

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 and Laboratory Training Program (EFELTP)

By:

Gebrekrastos Negash

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

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Addis Ababa, Ethiopia

Addis Ababa University, College of Health Sciences

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Examiner

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List of Abbreviations/acronyms

A/Tsimbla	Asgede Tsimbla
AAU	Addis Ababa University
AHO	Ahferom Health Office
ART	Anti- Retroviral-Therapy
AURI	Acute Urinary Infection
BEmOC	Basic Emergency Obstetrics Care
EFELTP	Ethiopian Field Epidemiology & Laboratory Training Program
EHNRI	Ethiopia Health & Nutrition Research Institute
EOS	Expanded outreach strategy
EPHA	Ethiopian Public Health Association
HC	Health Center
HCT	HIV Counselling and Testing
HEW	Health Extension Worker
HF	Health Facility
HH	House Hold
IDSR	Integrated Diseases Surveillance and Response
K/humera	Kafta humera
OTP	Outpatient Therapeutic Program

PITC-----Provider Initiated Testing and Counselling

PMTCT-----Prevention of Mother-to-Child Transmission

RHB-----Regional Health Bureau

S/humera-----Setit humera

SAM-----Severe Acute Malnutrition

TFP-----Therapeutic Feeding Program

TFU-----Therapeutic Feeding Unit

TRHB-----Tigray Regional Health Bureau

TRHB -----Tigray Regional Health Bureau

ULD-----Unknown Liver Diseases

UNICEF-----United Nations Children Fund

VCT-----Voluntary Counselling and Testing

VOD-----Veno Occlusive Diseases

WHO-----World Health Organization

Preface

This compiled body of works contains many outputs which, all of them were done during the residency time of the program. This body of works are categorized in to nine chapters. Each chapter is mentioned as follows:

The first chapter contains outbreak investigations: Many outbreak investigations were conducted; the first investigated outbreak was measles in Tigray region, western and north western zones from October 2010-june2012. Out of this outbreak abstract was prepared and submitted to different scientific conferences and accepted nationally in the Ethiopian public health association and accepted and presented in the AFENET international scientific conference, which was held in Tanzania. Some of the other investigated outbreaks were anthrax in Tigray region, Tanqua abergele district, May, 2011, Pertussis in Berhaile, Afar region from December to January 2011, relapsing fever in Mekelle, Tigray region from January 24 to 27. Abstract of anthrax outbreak was submitted to TEPHINET, Atlanta.

The second chapter is surveillance data analysis; Acute Watery Diarrhoea (AWD) data of Tigray Region from 2006 -2009. The third chapter is evaluation of malaria surveillance system in western zone of Tigray region. The fourth chapter is description of Health profile of Ahferom district in Central zone of Tigray region. The fifth and sixth chapters are development of abstracts and manuscripts for scientific presentations and according to this three abstracts have been written and out of these two were submitted, one accepted and presented in AFENET international conference which was held in Dar Salaam, Tanzania. The other abstract was accepted in the EPHA national conference which was held in Addis Ababa.

The seventh output is Meher humanitarian need assessment which was conducted in selected districts of Tigray region on November2011. The eighth output is A Protocol/proposal namely “retrospective Assessment on dog bite injury in Tigray region from 2007-2011 which was also developed as one of output for accomplishment of this masters program.

The ninth chapter contains activities done in addition to the main out puts which are mentioned as follows. Ten years retrospective assessment on ULD was collected from selected health facilities of Tigray region and Amhara regional states in August 2011. Exposure to trace metals was assessed in Akaki subcity of Addis Ababa, from July 5 to July 11/2011. Integrated supportive supervision (ISS) of TRHB which was conducted from September 16-October 15/2011 in Tigray region.

Narrative report of Tigray Regional Research laboratory activity has been developed and is included in this additional out puts.

Different trainings and conferences of public health have been conducted in different places at different times, to mention some of these, PHEM training in Adwa, Surveillance and EPI training in Mekelle, and conferences like 23rd EPHA conference in Addis Ababa, AFENET conference in Tanzania, 13th world congress on public health in Addis Ababa, ULD/VOD conference in Shire, Tigray region. I was participated as trainers and participants in those and others, and included under the additional outputs.

Chapter 1: outbreak investigations

1.1 Measles outbreak investigation in western and north western zone of Tigray region, Ethiopia in October 2010 -January 2011

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Abstract

Background: Measles is a highly infectious virus transmitted through contact with fluids from an infected person's respiratory secretions. Measles causes high morbidity and mortality particularly in developing countries. An average of 10-15 measles cases per year were reported in western and north western zone of Tigray region during the previous 4 years. We investigated an occurrence of extended measles transmission in a remote area to confirm the existence of outbreak, identify the etiologic agent and provide guidance on prevention and control measures.

Methods: A descriptive study was conducted and case definition for measles was applied, a suspected measles case was defined as any person with fever and maculopapular rash, and cough, conjunctivitis, or cornea or a patient diagnosed with measles by a clinician. From January 28- 31, 2011 attempts were made to identify all cases by collecting a line list of cases from health facilities in the affected zones and data was analyzed by MS-Excel. Blood specimens from 5 suspected cases were collected in December 2010.

Result: From October 2010 to January, 2011 a total of 408 clinically suspected cases and 16 deaths were reported. The case fatality rate was 4%. The median age of suspected cases was 18.3 years (range 3 months-36 years) and 228 (56%) cases were ≥ 15 years of age. Three quarters (75%) of cases were male. The majority of cases, 352 (88%), were unvaccinated or had unknown vaccination status. The attack rate of 10/10,000 was highest in the western zone where 379 (93%) cases were reported. In the North western zone there were 29 (7.1%) cases with an attack rate of 2/10,000. Of the 5 blood specimens collected for testing 3 (60%) were positive for measles specific IgM.

Conclusion and recommendation: A laboratory confirmed outbreak of measles occurred over a period of 5 months in primarily affecting those ≥ 15 years of age. The older age of those affected in

this outbreak combined with low levels of measles immunization suggests that both routine and supplementary immunization activities need strengthening. Immunization campaigns may need to include older age groups to improve herd immunity.

1.1.1 Introduction

Measles is an infection of the respiratory system caused by a virus, specifically a paramyxovirus, of the genus *Morbillivirus*. It is one of the leading causes of death among young children even though a safe and cost-effective vaccine is available. Measles is spread through respiration (contact with fluids, from an infected person's nose and mouth, either directly or through aerosol transmission). Its reservoir is human beings. It is highly contagious—90% of people without immunity sharing living space with an infected person will catch it. The infection has an average incubation period of 14 days (range 6–19 days) and infectivity lasts from 2–4 days prior, until 2–5 days following the onset of the rash (i.e. 4–9 days infectivity in total).¹

In 2008, there were 164 000 measles deaths globally – nearly 450 deaths every day or 18 deaths every hour. More than 95% of measles deaths occur in low-income countries with weak health infrastructures. It remains one of the leading causes of death among young children globally, despite the availability of a safe and effective vaccine. An estimated 164 000 people died from measles in 2008 – mostly children under the age of five².

An average of 10-15 measles cases per year were reported in western zone of Tigray region from 2007-2010. Starting from October/2010 the number of measles cases was raised i.e. 0 in sep, 9 in oct, 64 in Nov, 272 in December, 59 in January and 4 in February. On 4th week of January/2011 the western zonal health office called the regional health bureau to manage the outbreak. The zone has four Districts with population size of 375646, it is located about 600 km far from Mekelle (capital city of Tigray Region). It is border to Sudan in the west and Eritrea in the north. The area is Hot and harsh environment and it is also endemic for many febrile diseases like malaria, kala-azar (visceral leishmaniasis), typhoid fever and others. This zone is the most agricultural zone of Tigray region. This zone has: 49 health post, 18 health center, 1 hospital, 4 physicians, 12 health officer, 4 midwife nurses, 122 nurse and 115 health extension workers. This area receives only 12 hours electric power supply.

1.1.2. Objectives

1.1.2.1. General objective

- ❖ To investigate outbreak of Measles in Western and North western zone of Tigray region

1.1.2.2. Specific objectives

- To confirm the existence of outbreak
- To identify the possible reasons for the occurrence of the outbreak
- To describe the outbreak in respect of time, place and person

1.1.3. Methods and materials

Study design: Cross sectional descriptive study was carried out and data was collected using standard case definition.

Study area: western zone of Tigray region

Suspected Case definition: Any person with fever and maculopapular rash and either cough, conjunctivitis, or cornea and/or diagnosed by clinician as measles

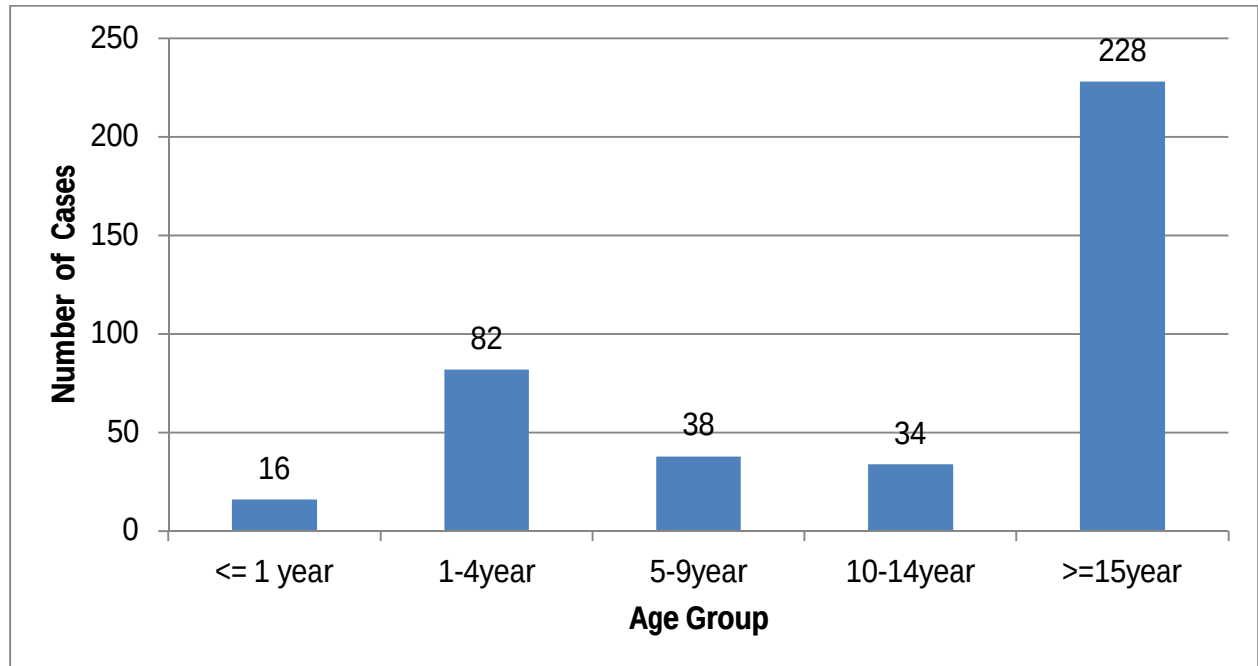
Attempts were made to identify all cases by distributing the case definition guide line to all health institutions and notifying the community leaders and health extension workers to report any case to near health facility. A line list of all cases was collected from all health sectors and data was analyzed by ms-excel. The standard line list was used for all new cases, to collect information on date of onset, age, sex, address, date seen at health facility, specimen taken & vaccination status. 5 Samples were sent to EHNRI, laboratory Confirmation. Other techniques used to identify additional cases included informing public administrator committee to mobilize their society to report any case to the nearer health facility.

Health experts were interviewed for Vaccine storage conditions and refrigerator handlings.

1.1.4 Results

From October 1-- to January 31, 2011 a total of 408 clinically suspected cases and 16 deaths with case fatality rate of 4% have been investigated .the Median age of suspected cases was 18.3 years, and Age range 3 months-36 years. Majority of the cases 303 (75%) were males. Almost all 352(88%) of cases were unvaccinated or had unknown vaccination status. 3/5 (60%) specimens sent to EHNRI for lab. Confirmation were positive for measles specific IgM.

Figure 1.1 Age distribution of measles cases in western and north western zone of Tigray, Ethiopia, october2010 to January 2011



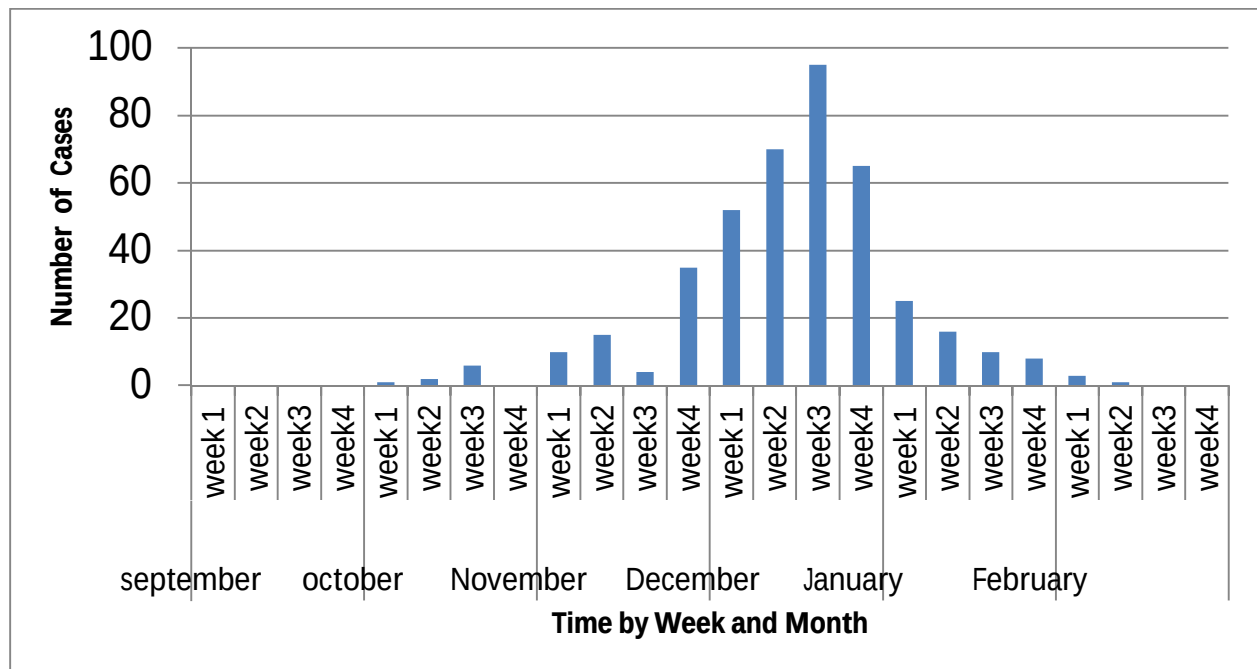
From the above graph, we observe that the disease was occurred among the age group of 15 years and above followed by the age group 1-4 years of old, this shows that it is adult measles which is not common in most countries,

Table 4.1 Distribution of suspected cases and deaths due to measles in western and north western zone of Tigray region ,Ethiopia October to January 2010/11

District	Suspected cases	Population size	Attack rate/10,000	Death	Case fatality rate(CFR)
Tsegede	86	109281	7.87	3	3.48 %
Welkait	172	147086	11.6	10	5.8 %
K/Humera	51	96809	5.3	1	1.96 %
S/Humera	70	22470	31.2	1	1.43 %
Asgede	29	142424	2	1	3.45 %
Tsimbla					
Total	408	528070	7.9	16	3.92 %

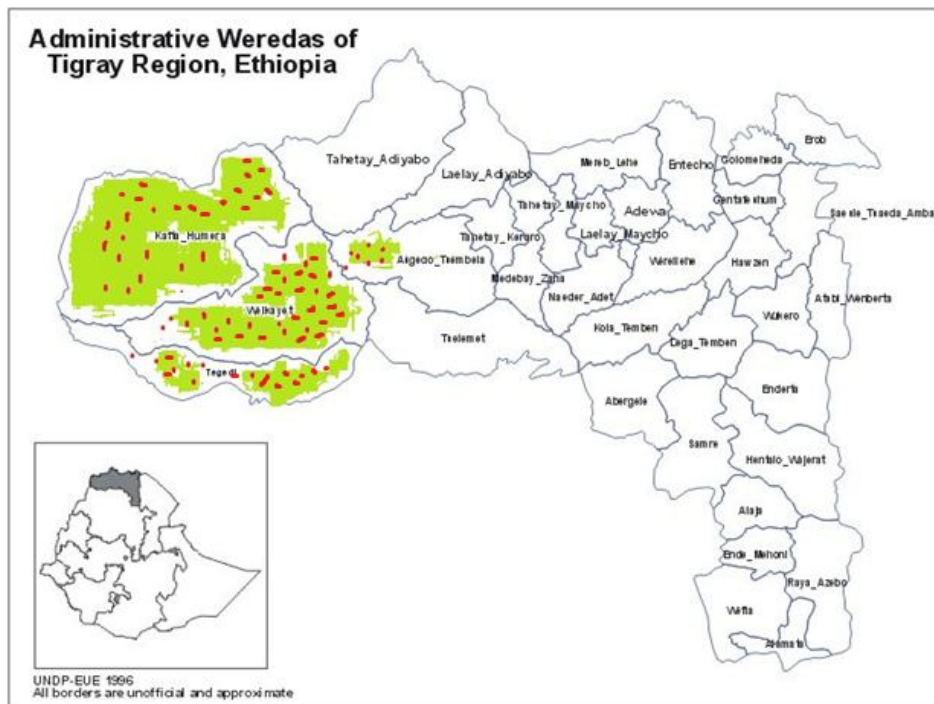
From this table we notice that the attack rate was higher in Setit Humera district with attack rate of 31.2 per 10,000 when compared with other districts, then this is followed by Welkait district with attack rate of 11.6 per 10,000.but when we see the case fatality rate it was higher in Welkait district with CFR of 5.8% followed by Tsegede with CFR of 3.48%.

Figure 2.2 Measles epidemic trend in western and north western zone of Tigray region,Ethiopia October-January 2010/11



This epidemic curve shows that the occurrence of diseases starts at second week of October and then it reaches at its peak level at the third week of January /2011.but no more cases were reported after the first week of February.

Figure1.3 Measles spot map in western and north western zone of Tigray, Ethiopia during October -January 2010/11



As we see in the figure 3 above the red dots represents the suspected cases and the yellowish shaded area is the affected area. The number of the dots does not exactly represent the number of the cases, one dot represents 5 cases. The disease started first at Tsegede and then spreads to the neighbouring areas. 38 (9%) cases have developed complications like pneumonia, diarrhoea and dehydration.

The case based report showed that first case seen at Tsegede and then spread to Kafta humera, to Welkait, Setit humera and finally to Asgedetsimbla.

According to interview the health professionals, the obtained result reveals that poor vaccine transportation and storage, low power supply for refrigerator and poor infrastructure (transportation) have contributed high value for low vaccine coverage.

1.1.5 Discussion

A laboratory confirmed measles outbreak has been investigated, 408 suspected cases with case fatality rate of 4%. A confirmed measles cases with case fatality rate of 8% cases have been reported in Somali Minneso since February 2011, and is sever than the outbreak occurred in Tigray, Ethiopia (2).

The West African sub region reported the highest measles morbidity between 1992- 1997 (121 measles cases per 100,000 inhabitants) this is higher when compared with this outbreak which has measles morbidity of 79/100,000 inhabitants. During the same period, the reported measles incidence in Central Africa and Eastern Africa was 81/100,000 and 78/100,000 inhabitants respectively which is similar with this finding. However, in 2000, lower morbidity of measles was reported from Southern Africa - 58/100,000 and countries in special circumstances (i.e. Angola, DR Congo, Ethiopia and Nigeria) - 33/100,000 inhabitants.

In contrast, significant reduction in reported measles incidence and mortality has been observed recently in countries in the Southern African sub region which have achieved and sustained high (i.e. >75%) routine measles vaccination coverage for several years. In some cases, measles incidence has shifted to older age groups, recent outbreaks in Cape Verde (1997) and Seychelles (1998) involved mainly individuals older than 15 years of age (5,6). This shows similar findings with this outbreak where individuals greater than 15 years of age were highly affected. Case fatality rate of 4 % similar with other countries which is estimated to be 3%-5%, but may reach to 10%-30% in some sub Sahara Africa (3, 5, and 6).

1.1.6 Conclusions:

A laboratory confirmed outbreak of measles occurred in north-western and western zones of Tigray. The largest proportion of cases occurred in the adult population. Occurrence and accumulation of susceptible population likely contributed to the outbreak. Sufficient vaccination of those of < 5 years of age may have protected them from illness. The infection was possibly introduced from Tsegede then spread to other parts of the zone.

1.1.7. Control actions taken

Health education on immunization of all susceptible infants and children were given to the community. Immunization program was planned nationally and the team focused for the local health officials on its implementation as it is part of prevention of this outbreak. The community was informed and obligated to report any case immediately to local health institution. The team discussed with the zonal administrations to solve problem with cold chain. The team promised to lobby to RHB to provide transportation and the local leaders planned to sensitize the local society in purchasing motor vehicles. Lack of electric supply will be solved according to the Ethiopian electric corporation program.

1.1.8. Recommendations:

Undertake routine and supplementary immunization campaigns focusing on all those without previous measles vaccination. Further analytical study that provides credible evidence should be carried out so that inclusion of adults in immunization will be considered. Woreda health office should ensure effective cold chain management. Reporting and notification of outbreaks from Woreda level to region should be immediate. The regional health bureau should follow for the implementation of those recommended actions.

1.1.9. References

1. David L. Heymann Control of communicable diseases manual. 19th edition pg.402.
2. Filia A, De Crescenzo M, Seyler T, et al. Measles resurges in Italy: preliminary data from September 2007 to May 2008. Eurosurveillance 2008; 13:pii=18928. Available at <http://www.eurosurveillance.org/viewarticle.aspx?articleid=18928>
3. World Health Organization: Measles. Media centre Fact sheet N°286: available at <http://www.who.int/mediacentre/factsheets/fs286/en/> date of accesses January 29/2011.
4. Eurosurveillance Editorial Team. Measles once again endemic in the United Kingdom. Euro surveillance 2008;13:1. Available at <http://www.eurosurveillance.org/viewarticle.aspx?articleid=18919>.
5. World Health Organization. Guidelines for Measles Surveillance. Regional Office for Africa: AFRO Measles Surveillance Guidelines, 2004.
6. 6. Clement CJ, Strasbourg M, Cutts FT, Torel C. The epidemiology of measles. World Health Stat Q. 1992, 45:285-291 lec5.pdf. available at: <http://www.columbia.edu/itc/hs/pubhealth/p8473/misc/salama> -
5 [http:// www.hemson.com/rmathew/ethiopia link page.html](http://www.hemson.com/rmathew/ethiopia link page.html)
6. Measles in Africa Burden of Disease WHO report of vaccine preventable disease WHO/AFRO available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5847a2.htm

1. Outbreak investigation of anthrax in Tanqua Abergele district, Tigray region, Ethiopia may 2011.

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Abstract

Introduction: Anthrax is an acute bacterial zoonotic disease caused by a gram-positive bacterium, bacillus anthracis. In Ethiopia, a total of 1219 suspected Anthrax cases and 16 deaths attributed to anthrax were reported in 2011. We investigated an occurrence of anthrax outbreak in Tanqua abergele district, Tigray region to confirm the existence of outbreak, to describe in respect of time, place, and person and provide guidance on prevention and control measures.

Methods: Descriptive cross sectional study conducted, a suspected cutaneous anthrax case was defined as any person with skin lesion evolving over 1 to 6 days from a popular through a vesicular stage to a depressed black scar invariably accompanied by oedema. From May 28 – 30, 2011 attempts were made to identify all cases by collecting a line list of cases from health facilities in the affected district. The line list was used for all cases, to collect information on date of onset, age, sex, address, date seen at health facility, & outcome and data was analyzed by MS-Excel.

Result: From May 9- 30, 2011 a total of 21 clinically suspected cases and 3 deaths were reported. Majority of the cases, 18(85%) had been developed cutaneous anthrax, but a few of them 2 (10%) had respiratory or pulmonary anthrax, and only one case had gastrointestinal anthrax. 12(57%) of the cases were males and 9(43%) females. The mean age of the cases was 9 year with range 2 months to 24 years. The case fatality rate is 9.5%.

Conclusion and recommendations: A suspected anthrax outbreak with high case fatality rate has been occurred among young population age groups. Immunization of livestock with removal of dead animal due to anthrax may limit the morbidity and mortality of the diseases.

Key words: Anthrax, anthrax outbreak, Ethiopia

1.2.1. Introduction

I. Back ground information

On the third week of May, 2011, Tanqua Abergele health office announced and requested assistance to the regional health bureau when this excessive number of cases and deaths observed in Sye kebele, which is one kebele in the district. The kebele, which has one health center with total population size of 5446, is located about 200 km to the south west from Mekelle. It is known for its hot and harsh environment. It has no electric supply; cases had been reported from other kebele of this district.

II. Clinical information

Anthrax is an acute bacterial zoonotic disease caused by a gram-positive bacterium, *Bacillus Anthracis*. Human beings almost invariably contract anthrax from animals. Recent events have, however show the potential of this organism in deliberate causation of damage to human health, leading to considerable mortality, morbidity and panic amongst the communities. Anthrax is primarily a disease of herbivores animals^{1,2&3}.

In human there are three possible forms of the disease, anthrax, which depends on route of exposure. Historically, the most common form has been *cutaneous anthrax*, in which the organism is spread through contact with tissues of any parts of livestock or wild animal (cattle, goat, sheep etc...) dying of the disease and through biting of flies that have feed on such animals, contact with soil contaminated by infected animals and then enters through a break in the skin. The cutaneous form begins as a papule at the entry site that progresses over several days to a vesicle and ulcerates. Edema sometimes massive surrounds the lesions, which then develops a characteristic black Escher. The patient may have fever, malaise and headache. A small percentage of cutaneous infections become systemic and these can be fatal³.

A more serious form is *inhalation anthrax*. Here the victim breathes in the organism and develops a severe respiratory disease. Systemic infection resulting from inhalation of *Bacillus anthracis* has a mortality rate approaching 100%. Initial symptoms are vague and flu-like, progressing to hypotension, shock and massive bacteremia and toxemia. The severe symptoms are believed to be the result of the bacillus exotoxins.

After acute symptoms have appeared, antibiotics can kill the organisms, but will not destroy the powerful toxins that have already been formed, and the person commonly dies in 2-3 days from respiratory failure, sepsis and shock.

The third form, *intestinal anthrax*, is contracted from the consumption of contaminated meat. In industrialized countries this is not usually a risk, although rare exceptions have been described. In August 2000, the Minnesota Department of Health was notified that *Bacillus anthracis* had been isolated from a steer on a farm in Roseau County. The infected steer was one of five dead cattle found in a pasture. On the basis of identification of the bacteria by phage typing of isolates cultured from tissues and blood samples by the North Dakota State University Veterinary Diagnostic Laboratory, anthrax was confirmed. A report of this incident described the management of and public health response to human exposure to meat contaminated with anthrax³.

In countries where hunger is a serious problem, ingestion of contaminated meat is more of a risk than it is in the U.S. Oropharyngeal anthrax begins with severe sore throat or with an ulcer in the oropharyngeal cavity, accompanied by neck swelling and fever. Gastrointestinal anthrax begins with anorexia, nausea, vomiting and abdominal pain. There may be hemorrhagic diarrhea. Intestinal anthrax can become systemic and lead to death. The infection has an average incubation period of 1-7 days although incubation periods up to 60 days are possible^{3, 4, & 5}.

III. Epidemiological information:

Domestic or wild animals become infected when they ingest spores while grazing on contaminated grass, was estimated in 1958 that between 20,000 and 100,000 cases occurred annually worldwide^{6&7}. In more recent years, anthrax in animals has been reported in 82 countries, and human cases continue to be reported from Africa, Asia, Europe, and the Americas.^{8,9} In the 1996–1997 global anthrax report, there appeared to be a general decrease in anthrax cases worldwide; however, anthrax remains under diagnosed and underreported.¹⁰ In the United States the annual incidence of human anthrax has steadily declined from about 127 cases in the early part of the 20th century to about 1 per year for the past 10 years. In Ethiopia, 1219 suspected Anthrax cases and 16 deaths attributed to Anthrax were reported in 2011.

1.2.2. Objectives: The main objectives of the investigation were:

- I. To confirm the outbreak,
- II. To identify the source and mode of transmission of the outbreak
- III. To describe the outbreak in terms of person, place and time
- IV. To control and prevent further spread of the diseases after investigating the etiological factor

1.2.3. Materials and methods:

Study area: Tanqua abergele district, central zone of Tigray region

Study design: Descriptive cross sectional study was conducted and suspected case definition was used, based on that a **suspected case of anthrax was** any person with acute onset characterized by several clinical forms which are:

- A) Localized form cutaneous: skin lesion evolving over 1 to 6 days from a papular through a vesicular stage to a depressed black eschar invariably accompanied by oedema that may be mild to extensive.
- B) Systemic forms:
 - Gastro intestinal: abdominal distress characterized by nausea, vomiting, anorexia, and followed by fever
 - pulmonary (inhalation): brief prodrome resembling acute viral respiratory illness, followed by rapid onset of hypoxia, dyspnoea and high temperature, with x-ray evidence of mediastinal widening
 - meningeal: acute onset of high fever possibly with convulsions, loss of consciousness, meningeal signs and symptoms, commonly noted in all systemic infections and has an epidemiological link to confirmed or suspected animal cases or contaminated animal products.

No specimen was taken for laboratory Confirmation. A line list of all cases was collected from the health center. The line list was used for all cases, to collect information on date of onset, age, sex, address, date seen at health facility & outcome. Diagnosis was based on clinical symptoms. The team visited and interviewed the exposed household on their history.

1.2.4. Results and discussions

From May 28 to May 30, 2011 anthrax outbreak investigated and according to these 21 suspected cases and 3 deaths had been identified.

Among the total 3 deaths, the two deaths were from one household who ate meat of goat which was died of suspected anthrax. The family members of the household are 9 and all ate the infected meat on 09/09/2003 E.C, then a female 5 years of age become ill on 12/09/2003 E.C. She was referred to Temeben Hospital on 14/09/2003 and immediately she died as a result of respiratory problem. From the same house hold a female 14 years of age laid up on 13/09/2003 and she came to health center on

15/09/2003. On the same day she was referred to Hospital and passed away on arrival as a result of respiratory problem. The third death was 14 year male and he expired on 13/09/2003 at his home.

The other members of the house hold ,two twins male and female whose age is one year , one male seven years of age ,one female 13 years of age, had been ill on 14/09/2003 and then all were referred to the hospital .They were admitted and treated with crystalline penicillin.

Other neighbouring of the house hold bought and consumed the infected meat from the house hold. Post exposure prophylaxis was provided to them.

Majority of the cases, 18(85%) had been developed cutaneous anthrax, but a few of them2 (10%) had respiratory or pulmonary anthrax, and only one case had gastrointestinal anthrax.

12(57%) of the cases were males and 9(43%) females. The mean age of the cases was 9 year with range 2 months to 24 years. The case fatality rate is 9.5%. The age distribution of the cases is described in figure 1 below.

