.2 Home Storage and Management of Water

Jerry cans of 20-25 litter capacity are used to store water at home (shelter). Regarding home water management workers at sheleko (Gawane sefer) and Asoba camps did not provided with purification/disinfecting chemicals (point-of-use water treatment chemicals) and directly use the raw water for drinking and other domestic use including food preparation. In addition, an expired point-of-use water treatment chemical (Water guard with expiry date 2008 and Water PUR with expiry date of Feb 2010) was identified from Sheleko and D-3 farm camps. Unlike Sheleko and D-3 camps the remaining three camps (Asoba, Fere-Selam and Arore camps) were observed to use water guard and water PUR with long expiry date (2012).

Un-hygienic handling of water containers (jerry cans, buckets and water cups) are a common problem in all camps. Majority of the observed water containers not covered and not kept cleaned and placed on the muddy floor and observed to be soiled.

5.4.1.3 Disposal of Human Excreta and Hand Washing Practices

Access to latrine facility and its' consistent utilization, proper operation and maintenance has a paramount importance in precluding faces from environment (soil, water and flies). Further more; hand washing practices at the most critical times reduces the faeco-oral transmission of diarrhoeal diseases including acute watery diarrhoea (AWD).

Sheleko, D-3, Asoba and Arore farm camps possess latrine facility with 12, 10, 16 and 10 seats (drop holes), respectively. D-3 farm have attempted to construct additional one block of latrine with 12 drop holes (slab work completed and construction of the superstructure is remaining). Unlike to other aforementioned four camps, Fere-Selam farm camps totally have no latrine facility. Similarly, though two blocks of latrine are constructed at Asoba farm camp, there is no fresh foot path leading to the latrines indicating absence of current use of the latrines. Thus, open field defection is commonly practiced among workers of the Asoba and Fere-Selam investment farms.

None of the camps (except D-3) have any hand washing facilities around the latrines. Hand washing facilities that observed at D-3 camp observed not filled with water and no soap or other substitute (like ash) for hand washing. Therefore, absence of hand washing facilities, water and soap or substitute materials indicate that, there is no practice of hand washing after latrine visit.

5.4.1.4 Hygiene Education/Promotion

Besides to provision of latrine with hand washing facilities, regular hygiene education/information on AWD would increases the workers' awareness about modes of transmission of AWD and its preventive measures and encourages them to practice healthy behaviors.

Representatives of the labour workers from Sheleko, D-3, Asoba and Fere-Selam camps and some of the interviewed workers have reported that, there was no health education session at their camps after the previous AWD outbreak. Whereas, those from Arore camps have attended hygiene education sessions recently and the camp have received supply of sanplant latrine slabs from Gawane Woreda AWD technical committee.

5.4.1.5 Access to Safe Food

Proper storage and handling of food during preparation and feeding reduces the risk food contamination and thereby limits the risk of AWD. Provision of proper food utensils and equipments to workers, arranging clean food preparation places (kitchen) together with hand washing practice before food handling and eating are some of the requisite to ensure food safety.

Unfortunately, it was observed that, none of the farm arranged kitchen and workers observed to prepare food outside in the open field (Sheleko and D-3 camps) and inside of the shelter (Asoba, Fere-Selam and Arore camps). Similarly, frying pun is used for dough preparation, baking and serving food. In addition, sacks of flour (food powder), food utensils and water cups are placed on the muddy floor, and food utensils at all farm camps observed to be soiled by mud and not properly cleaned.

5.4.1.6 Access to Descent Shelter

There are a total of 21, 11, 4, 3, and 4 shelters of different size for Sheleko, D-3, Asoba, Fere-Selam and Arore Camps, respectively. Arore camps shelters are newly constructed sites are away from the residence of native Afar communities and are divided in to compartments (one room for six workers) and provided one ITN for three workers (three workers share the same sleeping mat). There is no newly built shelter at the remaining four camps shelters and the previously built shelters have no compartment and all workers share the same room. In general, in all camps, three to five workers share the same sleeping mats.

None of the camps (except D-3) have provided workers with durable mat (plastic mat) and all most all sleep on Gareta or Selen placed on the floor.

Regarding cleanliness of the rooms, Sheleko and D-3 camps have observed to be kept clean during the visit, whereas, the remaining three camps (Asoba, Fere-Selam and Arore camps) shelters/rooms have never been cleaned recently.

5.4.1.7 Access to Medical Services and Workers Safety

Sheleko and D-3 camps have clinics staffed with nurses and medical officers to provide clinical services to their workers. Whereas, the remaining three camps observed that, they have no health facility and reported to use the nearby government health facilities. As reported by the clinic workers, malaria is commonly prevailing health problems among labor workers. However, shortage of antimalarial drugs (***Coartem***) is reported to be a main problem to properly manage the falciprum malaria cases.

Regarding safety issues, none of the farms provided personal protection devises to their workers. In addition, preparation food in the shelter may pose fire accident, and Fere-Selam camp shelters are observed to be about to collapse and my cause accident to workers.

In general, owner of the Fere-Selam investment farm firmly resisted to implement previous recommendations and improvement plan.

5.4.2 Situation of the Investment Sites in Zone One (Preliminary Assessment)

There are a number of small scale salt mining investments in Elidar Woreda and cotton/sugar can farm in Dubti Woreda hosting permanent and seasonal daily labourers. Preliminary assessment was conducted and the situation in the investment sites in zone one is stated as follows.

- Increased number of migrant daily labourers from other regions to salt mining investment areas (Dobi salt mining) (Elidar)
- Mining labor workers live in a crowded conditions and do not have an access to sanitation facilities (Dobi salt mining) (Elidar)
- Absence of sanitation and safe water supply in their working site (Elidar)
- Mining Workers mainly use water from unsafe source (unprotected hand dug wells) and reported to be inadequate
- Investors in salt mining area did not provide minimum requirement such as safe water supply, sanitation and Hygiene facilities, and decent shelter for daily laborers' (Elidar)
- Knowledge gap on AWD prevention and mode of transmission among the daily laborers in Dobi areas (Elidar)

To improve environmental conditions in the investment farms periodic supportive supervision from regional and Woreda technical task force is required. At the same time, based on the recommendations of the taskforces, the Woreda and regional administrative bodies are expected to take administrative corrective measures.

The team has identified the major reasons for the resistance from the investors to timely implement the recommended action points (improvement plan) could arise from lack of awareness /knowledge about labour proclamation.

6. Review and Revision of the Regional Emergency Preparedness and Response plan

The support team received copies of EPR plan and looks into the contents of the document and forwarded comments to be included. The comments are described as follows:

Under section 7.1.5 B (Page 19 of EPRP document)

- Considering the local capacity of the Woredas and resources, similar structure of the RRT have to be established at Woreda level so as to promptly investigate and respond to reported outbreaks. As per the national IDSR guidelines, the RRT composition should include at least IDSR expert at regional and focal persons at Woreda level.

Under section 7.3 (7.3.2 Planning assumption) (Page 22 of EPRP document)

- The table should clearly indicate number of Woredas/Kebeles to be covered by water tankering, number of water supply schemes to be maintained (rehabilitated), number new water supply schemes to be constructed, quantities of the water purification /disinfection chemicals and hygiene /sanitation supplies required

Under section 7.3.4 6th row in the table, (Page 23 of EPRP document)

- Training and capacity building, the target audience (trainee) should focus on FEMALE than MALE as women are most frequently involved on household water management.

Under section 7.3.5 Supplies (table) (Page 24 of EPRP document)

- Consider the number of water container (fiber glass for CTCs) and plastic buckets (for households)
- Third raw, Concentration of the HTH calcium hypochlorite might be 70%

Section 7.3.6 Coordination and assumption (Page 24 of EPRP document)

- ToT Training on sanitary survey and water quality monitoring and provision of water quality test kits, reagents and chlorine comparators to Woredas shall be considered

Annex 2 (High risk events for AWD)

- Date and month of migration of labour workers to investment sites include during preparation of farm land, weeding and harvesting times (months)
- Other aggravating risk factors in the investment farms shall be considered in the document

7. Strengthening the Regional and Woreda Outbreak Coordination Committees

The joint support team organized Woreda coordination committee meetings in seven studied Woredas of the region, have discussed on issues of the current status of preparedness focusing on the stocks of emergency drugs and medical supplies, WaSH supplies, regularity of the meetings, and on activities carried out by the Woredas on AWD prevention and control.

It was identified that committee meetings have never been happened after the containment of past AWD outbreak in five out of seven Woredas. However, in Amibara and Gawane Woredas committee have had met twice in November 2009. In addition, the multi-sector technical taskforces in Amibara and Gawane Woredas had regular meetings and have been intervening on AWD prevention activities in collaboration with AMREF, SC-UK, and CARE Awash mainly focusing of community awareness creation, strengthening of the community based structures, distribution of water purification/disinfection chemicals, hygiene and sanitation materials and health education/promotion materials until the end of March 2010.

In order to strengthen partnership at Woreda level the joint team contacted partner NGOs such as AMREF, SC-UK, and CARE Awash and government development enterprises such as Ethiopian water works construction enterprise (EWWCE), Ethiopian water works design supervision enterprise (EWWDSE) and housing development agency (HA) working in the Woreda to obtain their willingness to take part in the coordination and support government effort to prevent the occurrence and transmission of acute watery diarrhea.

Consensus reached on Woreda coordination committee meeting that, AWD issues has to be given special attention and should be the top management's agenda, work actively on preparedness, community awareness creation activities, strengthening of Kebele level structures and re-activating partnership with NGOs working in the Woredas. In addition, the team has discussed with top management of EWWDSE to abandon or rehabilitate artificial lakes formed during the construction of the main canal of Tendaho dam and irrigation development projects as per the construction agreement, so as to prevent the transmission vector-borne diseases.

