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

Ethiopian Field Epidemiology and Laboratory Training Program (EFELTP)

Compiled Body of Works in Field Epidemiology

By: BEYENE KIDU

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

April 2011
Addis Ababa

Addis Ababa University

College of Health Sciences

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Advisors

Dr. Richard Luce
Dr. Adamu Adissie

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Approval by Examining Board

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Examiner

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List of Abbreviations

AAU	Addis Ababa University
AB	Applied Biosystems
ABD	Acute Blood Diarrhea
AD	Auto Disposable
AFI	Acute Febrile Illness
AR	Attack Rate
ARI	Acute Respiratory
ART	Anti retro viral Treatment
ARV	Anti retro Viral
AWD	Acute Watery Diarrhea
B/ Gumuz	Benishangul Gumuz
BCG	Bacillus Calmette-Guerin
CDC	Centers for Diseases Prevention and Control
CFR	Case Fatality Rate
CHA	Community Health Agent
CI	Confidence Interval
CTC	Case Treatment Center
DHO	Disrtict Health Office
DHOH	District health office head
DHS	District Health System
DPT	Diphtheria-Tetanus –Pertussis
DQA	Data Quality Audit
E.C	Ethiopian Calander
EFELTP	Ethiopian Field Epidemiology and Laboratory Training Program
EFY	Ethiopian Fiscal Year
EHNRI	Ethiopian Health and Nutrition Research Institution
EHO	Environmental Health Officer
EIS	Epidemic Intelligence Services
EPHA	Ethiopian Public Health Association
EPI	Expanded Program on Immunization

EPR	Epidemic Prepardness and Response
ETB	Ethiopian Birr
ETEC	Entero-Toxigenic *Escherichia Coli*
FAO	Food and Agricultural Organization
FMOH	Federal Ministry of Health
FMoWR	Federal Ministry of Water Resource
Gov	Government
H.O	Health Officer/Office
HC	Health Center
HCP	Health Care Provider
HD	Health Department
HepB	Hepatitis B (vaccine)
HEWs	Health Extension workers
HF	Health Faclity
HH	Household
Hib	Haemophilus Influenza Type B
HIV/AIDS	Human Immuno Deficiency Virus/Acquired Immuno Deficiency Syndrom
HP	Health Post
HW	Health Worker
IDPs	Internally Displaced People
IFHP	International Family Health Program
IgM	Immunoglobulin M
ILI	Influenza like Illness
IRC	International Rescue Commttee
ITNs	Insecticide Treated Nets
JRF	Joint Reporting Forms
KAP	Knowledge Attitude Practice
Km	Kilo meter
NGOs	Non-Government Organization
OR	Odds ratio
OPD	Out Patient Department

OPV	Oral Polio Vaccine
ORP	Oral Rehydration Points
ORHB	Oromia Regional Health Bureau
ORS	Oral Rehydration Salt
P value	Probabolity Value
Penta	Penta valent vaccine
PHC	Primary Health Care
PHCSOs	Primary Health Care Service Outlets
PHEM	Public Health Emergency Management
PLWHA	People living with HIV /AIDS
PMTCT	Prevention of Mother to Child Transmission
RDTs	Rapid Diagnostic Tests
RED	Reach Every District
REST	Relief Society of Tigray
RNA	Ribonucleic Acid
RRT	Rapid Response Team
RT-PCR	Real Time Polymerize Chain Reaction
RWRB	Regional Water Resource Bureau
SAM	Sever Acute Malnutrition
SARI	Severe Acute Respiratory Infection
SNNPR	Southern Nations Nationalities and Peoples Region
SOS	Sustainable Outreach Services
SPSS	Statistical Package for Social Sciences
TB	Tuberculosis
TGL	Treatment
TT	Tetanus Texoid
U-5	Under Five
UNICEF	United Nations Children's Fund
URTI	Upper Respiratory Tract Infection
USA	United States America
VCT	Voluntary counselling and Testing

W/Arsi	West Arsi
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WK	Week
ZHD	Zonal Health Department
ZHO	Zone Health Office

Preface

This document is a complied body of works accomplished during two years stay in field epidemiology and training program, in Addis Ababa University. Activity reports constituted in the document are: different outbreak investigations, surveillance data analysis, surveillance system evaluation, health profile assessment, accepted abstract for scientific presentation, Public Health and Nutrition Emergency need assessment, research proposal and other additional outputs. A brief description of each report constituted in the document is illustrated below.

Three outbreak investigations were conducted in Oromia region: acute bloody diarrhea outbreak in Alagie Agricultural College (May 2009), acute watery diarrhea outbreak in Shashemene districts (June 2009) and pandemic influenza A (H1N1) 2009 in Illu ababora zone (Nov2010). The outbreak investigation made in Alagie Agricultural College and IlluAbaBora zone were exclusively descriptive type. In both cases the purpose of the investigation was to confirm the etiology of the outbreak and providing assistance in the prevention and control of the outbreak. The outbreak investigation carried out in Shashemene districts was case control study. Apart from confirming the etiology this investigation was aimed at identifying the possible risk factors associated with outbreak.

National acute respiratory infections surveillance data analysis was also performed in March 2009. In this case, two years i.e. from 2006 to 2007 morbidity and mortality data was obtained from Federal Ministry of Health, Plan and program department. The aim of this data analysis was to provide an overview of the burden of acute respiratory infections in under five children in Ethiopia.

A surveillance system evaluation was carried out in selected health facilities, district health offices and the regional health buraeu, Tigray region in Dec 2010. The purpose of this evaluation was to describe how well the communicable disease surveillance system in the region is working to meet its purpose and objectives. Concurrently, a health profile assessment of 2002 Ethiopian fiscal year of Enderta district was carried out.

An abstract entitiled “ Outbreak of Pandemic Influenza A (H1N1) — Illu Aba Bora Zone, Oromia Regional State, Ethiopia, November 2010 ” was submitted and accepted for oral presentation in the 47th Ethiopian Medical Association Annual Medical Conferrence held from 17-18 February, 2011 at United Nations Conference Center ; Addis Ababa.

Belg Public Health and Nutrition emergency need assessmen was conducted jointly with other partners within selected districts in all zones in far region in July 2010. The purpose of the assessment was to identify potential risk for the occurrence of public health emergencies, current preparedness status and response capacity of the region.

A research proposal on “Assessment of Immunization Data Quality from Routine Reports in Assosa District; Benishangul Gumuz region” was prepared and submitted to Addis Ababa Univeristy Ethical Review Board and approved.

In addition, other works like: acute watery diarrhea outbreak response supportive supervision in West harerge zone (Aug 2009), AWD outbreak and response assessment in Bale zone of Oromia region (Dec 2009) and Measles outbreak data analysis of Wolkait and Tseged districts, Tigray region (Nov 2010) were also accomplished.

.

Chapter 1 – Outbreak Investigations

1.1. Outbreak Investigation of Acute Bloody Diarrhea in Alagie Agricultural College, May 2009, Ziway, Ethiopia

Summary

Background: Diarrheal diseases are a global problem, but are especially prevalent in developing countries in conditions of poor environmental sanitation, inadequate water supplies, poverty and limited education. On 14th May 2009 the Federal Public Health Emergency Management based at the Ethiopian Health and Nutrition Research Institute received a report of unusual number of acute bloody diarrhea cases among college students from the Alagie agricultural college officials. In response, on 15th May 2009 a team composed of field epidemiology residents was dispatched to the site for investigation.

Objective: The purpose of the investigation was to determine the magnitude of the outbreak, confirm the etiology of the outbreak, identify gaps within the health system and support the response.

Methods: Clinic pharmacy prescriptions from 10 May through 16 May, 2009 were collected to count total cases affected by the outbreak. Including the index cases, a total of 58 cases were also interviewed with structured questionnaire to collect relevant information about the outbreak. All index cases and conveniently selected cases were included in the interview. Stool specimens from 3 cases and a drinking water sample from tap water were collected to verify the etiologic agent of the outbreak. Moreover; discussion was carriedout with heath workers to identify gaps in the health system. The quantitative data collected was entered and analyzed using EpiInfo version3.3.2 and Microsoft Excel and the qualitative data was narrated.

Results: The first date of onset of illness was on 09/05/2009(Ginbot 1/2001 E.C.). All cases were students. A total of 538 cases were identified during the outbreak, of which 482 (89.6%) were males. The age range of cases was 31, with a median age of 20 years. The attack rate was 49%, with a case fatality rate of <1. The most commonly presenting symptoms amongst the

interviewed cases were diarrhea, abdominal cramp, fever, rectal pain and vomiting respectively. Among the interviewed cases 89.7 % (52) practice hand washing with soap before any meal, but only 22.4%(13) practiced hand washing with soap after latrine. The laboratory test result showed that no pathogen was isolated from stool samples. The clinic is no under the supervision of the Minstry of Health and it never compiles and sends morbidity and mortality data reports at all time.

Conclusions: Neither the etiology nor the source of the outbreak could be identified. The overall attack rate was higher (49%) compared to other African countries; on the other hand, the case fatality rate was <1% which is acceptable

Background

Globally, around 1 billion people lack access to improved water and 2.5 billion have no access to basic sanitation In 2004 (1). Eighty-eight per cent of cases of diarrheal diseases worldwide are attributable to unsafe water, inadequate sanitation or insufficient hygiene (2).This could most probably contribute for diarrhea being the third largest cause of morbidity and the sixth largest cause of mortality among population of all ages worldwide (3).

Diarrhea is caused mainly by the ingestion of pathogens, especially in unsafe drinking-water, in contaminated food or from unclean hands (2).The major etiologic agents that account for the estimated 1.5 million deaths per year are enterotoxigenic *Escherichia coli* (ETEC), rotavirus, *Vibrio cholerae*, and *Shigella* spp(4, 5).

In Sub-Saharan Africa, repeated prolonged outbreaks of dysentery with high case fatality rates have increased the demand for antibiotics; causative pathogens such as *Shigella dysenteriae* type1 have developed resistance to locally affordable and available antibiotics (6). Studies from Central and East Africa also confirm that *S. dysenteriae* type 1 is resistant to multiple drugs (7-10).Treatment of dysentery with antibiotics to which the etiologic agent is resistant may prolong illness and increase risk of hemolytic uremic syndrome and death (11,12).

Diarrheal infection caused by Shigella dysentery type1 is most common in overcrowded areas like in refugee populations with poor sanitation, sub-standard hygiene, and unsafe water supplies, and during epidemics up to one-third of the population at risk may be infected (13).

On 14th of May 2009(Ginbot 6/2001E.C) the Federal Public Health Emergency Management (PHEM) based at the Ethiopian Health and Nutrition Research Institute (EHNRI) received a report of unusual number of acute bloody diarrhea cases among college students from the Alagie agricultural college officials.

On 15th of May 2009 (Ginbot 7/2001 E.C) a team composed of field epidemiology residents was dispatched to the site for investigation.

Objective

The purpose of the investigation was to determine the magnitude of the outbreak, confirm the etiology of the outbreak, identify gaps within the health system and support the response.