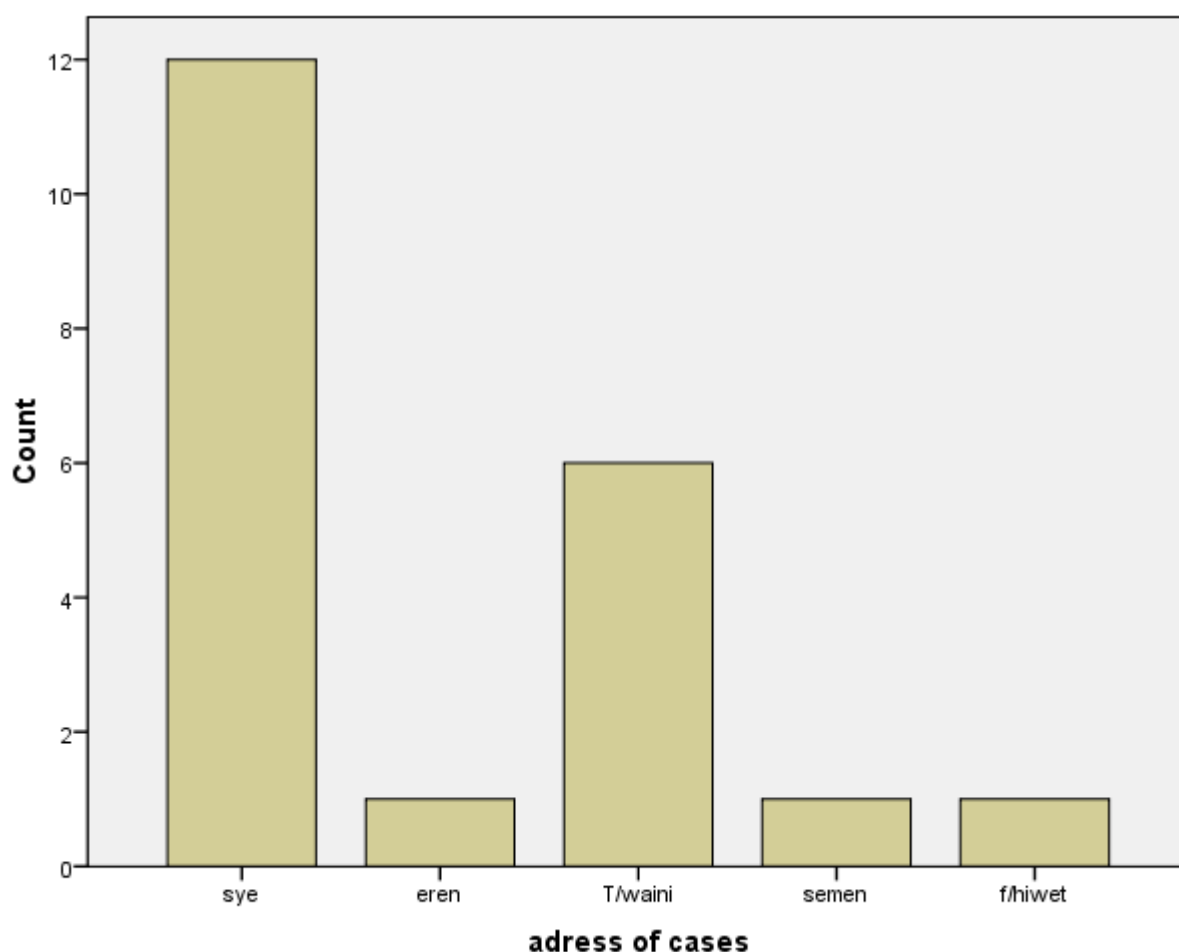


Figure 1. 4 Distribution of Anthrax cases by kebele in Tanqua Abergele district, Tigray region, Ethiopia ,may 2011

N.B count = number of cases, and address of cases = address of anthrax cases

As we observe from the above table, most of the cases were reported from Sye, this is the place where the suspected goat died. The goat which is suspected to be the source of the infection was died there. Peoples who are in the neighbouring of this kebele bought and consumed meat from that goat but don't acquired the infection, this may be due to the reason that they were provided with post exposure prophylaxis promptly. In the early part of the 20th century, inhalational anthrax cases were reported in rural villagers in Russia who worked with contaminated sheep wool inside their homes.¹¹ five inhalational anthrax cases occurred in woollen mill workers in New Hampshire in the 1950s. In this outbreak two cases had reported respiratory i.e. pulmonary anthrax similar with the above condition though the geographic coverage is not comparable. The largest reported human anthrax epidemic occurred in Zimbabwe from 1978 through 1980, with an estimated 10,000 cases. Essentially all cases were cutaneous, including rare gastrointestinal disease cases and eight inhalational anthrax cases; although no autopsy confirmation was reported.¹²

A study conducted in Gondar College of Medical Sciences, showed that twenty-seven patients with cutaneous anthrax and 3 deaths were identified over a three-year period at Gondar College of Medical Sciences in North Central Ethiopia and eighteen patients were clustered within four families in which an attack rate of 32% occurred. When this is compared with the current situation it is not exaggerated to say this was worse than the condition in Gondar as it is in very short period of time.¹³

A total of 1219 suspected Anthrax cases and 16 deaths attributed to Anthrax were reported from four regions in 2003. National attack rate was 1.6 per 100,000 populations and cases fatality rate was also 1.3%. Of the cases in Tigray 396(32%), Amhara 296(24%), SNNP 463(38%) and Oromia 64(5%) were reported sporadically from regional states¹³. The case fatality rate of this outbreak 9.5% is greater than the national CFR (1.3%) and this may be due to the inaccessibility of health care service in the affected district¹³.

1.2.5 Conclusion:

A suspected anthrax outbreak with high case fatality rate had been occurred among young population age groups. Majority of the cases had developed cutaneous anthrax with some intestinal anthrax and females were highly affected than males. Possible source of the outbreak was goat meat contaminated with anthrax then route of exposure might be mainly cutaneous exposure to the contaminated meat.

1.2.5. Control actions taken:

- A. The cases were treated with crystalline penicillin and Doxycycline antibiotics
- B. Incineration at the site of death was conducted.
- C. Health education was given to the community on its source, mode of transmission and how to prevent of the diseases.
- D. Attempts were made to meet veterinarian, unfortunately no veterinarian found in the area.
- E. The community was informed to report any case immediately to local health institution.

1.2.6. Recommendation: The district health office was recommended that:

- Any ruminants of the dead goat at the site of death or away should be incinerated.

The livestock/agricultural sector were recommended that:

- All domestic animals at risk should be immunized
- Any symptomatic animal should be treated with penicillin or tetracycline, immunize them after cessation of treatment and those animals should not be used for food until a few months have passed.

Reference:

1. WHO, Guideline for the surveillance and control of anthrax in human and animals WHO/EMC/ZDI/98.6
2. WHO Regional office, Manual for laboratory diagnosis of anthrax SEA-HLM-371 , WHO regional office for south east Asia , new Delhi
3. David L. Hermann, control of communicable diseases manual, 19th edition.pg 408.
4. [Http://www.nejm.org/](http://www.nejm.org/) www.ncbi.nlm.nih.gov/pubmed/15861891
5. Integrated diseases surveillance and response manual, WHO/RHB,2009
6. Maier. A Connolly communicable diseases control manual, a field manual, WHO/CDS/2005.27
7. Glassman HN. World incidence of anthrax in man. Public Health Rep. 1958;73:22–24.
8. Fujikura T. Current occurrence of anthrax in man and animals. Salisbury Med Bull Suppl. 1990;68:1
9. Liang X, Yu D. Identification of Bacillus anthracis strains in China. J Applied Microbiology. 1999; 87:200–203.
10. Hugh-Jones M. 1996–97 Global anthrax report. J Apply Microbiol. 1999;87:189–191
11. El-kina AV. The epidemiology of a pulmonary form of anthrax. Zh Microbiology Epidemiology Immunobiology. 1971; 48:112–116.
12. Davies JC. A major epidemic of anthrax in Zimbabwe. The experience at the Beatrice Road Infectious Diseases Hospital, Harare. Cent Afr J Med (Zimbabwe). Part 1, 1982;28:291–298; Part 2, 1983;29:8–12; Part 3, 1985;31:176–180
13. *Ethiopian Health & Nutrition Research Institute and Regional States Health Bureaus*

Chapter 2 – Surveillance data analysis

2.1 Surveillance data analysis of AWD in Tigray region, Ethiopia, 2006-2009

Executive summary

Introduction : Acute watery diarrhoea (AWD) is an illness characterized by main Symptoms like: no fever, no abdominal cramps vomiting and leg cramps , sudden onset, profuse painless watery stools (rice-water stool),nausea , vomiting early in the course of illness .in un treated cases rapid dehydration(with Signs like , Sunken eye balls ,dry mouth and tongue, absence of tears, skin goes back slowly) acidosis, circulatory collapse, hypoglycaemia in children and renal failure can rapidly lead to death. In Tigray region it is one of the main diseases which occurred in outbreaks in different times. So the main objective of this data analysis is: to estimate the magnitude of the health problem, to review the trend of the diseases, to make base line data for further assessment.

Methodology: At regional level data has been collected using semi structured checklist. Previously collected data was used and was analyzed through MS-excel.

Result and discussion:

Tigray experience a total of 6426 AWD cases and 150 deaths from 2006 to 2009 i.e. 1996(31.06%) cases and 8(10.6%) deaths in 2006, 4309(67.05%) cases and 64 (85.4%) deaths in 2007, 101(1.6%) cases and 3(4%) deaths in 2008, & 20 (0.3%) cases in 2009. In 2007, the region had an exceptionally heavy year in terms of AWD occurrence .In this year the number of reported cases and affected weredas increased , but the case fatality rate was much lower(1.6%) than in 2006(4.2%) . In 2008 the number of reported cases was radically reduced (101) with a slight increase in CFR (2.9%) when compared with 2007. In 2009 the number of reported cases as well as CFR was dropped to 20 (0.3%) and 0% respectively.

Conclusion and recommendation: The outbreak of AWD cases 2006 to 2009 mostly occurred in western and southern zones which are relatively remote areas in the region where preventive measures may not be carried out before. The TRHB should improve community-based epidemic prevention and control measures especially in those affected areas.

2.1.1. Introduction

Acute watery diarrhoea (AWD) is an illness characterized by main Symptoms like: no fever, no abdominal cramps vomiting and leg cramps , sudden onset, profuse painless watery stools (rice-water stool),nausea , vomiting early in the course of illness .in un treated cases rapid dehydration(with Signs like , Sunken eye balls ,dry mouth and tongue, absence of tears, skin goes back slowly) acidosis, circulatory collapse, hypoglycaemia in children and renal failure can rapidly lead to death.¹

AWD is one of the infectious diarrheal disease affecting humans. It is caused by the gram-negative bacteria, *Vibrio cholera* the most common responsible organisms for outbreak of AWD are Sero types *V. cholera O1 and O139*. These bacteria can live for long time in rivers and freshwater provided that nutrient levels (human feces) are high. The common factors that favours the emergence of AWD outbreak are: low coverage of safe water supply , Inadequate awareness/practices of the community on: hygiene and sanitation and food safety, poor environmental sanitation, low latrine coverage, low utilization rate, Seasonality not well understood ^(1,2)

Six pandemics occurred between 1817 and 1923, caused by *Vibrio cholera O1*, Classical biotype. The ongoing 7th pandemic is caused by *Vibrio cholerae O1*, El Tor biotype, which started in Indonesia in 1961, reached the Indian subcontinent in 1966 and then spread to the Middle East. It reached Africa in 1970 and extended rapidly throughout the continent, creating new endemic zones that had not seen cholera for over a century. It took another 20 years for the 7th pandemic to reach the Americas: the first cases were reported in Peru in 1991 and within one year the disease had spread throughout Latin America².

Humans are the main reservoir of *Vibrio cholerae*. Other potential reservoirs are water, some molluscs, fish and aquatic plants. it is transmitted indirectly from man to man thorough Fecal-oral route i.e. Drinking of contaminated water, Consumption of contaminated food as well as Contaminated fruits and vegetables.^{2,3}

AWD is one of the oldest diseases affecting humans. It is caused by the gram-negative bacteria *Vibrio cholerae*. Six pandemics occurred between 1817 and 1923, caused by *Vibrio cholerae O1*, Classical biotype. The ongoing 7th pandemic is caused by *Vibrio cholerae O1*, El Tor biotype, which started in Indonesia in 1961, reached the Indian subcontinent in 1966 and then spread to the Middle East .It reached Africa in 1970 and extended rapidly throughout the continent, creating new endemic zones that had not seen cholera for over a century. It took another 20 years for the 7th pandemic to reach the Americas: the first cases were reported in Peru in 1991 and within one year the disease had spread throughout Latin

America. Humans are the main reservoirs of *Vibrio cholerae*. Other potential reservoirs are water, some molluscs, fish and aquatic plants. AWD is often mild or without symptoms (80%), but sometimes it can be severe in (20%). Approximately one in 20 infected persons has severe disease characterized by profuse watery diarrhoea, vomiting, and leg cramps. In these persons, rapid loss of body fluids leads to dehydration and shock. Without treatment, death can occur within hours^(3,4)

The pandemic of the late 1960s hit Ethiopia in 1970 apparently from Djibouti resulting in several thousand deaths in Eastern, central and southern part and contained in 1971. AWD vaccination became a requirement for travel in to Ethiopia after this epidemic in 1973; another epidemic struck the country making its way through some Red Sea ports and the awash valley which affected Afar pastoralists & migrant farm workers on the irrigation farms in the awash valley. The AWD outbreak in 1985 apparently spread from Hararge to other parts of the country, including Addis Ababa.^(5,7)

2.2 Objectives of the data analysis:

1. To estimate the magnitude of the health problem in Tigray region
2. To review the trend of the diseases from 2007-2009 E.C
3. To make base line data for further assessment

2.3 Methodology

Suspected case definition: in a patient age 5 years or more, with severe dehydration or death from acute watery diarrhoea. In case of cholera epidemic a suspected case is any person age 5 or more with acute watery diarrhoea with or without vomiting.

Confirmed case definition: A suspected case in which *Vibrio cholera* 01 or 0139 has been isolated in stool.

Data sources: review routine surveillance report, outbreak investigations report and different cholera guide lines

Data collection: previously collected data has been used. This data was collected based on the routine surveillance report at regional health bureau based on semi structured check list.

Data analysis: Data has been analyzed through MS-excel.

2.4. Results:

1996 total cases and 151 total deaths had been reported in Tigray region from 2006-2009
1996 cases in 2006, 4309 cases in 2007, 101 cases in 2008 and 20 cases in 2009.

Table 2.1 Distribution of AWD cases and deaths in 2006-2009 in Tigray region by time and zone

Zone	Year								Total	
	2006		2007		2008		2009			
	case s	death s	Case s	Death s	Case s	death s	case s	Death s	Cases (%)	Deaths (%)
Western	1996	84	3732	34	22	0	0	0	5750(89.4%)	118(78%)
South western	0	0	238	18	69	3	0	0	328(5.1%)	21(14%)
Central	0	0	22	2	9	0	0	0	31(0.5%)	2(1.3%)
Eastern	0	0	3	1	0	0	1	0	4(0.06%)	1(0.6%)
Mekelle	0	0	0	0	0	0	4	0	4(0.06%)	0(0%)
Souther n	0	0	299	9	0	0	15	0	314(4.88%)	9((5.96%)
Total	1996	84	4294	64	100	3	20	0	6431(100%)	151(100%)

Table 2.2 Distribution of AWD cases and deaths by Time and place in the year 2006-2009 in Tigray region, Ethiopia

Years	Number of affected Woredas	Reported cases	Reported deaths	Case fatality Rate in %
2006	2	1996	84	4.2
2007	14	4309	64	1.48
2008	7	101	3	2.9
2009	4	20	0	0
Total	27	6426	151	2.3

AWD outbreaks occurred in Tigray region in the following 4 consecutive years (2006, 2007, 2008 & 2009) .In 2006 and 2007, majority of AWD cases were from Kafta Humera. The occurrences of the outbreaks showed similar seasonal trends i.e. from June - August/September.

Figure 2.1. Distribution of AWD cases by age and sex group in Tigray region, Ethiopia 2008

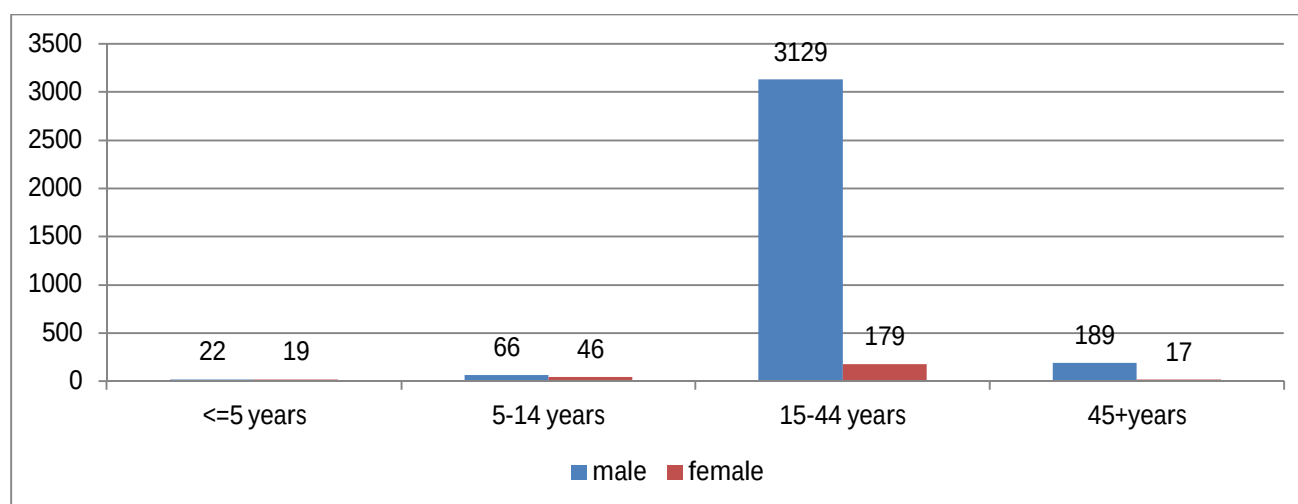


Figure 2.2 AWD cases reported by date in Tigray region, 2009

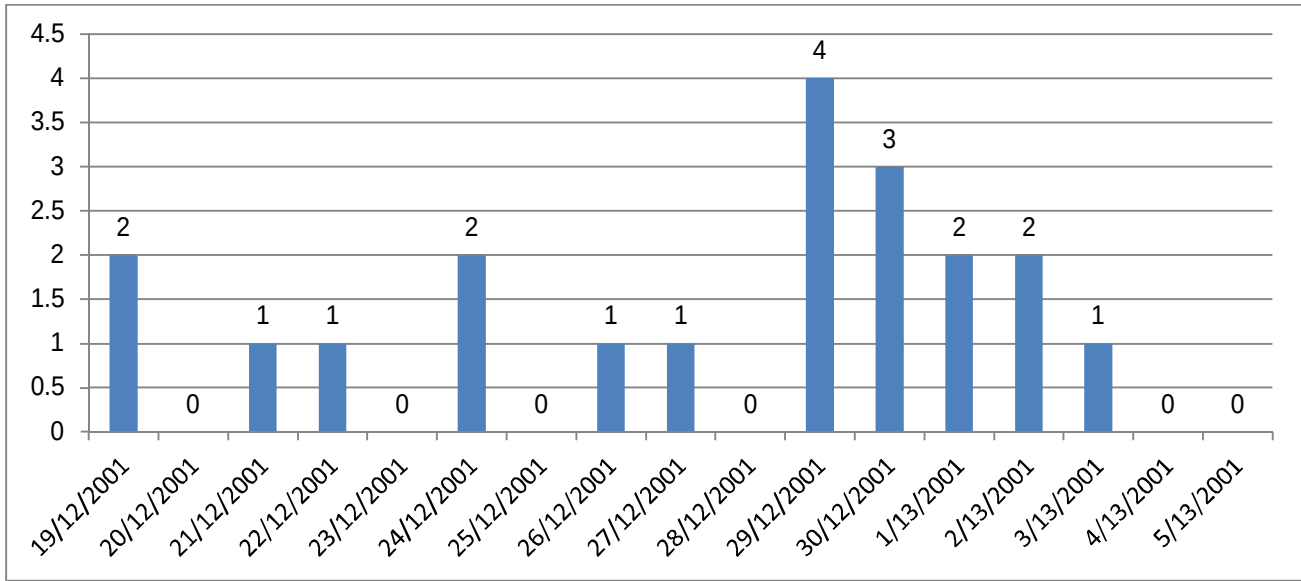
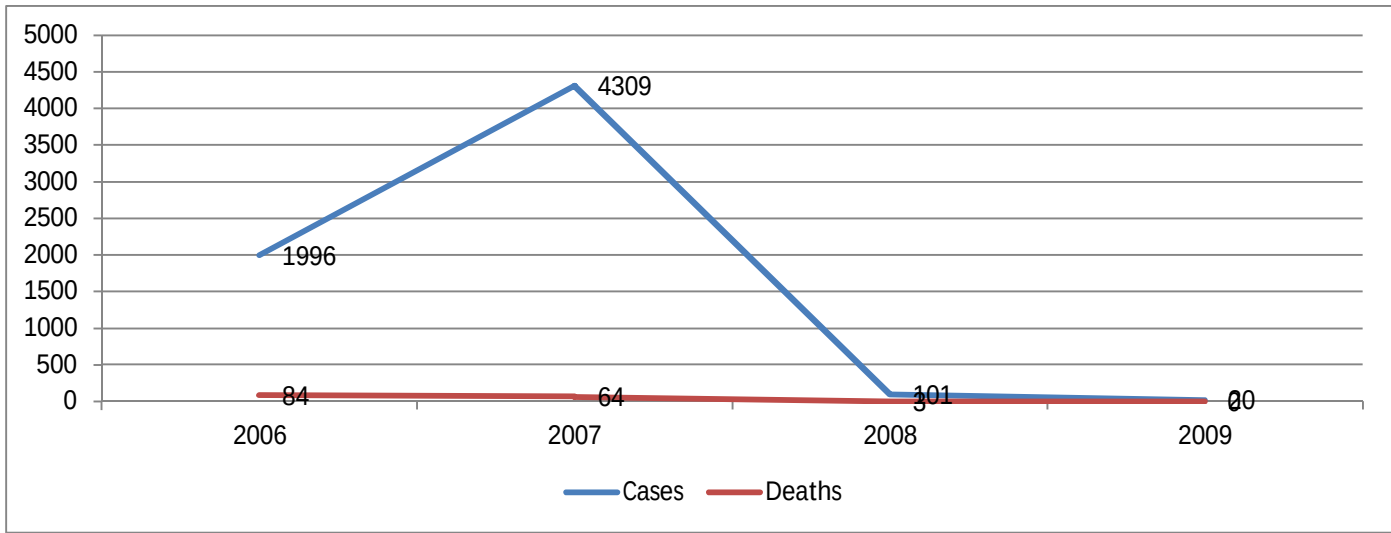


Figure 2.3 AWD cases and deaths in Tigray region 2006-2009



2.5. Discussion

Acute Watery Diarrhoea outbreaks occurred in the following 4 consecutive years (2006, 2007, 2008 & 2009). In 2006 and 2007, majority of AWD cases were from western zone (Humera) i.e. 89.4% of all the cases were reported from this zone. The occurrences of the outbreaks showed similar seasonal trends from June - August/September. Tigray experience a total of 6426 AWD cases and 150 deaths from 2006 to 2009 i.e. 1996(31.06%) cases and 8(10.6%) deaths in 2006, 4309(67.05%) cases and 64 (85.4%) deaths in 2007, 101(1.6%) cases and 3(4%) deaths in 2008, & 20 (0.3%) cases in 2009.

In 2007, the region had an exceptionally heavy year in terms of AWD occurrence. In this year the number of reported cases and affected weredas increased, but the case fatality rate was much lower(1.6%) than in 2006(4.2%). In 2008 the number of reported cases was radically reduced (101) with a slight increase in CFR (2.9%) when compared with 2007. In 2009 the number of reported cases as well as CFR was dropped to 20 (0.3%) and 0% respectively. The overall CFR for the region was 1.2%. The outbreak started during the rainy season. In 2006 the outbreak was occurred in western zone of Tigray where agricultural activity is highly practiced. In the rainy season the population density increases due to migration from different corners of the country for agricultural activities. This high population density with low latrine coverage and inadequate safe water supply are expected to be the main factors that favour the emergence of the outbreak.

When we see in gender and age distribution of Cases (figure 2.6) male were highly affected than females and the age group (15-44 years) was highly affected than the other age groups this may be due to the reason that young males move and actively participate in agricultural activities(which is the epidemic area) than females.

2.6. Conclusion

The outbreak of AWD cases 2006 to 2009 mostly occurred in western and southern zones which are relatively remote areas in the region where preventive measures may not be carried out before. Weak surveillance system (timely collecting information, completeness and reporting to the regional level may be one of the possible factors for the repeated occurrence of the outbreak for four consecutive years. The highest CFR which was 4.2% was occurred in western zone of Tigray region and this may be due to the reason that the area is inaccessibility for health infrastructure when compared with others.

2.7. Recommendation

It is recommended to TRHB and other responsible health partners that:

Long-term strategies should focus on improving safe and adequate water supply and latrine construction and utilization. Emphasis should be given in adequate preparedness and response in order to reduce mortality (CFR) especially in inaccessible zones. Improve community-based epidemic prevention and control measures. It needs further study on preparedness, response and laboratory conformation.

2.8 References:

1. Ministry of health, planning and programming service, Health and health related indicator, A.A. Ethiopia, 2003-4. 3-59.
2. David L. Hayman Control of communicable diseases manual. 19th edition pg.402.
3. <http://www.who.int/mediacentre/factsheets/fs107/en/>-accessed on 18-04-2011
4. CDC. Cholera Epidemic Associated With Raw Vegetables—Lusaka, Zambia, 2003-2004. *MMWR*. 2004; 53:783-786

Chapter 3 – Surveillance system evaluation

3.1 Surveillance system evaluation of Malaria, west zone, Tigray Region, Ethiopia, June 2011

Executive summary

Back ground: Tigray which is one of the 11 administrative regions of Ethiopia is situated in north part of Ethiopia. It is border to Sudan in the west, to Eritrea in the north, to two regions of the country Amhara and Afar in the south & east respectively. Malaria is a global public health problem that affects mostly women and children. It is ranked as the leading communicable diseases in Ethiopia, accounting for about 30 % of the overall disability adjusted life years lost. The main objective of this study was to assess surveillance system attributes, to assess core functions of surveillance with regard to malaria, to assess supportive functions related to surveillance.

Statement of the problem: Ethiopia practiced different strategies to have efficient and effective surveillance system. Most of the time, however, surveillance data for communicable diseases are not handled properly.

Rationale of the study: Use of the collected data at the local level as evidence for public health decision making is not well known. Surveillance system evaluation is not done in the area; and little is known about the effectiveness and efficiency of the system.

Methods and Materials: Study Area: West Tigray administrative Zone in Tigray Regional State.

Study Subjects: the study subjects are the selected health facilities, and health offices.

Sample Size and Sampling: 12 sites were selected purposively.

Data collection: Data was collected using questionnaire, observation and interviews for focal persons, review documents and records of some practical tools for surveillance.

Data Analysis: Data was entered and analyzed using Microsoft Excel and Epi-info version 3.2.2.

Dissemination/advocacy of the Study:

The project finding was disseminated to the regional, zonal, Woreda program managers and to the Ethiopian Field Epidemiology and Laboratory Training Program (EFELTP).

Results and discussion

I. Description of the system

Description of the diseases under surveillance. Malaria is the major disease burdens of all the 20 priority diseases under surveillance in the nation. According to the PHEM guideline there are two case definitions i.e. standard case definitions and community case definitions:

Population under Surveillance:

All population of this zone which is 375646 under surveillance for all the twenty priority diseases including malaria.

Case Detection and Registration (reporting formant)

The clinical register was found only in 60% of the visited health facilities; but the handling of these registers was poor.

There was highly shortage of reporting form in the past 6 months in 40% of the visited health facilities, and health offices.

The reporting rate of the health post and centres was only slightly higher than 25 %; and others facilities like the hospital had almost 90% report in 12 weeks time.

II. Evaluation of the performance and attributes of the surveillance system attributes

- **Usefulness** : information is not used in decision making at local level, it only detects trend
- **Simplicity** the system is Simple structure and ease of operation
- **Flexibility** the system Can accommodate new data requirements
- **Acceptability:** All Districts, Hospital and Health Facilities participate in the surveillance system
- **Representativeness:** The whole population is under surveillance; however, low health coverage may lower the representativeness of the system.
- **Timeliness and completeness** :Reporting rate is low for : which is 50% for HC,45.8% for HP, and 80% for Hospital

Conclusion: The surveillance system enables to capture cases from the community level, thus helps early detection and notification of the diseases. The system also enables to monitor the trend of the diseases, the whole population is under surveillance, However surveillance data is neither analyzed nor used properly at local level though the system is acceptable by all reporting sites. The system is simple and more flexible to operate however, its timeliness and completeness is not satisfactory.

- **Recommendation:** The district health offices are recommended to: Increase timeliness and completeness, analyze and use data for action, Conduct supervision and training for HF, prepare budget line for surveillance, document all activities.

3.1.1 Introduction

I. Back ground information:

Tigray which is one of the 11 administrative regions of Ethiopia is situated in north part of Ethiopia. It is border to Sudan in the west, to Eritrea in the north, to two regions of the country Amhara and Afar in the south & east respectively.

Burden of Malaria:

Malaria is a global emergency that affects mostly women and children. It is ranked as the leading communicable diseases in Ethiopia, accounting for about 30 %of the overall disability adjusted life years lost. Approximately 75% of the country is Malarious with about 68%of the total population of 73 million living in areas at risk of malaria. Malaria is reported to cause 70,000deaths each year.

In Tigray, of the malaria cases diagnosed, 60%are found to have been Pf while the remaining is Pv. Malaria is said to be the third cause of clinical admission consisting 2% all cases, in similar development, while 18.7% of all outpatient visits are malaria caused, 8.3% of deaths are associated with malaria. In 2009, 75822 malaria outpatient cases which is 12.1% of all outpatient cases and in 2010 a total of 83947 malaria cases which is 16.5% of all cases was reported. In 2010, out of the total 168 deaths, 35 (20.8%) of them were due to malaria ^(7, 8).

II. Statement of the problem

Public health surveillance is an ongoing systematic collection analysis, interpretation and dissemination of data regarding a health related event in community. Public health surveillance is used to assess public health status, define public health priorities, evaluate programs, and conduct research. This enables reducing morbidity and mortality and to improve health ^(2,3)

Ethiopia practiced different strategies to have efficient and effective surveillance system. Most of the time, however, surveillance data for communicable diseases are not handled properly. That means they are not collected, analyzed, and reported on time. Due to this reason their application is limited. Even though adequate information is collected, it is almost not available for use at the community level.

The ministry of health of Ethiopia identified 20 top priority diseases which are epidemic prone, of international concern and diseases on eradication and elimination programs for surveillance activities. These diseases are monitored by a designated bodies through available means of communication-telephone, paper based reporting etc. These 20 prioritized diseases are reported on immediately and weekly basis ^(4, 5).

Malaria is one of these 20 priority diseases reported as weekly basis. It is significant disease burden to the public. Diseases like malaria are of the ten top diseases throughout the nation for several years. Currently Malaria outbreak is the most frequently reported diseases in Tigray region ^(2, 6).

The overall purpose of surveillance of this diseases is to monitor the trend of the disease and to have prompt response.. Furthermore as early warning system, it guides prevention and risk aversion actions like sanitation, vector control and so on.

For these purposes, this disease has case definition(s) and integrated diseases reporting formats defined by the ministry of health and the WHO; and reporting is institutionalized into the health facilities and health offices.

Assessing the effectiveness and efficiency of this system in achieving the stated goals/ objectives is part of the development or improvement of the existing resources, infrastructure and design. This improves the information provided and thereby helps improve service provision and delivery. Especially, with the implementation of the new structure for surveillance system (PHEM) in the sector, the change in the quality of information need to be assessed particularly for diseases which exert high public health stress.

Malaria is a diseases which can be impacted for the better or worse by the change in the structure.

III. Rationale of the study:

- Malaria is the major diseases of the region with high frequency of epidemic and public health concern but relatively delayed in detection and reporting- for example, in malaria outbreak it is necessary to assess the surveillance strength in detecting it. We believe that the diseases could be used as main indicator of the surveillance system of the region.
- Use of the collected data at the local level as evidence for public health decision making is not well known;
- Surveillance system evaluation is not done in the area; and little is known about the effectiveness and efficiency of the system.

3.1.2 Objectives

3.1.2.1 General objective

- To assess malaria surveillance system evaluation in western zone of Tigray region, June 2011.

3.1.2.2 Specific objectives

- To Assess surveillance system attributes
- To assess core functions of surveillance with regard to malaria
- To assess supportive functions related to surveillance

3.1.3 Methods and Materials:

3.1.3.1 Study Area: West Tigray administrative Zone in Tigray Regional State. This zone is selected for its relative high burden of this selected disease for evaluation. The total population of this zone is estimated to be 375646 (taken from the 2007 census) with health coverage of 80%. The whole population is under surveillance for this disease.

3.1.3.2 Study Subjects: The study subjects are the health facilities (Hospitals, Health Centres, and Health Posts), health offices (Woreda Health Offices, and the Regional Health Bureau).

3.1.3.3 Sample Size and Sampling:

The Regional Health Bureau, two district health offices, one hospital, four health centres and four health posts were included in the sample.

Selection of the districts and the district health facilities was done as in the steps below:

1. From the zone two districts were selected by simple random sampling (SRS) method and the district health offices were included in the study
2. From each selected district four health centres were selected by convention on their accessibility.
3. From the total health posts under each selected health center, four were selected as above.

Finally, we have the Regional health bureau (RHB), one hospital, two district health offices, four health centres, four health Posts; totally 12 sites were assessed.

3.3.1.4 Data collection

Data was collected using questionnaire, observation and interviews for focal persons, review documents and records of some practical tools for surveillance. Data was collected by the principal investigator. There was short meeting with the Regional surveillance experts, Woreda surveillance experts, hospital

health care providers, and health extension workers. We identified the areas interest of each party and got some important information about the existing surveillance system.

This meeting was also an important first step for our assessment and recommendations; which will help for the implementation of recommendations and betterment of the surveillance and response of the major priority diseases of the evaluated zone and /or region.

We used the WHO Guideline, Protocol for the Assessment of National Communicable Disease Surveillance and Response Systems.

3.3.1.5. Data Analysis: Data was entered and analyzed using Microsoft Excel and Epi-info version

3.3. 1.6. Dissemination/advocacy of the Study:

The project finding was disseminated to the regional program managers and policy makers for possible interventions, and also was disseminated to the Ethiopian Field Epidemiology and Laboratory Training Program (EFELTP).

3.4. Results and discussions:

3.4.1 Description of the system

I. Description of the diseases under surveillance.

The PHEM core process targets 20 selected diseases. AFP/Polio, Avian Human Influenza, Cholera, Guinea Worm, NNT, measles, pandemic influenza , SARS, Small Pox, Plague, Yellow fever, Anthrax, Viral Hemorrhagic Fever ,Rabies, are to be reported immediately on detection and weekly as zero report. Meningitis, Malaria, Typhoid fever, Typhus, Relapsing fever, and dysentery are to be reported weekly.

The evaluation assessed the surveillance system of one weekly reportable disease, which is, malaria.

Malaria: In the region, malaria is the major disease burdens of all the 20 priority diseases under surveillance in the nation.

In Tigray Regional state, because of the climatic and environmental changes, 75% of the region is Malarious and 75% of the populations are at risk of malaria (1). In the region, in 2001E.C (2008-2009) of all outpatient and inpatient visits, malaria took 12.1% (with a total of 75822 cases) and 4.85% (with a

total of 3591 patients) respectively (²). In 2002, of all (655113) outpatient cases, 83947(16.5%), and of all (3526) in patient cases,583 (16.5%) cases were malaria.