Furthermore, the assessment findings (strengths, gaps and recommendation) were presented to and discussed with regional coordination committee. Among identified gaps, shortage of emergency drugs, medical supplies and CTC kits, shortage of trained human resources, shortage of point-of-use water purification/disinfection chemicals, maintenance of non-functional water supply schemes, strengthening of the IDSR system, conditions in the investment farms and strengthening of the coordination committees were identified to be the core issues that need urgent action by the participants. Regarding these core issues,

actions to be taken have been identified, duties and responsibilities assigned to concerned bureaus and implementation timeline was set on the discussion (annex 3).

8. Challenges

It has been identified that, there are some challenges to be urgently addressed by the region in collaboration with all stakeholders so as to eliminate undesirable outcomes of AWD outbreak.

- Shortage of trained health human resources on AWD prevention and response in general and in currently assessed Woredas in particular.
- Inadequate stock of life saving AWD emergency drugs and medical supplies in majority of the studied hot spot Woredas and some of the drugs in stock are approaching expiry date (are with three to four months shelf life).
- Low coverage potable water supply and latrine facility, and majority of the population use water from unsafe sources as well as open defection is commonly practiced. About one third of the water supply schemes are non-functional.
- Absence of emergency stocks of point-of-use water purification/disinfection chemicals in the majority of the studied hot spot Woredas
- AWD outbreak prevention and response coordination committees were observed to be inactive in majority of the studied Woredas

Regarding investment farms;

The living environment of the labour workers in the investment farms camps/shelters is deteriorating.

- No latrine facility in some of the camps and poor operation and maintenance among camps with latrine
- Use of raw water directly from Awash River and unsafe handling of water at home (shelter)
- Unsanitary handling of food and absence of food preparation room (kitchen)
- Poor awareness about AWD among newly recruited labour workers
- Investors' resistance to implement improvement plan
- In addition, absence of knowledge /awareness about labour proclamation among labour forces and absence of binding rules (contractual agreement) between employers and labour workers have predisposed to persuade the investors improve the living condition of the labour workers.

9. Actions Taken by the Joint Support Mission

The following activities have been conducted by the support mission together with the regional team and provided technical and material support to the Woredas and visited investment sites.

- On job orientation of health workers on planning of contingency drugs and supplies
- Orientation on case detection, management and reporting
- Provision of two to three copies of CTC and AWD case management guidelines to visited Woredas
- Provide AWD treatment procedures (Poster) to all visited Woredas
- On job orientation of health workers on planning of contingency WaSH supplies
- Orientation to water technicians on water scheme management
- Health education /hygiene education labour workers in all visited investment farms/sites
- Organize discussion with Woreda coordination committees (in five Woredas) and technical task force (two Woredas) and shared key findings of the assessment
- Discussion with representatives of investment farm owners, and other partners (NGOs working in the Woreda and Enterprises) to seek their partnership and involvement
- Provide support to Woredas in the on-site observation/supervision of investment farms

10. Conclusion and Recommendations

Existing records and reports indicates that, the region has been experienced AWD outbreaks in the last four years (2006 – 2009). In 2009, the index AWD case was reported from Gawane Woreda among labour forces on April 29, 2009 and has spread to other nine Woredas in the region. The out break totally contained on the 49th epidemiological week and since then there was no reported AWD case in the region.

Monitoring of the occurrence of outbreaks in Woredas with reliable communication network using telephone communication, regular visits to Woredas from the region by WHO EPI/Surveillance officer, presence of trained IDSR focal persons at Woreda level and frequent supportive supervision to investment farms by Woreda technical committees in Amibara and Gawane Woredas will have great importance to detect and respond to possible outbreaks of epidemic prone diseases in general, and particularly AWD outbreak.

Presence of emergency stocks of drugs and medical supplies as well as stocks of point-of-use water purification/disinfection chemicals in some of the hot spot Woredas, Continuous movement of some the Woredas on AWD prevention interventions through increasing community awareness about latrine use and safe water supply, motivation of communities to construct latrine, maintenance of water supply schemes, strengthening partnership with NGOs working in the Woreda, initiation of CLTSH, etc are some of the strengths to be further built up and promoted in other hot spot Woredas.

However, motivating health staff working at Woreda level through providing written IDSR report feed back and providing them with guidelines as well as use of police radiophone in Woredas with no reliable telecommunication means, and alerting all hot spot Woredas on the possibility of the AWD outbreak occurrence following the important risk factors such as population movement (labour migration) and contamination of water sources with runoff (sporadic rain fall) will contribute to the effectiveness of the surveillance system to promptly detect and adequately respond to AWD outbreak.

Urgent action has to be taken to keep the stocks of life saving drugs, medical supplies and CTC equipments required for management of AWD cases both at Woreda and regional levels. Top priority has to be given to hot spot Woredas with large investment farms and hosting huge number of labour workers, low access to potable water supply and with poor access to communication. Mechanisms have to devise to use emergency drugs and supplies with short shelf life. Among others, increasing number of trained (skilled) health human resources is a top priority issues to ensure proper CTC and AWD case management and infection prevention.

Maintaining the non-functional water supply schemes will increase the coverage from 28.9% to more than 60% in the currently assessed seven Woredas. Therefore, there is a need to provide technical and management support to AWD hot spot Woredas to conduct technical assessment of water supply schemes and on strengthening of water scheme management committees. In addition, further inventory of the stocks of point-of-use water purification and disinfection chemicals and ensuring the stock both at regional and Woreda level is a top priority issue.

Regular supportive supervision to hot spot Woredas (similar with that of Amibara and Gawane Woreda) by the region technical taskforce is required to activate Woreda and Kebele coordination committees and to strengthen partnership at Woreda level. Establishing Woreda multi-sector technical taskforce in the other hot spot Woredas (like that of Amibara and Gawane Woreda) will increase inter-sectoral collaboration and integration of AWD prevention and response interventions in the Woredas as well as enhance the participation of the non-governmental organizations working in the Woredas.

Conditions in the investment farm remain in favor of AWD occurrence and its spread among the labour workers. Therefore, regular vigilance to the situation in the investment farm camps is important to promptly detect and respond to AWD outbreak. In addition, complementary actions should be taken to increase the awareness of the investors and their workers on labour proclamation. Establishing binding rules between both parties (employer and employees) through facilitation of voluntarly organization of the labour workers and mutual agreement between employer and employee and follow up of the implementation of labour law.

Furthermore, stepwise corrective measures have to taken by regional and Woreda concerned government bodies on investors firmly resisted to implement improvement plans.

Annexes

Annex 1. Detail plan for emergency drugs, medical supplies and other response items requirements by zone/woredas

1. Drugs, medical supplies, budget and Logistics plan for Acute Watery Diarrhea Management, Afar Region, 2010

General Assumptions

At risk woredas = those affected at least once since 2006

ORS = 650 sachet per 100 cases

Attack Rate = 2%

Pregnancy = 2%

Doxycycline = 3 capsules per patient

Severe cases= 50%

Adult = 80%

Children = 20%

CTC = 1 CTC with 10 bed. Bed occ rate 3 days, Monthly addmision 100, six monthly admission 600

Wastage factor = 15%

RL = 120 bag per 20 severe cases

2 dollar per capita per sever case

Zone	Woreda	Population (July 2009)	Expected cases	Severe dehydration	RL/NS bag of 1000ml	ORS [satchets]	Doxacycline 100 mg caps, 1000 per tin [Tin]	PNGT	ANGT	IV Cannula	Scalp Vein	Amoxaciline 250mg/5ml susp,100 ml/bottle	RDT Kit of 20 tests for epidemic detection	CTC	Total Cost of drugs, supplies and CTC Kit	Operational cost-case management	Inter woreda resource moblization	Total Cost
		A	B = 2%A	C = 50% B	D= C x 6	E = 6.5 x B	F= 3 x B	G =0.03 xC	H = 0.1xC	I= 0.8xC	J= 0.09xC	L= 2x0.2xC	M=5 kitof 20tests for each woreda	N	O	P	Q=5person*30day*200birr	
Zone 1	Dubti	69,925	1,399	682	4,707	10,454	2	24	78	628	71	314	5	1		18,419	30,000.00	
	Elidar	85,103	1,702	830	5,729	12,723	3	29	95	764	86	382	5	2		22,417	30,000.00	
	Asayita	50,543	1,011	493	3,402	7,556	2	17	57	454	51	227	5	1		13,314	30,000.00	
	Afambo	25,832	517	252	1,739	3,862	1	9	29	232	26	116	5	1		6,805	30,000.00	
	Mile	99,328	1,987	969	6,686	14,850	3	33	111	892	100	446	5	2		26,164	30,000.00	
	Chifra	97,508	1,950	951	6,564	14,577	3	33	109	875	98	438	5	2		25,685	30,000.00	
	Adda'ar	58,425	1,169	570	3,933	8,735	2	20	66	524	59	262	5	1		15,390	30,000.00	
	Kori	23,465	469	229	1,580	3,508	1	8	26	211	24	105	5	1		6,183	30,000.00	
			10,203	4,977		76,264												
		Total items			34,341	152,529	17	172	572	4,579	515	2,289	35	11		0	0.00	
		Unit Cost in Eth. Birr			26.55	0.8	180.09	2.48	0.24	2.47	0.56	6.35		50898		0	0.00	N+O+P
		Total Cost in Eth. Birr			**911,750**	**122,023**	**3,092**	**426**	**137**	**11,310**	**288**	**14,538**		**559,878**	**1,623,442**	**432,545**	**240,000.00**	**2,295,987**
Zone 2	Afedra	34,690	694	347	2,394	5,186	5	12	40	319	248	160	5	1		9,366	30,000.00	
	Dalule	88,167	1,763	882	6,084	13,181	12	30	101	811	630	406	5	2		23,805	30,000.00	
	Zone-2 Total	**122,857**	**2,457**	**1,229**	**8,477**	**18,367**	**17**	**42**	**141**	**1,130**	**877**	**565**	**10**	**3**		**0**	**0.00**	
		Unit Cost in Eth. Birr			26.55	0.8	180.09	2.48	0.24	2.47	0.56	6.35		50898		0	0.00	
		Total Cost in Eth. Birr			**225,068**	**14,694**	**3,053**	**105**	**34**	**2,792**	**491**	**3,589**		**152,694**	**402,520**	**33,171**	**60,000.00**	**495,691**
Zone	Amibara	67,747	1,355	661	4,561	10,128	2	23	76	608	68	304	5	2		17,846	30,000.00	