Methods

Investigation area

Alagie College of Agriculture is located 215 Kms south of Addis Ababa (35 Kms from the main Addis to Hawassa road) bordering with the two rift valley lakes, Abiata and Shala. The total population of the college and nearby community was estimated to be around 10,080. The college has three campuses namely: Zeraideres, Sebele and Shalla with a total of 3,330 students, 191 teachers, 1559 other staffs and around 5000 nearby communities. Each campus is around 2 km apart from each other. The College has also a high school, an elementary school and a clinic. The acute bloody diarrhea outbreak was occurred at Seble campus. Seble campus consists of about 1100.

Data collection

Data collection was conducted from 15-16 May, 2009. Data collection was undertaken by Field Epidemiology and Laboratory Training Program Residents. Both primary and secondary data were collected. line list of all sick students due to the acute bloody diarrhea outbreak was not available, as a result clinic pharmacy prescriptions for Cotrimoxazole, Ciprofloxacilline, Chloramphinicole, Hyocine and oral rehydration salt (ORS) from 10-16/05/2009 (2-8/9/2001 E.C) were reviewed to count total cases affected by the outbreak. Patients receiving more than one prescription were counted only once to avoid duplication. Including the index cases, 58 cases were interviewed with structured questionnaire to collect relevant information about the outbreak. All the index cases and conveniently selected cases were included in the interview.

Stool specimens from 3 cases (in Cary-Blair transport medium) before starting antibiotic treatment and a water sample from one of the taps which Seble campus students were used for drinking were collected and sent to Ethiopian Health and Nutrition Reaserch Institute for microbiological investigation to verify the etiologic agent of the outbreak. Moreover; discussion was carriedout with heath workers to identify gaps in the health system.

Data entry and analysis

Data obtained from patient interview were entered and analyzed by computer software (Epi info version **3**.3.2). Data from record review was transcribed to Microsoft Excel from manual compilation, checked for completeness and analyzed. The qualitative data gathered through observation was narrated.

Results

a) Clinical and epidemiological findings of cases from record review (N=538)

According to our investigation a total of 538 cases and 1 death of acute bloody diarrhea were identified. All cases were students of the college and present themselves in the campus clinic. None of the staffs who were served in the students' cafeteria were ill due to the acute bloody diarrhea outbreak. The attack rate and case fatality rate was 49% and < 1% respectively. Only 18 of the cases were referred to Hawassa hospital. 482(89.6%) of the cases were males. The age range of cases was 20, with a median age 31 years. Majority of cases 324 (61.2%) were between 19-21 years old (Figure 1.1.1).

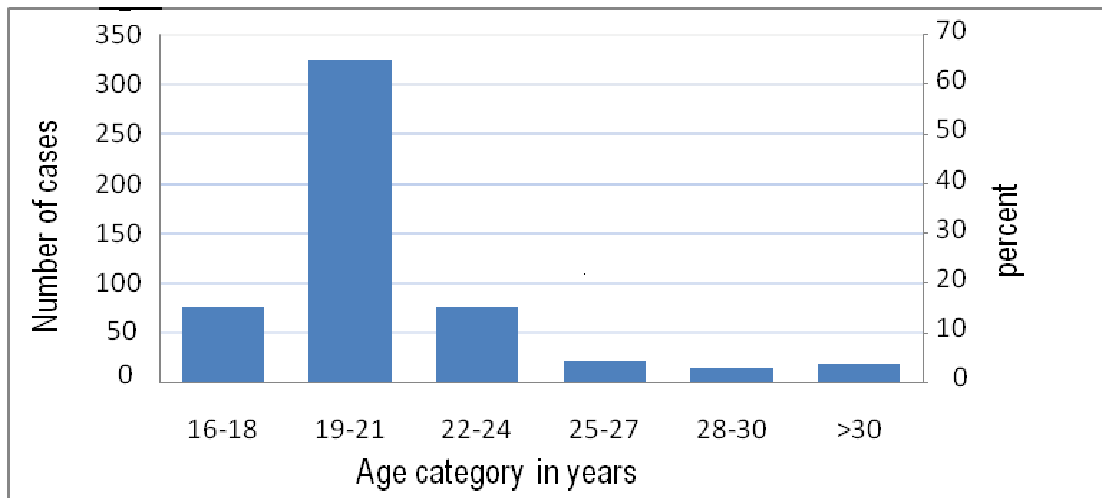

Figure 1.1.1 Age distribution of acute bloody diarrhea cases in Alagie Agricultural College, May 2009, Ziway, Ethiopia (N=529)

NB: The age of 9 cases was not indicated in the prescription

The first cases sought medical care at the college clinic on 10/05/2009. Majority of the cases were seen at the clinic between 11/05/2009 to 16/ 05/2009 and highest number 151 (28.1 %) of cases were seen on 12/05/2009 on the 4th days of the first date of onset of illness (Figure 1.1.2).

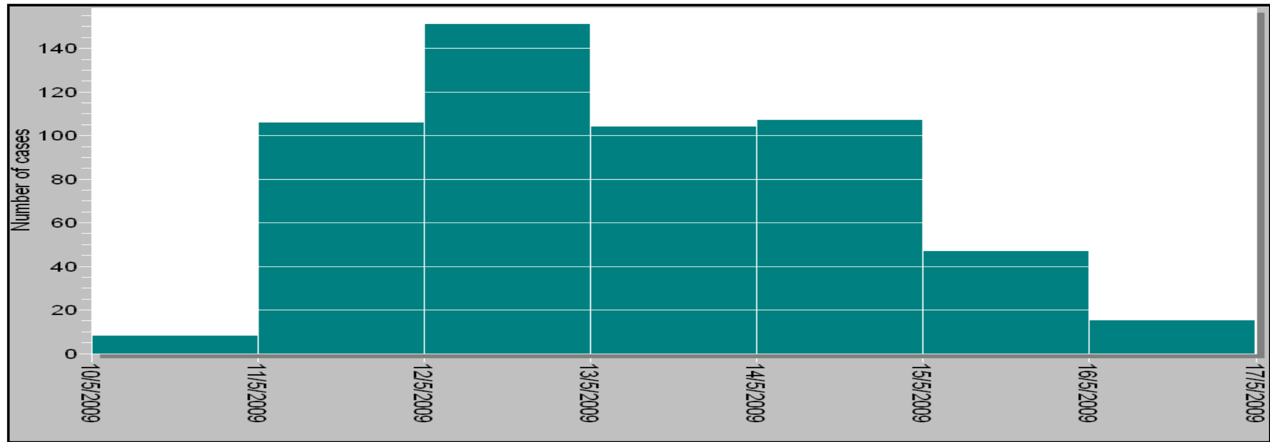

Figure 1.1.2 Number of acute bloody diarrhea cases by date of pharmacy prescription, Alagie Agricultural College Clinic, May 2009, Ziway, Ethiopia

b) Clinical and epidemiological findings of interviewed cases

The first date of onset of illness was on 09/05/2009(Ginbot 1/2001 E.C). The information from index cases was not found to be different from the rest of cases in having any recent trave history, feeding and drinking out of the campus, etc.

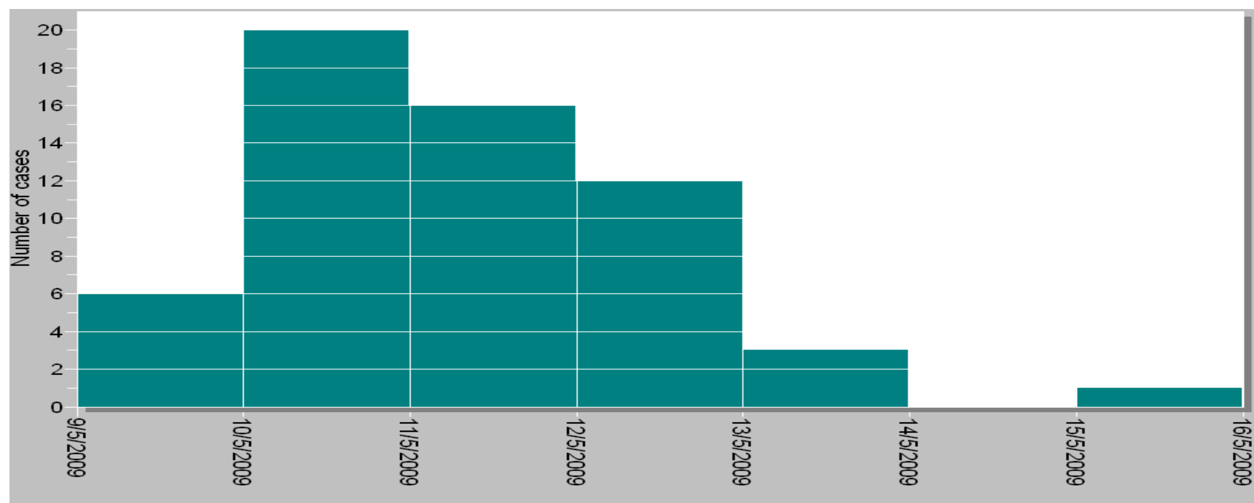

Figure 1.1.3 Epidemic curve of interviewed cases by date of Onset of Illness, Alagie Agriculture College, May 2009, Ziway, Ethiopia

In order of decreasing frequency, the main symptoms amongst the interviewed cases were diarrhea (100%), abdominal cramp (96.6%), fever (91.3%), rectal pain (70.7%) and vomiting (50%). Of the interviewed cases 13(22.3%) had altered state of consciousness (table 1.1.1).

Table 1.1.1 Reported symptoms among the interviewed cases (N=58) of acute bloody diarrhea in Alagie Agricultural College, May 2009, Ziway, Ethiopia

Symptoms	**Frequency**	**Percent**
Bloody diarrhea	58	100
Vomiting	29	50
Fever	53	91.3
Altered state of consciousness	13	22.4
Abdominal cramp	56	96.6
Rectal pain	41	70.7

The duration of illness for all interviewed cases before visiting the clinic was < 6hrs up to >2 days. 39(67.2%) of them visited the clinic with in 6hrs -24 hrs of their onset of illness (Table 1.1.2). 40(69.0%), 13 (22.4%), & 5 (8.6 %) of the interviewed cases had >6, 4 to 6 and <4 times episodes of diarrhea per 24 hrs respectively. It was also observed that most of cases started Co-trimoxazole treatment on the first two days revisited the clinic for compliant of similar symptoms (bloody diarrhea, fever, vomiting etc).

Table 1.1.2 Acute bloody diarrhea cases by duration of illness before visiting the clinic, Alagie Agriculture College, May 2009, Ziway, Ethiopia

Duration of illness before visiting health facility in days/hrs	**Frequency**
< 6hrs	9(15.5%)
6 hrs-24hrs	39(67.2%)
1-2 days	9(15.5%)
>2 days	1(1.7%)
Total	58(100.0%)

Only 13 (22.4 %) of the interviewed cases practiced hand washing with soap after latrine while 52(89.7 %) of them made hand washing with soap before any meal. Eating in a restaurant & traveling outside the college was low (table 1.1.3).