In West Tigray Zone, all districts are Malarious. From week 10-46(March-Nov 2010) a total of 142,856 cases of suspected and confirmed malaria were reported , from these 506 inpatient cases,52203 cases of fever suspected for malaria, 17092 cases positive for *Plasmodium falciparum* and 9454 were positive for *P.vivax*.

Case Definitions:

According to the PHEM guideline there are two case definitions i.e. standard case definitions and community case definitions:

Suspected case definition: Any person with fever or fever with headache, rigor, back pain, chills, sweats, myalgia, nausea, and vomiting diagnosed clinically as malaria

It is very important at the community level to strengthen the notification and increase the detection rate of the priority diseases

Confirmed case definition: Any person with fever OR Fever with headache, back pain, chills, rigor, sweating, muscle pain, nausea and vomiting OR Suspected case confirmed by RDT or microscopy.

i. Population under Surveillance:

The national PHEM targets all the population in the country to be under surveillance for all the twenty priority diseases. The Tigray Regional state follows the same structure, with a total population of more than 4.6 million (projected from the 2007 national census).

Table 3.1. The Population under Surveillance in the assessed Region and Administrative Areas, by Place of Residence (Population Projected from the 2007 National Census)

Areas	Under	Total
Assessment		Population in 2011
		(Projected from the 2007 cense)
Tigray Region		4532873
West zone		375646
Kafta humera District		96809
Setit Humera district		22470

Regarding the health care services the region has 1 Regional Referral hospital and 1 laboratory Research laboratory. In terms of care the Western Zone, has two hospitals; and at the peripheral level (at the district level) 18 health centres and 52 health posts under each health centres give service for the community.

The health care post coverage of the zone is 58.5% for health posts and 75.6% for health centres. In all assessed health facilities, the respondents agree that the population under surveillance have satisfactory health seeking behaviour, and there is relative improvement through the effort of the Health Extension Program as well as women development arm (Table 2).

Table 3.2 Number of health facilities in the study areas; Western zone Kafta Humera districts and Setit Humera Districts

Administrative Area	Number of Health Facilities Expected to report						Health Coverage
	H/p ost	H/Cent er	Hos p	NG O	Other s	Tota l	
Tigray Region	538	209	13				%
Western Zone	52	18	2	0	0	70	75.6%
Setit Humera	0	1				25	86.5%
Kafta Humera	17	8				45	75%

II. Case Detection and Registration (reporting formant)

The cases definition of malaria was available in all the visited health facilities. The understanding of the available cases definitions by the health care providers was satisfactory, as demonstrated by some of the health care providers at the time of the field visit.

In one of the health posts, the community cases definition of these priority diseases was distributed to the volunteer community health workers (called as Community Surveillance Officers), and monitoring of their surveillance activity by the Health Extension Workers was good.

The clinical register was found only in 60% of the visited health facilities; but the handling of these registers was poor. 3 of the health facilities without clinical register collects data from tally sheets

distributed to the outpatient department on daily bases, but the tally sheets were not well collected and/or kept, especially on weekends. Laboratory confirmation of cases took only 15- 40 minutes,

There was highly shortage of reporting form in the past 6 months in 40% of the visited health facilities, and health offices. And in one of the districts, the Woreda health office and the health posts and health centres under it use a different reporting format for weekly reporting.

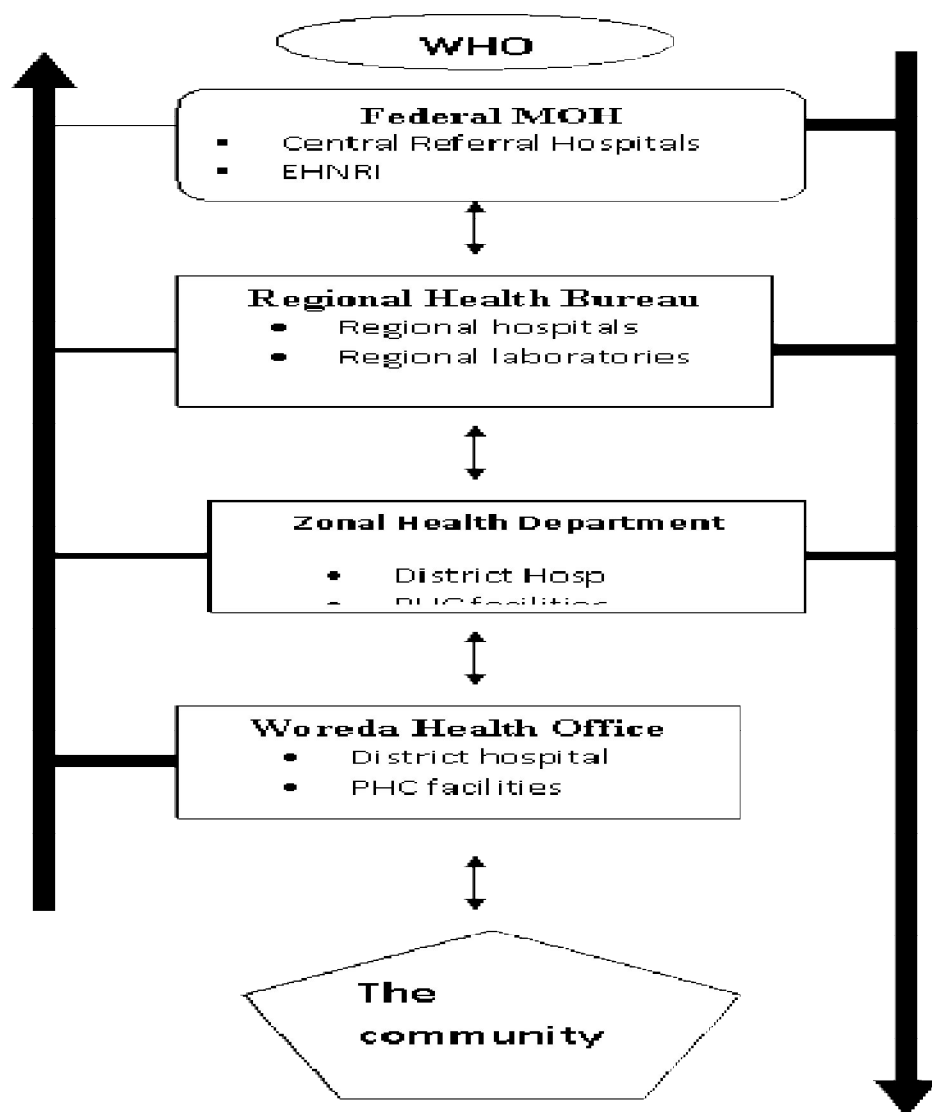
The weekly reporting rates of the visited health facilities over the past 12 weeks prior to assessment were 45.8% (11/24) for health posts, and 50% (12/24) for health centres. The overall reporting rates of the visited districts to the regional surveillance case team in 2003 EFY were 82.6% (43/52) and 88.5% (46/52) for Kafta Humera and Setit Humera districts respectively.

The reporting rate of the health post and centres was only slightly higher than 25 %; and others facilities like the hospital had almost 90% report in 12 weeks time.

All the reports were sent to the next level via telephone. However reporting through telephone is limited in health posts where there were no telephone services. In cases of emergency the HEWs uses their personal mobile phones, for which they were complaining for refund.

Information flow:

In Tigray region, the flow of information is different from other regions (e.g. Amhara), as we know there is no zonal health department in Tigray region. The Woreda health office directly reports to the regional surveillance office.



Data analysis

In few (20%) of the sampled health offices and health facilities, there was a responsible person for data analysis; however, analysis of the surveillance data was variable for these diseases at the District, and Regional health offices. Moreover, data analysis was not done on a regular basis. The threshold for action was set for malaria at all districts. Only 50% of the visited health facilities analyzed the data collected for surveillance at their capacity. The use of appropriate denominator was limited to the regional health bureau; raw numbers (not rates) were used to compare the incidences with the previous experiences at the districts and health facilities. The data was not analyzed by person, place and time in regular bases in most of (80%) of the health facilities and in few of (30%) of district health offices.

ii. Epidemic Preparedness and response

All the districts assessed have no experienced one or more types of outbreaks in the previous years. The sampled health offices (region and district) responded that they set epidemic preparedness and response plans for their priority diseases, and have epidemic management committee with rapid response team. However, except for the regional health bureau which stock drugs and other supplies of about 25% of the last year consumptions, all district have no any stock, nor budget line for emergency. The epidemic management committee and the rapid response teams are activated only when there is an event. The Tabia command post of the health sector activities did not have detailed revision of all activities related to surveillance, plans, and epidemic preparedness and response. This may undermine the attention given to surveillance and response of epidemic prone diseases- like malaria Moreover; they did not evaluate their experience and preparedness.

In the districts assessed, PHEM is raised as an agenda in the health office performance review meetings. There were neither written documents nor standard procedures for outbreak investigations.

iii. Feedback and Supervision

There was no culture of dissemination of the surveillance information nor supervision at all levels of the health system assessed.

All assessed health offices, region, and districts, responded that all the staffs working on surveillance units got short term training or workshops of 3-5 days by the Regional Health Bureau and partners. At the health facilities, only the focal person assigned for surveillance was trained,

Material resources available for surveillance

Resources for data management, communication, and logistics were all available at the region level. However, they all became very scarce down in the ladder. The computers at the district health office levels were not functional. The PHEM/ surveillance units at the district, and health facility level did not have communication ways- like telephone, fax machines, internet and so on. The logistic and budget constraints were complained by all the health units assessed except the regional level. These were mentioned frequently as the reasons for poor supervision, and monitoring of the health facility reports.

There was no a radio call system in any of the remote areas of the visited districts; which impacted the timeliness of reports of both immediately and weekly reportable diseases.

iv. The Laboratory

The laboratory capacity to collect and test and role in the surveillance of malaria was assessed both at the health facility and regional level. The region has one regional research laboratory. This is used in the outbreak investigation and confirmation at their capacities and quality assurance of facility level laboratories.

The health center level laboratories assessed were able to test malaria both by microscopy and RDT (health posts can use only RDT);

Malaria was confirmed at all levels of the health facilities-health posts, health centres. But frequent lack of reagents and RDT were common problems.

3.4. 2. Evaluation of the performance and attributes of the surveillance system

a) Usefulness

Early detection of epidemics of diseases under surveillance was a common understanding of all the respondents as the major use of the surveillance system. But the use of the system for assessment of the effect of prevention and control programs was very limited. Moreover, this well understood use of the surveillance system has so many challenges in the area of case detection, reporting and response following it.

Detection of cases

The surveillance system in the PHEM is organized in such a way that the community, health posts, and all other health facilities under the MoH will have active role in the detection of cases

This is set with cases definitions which are modified with respect to the reporting entity for early and easy case detection. However dissemination of case definitions of these diseases was very limited.

Practically, from the visited health posts, only one health post had good networking with the community and with referral system. In this health post there were volunteer community health workers, selected by the community and responsible for reporting all the health events, diseases to the health extension worker (HEW) weekly including zero reports.

Furthermore, limitations regarding the laboratory confirmations were also mentioned as the limiting factor for early cases detection. Some of these limitations were:

- Shortage of laboratory reagents- like RDTs
- Work load on the health extension workers
- Lack of resources and logistic for early case investigation at the community level
- Lack of budget for supervision of the health facilities, and early community level investigation

Providing appropriate and rapid response to epidemics

Once there is a suspected epidemic, all visited Woredas respond that, a rapid response team (RRT) from the Woreda health office will be deployed for cases investigation and case management. The usual response focuses on the case management. Investigation of potential causes and risk factors and guiding the response based on these findings was not accustomed in all visited sites.

Simplicity

In the detection of cases:

All respondents agreed that the case definitions of these diseases for identification of suspected cases are easy to understand and apply by all levels of health professionals. But to confirm cases, it was found usually difficult for factors related to shortage of RDT.

In the flux of data

The route of the data flow is clear and simple as it was set in the surveillance guideline and the reporting entities do not complain any problem in this regard. There was lack of reporting format but the data collection is not assumed to be time taking particularly the weekly reporting and case based reporting formats which took 5 min or less to fill a single report.

The major problem mentioned here was lack of reporting means to report cases to the next higher bodies especially from the health post to the Woreda health office. Logistics like telephone, public transport, internet, and fax were indicated as constraints. This impacted timeliness of the report. The health workers at the periphery usually use their personal mobile phones in case of urgent conditions.

In the data management:

Data from the health facilities were sent to the Woreda health office, and Regional Health Bureau in a paper form and use of the data was also very limited at all levels. However, transcribing the paper based data in to a data base is tried at the Regional Health Bureau only.

b) Flexibility

The previous IDSR system has been recently changed with the implementation of the current BPR and PHEM structure since 2009. This change has made the reporting format more flexible to report other newly occurring health event without much difficulty, and the formats are assumed to be easy and comprehensive, except for language barrier particularly at the health post level.

The quality of data:

The data quality was also assessed on the basis of completeness of the reporting format and the timeliness of the report as set in the guideline.

Some of the missed variables in the weekly reporting formats are *date of report was sent* (but week of report), and the *expected number of health facilities* to report. Variables like reports *hospital admission, date of admission, address, Cause of death, date of death* were missed in almost all visited sites,

c) Acceptability

The acceptability of the surveillance system assessed based on the engagement of the reporting agents and active participation in the case detection and reporting.

In the zone, the engagement of the reporting agents was not as expected and the reporting rate of the health facilities in the zone was below 50% as seen over 12 reporting weeks. The major reasons for poor engagement to the surveillance activity were poor means of communication, lack of feedback and /or of dissemination of the results or situations in their district or region, reporting formats are assumed to be time consuming, lack of understanding of the relevance of the data collected, and the health care providers are not interested to record each consultations in their clinic.

d) Sensitivity

The surveillance system to detect cases of malaria:

The sensitivity of the surveillance of these diseases in the detection of the cases and outbreaks were seen separately:

Since the surveillance system is based in the health facilities, the capacity of the surveillance system to capture cases in the community is dependent on different reasons:

Treatment like anti- malaria (coartem), otherwise, cases are not recorded and reported if they have no any drug. Hence, the number of cases reported from the health post will be high when they have anti-malaria and RDT at hand

The technical and logistic capacity of the health facilities in detection and laboratory confirmation of cases. These factors undermine the burden of cases in the community and hence the sensitivity of the surveillance to pick the case to be low.

The surveillance system to detect an outbreak of malaria

The capacity of the surveillance system to detect an outbreak is influenced by the definition of the outbreak.

In case of malaria and , the sensitivity of the surveillance system is dependent on different reasons, like regular analysis of the data, definitions of the thresholds, case detection and reporting rate of the expected health facilities and so on. unluckily, the reporting rate of the health facilities was much lower than expected as shown in above, there was no regular analysis of the collected data, And hence, the sensitivity of the cases detection and outbreak detection of the surveillance system is high likely to be lower. However, the sensitivity of the system increases once the number of cases raises high or death starts to occur, i.e. the surveillance system would be sensitive for high epidemics.

e) Predictive value positive

It was not possible to measure the PVP of the surveillance system in our assessment of the surveillance of these diseases. Because, the laboratory confirmation of all suspected cases by the case definition couldn't be possible, or not practiced. For example, malaria in non epidemic seasons and whenever RDT is available, the health posts treat and register only RDT positives; which seemed to be 100% PVP, but RDT negatives cases are usually referred and not registered. But, in general, for the case definitions are broad for these diseases especially at the health post and community level, the PVP is expected to be low especially for febrile illnesses.

f) Representativeness

The representativeness of the surveillance system is related to the health service coverage, the reporting rate of the health facilities, the health seeking behaviour of the community, and the technical capacity of the health care providers and so on.

However, these factors are not well met for the reasons mentioned above. So the representativeness of the system is likely to be very low.

g) Timeliness

The average reporting rates of the health facilities in the zone were found to be low (54%). But of those which reported, the number of facilities which reported timely was difficult to know exactly; for the reports were not segregated, nor date report received were not recorded in almost all forms as mentioned earlier in the data quality. .

3.5. Conclusion and recommendations

The whole population is under surveillance, thus the system is representative though it has limitation due to factors like low health care coverage of this zone. All Woredas of the zone are Malarious .The participation of HEW and WDA has a great contribution in improving the health seeking behaviour of the society and then in early detection of cases.

The clinical register was found only in 60% of the visited facilities and some of the sites used tally sheet which is not structured .Moreover, the case detection of the surveillance system is being affected by: shortage of logistics mainly RDT, transport, reporting format, internet, fax, phones. Fulfilling these materials will strengthen the system in its ability to detect cases early.

The acceptability of the system is not satisfactory due to the poor means of communication (especially at health post level,) lack of feedback, lack of understanding on the use of the data collected. Data is neither analyzed on regular basis nor used for decision in majority (80%) of the health facilities. Most of the sites have public health emergency committee and emergency response team .however, neither of these have written document nor are active functional. There is no regular supervision and feedback system in levels of the system.

In general, to strengthen the surveillance system of malaria the responsible levels has to improve means of communication and coordination, should provide supervision and feedback, all levels has to take responsibility to fill reporting formats and reporting timely, build awareness the importance of data collection and recording for health care. Epidemic committee should strengthen and has to be well documented all of its activities in all levels. The regional health bureau should provide trainings, supervisions, and secure logistics like phone or internet and stationary materials.

3.6. Limitation of the Study

The main limitations of this evaluation was shortage of time and transport, due to these limitations the study design was relayed on mainly non probability methods which might be limited its representativeness. In adequate literatures of similar study for better assessment was other limitation of this study.

3.7. References

1. Health Surveillance Coordinating Committee (HSCC) Population and Public Health Branch Framework and Tools for Evaluating Health Surveillance Systems. March 2004
2. World Health Organization Regional Office for Africa. Integrated Disease Surveillance Strategy, a regional strategy for communicable diseases 1999-2003.1999. Unpublished document AFR/RC 48/8
3. Sathyanarayana.An. Evaluation of Integrated Diseases Surveillance Project Bellary Unit Karnataka state, India
4. Centers for disease control and prevention. Updated Guidelines for Evaluating Public Health Surveillance Systems. Morbidity and mortality weekly report. 2001, 50(13)
5. Standiford P., Annett H., Cibulskis R. What can information systems do for primary health care? An international perspective. Social Sciences and Medicine .1992, 34: 1077-87
6. Federal Democratic Republic of Ethiopia. National Technical Guide line; Integrated Disease Surveillance and Response. Ministry of Health: Addis Ababa, 2002, 1st edition
7. Ethiopian Federal Ministry of Health/Ethiopian Public Health Institute. Public Health Emergency management Guideline, 2009
8. Tigray Regional Health Bureau. Annual report, Mekelle, 2002,

Annexe 3

Annex 3.1: Questionnaire of Malaria surveillance system evaluation in western zone of Tigray region, Ethiopia June 2011.

REGIONAL LEVEL QUESTIONNAIRE

Identifiers:

Assessment team

Respondent

Date

Surveillance System

Interviewer

General

I. Availability of a National Surveillance Manual

1. Is there a national manual for surveillance?

Yes / No / Not applicable / Unknown

2. **If yes**, describe (last update, diseases included, case definitions, surveillance and control, integrated or different for each disease):

II. Case Detection and Registration

3. Do you have standard case definitions for the Country's priority diseases like AWD, AFP (polio), malaria, and measles?

Yes / No / Unknown / Not applicable

4. **Obs [1 to n priority diseases] Observed** the standard case definition for (each priority disease) Yes No Unknown Not applicable

III. Data reporting::

Presence of recommended reporting forms in the country at all times over the past 6 months

5. Is the central level responsible for providing surveillance forms to the health facilities? Yes No Unknown Not applicable

6. **If yes**, have you lacked appropriate surveillance forms at any time during the last 6 months? Yes No Unknown Not applicable

7. What are the reporting entities for the surveillance system?

- Public health facilities
- NGO health facilities
- Military health facilities

- d. Private health facilities
- e. Others _____

8. Percent of district reports(either directly or through an intermediate level) received each reporting period at the central level during the past 3 months:

Number of reports in the last 3 months compared to expected number

Weekly: _____ /12 times the number of districts
Immediately: _____ /----- times the number of districts

9. On time (use national deadlines)

Number of weekly reports received on time: _____ /12 times the number of districts

10. Was there any report of the immediately reportable diseases in the past 1 month?
 Yes/ No

11. If yes, with in what time is the report received after detection of the case/ diseases?

- a. Less than 1 hour
- b. 2-24 hour
- c. 1- 2 days
- d. 3- 7 days
- e. After 1 week

12. Percent of districts that have means for reporting to next level by e-mail, telephone, fax or radio

13. Capacity to report to next level by e-mail, telephone, fax or radio:

How do you report?

- a. Mail
- b. Fax
- c. Telephone
- d. Radio
- e. Electronic
- f. Other

IV. Data analysis

Does the regional level:

14. Describe data by person (case based, outbreaks, sentinel)?

(Obs) Observed description of data by age and sex:

Yes No Unknown Not applicable

15. Describe data by place?

(Obs) Observed description of data by district (tables, maps)

Yes No Unknown Not applicable

16. Describe data by time?

(Obs)Observed description of data by time:

Yes No Unknown Not applicable

17. Perform trend analysis?

- Obs** Observed line graph of cases by time
 Yes No Unknown Not applicable
18. List disease(s) for which line graph is observed

19. **Have an action threshold defined for each priority disease?**
 Do you have an action threshold defined for AWD, Measles, AFP (polio), malaria?
 Yes No Unknown Not applicable
20. Who is responsible for the analysis of the collected data?

21. How often do you analyze the collected data?
 a. Daily
 b. Weekly
 c. Every 2 weeks
 d. Monthly
 e. Quarterly
 f. As needed.....
22. **Have appropriate denominators?**
Obs Observed presence of demographic data (E.g. population by district and hard to reach groups)
 Yes No Unknown Not Applicable

V. **Outbreak Investigation**

- Percent of suspected outbreaks that were investigated in the past 6 months**
23. Number of outbreaks suspected in the past year: _____
24. List the diseases: _____
25. Of those, number investigated: _____
 (Observe reports and take copies if possible)
- Of the investigated outbreaks in the past 1 year, percent in which risk factors were looked for:**
26. Number of outbreaks in which risk factors were looked for: _____
- Of the investigated outbreaks in the past 1 year, percent in which findings were used for action**
27. Number of outbreaks in which findings were used for action: _____
 [Observe report]
28. **Of districts that investigated an outbreak, percent that looked for risk factors**
 Number of districts that looked for risk factors [observe in reports]

29. **Of districts that investigated an outbreak, percent that used the data for action (action include containing outbreak, improving surveillance, community actions)**
 Number of districts that used the data for action [observe in final report]

VI. **Epidemic preparedness(relevant for epidemic prone diseases)**

30. **Existence of a Regional/Zonal plan for epidemic preparedness and response**
Obs Observed a written plan of epidemic preparedness and response
Yes No Unknown Not applicable
31. **Existence of emergency stocks of drugs, vaccines, and supplies at all times in past 1 year:**
Has the region had emergency stocks of drugs, vaccines, and supplies at all times in past 1 year?
Yes No Unknown Not applicable
32. **Experience of a shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)**
Has the country experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)?
Yes No Unknown Not applicable
33. **Existence of a standard case management protocol for AWD, Malaria, AFP (polio), measles**
Obs Observed the existence of a written case management protocol for at least 1 priority disease
34. **If yes, list:** _____
35. **Presence of a budget line for epidemic response**
Is there a budget line for epidemic response?
Yes No Unknown Not applicable
36. **I. Existence of a regional epidemic management committee**
Observed minutes (or report) of meetings of epidemic management committee
Yes No Unknown Not applicable
37. **Existence of a regional rapid response team for epidemics**
Does the country have a rapid response team for epidemic?
Yes No Unknown Not applicable

VII. Response to epidemics

38. **Ability of the regional level to respond within 48 hours of notification of most recently reported outbreak:**
Obs Observed that the central level responded within 48 hours of notification of most recently reported outbreak (from written reports with trend and intervention)
Yes No Unknown Not applicable
39. **Ability of the regional epidemic management committee to evaluate its preparedness and response activities:**
(Obs) Has epidemic management committee evaluated its preparedness and response activities during the past year (Observe written report to confirm)?
Yes No Unknown Not applicable

VIII. Feedback

Existence of a report or bulletin that is regularly produced to disseminate surveillance data:

40. How many feedback bulletin or reports has the regional level produced in the last year? _____
41. **Obs:** Observed the presence of a report or bulletin that is regularly produced to disseminate surveillance data
 Yes No Unknown Not applicable

IX. Supervision

Percent of supervisors that made the required number of supervisory visits in the past 6 months

42. How many supervisory visits have you made in the last 6 months? _____
 Obtained required number of visits from regional level _____
43. The most usual reasons for not making all required supervisory visits. (Text)

X. Training

Percent of health personnel trained in disease surveillance

44. What percent of your subordinate personnel have been trained in surveillance?

45. Have you been trained in disease surveillance?
 Yes No Unknown Not applicable
46. **If yes**, specify when, where, how long, by whom?

Percent of health personnel that have received post-basic training in epidemic management

47. Have you received any post-basic training in epidemic management?
 Yes No Unknown Not applicable
48. **If yes**, specify when, where, how long, by whom?

49. **Obtain and analyze the content of the surveillance and epidemic management training**
 Strengths _____
 Weaknesses _____
 Opportunities _____
 Threats _____

XI. Resources

Percent of sites that have:

50. Data management

Computer
 Printer

Photocopier
Data manager
Statistical package

51. **Communications**

Telephone service
Fax
Radio call
Satellite phone
Computers that have modems

52. **Budget line** _____

53. **Logistics** _____

XII. Surveillance

Have a functional computerised surveillance network

54. Do you have a computerised surveillance network at this level?

Yes No Unknown Not applicable

Budget for surveillance

55. Is there a budget line for surveillance in the Regional Health Bureau budget?

Yes No Unknown Not applicable

56. **If yes**, what is the proportion: %

Opportunities for strengthening surveillance

57. How could surveillance be improved?

XIII. Surveillance Co-ordination

Existence of focal unit for surveillance at RHB level

58. **Obs** Is there a focal unit for surveillance at the MOH central level? [Observe organogramme of MoH to confirm]

Yes No Unknown Not applicable

Opportunities for integration

59. What opportunities are there for integration of surveillance activities and functions (core activities, training, supervision, guidelines, resources etc.)?

Questionnaire for Attributes and level of Usefulness:

1. Total population under surveillance _____
2. What is the incidence / Prevalence of -----in your area/region

- AWD _____cases _____Deaths _____
- Malaria _____cases _____Deaths _____
- AFP(polio) _____cases _____Deaths _____
- Measles _____cases _____Deaths _____

I. Level of Usefulness of the Surveillance System for these selected priority diseases

Does the surveillance system help

1. to detect outbreaks of these selected priority diseases early? Yes/ No
2. to estimate the magnitude of morbidity and mortality related to these disease, including identification of factors associated with these diseases? Yes/ No
3. permit assessment of the effect of prevention and control programs? Yes/ No

Observe (confirmation):

- interventions and diseases trends analyzed ---Available //Not available

II. Describe Each System Attributes:

i. Simplicity:

1. Is the case definition of AWD, malaria, AFP (polio), and measles easy for case detection by all level health professionals? Yes/ No
2. What are the organizations which need to receive reports of the surveillance data
3. Do you feel that additional data collected on a case are time consuming? Yes/No
4. How long it takes to fill the format? a, <5 minute b-10-15minuts c- >15 minutes
5. How long does it take to have laboratory confirmation of
 - A. AWD
 - B. Measles
 - C. AFP (Polio)
 - D. Malaria

ii. Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? Yes/ No
2. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes /No

Comment: _____

iii. Data Quality: (Completeness of the reporting forms/and validity of the recorded data)

1. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? Yes/ No

2. Are the reporting site / data collectors trained/ supervised regularly? Yes/No
3. **Observe:** Review the last months report of these diseases
 - A. Average number of **unknown or blank responses** to variables in each of the reported forms

- B. Percent of reports which are complete(that is with no blank or unknown responses) from the total reports

iv. Acceptability:

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes/No
2. If yes, how many are active participants (of the expected to)? _____
3. If No, what is the reason for their poor participation in the surveillance activity?
 - A. Lack of understanding of the relevance of the data to be collected
 - B. No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities
 - C. Reporting formats are difficult to understand
 - D. Report formats are time consuming
 - E. Other:

v. Representativeness:

1. What is the health service coverage of the district/ zone/ region? _____%
2. Do you think, the populations under surveillance have good health seeking behavior for these diseases? Yes / No
3. Who do you think is well represented by the surveillance data? the urban/ the rural

vi. Timeliness:

1. -----
2. -----

vii. Stability:

1. Was the new BPR restructuring affect the procedures and activities of the surveillance of these diseases? Yes/ No
2. Was there lack of resources that interrupt the surveillance system? Yes/No

DISTRICT (INTERMEDIATE LEVEL) QUESTIONNAIRE

Identifiers

Assessment team	District
Date	region/province
Interviewer	country
Respondent	surveillance system

Percent of districts with available national surveillance manual

1. Is there a national manual for surveillance at this site?

Obs Observe national surveillance manual:

Yes No unknown Not Applicable

I. Case confirmation

Percent of districts that have the capacity to transport specimens to a higher level lab

2. Does the district have the capacity to transport specimens to a higher level lab?

Yes No Unknown Not applicable

Percent of districts with guideline for specimen collection, handling and transportation to next level

3. Does the district have guidelines for specimen collection, handling and transportation to the next level?

Yes No Unknown Not applicable

II. Data reporting

Percent of sites that have forms recommended for the country for that site at all times over the past 6 months

4. Have you lacked forms recommended for the country at any time during the last 6 months?

Yes No Unknown Not applicable

Percent of health facilities that reported each reporting period to the district level during the past 3 months:

5. Number of reports received in the last 3 months compared to expected number

Weekly: _____ /12 times the number of health facilities

Immediately: _____ /----- times the number of health facilities

On time (use national deadlines)

6. Number of weekly reports submitted on time: ____/12 times the number of health facilities

7. Number of immediately reports submitted on time: _____/3 times the number of health facilities

8. **Percent of districts that have means for reporting to next level by e-mail,**

telephone, fax or radio

How do you report:

- a. Mail
- b. Fax
- c. Telephone
- d. Radio
- e. Electronic
- f. Other

Strengthening reporting

9. How can reporting be improved?

**III. Data
analysis**

10. I. Percent of sites that:

Describe data by person (case based, outbreaks, sentinel)

Obs Observed description of data by age and sex

Yes No Unknown Not applicable

11. Describe data by place

Obs Observed description of data by place (locality, village, work site etc)

Yes No Unknown Not applicable

12. Describe data by time

Obs Observed description of data by time

Yes No Unknown Not applicable

13. Perform trend analysis

Obs Observed line graph of cases by time

Yes No Unknown Not applicable

14. List:

15. Have an action threshold for each priority disease

Do you have an action threshold for any of the country priority diseases?

Yes No Unknown Not applicable

16. **If yes**, what is it? _____ cases _____% increase _____rate
(Ask for 2 priority diseases)_

17. Have appropriate denominators

Obs Observed presence of demographic data at site (E.g. population <5 yr, population by village, total population)

Yes No Unknown Not applicable

18. Who is responsible for data analysis? _____

19. How often do you analyze the collected data?

- a. Daily
- b. Weekly
- c. Every 2 weeks
- d. Monthly
- e. Quarterly
- f. As needed.....

IV. Outbreak investigation

20. Percent of suspected outbreaks that were investigated in the past 6 months:

Number of outbreaks suspected in the past year 6 months: _____

Obs Of those, number investigated (Observe reports and take copies if possible):

21. Percent of districts that have ever conducted an outbreak investigation

[Number of districts assessed that have ever conducted an outbreak investigation,
Number of districts assessed to obtain indicator]

22. Has your district ever investigated an outbreak?

Yes No Unknown Not applicable

V. Epidemic preparedness

23. Percent of districts that have a plan for epidemic preparedness and response

(Obs) Observed a written plan of epidemic preparedness and response

Yes No Unknown Not applicable

24. Percent of districts that have emergency stocks of drugs and supplies at all times in past 1 year

Has the district had emergency stocks of drugs and supplies at all times in past 1 year?

Obs Observed the stocks of drugs and supplies at time of assessment

Yes No Unknown Not applicable

25. Percent of districts that experienced a shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)

Has the district experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)?

Yes No Unknown Not applicable

26. Presence of a budget line for epidemic response or access to funds for epidemic response

Is there a budget line or access to funds for epidemic response?

Yes No Unknown Not applicable

27. Percent of districts that have an epidemic management committee

Obs Observed minutes (or report) of meetings of epidemic management committee

Yes No Unknown Not applicable

28. Percent of districts that have rapid response team for epidemics

Does the district have a rapid response team for epidemics?

Yes No Unknown Not applicable

VI. Responses

29. Percent of sites that implemented prevention and control measures based on local data for at least one reportable disease or syndrome

Has the district implemented prevention and control measures based on local data for at least one reportable disease or syndrome?

Yes No Unknown Not applicable

30. Percent of districts that responded within 48 hours of notification of most recently reported outbreak

Obs Observed that the district responded within 48 hours of notification of most recently reported outbreak (from written reports)

Yes No Unknown Not applicable

31. Percent of districts that achieved acceptable case fatality rates (e.g. 10% for Meningococcal CSM 1% for Cholera) during the most recent outbreak

Obs Observed that the district achieved an acceptable case fatality rate for most recent outbreak (Observe from outbreak report)

Yes No Unknown Not applicable

32. Percent of epidemic management committees that have evaluated their preparedness and response activities during the past year

Obs Has epidemic management committee evaluated their preparedness and response activities during the past year? (observe written report to confirm)

Yes No Unknown Not applicable

VII. Feedback

33. Percent of sites that have written report that is regularly produced to disseminate surveillance data

How many feedback written reports has the district produced in the last year?