3	Gewane	33,524	670	327	2,257	5,012	1	11	38	301	34	150	5	1		8,831	30,000.00	
	Bure Mudayitu	34,030	681	332	2,291	5,087	1	11	38	305	34	153	5	1		8,964	30,000.00	
	Dulacha	22,143	443	216	1,491	3,310	1	7	25	199	22	99	5	1		5,833	30,000.00	
	Argoba	23,696	474	231	1,594	3,543	1	8	27	213	24	106	5	1		6,237	30,000.00	
			3,623	**1,767**		27,080												
		Total Items			12,193	27,080	6	61	203	1,626	183	813	25	6		0	**0.00**	
		Unit Cost in Eth. Birr			26.55	0.8	180.09	2.48	0.24	2.47	0.56	6.35		50898		0	0.00	
		Total Cost in Eth. Birr			**323,713**	**21,664**	**1,098**	**151**	**49**	**4,015**	**102**	**5,162**		**305,388**	**661,342**	**47,710**	**150,000.00**	**859,052**
Zone 4	Teru	79,157	1,583	792	712	1,544	3	27	95	95	11	364	5	2		21,372	30,000.00	
	Yalo	49,861	997	499	449	972	2	17	60	60	7	229	5	1		13,462	30,000.00	
	Ewa	49,584	992	496	446	967	2	17	60	60	7	228	5	1		13,388	30,000.00	
	Awra	37,565	751	376	338	733	1	13	45	45	5	173	5	1		10,143	30,000.00	
	Golina	52,312	1,046	523	471	1,020	2	18	63	63	7	241	5	1		14,124	30,000.00	
	Zone-4 Total	**268,479**	**5,370**	**2,685**	**2,416**	**5,235**	**9**	**93**	**322**	**322**	**36**	**1,235**	**25**	**6**		**0**	**0.00**	
		Unit Cost inEth. Birr			26.55	0.8	180.09	2.48	0.24	2.47	0.56	6.35		50898		**0**	0.00	
		Total Cost in Eth. Birr			**64,153**	**4,188**	**1,668**	**230**	**77**	**796**	**20**	**7,842**		**305,388**	**384,363**	**72,489**	**150,000.00**	**606,852**
Zone-5	Telalak	40880	817.6	399	2753.1	6111.56	1.37655	13.766	45.885	367.08	41.3	183.54	5	1		10,773	30,000.00	
	Dawe	45578	911.56	445	3070.5	6813.911	1.53525	15.353	51.175	409.4	46.06	204.7	5	1		12,015	30,000.00	
	Dalifage	38931	778.62	380	2622	5820.185	1.311	13.11	43.7	349.6	39.33	174.8	5	1		10,260	30,000.00	
			2508	1224														
		Total Items			8,446	18,746	4.2228	42	141	1,126	127	563	15	3		0	**0.00**	
		Unit Cost inEth. Birr			26.55	0.8	180.09	257	25.2	3.8	0.56	6.35		50898		0	0.00	
		Total Cost in Eth. Birr			**224231**	**14997**	**760.5**	**10853**	**3547**	**4279.1**	**70.9**	**3575.3**		**152694**	**415,007**	**33,048**	**90,000.00**	**538,055**
		Grand total in ET Birr																**4,795,637**

2. Drugs, medical supplies, budget and Logistics plan for Malaria Case Management, Afar Region, 2010

General Assumptions

At risk woredas = Total population of the woreda

Attack Rate = 2%
Severe cases= 15%
RL = 5bags x 0.2% of total population
30% cases (P.Vivax)
70% cases (P.falciparum)

Pregnancy = 4% of total population
Under-five = 16% of total population
Coartem
Wastage factor = 15% included

Quinine = 10 ampule per sever case
Dextros 40% = 8 ampule per severe case
3days addmision
5Health workers (HWs)per woreda trained on management of sever and complicated malaria for five days

Zone	Woreda	Population (July 2009)	Expected cases	Severe case	RL/DW bag of 1000ml	Coartem 24 tab blister/pack	Chloroquine 150mg tin of 1000 tab	Quinine injection (of 10 ampule) Pack	Quinine 300mg tab pack of 100	Chloroquine syrup of 60ml bottle	Dextrose 40% of 20ml (ampule 20), pack	Paracitamol 500mg tab (tin of 1000)	Paracitamol suspension 100ml bottle	RDT kit	Total Cost of drugs, and supplies	Operational cost-case managment (27 Birr/sever case/day)	Inter-woreda Moilizitio cost
		A	B = 2%A	C = 15% B	D= B x 5x 0.7x1.15x0.15	E = Bx0.7X1.15	F=10 x B x0.3x1.15/1000	G = C X 10X1.15	H = C x 24X1.15/1000	I= BX0.3X.16x1bots	J= 8xCX1.15/20	K= 10 xBX0.84X1.15/1000	L=Bx0.16x1.15 X1 bottle	M=Bx1.15	N	O=Cx3days x 27Birr	
Zone 1	Dubti	69,925	1399	210	844	1,126	5	241	58	77	96	14	257	1,608		16,992	15,000
	Elidar	85,103	1702	255	1,028	1,370	6	294	70	94	117	16	313	1,957		20,680	15,000
	Asayita	50,543	1011	152	8	814	3	174	42	56	70	10	186	1,162		12,282	15,000
	Afambo	25,832	517	77	312	416	2	89	21	29	36	5	95	594		6,277	15,000
	Mile	99,328	1987	298	1,199	1,599	7	343	82	110	137	19	366	2,285		24,137	15,000
	Chifra	97,508	1950	293	1,177	1,570	7	336	81	108	135	19	359	2,243		23,694	15,000
	Adda'ar	58,425	1169	175	705	941	4	202	48	65	81	11	215	1,344		14,197	15,000
	Kori	23,465	469	70	283	378	2	81	19	26	32	5	86	540		5,702	15,000
		Total items			**5,558**	**8,213**	**35**	**1,760**	**422**	**563**	**704**	**99**	**1,877**	**11,733**		**123,961**	**120,000**
		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr			**147,552**	**110,959**	**3,569**	**58,729**	**28,553**	**4,168**	**118,219**	**2,030**	**7,791**	**316,790**	**798,360**		
Zone 2	Afedra	33,844	677	102	409	545	2	117	3	37	47	7	125	778		8,224	15,000
	Bidu	25,625	513	77	309	413	2	88	2	28	35	5	94	589		6,227	15,000
	Erebeti	38,068	761	114	460	613	3	131	3	42	53	7	140	876		9,251	15,000
	Aba'ala	39,864	797	120	481	642	3	138	3	44	55	8	147	917		9,687	15,000

	Dalule	88,167	1763	265	1,065	1,419	6	304	7	97	122	17	324	2,028		21,425	15,000
	Megale	29,529	591	89	357	475	2	102	2	33	41	6	109	679		7,176	15,000
	Berhale	82,842	1657	249	1,000	1,334	6	286	7	91	114	16	305	1,905		20,131	15,000
	Kuneba	56,909	1138	171	687	916	4	196	5	63	79	11	209	1,309		13,829	15,000
		Total Items			**4,768**	**6,357**	**27**	**1,362**	**33**	**436**	**545**	**76**	**1,453**	**9,082**		**95,948**	**120,000**
		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr			**126,585**	**85,884**	**2,763**	**45,457**	**2,210**	**3,226**	**91,503**	**1,571**	**6,030**	**245,201**	**610,430**		
Zone 3	Awash	32,064	641	96	387	516	2	111	3	35	44	6	118	737		7,792	15,000
	Amibara	67,747	1355	203	818	1,091	5	234	6	75	93	13	249	1,558		16,463	15,000
	Gewane	33,524	670	101	405	540	2	116	3	37	46	6	123	771		8,146	15,000
	Bure Mudayitu	34,030	681	102	411	548	2	117	3	38	47	7	125	783		8,269	15,000
	Dulacha	22,143	443	66	267	357	2	76	2	24	31	4	81	509		5,381	15,000
	Argoba	23,696	474	71	286	382	2	82	2	26	33	5	87	545		5,758	15,000
		Total Items			**2,574**	**3,433**	**15**	**736**	**18**	**235**	**294**	**41**	**785**	**4,904**		**51,809**	**90,000**
		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27		0	
		Total Cost in Eth. Birr			**68,351**	**46,374**	**1,492**	**24,545**	**1,193**	**1,742**	**49,409**	**849**	**3,256**	**132,400**	**329,611**		
Zone 4	Teru	79,157	1583	237	956	1,274	5	273	7	87	109	15	291	1,821		19,235	15,000
	Yalo	49,861	997	150	602	803	3	172	4	55	69	10	183	1,147		12,116	15,000
	Ewa	49,584	992	149	599	798	3	171	4	55	68	10	182	1,140		12,049	15,000
	Awra	37,565	751	113	454	605	3	130	3	41	52	7	138	864		9,128	15,000
	Golina	52,312	1046	157	632	842	4	180	4	58	72	10	193	1,203		12,712	15,000
		Total Items			**3,242**	**4,323**	**19**	**926**	**22**	**296**	**371**	**52**	**988**	**6,175**		**65,240**	**75,000**
		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr			**86,072**	**58,397**	**1,878**	**30,909**	**1,503**	**2,193**	**62,218**	**1,069**	**4,100**	**166,725**	**415,065**		
Zone 5	Sumu Robi	34,274	686	103	414	552	2	118	3	38	47	7	126	789		8,335	15,000
	Hadele Ela	37,742	755	113	456	608	3	130	3	42	52	7	139	868		9,171	15,000
	Telalak	40880	818	123	494	658	3	141	3	45	56	8	150	940		9,934	15,000
	Dawe	45578	912	137	550	734	3	157	4	50	63	9	168	1,048		11,075	15,000
	Dalifage	38931	779	117	470	627	3	134	3	43	54	8	143	895		9,460	**60,000**