Table 1.1.3 Observed risk factors among cases of acute bloody diarrhea outbreak at Alagie Agricultural College, May 2009, Ziway, Ethiopia

Risk factors	**Frequency of cases (Number & %)**
Contact history to an individual with similar illness (visiting or caring of cases)	33(58%)
Hand washing with soap after latrine	13(22.4%)
Hand washing with soap before having any meal	52(89.7%)
Any travel history within 7 days before illness	4(6.9%)
Eating at restaurant within 7 days before illness	2(3.4%)
Sharing feeding or drinking utensils	8(13.8%)
Latrine usage(always)	57(98.35)
Total	(n=58)

c) All stool samples which were sent to EHNRI microbiology laboratory to confirm the etiology of the outbreak couldn't show any growth of bacteria. The water sample was not also analyzed.

d) Gaps in the health system

The clinic is out of the jurisdiction of Minstry of Health. It never compiles and sends morbidity and mortality data reports at all time. There is no awareness among health workers to wards national notifiable diseases under surveillance. Health workers were not aslo trained in case management, particularly during emergencies. The clinic was facing shortage of drug frequently. The clinic is not net worked to any responsible health sector (issue of ownership to the ministry of health and Agricultural sector not settled).

e) **Response**

- ✓ At the very star tof the outbreak cases were treated with Cotrimoxazole and fluids, but all patients didn't respond to Cotrimoxazole. Afterwards, patient treatment was replaced by potent antibiotic; Ciprofloxaciline which was guided by phycian came from Hawasa hospital. Some severe cases were refered to Hawasa hostital.
- ✓ Health Education was provided to foodhandlers and students on the control and prevention of diarrheal diseases outbreak.
- ✓ Stool speciemens from untreated cases and drinking water sample were collected and transported to EHNRI for laboratory confirmation.
- ✓ The team undertook discussion with college leaders on controlling the outbreak and prevention of similar events.

Discussion

This outbreak of acute bloody diarrhea affected about 538 college students during 1 week period resulting in significant morbidity, 18 referals and 1 death. The overall attack rate (49%) was very high compared to some West African out break experiences of < 7.5% (14-16), however; the case fatality rate of Alagie acute bloody diarrhea (ABD) outbreak was low(<1%) which is acceptable.

The peak in the number of cases appeared on 12/05/2009(Ginbot 4/2001 E.C.) which was on the 4th day after the first date of onset and the curve fall dawn within three days after getting its peak. This sharp rise and fall of the epidemic curve well fit with the typical characteristic of common source type of epidemic (Figure 1.1.2), but the source of the outbreak was not yet identified. The duration of this outbreak lasted 7 days which is very similar to Cameroonean outbreak of Shigellosis (14).

When cases with acute bloody diarrhea were flooding to the clinic in the first day of the outbreak, cases were treated with Cotrimoxazole and fluids, but no one of cases responded to this drug as a result they came once again seeking medical attention. Perhaps the agent might develop resistance to this drug. Afterwards, patient treatment was replaced by Ciprofloxacine after consultation was received from physician came from Hawasa hospital and all the cases treated with this drug showed improvement quickly.

College students were the only victims of the outbreak and this raised a question why only students which also needs further investigation. Becuase our interview excluded non diseased (control) students, the association of risk factors shown in table 1.1.3 with the outbreak was not analytically tested.

The etiology of the outbreak was left unknown for all stool samples which were sent to EHNRI microbiology laboratory for confirmation couldn't show any growth of bacteria. Besides, the water sample was not also analyzed perhaps due to low professional responsibility or lack of awareness about importance of biological and environmental samples in outbreak investigation. However, considering the major typical signs and symptoms like fever, abdominal, cramp, vomiting, bloody mucoid diarrhea and rectal pain; Shigellosis/E.coli (ETEC) could be the possible etiologic agent of the outbreak.

Conclusions

Neither the etiology nor the source of the outbreak could be identified. But based on the case definition and characteristics observed on antibiotic treatment the cause of the outbreak could be shigellosis but other agents like Entero-heamorrhagic Escherichia coli could not also be excluded. The overall attack rate was higher (49%) compared to other African countries; on the other hand, the case fatality rate was <1% which is acceptable.

Recommendations

Biological and environmental samples sent from field for laboratory confirmation should be transported and analyzed appropriately and promptly. Health care providers within the college clinic should be trained and updated on case management, recording and reporting of cases especially during outbreak. The clinic activities should be followed and supervised by a body of health sector (local, zonal, regional or federal level).

Limitations

Delayed investigation due to transport problem to move to the place prevented us from collecting enough biological samples from cases before they received antibiotic treatment. Limited time of

stay and absence records of cases in the clinic outpatient and inpatient departments at the site also prevented thorough investigation of the outbreak.

Acknowledgments

We thank kindly the administrative staffs and dean of the college for their overall cooperation during the investigation.We would like to thank Mr. Abdurahman for his cooperation in providing all the pharmacy prescriptions to screen out the cases overnight in the absence of any other records.We thank all the participants for their willingness to participate in the study. We also thank our resident advisor Dr. Richard Luce for his meticulous reviewing of the whole document and EFLTP residents; Dr. Mer'Awi & Mr. Tadele for their support of making draft questionnaire while we were processing the administrative issues for field visit.

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1.2 Epidemiological Investigation of Acute Watery Diarrhea Outbreak in Shashemene District, West Arsi Zone, Oromia Region, June 2009

Introduction

W/Arsi zone is one of the seventeen administrative zones of Oromia Regional state. Administratively the zone is subdivided in to 12 districts and 308 rural and 27 urban kebeles with a projected total population of 1,814,956. The zonal capital is Shashemene which is located at 250 kms from Addis Ababa in southern part of the region on the main road to Hawassa. The zone shares border with SNNPR in south, East shoa and Arsi zone in the east and Bale zone in the west. The zone has 1 hospital, 10 health centers, 20 Nucleus Health centers, 32 Health stations and140 health posts. The potential health service coverage of the zone is 80% and the latrine coverage is 67.1%.

In 2006 the zone was the 1st most affected zone by Acute Watery Diarrhea Outbreak in the region. All districts (12) within the zone were affected due to the outbreak. During the outbreak a total of 13,751 cases and 126 deaths with an overall attack rate of 8 per 1000 population and CFR of 0.9% were reported.

On 1st May 2009 the first 7 cases of AWD were reported from Shashamane districts within W/Arsi zone. Since then, the zonal health officials received report of AWD cases from neighbouring districts around shashemene town. As of 15th May 2009, the zone had reported 48 cases and 6 deaths. Cases are currently being reported from 4 districts and one town administration, Shashamane Town within the zone. On 25th May, 2009 an investigative team from EFELTP (AAU) moved to the area to conduct epidemiological investigation.

Objectives

General Objective:

- ✓ To conduct epidemiological investigation of Acute Watery Diarrhea outbreak in Shashemene district, West Arsi zone, Oromia region, June 2009

Specific Objectives:

- ✓ To confirm the etiological agent of the outbreak
- ✓ To identify the possible risk factors for transmission of Acute Watery Diarrhea outbreak in Shashemene district, West Arsi zone ,Oromia, June 2009

Methods

Study area and study population: This investigation was conducted in Shashemene district within West Arsi zone, Oromia region. Shashemene district is one among the 12 districts in the zone which was seriously affected by AWD. Participants of the study were residents of shashamane district, particularly Awasho and Kore Rogicha kebele where AWD cases were reported.

Study design and study period: A case control study was conducted from 25 May -14June 2009.

Sample size and sampling procedure: Thirty seven cases presented to CTCs during data collection period that fulfilled surveillance case definition of acute watery diarrhea and 37 Controls were included in the study. Controls were selected from two villages (Awasho and Kore Rogicha) where cases of AWD came from. Controls were selected on convenient basis from households where cases were not appeared.

Data collection: Stool specimens were obtained from 9 cases before starting anti biotics treatment. Stool specimens were transported using Cary-Blair transport medium and were maintained under cold chain until laboratory analysis. A structured questionnaire was used to collect information from cases (including case sampled for lab test) and controls. Data collection was performed by Field Epidemiology and Laboratory Training Program Residents. Moreover, site observation was employed to collect the qualitative information.

Data entry and analysis: The quantitative data gathered were entered and analyzed with Epi-Info version 3.3.2 and the qualitative information was narrated. Frequencies and cross-tabulations were computed among different variables.

Results

A total of 37 clinical AWD cases and 37 controls from the same areas were included in the study. Majority (54.03%) of the respondents were from Kore Rogicha kebele. The proportion of females in cases and controls was 62.16% and 37.84% respectively. Virtually half of (51.5%) the cases were individuals with less than 10 years of age (Table 1.2.1). Median age of cases and controls was 8 and 35 years respectively. Of the total respondents, farmers account for 37.84% and house wife 28.38% (Table 1.2.1).

Of the 37 clinical AWD cases, stool specimens were collected from 9 cases, of which 5 were females. The age range of cases sampled for laboratory test was 3 to 55 years with a media age of 8 years. The etiological agent of the outbreak was confirmed by EHNRI laboratory as Vibrio cholera Inaba 01 and allof the sampled individuals were positive. As findings from laboratory test depicted, Vibrio cholera Inaba 01 was resistance for co-trimoxazole and sensitive for Tetracycline, Erythromycine, Norfloxacine, Ceftriaxone, Norfloxaciline, Ciprofloxaciline, Amoxiciline, and Doxycycline.

Table 1.2.1 Demographic characteristics of AWD cases and controls in Shashemene District, West Arsi zone, Oromia Region, June 2009

Variable	Cases No (%)	Controls No (%)	Cases and control No (%)
Sex:			
Male	14(37.8)	23(62.2)	37(50)
Female	23(62.2)	14(37.8)	37(50)
Age group in year:			
0 – 10	19(51.4)	0(0)	19(25.7)
11 – 20	7(18.9)	2(5.4)	9(12.2)
21 – 30	5(13.5)	13(35.1)	18(24.3)
30 and over	6(16.2)	22(59.5)	28(37.8)
Occupation:			
Farmer	5(13.5)	23(62.2)	28(37.8)
House wife	9(24.3)	12(32.4)	21(28.4)
Students	3(8.1)	2(5.4)	5(6.8)
Others	21(56.8)	0(0)	21(28.4)
Residence:			
Awasho	8(21.6)	18(48.7)	26(35.1)
Kore Rogicha	21(56.8)	19(51.4)	40(54)
Others	8 (21.6)	0(0)	8(10.8)

All respondents reported that there was flooding in the outbreak area preceding the epidemics. And no water treatment was performed at source and household level. Among the 37 cases, 15 had contact with people who had diarrhea, 15 ate foods like: tomato, kita, sugarcane, Coffee, water, Boleke, Injera, Enset, Genfo, raw vegetable and fruits like mango and banana from outside. Majority of controls (89%) and cases (56.8%) heard about the outbreak before the illness from different actors.