Obs Observed the presence of a written report that is regularly produced to disseminate surveillance data (district and higher)

Yes No Unknown Not applicable

34. Percent of sites that have received a report or bulletin from a higher level during the past year on the data they have provided

How many feedback bulletin or reports has the district received in the last year?

Obs Observed at least 1 report or bulletin at district from a higher level during the past year on the data they have provided

Yes No Unknown Not applicable

VIII. Supervision

35. Percent of individuals supervised in the past 6 months

How many times have you been supervised in the last 6 months?
Obs Observed supervision report or any evidence of supervision in last 6 months
 Yes No Unknown Not applicable

36. Of those supervised in the previous 6 months, percent of individuals for which the supervisor from the next higher level reviewed surveillance practices appropriate to their level

Obs Observed supervision report or any evidence for appropriate review of surveillance practices
 Yes No Unknown Not applicable

37. Percent of supervisors that made the required number of supervisory visits in the past 6 months

How many supervisory visits have you made in the last 6 months? _____
 (Obtain required number of visits from central level)_____

38. The most usual reasons for not making all required supervisory visits. (Text)

Reason 1 _____
 Reason 2 _____
 Reason 3 _____

IX. Training

39. Percent of health personnel (in position of responsibility) trained in disease surveillance

Have you been trained in disease surveillance?
 Yes No Unknown Not applicable

40. If yes, specify when, where, how long, by whom?

41. Proportion of districts with staff trained in surveillance and epidemic management

What percent of your personnel in the district have been trained in surveillance and epidemic management? _____

X. Resources

42. I. Percent of sites that have:

Logistics

- a. Electricity
- b. Bicycles
- c. Motor cycles
- d. Vehicles

43. Data management

- a. Stationery
- b. Calculator

- c. Computer
- d. Printer
- e. Statistical package

44. Communication

- a. Telephone service
- b. Fax
- c. B radio
- d. Computers that have modems

45. Information education and communication materials

- a. Posters
- b. Megaphone
- c. Flipcharts or Image box
- d. VCR and TV set
- e. Generator
- f. Screen
- g. Projector (Movie)
- h. Other:

46. Hygiene and sanitation materials

- a. Spray pump
- b. Disinfectant

XI. Surveillance co-ordination:

47. Existence of a surveillance co-ordination focal unit or person at district level

Is there a surveillance co-ordination focal point within the district epidemic management committee?

XII. Satisfaction with surveillance system

48. Satisfaction with the surveillance system

Are you satisfied with the surveillance system?

Yes No Unknown Not applicable

49. If no, how can the surveillance system be improved?

50. Opportunities for integration

What opportunities are there for integration of surveillance activities and functions (core activities, training, supervision, guidelines, resources etc.)

HEALTH FACILITY QUESTIONNAIRE

Identifiers

Assessment team	Type of health facility
Date	District
Interviewer	Region/province
Respondent	Country
Name of health facility	Surveillance system

1. Percent of health facilities with national surveillance manual

Is there a national manual for surveillance at this site?

Obs Observe national surveillance manual:

Yes No Unknown Not applicable

I. Case detection and registration

2. Percent of health facilities that have a clinical register

Obs Observed the existence of a clinical register

Yes No Unknown Not applicable

3. Percent of health facilities that correctly register cases

Obs Observed the correct filling of the clinical register during the previous 30 days

Yes No Unknown Not applicable

4. Percent of health facilities that have standardised case definitions for the country's priority diseases

Do you have a standard case definition for: (each priority disease) AWD, AFP (polio), measles, malaria?

Yes No Unknown Not applicable

5. **Obs** Observed the standard case definition for: (each priority disease)

Yes No Unknown Not applicable

6. Percent of health facilities that use standardised case definitions for the country's priority diseases

Obs Observed the respondent correctly diagnosing one of the country's priority diseases using a standard case definition

Yes No Unknown Not applicable

(Select one of the priority diseases in the facility's clinical register and ask how they diagnosed it — interviewer should have the standard case definition from MOH)

II. Case confirmation

7. Percent of health facilities that have the capacity to collect specimens (sputum stool, blood/serum and CSF)

Are you able to collect sputum	Y	N	U	N/A
Stool	Y	N	U	N/A
Blood	Y	N	U	N/A
CSF at this facility?	Y	N	U	N/A

8. **Obs** Observed the presence of materials required to collect

Stool	Y	N	U	N/A
blood/serum	Y	N	U	N/A
CSF	Y	N	U	N/A

9. **Percent of health facilities that have the capacity to handle specimens until shipment**

Do you have the capacity to handle sputum, stool, blood/serum and CSF until shipment at this facility?

Yes No Unknown Not applicable

10. **Obs** Observed presence of functional cold chain at health facility

Yes No Unknown Not applicable

11. **Percent of health facilities that have the capacity to ship specimens to a higher level lab**

12. **Obs** Observed presence of transport media for stool at health facility

Yes No Unknown Not applicable

13. **Obs** Observed presence of packing materials for shipment of specimens at health facility

Yes No Unknown Not applicable

III. Data reporting

14. **Percent of sites that have appropriate surveillance forms for that site at all times over the past 6 months**

Have you lacked appropriate surveillance forms at any time during the last 6 months?

Yes No Unknown Not applicable

15. **Percent of sites that reported accurately cases from the registry into the summary report to go to higher level**

Observed that the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])

a. Obs Measles	Y	N	U	N/A
b. Obs Malaria	Y	N	U	N/A
c. Obs AFP (polio)	Y	N	U	N/A
d. Obs AWD	Y	N	U	N/A

16. **Percent of sites that reported each reporting period to the next higher level during the past 3 months**

Number of reports in the last 3 months compared to expected number

Obs Weekly: /12 times the number of sites

Obs immediately: /-- times the number of sites

17. On time (use national deadlines)

Obs Number of weekly reports submitted on time:-_____/12 times the number of sites

Obs Number of immediately reports submitted on time: ____/-- times the number of sites

18. Percent of HF that have means for reporting to next level by e-mail, telephone, fax or radio

How do you report?

- Mail
- Fax
- Telephone
- Radio
- Electronic
- Other

19. Strengthening reporting

How can reporting be improved?

IV. Data analysis

Percent of sites that:

20. Describe data by person (outbreaks, sentinel)

Obs Observed description of data by age and sex

Yes No Unknown Not applicable

21. Describe data by place

Obs Observed description of data by place (locality, village, work site etc)

Yes	No	Unknown	Not applicable
-----	----	---------	----------------

22. Describe data by time

Obs Observed description of data by time

Yes	No	Unknown	Not applicable
-----	----	---------	----------------

23. Perform trend analysis

Obs Observed line graph of cases by time

Yes	No	Unknown	Not applicable
-----	----	---------	----------------

24. Have an action threshold for each priority disease

Do you have an action threshold for any of the Country priority diseases?

Yes No Unknown Not applicable

25. **If yes**, what is it (Ask for 2 priority diseases)? _____cases _____ % increase
rate

26. Who is responsible for data analysis? _____

27. How often do you analyze the collected data?

- a. Daily
- b. Weekly
- c. Every 2 weeks
- d. Monthly
- e. Quarterly
- f. As needed.....

28. Have appropriate denominators

Obs Observed presence of demographic data at site (E.g. population <5 yr., population by village, total population)

Yes No Unknown Not applicable

V. Epidemic preparedness

29. Percent of health facilities that have a standard case management protocol for epidemic prone diseases

Obs Observed the existence of a written case management protocol for 1 epidemic prone disease

Yes No Unknown Not applicable

VI. Epidemic response

30. Percent of sites that implemented prevention and control measures based on local data for at least one epidemic prone disease

Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease?

Yes No Unknown Not applicable

31. Percent of sites that achieved acceptable case fatality rates (e.g. 10% for Meningococcal CSM 1% for Cholera) during the most recent outbreak

Obs Observed that the health facility achieved an acceptable case fatality rate for most recent outbreak

Yes No Unknown Not applicable

VII. Feedback

32. Percent of sites that have received a report or bulletin from a higher level during the past year on the data they have provided

How many feedback bulletin or reports has the health facility received in the last year?

—

Obs Observed at least 1 report or bulletin at the health facility from a higher level during the past year on the data they have provided

Yes No Unknown Not applicable

33. Percent of health facilities that conducted at least semi-annual meetings with community members to discuss results of surveillance or investigation data

How many meetings has this health facility conducted with the community members in the past six months? _____

Obs Observed the minutes or report of at least 1 meeting between the health facility team and the community members within the six months

Yes No Unknown Not applicable

VIII. Supervision: _____

34. Percent of individuals supervised in the past 6 months

How many times have you been supervised in the last 6 months? _____

Obs Observed supervision report or any evidence of supervision in last 6 months

Yes No Unknown Not applicable

35. Of those supervised in the previous 6 months, percent of individuals for which the supervisor from the next higher level reviewed surveillance practices appropriate to their level

Obs Observed supervision report or any evidence for appropriate review of surveillance practices

Yes No Unknown Not applicable

IX. Training _____

36. Percent of health personnel trained in disease surveillance and epidemic management

Have you been trained in disease surveillance and epidemic management?

Yes No Unknown Not applicable

37. If yes, specify when, where, how long, by whom? _____

X. Resources _____

Percent of sites that have:

38. Logistics

- a. Electricity
- b. Bicycles
- c. Motor cycles
- d. Vehicles

39. Data management

- a. Stationery

- b. Calculator
- c. Computer
- d. Software
- e. Printer
- f. Statistical package

40. Communications

- a. Telephone service
- b. Fax
- c. Radio call
- d. Computers that have modems

41. Information education and communication materials

- a. Posters
- b. Megaphone
- c. Flipcharts or Image box
- d. VCR and TV set
- e. Generator
- f. Screen
- g. Projector (Movie)
- h. Other:

42. Hygiene and sanitation materials

- a. Spray pump
- b. Disinfectant

43. Protection materials (list) _____

**XI. Satisfaction _____ with _____ surveillance
system**

44. Satisfaction with the surveillance system

Are you satisfied with the surveillance system?

Yes No Unknown Not applicable

45. If *no*, how can the surveillance system be improved?

46. Opportunities for integration

What opportunities are there for integration of surveillance activities and functions (core activities, training, supervision, guidelines, resources etc.)

Health Post Level Questionnaire

Identifiers

Assessment team	Type of health facility
Date	District
Interviewer	Region/province
Respondent	Country
Name of health facility	Surveillance system

1. Percent of health facilities with national surveillance manual

Is there a national manual for surveillance at this site?

Obs Observe national surveillance manual:

Yes No Unknown Not applicable

I. Case detection and registration

2. Percent of health facilities that have a clinical register

Obs Observed the existence of a clinical register

Yes No Unknown Not applicable

3. Percent of health facilities that correctly register cases

Obs Observed the correct filling of the clinical register during the previous 30 days

Yes No Unknown Not applicable

4. Percent of health facilities that have standardised case definitions for the country's priority diseases

Do you have a standard case definition for: (each priority disease) AWD, AFP (polio), measles, malaria?

Yes No Unknown Not applicable

5. **Obs** Observed the standard case definition for: (each priority disease)

Yes No Unknown Not applicable

6. Percent of health facilities that use standardised case definitions for the country's priority diseases

Obs Observed the respondent correctly diagnosing one of the country's priority diseases using a standard case definition

Yes No Unknown Not applicable

(Select one of the priority diseases in the facility's clinical register and ask how they diagnosed it — interviewer should have the standard case definition from MOH)

II. Data reporting

7. Percent of sites that have appropriate surveillance forms for that site at all times over the past 6 months

Have you lacked appropriate surveillance forms at any time during the last 6 months?

Yes No Unknown Not applicable

8. Percent of sites that reported accurately cases from the registry into the summary report to go to higher level

Observed that the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])

a. Obs Measles	Y	N	U	N/A
b. Obs Malaria	Y	N	U	N/A
c. Obs AFP (polio)	Y	N	U	N/A
d. Obs AWD	Y	N	U	N/A

9. Percent of sites that reported each reporting period to the next higher level during the past 3 months

Number of reports in the last 3 months compared to expected number

Obs Weekly: /12 times the number of sites

Obs immediately: /-- times the number of sites

10. On time (use national deadlines)

Obs Number of weekly reports submitted on time:- ____ /12 times the number of sites

Obs Number of immediately reports submitted on time: ____ /-- times the number of sites

11. Percent of HF that have means for reporting to next level by e-mail, telephone, fax or radio

How do you report?

- a. Mail
- b. Fax
- c. Telephone
- d. Radio
- e. Electronic
- f. Other

12. Strengthening reporting

How can reporting be improved?

**III. Data
analysis**

Percent of sites that:

13. Describe data by person (outbreaks, sentinel)

Obs Observed description of data by age and sex

Yes No Unknown Not applicable

14. Describe data by place

Obs Observed description of data by place (locality, village, work site etc)
Yes No Unknown Not applicable

15. Describe data by time

Obs Observed description of data by time
Yes No Unknown Not applicable

16. Perform trend analysis

Obs Observed line graph of cases by time
Yes No Unknown Not applicable

IV. Epidemic response

17. Percent of sites that implemented prevention and control measures based on local data for at least one epidemic prone disease

Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease?

Yes No Unknown Not applicable

V. Feedback

18. Percent of sites that have received a report or bulletin from a higher level during the past year on the data they have provided

How many feedback bulletin or reports has the health facility received in the last year?

—

Obs Observed at least 1 report or bulletin at the health facility from a higher level during the past year on the data they have provided

Yes No Unknown Not applicable

19. Percent of health facilities that conducted at least semi-annual meetings with community members to discuss results of surveillance or investigation data

How many meetings has this health facility conducted with the community members in the past six months? _____

Obs Observed the minutes or report of at least 1 meeting between the health facility team and the community members within the six months

Yes No Unknown Not applicable

VI. Supervision:

20. Percent of individuals supervised in the past 6 months

How many times have you been supervised in the last 6 months? _____

Obs Observed supervision report or any evidence of supervision in last 6 months

Yes No Unknown Not applicable

21. Of those supervised in the previous 6 months, percent of individuals for which the supervisor from the next higher level reviewed surveillance practices appropriate to their level

Obs Observed supervision report or any evidence for appropriate review of surveillance practices

Yes No Unknown Not applicable

VII. Training

22. Percent of health personnel trained in disease surveillance and epidemic management

Have you been trained in disease surveillance and epidemic management?

Yes No Unknown Not applicable

23. If yes, specify when, where, how long, by whom? _____

VIII. Resources

Percent of sites that have:

24. Logistics

- a. Electricity
- b. Bicycles
- c. Motor cycles
- d. Vehicles

25. Data management

- a. Stationery
- b. Calculator
- c. Computer
- d. Software
- e. Printer
- f. Statistical package

26. Communications

- a. Telephone service
- b. Fax
- c. Radio call
- d. Computers that have modems

27. Information education and communication materials

- a. Posters
- b. Megaphone
- c. Flipcharts or Image box
- d. VCR and TV set
- e. Generator
- f. Screen

- g. Projector (Movie)
- h. Other:

28. Hygiene and sanitation materials

- a. Spray pump
- b. Disinfectant

29. Protection materials (list) _____

IX. Satisfaction _____ with _____ surveillance
system

30. Satisfaction with the surveillance system

Are you satisfied with the surveillance system?

Yes No Unknown Not applicable

31. *If no*, how can the surveillance system be improved?

32. Opportunities for integration

What opportunities are there for integration of surveillance activities and functions (core activities, training, supervision, guidelines, resources etc.)

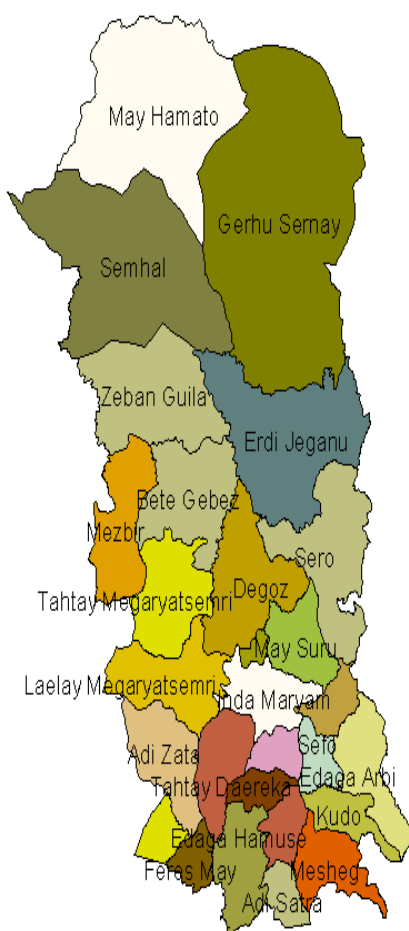
Chapter 4. – HEALTH PROFILE OF AHFEROM HEALTH OFFICE
Tigray, Ethiopia, 2010

Ahferom Wereda Map



Legend

- Adi Bereto
- Adi Eykoro
- Adi Satra
- Adi Zata
- Bete Gebez
- Degoz
- Edaga Arbi
- Edaga Hamuse
- Emba Ahferom
- Endalashen
- Enticho Town
- Erdi Jeganu
- Feres May
- Gerhu Sernay
- Inda Maryam
- Kudo
- Laelay Megaryatsemri
- May Hamato
- May Keyahat
- May Suru
- Mesheg
- Mezbir
- Sefo
- Semhal
- Sero
- Tahtay Daereka
- Tahtay Megaryatsemri
- Zeban Guila



0.05 0 0.05 0.1 0.15 Kilometers

Preface:

Ahferom, which is located about 200 km from Mekelle, is one of the districts of the central zone of Tigray region. It is bordered to the west by Adwa, to the east Ganta afeshum (one district of eastern zone of Tigray) to the north Eritrea and to the south werealeke (one district of central zone of Tigray region). It has the largest population size of all districts from Tigray region. Its population size is 187004 with 91930 males and 95137 females. The education coverage of the district is 95 %. This district covers an area of 23,434 hectares, the annual rain fall of this district is 570-700mm. with annual temperature 22°C-27°C and altitude 500-3200 meter above sea level (obtained from natural resource and rural development office of the district). the district has 24 hours electric power supply with full coverage of telecommunication service. however the district has shortage of transport facility (ambulance) especially in those villages which are away from the main road. When we see the health infrastructure of this district it has no Hospital, the society have to travel to Adwa, which is 35km far to get Hospital service, it has 7 health centers, and 22 health posts. The number of health professionals is increasing from time to time, in this year; it has 6 health officers and 10 mid wife nurses (60%) coverage, 73 clinical nurses and 73 health extension workers. This year the district health office gets the highest achievement in VCT() and ART() service coverage when compared with the last six years, the same holds true in immunization coverage for example TT2 coverage is 80% and 52.8% for pregnant and non pregnant mothers respectively. vitamin A coverage and de-worming coverage is also 98.8% and 106% respectively. In this district there are 647 SAM, 5531 MAM, and 2431 lactating mothers. Acute upper respiratory tract infection followed by diarrheal diseases and malaria are the leading causes of morbidity with prevalence. Of 4.1%, 2.2% and 2.1% respectively.

The objective of this work profile is to provide up-to-date information of the health care played in the district, i.e. to assess and describes health and health related issues, to assess health indicators and to identify problems for priority setting, which can be intervened and to know the progress of health coverage, in general, and notify this for responsible stake holders, or organizations in which they will take their own part on its improvement.

Finally, I would like to say this work profile is produced for the first time which may have many gaps due to data limitation. But it is expected that this will be a base line for the future development of the profile.

4.1. Introduction

What is Description of health profile?

Definition: It is the presentation and discussion of health data and important health related indicators to describe the health and related sociological factors in the geographic area under discussion.

4.2 Objective: The main objective of this study is:

- To asses and describes health and health related issues
- To identify problems for priority setting.

4.3. Methods and Materials

Data was collected using the following methods to describe the health status of the district

1. Reviewing available data in the health office of the district and health institutions of the district
2. By interviews with concerned health offices heads, experts, and health professionals as well as responsible bodies from other sectors like agriculture and finance offices
3. Review of publications about the district
4. Personal observations

4.3. Findings

4.3.1. Expansion of Health facilities and human resource in Ahferom district

Table 4.1 Expansion of Health posts in Ahferom district 2010.

Health posts Constructed				Fully equipped Health posts		
Tabias(KEBELLE)	Constructed in 2002	So far available	Coverage in (%)	Equipped in 2002.	So far fully equipped	Coverage in (%)
Ziban gula	0	1	100%	0	1	100%
May hamato	0	1	100%	0	1	100%
Semhal	0	0	0	0	0	0
Gerhoseray	0	1	100%	0	1	100%
Degoz	0	1	100%	0	1	100%
Maysru	0	0	0	0	0	0
Mezbir	0	1	100%	0	1	100%
Betgebez	0	1	100%	0	1	100%
Tahtaymaytsemri	0	1	100%	0	1	100%
Dibdibo	0	0	0	0	0	0
Lelaymaytsemri	0	1	100%	0	1	100%
Adi bereto	0	0	0	0	0	0
Adisatra	0	1	100%	0	1	100%
Maykeyahat	0	1	100%	0	1	100%
Sefo	0	1	100%	0	1	100%
Endaleshen	0	1	100%	0	1	100%
Feresmay	0	0	0	0	0	0
Adiykoro	0	1	100%	0	1	100%
Enticho 03	0	0	0	0	0	0
Adizata	0	1	100%	0	1	100%
Edagahamus	0	1	100%	0	1	100%

Agamo	0	0	0	0	0	0
Tahtay daereka	0	1	100%	0	1	100%
Hoyemedeb	0	1	100%	0	1	100%
Semhal	0	0	0	0	0	0
Kudo	0	1	100%	0	1	100%
Erdigeganu	0	1	100%	0	1	100%
Sero	0	1	100%	0	1	100%
Endamariam	0	0	0	0	0	0
Meshig	0	1	100%	0	1	100%
Edgaarbi	0	1	100%	0	1	100%
Embahferom	0	1	100%	0	1	100%
Enticho 01	0	0	0	0	0	0
Woreda(total)	0	22	66.6%	0	66.6%	66.6%

From the above table we observe that 22(68.7%) of the total (32) Kebels have 100% coverage in health posts. But the remaining 10(32.3%) kebels have no health post at all.

4.3.2 Health centres

The district requires 8 HCs, currently there are 7 fully equipped HCs i.e. its coverage is 87.5%. No HC is constructed this year.

4.3.3 Human Resource

Table 4.5. Number of Health Professional working under Ahferom Health office

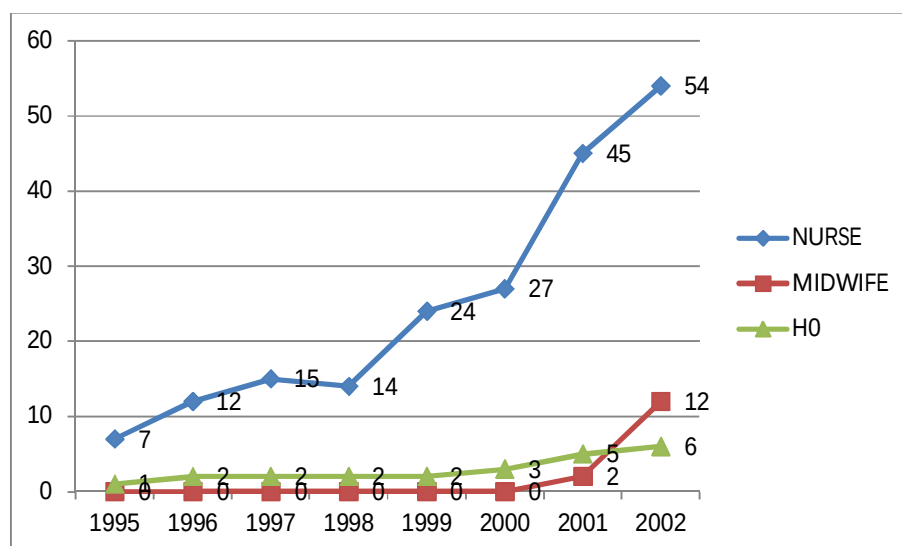
s. no	Health professionals by Type	Gov't		TOTAL
		M	F	M+F
1	General practitioner	0	0	0
3	Health Officer	6	0	6

4	Pharmacist	0	0	0
5	Nurse B.Sc.	0	0	0
6	Psychiatry Nurse	0	0	0
7	Pediatric Nurse	0	0	0
8	Ansth.Nurse B.S.c	0	0	0
9	Dental Nurse	0	0	0
10	OR Nurse	0	1	1
11	Ophthalmic Nurse	1	0	1
12	Clinical Nurse	29	25	54
13	Junior Clinical Nurse	0	0	0
14	public Health Nurse	0	0	0
15	x-ray Technician	0	0	0
16	Midwife Nurse	2	10	12
17	Junior Health Assistance	0	0	0
18	Lab. Technology B.Sc.	2	0	2
19	B.S.c Environnemental H.W	1	0	1
20	Environmental/Technician	1	1	2
21	Junior Environmental H.W	0	0	0
22	Health Assistant	0	0	0
23	Lab. Technician	7	1	8
24	Junior Lab. Technician	0	0	0
25	Pharmacy Technician	7	1	8
26	Junior Pharmacy Technician	0	0	0
27	Junior X-Ray Technician	0	0	0
28	Health Extension Workers	0	56	56
	Total	56	95	151

From the above table we see that the health professional coverage in most professions is very low. For example, there is no BSC nurse, pharmacist, general practitioner etc. But the coverage in

professions like health officers, mid wife nurses, and Health extension programs gets better from time to time.

Figure 4.1. Human Resource in the last eight years 2010



As we lookout the above graph, the number of those professionals have been increased continuously. Even though the number of Health officers shows insignificant change, Nurse training and deployment have been developed continuously over the decade. The number of midwife nurse shows remarkable change in 2002.

Table 4.3 Professional to population ratio in Ahferom district in 2010

Health officers to population ratio				Nurse to population ratio		Health extension workers to population ratio	
Catchment area	Population	Health officer	ratio	nurse	Ratio	HEW	Ratio
Enticho HC	41019	1	1:41019	30	1:1367	7	1:5860
Feresmay HC	34751	1	1:34751	9	1:3861	10	1:3475
Maykerts HC	16614	1	1:16614	5	1:3322	7	1:2373
Dibdibo HC	16527	1	1:16527	8	1:2065	8	1:2065

Mezbir HC	20398	0	0	9	1:226 6	6	1:2266
Gerhoserna y HC	33485	1	1:33485	6	1:558 1	10	1:3348
Edgaarbi HC	29530	1	1:29530	6	1:492 1	5	1:5906
Woreda	187004	6	1:31167.3 3	73	1:256 1	53	1:3528 .

As clearly indicated in this table the health officer to population ratio is low in Mezbir and Gerhosernay when compared with the other catchment areas of the district.

4.4.4. Budget

Public health expenditure on health					
All sectors' budget	Health's budget	Share of health (%)	Total population	Total Health expenditure	Expenditure per capita
30115917.07	3358589	8.97%	187004	5723415	20.3

Table 4.4. AHO, Budget Allocated and Utilized (2002 EFY) *

Budget Type	Allocated	Utilized	%
Capital	3358589	3358589	100%
WHO(operational cost for measles and polio	109252	109252	100%
Malaria control program	10929.65	10929.65	100%
WHO (health and nutrition program)	13810	13810	100%
GAVI(routing EPI)	11850	11850	100%
CBN initial training VEHWS	182442	182442	100%
WHO (community surveillance)	61200	61200	100%
Total	3748072	3748072	100%

This table shows that the budget allocated in the district was utilized 100%.

4.4.5. Health Promotion and Diseases prevention

Health extension program

Households with completed HEP						Households with Latrine Facilities		
Tabias	Population	Eligible HHs	HHs Graduated in 2002	Cumulative	Percent	Constructed in 2002	Cumulative	Percent
33	187004	42500	11300	42110	99%	11300	15000	99

Table 4.5 Maternal Health service in Ahferom district, Tigray region in 2010

Contraceptive acceptance Rate (CAR)				Antenatal care coverage		
Area	Eligible	New + Repeat acceptors	Percent	Eligible	ANC 1 st + visit	Percent
All Tabias	36839	35825	97	7106	5702	80

4.4.6 PMTCT service

Proportion of HFs providing PMTCT service			Pregnant women counselled and tested for PMTCT		
Total health facility	HFs providing PMTCT service	Percent	Eligible	Counselled and tested for PMTCT	Percent
7	4	57%	4000	2703	68%

Of the 7 health facilities 4 (57%) of them provide PMTCT and among 4000 eligible pregnant women 2703(68%) of them counselled and tested for PMTCT.

Infrastructure for VCT and ART

As mentioned above there are seven health facilities and all of these provide VCT. Among the 7 HFs only 1(14%) provide ART service.

Prophylaxis for HIV positive mothers

There are 300 total no of HIV positive mothers and among those 20(6%) get PMTCT prophylaxis and only 8(2%) of them get a full course ARV prophylaxis on deliveries.

ART service: there are 2590 peoples who live with HIV/AIDS, and among those 1540(59.5%) met the criteria to start ART and 240 (15.5%) have ever stated ART and currently there are 105 (6.8%) peoples on ART.

Table 4.6 Immunization coverage in Ahferom district in Tigray region in 2010

TT 2+ immunization coverage of Pregnant Women				TT 2+ immunization coverage of non Pregnant Women		
Tabias(kebele)	Eligible	Achievement	Percent	Eligible	Achievement	Percent
Ziban gula	319	300	94%	1656	850	51.3%
May hamato	183	170	93%	951	400	42%
Semhal	244	200	82%	1267	635	50%
Gerhoseray	252	210	83%	1309	675	52%
Degoz	176	140	80%	915	550	55%
Maysru	183	130	71%	956	480	50.2%
Mezbir	242	190	79%	1254	709	57%
Betgebez	214	182	85%	1109	590	53.2%
Tahtaymaytsemri	228	192	84%	1180	554	47%
Dibdibo	106	80	75%	549	256	46.6%
Lalaymaytsemri	294	243	83%	1526	980	64%
Adi bereto	180	143	79%	1453	820	56.4%
Adisatra	244	200	82%	1264	706	56%

Maykeyahat	151	110	73%	781	489	63%
Sefo	197	147	75%	1024	599	58.5%
Endaleshen	152	100	66%	786	353	45%
Feresmay	164	123	75%	851	500	59%
Adiykoro	186	147	79%	964	480	50%
Enticho 03	202	186	92%	1048	556	53%
Adizata	322	285	89%	1668	800	48%
Edagahamus	190	150	79%	986	400	40.5%
Agamo	38	25	66%	199	100	50.25%
Tahtay daereka	329	229	70%	1706	809	47%
Hoyemedeb	278	208	75%	1444	743	51.4%
Kudo	193	140	73%	999	383	38.3%
Erdigeganu	313	276	88%	1625	807	50%
Sero	385	330	86%	1995	900	45%
Endamariam	175	105	60%	909	465	51%
Meshig	267	200	75%	1384	774	56%
Edgaarbi	274	231	84%	1422	700	50%
Embahferom	191	109	57%	990	507	51.2%
Enticho 01	163	143	88%	857	462	54%
Enticho 02	174	130	75%	903	551	61%
Woreda	7106	5682	80	37393	19483	52.8

The pregnant and non pregnant TT2 immunization coverage in all districts as noticed in the above table is averagely 50%. The districts like Mayhamato, Endaleshen have low TT2 immunization coverage and this may be due to the reason that these districts are remote areas.

4.4.7 Child health

Pentavalent-3 immunization coverage (under 1year)				Measles Immunization Coverage		Fully Immunization coverage	
Tabias(kebele)	Eligible	Achievement	<i>Percent</i>	Achievement	Percent	Achievement	Percent
Ziban gula	294	203	69	226	76.8	226	76.8
May hamato	169	127	75	109	65	109	65
Semhal	225	185	82	175	77.7	175	77.7
Gerhosernay	233	179	77	203	87	203	87
Degoz	163	120	74	100	61	100	61
Maysru	170	119	70	100	59	100	59
Mezbir	223	175	78.5	180	80	180	80
Betgebez	197	137	70	107	54	107	54
Tahtaymaytsemri	271	201	74	171	63	171	63
Dibdibo	98	70	71	78	80	78	80
Laelaymaytsemri	271	220	81	171	63	171	63
Adi bereto	231	170	74	201	87	201	87
Adisatra	225	173	77	200	88	200	88
Maykeyahat	139	100	72	109	78	109	78
Sefo	182	102	56	112	61	112	61
Endaleshen	140	115	82	100	72	100	72
Feresmay	151	130	86	101	57	101	57
Adiykoro	171	140	81.8	111	65	111	65
Enticho 03	186	139	75	116	62	116	62
Adizata	296	238	80	216	73	216	73
Edagahamus	175	130	74	135	77	135	77
Agamo	35	28	80	25	72	25	72

Tahtay daereka	303	240	79	213	70	213	70
Hoyemedeb	278	210	75.5	203	73	203	73
Kudo	177	117	66	100	57	100	57
Erdigeganu	289	230	80	209	73	209	73
Sero	355	300	84.5	230	65	230	65
Endamariam	161	130	80	100	62	100	62
Meshig	246	200	81	219	89	219	89
Edgaarbi	253	220	87	203	80	203	80
Embahferom	176	130	74	106	60	106	60
Enticho 01	152	125	82	122	54	122	54
Enticho 02	160	119	74	120	46	120	46
Woreda	6645	5222	78.6	4871	73	4871	73

Table 4.7 Vitamin A and Deworming coverage in Ahferom district 2010

Vitamin A supplementation for 6- 59months of age				Proportion of Children 2-5yrs. Age Dewormed		
Tabias	Eligible	Achievement	Percent	Eligible	Achievement	Percent
Ziban gula	1154	1135	98.3	774	774	100
May hamato	663	600	90	445	445	100
Semhal	883	883	100	593	593	100
Gerhosernay	912	893	98	612	620	101
Degoz	638	604	97	428	430	101
Maysru	666	666	100	446	446	100
Mezbir	874	823	97	586	586	100
Betgebez	773	750	98	518	518	100
Tahtaymayts emri	822	800	97	552	552	100

Dibdibo	383	383	100	257	260	101
Laelaymayts emri	1004	1004	100	714	700	99
Adi bereto	638	610	95.6	428	420	101
Adisatra	1081	1065	98.5	591	593	99
Maykeyahat	543	555	99	365	360	99
Sefo	913	965	105	479	468	98
Endaleshen	547	547	100	367	370	101
Feresmay	593	650	109	398	390	98
Adiykoro	672	672	100	451	400	88.6
Enticho 03	730	730	100	490	500	102
Adizata	1662	1657	99	780	780	100
Edagahamus	987	975	98	461	461	100
Agamo	139	160	104	93	93	100
Tahtay daereka	1389	1385	99.7	798	798	100
Hoyemedeb	1006	1006	100	675	675	100
Kudo	696	690	99.6	467	467	100
Erdigeganu	1233	1230	100	760	760	100
Sero	1391	1434	103	933	933	100
Endamariam	633	610	96	425	425	100
Meshig	964	960	99.5	646	646	100
Edgaarbi	991	980	98.8	665	665	100
Embahferom	690	690	100	463	463	100
Enticho 01	297	270	90	403	403	100
Enticho 02	629	600	95	422	422	100
Woreda	27302	26982	98.8	19542	20731	106

Table 4.8. HIV/AIDS prevention and control plan vs. achievement in Ahferom District

<i>Activities</i>	<i>Plan</i>	<i>Achievement</i>	<i>Percent</i>
Distribution of condom	89000	165000	185%
VCT	16000	22166	138%
PICT	21542	22076	102%
PMTCT	4000	2703	68%
Health education	100,000	150,000	150%
ART coverage	34	54	110%
Support and care for children who are victims	74	74	100%
Support for HIV/AIDS patients	100	120	120%
Tabias to be conducted social discussion	33	33	100%
Tabias which established board	33	33	100%

The above table shows that the HIV/AIDS prevention and control program plan was achieved in most activities except PMTCT service.