		Total Items	**2,384**	**3,179**	**14**	**681**	**16**	**218**	**272**	**38**	**727**	**4,541**		**47,976**	
		Unit Cost inEth. Birr	26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr	**63,295**	**42,943**	**1,381**	**22,730**	**1,105**	**1,613**	**45,753**	**786**	**3,015**	**122,605**	**305,226**		

3. Drugs, medical supplies, budget and Logistics plan for Measles Case Management, Afar Region, 2010

General Assumptions

At risk woredas = those affected at least once since 2006

Attack Rate = 2%

Severe cases= 10%

Adult = 20% of all cases

Children = 80% of all cases

Admitted patients = 6 vials of crys. Penicilline/day

Vit. A = 200,000IU capsulx3 doses

Ciprofloxcilin for adult sever cases

Under 15 population=44%

under 5 population=16% for scalp vein canulla

Wastage factor = 15%

RL/ D5W/NS of 500 ml= 1bag/day/ severe cases 5 days

2 dollar per capita per sever case

Zone	Woreda	Population (July 2009)	Most vulnerable populatoion (age under 15)	Expected cases	Severe case	RL/NS bag of 500ml	Crystaline Pencillien 1mil.IU/ vial box of 100 vials	TTC eye ointment 1%0f 100 tube	Vitamin A of 200,000IU tin of 1000capsule	Dextrose 40% of 20ml of 20amp	Paracitamol 125mg/ 5ml bottle	IV Cannula	Scalp Vein	Amoxacilline 250mg/5ml susp,100 ml/bottle	Ciproflo xacine 500mg tab of 10 (strip)	Measeles vaccine, vials of doses	AD syringe for vaccination 3ml; Box of 100	Safety Box of discarding 100 syringe	Total Cost of drugs, & supplies	Operational cost	Inter-woreda Moilizt cost
		A	B=Ax0.44	C = 2%B	D = 10% C	E= D x 5*1.15	F=Dx0.8x5days x6vialx 1.15/50	G = C*1.15/100	H= Cx3x1.15/1000	I=(5x2xD*1.15)/20	J = 1xCx1.15	K=Dx 1.15	L= Dx0.16x1.15	M= Dx1x0.16x 1.15	N=Dx0.2x10x 1.15/10	O=Ax0.44x 1.15	P=Ax0.44x 1.15/100	Q=Ax0.44x1, 15/100	O	P=D*27	
Zone 1	Dubti	69,925	30767	615	62	354	15	7	2	35	708	71	11	11	71	3,538	354	354		1,661	10,000
	Elidar	85,103	37445	749	75	431	18	9	3	43	861	86	14	14	86	4,306	431	431		2,022	10,000
	Asayita	50,543	22239	445	44	256	11	5	2	26	511	51	8	8	51	2,557	256	256		1,201	10,000
	Afambo	25,832	11366	227	23	131	5	3	1	13	261	26	4	4	26	1,307	131	131		614	10,000
	Mile	99,328	43704	874	87	503	21	10	3	50	1,005	101	16	16	101	5,026	503	503		2,360	10,000
	Chifra	97,508	42904	858	86	493	21	10	3	49	987	99	16	16	99	4,934	493	493		2,317	10,000
	Adda'ar	58,425	25707	514	51	296	12	6	2	30	591	59	9	9	59	2,956	296	296		1,388	10,000
	Kori	23,465	10325	206	21	119	5	2	1	12	237	24	4	4	24	1,187	119	119		558	10,000
		Total items				2,581	108	52	15	258	5,163	516	83	83	516	**25,813**	2,581	2,581		**12,121**	**80,000**
		Unit Cost in Eth. Birr				14.23	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**36,731**	**4,590**	**139**	**8,936**	**43,347**	**21,424**	**1,275**	**99**	**525**	**2,788**	**0**	**0**	**0**	**119,855**		

Zone 2	Afedra	33,844	14891	298	30	171	14	3	1	17	343	34	5	5	34	1,713	171	171		804	10,000
	Bidu	25,625	11275	226	23	130	11	3	1	13	259	26	4	4	26	1,297	130	130		609	10,000
	Erebeti	38,068	16750	335	33	193	16	4	1	19	385	39	6	6	39	1,926	193	193		904	10,000
	Aba'ala	39,864	17540	351	35	202	17	4	1	20	403	40	6	6	40	2,017	202	202		947	10,000
	Dalule	88,167	38793	776	78	446	37	9	3	45	892	89	14	14	89	4,461	446	446		2,095	10,000
	Megale	29,529	12993	260	26	149	12	3	1	15	299	30	5	5	30	1,494	149	149		702	10,000
	Berhale	82,842	36450	729	73	419	35	8	3	42	838	84	13	13	84	4,192	419	419		1,968	10,000
	Kuneba	56,909	25040	501	50	288	24	6	2	29	576	58	9	9	58	2,880	288	288		1,352	10,000
		Total Items				1,998	167	40	12	200	3,996	400	64	64	400	19,979	1,998	1,998		9,382	80,000
		Unit Cost in Eth. Birr				14	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**28,431**	**7,105**	**108**	**6,917**	**33,551**	**16,583**	**987**	**77**	**406**	**2,158**	**0**	**0**	**0**	**96,322**		
Zone 3	Amibara	67,747	29809	596	60	343	29	7	2	34	686	69	11	11	69	3,428	343	343		1,610	10,000
	Gewane	33,524	14751	295	30	170	14	3	1	17	339	34	5	5	34	1,696	170	170		797	10,000
	Bure Mudayitu	34,030	14973	299	30	172	14	3	1	17	344	34	6	6	34	1,722	172	172		809	10,000
	Dulacha	22,143	9743	195	19	112	9	2	1	11	224	22	4	4	22	1,120	112	112		526	10,000
	Argoba	23,696	10426	209	21	120	10	2	1	12	240	24	4	4	24	1,199	120	120		563	10,000
		Total Items				**917**	**77**	**18**	**5**	**92**	**1,833**	**183**	**29**	**29**	**183**	**9,166**	**917**	**917**		**4,304**	**50,000**
		Unit Cost in Eth. Birr				14.23	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**13,043**	**3,259**	**49**	**3,173**	**15,392**	**7,608**	**453**	**35**	**186**	**990**	**0**	**0**	**0**	**44,188**		
Zone 4	Teru	79,157	34829	697	70	401	33	8	2	40	801	80	13	13	80	4,005	401	401		1,881	10,000
	Yalo	49,861	21939	439	44	252	21	5	2	25	505	50	8	8	50	2,523	252	252		1,185	10,000
	Ewa	49,584	21817	436	44	251	21	5	2	25	502	50	8	8	50	2,509	251	251		1,178	10,000
	Awra	37,565	16529	331	33	190	16	4	1	19	380	38	6	6	38	1,901	190	190		893	10,000
	Golina	52,312	23017	460	46	265	22	5	2	26	529	53	8	8	53	2,647	265	265		1,243	10,000
		Total Items				1,359	113	27	8	136	2,717	272	43	43	272	13,585	1,359	1,359		6,379	50,000
		Unit Cost in Eth. Birr				14	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**19,332**	**4,831**	**73**	**4,703**	**22,813**	**11,276**	**671**	**52**	**276**	**1,467**	**0**	**0**	**0**	**65,495**		
Zone5	Sumu Robi	34,274	15081	302	30	173	14	3	1	17	347	35	6	6	35	1,734	173	173		814	10,000
	Hadele Ela	37,742	16606	332	33	191	16	4	1	19	382	38	6	6	38	1,910	191	191		897	10,000
	Telalak	40880	17987	360	36	207	17	4	1	21	414	41	7	7	41	2,069	207	207		971	10,000

	Dawe	45578	20054	401	40	231	19	5	1	23	461	46	7	7	46	2,306	231	231		1,083	10,000
	Dalifage	38931	17130	343	34	197	16	4	1	20	394	39	6	6	39	1,970	197	197		925	10,000
		Total Items				**999**	**83**	**20**	**6**	**100**	**1,998**	**200**	**32**	**32**	**200**	**9,989**	**999**	**999**		**4,690**	**50,000**
		Unit Cost inEth. Birr				14.23	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**14,214**	**3,552**	**54**	**3,458**	**16,774**	**8,291**	**493**	**38**	**203**	**1,079**	**0**	**0**	**0**	**48,156**		

4. Drugs, medical supplies, budget and Logistics plan for Meningitis Case Management, Afar Region, 2010

At risk woredas = those affected at least once since 2006

Attack Rate = 0.3%(WHO /CDS/EPR/2007.3)