Findings from interview depicted that no association was identified among the hypothesized potential risk factors such as: latrine utilization, hand washing practice, and contact with persons with similar illness and eating food outside with the outbreak. However; findings from site observation showed that in virtually all visited houses of cases and controls, low latrine utilization was observed (fecal matter present in compound). Water used for drinking and washing utensils was turbid, and no hand wash facility was observed near the toilet.

From the overall respondants majority 44.6% got water from river and hand pump and about 51.4 % of the controls got water only from river. Fifity-four and 70.3% of controls and cases had latrine respectively. Among controls and cases who owned latrine about 60% of the controls and 79.2% of cases utilized their latrine always (see table1.2.2).

Table 1.2.2 Distribution of AWD cases and controls by risk factors in Shashemene District, West Arsi zone, Oromia Region, June 2009

Variable	**Cases, No (%)**	**Controls, No (%)**	**Cases and Controls, No (%)**
Water source:			
Hand pump	13 (35.1)	1(2.7)	14(18.9)
River	7(18.9)	19(51.4)	26(35.1)
Spring	0(0)	0(0)	0(0)
River and Hand pump	15(40.5)	18(48.7)	33(44.6)
Do you have latrine:			
Yes	26 (70.3)	20(54)	46(62.2)
No	11(29.7)	17(46)	28(37.8)
Latrine use:			
Use always	19(79.2)	12(60)	31(61.4)
Use sometimes	5(20.8)	8(40)	13(38.5)

Results from interview showed that hand wash after latrine and use of water from hand pump were significantly associated with the outbreak. On the other hand use of water from river and information on AWD outbreak were protective (see table 1.2.3).

Table1.2.3 Relationship of selected risk factors with AWD outbreak in Shashemene District, West Arsi zone, Oromia Region, June 2009

Risk factors	OR	95% CI	P value
Hand wash after latrine	6.4	1.8-22.5	0.003
Information on outbreak	0.16	0.05-0.54	0.002
Water from river	0.22	0.08-0.63	0.004
Water from hand pump	19	2.9-159	0.004

Discussion

This investigation found that laboratory confirmed Cholera outbreak was identified in Shashemene district, W/Arsi zone in June 2009, resulting in a significant morbidity in all age groups.

In this investigation virtually half (51.5%) of the cases were children less than 10 years of age. Perhaps this could be due to their behaviour and immunity to present clinical symptoms earlier than adults.

Prior to the outbreak there was rain in the area resulting in flooding which can possibly result in contamination of the water points from which the Awasho and Korerogicha kebele residents fetch water for drinking and washing purposes.

According to the findings from interview, from the overall respondents about 44.6% got water from river and hand pump alternatively and among individuals who owned latines about 60% of the controls and 79.2% of the cases utilized their latrine usually. However, observational findings showed that low latrine utilization (fecal matters present in the compound) in virtually all visited houses of cases and controls. Besides, the water they were using for drinking and washing utensils was turbid.

Results from interview showed that hand wash after latrine and use of water from hand pump were significantly associated with the outbreak. On the other hand, use of water from river and

information on AWD outbreak were protective. With regard to hand wash after latrine, individuals might have washed with contaminated water or didn't wash at all (respondents' bias). As for the hand pump, there could be contamination due to the flooding or the water fetched from hand pump might be contaminated at home. The water sources; particularly, the hand pump was not treated prior to the outbreak and none of the respondents practice household water treatment.

Of the diseased (37) individuals,15 reported they had contact with people who had similar illness, 15 ate food (kita, sugarcane, Coffee, water, Boleke, Injera, Enset, Genfo, raw vegetable and fruits like mango and banana) in their neighbours by the time they went to ask the sick people.

However, no statistical association was identified among the hypothesized potential risk factors such as latrine utilization, hand washing practice, and contact with persons with similar illness and eating food outside.

This investigation had considerable limitations: Firstly, controls were selected on the basis of absence of clinical symptoms only, which is not absolutely true as 90% of Cholera infected individuals are asymptomatic. Secondly, no attempts were made to control possible cofounders during design and analysis. Similarly, no attempts were made to minimize biases at all (selection of controls, respondents' bias etc.). Thirdly, the questionnaire had some defects and was not pretested. Fourthly, water samples from the suspected water sources and respondents' houses were not collected for confirmation of fecal contamination. Lastly, we used small sample size which can result in poor precision.

Conclusions

Laboratory confirmed Cholera outbreak was identified in Shashemene district; however, the source of the outbreak remained unknown. Though the possible risk factors were discussed, no clear statistical association was observed. Water treatment both at the source and household level was not practiced at all. Moreover, low latrine utilization was observed.

Recommendations

1. Aboveall, Communities should be educated on the prevention and control of diarrheal diseases especially during outbreaks.
2. Household water treatment chemicals should be distributed to communities.
3. Laboratory test of source water and household water for fecal contamination must be done. And regular monitoring of water quality of sources particularly the hand pumps should be in place.
4. Focus should be given to ensure safe and adequate water supply in the affected kebeles to prevent similar outbreak.

Acknowledgments

We thank all the participants for their willingness to participate in the study. We thank all facilitators from EPHA, EFELTP coordinators and Oromia regional health bureau, public health emergency management core process for technical and financial support to undergo the investigation. We would also like to thanks Shashamane district Administration and health office for good support and facilitate to conduct this investigation. We also thank the laboratory staff in EHNRI for their support to confirm the etiology of outbreaks, and west Arsi zone for their logistic support. We would also like to extend our gratitude to all respondents for their cooperativeness during the investigation.

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1.3 Outbreak of Pandemic Influenza A (H1N1) — Illu-Aba Bora Zone, Oromia Regional State, Ethiopia, November 2010

Introduction

Influenza is an acute and highly contagious viral disease of the respiratory tract characterized by fever and respiratory tract symptoms (cough, coryza, and sore throat), headache, myalgia, and prostration. Occasionally nausea, diarrhea and vomiting may occur. Influenza virus infection occurs after transfer of respiratory secretions from an infected individual to a person who is immunological susceptible. But people may also become infected through touching inert objects having influenza viruses on the surface (fomite transmission), and then touching their mouth or nose (1).

Influenza virus shedding begins the day prior to symptom onset and often persists for five to seven days or longer in children, especially in young infants (2). Peak viremia occurs during the first two to three days of illness. If symptoms persist for more than 7 days, the chances of communicability persist until resolution of illness. Laboratory confirmation of influenza virus infection can be done by isolation of viruses from throat, nasal and nasopharyngeal secretions or tracheal aspirate or washings (1).

Three types of influenza virus are recognized: A, B, and C. Influenza A and B can cause outbreaks of serious human illness whereas influenza C causes only mild disease (1). Influenza viruses are constantly undergoing evolution and epidemics occur whenever there are small changes in the viral genome which accrue over time resulting in the creation of new strains, a process known as antigenic 'drift'. The new influenza virus strains can evade the host immune system since the immunity gained from previous infections or after vaccination, may not afford significant protection against the newly emerged strains. Influenza A virus can be found in many different vertebrate species and it is also the only one to cause pandemics. This occurs through a process of antigenic 'shift' where there is a sudden and dramatic re-assortment of viral genes producing a radically altered strain of influenza virus to which humans are totally susceptible. An influenza pandemic is characterized by an explosive global spread of influenza due to the circulation of a novel strain of influenza A virus in humans, with capacity for sustained and efficient human-to-human transmission resulting in a high number of cases and/or deaths. With

the increase in global transport and communications, as well as urbanization and overcrowded conditions, epidemics due to new influenza viruses are likely to be established quickly around the world**.** Global pandemics have been reported since the Middle Ages. The most well documented pandemics occurred in 1918 (H1N1, the Spanish flu), 1957 (H2N2, the Asian flu) and 1968 (H3N2, the Hong Kong flu) (3).

A novel influenza A (H1N1) virus containing genes from humans, swine and avian species and never before linked to human disease emerged among people in Mexico in late March and early April 2009. The triple reassortant virus then spread with travelers worldwide, resulting in the first influenza pandemic of the 21st century (4, 5). The World Health Organization (WHO) first declared the pandemic in June 2009, when the virus had spread to most regions of the world at an alarming rate (6). The incubation period of the novel influenza A (H1N1) virus appeared to be approximately 2-3 days, but could range up to 7 days. The majority of illnesses caused by pandemic influenza A(H1N1)2009 virus as it subsequently became known, have been self-limited mild to moderate uncomplicated disease, however severe complications including fatal outcomes have been reported (7). As of August 1, 2010 more than 214 countries and overseas territories or communities had reported laboratory confirmed cases of pandemic influenza A (H1N1)2009 virus, including over 18,449 deaths worldwide (8). Unlike previous pandemic influenza viruses of the past century, pandemic influenza A(H1N1) 2009 virus had low virulence even though its transmissibility was still high (9). By August 2010 the World Health Organization (WHO) officially declared 2009 pandemic influenza A (H1N1)) to be over, and the start of the post-pandemic phase**.** By that time the virus was so widespread and had completely replaced seasonal influenza viruses in many parts of the globe. Thus it was no longer considered differently from other seasonal flu viruses. However it was recognized that it could still cause pockets of outbreaks, particularly in areas and communities where it had not previously spread (10).

In Ethiopia confirmed pandemic influenza A (H1N1) virus infection was first identified in June 2009, in Addis Ababa**.** The index cases were students returning after a period of study in the United States. In the months immediately following the identification of the index cases, most cases were associated with travel history to places where the virus was already known to be present. However gradually a number of cases were also noted in those without any travel

history, indicating that the virus had spread and that local circulation was already taking place. This was the case for Addis Ababa and also in some regions**.** As on 30th October, 2010, three hundred fifty three (353) persons have been tested so far of which 36 are positive for pandemic influenza A (H1N1) 2009 virus (11).

Health officials of Illu Ababora zone were alerted of the unusual respiratory illness in mid October, 2010 following the occurrence of clustering of cases among all age groups in large segments of the population within a relatively short period, resulting in a sudden unusually high patient flow seeking medical care within all health facilities of the area. This was coincided with pandemic influenza A (H1N1)2009 vaccination campaign conducted in Jimma town. All patients within the acute phase of infection reported with similar symptoms including: fever, coryza, cough, myalgia, and headache. In light of this there was suspicion among health officials that the illness might be due to pandemic influenza.

In 5 November 2010 an investigative team consisting of residents from the field epidemiology training program (AAU), the national influenza laboratory (EHNRI) and the Oromia regional laboratory branch in Jimma responded to a call from the Oromia regional health bureau, to verify the existence of outbreak, determine the etiology of the unusual acute respiratory illness of unknown origin and provide guidance in the control of the outbreak.

Methods

Investigation Sites

IlluAbaBora zone is found in the Western part of Oromia region. Administratively it consists of 24 districts including two town administrations. The zonal capital is based at Metu town. The zone capital is located at 600 km away from Addis Ababa. According to National 2007cencus projection the zone has a total population of 1,476,125 million in 2010. The zone is bordered with Jimma zone in the East, Kelem Welega zone in the North West, West and Eeast welega zones in the North, and Gambele region and in the South.