Table 4.9. AHO VCT for the last six years

Year	No. of counselled and tested			Positive		
	Male	Female	Total	Male	Female	Total
1997	354	304	658	15	20	35
1998	178	278	456	16	19	35
1999	3130	4118	7248	98	139	237
2000	11161	9262	20423	270	280	550
2001	4712	4071	8783	48	86	134

2002	19401	22753	42154	53	121	174
Total	38936	40786	79722	500	665	1165

The above

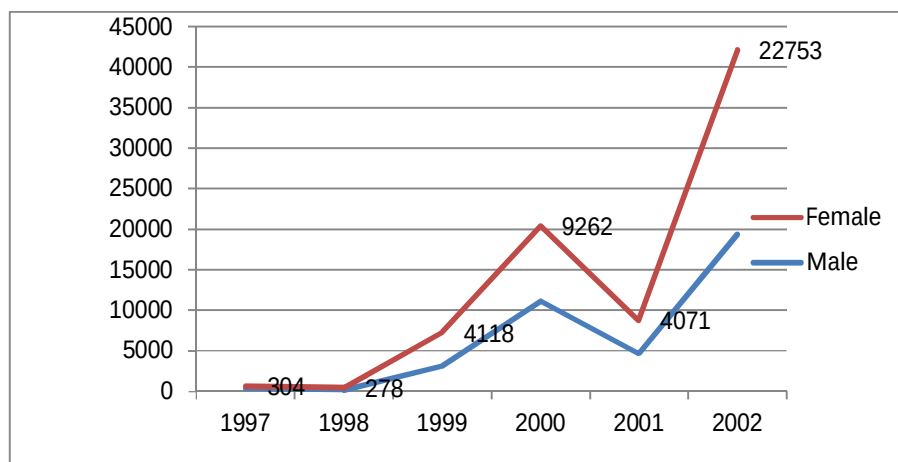


Figure 4.2 Trend of HIV/AIDS testing in the last six years in Ahferom district , Tigray region in 2010.

The above graph shows that HIV/AIDS testing increases linearly from 1997 -2000, but it declines in 2001, this may be due to the reason that this period was the national governmental election period and the health staffs as well as the society may be dedicated in the election process. It then goes up radically in 2002.

4.6. 9. Malaria, Tuberculosis and Pneumonia prevention and control

4.6.9.1 Malaria prevention and control

ITN distribution					Proportion of HHs with IRS coverage		
Tabias	Malarious HHs	ITNs distributed in 2002	Cumulative ITN distributed	Percent	Malarious HHs	Sprayed HHs	Percent
33	20730	29000	77788	98%	23752	20273	85.4

4.6.9.3 Pneumonia and malaria cases for under five children

New pneumonia cases per 1000 pop. Among under 5 age				New malaria cases per 1000 population		
Tobias	Total <5 years age	Cases	Coverage per 1000.	Population exposed	Cases	Coverage per 1000
All	30500	2890	94.7	150230	20100	133.3

This shows that 95 children out of 1000 children of age less than five years were affected by pneumonia and 133 children of 1000 children of age less than 5 years were affected by malaria.

4.6.10 Nutrition intervention in Ahferom district 2002 EFY

Malnutrition is a major public Health problem in Ethiopia that leading to 57% child mortality directly and indirectly. Malnutrition is a significant cause of ill health, faltering physical growth, reduced mental abilities, loss of productivity and death. Therefore it is a serious issue to national socio economic development as well as a major cause of pain and suffering.

In fact, the nutritional status of children is mainly the outcome of the following factors.

1. Lack of adequate food
2. disease/infection
3. Poor quality of maternal and child health care.

To save the life of mothers and children, the necessary intervention involves continuous care throughout pregnancy, child birth, leading to care for children in the crucial early years of life.

In response the high malnutrition rate UNICEF lounged enhanced outreach strategy all over the country in collaboration with other partners like WFP, MOH, RHBs and has been gone operational in Tigray since 2005 and in Ahferom since 2007.

The strategy involved the screening of under –five children, pregnant and lactating mothers in food insecure areas to identify acute malnourished cases .This program is intended to bridge the health extension package.

The national strategy for the treatment of severe acute malnutrition is based on therapeutic feeding unit (TFUs) carried out at local health facilities using national protocols to treat severe acute malnutrition. Based on that currently there are 25 OTP sites 7 health centers and 18 health posts in Ahferom district supported by UNICEF, WFP, DPPC to treat SAM without complications. Those cases who develop complications are referred accordingly.

Expansion of therapeutic feeding program in the district showed remarkable result in the last four years.

A survey at kebele level was done to detect utilization of iodized salt used by HH.

Awareness of mothers to vitamin A provision and De-worming is increased.

RHB in collaboration with UNICEF, WFP, DPPC support nutrition intervention in Ahferom as follows:

1. Therapeutic feeding unit (TFU):

This program is designed for case management of severe acute malnutrition (SAM) at in patient level.

2. Outpatient Therapeutic Program (OTP):

SAM cases without complication is identified through screening of affected population, by community volunteers from community based nutrition, by health extension workers and by self referrals to health facilities. This program was started in one health center i.e. Enticho health center in 2007, one additional health center (Feresmay health center) was functional in 2008, and one health center (Gerhosernay health center) in 2009. Currently, as mentioned above, there are 7 health centres and 18 health posts that provide nutrition intervention. By 2002 all Tabias were introduced nutrition intervention. The 2002 nutritional survey showed that 647 severe acute malnutrition, 5531 moderate acute malnutrition, and 2431 lactating mothers were identified and managed accordingly.

3. Enhanced outreach strategy (EOS):

This program is conducted every three months i.e. four times per year and is targeted at supplementation feeding program for child survival to address the immediate and underlying causes of thorough screening of acute malnutrition, provision of supplementary food to malnourished children, pregnant and child bearing women to correct their nutritional status

and prevent them from further deterioration. It brings remarkable result in vitamin A coverage (98.8%) and De-worming (106%) as we can refer this figure in table 7.2.

4. Community based nutrition (CBN): this involves preventing malnutrition using non food based approach and engages the community to access, and act on factors that influence the nutritional status of children.

Priorities identified

Maternal and child health services are among the most components of a health delivery system especially, in developing countries like Ethiopia. Attending delivery at health facilities by skilled attendants is not as anticipated in the district assessed as indicated in the previous sections.

Vaccinating children at the right age and especially with the vaccines given in earlier ages (BCG) is not such a common practice which needs much emphasis.

Health care services such as provision of therapy on anti retroviral to HIV positive patients within the vicinity of their surrounding is among the very important health aspects requiring attention and commitment at all levels of the health system.

Budget allocated for drug consumption is very low as evaluated from the findings and one of the priority areas for our assessment.

Chapter 5–Scientific manuscript for peer review journals

5.1. Atypical Measles Outbreak—Western and North western Zones of Tigray Region, Ethiopia, October 2010 – January 2011

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Abstract

Background: Measles is a highly infectious virus transmitted through contact with fluids from an infected person's respiratory secretions. Measles causes high morbidity and mortality particularly in developing countries. An average of 10-15 measles cases per year were reported in western and north western zone of Tigray region during the previous 4 years. We investigated an occurrence of extended measles transmission in a remote area to confirm the existence of outbreak, identify the etiologic agent and provide guidance on prevention and control measures.

Methods: A suspected measles case was defined as any person with fever and maculopapular rash, and either cough, conjunctivitis, or cornea or a patient diagnosed with measles by a clinician. From January 28- 31, 2011 attempts were made to identify all cases by collecting a line list of cases from health facilities in the affected zones and data was analyzed by MS-Excel. Blood specimens from 5 suspected cases were collected in December 2010.

Result: From October 2010 to January, 2011 a total of 408 clinically suspected cases and 16 deaths were reported. The case fatality rate was 4%. The median age of suspected cases was 18.3 years (range 3 months-36 years) and 228 (56%) cases were ≥ 15 years of age. Three quarters (75%) of cases were male. The majority of cases, 352 (88%), were unvaccinated or had unknown vaccination status. The attack rate of 10/10,000 was highest in the western zone where 379 (93%) cases were reported. In the North western zone there were 29 (7.1%) cases with an attack rate of 2/10,000. Of the 5 blood specimens collected for testing 3 (60%) were positive for measles specific IgM.

Conclusion: A laboratory confirmed outbreak of measles occurred over a period of 5 months in primarily affecting those ≥ 15 years of age. The older age of those affected in this outbreak combined with low levels of measles immunization suggests that both routine and

supplementary immunization activities need strengthening. Immunization campaigns may need to include older age groups to improve herd immunity.

5.1.1. Introduction

Measles is an infection of the respiratory system caused by a virus, specifically a paramyxovirus, of the genus *Morbillivirus*. Measles is spread through respiration (contact with fluids, from an infected person's nose and mouth, either directly or through aerosol transmission). Its reservoir is human beings. It is highly contagious—90% of people without immunity sharing living space with an infected person will catch it. The infection has an average incubation period of 14 days (range 6–19 days) and infectivity lasts from 2–4 days prior, until 2–5 days following the onset of the rash (i.e. 4–9 days infectivity in total).¹ An average of 10-15 measles cases per year were reported in western zone of Tigray region during the previous 4 years. Starting from October the number of measles cases was raised i.e. 0 in sep, 9 in oct, 64 in Nov, 272 in December, 59 in January and 4 in February. The zone has four Districts with population size of 375646, It is located about 600 km far from Mekelle (capital city of Tigray Region). It is border to Sudan in the west and Eritrea in the north. The area is Hot and harsh environment and it is also endemic for many febrile diseases like malaria, kalazar (visceral leishmaniasis), typhoid fever and others. This zone is the most agricultural zone of Tigray region. This zone has: 49 health post, 18 health center, 1 hospital, 4 physicians, 12 health officer, 4 mid wife nurses, 122 nurse and 115 health extension workers. This area receives only 12 hours electric power supply. On 4th week of January, 2011 the western zonal health office called the regional health bureau to manage the outbreak. Hence, the objective of this investigation was to confirm the existence of outbreak, to identify the possible reasons for the occurrence of the outbreak and to describe the outbreak in respect of time, place & person.

5.1.2. Methods and materials

Descriptive cross sectional study was conducted and standard case definition was used to diagnose cases. This case definition is as follows:

Suspected Case definition: Any person with fever and maculopapular rash and either cough, conjunctivitis, or cornea and/or diagnosed by clinician as measles

Attempts were made to identify all cases by distributing the case definition guide line to all health institutions and notifying the community leaders and health extension workers to report any case to near health facility. A line list of all cases was collected from all health sectors and data was analyzed by ms-excel. The standard line list was used for all new cases, to collect information on date of onset, age, sex, address, date seen at health facility, specimen taken& vaccination status. 5 Samples were sent to EHNRI, laboratory Confirmation. Other techniques used to identify additional cases included informing public administrator committee to mobilize their society to report any case to the nearer health facility.

Health experts were interviewed for Vaccine storage conditions and refrigerator handlings.

5.1. 3. Results

From October 1-- to January 31, 2011 a total of 408 clinically suspected cases and 16 deaths with case fatality rate of 4% have been investigated .the Median age of suspected cases was 18.3 years, and Age range 3 months-36 years. Majority of the cases 303 (75%) were males. Almost all 352(88%) of cases were unvaccinated or had unknown vaccination status. 3/5 (60%) specimens sent to EHNRI for lab. Confirmation were positive for measles specific IgM.

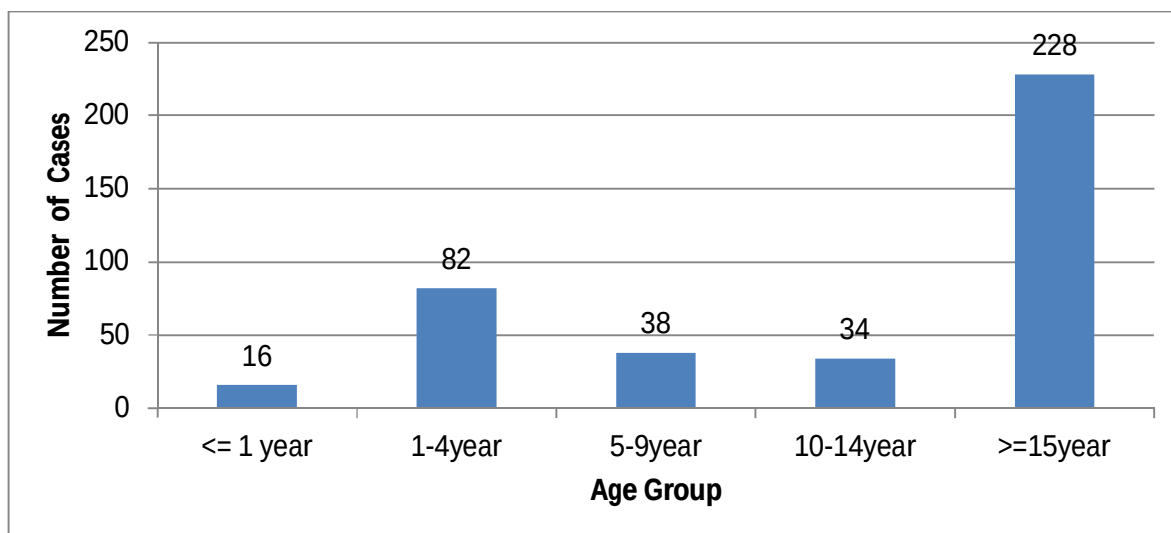
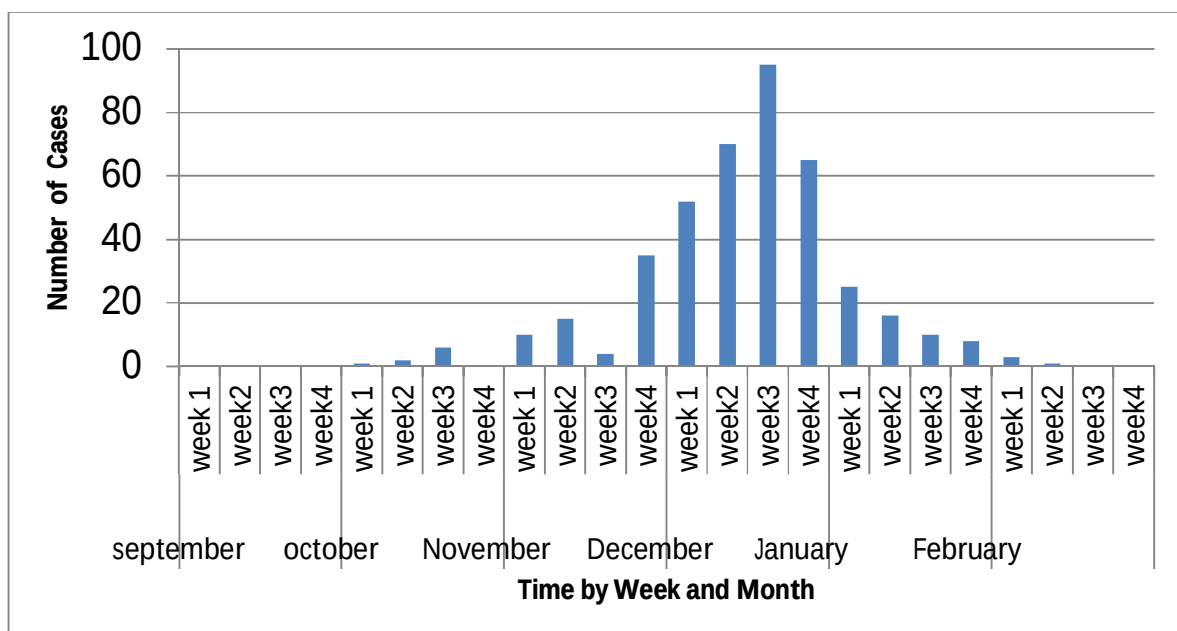


figure 5.1: Age distribution of measles cases in western & north western zone of Tigray, Ethiopia October 2010 to January 2011.

Table 5.1: Distribution of suspected cases and deaths due to measles in western and north western zone of Tigray region, Ethiopia October to January 2010/11

District	Suspected cases	Population size	Attack rate/10,000	Death	Case fatality rate(CFR)
Tsegede	86	109281	7.87	3	3.48 %
Welkait	172	147086	11.6	10	5.8 %
K/Humera	51	96809	5.3	1	1.96 %
S/Humera	70	22470	31.2	1	1.43 %
Asgede	29	142424	2	1	3.45 %
Tsimbla					
Total	408	528070	7.9	16	3.92 %

Figure 5.2: Measles epidemic trend in western and north western zone of Tigray region, Ethiopia oct-Jan.2010/11



The case based report showed that first case seen at Tsegede and then spread to Kafta humera, to Welkait, Setit humera and finally to Asgedetsimbla.

Vaccine transportation and storage conditions, refrigerator handlings were interviewed for the health experts and found with some problems like improper storage of vaccine, shortage of electric supply, failure in delivering vaccine to the community in time due to lack of transportation.

5.1.4 Discussion

Confirmed measles cases with 8 hospitalized cases have been reported in Somali Minneso since February 2011. This is the recent outbreak in Africa and is a little bit smaller than the outbreak occurred in Tigray, Ethiopia (2). The West African sub region reported the highest measles morbidity between 1992- 1997 (121 measles cases per 100,000 inhabitants) this is higher when compared with this outbreak which has measles morbidity of 79/100,000 inhabitants. During the same period, the reported measles incidence in Central Africa and Eastern Africa was 81/100,000 and 78/100,000 inhabitants respectively which is similar with this finding. However, in 2000, lower morbidity of measles was reported from Southern Africa - 58/100,000 and countries in special circumstances (i.e. Angola, DR Congo, Ethiopia and Nigeria) - 33/100,000 inhabitants.

Case fatality rate of 4 % similar with other countries which is estimated to be 3%-5%, but may reach to 10%-30% in some sub Sahara Africa (3).

5.1.5 Conclusions:

A laboratory confirmed outbreak of measles occurred in north western and western zones of Tigray. The largest proportion of cases occurred in the adult population. Lack of previous vaccination among this population likely contributed to the outbreak and accumulation of susceptible population. Sufficient vaccination of those of < 5 years of age may have protected them from illness. The infection was possibly introduced from Tsegede then spread to other parts of the zone.

5.1.6 Control actions taken

Health education on immunization of all susceptible infants and children were given to the community. Immunization program was planned nationally and the team focused for the local health officials on its implementation as it is part of prevention of this outbreak.

The community was informed and obligated to report any case immediately to local health institution. The team discussed with the zonal administrations to solve problem with cold chain. The team promised to lobby to RHB to provide transportation and the local leaders planned to sensitize the local society in purchasing motor vehicles. Lack of electric supply will be solved according to the Ethiopian electric corporation program.

5.1.7 Recommendations

Undertake immunization campaigns focusing on all those without previous measles vaccination. Further study which provides sound evidence should be conducted to consider adult vaccination. Woreda health office should ensure effective cold chain and proper storage and handling of vaccine. Reporting and notification of outbreaks from Woreda level to region should be immediate.

5.1.8 References

1. Filia A, De Crescenzo M, Seyler T, et al. Measles resurges in Italy: preliminary data from September 2007 to May 2008. *Eurosurveillance* 2008; 13: pii=18928. Available at <http://www.eurosurveillance.org/viewarticle.aspx?articleid=18928>
2. Eurosurveillance Editorial Team. Measles once again endemic in the United Kingdom. *Euro surveillance* 2008;13:1. Available at <http://www.eurosurveillance.org/viewarticle.aspx?articleid=18919>.
3. David L. Heymann *Control of communicable diseases manual* 19th edition pg.402.
4. <http://www.columbia.edu/itc/hs/pubhealth/p8473/misc/salama-lec5.pdf>
5. <http://www.hemson.com/rmathew/ethiopia-link-page.html>

Chapter 6 – Abstracts for Scientific Presentation

6.1. Atypical Measles Outbreak—Western and North-western Zones of Tigray Region, Ethiopia, October 2010 – January 2011

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Background: Measles is a highly infectious virus transmitted through contact with fluids from an infected person's respiratory secretions. Measles causes high morbidity and mortality particularly in developing countries. An average of 10-15 measles cases per year were reported in western and north western zone of Tigray region during the previous 4 years. We investigated an occurrence of extended measles transmission in a remote area to confirm the existence of outbreak, identify the etiologic agent and provide guidance on prevention and control measures.

Methods: A suspected measles case was defined as any person with fever and maculopapular rash, and either cough, conjunctivitis, or cornea or a patient diagnosed with measles by a clinician. From January 28- 31, 2011 attempts were made to identify all cases by collecting a line list of cases from health facilities in the affected zones and data was analyzed by MS-Excel. Blood specimens from 5 suspected cases were collected in December 2010.

Results: From October 2010 to January, 2011 a total of 408 clinically suspected cases and 16 deaths were reported. The case fatality rate was 4%. The median age of suspected cases was 18.3 years (range 3 months-36 years) and 228 (56%) cases were ≥ 15 years of age. Three quarters (75%) of cases were male. The majority of cases, 352 (88%), were unvaccinated or had unknown vaccination status. The attack rate of 10/10,000 was highest in the western zone where 379 (93%) cases were reported. In the North western zone there were 29 (7.1%) cases with an attack rate of 2/10,000. Of the 5 blood specimens collected for testing 3 (60%) were positive for measles specific IgM.

Conclusion: A laboratory confirmed outbreak of measles occurred over a period of 5 months in primarily affecting those ≥ 15 years of age. The older age of those affected in this outbreak combined with low levels of measles immunization suggests that both routine and supplementary immunization activities need strengthening. Immunization campaigns may need to include older age groups to improve herd immunity.

Keywords: Measles, measles outbreak, Ethiopia

6.2 Anthrax outbreak investigation in Tanqua abergele district Tigray region, Ethiopia may 2011.

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Abstract

Introduction: Anthrax is an acute bacterial zoonotic disease caused by a gram-positive bacterium, bacillus anthracis. In Ethiopia, a total of 1219 suspected Anthrax cases and 16 deaths attributed to anthrax were reported in 2011. We investigated an occurrence of anthrax outbreak in Tanqua abergele district, Tigray region to confirm the existence of outbreak, to describe in respect of time, place, and person and provide guidance on prevention and control measures.

Methods: descriptive cross sectional study conducted, a suspected cutaneous anthrax case was defined as any person with skin lesion evolving over 1 to 6 days from a papule through a vesicular stage to a depressed black eschar invariably accompanied by edema. From May 28 – 30, 2011 attempts were made to identify all cases by collecting a line list of cases from health facilities in the affected district. The line list was used for all cases, to collect information on date of onset, age, sex, address, date seen at health facility, & outcome and data was analyzed by MS-Excel.

Results: From May 9- 30, 2011 a total of 21 clinically suspected cases and 3 deaths were reported. Majority of the cases, 18(85%) had been developed cutaneous anthrax, but a few of them 2 (10%) had respiratory or pulmonary anthrax, and only one case had gastrointestinal

anthrax. 12(57%) of the cases were males and 9(43%) females. The mean age of the cases was 9 year with range 2 months to 24 years. The case fatality rate is 9.5%.

Conclusion and recommendations: A suspected anthrax outbreak with high case fatality rate has been occurred among young population age groups. Immunization of livestock with refusal of eating dead domestic animals meat with appropriate removal of dead animal due to anthrax may limit the morbidity and mortality of the diseases.

Key words: Anthrax, anthrax outbreak, Ethiopia

6.3 Suspected Pertussis outbreak investigation- in Berhaile, Afar region Ethiopia December- January 2011

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Abstract

1. **Back ground:** Pertussis is an acute bacterial disease of the respiratory system which spreads through contact with fluids from an infected person's respiratory mucus membrane. It is common mainly in developing countries, where epidemic occurs every 3-4 years. However, no pertussis case had been reported from this area for the last three years. We investigated: to determine who is at risk, to describe by person, time and place, and to propose intervention.
2. **Methodology:** Descriptive cross sectional study was conducted, Pertussis was defined as: an illness characterized by cough, vomiting, sneezing, runny nose, watery eyes and/or diagnosed by physician. Data on demographic factors and vaccination status was collected using standard line list, and searched for additional cases in every facility and house hold.
3. **Results:** We identified 124 suspected cases of pertussis in two months from Dec _ Jan. Attack rate is 28/10000 and highest among 1-4 age group. The age ranges 3 months—14 years with median age 2 years. Half 64(52%) of the cases were males. 14 deaths (CFR=10%) occurred. All cases were not vaccinated.
4. **Conclusion:** The investigation suggested that a suspected pertussis outbreak occurred among unvaccinated population mainly children, thus strengthening immunization is recommended to limit the morbidity and mortality of the diseases.

Key words: pertussis, pertussis outbreak, Tigray Ethiopia

Chapter 7. Disaster management situation visited

7.1. Meher rapid emergency needs assessment on non-food (health, nutrition, water, hygiene and sanitation, and education in Tigray region December 2011.

EXECUTIVE SUMMARY

Meher Rapid Emergency Needs Assessment was conducted in Tigray from November 23 to December 6/2011. As part of the Meher assessment, this non-food emergency assessment was conducted in drought hot spot 20 Woredas of Tigray with the objective to identify existing and or potential non-food emergencies or threats that could be related to rainfall performance during the recent “Kiremt” and other causes. Health emergency, whether disease outbreaks or other health emergencies including wide spread malnutrition, usually follow emergency events and could lead to increased illness and deaths. During emergency conditions, access to safe water and sanitary facilities are major challenges. If proper measures are not undertaken, the lack of safe water and sanitary facilities could lead to adverse effects in fulfilling daily needs, and could lead to increased morbidity & mortality due to food & water borne diseases.

The assessment was conducted using a nationally standardized non - food meher rapid emergency needs assessment checklist. Information was collected using the formatted checklists, and observations and discussions made with Zone and Woreda Administrations and Sector Offices officials and concerned experts. Information was collected on existing and or potential emergencies on health, nutrition, water – hygiene and sanitation and education. Experts from Ministry of Water and Energy (MWE), Tigray Bureau of Water and Natural Resources (BOWR), Ethiopian Health and Nutrition Institute (EHNRI), UNICEF, Catholic Relief Society (CRS), and Adi Grat Catholic Secretariat (ADCS) participated during the assessment. Two teams were assigned – one team covers North Western and Central Zones (10 Woredas), the other team covered Eastern, South Eastern and Central Zones (10 Woredas). The two teams then joined together and compiled one report that was done from December 6 to 9/2011.

The total population for the assessed 20 Woredas is 2,492,197 of which 364,534 children less than five years of age. In addition, there are special populations that may need additional focus during emergencies. The categories of the special population are: two refugee sites in

Tselemti (27,000); and Gold miners in Tselemti, Laelay Adiabo, Mereb Leke, and Worie Leke Woredas (53,500). According to the food Meher assessment, a total of 491,493 people are estimated that need food aid due to drought and other causes in the whole Tigray. Of the total population, 71,758 will be children age of less than five years, 18,677 pregnant mothers, 18,677 lactating mothers and 115,501 reproductive age group women. Of the total population, 21,182 are the unspecified liver disease affected people in North Western Zone Woredas, and 14,653 are internally displaced people from border villages in Ahferom, Mereb Leke, and Gulo Mekeda Woredas.

During this assessment, the health situation in the visited Woredas is more or less stable. There was no significant outbreak of diseases or health emergency at present in the visited Woredas. The major outbreak reported in the last four months was pertussis in Tselemti Woreda, in which 317 cases and 3 deaths were reported. Forty seven measles cases were reported from the whole Tigray from July to October 2011 from 9 Woredas. It was reported that there were malaria cases increment in Raya Alamata during July to October 2011. In all visited Woredas, malaria was reported as the first top leading cause of morbidity in the first quarter of EFY 2004. There was no any AWD report in Tigray for the last 3 years. There was no recent pyogenic meningitis outbreak in the visited Woredas.

Unspecified liver disease is the ongoing unknown cause disease in all 6 rural Woredas of North Western Zone (except Shire and Sheraro Towns) for the last years. The most affected Woreda is Tahitay Koraro, in which people are displaced to Kelakil shelter, followed by Medebay Zana and then Asgede Tsimbla. Currently, there are 98 cases living with the disease.

Considering the existing factors for diseases outbreaks or health emergencies, the most predicted diseases that could occur as outbreaks are malaria, measles, pertussis, and waterborne diseases. Acute Watery diarrhoea (AWD) and Pyogenic Meningitis are the other diseases that can occur as outbreaks.

Based on information obtained from Woredas and existing Therapeutic Feeding Programmes (TFP) and Community Health Days (CHD) data, the nutrition situation in Tigray is stable. But close follow is required, particularly, in those drought affected areas to monitor and give response for possible increased malnutrition levels.

Most of the drugs required for outbreak prone diseases are available in stock in all Woredas. Generally, the Woreda Health Offices are aware that they have to put drug stocks for possible disease outbreaks and would be able to manage limited cases at initial stages of outbreak, but all require additional drugs and medical supplies support. The control and preparedness activities are fairly strong in all Woredas. Majority have multi-sector emergency committees, all have IDSR plans and surveillance focal persons and report regularly; but EPRPs, data management, and timely reporting need improvement.

During the assessment, a total number of people affected and/or at risk water supply emergency are estimated to be **422,121 (222,589 affected, and 199,537 at risk)**. There are a total of **6,215** water supply schemes in the 19 visited Woredas, out these **984 (16%)** schemes are non-functional due to various reasons (drought, old lifespan of boreholes, over operation, operation and maintenance problems such as lack of spare parts, skilled man power). As a result the communities are forced to use unprotected water sources, and travelling long distance (5-8 kms) in search for alternative water sources that exposing them to food and water born disease. Currently, 56,138 people are being served by Water trucking in Raya Azebo Woreda, Edaga Arbi Town and Shire Town, in the visited Woredas. A total of **997** schools are found in the whole 19 Weredas, out of these, **696 (70%)** schools are without water **263 (26%)** are without latrine. There are **397** Health institutions in the 19 visited Woredas out of which **306 (77%)** are without water and **14 (0.04%)** are without latrine.

The following major causes of WASH related emergencies were observed in the visited hot spot Woredas.

- Drought (Yield of Borehole, shallow wells, hand dug well and springs decrease or become dry)
- Flooding (a number of springs and hand dug wells destroyed by flooding due to their location at river banks)
- Old life span of schemes (old mono pumps >20 years old) especially in Raya-Azebo and Alamata Woredas.
- Over operation due to large number of beneficiaries without rest for more than 12 hours
- Poor potential of ground water due to geology, topography
- Integration problem (poor WASH facilities in school and Health Institutions)

- Shortage of supply and low awareness on HH water treatment technics.
- Shortage of spare parts & equipment such as crane
- Budget constraint

During the assessment, the teaching learning activities in Tigray region was found to be stable, and most schools are regularly functioning. The overall enrollment rates of primary education (1- 8 grade) in the assessed Woredas were over 90%. However, drought, hailstorm, flooding, high wind, and critical shortage of water supply have been challenging the education sector in the visited Woredas.

In addition to drought and related problems, Woredas that are bordering with Eretria by border tension. There is student labor migration in some Woredas, which is assumed to be to be due to poverty resulted from drought or other causes and that increases out of school. Schools in Raya Azebo, Raya Alamata, Hintalo Wajerat, Enderta, Kilte Awlaelo, and Tanqua Abergele were affected by drought, flooding, high wind and critical shortage of water and students are attending their education under temporary shed. Over all, a total of 72,850 (34,895 male and 37,955 female) students in 136 schools from 20 assessed Woredas of the region have been affected by drought, flooding, high wind, border tension and critical shortage of water supply and need support.