Severe cases= 50%

Of the sever cases only about 50% cases are very sever & do need NGtubes

Children age U1 = 3.6% of the total population

Children age U5 = 16% of the total population

RL = 2 bags per day for 4 days

Attack Rate = 0.3% of total population

One case x 5 bags of RL 1000ml Oily CAF is high likely to be us

RDT kit of 20 tests for each episode of outbreak

One case x 5 vials of crystallin pen 500mg

One Vial AC vaccine for 50 persons

87% of the population(=rural) is treated with Oily CAF

If 50% of the cases will be admitted and treated with Pen.G or Ceftria

2 dollar per capita per sever case

Zone	Woreda	Population (July 2009)	Expected cases	Severe cases	RL/DNS bag of 1000ml	Crystaline Penicilline (500 mg Vial) box of 100	Ceftriaxone inj.of 1gm of 50vials	Oily Chloramphenicol of 3gm vial; box of 50	Paracitamole 500mg tab; tin of 1000 tabs	Paracitamole susp. of 100ml bottle of 125mg/5ml	PNGT each	ANGT each	IV Cannula	Scalp Vein	Dextrose 40% of 20ml of 20amp	AC Vaccine (vial of 50 dose)	Vaccione Diluant of 50 ml vial; Box of 50	AD syringe for vaccination 3ml; Box of 100	Safety Box of discarding 100 syringe	RDT kit of 20 tests	Total Cost of drugs and supplies	Operational cost	Inter-woreda Resource mobilization
		A	B = 0.3%A	C = 50 % B	D= C x 2x4x1.15	E = 18 vial/dayx 4dxCx0.5x 1.15	F= 2 gm/d x 4dx Cx0 .5x1 .15	G=Bx 0.87x 1vialx 1.15	H=Bx 0.84x 10tab x1.15 /1000	I=Bx0 .16x1 bottx 1.15	J=Cx0. 036x1. 15	K = Cx0 .5x0 .96x 1.15	L= BX1. 15	M= Bx0 .036 x1.1 5	N=Bx1 ampx4 dx1.15/ 20	O= 0.7xA x1.15 /50	P=Ax0. 7x1.15/ 50	Q=Ax0. 7x1.15/ 100	R=Ax 0.7x1 ,15/1 00	1kit for each woreda	N	O	
Zone 1	Dubti	69,925	210	105	965	43	10	210	2	39	4	58	241	9	48	1,126	1,126	563	563	1		5,664	15,000
	Elidar	85,103	255	128	1,174	53	12	255	2	47	5	70	294	11	59	1,370	1,370	685	685	1		6,893	15,000
	Asayita	50,543	152	76	697	31	7	152	1	28	3	42	174	6	35	814	814	407	407	1		4,094	15,000
	Afambo	25,832	77	39	356	16	4	78	1	14	2	21	89	3	18	416	416	208	208	1		2,092	15,000
	Mile	99,328	298	149	1,371	62	14	298	3	55	6	82	343	12	69	1,599	1,599	800	800	1		8,046	15,000
	Chifra	97,508	293	146	1,346	61	13	293	3	54	6	81	336	12	67	1,570	1,570	785	785	1		7,898	15,000
	Adda'ar	58,425	175	88	806	36	8	175	2	32	4	48	202	7	40	941	941	470	470	1		4,732	15,000

	Kori	23,465	70	35	324	15	3	70	1	13	1	19	81	3	16	378	378	189	189	1		1,901	15,000
		Total items			7,040	317	70	1,531	15	282	32	422	1,760	63	352	8,213	8,213	4,107	4,107	8		41,320	120,000
		Unit Cost in Eth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			186,906	13,495	380	0	305	1,169	79	101	4,347	76	59,110	0	0	0	0	0	265,967		
Zone 2	Afedra	33,844	102	51	467	42	5	102	1	19	2	28	117	4	23	545	545	272	272	1		2,741	15,000
	Bidu	25,625	77	38	354	32	4	77	1	14	2	21	88	3	18	413	413	206	206	1		2,076	15,000
	Erebeti	38,068	114	57	525	47	5	114	1	21	2	32	131	5	26	613	613	306	306	1		3,084	15,000
	Aba'ala	39,864	120	60	550	50	6	120	1	22	2	33	138	5	28	642	642	321	321	1		3,229	15,000
	Dalule	88,167	265	132	1,217	110	12	265	3	49	5	73	304	11	61	1,419	1,419	710	710	1		7,142	15,000
	Megale	29,529	89	44	408	37	4	89	1	16	2	24	102	4	20	475	475	238	238	1		2,392	15,000
	Berhale	82,842	249	124	1,143	103	11	249	2	46	5	69	286	10	57	1,334	1,334	667	667	1		6,710	15,000
	Kuneba	56,909	171	85	785	71	8	171	2	31	4	47	196	7	39	916	916	458	458	1		4,610	15,000
		Total Items			5,449	490	54	1,185	11	218	25	327	1,362	49	272	6,357	6,357	3,179	3,179	8		31,983	120,000
		Unit Cost in Eth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			144,668	20,891	294	0	236	905	61	78	3,365	59	45,752	0	0	0	0	0	216,308		
Zone 3	Amibara	67,747	203	102	935	84	9	203	2	37	4	56	234	8	47	1,091	1,091	545	545	1		5,488	15,000
	Gewane	33,524	101	50	463	42	5	101	1	19	2	28	116	4	23	540	540	270	270	1		2,715	15,000
	Bure Mudayitu	34,030	102	51	470	42	5	102	1	19	2	28	117	4	23	548	548	274	274	1		2,756	15,000
	Dulacha	22,143	66	33	306	28	3	66	1	12	1	18	76	3	15	357	357	178	178	1		1,794	15,000
	Argoba	23,696	71	36	327	29	3	71	1	13	1	20	82	3	16	382	382	191	191	1		1,919	15,000
		Total Items			2,500	225	25	544	5	100	11	150	625	22	125	2,916	2,916	1,458	1,458	5		14,672	75,000
		Unit Cost in Eth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			66,368	9,584	135	0	108	415	28	36	1,544	27	20,989	0	0	0	0	0	99,233		
Zone 4																							
	Teru	79,157	237	119	1,092	98	11	238	2	44	5	66	273	10	55	1,274	1,274	637	637	1		6,412	15,000
	Yalo	49,861	150	75	688	62	7	150	1	28	3	41	172	6	34	803	803	401	401	1		4,039	15,000
	Ewa	49,584	149	74	684	62	7	149	1	27	3	41	171	6	34	798	798	399	399	1		4,016	15,000
	Awra	37,565	113	56	518	47	5	113	1	21	2	31	130	5	26	605	605	302	302	1		3,043	15,000
	Golina	52,312	157	78	722	65	7	157	2	29	3	43	180	6	36	842	842	421	421	1		4,237	15,000
		Total Items			3,705	333	37	806	8	148	17	222	926	33	185	4,323	4,323	2,161	2,161	5		21,747	75,000
		Unit Cost in Eth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			19,167	2,768	39	0	31	120	8	10	446	8	6,061	0	0	0	0	0	28,658		
Zone5	Sumu	34,274	103	51	473	43	5	103	1	19	2	28	118	4	24	552	552	276	276	1		2,776	15,000

	Robi																						
	Hadele Ela	37,742	113	57	521	47	5	113	1	21	2	31	130	5	26	608	608	304	304	1		3,057	15,000
	Telalak	40880	123	61	564	51	6	123	1	23	3	34	141	5	28	658	658	329	329	1		3,311	15,000
	Dawe	45578	137	68	629	57	6	137	1	25	3	38	157	6	31	734	734	367	367	1		3,692	15,000
	Dalifage	38931	117	58	537	48	5	117	1	21	2	32	134	5	27	627	627	313	313	1		3,153	15,000
		Total Items			2,724	245	27	593	6	109	12	163	681	25	136	3,178	3,178	1,589	1,589	5		15,990	75,000
		Unit Cost inEth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			**72,327**	**10,445**	**147**	**0**	**118**	**452**	**30**	**39**	**1,682**	**29**	**22,874**	**0**	**0**	**0**	**0**	**0**	**108,144**		

Annex 2. Detail plan for capacity building, strengthening of surveillance system and inter-sectoral coordination

Activities	unit	quantity	number of days	cost						
				DSA	Transport	Stationery	Refreshment	Miscellaneous	Capital equipment cost	Total
In-service training on AWD case management and infection prevention	number	110	7	115,500.0	33,000.0	9,900.0	16,500.0	8,745.0	0.0	183,645.0
Integrated In-service training on PHEM for 70 health workers	number	70	8	82,000.0	21,000.0	6,300.0	14,000.0	6,165.0	0.0	129,465.0
In-service training on communication skills and social mobilization for 220 health extension workers (10 HEWs from 22 AWD hot spot woredas)	number	220	4	132,000.0	22,000.0	13,200.0	22,000.0	9,460.0	0.0	198,660.0
Organize emergency coordination meeting once per month at regional and Woreda levels (6 meetings at region and 22 x 6 meetings at Woreda = 138 sessions)	session	15	138	0.0	0.0	0.0	41,400.0	2,070.0	0.0	43,470.0
Produce IEC materials (1000 posters and 3000 Leaflets) in Afar Language on AWD prevention and control and distribute to Kebeles	item	1000 posters, 3000 leaflets	0	5,000.0	5,000.0	20,000.0	0.0	1,500.0	0.0	31,500.0
Coordination of labor force (migrant labourers) sensitization on AWD outbreak at their home region (departure) and at investment farm (destination)	visit	2	0	10,000.0	6,000.0	1,000.0	3,000.0	1,000.0	0.0	21,000.0
Organize health education (AWD prevention, control, early treatment seeking) using Mobil Video van at investment farm/sites	visit	1		5,000.0	3,000.0	1,000.0	1,000.0	500.0	0.0	10,500.0
Training of 33 policy radio operators on surveillance report for 6 days	number	33	6	24,750.0	9,900.0	1,650.0	3,300.0	1,980.0	0.0	41,580.0

Procure and install radio-communication equipment at 8 remote Woredas	number	8	0	0.0	0.0	0.0	0.0	0.0	400,000.0	400,000.0
Procure and provide surveillance data management equipment(Desk Top Computer) for 21 Woredas and RHB surveillance unit	number	22	0	0.0	0.0	0.0	0.0	0.0	110,000.0	110,000.0
Total cost by line item				**374,250.0**	**99,900.0**	**53,050.0**	**101,200.0**	**31,420.0**	**510,000.0**	**1,169,820.00**

Annex 3 Dummy Tables

Table 1. Socio demographic characteristics of respondents Sidama zone, SNNPR 2010

Variable	Cases n (%)	Controls n (%)
Sex Male Female		
Age <4 years 5 – 14 years 15 – 24 years 35 – 44 years 45 – 54 years >55 years		
Marital status Single Married Divorced Widowed Separated		
Ethnicity Sidama Amhara Oromo Tigrie Gurage Other		
Educational level Illiterate Read and write Elementary Secondary Above secondary		
Religion status Orthodox Muslim Protestant Catholic		

Occupation Gov't employee House wife Daily labourer Student Merchant Unemployed Other		

Table 2. Clinical Presentations of Cases of Measles outbreak in Sidama zone, SNNPR number of cases, from____to_____ 2010.