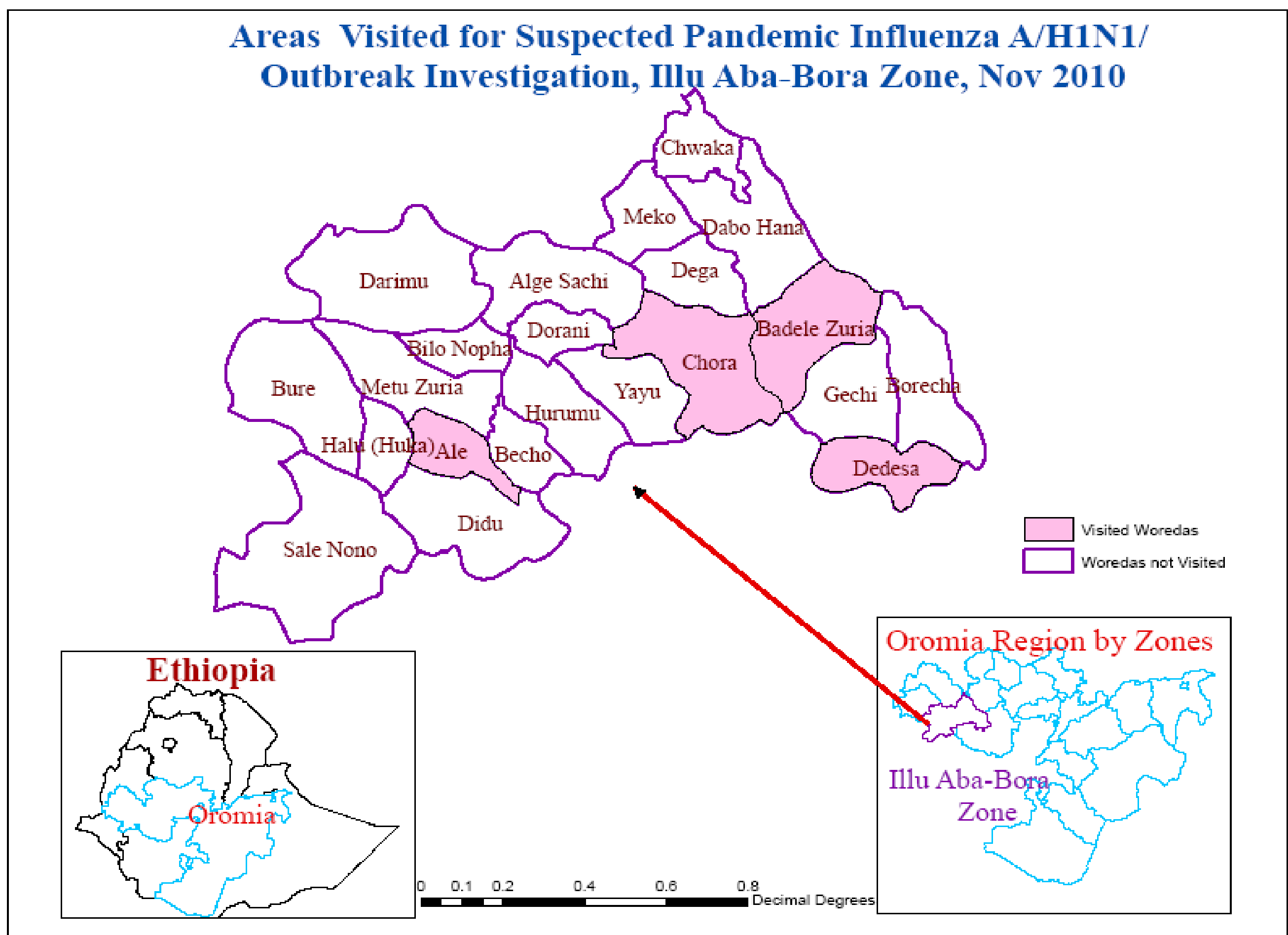

Figure1.3.1 Map of areas visited for suspected pandemic influenza A (H1N1) 2009 outbreak investigation in Illu Aba Bora zone

Investigation was conducted in the four districts from which cases were reported, including Ale, Chora, Bedele and Didesa districts of Illu Aba Bora zone.

Case Definitions

For this investigation a suspect pandemic influenza A (H1N1)2009 case was defined as any person with influenza- like illness (ILI). A case of influenza- like illness in turn was defined as any resident of the four localities who had experienced a sudden onset of fever and cough and or sore throat in the absence of other known causes other than influenza. A confirmed case of pandemic influenza A(H1N1) 2009 was defined as a person with ILI and laboratory evidence of pandemic influenza A(H1N1) 2009 virus infection diagnosed by real time RT-PCR testing of a throat swab specimen.

Data Collection Methods

- Regarding the overall situation of the outbreak, discussions were held with officials from the zonal health department and district health office heads as well as with surveillance focal persons assigned to the area.
- Patient registers were reviewed to collect information with regard to the clinical and epidemiological information of suspected cases. The list of suspected pandemic influenza A (H1N1)2009 cases from Gore prison and Gore town were obtained through review of the logbooks at Gore health center. Clinical diagnosis of the cases was verified by a physician from Metu hospital on 3 November 2010.
- From 7-8 November 2010, respiratory specimens were obtained from 22 influenza-like illness cases. Site of specimen collection included Gore prison camp (N=5), Bedele health center (N=4), Abdella clinic (N=9) and Denbi health center (N=4). Most of the cases were in the acute stage of infection. Nine of those sampled were individuals who had failed to improve after a course of antibiotic treatment.

Laboratory Procedure

Throat swabs were collected from suspect cases using viral transport medium (Becton Dickinson). Specimens were maintained under cold chain until laboratory analysis. RNA was extracted from respiratory specimens using a commercial RNA extraction kit (RNA Mini kit, QIAGEN). Five micro liters of extracted RNA from each patient was used in separate 20ul reaction mixtures (AgPath, Ambion) containing different influenza primers and probes (CDC Influenza Division, Atlanta, USA): influenza A, influenza B and influenza A subtypes (seasonal

A/H1, seasonal A/H3, swine influenza A and swine H1/ [2009 pandemic influenza A (H1N1)]. A control for amplification was also included (RNAse P). Amplification was carried out on an Applied Biosystems (AB) 7500 Fast real-time PCR system for a total of 45 cycles. Threshold for positivity was calculated for all positive specimens, including seasonal and swine influenza positive controls.

Data Entry and Analysis

The qualitative data obtained from the health officials was narrated and the clinical, epidemiological and laboratory data were entered and analyzed using micro-soft excel**.**

Results

a) **General description of the Outbreak**

The zonal health officials in Illu Aba Bora zone recognized there was an unusual increase of acute influenza-like illness which began sometime in mid October 2010. According to the zonal surveillance focal person, four districts (Ale, Chora, Bedele and Dedesa) had reported an unusual increase in acute influenza-like illness within their catchment areas but none of the districts identified the index cases. Zonal health officials recognized that a campaign of pandemic influenza vaccination had been recently ongoing in the country but this vaccination had not been conducted in high risk groups in any of the districts of Illu Aba Bora zone.

In Ale district cases were reported from Gore town and Gore prison camp. The cases from Gore prison camp were seen at Gore health center on 28 October, 2010. The Ale district health office reported the event to Illu Aba Bora zonal health office on 1st November, 2010. In response, the zonal health office dispatched a team comprised of one physician from Metu hospital and the zonal surveillance focal person to the site for clinical and epidemiological investigation. The team investigated cases from Gore prison camp and Gore town who sought medical consultation at Gore health center from 28 October to 5 November 2010. The clinical investigation showed that 79 of the 150 prisoners and 7 individuals from Gore town had acute influenza-like illness. The clinical investigation also revealed that all patients within the acute phase of infection reported with similar symptoms including: fever, coryza, cough, myalgia, and headache. On the basis of the clinical finding the physician suspected the illness might be due to pandemic

influenza and suggested laboratory investigation. Also in Ale district school absenteeism was reported from one primary school and one high school. Ninety-seven out of 208 (47%) and 24 out of 52 (46%) primary and secondary school students respectively were absent from school because of fever and acute respiratory symptoms.

b) Surveillance

The case definition that was being used to identify suspected cases of pandemic influenza was the same case definition that was adopted at the very start of the pandemic. It included a reference to history of recent travel outside of Ethiopia to a location where pandemic influenza was already present, and also having had contact with a confirmed case of pandemic influenza within the past 7 days.

There was inadequate awareness about recent progress/developments concerning global pandemic influenza situation in general. In some cases there was not even the awareness that the virus had been detected in Ethiopia since June 2009.

The record review in four visited health facilities (one from each affected districts) revealed that individuals presenting with flu like symptoms were clinically diagnosed as influenza like illness, AFI, pneumonia, common cold and bronchitis during this period.

Cases were not registered in a separate outbreak registration or a line listing form and the case registration lacked important variables like date of onset of illness of a patient. Active case search and case tracing was not in place in all the affected areas.

c) Findings from record review (Gore town and Gore prison) (N=86)

The age range of influenza-like illness/suspected pandemic influenza A (H1N1)2009 cases was from 2 through 56 years, with a median age of 28 years. All cases from Gore prison camp (N=79) were males. Of 7 cases from Gore town, 4 were females (57%). The clinical attack rate in Gore prison camp was 53% (79/150). Fever and cough were two clinical symptoms which were present in all cases. Amongst prisoners at Gore prison camp other notable clinical signs included runny nose, sore throat and myalgia. None of the prisoners experienced any abdominal

pain or diarrhea. In contrast the cases from Gore town (N=7) reported gastric disturbance in 2 individuals (29%) (Table1). All cases were mild and no death was reported.

Table 1.3.1 Number of suspected Pandemic Influenza A (H1N1) 2009 cases in Gore Prison Camp and Gore Town reporting specific symptoms, November 2010

Symptoms	**Total Cases (N=86)**	**Frequency of cases, Gore Prison (N=79)**	**Frequency of cases, Gore town (N=7)**
Fever	86	79 (100%)	7 (100%)
Cough	86	79(100%)	7 (100%)
Runny nose	59	56 (71%)	3 (43%)
Myalgia	60	53 (67%)	7 (100%)
Sore throat	54	52 (66%)	2 (29%)
Headache	52	47 (59%)	5 (71%)
Back pain	42	40 (51%)	2 (29%)
Shortness of breath	47	45 (57%)	2 (29%)
Abdominal pain	1	0 (0)	1(14%)
Diarrhea	1	0 (0)	1(14%)

In Gore the surge in cases reporting to health facilities with symptoms of acute influenza-like illness peaked towards the end of October 2010. Disproportionately affected were individuals in the prison camp although there were some community cases which were also occuring simultaneously. However by the time that the investigative team arrived in Gore town (7 November 2010), the number of cases in the community was virtually nil (Figure 1.3.2).