As malaria was the top leading in visited Woredas and malaria is epidemic prone disease, top attention needs to be given to strengthen malaria control activities. Such include, making available anti malaria drugs and rapid diagnostic test reagents, insecticide residual spray (IRS), long lasting insecticide treated bed nets (LLNs) distribution to increase coverage and for replacement, strengthening surveillance and environmental management. Vaccine preventable diseases, particularly, measles and pertussis, are the predicted diseases to occur as outbreaks, thus it is necessary to strengthen routine EPI. Measles mass vaccination in the drought affected Woredas is required. In addition, early detection, reporting, and effective case management of vaccine preventable outbreaks should be in place. To prevent severe consequences of food and water borne diseases, planning and preparation for response are required in terms of IEC/BCC, safe WASH, disease prevention and health seeking; and availing drugs and medical supplies required for case management. AWD and Pyogenic meningitis also requires due attention and close follow up.

In the drought affected Woredas, routine health services need to be maintained that availing preventive, curative and promotional services are necessary. In this regard, maternal and child health services should get the highest priority.

Despite of the overall acute malnutrition level of the assessed Woredas is stable; acute malnutrition is transient and can be changed with some aggravating factors. Hence close monitoring and follow up is mandatory, particularly, in those drought affected Woredas and pocket areas among which include Raya Azebo, Raya Alamata, Enderta, H/Wajerat, Erob, T/Abergele, Tselemti and Laelay Adiabo Woredas. Much effort is needed to improve the active case detection to increase admission of SAM cases in regular pattern. Expansion of OTPs is required in Tselemti, Tahitay Adiabo and Laelay Adiabo Woredas to response to malnutrition ion in drought affected areas. The existing delay in reporting CHDs and TFPs need to be improved so that information can be used for action on time.

The unspecified liver disease in North Western Zone Woredas should get increased attention so that the affected people could get the necessary basic and health needs support, including medical care, referral, and nutritious food.

Emergency drugs and medical supplies support for the predicted disease outbreaks are required. In addition, general health services support is required for people in drought affected Woredas/pocket areas. Capacity building and operational cost support for Woredas are also required.

To alleviate the identified WASH related emergency different interventions have been proposed are, water trucking, provision of household water treatment chemicals, rehabilitation of existing non-functional water supply schemes, construction of additional water points and capacity building works.

A total of 72,850 (34,895 male and 37,955 female) students in 136 schools from 20 assessed Woredas of the region have been affected by drought, flooding, high wind, border tension and critical shortage of water supply. Those affected students and damaged schools need support in terms of school furniture, education materials and building materials for rehabilitation of the schools and students support.

It will be necessary that Regional Health Bureau and Education Bureau to participate in next the Meher Rapid Emergency needs assessment as they were not participated during this assessment. The Bureau of Agriculture and Rural Development/Food security and Early Warning need to discuss with the Bureaus so that they can own the Meher assessment results and act accordingly.

The summaries of target beneficiary population, expected cases of diseases outbreaks and budget requirement are indicated in this annexes section .

7.1.1 INTRODUCTION

This assessment on non-food emergency was conducted as part of the Meher Rapid Emergency Needs Assessment of EFY 2003/2004. The assessment was conducted from November 23 – December 6/2011. Health emergency, whether disease outbreaks or other health emergencies including wide spread malnutrition, usually follow after emergency events due to natural or manmade disasters. During emergency conditions, access to safe water and sanitary facilities are major challenges. If proper measures are not undertaken, the lack of safe water and sanitary facilities could lead to adverse effects in fulfilling daily needs; and could lead to increased morbidity and mortality due to food and water borne diseases. During emergency, the process of teaching - learning would be difficult due to direct or indirect effects of the situation. If proper measures are not taken, there could be decreased school enrolment, increased school drop outs, and partial functioning or closure of schools. During the recent rainy season, rain fall was started late and was erratic in pattern with many dry spells in most areas of Tigray. As a result there could be drought affected wide or pocket areas that consequently would lead to severe consequences on health and welfare of the population among which include malnutrition due shortage of food, communicable disease, and disease outbreaks that subsequently could lead to increased morbidity and mortality. Non-food emergency assessment is crucial to forecast and assess the magnitude of the emergency threats and accordingly to make the necessary plans and preparations so that to prevent unnecessary human damage and deaths. Accordingly, this the non-food emergency assessment was conducted in drought hot spot 20 Woredas of Tigray with the objective to identify existing or potential emergencies or threats that could be related to rainfall performance during the recent “Kiremt” and other causes.

7.1.2 OBJECTIVE

- To identify existing or potential non-food emergencies and assess the magnitude and likelihood of the emergency situations in drought hot spot Woredas of Tigray.
- To assess the level of humanitarian crises and the need for emergency aid.
- To plan and prepare for the emergency responses for existing and or predicted emergency conditions.

7.1.3 METHODS

The assessment was conducted using a nationally standardized non - food Meher rapid emergency needs assessment checklist. In addition to the formatted checklists, observations and discussions with officials and concerned experts were also made. Data were collected from Woreda Health Offices using the developed checklist, observations and discussions. In addition, information was collected from Zone Administrations, Woreda Administrations and Woreda Agriculture and Rural Development Offices. For the non-food part, assessment was conducted in 20 Woredas. Based on the checklists, observations, and discussions, information was collected on existing and or potential emergencies on health, nutrition, water –sanitation and education. Information collected on health include: top diseases, disease outbreaks, epidemic prone diseases and nutritional status. Information collected on WASH include: WASH emergencies, water and sanitation status at community and institutional levels. Information collected on Education include: any existing education emergencies and affected children.

Assessment Team members

Experts from MWE, BOWR, EHNRI, UNICEF, CRS, and ADCS participated during the assessment. Two teams were assigned – one team covers North Western and Central Zones (10 WOREDAS), the other team covered Eastern, South Eastern and Central Zones (total 10 Woredas). The two teams then joined together and compiled one report that was done from December 6 to 9/2011.

ASSESSMENT POPULATION PROFILE

The total population for the assessed 20 Woredas is 2,492,197 of which 364,534 children less than five years of age. In North Western Zone, there are special populations that may need

additional focus during emergencies. The category of the special population is: two refugee sites in Tselemti; Gold miners in Tselemti, Laelay Adiabo, Mereb Leke and Worie Leke; and IDPs in Ahferom and Mereb Leke Woredas that displaced from border villages to nearby Tabias (Table 3a).

However, according to the food Meher assessment, a total of 491,493 people are estimated that need food aid due to drought and other causes in the whole Tigray. Of the total population, 71,758 will be children age of less than five years, 18,677 pregnant mothers, 18,677 lactating mothers and 115,501 reproductive age group women. Of the total population, 21,182 are the unspecified liver disease affected people in North Western Zone Woredas 98 of them are cases, and 14,653 are internally displaced people in Ahferom, Mereb Leke and Gulo Mekeda Woredas border villages.

7.1.4 ASSESSMENT FINDINGS

1) HEALTH AND NUTRITION

HEALTH SITUATION

Tigray has poor health and health related indicators. According to DHS 2005, Neonatal mortality, infant mortality, and under five mortality rates were found to be 40/1000, 67/1000 and 106/1000 live births, respectively. In DHS 2011, 51.4%, 10.3% and 35.1% of less than five years of age children were found to be stunted, wasted and under-weight, respectively; in which all are above national levels of 44.4%, 9.7%, and 28.7% respectively.

FIVE TOP DISEASES

In the visited drought hot spot Woredas, the three top leading causes of morbidity are Malaria, acute respiratory infections, and diarrheal diseases in the order given. Fourth and fifth top leading causes of morbidity varies from Woreda to Woreda, among which skin infections, eye diseases and dyspepsia are commonly ranked.

HEALTH FACILITIES STATUS

In the visited Woredas a total of 106 health centres and 306 health posts are available. Of the total 52 (49%) health centres and 273 (89%) have no water supply. All health centres have latrines but 6 health posts have no latrine facility (Table 2). Access to safe water ranges from 47% in Tanqua Abergele Woreda to 89% in Saesie Tsaeda Emba Woreda. Household latrine coverage ranges from 51% in Tahitay Koraro to 98% in Atsbi Wonberta Woreda.

Table 7.1: Health facilities status in Meher assessed Woredas, Tigray, and December 2011

S.N	Zone	Woreda	Tot HCs	Tot HPs	HCs with out water	HCs with out latrines	HPs with out water	HPs with out latrines	Water coverage (%)	HH latrine coverage (%)
1	North Western	L/Adiabo	5	16	3	0	16	0		79
2		T/Koraro	4	10	2	0	10	0	60	51
3		Tselemti	7	16	5	0	16	0	64	75
4		M/Zana	6	22	4	0	22	2	74	68
5	Central	T/Maichew	5	13	2	0	11	0	59	
6		N/Adet								NIP
7		M/Leke	6	15	2	0	10	2	59	95
8		W/Leke	6	23	3	0	23	1	73	90
9		Ahferom	7	22	4	0	22	0	66	78
10		T/Abergele	5	15	3	0	13	1	47	90
11		Erob	4	6	3	0	5	0	61	97
12		G/Mekeda	6	14	3	0	14	0	72	95
13		S/T/Emba	7	25	4	0	24	0	89	91
14		Hawzen	5	21	2	0	21	0	81	
15		A/Wonberta	5	15	1	0	15	0	54	98
16		K/Awlaelo	5	16	4	0	16	0		
17	S/Eastern	Enderta	6	13	5	0	13	0	75	94
18		H/Wajirat	7	17	2	0	16	0		
19	Southern	R/Alamata	4	14						61
20		R/Azebo	6	13	0	0	6	0		
		Total	106	306	52	0	273	6		

Note:

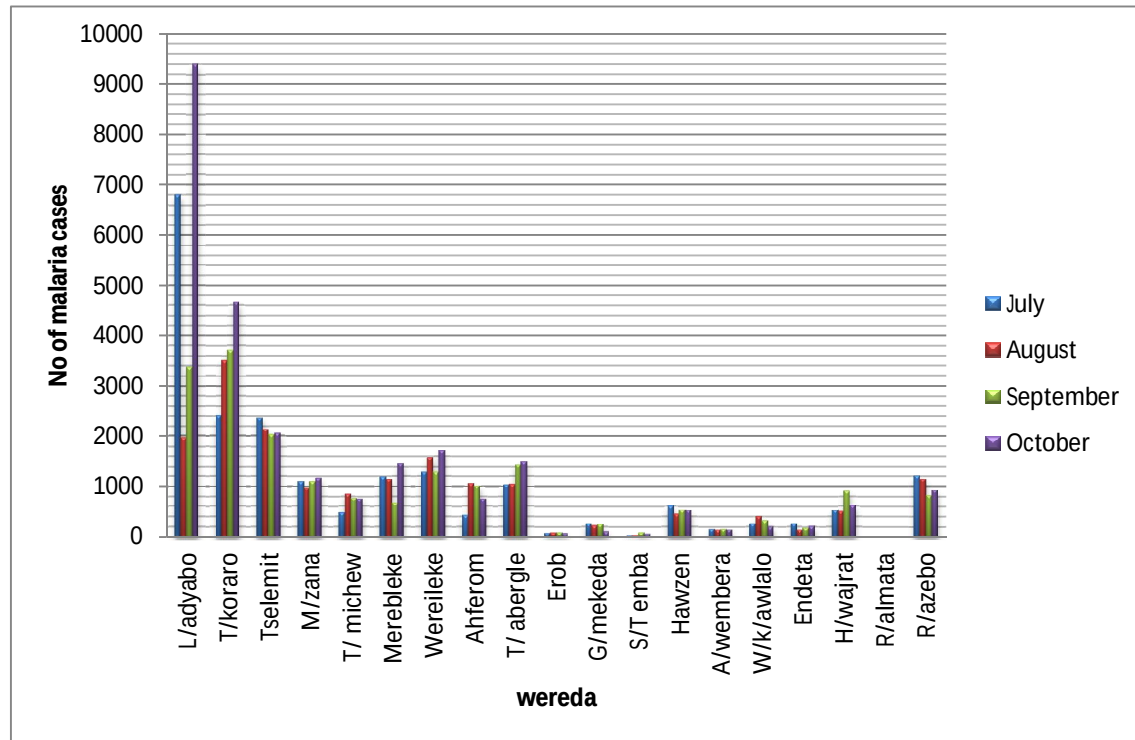
NIP - No information provider found in Naedir Adet Woreda (for health and water).

EXISTING HEALTH EMERGENCIES

The health situation in the visited Woredas is more or less stable. There was no significant outbreak of diseases or health emergency at present in the visited Woredas. The major outbreak reported in the last four months was pertussis in Tselemti Woreda. Some cases of measles were reported from four Woredas . It was reported there some malaria cases increment in Raya Alamata.

Malaria: Malaria cases increment has been reported from Raya Alamata Woreda in the months of July to October 2011. A total of 4,096 cases were reported from July to September 2011 from the Woreda. The stated factor that contributed to the increase in malaria cases was that majority of people are sleeping outside their homes because of bedbugs. There was no malaria outbreak reported in the other visited Woredas. The number malaria cases reported in the four months period were highest in Laelay Adiabo followed by Tahitay Koraro and Raya Alamata (Fig. 1)

Figure 7.1: Malaria cases trend July to October 2011 in meher assessed woredas, Tigray, December 2011



Measles: In the visited Woredas, a total of 26 Measles cases have been reported from four Woredas, namely, Tselemti (21 cases), Laelay Adiabo (3 cases), Medebay Zana (1 case), and Ahferom (1 case) in the period July to October 2011; but a total of 47 cases were reported from the whole Tigray in same period from 9 Woredas. There was no measles death reported in this period. Three of those four were also among those Woredas that reported many measles cases in EFY 2003: Tselemti – 318 cases and no deaths, Laelay Adiabo – 114 cases and 3 deaths, and Medebay Zana – 54 cases and 3 deaths. In EFY 2003, a total of 3,655 measles cases and 66 measles deaths were reported in the whole region from 36 Woredas (total until present = 3,702 cases and 66 deaths).

Pertussis: outbreak has been reported from Tselemti Woreda and total of 317 Pertussis cases and 3 deaths were reported from September 12 to November 15/2011 (Table 5).

Food and Water borne diseases: A total of 20 Typhoid cases were reported from Enderta Woreda (6 cases) and Saesie Tsaeda Emba (14 cases). There was no any death reported.

Other outbreak prone diseases: There were no any AWD or meningitis reported in the period July to October 2011 in the visited Woredas.

Unspecified Liver Disease

Unspecified liver disease is the ongoing unknown cause disease in all 6 rural woredas of North Western Zone (except Shire and Sheraro Towns) for the last many years. The most affected Woreda is Tahitay Koraro, in which people are displaced to Kelakil shelter, followed by Medebay Zana and then Asgede Tsimbla.

The general status as information obtained from Zone Administration is indicated below.

- Total population affected = 21,182 (4,814 Households)
- Total cases since start of disease = 939
- Total deaths since start of disease = 276
- Total cases existing = 663
- In Kelakil shelter only
 - o Affected population = 1,720 (348 households)
 - o Existing cases = 98
- Actions being undertaken (unspecified liver disease): Assessment of the disease is ongoing by Federal Team. Social support is being provided in terms of health care and case management, and food support. However, according to the information from Woredas there is additional social support demand from the affected population.

Table 7.2: Outbreak prone diseases reported from July to October 2011 in Meher assessed Woredas, Tigray, and December 2011

Zone	Woreda	Malaria					Measles					Pertussis				
		Jul	Aug	Sept	Oct	Total	Jul	Aug	Sept	Oct	Total	Jul	Aug	Sept	Oct	Total
N/western	L/Adlabo	6808	1964	3386	9399	21,557										
N/western	T/Koraro	2,415	3,496	3,708	4,644	14,263										
N/western	Tselemit	2359	2135	2025	2054	8573								156	158	314
N/western	M/Zana	1093	966	1099	1169	4,327			1		1					
central	T/ Michew	475	847	758	747	2,827										
central	Mereb leke	1194	1143	666	1451	4,454										
central	Wereileke	1276	1576	1276	1701	5,829										
central	Ahferom	422	1062	1014	754	3,252				1	1					
central	T/ abergele	1040	1046	1427	1489	5,002										
eastern	Erob	70	75	80	72	297										
eastern	G/Mekeda	255	219	242	103	819										
eastern	S/T emba	27	31	81	51	190										
eastern	Hawzen	600	448	523	515	2086										
eastern	A/wembera	156	135	153	139	583										
eastern	W/k/awlalo	256	407	318	200	1181										
s/east	Endeta	262	135	173	205	775										
s/east	H/wajrat	515	497	907	614	2533										
south	R/almata					4096										
south	R/azebo	1209	1138	815	924	4086										
	Total	20432	17320	18651	26231	86730	0	0	1	1	2	0	0	156	158	314

Note: 3 deaths of pertussis were reported from Tselemti woreda in September 2011.

Nutrition status

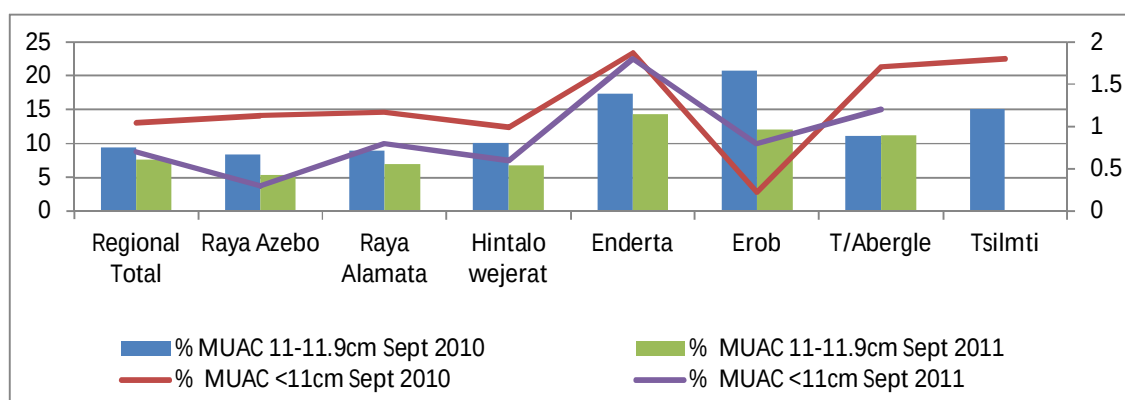
Based on information obtained from Woredas and existing Therapeutic Feeding Programmes (TFP) and Community Health Days (CHD) data, the nutrition situation in Tigray is stable. In Tigray, there are 660 Outpatient therapeutic Feeding Program sites (OTP) and 21 Therapeutic Feeding Units (TFU). Community Based Nutrition (CBN) is expanded in 34 rural Woredas. Regional Bureau of Health has been conducting CHD screening for children, pregnant & lactating mothers every three months in CHDs with vitamin A supplementation and Deworming every six months. For this analysis two CHD screening results are considered that is September 2010 and September 2011 so that to compare the nutritional status in these two similar periods.

CHD screening results

Regionally, children with MUAC<12cm & or edema and MUAC<11cm & or edema in September 2010 was 9.4 % & 1.01% and decreased to 7.4% & 0.7% in September 2011, respectively.

According to the trend the percentage of children MUAC<12cm & or edema and MUAC<11cm & or edema is also decreased in most Woredas in the last screening result (September 2011). Graphical presentation considering two CHD screening results of MUAC11 – 11.9cm (Moderate Acute Malnutrition – MAM) & or edema and MUAC<11 (Severe Acute Malnutrition – SAM) & or edema of the affected Woredas and regional average is presented below

Fig.7. 2: TFP admissions and performance indicators from January 2010 to October 2011, Tigray, December 2011



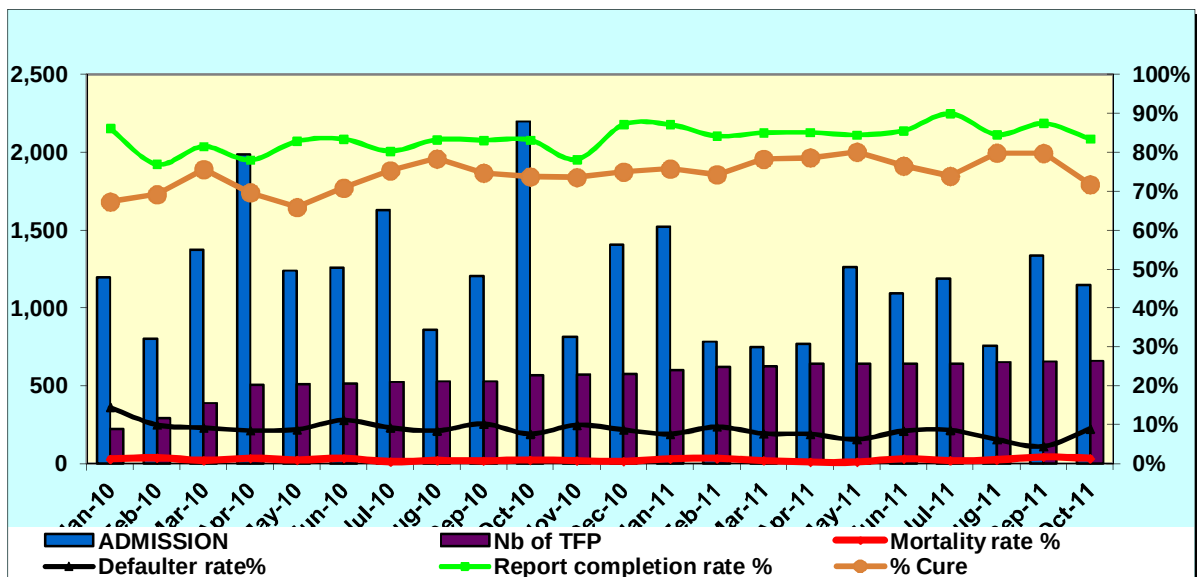
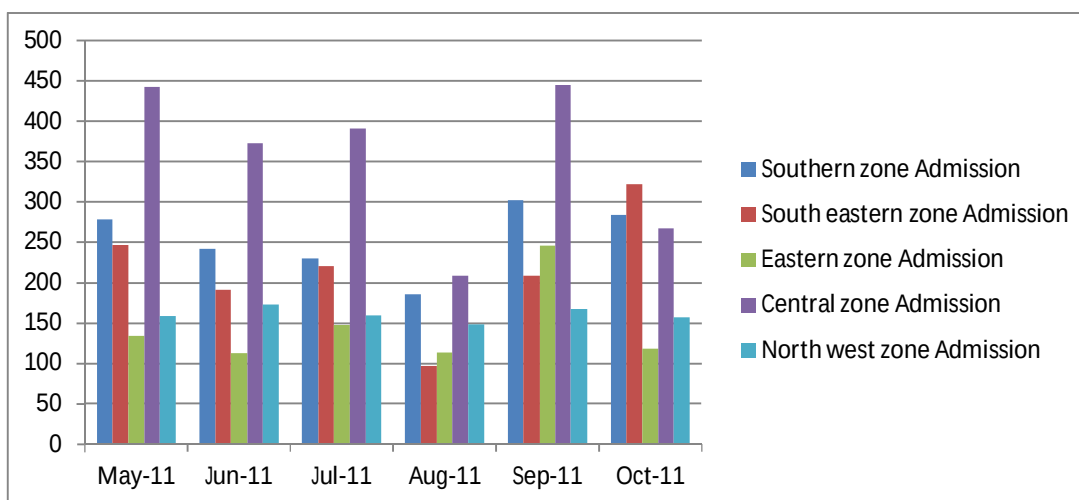


Figure 7.3: Comparison of Moderate and Severe Acute Malnutrition between September 2010 and September 2011 in drought affected Woredas, Tigray, and December 2011

Regionally the trend of TFP admission has increased gradually and picked on the month of September 2011. This increment may lead us to conclude the following assumptions.

- The pick level was observed on July and September which may be due to the mass screening periods
- b) The pick level of October may be due to the late hunger period that the number of malnourished children increased compared with other months.

Figure 7. 4: TFP admissions by zone from May to October 2011, Tigray, December 2011



The level TFP admissions vary between months even at Zonal level and significant increase in admission usually follows after CHDs (Fig7. 4).

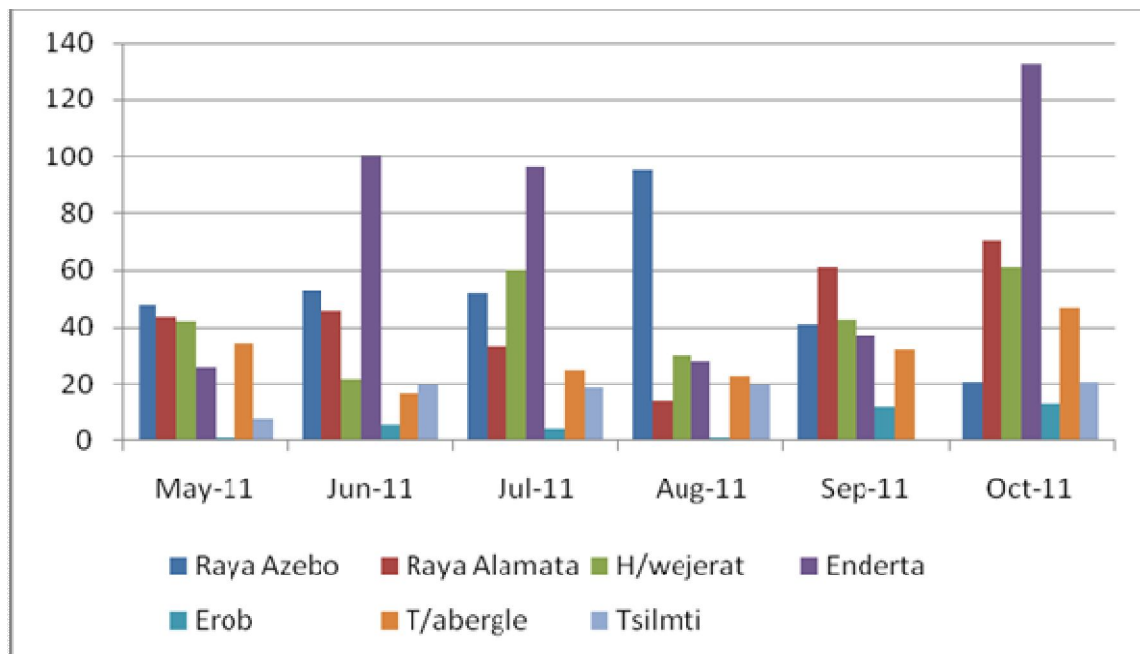
Central zone: The overall trend of admission is stable. The pick level of admission is observed in May and September 2011 (Fig. 4). Woreda Tanqua Abergele had high level of admission on October 2011,

Southern and South Eastern zone: Admission trend from May-Sep was fluctuating. The pick level of admission was observed in September and October 2011. Woreda Raya Azebo, Raya Alamata, Enderta and Hintalo Wajerat exhibited the high level of admissions in September and October 2011.

Eastern Zone: in this Zone high level of admission was observed in May and October 2011 that is directly related with the mass screening period.

North-western zone: in all Woredas the admission trend from July-Sep was constant but on the month of October it slightly rises.

Fig.7. 5: TFP admission trend in drought affected woredas from May to October 2011, Tigray, December 2011



POTENTIAL HEALTH THREATS

a. Disease outbreaks

The most predicted diseases that could occur as outbreaks are malaria, measles, pertussis, and waterborne diseases. However, Acute Watery Diarrhea (AWD) and Pyogenic Meningitis are the other diseases that can occur as outbreaks.

Malaria: The risk factors for malaria are that all the visited Woredas are malaria endemic and have risk factors for malaria transmission, such as, favourable mosquito breeding sites like interrupting rivers, irrigations, and water wells. Some Woredas also need LLINs replacement, and if not replaced there could be risk of increment or outbreak of malaria cases. LLNs coverage is low in few Woredas, namely, Tselemti (63%), Gulo Mekeda (<80%), and Atsbi Wonberta (60%). Mereb Leke Woredas needs 12,000 LLNs for replacement even though the coverage is 100%.

Measles: The risk factors for measles outbreak are that because most Woredas have reported many measles cases in EFY 2003 and measles coverage is low in many Woredas. Few Woredas are still reporting measles cases in the region. The regional Measles coverage is relatively low, 82% for EFY 2003. In 2011, a total of 3,702 measles cases 66 deaths were reported from 36 Woredas in Tigray. Majority of the cases were adults and that the increased cumulative susceptible adult population is challenge for measles control. All these factors increase the risk of measles transmission in Tigray.

Pertussis: Until October 2011, a total of 314 suspected pertussis cases and 3 deaths were reported from Tselemti Woreda. Additional three cases were also reported from the Woreda in November 2011. Hence the outbreak could continue in the Woreda and could expand to other Woredas.

Food and Water borne diseases: In all the visited Woredas, access to safe water supply is relatively low. Safe water coverage in the visited Woredas ranges from 47% in Tanqua Abergele to 89% in Saesie Tsaeda Emba. Reduced hygiene and sanitary practices could also contribute to the risk of transmission of food and water borne diseases. The households

latrine coverage in the visited Woredas ranges from 51% in Tahitay Koraro to 98% in Atsbi Wonberta, but utilization could be much lower than the reported coverage of latrine availability. In drought affected Woredas/pocket areas the risk of food and water borne diseases will be higher as availability of safe water will be much lower due to reduced ground water, drying of water schemes, and sanitary and hygienic conditions could be very much compromised.

AWD: In Tigray, there was no AWD report for the last three years. But Tigray has experienced outbreaks of AWD in the years 2007 – 2009. The most favourable conditions for AWD transmission is poor hygiene and sanitation and existing. Therefore, AWD risk cannot be excluded as the disease is highly communicable and could be transmitted from other neighbour regions.

Pyogenic meningitis: At present, there is no pyogenic meningitis outbreak in the visited Woredas. However, pyogenic meningitis is serious disease that need close follow up and preparation for response of any outbreaks because mass vaccination coverage is low and Ethiopia is in the countries meningitis belt.

Table 7.3: Risk factors for epidemic prone diseases in Meher assessed Woredas, Tigray, and December 2011

S. N	Woreda	Malaria endemic Y/N	ITNs cov	Ongoing measles outbreak	Measles vaccine coverage (%)	Ongoing Pertusis outbreak	AWD last 3 years	Meningitis last 3 years
1	L/Adiabo	Y	>80	N	95	N	N	N
2	T/Koraro	Y	>80	N	90	N	N	N
3	Tselemti	Y	63	N	98	Y	N	N
4	M/Zana	Y	>80	N	91	N	N	N
5	T/Maichew	52%	>80	N	77	N	N	N
6	N/Adet							
7	M/Leke	Y	>80	N	81	N	N	N
8	W/Leke	Y	>80	N	95	N	N	N
9	Ahferom	Y	80	N	85	N	N	N
10	T/Abergele	Y	>80	N	88.4	N	N	N
11	Erob	Y	>80	N	76	N	N	N
12	G/Mekeda	N	<80	N	50	N	N	N
13	S/T/Emba	Y	>80	N	73	N	N	N

14	Hawzen	Y	>80	N		N	N	N
15	A/Wonberta	N	60	N	58	N	N	N
16	K/Awlaelo	Y	>80	N	80	N	N	N
17	Enderta	N	>80	N		N	N	N
18	H/Wajirat	Y	>80	N		N	N	N
19	R/Alamata	Y	>80	N	93	N	N	N
20	R/Azebo	Y	>80	N	73	N	N	N

AVAILABILITY OF DRUGS AND MEDICAL SUPPLIES FOR INITIAL EMERGENCY MANAGEMENT

Most of the drugs required for outbreak prone diseases are available in stock in all Woredas. However, all visited Woredas do not have pyogenic meningitis diagnostic test reagent and kit for AWD Case Treatment Centres (CTC) (Table 5). The drugs with likely shortage are Amoxicillin suspension and Tetracycline eye ointment for measles cases treatment, ORS and Doxycycline if many cases of AWD, Coartem if many malaria outbreaks, and IV fluids. Generally, the Woreda Health Offices are aware that they have put drug stocks for possible disease outbreaks and would be able to manage limited cases at initial stages of outbreak, but all said they require additional drugs and medical supplies support (Table 7).

Table 7.4: Availability of emergency drugs in Meher assessed Woredas. Tigray, December 2011

S.N	Woreda	Ringer Lactate	ORS	Doxycycline	Amoxicillin suspension	Tetracycline eye ointment	Vitamin A	Coartem	RDT malaria
1	L/Adiabo	Y	Y	Y	Y	Y	Y	Y	Y
2	T/Koraro	Y	Y	Y	N	Y	Y	Y	Y
3	Tselemti	Y	Y	N	N	N	N	Y	Y
4	M/Zana	Y	Y	N	Y	Y	N	Y	Y
5	T/Maichew	Y	Y	Y	Y	Y	Y	Y	Y
6	N/Adet								
7	M/Leke	Y	Y	Y	Y	Y	Y	Y	Y
8	W/Leke	Y	Y	Y	Y	Y	Y	Y	Y
9	Ahferom	Y	Y	Y	Y	Y	Y	Y	Y
10	T/Abergele	Y	Y	Y	Y	Y	Y	Y	Y
11	Erob	Y	Y	Y	Y	Y	Y	Y	Y

12	G/Mekeda	N	N	Y	Y	Y	Y	Y	Y
13	S/T/Emba	Y	Y	Y	Y	Y	Y	Y	Y
14	Hawzen	N	Y	Y	Y	Y	Y	N	Y
15	A/Wonberta	Y	Y	Y	Y	Y	Y	Y	Y
16	K/Awlaelo	Y	Y	Y	Y	Y	Y	Y	Y
17	Enderta	Y	Y	Y	Y	Y	Y	Y	Y
18	H/Wajirat	Y	Y	Y	Y	Y	Y	Y	Y
19	R/Alamata	N	N	Y	N	N	N	N	Y
20	R/Azebo	Y	Y	Y	Y	Y	N	Y	Y

b. Nutrition status

The nutrition status in the region is still stable. However, some Woredas need close monitoring of the nutrition situation for early detection and response particularly those drought prone Woredas/pocket areas so that to avoid severe consequences of malnutrition. The Woredas that need close monitoring are Laelay Adiabo, Tselemti, Tanqua Abergele, Erob, Raya Alamata, Raya Azebo, Enderta and Hintalo Wajerat. Raya Alamata and Ray Azebo Woredas are totally affected by drought during the recent Kiremt. The other stated Woredas have reported that there are drought affected Tabias. The drought affected Woredas/pocket areas are at risk of shortage of food, if adequate food support is not provided, and consequently could lead to increased level of malnutrition and its adverse effects including increased deaths.