symptom	**Percent**
Φ Fever	
Φ cough,	
Φ coryza (runny nose),	
Φ and/or conjunctivitis (red eyes	
Φ *Rash phase*	

Table 3. . Risk factors Analysis for possible association with measles outbreak in Sidama zone, SNNPR from_____to_____2010

Risk factors	**Cases (%)**	**Controls (%)**	**Odds Ratio (95% Confidence interval)**	**p-value**
Educational level parents				
Number of children in the household				
Religion of parent				
Vaccination status				
Occupation of parent				
Travel history				

Table-4 Number of measles cases and deaths in Sidama Zone from 2006□2010

Years	2006	2007	2008	2009	2010
No of Cases					
No of Deaths					

Annex 4 Questionnaire- English Version

ADDIS ABABA UNIVERSITY
MEDICAL FACULTY
DEPARTMENT OF COMMUNITY HEALTH

QUESTIONNAIRE PREPARED TO ASSESS RISK FACTORS FOR MEASLES OUTBREAK IN SIDAMA ZONE, SNNPR 2010

I **Participant information sheet**

Greetings! My name is _____. I am working as a data collector for Tilahun Tafese who is doing his research entitled ". assessment of risk factors and trends of measles outbreak in Sidama Zone, SNNPR " as a partial fulfillment for requirement of master of public health at Addis Ababa university Medical faculty. I would like to inform you that you and I would have a short discussion concerning this study. Before we go to our discussions, I will ask you to listen carefully what I am going to read to you about the purpose and general condition of the study and tell me whether you agree or disagree to participate in this study.

Purpose of this study is to identify the risk factors and the trends of the outbreak and possible gaps in measles control strategy.

Introduction; Measles is a leading vaccine preventable childhood killer. In each year measles currently kills nearly 454,000 people worldwide. Of these, 410,000 deaths are among children under the age of five years. Ethiopia contributes to 46% of cases and 51% of the deaths from measles among eight eastern Africa countries. This case-control study will be carried out to examine the risk factors that were associated with measles outbreak in Sidama zone and then recommended of simple and effective risk- reduction measure would help health care services to reduce morbidity and mortality due to measles outbreak. .

I am interviewing mother/caretaker who has children in all selected Keble and you are selected to be one of the participants in this important study. The study will be conducted through interview. The information you give us is strictly confidential and will be used only for the study purposes. A code number will identify every participant and no names will be used. The interview is voluntary and you have the right to participate or not to participate or to refuse at any time during the interview. However, your participation is very important for the success of this study. We greatly appreciate your truthful and keen participation in responding to this question.

Do you have any question?

If you have any question you can contact the principal investigator at any time convenient for you using the following address.

Name: Tilahun Tafese Phone number: 0911 748954

Address: Addis Ababa, Ethiopia E-mail: tilahuntafeseafele@yahoo.com

Informed Verbal consent form

As it is described in the information sheet, the information you provide is very important in order to guide programs, planning and for intervention action.

Now please tell me if you agree to participate in the interview.

The participant 1. Agree

2. Did not agree

Thank you!!

If the study subject agrees to participate in the study, start the interview.

Interviewer signature certifying that the informed consent has been given verbally.

Name---------- signature----------

Date----------month----------2010

Questionnaires for Case control study on Measles outbreak in Community Level Code/Patient Name_____ date of Data collection_____

I . Socio-demographic Characteristics

S. No	Questions	Alternatives	Skip
101	Respondent relation to Child?	1.Mother 2.Father 3.Other_____	
102	Age of the child	_____ (in Months/years)	
103	Sex	1.Male 2.Female	
104	Occupation	1. Gov't / NGO employee 2. House wife 3. Daily labourer 4. Student 5. Merchant 6. Farmer 7. Unemployed 8. Other (specify)_____	
105	Educational level	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary	
106	Marital status	1. Single 2. Married 3. Divorced 4. Widowed 5. Separated	
107	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Other (specify)_____	
108	Ethnicity	1. Sidama 2. Oromo 3. Amhara 4. Tigrie 5. Gurage 6. Other (specify)_____	

109	Number of children in the household	_____	
110	Is there any sick child with rash, fever, running nose/conductivities (illness)?	1. Yes 2. No	
111	If yes number of sick children	_____	
112	Date of Onset	1_____ 2_____ 3_____	

II**. Clinical History of Diseases Date of Onset:**

201	Is there any child who had fever	1.Yes 2.No From_____to_____	
202	If yes to question no 201	Date onset_____	
203	If yes to question 201 what was the symptoms	1. Fever 2.cough, 3.coryza (runny nose), 4.and/or conjunctivitis (red eyes *5.Rash phase* *6.Diarrhea* 7.Ear discharge 8.Other	
204	Did you take your child for treatment?	1.Yes 2.No	
205	If yes to question number 204 mention the place and date visits?	_____	
206	Date of Health facility Visits and Treatment given	Date_____ 1.ORS 2.Antibiotics 3.Vitamin A 4.Supplementary food 5.Others given_____	
207	Traditional Healer	Date of Visits _____ Treatment given_____	
208	Did you give any intervention for sick child at home?	1.Yes 2.No	
209	If yeas to question 206 intervention given	_____	

210	Did your child recovered after the treatment?	1.Yes 2.No	
211	If no to question number 208	_____	

III. Vaccination History

301	Did you get vaccinated your Child for measles?	1.Yes 2.No	
302	If yes to question 301 date and Number of vaccine doses received	1.Age of child at first Vaccination _____ 2.Age of child at recent Vaccination_____	

IV. Risk Factors

401	Had received vitamin A supplementation within 6 months for your child?	1.yes 2.No	
402	Had received deworming within 6 months for your child?	1.yes 2.No	
403	How many months did you feed only breast for your child	_____	
404	When did you start supplementary food for the Child?	_____	
405	List the addition food given for child	_____ _____	
406	Did you take your child within 7-18 days before rash onset to other area?	1.Yes 2.No	
407	If Yes to question 6 place of travel	1.School, 2.Neighbor 3.Market 4.Other_____	

Checked by supervisor

Results code 1. Complete 2. Partially complete 3. Refused

4. Other (specify)_____

Name of supervisor: ---------- Signature: _____ Date _____

Annexes 5

Annex5.1. Detail description of the Strengths and gaps Regarding AWD preparedness and Response, and action taken by the JSM

Annex-1 Strengths, gaps identified by AWD prevention and response thematic areas in seven studied Woredas of Afar Region (April 2010) --- (1)

Thematic areas	Strengths	Identified Gaps	Actions taken by the support team
Strengthening AWD reporting and response	• Trained IDSR focal persons assigned • Use telephone for regular reporting to region • Woredas received supportive supervision from WHO EPI/Surveillance officer • Woredas have conducted supportive visit to health facilities once in the last six months • Woredas are provided with oral report feed back	• Delayed IDSR report from some remote Kebeles to Woredas due to absence communication means • Written report feedback not provided to Woredas from region • Absence of IDSR guidelines in all visited Woredas	
Case management and infection prevention	• Woredas like Elidar, Amibara, and Adda'ar relatively kept stocks of life saving drugs and supplies • Majority of the health staffs in the studied Woredas have ever engaged in AWD case management and prevention • All Woredas have disinfected CTC equipments and materials after the containment of previous outbreak and majority of the Woredas properly stored re-useable CTC materials • Some Woredas like Amibara, Dubti have a sample CTC and Case management guidelines • Use of BIN CARD to monitor drug stocks and shelf line in Asayita Woreda	• Other Woredas like Afambo, Dubti and Gawane do not have adequate stocks of live saving drugs and supplies • Some drugs observed to be about reaching shelf life • Overall there is a shortage of adequately trained health staff on case management and infection prevention • Attrition of the staff including trained once • CTC closure in some of the Woredas like Asayita, Dubti and Gawane was incomplete and not properly stored re-usable CTC materials and CTC latrines not properly abandoned • Absence of CTC and AWD case management guidelines at Woreda and health facility levels	• On job orientation of health workers on planning of contingency drugs and supplies • Orientation on case detection, management and reporting • Provision of two to three copies of CTC and AWD case management guidelines to visited Woredas • Provide AWD treatment procedures (Poster) to all visited Woredas

Annex5. 1 Strengths, gaps identified by AWD prevention and response thematic areas in seven studied Woredas of Afar Region (April 2010) --- (2)

Thematic areas	Strengths	Gaps identified	Actions taken by the support team
Improving WaSH Services	• Relatively better water supply coverage in Asayita and Adda'ar Woredas compared to others • Improved awareness about safe water and proper hygiene and sanitation in Amibara and Gawane, Dubti and Asayita Woredas compared to others • Relatively better coverage of latrine facilities in Amibara and Dubti Woredas compared to others • Relatively supply of point-of-use water treatment chemicals (water PUR and Water Guard) is available in Amibara, Adda'ar and Gawane Woredas • Conducted sanitation campaign (CLTSH) in Asayita Woreda and improved hygiene awareness and actions	• Low water supply coverage in Gawane, Elidar, Afambo, Amibara and Dubti Woredas • Low access to latrine facilities (Coverage) in Gawane, Adda'ar, Elidar, Afambo, Asayita Woredas • No stocks of point-of-use water purification/disinfection chemicals in Elidar, Asayita, Afambo and Dubti Woredas • A number of water supply schemes reported to be non-functional due to poor operation and maintenance • Delay in completion of newly drilled wells and maintenance of non-functional water supply schemes	On job orientation of health workers on planning of contingency WaSH supplies and material Orientation to water technicians on water scheme management