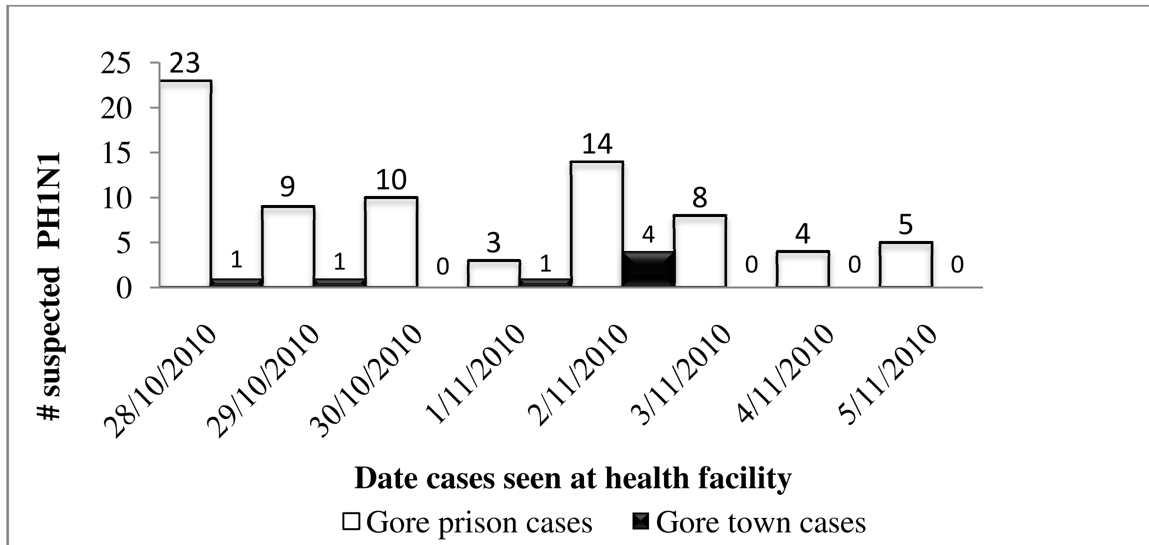

Figure 1.3.2 Distribution of suspected Pandemic Influenza A (H1N1)2009 cases in Gore Prison Camp and Gore Town by date seen at health facility, Illu Aba Bora zone, November 2010

The age group most affected in Gore (Ale district) tended to be young adults in the age range 26-33years (N=32) followed by those 18-25 years (N=29) and those 34-41 years (N=17). Together these 3 age categories accounted for 78 cases (91% of total cases present) (Figure1.3.3).

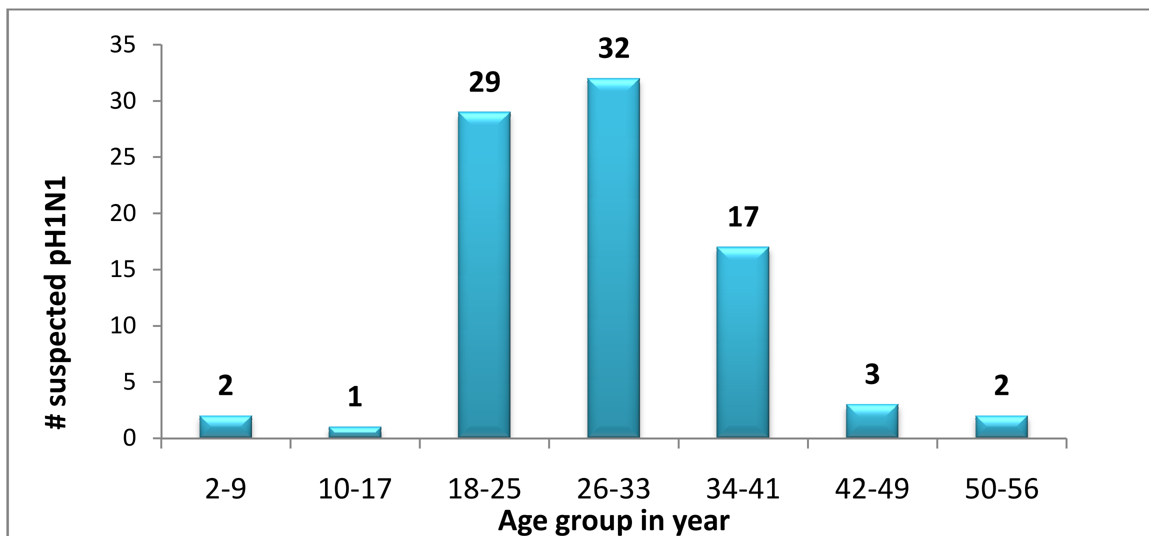

Figure 1.3.3 Distribution of suspected Pandemic Influenza A (H1N1)2009 cases by age group in Gore prison and Gore Town, Illu Aba Bora zone, November, 2010

d) Findings of cases sampled for laboratory test from four localities(N=22)

I. Epidemiological and clinical Findings

Out of 22 individuals from whom a respiratory specimen was obtained there were 13 males and 9 females. Patients' ages ranged from 7-60 years, with a median age of 25 years.

The most commonly presenting clinical symptoms in those sampled were cough (100%), fever (82%), runny nose (77%), headache (68%) and sore throat (36%). The same five clinical symptoms were found to be the most commonly presenting ones in those individuals with confirmed pandemic influenza A (H1N1)2009 virus infection. None of the individuals with confirmed 2009pandemic influenza A (H1N1) virus infection suffered from nose bleeds, or a feeling of thirst or burning sensation (Table 1.3.2). Out of the 22 individuals, 9 cases had received antibiotics and antipyretics but without clinical improvement. All cases were mild and no death was reported.

Table 1.3.2 Number of suspected Pandemic Influenza A (H1N1)2009 cases sampled for laboratory investigation reporting specific symptoms, from four Localities (Gore, Abdella, Bedelle, and Denbi) in Illu Aba Bora zone, November 2010

Presenting Symptoms	Cases Sampled (N=22)	Cases Confirmed (N=16)
Cough	22(100%)	16 (100%)
Fever	18(82%)	14 (88%)
Runny nose	17(77%)	13(82%)
Headache	15(68%)	11(69%)
Sore throat	8(36%)	5(31 %)
Myalgia	3(14%)	3(19%)
Back pain	3(14%)	3(19%)
Anorexia	1(4.5%)	1(6.3%)
Nose bleeding	1(4.5%)	0 (0%)

Feeling thirsty	1(4.5%)	0 (0%)
Burning sensation	1(4.5%)	0 (0%)
Chest pain	1(4.5%)	1(6.3%)
Shortness of breath	2(9%)	2 (13 %)

II. Laboratory Findings

Sixteen (73%) out of the 22 respiratory specimens were positive for influenza A virus and none were positive for influenza B. The influenza A-positive samples were sub-typed further; all were positive for pandemic influenza A (H1N1)2009 virus infection. No seasonal influenza viruses were present. One additional sample which was positive for influenza A remained below the threshold of positivity for general swine influenza A and also swine H1 viruses (pandemic influenza A(H1N1) 2009). It was classified as indeterminate. Specimen integrity was good in all cases as seen from amplification of RNase P gene from extracted samples, including from influenza-negative specimens.

The number of samples tested and those with positive pandemic influenza A (H1N1)2009 results from each of the 4 sites are displayed below (Fig1.3.4).

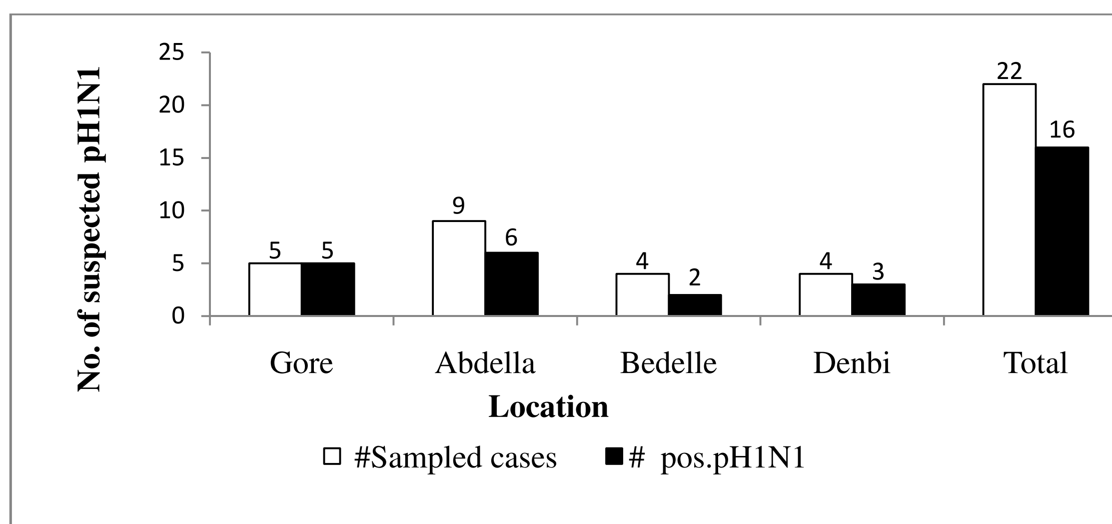

Figure 1.3.4 Number of cases sampled for laboratory test and confirmed Pandemic Influenza A (H1N1)2009 by location, Illu Aba Bora zone, 7-8 November 2010

Of the 22 respiratory specimens collected over a 2-day period during the outbreak investigation, the majority were obtained within 1 week of the onset of flu-like symptoms whilst a few samples were obtained from individuals who had manifested clinical symptoms for a longer duration (Figure1.3. 5).

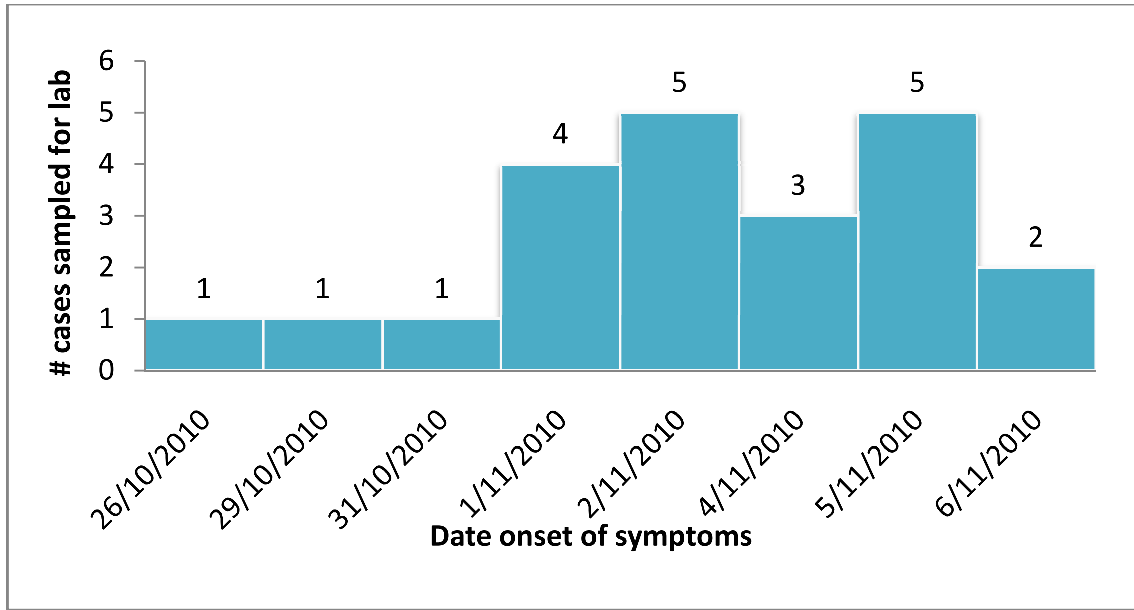

Figure1.3.5 Number of suspected Pandemic Influenza A (H1N1)2009 virus cases sampled for lab test by date onset of symptoms from four localities (Gore, Abdella, Bedele, and Denbi), Illu Aba Bora zone, 7-8 November, 2010(N=22)

The highest number of cases who were sampled were in the age range 16-33 years (N=14), out of which 11 (79%) were confirmed pandemic influenza A (H1N1)2009 cases. Only 5 of the sampled individuals were in an older age category and out of those ones, there were 3 confirmed pandemic influenza cases (Figure1.3.6).