According to the current Meher assessment, a total of 448,675 people are affected by drought and need food aid. The affected population also need to have access to routine health services, nutrition programs, and close follow up of diseases/epidemics that could be related to shortage of food and lack of access to safe water.

HEALTH EMERGENCIES COORDINATION

Overall, the emergency coordination system in the visited Woredas is relatively strong. All Woredas have functional Public Emergency Multi Sector Committees. Majority of the Woredas have Emergency Preparedness and Response Plans (EPRPs). All Woreda Health Offices have IDSR plans and IDSR focal persons. All report on regularly bases based on the national IDSR guidelines. All Woredas also report that they have reserve medical stocks for possible emergencies. However, the data management, and timely reporting need to be

improved so actions could be undertaken on time. The emergency committees need to be strengthened so that they will be regularly functional and proactive.

PROBLEMS/CHALLENGES

- Some Woredas do not have EPRP
- Low LLNs coverage in some Woredas
- Low EPI/Measles coverage in some Woredas
- Low access to safe water in all Woredas
- Lack of water in most of health centres and all health posts
- Need for training on health emergencies and EPRP in Woreda health Offices
- OTP is not expanded in north Western Zone particularly in Laelay Adiabo, Tahitay Adiabo and Tselemti, hence it could be a problem for SAM response in drought affected Tabias.
- There is no TSF distribution in six Woredas, namely, Tahitay Adiabo, Laelay Adiabo, Tahitay Koraro, Asgede Tsimbla, Medebay Zana, and Tahitay Maichew.
- There is delay of reporting on CHD and TFP

Assessment field trip related challenges

- Field trip team not trained on how to conduct the meher assessment
- Absence of personnel from FMOH and RHB in the assessment team.
- There was no information provider in Naedir Adet Woreda for health and water part of the assessment (Woreda Health Office and Water Office were absent).

CONCLUSIONS AND RECOMMENDATIONS

Malaria is the first leading cause of morbidity in all the visited Woredas during the meher assessment. Therefore, top attention needs to be given to strengthen malaria control activities.

Such include, making available anti malaria drugs and rapid diagnostic test reagents, Insecticide residual spray (IRS), long lasting insecticide treated bed nets (LLNs) distribution to increase coverage and for and replacement, strengthening surveillance and environmental management.

Vaccine preventable diseases, particularly, measles and pertussis, are the predicted diseases to occur as outbreaks because measles outbreaks were reported in 2003 from most Woredas in Tigray, and pertussis outbreak is on-going in Tselemti Woreda. The regional measles coverage is also relatively low. Measles outbreak and its consequences is also a risk in the drought prone Woredas/pocket areas. Adult measles would be a challenge, as majority of the measles cases reported in EFY 2003 were adults. For this reason measles mass vaccination in the drought prone Woredas is required. Strengthening routine immunization is also required in the Woredas so that to prevent vaccine preventable outbreaks. In addition, early detection, reporting, and effective case management of vaccine preventable outbreaks should be in place.

Access to safe water is a problem in all Woredas in Tigray. This could be synergised by the drought in the affected areas. This could lead to shortage of safe water and poor sanitary and hygienic conditions that in turn could lead to increased occurrence of food and water borne diseases, including AWD. To prevent untoward consequences from the food and water borne diseases, planning and preparation for response are required in terms of IEC/BCC, safe WASH, disease prevention and health seeking; and availing drugs and medical supplies required for case management.

In the drought affected Woredas, routine health services need to be maintained that availing preventive, curative and promotional services are necessary. In this regard, maternal and child health services should get the highest priority.

Despite of the overall acute malnutrition level of the assessed Woredas is stable; acute malnutrition is transient and can be changed with some aggravating factors. Hence close monitoring and follow up is mandatory, particularly, in those drought affected Woredas and pocket areas among which include Raya Azebo, Raya Alamata, Enderta, H/Wajerat, Erob, T/Abergele, Tselemti and Laelay Adiabo Woredas. Although the TFP sites expansion and reporting rate is improving from time to time, much effort is needed to improve the active case detection and community mobilization to increase admission of SAM cases in regular pattern so that the TFP admission trend can be utilized as a better indicator for nutritional status monitoring and case management. Expansion of OTPs in Tselemti, Tahitay Adiabo and

Laelay Adiabo is required as these Woredas are drought affected and OTP is not fully expanded. Admission rate from CHDs and CBN referrals need be strengthened. The existing TFPs need to be to continue in a strengthened and universal coverage. The existing delay in reporting CHD and TFP need to be improved so that information can be used for action on time.

The unspecified liver disease in North Western Zone Woredas should get increased attention so that the affected people could get the necessary basic and health needs support, including medical care, referral, and nutritious food.

Emergency drugs and medical supplies support for the predicted disease outbreaks are required. In addition, general health services support is required for people in drought affected Woredas/pocket areas. Capacity building and operational cost support are also required.

It is necessary that Regional Health Bureau to participate in the Meher Rapid Emergency needs assessment.

REQUIREMENTS/DRUGS AND MEDICAL SUPPLIES

The required drug, medical supplies for possible health emergency responses are indicated in Tables below. Budget for operational cost and capacity building is also estimated and indicated below in tables. For details of target population refer to Annexes.

Table 7.5: Target population for emergency response during diseases epidemics, Tigray, Tigray, December 2011

S.N	Emergency condition	Target population	Remarks
1	AWD cases	15,038	3,008 severe cases
2	Measles cases	6,450	
3	Pertussis	3300	
4	Pyogenic Meningitis cases	62,958	1.923,407 populations need mass vaccination.
5	Malaria epidemic cases	36,303	
6	Water borne	2,228	

	communicable diseases cases		
	Total	126,277	

Table 7.6: Target population for MCH services for affected population as Meher Assessment EFY 2011, Tigray, December 2011

	Emergency condition	Total affected population	Under five children	Pregnant Mothers	RAGW
1	Drought	455658	66526	17315	107080
2	IDPs	14,653	2139	557	3443
3	ULD	21,182	3093	805	4978
	Total	491493	71758	18677	115501

Table7.7: Training, monitoring and evaluation for health emergencies, Tigray, December 2011

Key Preparedness Activity	Time line 2011			Budget (ETB)		GAP (USD)
	Q2	Q3	Q4	Required	Gap	
Training on Surveillance and communication for 1,246 health professionals, including Woreda surveillance focal persons, HEP supervisors and HEWs for 3 days.	X	X		1370876.98	1370876.98	80121.39
Training on case management of AWD, Meningococcal meningitis, Malaria and Measles for 220 health workers for 3 days.		X	X	279682.63	279682.63	16346.15
Training on MNCH for 123 health workers for 10 days.	X	X	X	278150.60	278150.60	16256.61
Sensitization for 340 steering committee members	X	X		304154.89	304154.89	17776.44
Monitoring and evaluation for 46 woredas and RHB.	X	X	X	635095.65	635095.65	37118.39

Total				2,867,960.75	2,867,960.75	167,618.98
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Table 7.8: Communication interventions for prevention and control of epidemic diseases/health emergency conditions, Tigray, December 2011

SN	Description	Unit	Unit price including distribution (Birr)	Quantity	Total cost (Birr)	Total cost (USD)
1	AWD/other epidemics Brouchers	Each	2.66	110,000	301136	17600
2	AWD/other epidemics Posters	Each	5.32	10,000	54752	3200
3	AWD/other epidemics leaflets	Each	2	110,000	225852	13200
4	AWD/other epidemics flip Charts/Flip Cards	Each	332.8	1,000	342200	20000
	Total			231,000	923940	54000

Table 7.9: Drugs and medical supplies requirement (Health) for Meher assessment 2011 response, Tigray, December 2011

S.N	Description of Items	Unit	Required supplies			Unit price (USD)	Total cost (USD)	Total cost (Birr)
			Required Qty	Available in Region	Gap			
I	Drugs and supplies for general health emergencies, measles, pertusis and AWD							
1	CTC KITS	Kit	32	32	0	6441.05	0.00	0.00
2	Emergency drug Kits (new)	Kit	54	0	54	1826.00	98604.00	1687114.44
3	Delivery kit (for 10000 displaced people)	Kit	49	0	49	900.00	44100.00	754551.00
4	FP - PILLS cycles	Cycles	1545774	0	1545774	0.20	309154.83	5289639.12
5	FP - injectables vials	Vials	515258	0	515258	0.50	257629.02	4408032.60
6	ORS sachets new formula carton of 1000	Carton	250	0	250	71.33	17832.50	305114.08

7	Water guards	Ampoules	500000	0	500000	0.19	95000.00	1625450.00
8	Refrigerators, Sibir 170 EK	Each	45	0	45	1624.00	73080.00	1250398.80
9	Cold boxes	Each	90	0	90	185.00	16650.00	284881.50
10	Vaccine carriers	Each	200	0	200	162.00	32400.00	554364.00
11	Vitamin A 100,000 IU tin of 500 (for measles cases management)	Tin	250	0	250	0.90	225.00	3849.75
12	TTC eye ointment 1%/TBE-5G (for measles cases management)	Each	14319	0	14319	0.25	3579.75	61249.52
13	Measles vaccine for measles mass vaccination	Vial 10 dose	7,965	0	7965	2.21	17564.27	300524.66
14	AD syringes of 0.5ml of 100 (for measles mass vaccination)		797	0	797	11.06	8809.44	150729.56
15	Mixing syringes of 5ml of 100 (for measles mass vaccination)		836	0	836	11.00	9199.73	157407.46
16	Safety boxes "		8	0	8	18.46	154.39	2641.58
17	Motor cycles YAMAHA 185	Each	50	0	50	2180.00	109000.00	1864990.00
II	Drugs and supplies for Meningitis epidemics							
1	Meningococcal meningitis type AC vaccine of 50 doses	Vials	35137	0	35137	9.01	316586.32	5416791.96
2	AD syringes of 0.5ml of 100	Box	19,501	0	19501	11.06	215682.78	3690332.30
3	Mixing syringes of 5ml of 100	Box	351		351	11.00	3861.00	66061.71
4	Iv fluids DW and DNS box of 10	Box	2000		2000	21.64	43280.00	740520.80

5	Disposable glove (latex) box of 100	Box	3500		3500	2.64	9240.00	158096.40
6	CAF + distilled water box of 5	Box	3000		3000	1.77	5310.00	90854.10
7	CAF capsule tin of 1000	Tin	100		100	3.50	350.00	5988.50
8	Scalp needle	Each	500		500	0.10	50.00	855.50
9	Plaster	Each	1000		1000	0.80	800.00	13688.00
10	Scissors	Each	500		500	0.70	350.00	5988.50
III	Drugs and supplies for malaria epidemics							
1	ITN	Piece	250000	0	250000	3.00	750000.00	12832500.00
2	Quinine 300 mg/2ml ampoules box of 10	Box	872	0	872	1.52	1325.44	22678.28
3	Quinine 300 mg tabs tin of 100	Tin	1220	0	1220	2.97	3623.40	61996.37
4	Coartem tablets pac of 360	Pac	7745	0	7745	24.95	193229.43	3306155.60
5	Chloroquine Syrup of 250 ml	Bottle	5000	0	5000	0.29	1450.00	24809.50
6	Chloroquine Phosphate 300mg tab of 1000	Tin	72	0	72	5.56	400.32	6849.48
7	RDTs multi species test box of 40 tests	Box	4030	0	4030	23.25	93688.97	1603018.23
8	Ringer lactate of 1000 ml box of 10	Box	8713	0	8713	21.64	188549.32	3226078.87
9	Glucose 50% 50 ml box of 20	Box	4357	0	4357	10.45	45530.65	779029.42
10	Paracetamole 100 mg tablets/PAC-1000	Tin	100	0	100	0.94	94.00	1608.34
IV	Drugs and supplies for Water borne /communicable diseases							
1	Ringer lactate 1000 ml box of 10	Box	100	0	100	17.42	1742.00	29805.62

2	Ceftriaxone of 500 mg box of 100	Box	388	0	388	26.23	10185.11	174267.21
3	Cannula all types (16,18,22,25)	Each	1051	0	1051	0.28	294.14	5032.74
4	Cotrimoxazole syrup of 240/5ml susp	Bottle	600	0	600	0.48	288.00	4927.68
5	Amoxicillin 250mg/5ml susp,100 ml/bottle	Bottle	526	0	526	0.47	247.13	4228.33
6	ORS sachets new carton of 1000.	Carton	2627	0	2627	71.33	187369.64	3205894.61
V	Drugs and supplies for unspecified liver disease							
1	Spiranolactone tablet of 25 mg pac of 100	Pac	4,500	0	4500	0.50	2250.00	38497.50
2	Frusemide Tablet of 40 mg pac 100	“	4,500	0	4500	0.50	2250.00	38497.50
3	Frusemide injection of 20 mg	Ampoule	40,000	0	40000	0.05	2000.00	34220.00
4	Multivitamin tablets pac o 100	Pac	1,500	0	1500	0.20	300.00	5133.00
5	Vitamin B complex tablets pac of 100	Pac	150,000	0	150000	0.20	30000.00	513300.00
6	Vitamin B complex injection of 2 mg	Ampoule	2500	0	2500	0.03	75.00	1283.25
7	Ceftriaxone injection of 1 mg	Ampoule	4000	0	4000	0.03	120.00	2053.20
8	Ampicilline injection of 500 mg	Ampoule	5000	0	5000	0.01	50.00	855.50
9	Gentamicne injection of 80 mg box of 50	Box	3000	0	3000	3.81	11430.00	195567.30

10	Ciprofloxacin tablet of 500 mg pac of 10	Pac	400	0	400	0.25	100.00	1711.00
11	Normal Saline of 1000 ml box of 10	Box	500	0	500	21.64	10820.00	185130.20
12	Ringer lactate 1000 ml box of 10	Box	500	0	500	21.64	10820.00	185130.20
13	Dextrose in Water 5% of 1000 ml box of 10	Box	500	0	500	21.64	10820.00	185130.20
14	Glucose 50% 50 ml box of 20	Box	200	0	200	10.45	2090.00	35759.90
15	Diclofenac injection 75 mg	Ampoule	2000	0	2000	0.25	500.00	8555.00
16	Paracetamol tablet of 500 mg pac of 1000	Tablet	300	0	300	0.94	282.00	4825.02
17	Paracetamol tablet of 1000 mg	Tablet	200	0	200	0.94	188.00	3216.68
18	Paracetamol syrup of 100 ml	Bottle	500	0	500	1.10	550.00	9410.50
19	Albendazole tablet of 100 mg of tin 100	Tin	30	0	30	0.62	18.60	318.25
20	IV canula 24 g	Each	3000	0	3000	0.29	870.00	14885.70
21	IV canula 18 g	Each	2000	0	2000	0.29	580.00	9923.80
22	Distilled water of 10 ml box of 50	Box	400	0	400	2.02	808.00	13824.88
23	Syringe with needle of 5 ml box of 100	Box	6000	0	6000	3.20	19200.00	328512.00
24	Syringe with needle of 2 ml box of 100	Box	1500	0	1500	2.30	3450.00	59029.50
25	NG tube pediatric	Each	1500	0	1500	0.05	75.00	1283.25
26	NG tube adult	Each	1500	0	1500	0.05	75.00	1283.25
27	Foley catheter	Each	1000	0	1000	0.10	100.00	1711.00
	TOTAL						3276332.19	56058043.70

ANNEXES 7. (Health and Nutrition)

Annex 7.1: AWD outbreak prone Woredas and estimated cases in 2012, Tigray, December 2011					
S.N	Zone	Woreda	Population (2011)	AWD expected cases (rate 0.6%)	AWD severe cases (20%)
1	Western	Kafta Humera	101710	610	122
2	"	Humera Town	23607	142	28
3	"	Wolkait	154533	927	185
4	"	Tsegede	114813	689	138
5	North Western	Tahitay Adiabo	100865	605	121
6	"	Sheraro Town	18805	113	23
7	"	Laelay Adiabo	123862	743	149
8	"	Tahitay Koraro	75665	454	91
9	"	Shire Town	51197	307	61
10	"	Asgede Tsimbla	149634	898	180
11	"	Medebay Zana	139083	834	167
12	Central	Tahitay Maichew	109481	657	131
13	"	Laelay Maichew	80149	481	96
14	"	Axum Town	49262	296	59
15	"	Naedir Adet	115395	692	138
16	"	Kola Temben	148255	890	178
17	Eastern	Gulo Mekeda	93561	561	112
18	"	Adigrat Town	63549	381	76
19	"	Kilte Awlalo	114524	687	137
20	"	Wukro Town	33344	200	40
21	South Eastern	Enderta	126140	757	151
22	Southern	Raya Azebo	150162	901	180
23	"	Alamata Rural	94220	565	113
24	"	Alamata Town	36644	220	44
25	Mekelle	Mekelle	237922	1428	286
		Total	2506383	15038	3008

Annex 7.2: Measles and pertusis prone Woredas and estimated cases in 2012, Tigray, December 2011					
S.N	Zone	Woreda	Population (2011)	Measles expected cases (attack rate 0.2%)	Pertusis cases (AR 0.2%)
1	Western	Kafta Humera	101710	203	203
2	"	Humera Town	23607	47	47
3	"	Wolkait	154533	309	309
4	"	Tsegede	114813	230	230
5	North Western	Tahitay Adiabo	100865	202	202
6	"	Sheraro Town	18805	38	38
7	"	Laelay Adiabo	123862	248	248
8	"	Tahitay Koraro	75665	151	151
9	"	Shire Town	51197	102	102
10	"	Asgede Tsimbla	149634	299	299
11	"	Tselemti	153241	306	306
12	"	Medebay Zana	139083	278	278
13	Central	Tahitay Maichew	109481	219	219
14	"	Laelay Maichew	80149	160	160
15	"	Naedir Adet	115395	231	231
16	"	Axum Town	44707	89	
17	"	Worie Leke	161649	323	
18	"	Mereb Leke	118328	237	
19	"	Adwa Rural	110042	220	
20	"	Adwa Town	44707	89	
21	"	Ahferom	191678	383	
22	"	Kola Temben	148255	297	
23	"	Abiy Adi Town	17754	36	
24	"	Tanqua Abergele	102482	205	
25	Eastern	Hawzen	121912	244	
26	"	Saesie Tsaeda Emba	156940	314	
27	"	Kilte Awlalo	114524	229	
28	"	Wukro Town	33344	67	
29	"	Adi Grat Town	63549	127	
30	"	Erob	28547	57	
31	"	Gulo Mekeda	93561	187	
32	"	Ganta Afeshum	97815	196	
33	"	Atsbi Wonberta	123885	248	
34	South Eastern	Enderta	126140	252	
35	"	Hintalo Wajerat	168021	336	
36	"	Degua Temben	125311	251	
37	"	Seharti Samre	137424	275	
38	Southern	Raya Azebo	150162	300	
39	"	Raya Alamata	94220	188	
40	"	Alamata Town	36644	73	
41	"	Ofla	140132	280	
42	"	Korem Town	17495	35	
43	"	Enda Mekoni	93522	187	
44	"	Maichew Town	25922	52	
45	"	Alaje	119161	238	
46	Mekelle	Mekelle	237922	476	
		Total	4757795	9516	3024

Annex7. 3: Pyogenic Meningitis outbreak prone woredas and estimated cases in 2012, Tigray, December 2011					
	Zone	Woreda	Population (2011)	Expected cases (2% attack rate)	Mass vaccination (70% of popn)
1	Western	Kafta Humera	101710	2034	71197
2	“	Humera Town	23607	472	16525
3	“	Wolkait	154533	3091	108173
4	“	Tsegede	114813	2296	80369
5	North Western	Tahitay Adiabo	100865	2017	70606
6	“	Sheraro Town	18805	376	13163
7	“	Laelay Adiabo	123862	2477	86704
8	“	Tahitay Koraro	75665	1513	52966
9	“	Tselemti	153241	3065	107269
10	“	Asgede Tsimbla	149634	2993	104744
11	“	Medbay Zana	139083	2782	97358
12	Central	Worie Leke	161649	3233	113154
13	“	Ahiferom	191678	3834	134175
14	“	Kola Temben	148255	2965	103779
15	“	Abiy Adi Town	17754	355	12428
16	“	Tanqua Abergele	102482	2050	71738
17	Eastern	Hawzen	121912	2438	85338
18	“	Kilte Awlaelo	114524	2290	80167
19	“	Wukiro Town	33344	667	23341
20	“	Saesie Tsaeda Emba	156940	3139	109858
21	South East	Seharti Samre	137424	2748	96197
22	“	Hintalo Wajirat	168021	3360	117615
23	Southern	Alaje	119161	2383	0
24	“	Raya Azebo	150162	3003	0
25	“	Raya Alamata	94220	1884	0
26	“	Alamata Town	36644	733	0
27	Mekelle	Mekelle	237922	4758	166546
		Total	3147911	62958	1923407

Annex 7.4: Malaria epidemic prone woredas and estimated cases in 2012, Tigray, December 2011

S.N		Zone	Population (2011)	Target (attack rate 2%)	Remarks
1	Western	Kafta Humera	101710	2034	
2	"	Tsegede	114813	2296	
3	North Western	Asgede Tsimbla	149634	2993	
4	"	Tahitay Adibao	100865	2017	
5		Lelay Adiabo	123862	2477	
6	"	Medebay Zana	139083	2782	
7	"	Tselmti	153241	3065	
8	Central	Kola Temben	148255	2965	
9	"	Mereb Leke	118328	2367	
10	"	Worie Leke	161649	3233	
11	Eastern	Hawzen	121912	2438	
12	South Eastern	Seharti Samre	137424	2748	
13	Southern	Raya Azebo	150162	3003	
14	"	Raya Alamata	94220	1884	
		Total	1815157	36303	

Annex7. 5: Water born communicable diseases outbreaks prone Woredas in 2012, Tigray, December 2011

S.N		Zone	Population (2011)	Target (attack rate 0.1%)	Remarks
1	Eastern	Erob	28547	29	
2		Gulomekeda	93561	94	
3		G/Afeshum	97815	98	
4		Saesie Tsaeda Emba	156940	157	
5		Hawzen	121912	122	
6		Kilte Awlalelo	114524	115	
7		Wukro Town	33344	33	
8		Atsbi Wonberta	123885	124	
9	South Eastern	Enderta	126140	126	
10		Hintalo Wajerat	168021	168	
11		Seharti Samre	137424	137	
12	Southern	Endamekoni	93522	94	
13		Raya Azebo	150162	150	
14		Alamata Rural	94220	94	
15		Alamata Town	36644	37	
16	Central	Tanqua Abergele	102482	102	
17		Naedir Adet	115395	115	
18	North Western	Shire Town	51197	51	
19		Sheraro Town	18805	19	
20	Western	Kafta Humera	101710	102	
21		Humera Town	23607	24	
22	Mekelle	Mekelle	237922	238	
		Total	2227780	2228	

Annex 7.6: OTP performance from January to October 2011, Tigray, December 2011

Month	Admission (No)	Cure (No)	Death (No)	Default (No)	Non- respondent (No)	Medical Transfer (No)	Total Discharged (No)	% Cured	% Death	% Default
Jan-11	1,523	837	13	84	42	27	1,105	75.7%	1.2%	7.6%
Feb-11	784	801	14	102	42	35	1,078	74.3%	1.3%	9.5%
Mar-11	749	905	9	89	41	28	1,156	78.3%	0.8%	7.7%
Apr-11	767	611	3	59	25	27	777	78.6%	0.4%	7.6%
May-11	1,261	568	3	44	25	19	709	80.1%	0.4%	6.2%
Jun-11	1,092	746	12	82	32	29	975	76.5%	1.2%	8.4%
Jul-11	1,189	857	9	100	57	44	1,160	73.9%	0.8%	8.6%
Aug-11	757	839	10	65	26	22	1,051	79.8%	1.0%	6.2%
Sep-11	1,335	671	14	37	38	17	841	79.8%	1.7%	4.4%
Oct-11	1,148	609	11	76	20	37	849	71.7%	1.3%	9.0%
	10,605	7,444	98	738	348	285	9,701	76.7%	1.0%	7.6%

Annex 7.7: CHD report for September 2011, Tigray, December 2011

S.N	Zone	Woreda	Target pop. (6-59 months) 13.73%	Nb of children screened	Screening coverage %	Nb of children MUAC >= 12cm	Nb of children MUAC 11-11.9cm	Nb of children MUAC < 11cm
1	C. Tigray	Adwa Rural	14,875	12,414	83.5%	11,912	463	
2	C. Tigray	Ahferom	26,975	21,862	81.0%	20,022	1,699	
3	S. Tigray	Alage	16,770	14,116	84.2%	12,241	1,709	
4	S. Tigray	Alamata	13,260	13,088	98.7%	12,063	916	
5	N.West	Asegeda Tsimbela	21,059	20,723	98.4%	20,006	522	
6	E. Tigray	Atsbi Wenberta	17,435	15,230	87.4%	14,482	701	
7	S .East	D/Temben	17,637	16,195	91.8%	13,721	2,304	
8	S. Tigray	Endamehoni	13,177	12,051	91.5%	10,098	1818	
9	S. Tigray	Enderta	17,329	13478	77.8%	11302	1934	
10	E. Tigray	Erob	4,018	1939	48.3%	1689	234	
11	E. Tigray	Ganta Afeshum	13,040	8415	65%	7658	705	
12	E. Tigray	Gulomahda	13,167	6556	49.8%	5881	607	
13	E. Tigray	Hawzen	16,746	9503	56.7%	9037	586	
14	S .East	Hin/Wajirat	23,646	21145	89.4%	19583	1423	
15	C. Tigray	K/Tembiene	20,818	20064	96.4%	17823	2046	
16	West	Kafta Humera	13,624		0.0%	0	0	
17	.Tigray	KilteAwlalo	16,044	14956	93.2%	13859	1010	
18	C. Tigray	L/ Maychew	10,866	10,412	95.8%	9993	362	
19	N.West	Laelay Adiyabo	17,430	15743	90.3%	15393	255	
20	N.West	Medebay Zana	19,573	18118	92.6%	17102	838	
21	C. Tigray	Mereb Leke	16,653	14855	89.2%	13924	846	
22	C. Tigray	Naeder Adet	16,256	14864	91.4%	13137	1656	
23	S. Tigray	Ofla	18,776	18451	98.3%	16804	1451	
24	S. Tigray	Raya Azebo	20,618	19123	92.8%	18176	1020	
25	E. Tigray	Saesi Tsaedaemba	22,083	13882	62.9%	12951	874	
26	S .East	Saharti Samre	19,597	17476	89.2%	15993	1314	
27	C. Tigray	T/ Abergele	14,071	12008	85.3%	10516	1344	
28	C. Tigray	T/Maychew	15,408	15887	103.1%	14322	1476	
29	N.West	Tahtay Adiyabo	14,535	10899	75.0%	10703	152	
30	N.West	Tahtay Koraro	10,385	8509	81.9%	8248	182	
31	West	Tsegede	15,641		0.0%	0	0	
32	N.West	Tselemti	21,040		0.0%			
33	C. Tigray	Werie Lehe	22,194	16628	74.9%	14474	2042	
34	Western	Wolkait	20,765		0.0%			

Annex7. 8: Population beneficiaries as Meher assessment 2011, Tigray, December 2011

<i>Emergency beneficiaries in drought affected areas</i>	<i>IDPSs</i>	<i>ULD Affected</i>	<i>Total Emergency beneficiaries</i>	<i>Children less Than five years of age</i>	<i>Pregnant mothers</i>	<i>Reproductive age women</i>	<i>Wash Beneficiaries</i>	<i>Education beneficiaries (students)</i>
455,658	14,653	21,182	491,493	71,758	18,677	115,501	422,121	72850
Expected cases								
Cases			Number					
Malaria outbreak cases			36,303					
Measles			9,516					
Target for Measles mass vaccination (<5 year children)			71,758					
Pertusis			3,024					
Water borne diseases			2,228					
AWD			15,038					
AWD severe cases			3,008					
Meningitis			62,958					
Target for meningitis mass vaccination			1,923,407					

Annex7. 9: Budget requirements for meher assessed beneficiaries, Health, WASH and Education, Tigray, December 2011

Component	Budget estimate	
	USD	Birr
1. Health		
Training, monitoring and evaluation	167619.00	2867961.09
Cost for IEC/BCC	54000.00	923940.00
Cost for drugs and medical supplies	3276332.00	56058040.52
Sub Total	3,497,951.00	59,849,941.61
	8,084,654.63	138,813,520.00
2. wash		
	128,928.30	2,213.698.91
3. Education		
	11,711,533.93	200,877,160.52
Grand Total		

Annex 7. 10. MEHER humaniterain needs assessment in Tigray region,December 2011

Rapid Meher assessment- Health Sector: Woreda level Questionnaire 2011

Serial No.

Interviewer name _____

Institution:_____

Interview Date: (dd) _____/(mm) _____/2011

Region:_____

Zone:_____Woreda_____

Main contact at this location: Name:_____ Position:_____ Tel:_____

SECTION I: SOCIO- DEMOGRAPHIC PROFILE

1.1. Woreda total population: M:_____F:_____ Under 5_____ Total:_____

1.2. Special Population (if any): Pastorals_____ Refugees_____ IDPs_____ Migrant Workers_____

SECTION II: HEALTH PROFILE

2.1.Morbidity and Mortality (List top 5 causes of Morbidity and Mortality) in the year 2003 EC (2010-2011GC)

a. Morbidity	b. Mortality
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

2.2.List number of cases/deaths from Hamle 2003 to Tikimit 2004 (July-October 2011)

Month	AWD		Malaria		Measles		Meningitis	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Jul 2010								
Aug 2010								
Sep 2010								
Oct 2010								

2.3.Ongoing outbreak?

Is there any ongoing outbreak of any disease? YES_____ NO_____

If yes, specify the type of disease

Number of cases _____Deaths _____(specify the time period)

2.4.Preparedness: Is there emergency drugs and supplies enough for 2 months? Or easily accessible on need?

Ringer Lactate (to treat AWD cases) Yes ☐ No ☐

ORS (to treat AWD cases):	Yes ☐	No ☐
Doxycycline (to treat AWD cases):	Yes ☐	No ☐
Consumables : Syringes, Gloves (for AWD management):	Yes ☐	No ☐
Amoxil susp (measles)	Yes ☐	No ☐
Tetracycline ointment (measles)	Yes ☐	No ☐
Vit A (measles)	Yes ☐	No ☐
Coartem for Malaria	Yes ☐	No ☐
Lab supply: RDT for Malaria	Yes ☐	No ☐
Lab supply: RDT (pastorex) for Meningitis	Yes ☐	No ☐
Number of CTC kit available: (for AWD)	Yes ☐	No ☐
Main shortage (if any): Specify		

2.5. Coordination

Is there a multi sectoral PHEM coordination forum?	Yes ☐	No ☐
Is there a drought response plan?	Yes ☐	No ☐

SECTION III: RISK FACTORS

Diseases	Risk factors for epidemics to occur	Yes/No
Malaria	Malaria endemic area	
	Presence of malaria breeding site	
	Interrupted or potentially interrupting rivers	
	Unprotected irrigation in the area	
	LLINs coverage <80%	
	Depleted prevention and control activities	
Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify date)	
	If yes : number of people vaccinated	
AWD	Was there AWD epidemic in the last three years (If yes specify date)	
	Source of water safe? (indicate the source)	
Measles	Ongoing measles cases	
	Widespread malnutrition	
	Is vaccination coverage good? (indicate <1 measles vaccine coverage)	

Any other observations you made or any risks of epidemics?