Improving community awareness	• Intensive awareness creation activities on AWD prevention and control in rural communities in some of the Woredas like Amibara and Gawane Woredas • In Amibara and Gawane Woredas, Production IEC materials on AWD prevention and control and distribution to target communities (T-Shirts, leaflets and posters) and billboards erected at different sites in the Kebeles. • In Gawane and Amibara Woredas, existing health committees and school health clubs sensitized/strengthened and new health committees and school clubs formed, and used for community based hygiene promotion • In Gawane and Amibara Woredas, Community awareness increased on use of point-of-use water treatment chemicals and house demand for chemicals increased	• Lack of IEC materials on AWD prevention and control • Lack of health education/communication guidelines at Woredas • Lack of guidelines on point-of-use water purification/disinfection • Improper usage of Water purification/disinfection chemicals among households in Amibara Woreda (Use water guard for cloth washing) • Misusage of hygiene materials provided to households (some households sold soap at low cost and stored soap pilfered by unknown individuals) in Gawane Woreda probably due to low awareness • Poor awareness about AWD (mode of transmission and preventive measures) among workers at investment sites	Health education /hygiene education labour workers in all visited investment farms

Annex5. 1 Strengths, gaps identified by AWD prevention and response thematic areas in seven studied Woredas of Afar Region (April 2010) --- (3)

Thematic areas	Strengths	Identified Gaps	Actions taken by the support team
Coordination and resource mobilization	• Strong technical task force in some of the Woredas like in Amibara and Gawane Woredas • Active alliance between Woreda technical taskforce and partner NGOs and some investors in Gawane and Amibara Woredas • Maximum use of partners resources for AWD prevention and control • Monthly supervision to investment farms and rural Kebeles with technical, financial and transport support from SC-UK, AMREF and CARE Awash and monthly meeting with investors (Amibara and Gawane Woredas) • Opening of dry weather rural road through community participation to connect Woreda town to remote Kebeles experienced AWD outbreak in 2009 • Initiation of plan to integrate latrine promotion through community participation by integrating in to productive safety net program (PSNP) • Regular information exchange on occurrence of outbreak, conflicts, and other issues between all Kebeles and Woreda cabinet through mobile phone.	• Inactive coordination committee at other Woredas like Elidar, Adda'ar, Asayita, Dubti and Afambo Woredas after the containment of previous outbreaks (no committee meeting after past out break, no contingency plan, • Absence of technical task force in the above mentioned Woredas • Lack of vehicles and operational budget to continue sustain supportive supervision to farms and Kebeles in Gawane and Amibara Woredas, and in other five Woredas. • Absence of corrective measure on investors resisting to implement investment farm environmental improvement plans • Absence of ear marked contingency budget for AWD prevention and response	Organize discussion with Woreda coordination committees (in five Woredas) and technical task force (two Woredas) and shared key findings of the assessment Technical guidance on Revitalizing the AWD woreda task force and establishment of Subcommittees by orienting the duties and responsibities of each clearly, finally consensus was reached on preparation of its implementation plan by Adopting accordingly to the local set up in all visited zone one woredas Discussion with representatives of investment farm owners, and other partners (NGOs working in the Woreda and Enterprises) to seek their partnership and involvement Provide support to Woredas in the on-site observation/supervision of investment farms

Annex 6. Detail Description of the Recommended Action Points

Annex6. Gaps identified by AWD prevention and response thematic areas and recommended actions and responsible bodies in seven studied Woredas of Afar Region (April 2010) --- (1)

S. No	Gaps identified	Actions to be taken	Responsible organization/partner
Strengthening AWD reporting and response	• Delayed IDSR report from some remote Kebeles to Woredas due to absence communication means • Written report feedback not provided to Woredas from region • Absence of IDSR guidelines in all visited Woredas	• Make monthly supportive supervision jointly with WHO EPI/Surveillance offices • Analyze the IDSR data by time, place and person as well as timeliness and completeness of IDSR reports for all Woredas and provide written report feedback to Woredas • Print and distribute adequate IDSR guidelines to all Woredas and major health facilities	RHB and WHO EPI/Surveillance officers
Case management and infection prevention	• Other Woredas like Afambo, Dubti and Gawane do not have adequate stocks of live saving drugs and supplies • Some drugs observed to be about reaching shelf life • Overall there is a shortage of adequately trained health staff on case management and infection prevention • Attrition of the staff including trained once • CTC closure in some of the Woredas like Asayita, Dubti and Gawane was incomplete and not properly stored re-usable CTC materials and CTC latrines not properly abandoned • Absence of CTC and AWD case management guidelines at Woreda and health facility levels	• Preposition adequate life saving AWD drugs, medical supplies and CTC materials • Devise mechanism to use drugs with nearest expiry date (with short shelf life) to be used for regular health services by health facilities • organize/conduct in-service training on CTC management AWD treatment and infection prevention for health workers • Form regional technical team and provide technical support to Woredas with improper CTC closure • Print and distribute adequate CTC and AWD case management guidelines to all Woredas and major health facilities	RHB, FMoH, UNICEF, WHO RHB RHB, FMoH, UNICEF, WHO RHB RHB, UNICEF, WHO

Annex 6 Gaps identified by AWD prevention and response thematic areas and recommended actions and responsible bodies in seven studied Woredas of Afar Region (April 2010) --- (2)

S. No	Gaps identified	Actions to be taken	Responsible organization/partner
Improving WaSH Services	• Low water supply coverage in Gawane, Elidar, Afambo, Amibara and Dubti Woredas • Low access to latrine facilities (Coverage) in Gawane, Adda'ar, Elidar, Afambo, Asayita Woredas • No stocks of point-of-use water purification/disinfection chemicals in Elidar, Asayita, Afambo and Dubti Woredas • A number of water supply schemes reported to be non-functional due to poor operation and maintenance • Delay in completion of newly drilled wells and maintenance of non-functional water supply schemes	• Conduct rapid technical assessments to non-function water supply schemes and urgently maintain and strengthen/establish community management system • Integrate Latrine promotion in to productive safety net program to increase latrine coverage in the region in general and in AWD hot spot Woredas in particular • Mobilize resources from NGOs and pre-position point-of-use water purification/disinfection chemicals at all Woredas • Urgently finalize construction of newly drilled water supply schemes	RWRB, FMoWR, UNICEF DPPO, RHB, Woreda admin council RWRB, FMoWR, NGOs, Regional coordination committee RWRB, UNICEF, NGOs
Improving community awareness	• Lack of IEC materials on AWD prevention and control • Lack of health education/communication guidelines at Woredas • Lack of guidelines on point-of-use water purification/disinfection • Improper usage of Water purification/disinfection chemicals among households in Amibara Woreda (Use water guard for cloth washing) • Misusage of hygiene materials provided to households (some households sold soap at low cost and stored soap pilfered by unknown individuals) in Gawane Woreda probably due to low awareness • Poor awareness about AWD (mode of transmission and preventive measures) among workers at investment sites	• Produce locally appropriate IEC materials and distribute in all Woredas • Organize/conduct training on health education/communication skills for health extension workers and other development workers (teachers and pastoralist development workers) • Conduct training for influential community leaders, women and health extension workers on promotion of point-of-use water purification/disinfection chemicals • Provide continuous education on importance of water purification/disinfection chemicals to discourage miss use of the supplies	RHB, FMoH, UNICEF RHB, FMoH, UNICEF RHB, Woreda health office, Woreda water resource office Health extension Workers, teachers and other development workers

Annex 6 Gaps identified by AWD prevention and response thematic areas and recommended actions and responsible bodies in seven studied Woredas of Afar Region (April 2010) --- (3)

S. No	Gaps identified	Actions to be taken	Responsible organization/partner
Coordination and resource	• Inactive coordination committee at other Woredas like Elidar, Adda'ar, Asayita, Dubti and Afambo Woredas after the containment of previous outbreaks (no committee meeting after past out break, no contingency plan, etc) • Absence of technical task force in the above mentioned Woredas • Lack of vehicles and operational budget to continue sustain supportive supervision to farms and Kebeles in Gawane and Amibara Woredas, and in other five Woredas. • Absence of ear marked contingency budget for AWD prevention and response	• Continuous visit to AWD hot spot Woreda to sensitize/ activate Woreda coordination committee • Establish Woreda technical task force in all hot spot Woredas, orient on duties and responsibilities and initiate Woreda specific AWD prevention and control plans • Strengthen / Establish partnership with NGOs in the Woredas and with private sectors to pool local resources for supportive supervision to Kebeles and investment sites	Regional technical task force Regional Technical task force Regional and Woreda Technical committees
Investment farms (sites)	• Lack of awareness /knowledge about labour proclamations among investors (employers) and the labour workers (employees) • Absence of mutual agreement between employer and the employees (absence of binding rules between the two parties) • Absence of corrective measures on investors firmly resisting to implement investment farm environmental improvement plans	• Organize awareness creation meetings and consultations with employers and labour forces and sensitize on labour proclamation • Provide technical and managerial support to labour forces to organize them in associations and facilitate mutual agreement • Regular follow up of compliance of labour proclamation, duties and responsibilities as per mutual agreement • Continuous supportive supervision to investment sites to monitor implementation status of improvement plans • Take Corrective measures on investors resisting implementation of AWD prevention and control plan in farm sites	Regional BoLSA Regional BoLSA Regional BoLSA Regional and Woreda technical taskforce Regional Government

Annex-7 Brief Notes on Core Priority Issues Raised on Plenary Discussion

Representatives from Regional Health, Water resource, Education and Pastoralist development bureaus, regional Investment and Disaster preparedness and prevention offices, UNICEF, WHO and Federal MoH and MoWR have been participated on the regional coordination meeting. i.e., a total 15 participants (3 from UNICEF, 1 from World Health Organization, 9 from regional bureaus, 2 from Federal MoH and 1 from MoWR). Key findings (Strengths, gaps and recommendations) of the assessment conducted in seven hot spot Woredas and investment sites presented by joint support mission on the meeting and explanation given on questions raised by the participants followed by identification of the core AWD preparedness issues to be addressed urgently.

Health

- Strengthening IDSR to early detect and notify AWD outbreak.
- Ensuring the stocks of emergency drugs, medical supplies, monitoring of the proper storage of re-useable CTC equipments and CTC kits and the use of drugs with short shelf life.
- Increasing knowledge and skills of health human resources on AWD case management and infection prevention (training adequate number of health workers).