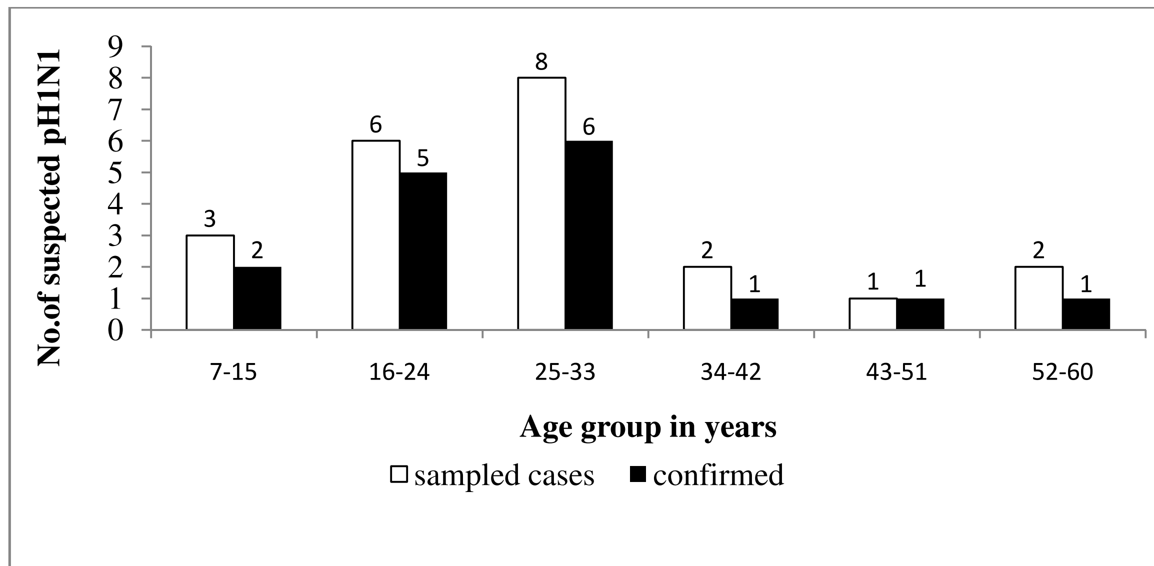

Figure 1.3.6 Age distribution of sampled and confirmed pandemic influenza A (H1N1)2009 virus cases from four localities (Gore, Abdella, Bedele, and Denbi), Illu Aba Bora zone, 7-8 November, 2010

Discussion

Confirmed pandemic influenza A (H1N1) 2009 virus was identified from all four sites (one site from each district). This may imply that pandemic influenza has made significant entry into these communities, making it likely that many individuals would have been exposed by now and perhaps also built some immunity against it.

In all four districts that reported suspected pandemic influenza A (H1N1)2009 index cases were not identified which resulted in of difficulty understanding of the introduction of the virus in the community.

Though the unusual increase of influenza like illness was observed in some districts within Illu Aba Bora zone three weeks before the confirmation, there was a delay in reporting of the situation to the higher level which in turn resulted in a delay in response. The outbreak lasted more than three weeks which in turn can increase the transmission of the virus in the communities.

There was inadequate awareness among health officials and health providers about recent progress/developments concerning global pandemic influenza situation in general. This might be due to poor information dissemination or ignorance starting from federal level to grass root level. All cases presenting flu-like symptoms were treated with anti-biotics and antipyretics. There was no antiviral drug available in any of the districts of Illuababora zone and no pandemic influenza (H1N1) 2009 vaccination of high risk group was conducted.

Age-specific frequency of cases was highest among young adults 16-33 years in confirmed cases and 18-33 in suspected cases, with the lowest frequency of cases among old age, a pattern that is consistent with reports from other countries.

The clinical cases attack rate at Gore prison camp was very high reached 52.6% (79/150) this might be contributed by factors such as environmental conditions of the premises and the contact rate between infectious and non infectious cases among the prisoners

As observed from patient registries, cases with flu-like symptoms were diagnosed as influenza like illness in many cases, pneumonia, AFI, common cold and bronchitis which might underestimate the true incidence of pandemic influenza A (H1N1). The case definition which they were using to identify suspected cases of pandemic influenza A (H1N1)2009 virus infection was the case definition adopted in the very start of the pandemic which encompasses travel history outside Ethiopia and contact history with confirmed cases within 7 days of onset of first symptoms as one defining criteria. But since no one in the affected communities had any record of recent travel outside the country, there was reluctance to report the outbreak of flu-like illness as possibly being pandemic influenza. In fact it is difficult to distinguish pandemic influenza (H1N1) virus infection from other respiratory illnesses via only clinical symptoms if not diagnosis is supported with laboratory. Even the current working case definition set by FMOH for the routine surveillance to detect suspected pandemic influenza A (H1N1) is more or less similar except the current case definition excludes travel history. So, the case definition should be very sensitive enough to detect the disease and needs some modification.

Measures taken

- ✓ Clinical investigation of cases by physician only in Gore
- ✓ All cases were treated with antibiotics and antipyretics
- ✓ Respiratory specimens of suspected cases of pandemic influenza A (H1N1) were collected and tested
- ✓ Clarification was provided on the status of pandemic influenza A (H1N1) 2009 globally and in Ethiopia, besides updated case definition was provided to be used to detect suspected cases of pandemic influenza A (H1N1) 2009.
- ✓ Orientation was provided to health officials and healthcare providers in case registration during outbreak situation.
- ✓ Line listing forms to be used during were provided to the district and zonal health officials

Conclusions

A laboratory-confirmed outbreak of pandemic influenza A (H1N1) 2009 was identified in 4 districts of Illu Aba Bora zone in Oromia Region; however, neither the source of introduction nor the index case could be identified. The outbreak demonstrated the difficulty in reporting an immediately notifiable disease that cannot be clinically distinguished from other acute respiratory illnesses. Laboratory-based surveillance for influenza-like illness or severe acute respiratory illness (ILI/SARI surveillance) is necessary to conclusively determine etiology in outbreaks of respiratory disease.

Though pandemic influenza A (H1N1) 2009 was confirmed in the four districts, there is no 100% confidence that the silence districts within the zone are really free of the disease. The findings of this investigation might not accurately represent the real magnitude of the outbreak within Illu AbaBora zone.

Recommendations

Increase awareness among health officials, healthcare providers and the wider community about new emerging respiratory diseases. The case definition should be modified to the point it can be more sensitive to detect suspected cases of influenza like illness. During outbreaks enhanced

surveillance should be in place. Timely and appropriate communication or information dissemination system from higher to lower lever or vice versa should be in place.

Acknowledgements

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Chapter 2– Surveillance Data Analysis Report

2.1. Description of Acute Respiratory Infections in Children Less Than Five Years of Age from 1998 to 1999 EFY, Ethiopia

Introduction

Acute respiratory infections are frequent burden to health despite the fact that cost effective methods for their prevention and cure are available (1, 3). Acute respiratory infections in children less than five years of age are among the leading causes of mortality and morbidity throughout the world, causing more than 4 million deaths annually (1).

Acute respiratory infections account for over a third of the causes of morbidity and mortality in Ethiopian children. ARI are the leading causes of morbidity and mortality among infants. They account for at least 27.2% of outpatient visits, 29.1% of hospital admissions, and 39.8% of hospital deaths all of which were due to pneumonia (2).

Prevalence of ARI varies by age of child. Children age 6_11months are most likely to show symptoms of ARI (18%) compared with children in the other age groups (2, 3). There are small differences in the prevalence of ARI by gender of the child and wealth quintile. Children living in households that use wood/straw or animal dung for cooking are proportionately more likely to exhibit symptoms of acute respiratory infections than children living in households using other sources of cooking fuel. ARI were higher among children in rural area (13%) than children in urban areas (9%) (3).

The colonization of the respiratory tract of children by potential pathogens is universal, with 85% of the world's children harboring, H.influenza, 83% M.catarrhalis and 90% S.pneumonia in nasopharynx (2). Risk factors for ARI in the Ethiopian context include use of biomass fuel for cooking, indoor air pollution, lack of a separate bed room from kitchen for children, lack of functional windows, malnutrition and age (2, 3). Prevalence of ARI ranges from a high of 14% among children <5 year living in Tigray, Oromia and SNNPR to a low 2% among children in Diredawa. ARI prevalence is lower for children whose mothers have at least some secondary Education (3).

Though acute respiratory infections are responsible for huge number of cases and deaths especially in children less than five years of age in Ethiopia, they are not amongst diseases under the national surveillance system. So the aim of this data analysis was to provide an overview of ARI in children less than five years of age from 1998 to 1999 EFY in the country.

Objectives

- ✓ To understand the distribution of different types of ARI in children less than five years of age
- ✓ To describe the distribution of ARI cases by person, place and time

Methods and materials

A national secondary morbidity and mortality data on acute respiratory infections of 1998 and 1999 EFY was collected from Federal Ministry of Health, Plan and Programming department. The data was gathered after a support letter was obtained from Addis Ababa University, College of Health Sciences, School of Public Health. The national under one, five year population and regional populations were obtained from Health and Health Related Indicators of the year 1998 and 1999 to calculate rates. Virtually all the quantitative data was entered and analyzed using Micro-soft Excel and some of the information was narrated. The analyzed data was interpreted and presented to EFELTP residents.

Results

In 1998 EFY only seven regions reported the inpatient cases report, four regions the outpatient cases report and six regions deaths report (report from Oromia has no sex and age category). Likewise, in 1999 EFY only seven regions reported the inpatient cases report, four regions the outpatient cases report and four regions deaths report.

Pneumonia and acute upper respiratory infections were the first and second leading causes of outpatient, inpatient and death in both 1998 and 1999 EFY respectively (table 2.1.1).