Rapid Meher assessment- Health Sector. Region/Zone

Interviewer name _____	Institution: _____
Interview Date: (dd) ____ / (mm) ____ / 2011	Region: _____
	Zone: _____

Main contact at this location:		Name: _____		Position: _____		Tel: _____	
1. COORDINATION							
A.		Is there a functional multisectoral coordination forum for the health sector?				Yes ☐	No ☐
B.		Are all relevant government, NGOs and UN agencies represented?				Yes ☐	No ☐
C.		Frequency of regular meeting? (Weekly, Every 2 weeks, monthly.....)					
2. Is there any ongoing outbreak?						Yes ☐	No ☐
If yes, specify the type of disease _____							
Number of cases _____ Deaths _____ (specify the time period)							
3. Mention anticipated epidemics _____,							
If yes please indicate Zone/Woreda at risk and risk population per anticipated risk:							
4. Public Health emergency Management							
A.		Is there a Public Health Emergency Preparedness and response plan?				Yes ☐	No ☐
						If yes, is the plan funded?	Yes ☐ No ☐
B.		Is there a trained staff on PHEM				Yes ☐	No ☐
If yes specify number of trained personnel _____							
C. Is there stock of: (Use the Stock estimation matrix to estimate the amount of stock for each drug/supply for 6 months)		Drugs and medical supplies		Total requirement		Available	Gap
		i. Meningitis vaccine					
		ii. Drugs:		Coartem			
				Oily CAF			
				Doxycycline			
				Ringer lactate			
				ORS			
				Amoxil suspension			
				Cotrimoxazole suspension			
				Tetracycline Ointment			
		Vit A.					
		iii. Lab supplies		RDT (Malaria)			
Pastorex (Meningitis)							
CTC Kit (AWD)							

Summary : Requirements/Needs/ 2011

Region/Zone	Type of Health emergency	Total estimated Beneficiaries	Required finance

Annex 7.11 Population distribution of non-food meher assessed 20 Woredas, Tigray, December 2011

Note:

IDPs – internally displaced people

GM – Gold miners

S.N	Zone	Woreda	Population				Special Population				Remark
			M	F	Tot	<5 yr	Pasto-Ralists	Refugees	IDPs	Migrant Workers	
1	North Western	L/Adiabo	61683	62179	123862	18084	0	0	0	10000	GM
2	“	T/Koraro	38953	38984	77937	11371	0	0	0	0	
3	“	Tselemti	77040	80185	157225	22893	0	27000	0	40000	GM, 2 Refugees
4	“	M/Zana	70567	71999	142566	20814	0	0	0	0	
5	Central	T/Maichew	53706	55775	109481	15984	0	0	0	0	
6	“	N/Adet	57208	58186	115395	16848	0	0	0	0	
7	“	M/Leke	59794	61552	121346	17696	0	0	2143	3000	GM
8	“	W/Leke	78965	82160	161125	26425	0	0	0	500	GM
9	“	Ahferom	96663	99870	196533	28684	0	0	2509	0	Border villages
10	“	T/Abergele	51472	53572	105044	15336	0	0	0	0	
11	Eastern	Erob	14396	14865	29261	4272	0	0	0	0	
12	“	G/Mekeda	47183	48717	95900	14001	0	0	0	0	
13	“	S/T/Emba	79148	81718	160866	23486	0	0	0	0	
14	“	Hawzen	58306	63659	121965	17827	0	0	0	0	
15	“	A/Wonberta	62475	64507	126982	18527	0	0	0	0	
16	“	K/Awlaelo	57491	59360	116851	17060	0	0	0	0	
17	S/Eastern	Enderta	51760	52385	104145	15205	0	0	0	0	
18	“	H/Wajirat	87389	87833	175222	25143	0	0	0	0	
19	Southern	R/Alamata	47322	49254	96576	14100	0	0	0	0	
20	“	R/Azebo	75727	78189	153916	20779	0	0	0	0	
		Total	1227248	1264949	2492197	364534	0	27000	4652	53500	

Chapter 8. Research project proposal

Retrospective assessment of dog bites injury in Tigray regional state, Ethiopia from January 2007- January 2011.

Gebre Kirstos Negash

AAU/ EFELTP

Addis Ababa University, college of health sciences

School of public health

Research project

Retrospective assessment of dog bites injury in Tigray regional state,
Ethiopia from January 2007- January 2011.

Name of the investigator : Gebrekirstos Negash

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Advisor: Zegeye Hailemariam (DVM, MPH, MTVM)

Project duration 3 months

Study area: Tigray regional state

Total cost of the project: **13,029.50** ETB

Summary:

Dog bite injuries are attacks on humans by feral or domestic dogs. Animal bites and scratches represent the most important public health issue related to dogs and cats because of the risk of rabies transmission associated with physical trauma, and wound infections. So the main objective of this study is to describe the diseases in respect of time, place and person as well as to assess the trend of the diseases over the five year period.

Dog bite injury in Ethiopia as well as in Tigray region is becoming primarily a public health concern. The IDSR report of TRHB showed that from 2002-first quarter of 2004 EFY, 3963 dog bite cases and 19 dog bite related deaths have been reported from all over the region (13). Moreover, many people receive anti rabies post exposure treatments annually due to the wide spread nature of dog rabies. Tigray region receives more anti rabies vaccine dose in the previous year when compared with the other regions.

Globally ≥ 15 million people receive rabies prophylaxis annually, mainly for dog bite injuries. It is reported that at least 87 countries are at risk of rabies covering a 2.4 billion population, mainly in the developing countries. Globally, the number of human deaths due to rabies is estimated to be 40,000 to 70,000 annually and estimated 10 million people require post exposure treatment . In Africa, between 1990 and 1996 a total of 23 709 bite injuries were reported from suspect rabid animals in the United Republic of Tanzania. Other study was conducted in 2007 in South Africa and in that study 2021 dog bite injuries were identified among children.

In Ethiopia, a retrospective study on dog bite injury was conducted in Addis Ababa from September 2008 to august 2009 and then 1299 cases of exposure to animal bite and/or scratch have been reported.

This is facility based cross-sectional study to be done retrospectively on secondary data. The assessment will be done in selected health facility of Tigray region. The study population is all recorded injured peoples and the study subjects are all peoples who suffered from dog bite injury from January 2007 – December 2011. All dog bite injuries in the period January2007-December2011 will be included in the data collection. Quantitative and qualitative data will be collected after ethical clearance is obtained. Data will be entered by principal investigator using EPI Info version 3.2.2. Data will be entered, cleaned and then analyzed by epi-enfo version3.2.2 for descriptive statistics for the variables on interest.

8.1. Introduction

8.1.1 Back ground information

Dog bite injuries are attacks on humans by feral or domestic dogs . With the close association of dogs and humans in daily life (largely as pets), dog attacks—with injuries from very minor to significant, and severe to fatal—are common(1) . Animal bites and scratches represent the most important public health issue related to dogs and cats because of the risk of rabies transmission associated with physical trauma, and wound infections(2).

Though, rabies is one of the vaccine preventable diseases, it is practically difficult and irreversible for medical treatment after the on-set of clinical manifestation of the disease. In spite of the availability of safe and effective preventive tools in global market, the burden of the disease could not be reduced in developing countries. Currently, i.e. according to the September 2011 WHO report, more than 55, 000 people die of rabies every year. 40% of people who are bitten by suspect rabid animals are children under 15 years of age. Dogs are the source of 99% of human rabies deaths (1, 3). Every year, more than 15 million people worldwide receive a post-exposure preventive regimen to avert the disease – this is estimated to prevent 327 000 rabies deaths annually. Rabies is present on all continents with the exception of Antarctica, but more than 95% of human deaths occur in Asia and Africa (4). In developing countries, the vaccination status of the suspected animal alone should not be considered when deciding whether to initiate prophylaxis or not. Dog bite rabies potentially threatens over 3.3 billion people in Asia and Africa. People most at risk live in rural areas where human vaccines and immunoglobulin are not readily available or accessible. Poor people are at a higher risk, as the average cost of rabies post-exposure prophylaxis after contact with a suspected rabid animal is US\$ 40 in Africa and US\$ 49 in Asia, where the average daily income is about US\$ 1–2 per person. In India, 20 000 rabies deaths (that is, about 2/100 000 population at risk) are estimated to occur annually; in Africa, the corresponding figure is 24 000 (about 4/100 000 population at risk) (4).

In Ethiopia many people receive anti rabies post exposure treatments annually due to the wide spread nature of dog bites (9). There is, however, lack of sufficient information to scale the magnitude of dog bite injury among humans in the region. In this retrospective study we will

report the magnitude of dog bite as seen in Tigray over the period 2007-2011. The main objective of the Study is, therefore, to generate baseline information on the magnitude of dog bite injury in the region, Thereby to create awareness among policy makers and the public at large.

8.1.2 Statement of the problem:

Dog bite injury in Ethiopia as well as in Tigray region is becoming primarily a public health concern. The IDSR report of TRHB showed that from 2002-first quarter of 2004 EFY, 3963 dog bite cases and 19 dog bite related deaths have been reported from all over the region (13). Moreover, many people receive anti rabies post exposure treatments annually due to the wide spread nature of dog rabies. Tigray region receives more anti rabies vaccine dose in the previous year when compared with the other regions. Most people are at increased risk of being exposed to rabies, as man-dog contact is very common in the region. There is, however, lack of sufficient information to scale the magnitude of dog bite injury among humans in the region. The coordination of regional health bureau with different stake holders like agricultural bureau is also not clearly known. In this retrospective study, information on the status of dog bite injury as seen in Mekelle hospital, Tigray region, over the period of 2007-2011 will be reviewed. The main objective of the Study is, therefore, to generate baseline Information on the magnitude of dog bite in the region, thereby to create awareness among policy makers and the public at large in order to improve prevention intervention and control strategies .

8.1.3. Literature review

Globally ≥ 15 million people receive rabies prophylaxis annually, mainly for dog bite injuries (1). The most serious dog bites may end with death of the victims (1, 2). It is reported that at least 87 countries are at risk of rabies covering a 2.4 billion population, mainly in the developing countries. Globally, the number of human deaths due to rabies is estimated to be 40,000 to 70,000 annually and estimated 10 million people require post exposure treatment (4).

Every year, approximately 5 million people are bitten by dogs with children the most common victims. Dog bite injuries in children remain under recognized and underreported and of particular concern since they are disproportionately represented in dog bite injury statistics (2). American Humane organization reported “children under 15 years of age are the most common victims, making up approximately 70% of all dog bite victims (7). In the United States, 4.7 million people were estimated to have been bitten by dogs in 1994 (an incidence rate of 16.1/1000 in adults and 24.5/1000 in children), of whom 800,000 required medical treatment (3, 4). Later, a survey conducted during 2001–2003 in the USA estimated 4.5 million dog bites each year (an incidence rate of 16.6/1000 in adults and 13.1/1000 in children), an increase of 3% in adults and a decrease of 47% in children (7, 8). Dog bite World human mortality from endemic canine rabies was estimated to be 55 000 deaths per year, as mentioned above, (90% CI: 24 500–90 800) with 56% of the deaths estimated to occur in Asia and 44% in Africa (9).

In Africa, between 1990 and 1996 a total of 23 709 bite injuries were reported from suspect rabid animals in the United Republic of Tanzania (5). Other study was conducted in 2007 in South Africa and in that study 2021 dog bite injuries were identified among children (10).

In Ethiopia, a retrospective study on dog bite injury was conducted in Addis Ababa from September 2008 to August 2009 and then 1299 cases of exposure to animal bite and/or scratch have been reported (9). Another retrospective study of 1996–2000 showed that, 91.6% of the fatal human Rabies cases were attributed to dog bites (10).

8.2. Objective

8.2.1 General Objective

To determine the prevalence of dog bite injury in Tigray region from 2007 - 2011.

8.2.2 Specific Objectives

- I. To Describe and characterize animal bites in respect of time, place and person.
- II. To assess the trend of the diseases over the given period i.e2007-2011
- III. To assess the immunization status of dog in Tigray region during the last five years
- IV. To assess the district authorities and health facility preparedness and management of animal bites and rabies

8.3. Methodology and materials

8. 3.1 Study Design – This is an facility based cross-sectional study to be done retrospectively on secondary data. The occurrence of dog bites in humans will be determined by reviewing the registers used for recording animal bitten cases and post exposure anti rabies treatments. The number of people that received post exposure anti rabies treatments during the same period will be obtained by reviewing the records of people that came to the institute being bitten by rabid or suspected rabid animals. Data that contains information like; identification number, date, name of patients, sex, address (zone, Woreda, kebele, house no.), type of biting animal, date of bite, site of bite, vaccine given and health institution where vaccine is given will be collected. The data for fatal human rabies cases will be obtained from the records of people that came to the facility in search of treatment after developing the signs and symptoms of rabies and those who finally died; their relatives who were told to come back to the institute for post exposure treatments confirmed their death. Rabies diagnosis on humans will be verified based on clinical signs and history of animal bite. A simple univariate analysis will be performed to generate frequencies and cross- tabulation of variables of interest.

8.3.2 Study Area – The assessment will be done in selected health facility (Mekelle Hospital) of Tigray region. This hospital is selected as it is used as referral hospital of the region where most of the peoples bitten by suspected rabies have been getting service there.

8.3.3 Study Population – Data will be collected at health facility level. The study population is all recorded injured peoples and the study subjects are all peoples who suffered from dog bite injury from January 2007 – December 2011.

8.3.4 Study Duration: Jan 2012-April 2012

8.3.5 Sample size and sampling Methods –. All dog bite injuries in the period January 2007- December 2011 will be included in the data collection.

8.3.6 Data Collection Tools and Procedures: quantitative and qualitative Data will be collected using the data collection formats prepared for this assessment (See Annex), which will be pretested in a hospital which is not part of the study to check the instrument for its clarity,

completeness of variables etc. Accordingly the data collection instrument will be revised and finalized. At the health facility level, the Data collector will review the clinical records, charts and reports made by the health facility in the last five years using the prepared questionnaire.

8. 3.7 Data Collector: Data on dog bite/suspected rabies patients will be collected by five diploma nurse professionals' in the respective health facility. One day training on data collection will be provided. Collected Data will be revised daily by the investigator to ensure its quality.

8.3.8 Data Collection Instruments: Data will be collected using the data collection formats prepared for this assessment (See Annex), which will be pretested in a hospital which is not part of the study to check the instrument for its clarity, completeness of variables etc. Accordingly the data collection instrument will be revised and finalized. At the health facility level, the Data collector will review the clinical records, charts and reports made by the health facility in the last five years using the prepared questionnaire.

8.3.9 Data quality assurance: the data collectors will be given intensive training. Questionnaires will be checked every day by the investigator for completeness. Incomplete and inconsistent entries will be sent back to the data collector.

8.3.10. Data Entry and Analysis: Data will be entered by principal investigator using EPI Info version 3.2.2. Data will be cleaned and then analyzed for descriptive statistics for the variables on interest. Descriptive statistics, Chi square test and one way ANOVA will be computed which will be further discussed and interpreted as necessary.

8.3.11. Ethical Considerations: All the process will be started after Permissions is obtained from Addis Ababa University, school of public health. Support letter will be requested from the regional, zonal and health facility officials before the data collection. During the data collection, all precautions will be taken to confidentially maintain patient's personal information.

8.3.12. Expected Results: The findings from the assessment are expected to improve implementation of interventions on control and preventive actions.

8.4. Action plan

Activities	Dec.2011	Jan.2012	Feb.2012	Mar.2012	April2012	May2012	June2012
Writing proposal	Xx						
Submission of finalized proposals	Xx						
Prepare fieldwork		xxxx					
Data collection			Xxxx				
Data entry and analysis				xxxx			
Write up and submission of report					xx xx		
Submission of compiled final version						xxxx	
Defense							xxxx

Table 8.1. Budget break down for the implementation of the project.

Item/Description	Quantity/Number	No of days	Price or (Rate per day)	Total cost(ETB)	Remark
Perdiem					
Principal investigator	1	10	400	4000	
Others	5	10	150	7500	For those who participate in the data collection.
Stationary					
writing pad	5		15	75	
Paper (A4 size)	3		20	60	
Blank WR-CD	10		1	10	
Printing and Photo copying				200	
Sub- total				11845	
Contingency (10%)				1184.50	
Grand TOTAL				13,029.50	-

8.6. References

1. http://en.wikipedia.org/wiki/Dog_bite
2. *Dog bite as public health concern in Addis Ababa:*
www.ajol.info/index.php/ejhd/article/view/69851/57931
3. WHO/rabies available at www.who.int/mediacentre/factsheets/fs099
4. Health and Population, *Perspectives and Issues* 26 (4): 154-161, 2003

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Available at : <http://nihfw.org/Publications/material/J507.pdf>
5. <http://www.who.int/bulletin/archives/80%284%29304.pdf> in Tanzania
6. www.who.int/rabies/epidemiology/Rabiessurveillance.pdf
7. Tenzin, Dhand NK, Gyeltshen T, Firestone S, Zangmo C, et al. (2011) Dog Bites in Humans and Estimating Human Rabies Mortality in Rabies Endemic Areas of Bhutan. *PLoS Negl Trop Dis* 5(11): e1391.
doi:10.1371/journal.pntd.0001391
9. The status of rabies in Ethiopia: A retrospective record review, available at ejhd.uib.no/ejhd-v24-n2/127%20The%20status%20of%20rabies
10. Health/south Africa medical journal : available at http://findarticles.com/p/articles/mi_6869/?tag=content;col1
11. *Current WHO guide for rabies pre and post-exposure treatment in humans*. Geneva, World Health Organization, 2002
(http://www.who.int/rabies/en/WHO_guide_rabies_pre_post_exp_treat_humans.pdf).
12. *WHO expert consultation on rabies. First report*. Geneva, World Health Organization, 2005 (WHO Technical Report Series No. 931; ISBN 92 4 120931;
http://www.who.int/rabies/trs931_%2006_05.pdf).
13. Tigray regional health bureau IDSR report, 2003/2004

Annex 8

Annex 8.1. Distribution of dog bites injury by age group in mekelle hospital, Tigray region in the period 2007-2011.

year	Age group				
	1-14	15-49	50+	Unknown	Total
2007					
2008					
2009					
2010					
2011					
Total					

Annex 8.2. Sex and age distribution of dog bite injury cases in mekelle hospital, Tigray region 2007-2011.

Age group	Male		Female		Total	
	Number	%	Number	%	Number	%
1-14						
15-49						
50+						

Annex 8.3 Questionnaire for retrospective assessment of dog bite injury in Tigray region

I. Patient information

1. Name of the patient: _____
2. Age in years: _____
3. Sex of the patient: Male ☐ Female ☐
4. Main occupation (Farmer, housewife, student, if recorded): _____
5. Patient address :
 - a. Region: _____
 - b. Zone: _____

- c. Woreda: _____
- d. Kebele: _____
- e. Tabia _____
6. Chief complaint: _____
7. Does the patient record report any of the following signs and symptoms?
- a. Hydrophobia : Yes ☐ No ☐ ☐ Unknown
- b. Aerophobia Yes ☐ No ☐ ☐ Unknown
- c. fluctuating consciousness Yes ☐ No ☐ ☐ Unknown
- d. Early and prominent muscle weakness Yes ☐ No ☐
☐ Unknown
8. What was the biting animal 1) dog---2)cat----3)others----
9. Date of dog bite occurred -----
10. Location where bite occurred 1) home ----2) along the road-----3)forest-----4)other----
11. Date of onset of the illness:
12. Did the patient provided 1)yes 2)no
13. What was the type of injury occurred? 1)laceration---- 2) puncture-----3) Tearing of flesh ----
--
14. Does the patient record report any of the following signs and symptoms ?
- a. Neurologic syndrome : 1)Yes-- 2)No 3)Unknown
- b. paralytic syndromes: 1) Yes 2)No 3)Unknown
15. Patient outcome (if information available):
- a. Patient improved (Yes/No) Unknown
- b. Patient died (Yes/No) Unknown, if yes what was the cause of death? 1)respiratory paralysis 2) coma
16. What was the treatment given for the bitten patient 1) anti rabies virus---2) rabies immunoglobulin----3)tetanus toxoid-----4)antibiotics----5) analgesics----6) Anti-inflammatory drugs-----7)others----

II. Dog information

1. Address of the dog-----
2. Does the dog have immunized? 1)Yes---2)no----3)unknown---

3. Did the dog have history of contact with street dogs? 1) yes 2)no
4. Does the dog have any sign of rabies diseases? 1 yes) 2) no

III. Preparedness

5. Major interventions taken to prevent and control rabies(review any available reports ,ask focal persons)-----
6. Was there any livestock immunization in the study areas during the last five years 1) yes, 2)no ,3) unknown
7. If yes, to question 19,for which livestock and specify the period.
8. Does the hospital/district have enough anti rabies vacin?1)yes 2)no
9. Does the hospital/district have enough anti tetanus? 1 yes 2)no
10. Does the district conduct baiting of stray dogs and cats? ----
11. Does the district conduct vaccination of live stock and/or pets

Chapter 9 – Other Additional Output Report

9.1 Narrative summary of Tigray Regional Health Research Laboratory activity

9.1.1 Introduction

Tigray region has one research laboratory situated in mekelle city .the level of the laboratory is regional research laboratory. It is under the diseases prevention and promotion core process of Tigray regional health bureau. The institute has different departments like Bacteriology, parasitology, haematology, virology and serology and clinical chemistry. Different types of diseases ranging from routine like blood film, stool examination, urinalysis to sophisticated tests like CD4 count, TB culture, viral load and different bacteriological cultures are being performed in this laboratory. The main objective of the laboratory is to provide technical support for the laboratory facilities so that they will strength their capacities throughout the region. The institution also plays a vital role in early detection and notification of epidemic prone diseases.

The institution conducts two types of quality control those are External Quality Control(EQC) and Internal Quality Control(IQC). This two programs have their own input in ensuring the guaranty of the accuracy and reliability of the test results.

This institute has its own free standing building with 12 rooms which have 21 benches. The laboratory has facilities like electric city, running water, a backup power source in case of power failure. This back up power source protects equipments like refrigerators, computers, viral load machines, autoclaves, incubators, water bath etc.

The laboratory communicates with different organizations through post, telephone, fax, mail and internets. It has two Msc in Medical parasitology, 10 BSC in medical laboratory technology and one diploma laboratory in total 13 professionals.

Different trainings have been provided for the staffs on different diseases like AWD, Malaria, meningitis, H1N1 etc... however the laboratory has shortage of reagents to investigate this above mentioned and other diseases. Lack of funds is the main reason for this. This facility uses distilled water for preparation of reagents and Medias.

Below is listed the laboratory tests performed and not performed separately.

Table1. Type of tests with their specimens performed at the laboratory:

Diseases	Specimen type	assay performed	number /month
HIV/AIDS	Blood ,serum,DBS	KHB/Stat pack/unigold/viral load measurement	
Meningitis	CSF	Cell count Latex agglutination Gram stain Culture Identification tests Drug susceptibility tests	
Shigellosis	Stool	Wet mount microscope ,stool culture	
Watery diarrhea (cholera)	Faeces	Wet microscopic preparation Culture-TCBS Culture –Alkaline peptone Sero typing	
Malaria	Blood	Thick /thin film microscopy	
Pulmonary Tuberculosis	Sputum	Microscopy /AFB examination	

However, due to lack of skilled man power and supplies the following tests on epidemic potential diseases are not performed .

Table 2. Types of tests with their specimens not performed at the laboratory

Diseases	Specimen	assay performed	Test performed
Measles	Serum ,throat swab, conjunctiva swab,	IgM by EIA Other serological test Virus isolation	No
Yellow fever	Blood, post mortem liver	IgM Virus isolation	No
Typhoid	Blood, faeces, serum	Culture. Identification tests , drug susceptibility, serological tests, Widal test,	No
Brucellosis	Blood ,serum	Culture, identification tests, serological tests, Brucella agglutination tests	No
Hepatitis	Serum	Anti-HAV IgM, Anti HBsAg, Anti-HCV IgM	No
Viral hemorrhagic fever(any)	Serum and other tissue specimens	IgM Virus detection	No
Acute flaccid paralysis	Faeces	Virus isolation, virus typing	No

2. Specimen collection, labeling and handling

Specimens are collected and handled properly. the request form of this laboratory contains patient information like specimen type, date and time of collection, type of test requested, patient name, patient unique ID number .the laboratory also has log book and electronic record of all specimens sent for diagnostic testing. Specimens are discarded after testing and specimens for bacteriological isolates are sent to reference laboratory for confirmation, identification of unknown organism and tests not performed in the laboratory. A number of samples have been sent in the last six months. Specimens have been sent using transport medias like Trans-isolate and Cary and Blair.

3. Reporting procedures:

The number and type of tests performed with their results are recorded and stored. the laboratory provides regular reports of patients with notifiable diseases to federal ministry of health. Reports are submitted quarterly to FMOH/EHNRI.

4. Quality control activity:

The laboratory has internal as well as external quality control programs. Supervisions are conducted to this facility. it has regular monitoring of quantities of reagents and materials so that there is warning if stocks become low.

9.2 Investigation of rumours on food poisoning outbreak in Afar region, Ethiopia June 2011

Assessment of unknown outbreak reported from Afar region, Berhaile district, Alla kebele. A total of 14 Unknown cases and 2 deaths (both females) were reported on June 6, 2003 E.C who were manifested a clinical sign and symptoms of diarrhoea at wua gedi village. Median age of cases was 11 years with age range 4 months -48 years. All affected subjects were a member of a single family. Clinical signs and symptoms taken during assessment include tenesmus with continuous diarrhoea of greater than 30 episodes per day and this was accompanied by vomiting in the next day (07/10/2003E.C). All cases were referred to Mekelle Hospital. Stool exam was

done and result revealed Trophozoite of *Entamoeba Histolitica* and was treated accordingly. During the assessment, patients were inquired at mekelle Hospital for possible source of water, food staff and feeding, hygiene and sanitation. The source of water in the kebele is steam water; their feeding habit is a custom porridge and bread with fresh milk. There is no near health facility, they should move 20 km to get health care services. health education was provided on general cleanliness” to use Waha Agar’ treated water for drinking, using of boiled milk, to wash their hands before and after meal and always after using toilet. It was suggested that the possible cause of diarrhoea in the family could be food poisoning and the source of the infection might be the porridge and the un boiled or fresh milk used during the meal before clinical manifestation exhibited.

9.3 Suspected meningitis outbreak assessment in Asgedetsimbla, Tigray region June 2011.

From June 11 to 13, 2011 one who is 25 years of age male suspected case and one who is 13 years of age female laboratory Confirmed cases of meningitis were reported from Asgedetsimbla district, Tigray region. The district has a total population of 149,968 and approximately 50,000 gold miners are deployed there. No meningitis case was reported from this area for the last 10 years. CSF sample was collected from the 13 age female patient and examined for gram stain ,glucose, protein, differential count and WBC count at Suhul Hospital, Shire, as a result gram negative diplococcic was observed , the protein level was +++,with glucose level 0. The total WBC was $8000/\text{mm}^3$ with differential count 85% neutrophils and 15% lymphocytes. This patient has previous history of abscess/oedema at her lateral neck, she has no travel history, she has been treated for measles on January 2011. The suspected case has history of contact with the confirmed case; he was Sibling of the confirmed case and had been giving care for the patient. The team with the district health experts moved to the area and conducted home to home survey to identify additional cases, but no case was found. The team tried to verify the clinical and laboratory diagnosis that was performed at the Hospital, but unfortunately the microscopic slide examined for gram stain was not available at that time and become challenge in confirmation of the outbreak, in addition to this the one clinically suspected case for meningitis was positive for *plasmodium falcifarum*. The laboratory confirmed Case was treated with ceftraxone and the suspected case was treated with anti malaria and antibiotics. So based on those information it

was difficult to conclude this as meningitis outbreak. Prophylaxis was provided for 18 contacts .Health education via leaflets, microphones, and meetings were carried out on how to prevent the disease and to prevent for future emergence of the outbreak.

9.3 Assessment of exposure to trace metals in AKaki sub city Addis Ababa July 2011.

There was a study conducted by EHNRI in collaboration with CDC-Atlanta in Akaki subcity Addis to assess whether the community is exposure to trace metals as a result of the waste product of the industries in the subcity. In Ethiopia there are around 400 industries and around 300 of them are located in the Akaki/kality subcity. So there is a suspicion that the peoples living in that locality and using water from the AKaki river source might have been exposure to trace metals, which have a chronic health problem in human beings. To take intervention for that problem ministry of health requested evidenced based information for EHNRI and CDC. After that I was participated as a member of the investigator team and collected data from 100 control households and 300 case households. Urine, blood, and water samples were collected from the suspected area and from non suspected area for the exposure of heavy metals. Samples are being processing in Atlanta and in Addis and then the result will be disseminated in the near future.

9.4 Retrospective assessment of Chronic Liver Disease in selected health facilities of Tigray and Amhara region August 21- September 14/2011

Unspecified liver disease (ULD) is a chronic disease that affects both humans and animals. This disease was first reported in 2005 from Tsead Amba affecting both humans and Animals. The main symptoms associated with the disease are febrile, abdominal pain, abdominal swelling, chronically sick, hepatomegaly, ascites, and edema. A team deployed to collect ten years' liver associated diseases data: 8 hospitals and 1 HC covered (2 Hospitals and 1 HC from Amhara and others from Tigray region. The major objectives of this assessment were to look at the burden or trend of the diseases, to describe the cases in terms of person, time and place. The methods used were debriefed the regional health bureau, the chief executive officer (CEO) and chief clinical officer of each health facility. Questionnaire was prepared to collect demographic and

epidemiological data and Logbooks were explored to collect cases of liver associated disease then patient cards collected to look at the variable of interest.

Based on this, the total number of cases was found to be 834, of these, 663 were males with Mean age of cases 39 and Median age of cases 40 years. The age group (30-44) is the most affected (30.5%); the next highest affected age groups: 45-59 (24.7%) and 15-29 (20.9%). Among the 834, 663 (79.5%) were males and the others 171 (20.5%) were females. Of 768 cases, 80.6% reported from Tigray region and 18% from Amhara and the rest from Afar. Of 620 (80.6%) cases reported from Tigray, 350 (45.4%) cases were reported from North West zone, and Central zone {142 (18.4%)} is next affected area zone. Out of the 648 cases 327 (50.46%) were CLD cases. And, 178 (27.47%) were ULD cases. Based on the findings it was concluded that Cases of chronic liver disease were reported other than the sites under surveillance moreover, the number of cases increased since 2001 EC.

9.5 Integrated supportive supervision (ISS) in Tigray region October 2011.

Tigray regional health bureau conducted ISS throughout the region from September 10 to October 5/2011. The aim of the supervision was to assess the health service delivery in the region and then to identify the gaps so that intervention will be taken accordingly. I was assigned with the western zone team and I provided supportive supervision starting from the community to the hospital health workers.

9.6 Trainings and conferences

9.6.1 Surveillance and EPI training: There was two days training from 13 January to 14 January in Axum Hotel, Mekelle which was organized by TRHB in collaboration with WHO. This training with the title "surveillance and EPI significance in prevention and control of communicable diseases" was aimed at sensitizing public health workers, private health workers, political leaders and health institution directors on the advantage of surveillance and EPI in prevention and control of epidemic potential diseases. I provided the surveillance section to these trainees. The number of trainees was 150 from the above mentioned sectors.

9.5.1 PHEM training: There was training, the title of the training was "surveillance training for clinicians" conducted in Adwa, Soloda hotel which was organized by TRHB in collaboration with WHO and was conducted from 22-25 April. The main objective of this

training to improve and strengthen surveillance activities, particularly, in health centers and communities. The number of trainees was 52 who all were from health centers.

- 9.5.2 **Malaria training:** on January 15-16 malaria training with the title Current strategies and Burden of malaria in Tigray region was given to private health institutions. this training was organized by TRHB in collaboration with private health sectors (PHSA)
- 9.5.3 **EPHA annual conference:** this was held in Addis in october30-Nov3/2011.I learnt and got experience of public health interventions and policies from the officials and expertises participated there. Particularly the issue of substance use like alcohol and tobacco was given more emphasis at that day.
- 9.5.4 **AFENET conference:** The Tanzania Ministry of Health and Social Welfare (MoHSW), African Field Epidemiology Network (AFENET), and the Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) were co-sponsored the 4th AFENET Scientific Conference which was held in Dar es Salaam, Tanzania from 11-16 December 2011.I presented scientific paper on my outbreak investigation on measles in this conference.
- 9.5.5 **13th world conference:** This conference was conducted from 23-27 April in Addis Ethiopia. Many scientific papers and health policies of different countries had been presented .I participated in this conference and learn more from the experience of different expertise.
- 9.5.6 **ULD conference:** this conference was held in Shire, Tigray region from 29-30 April/2012.different scientific papers from different fields were presented about the diseases. In that conference the principle of one health was articulated, where different researchers from AAU, EHNRI, MOH, Mekelle university,CDC etc..

Annexes 9 CV/resume of Field Epidemiology Resident

PERSONAL INFORMATION

Name	Gebre Kirstos Negash Gebru
Sex	Male
Date of	January 1985

Birth	
Nationality	Ethiopian
Address	Tigray Regional Health Bureau P.O.Box Mekelle, Tigray
Telephone	+251921567379
E-mail	negash_gebre@yahoo.com , fieldepidemology03@gmail.com
EDUCATIONAL BACKGROUND	
Dates (from – to)	September 2003 to July 2006
Name of organization/college/university providing education and training	Jimma university, Jimma, Ethiopia
subjects/skills covered	3 years in medical laboratory technology
Title of qualification given	BSC in Medical laboratory technology
On Job training	
Dates (from – to)	JUNE 6-13
Name of organization/college/university providing education and training	Medicines Sans Frontiers -Holland(MSF-Holland)
subjects/skills covered	Laboratory quality control, TOT, kalazar laboratory diagnosis, clinical chemistry, haematology and microbiology
Title of qualification given	Certificate on continuous improvement of laboratory quality service in Nairobi, Kenya

Dates (from – to)	November 2010- to now
Name of organization/college/university providing education and training	Addis Ababa university
subjects/skills covered	Field epidemiology with 75% field attachments
Title of qualification given	FELTP resident
Dates (from – to)	October 23-29/2008
Dates (from – to)	March 19 th to 31 st , 2007
Name of organization/college/university Providing education and training	Tigray regional health bureau in collaboration with WHO at mekele, Ethiopia
subjects/skills covered	Laboratory diagnosis on kal-azar
Title of qualification given	
Dates (from – to)	
Name of organization/college/university providing education and training	Management of science for health (MSH)
subjects/skills covered	Laboratory management
Title of qualification given	Laboratory supply management
Language	Amharic
	Tigrigna

	English
Computer knowledge	Certificate on basic computer skills
Summary	Hard worker, feel responsible, sociable, patience, working for change
Reference	Mr. BeriHu Mesfin Tigray regional health bureau (Former Humera hospital CEO) Tel:+251-914706684 <u>Mekelle</u> Dr. Zewdu Belew (internist) Humera hospital CCO Dr.Shanko Gebru (surgeon) Humera hospital Inpatient director Tel.no.+251921991810 <u>Humera</u>

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: Gebrekirstos Negash

Signature: -----

Place: Addis Ababa, Ethiopia

Date of Submission: 15/05/2012

The thesis has been submitted for examination with my approval as a university advisor.

Name of advisor: Dr .Zegeye Hailemariam

Signature: _____Date: 15/05/2012