Water Sanitation and Hygiene

- Maintenance of non-functional water supply schemes
- Ensure the stocks of point-of-use water purification and disinfection chemicals at regional and Woreda levels

Coordination

- Frequent meetings of the regional coordination committee/ task force
- Strengthening Woreda AWD prevention and response coordination committee/taskforce through alerting all hot spot Woredas
- Initiating the direct involvement of regional and local government in improvement of health and safety conditions of farm camps/shelters by taking stepwise measures on the resistant investors

Base on the discussion, the regional committee set the following action points

S. No	Action points	Timeline	Responsible Organization
1	Assign two professionals (one from UNICEF and one from Regional health bureau) to make inventory of re-useable CTC equipments, stocks of emergency drugs and medical supplies at all AWD hot spot Woredas	May 7, 2010	Regional Health Bureau and UNICEF Afar field office
2	Preparation of Drugs and supply plan and submission of requests to partner organizations	May 7, 2010	Regional Health Bureau and UNICEF Afar field office
3	Facilitation of health workers training in consultation and support from Federal Ministry of Health (FMoH/PHEM shall give feedback urgently on proposal /discussion made on professionals training)	May 7, 2010	Regional Health Bureau and FMoH
4	The regional outbreak prevention and response coordination committee/taskforce meeting shall be held every two weeks	10 May 2010	Regional coordination committee
5	Pass directives (written order) to the investment farms owners to implement the improvement plan		Regional Government
6	Write a letter to all hot spot Woredas to alert them strengthen surveillance on AWD and activate Woreda coordination committee/ taskforces		Regional health Bureau

Annex 8 Distribution of contingency stocks of emergency drugs and medical supplies in seven studied Woreda (zone 1 and 3), Afar Region (April, 2010)

S. No	Description of items	Unit	Quantities of emergency drugs, medical supplies and materials								Remarks
			Amibara	Gawane	Adda'ar	Elidar	Asayita	Afambo	Dubti	Total	
1	IV Canula, sterile 16G		0	0	0	0	0		0	0	
2	IV Canula , sterile 18G		0	0	0	0	0		0	0	
3	IV Canula, sterile 20G		0	0	0	0	0		0	0	
4	Scalp vein infusion set, sterile disposable, G21, packing size: box of 100	Box	1	0	0	2	0		0	3	
5	Scalp vein infusion set, sterile disposable, G23, packing size: box of 100		0	0	0	0	0		0	0	
6	Scalp vein infusion set, sterile disposable, G25, packing size: box of 100		0	0	0	0	0		0	0	
7	Gauze bandage, cotton absorbent, 10cm x 4m	Roll	10	0	0	0	0		0	10	
8	Gauze bandage, cotton absorbent, 6cm x 4m	Roll	5	8	0	0	0		0	13	
9	Zinc Oxide adhesive tape, 5m x 5cm	Pcs	20	4	0	0	0		25	49	
10	Gauze compress, cotton, absorbent, 10 x 10cm, non sterile		0	0	0	0	0		0	0	
11	Cotton wool, absorbent, 500g		5	40	30	0	0		0	75	
12	Waterproof apron, PVC, disposable, box of 100	Pcs	5	0	0	0	100		0	105	
13	Glove latex sterile, ambidextrous, large, box of 50 pairs	Box	4	50	0	0	0		0	54	
14	Glove latex sterile, ambidextrous, medium, box of 50 pairs		0	0	20	0	0		0	20	
15	Glove latex sterile, ambidextrous, small, box of 50 pairs		0	0	0	0	0		0	0	
16	Heavy duty gloves	Pair	6	2	0	10	0		0	18	
17	PE transparent, 100cmx500m, 0.05mm thick			0	0	0	0		0	0	
18	Antibacterial soap/liquid detergent	Jeri can	2	0	0	0	0		0	2	

19	Syringe & Needles sterile disposable, 5 ml luer, pack of 100pcs		0	1	0	0	0		0	1	
20	Nasogastric feeding tube, sterile CH8	Pcs	100	0	0	0	0		0	100	
21	Nasogastric feeding tube, sterile CH10		0	0	0	0	0		0	0	
22	Thermometer, clinical, Cels scale		0	5	15	0	0		0	20	
23	Chlorine powder, 45Kg drum	Drum	2	2	0	0	0		1	5	
24	Cetrimide 15% chlorhexidine digluconate 1.5%, 1 litre bottle		0	0	0	0	0		0	0	
25	Oral Rehydration salts pack of 25 Sachets	Sachets	1000	1000	60	8000	0			10060	
26	Ringers Lactate 500ml bag	Bag	300	156	450	500	640		460	2506	
27	Rubber boots (various sizes)		0	2	0	0	0		0	2	
28	Backpack sprayer		0	0	0	0	0		0	0	
29	Biohazard bags		0	0	0	0	0		0	0	
30	Handsprayers		0	0	0	3	0		1	4	
31	Infusion Sets		300	156	600	500	640		460	2506	
32	Saline 500ml bag		0	0	0	0	0		0	0	
33	Dextrose 500ml bag		0	0	0	0	0		0	0	
34	Tongue Depressors, box of 100		0	0	0	0	0		0	0	
35	Plastic bucket, 15L, Red	Pcs	15	0	0	0	0		0	15	
36	Plastic bucket, 15L, Green	Pcs	3	7	0	0	0		0	10	
37	Safety Boxes	Pcs	300	14	15	5	0		0	334	
37	Tetracycline capsules, 250mg	Tin	0	0	0	0	3		0	3	
39	Ciprofloxacine tablets, 250mg	Tin	0	0	0	0	0		0	0	
40	Erythromycin tablets, 250mg	Tin	0	0	0	0	0		0	0	
41	Ampicillin capsules, 250mg	Tin	0	0	0	0	0		0	0	
42	Azithromycin capsules, 250mg	Tin	0	0	0	0	0		0	0	

43	Doxycycline capsules 100mg tin of 1000 tabs	Tin	1	0	0	0	0		0	1	
44	Ciprofloxacine injectable, 400mg	Box	0	0	0	0	0		0	0	

Annex 9 Distribution of trained professionals on AWD outbreak prevention and control in seven studied Woreda (Zone 1 and 3), Afar region, April 2010

S. No	Professional categories	Amibara		Gawane		Adda'ar		Elidar		Asayita		Afambo		Dubti		Total (7 Woredas)			Remarks
		Existing	Trained	Existing	Trained	Existing	Trained	Existing	Trained	Existing	Trained	Existing	Trained	Existing	Trained	Existing	Trained	% trained	
1	GMP	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**	**0**	**0.0**	
2	Health officer	1	1	0	0	0	0	0	0	3	0	1	0	3	2	**8**	**4**	**50.0**	
3	BSc Nurse	1	0	1	0	0	0	1	0	2	0	1	0	0	0	**6**	**0**	**0.0**	
4	Diploma Nurse	12	12	7	2	4	2	17	2	10	1	8	5	4	3	**64**	**27**	**42.2**	
5	Mid wife	0	0	2	0	1	1	2	0	0	0	0	0	1	0	**6**	**1**	**16.7**	
6	Jun. Cli Nurse	7	7	3	0	0	0	0	0	0	0	0	0	0	0	**10**	**7**	**70.0**	
7	Sanitarian	2	1	1	0	1	0	2	0	2	2	1	0	0	0	**9**	**5**	**55.6**	
8	Health Assistant	0	0	3	0	0	0	0	0	1	0	0	0	0	0	**4**	**0**	**0.0**	
9	Pharmacy tech	1	0	0	0	2	0	1	0	5	0	1	0	3	1	**13**	**2**	**15.4**	
10	Lab techno	1	0	2	0	0	0	0	0	0	0	0	0	0	0	**3**	**0**	**0.0**	
11	Lab Diploma	1	1	2	1	2	1	6	0	4	1	1	0	4	2	**20**	**6**	**30.0**	
12	Druggist	3	0	2	0	0	0	0	0	0	0	0	0	0	0	**5**	**0**	**0.0**	
13	Health extension	24	8	20	0	11	0	14	0	19	19	11	0	15	0	**114**	**27**	**7.4**	
14	Front line	18	18	9	0	14	0	31	0	0	0	1	1	19	5	**92**	**24**	**26.1**	
	Total	71	48	52	3	35	4	74	2	47	23	25	6	49	13	**351**	**99**	**28.2**	
% Trained by Woreda		**67.6%**		**5.8%**		**11.4%**		**2.7%**		**48.9%**		**24%**		**26.3%**					

Source: Review of records of Woreda Health Offices, April 2010. GMP = General Medical Practitioner, Clinical staffs = (GMP + Health Officers + BSc, Diploma and Junior Nurses+ health assistants)

I-Principal investigator CV

I - Personal Details

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II – Educational Background

S. No	Place	Year
1	Bensa Daye primary school	1975—1992 E.C
2	Aleta Wondo Secondary high school	1983—1988 E.C
3	AAU Faculty of Medicine Centralized School of Nursing, Diploma in Nursing	1990—1992 E.C
4	Debub Univerisity, Dilla Teacher Education and health science College, Degree in Public Health	1994—1996 E.C

III- Work Experience

S .No	Work Place	Zone	Position	Year
1	Aroressa Health center	Sidama	Staff Nurse	1990—1993E.C
2	Aroressa WorHo	Sidama	Head, Woreda Health Office	1993—1994 E.C
3	Bensa WorHo	Sidama	Head, Health service program.	Since 1997 E.C

IV-References

1- Mesay Hailu Head, Sidama Zone Health Department 091138966

2- Asechenak Zerihun PHAM, Sidama Zone Health Department 0916830178

3- Getachew Samuel HIV/AIDS pre, and con. Desk, Sidama Zone Health Department. 0916830213

Declaration

I, the undersigned, declare that this is my original work and has never been presented by another person in this or any other University and that all the source materials and references used for this thesis have been duly acknowledged.

Name: _____

Signature: _____

Place: _____

Date of Submission: _____

The thesis has been submitted for examination with my approval as a university advisor.

Name of advisor: _____

Signature: _____

Date: _____