Table 2.1.1 Number of reported cases and deaths of different types of ARI in children less than five years of age from 1998 to 1999 EFY, Ethiopia

Classification of ARIs	**1998 EFY**				**1999 EFY**			
	Outpatient	Inpatient	Total	death	Outpatient	Inpatient	Total	death
AURIs	51,192	493	51,685	46	9,291	521	9,812	16
Influenza	2,100	1	2,101	0	1,225	1	1,226	48
Pneumonia	108,360	9,879	118,239	435	9,337	7,827	17,164	724
Acute bronchitis	5,372	122	5,494	3	905	90	995	7
Total	**167,024**	**10,495**	**177,519**	**484**	**20,758**	**8,439**	**29,197**	**795**

Morbidity and mortality due to ARI was higher in males than females in both fiscal years. There was also a decrement in the number of cases of ARI in both sexes from 1998 to 1999 EFY (table 2.1.2).

Table 2.1.2 Gender distribution of cases and deaths of ARI in children less than five years of age from 1998 to 1999 EFY, Ethiopia

Sex	1998 EFY				1999 EFY			
	Inpatient	Outpatient	Total	Death	inpatient	outpatient	Total	death
Female	3,775	74,204	77,979	162	3,339	9,093	12,432	212
Male	5,138	92,795	97,933	244	5,100	11,126	16,226	275
Total	8,913	166,999	175,912	406	8,439	20,219	28,658	487

Note: The result in table 2.1.2 doesn't include the 1998 EFY Oromia report (Aggregated report no separate sex)

The highest acute respiratory infections morbidity rates were reported from Diredawa, SNNPR, Afar, Hareri, and Somalia respectively. And the least cases were reported from Addis Ababa, Tigray and B/ Gumuz (Figure 2.1.1).

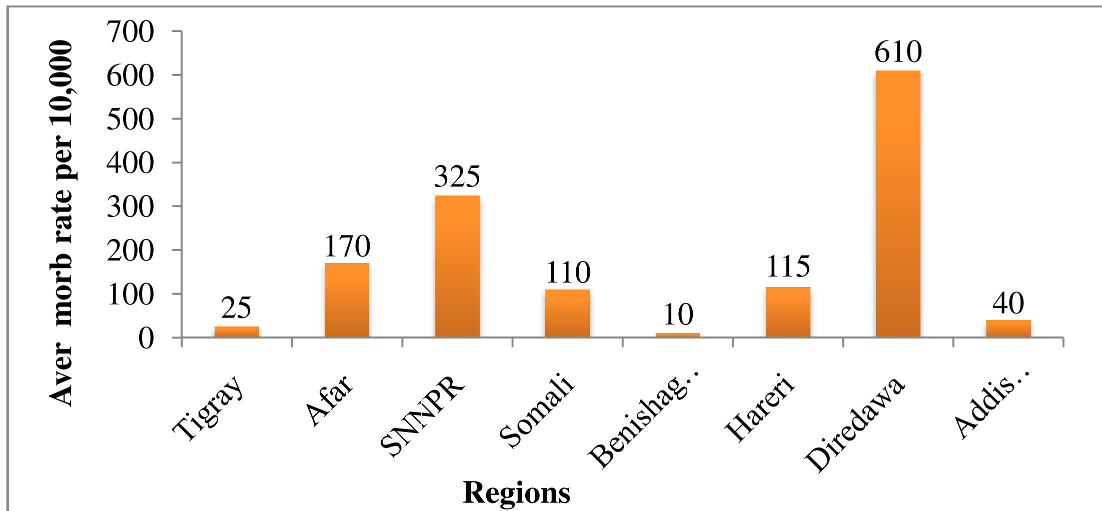

Figure 2.1.1 ARI average morbidity rate per 10,000 in children less than five years of age of 1998 and 1999 EFY by Region, Ethiopia

Cases of acute respiratory infections were higher in <1 children than children age of 1_4 in both 1998 and1999 EFY. Acute respiratory infection decreased from 1998 to 1999 in both age groups (Figure 2.1.2)

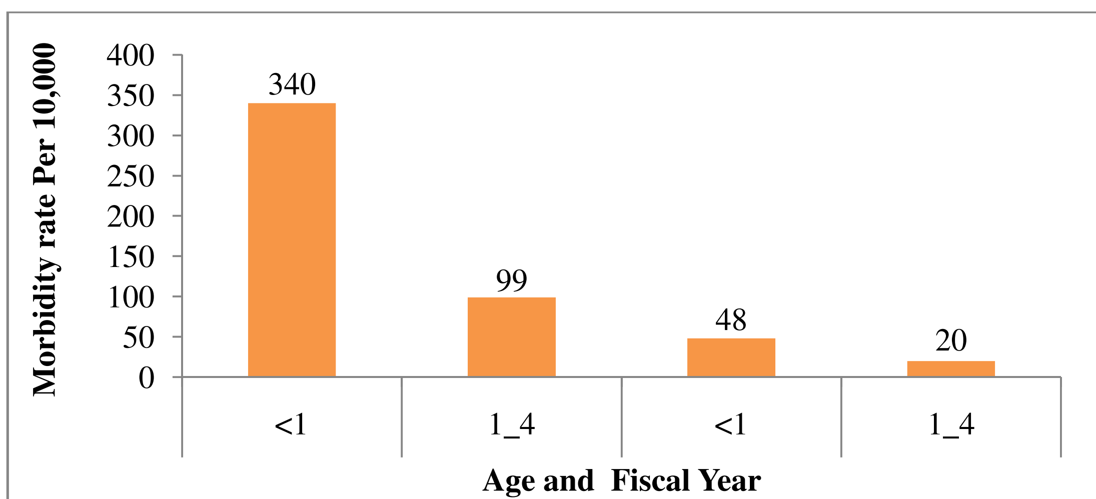

Figure 2.1.2 Age distribution of ARI morbidity rate per 10,000 in children less than five years of age by fiscal year, Ethiopia

Death due to acute respiratory infections was higher in <1 than in 1_4 age of children in both years. Death increased from 1998 to 1999 in both age groups (Figure 2.1.3).

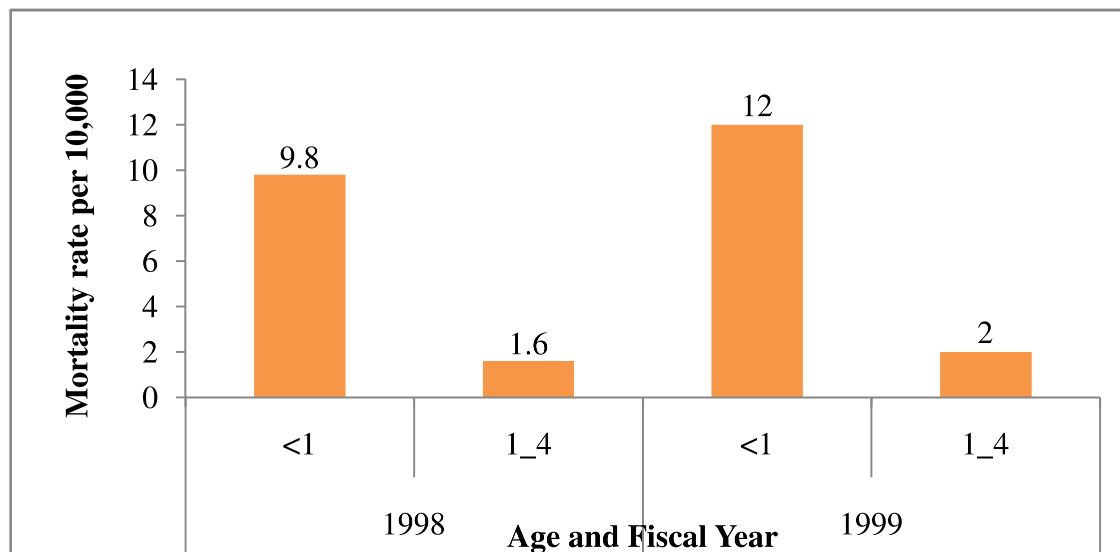

Figure 2.1.3 Age distribution of ARI mortality rate per 10,000 in children less than five years of age by fiscal year, Ethiopia

Discussion

Pneumonia and acute upper respiratory infections were the first and second leading causes of outpatient, inpatient and death in both 1998 and 1999 EFY respectively (table2.1.1). In light of this finding, Pneumonia was the 1st leading causes of morbidity and mortality in children less than five years of age over other types of ARI.

Acute respiratory infections morbidity rate was higher in children aged <1 than 1_4 years in both 1998 and 1999 EFY (Figure2.1.2) This could because we often use biomass for cooking and children <1years spent most of their time with their mothers at home while they cook, as compared to children aged 1_4years. Likewise, the finding of this analysis was consistent with some studies conducted in Ethiopia. Acute respiration infections morbidity rate in children less than five years of age decreased from 1998 to 1999 in both <1 and 1_4 years children (Figure 2.1.2), but the mortality rate increased from 1998 to 1999 EFY in both age groups (Figure 2.1.3). And the reason for this was not clearly defined.

The highest incidence of acute respiratory cases was reported from Diredawa next by SNNPR and the least from Benishangul Gumuz. The analysis didn't show the incidence of acute respiratory cases from Oromia, Amhara (the two biggest regions) and Gambella region for unknown reason.

This data analysis didn't clearly show the true of incidence of acute respiratory infections in the country due to incomplete reporting in terms of the number of reporting regions and reporting period. Some regions' report lacked important variable like age and sex. Generally, this data analysis showed that there was huge inconsistency of data in all the reports as a result comparison was difficult.

Conclusions and Recommendations

This data analysis showed that Pneumonia was the leading cause of morbidity and mortality in children less than five years of age. Morbidity and mortality rate was higher in children <1 year than 1_4 years. Besides, this data analysis showed that there was huge inconsistency of data in all the reports. Strengthening of the existing childhood interventions, timely monitoring of the timeliness and completeness of reports, and cascade training on the importance of health and health related data for those working with health data are instrumental in showing the true picture of the disease.

Acknowledgments

I deeply thank Federal Ministry of Health, Plan and Program department for their cooperation in provision of the data.

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Chapter 3 – Evaluation of Surveillance System

3.1. Evaluation of Epidemiological Diseases Surveillance System, Tigray, Ethiopia, December 2010

Background

Public health surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data about a health-related event for use in public health action to reduce morbidity and mortality and to improve health (1) and it is essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know (2). Public health surveillance is an essential component of evidence-based decision making practices (3). It includes case detection and registration, case confirmation, data reporting, data analysis, outbreak investigation, response and preparedness activities, feedback, and communication (4).

A public health surveillance system is dependent on a clear case definition for the health-related event under surveillance. The case definition of a health-related event can include clinical manifestations, laboratory results, epidemiologic information and/or specified behaviors, as well as levels of certainty (e.g., confirmed/definite, probable/presumptive, or possible/suspected). The use of a standard case definition increases the specificity of reporting and improves the comparability of the health-related event reported from different sources of data, including geographic areas (5).

Effective Communicable diseases control relies on effective surveillance and response system that promote better coordination and integration of surveillance function. In Africa, where infectious diseases continue to be a major health problem, many of the national surveillance systems ensure neither timely detection nor an effective response to them *(6)*. To address this issue, in 1998 the World Health Organization Regional Office for Africa approved the Integrated Disease Surveillance and Response (IDSR) strategy for strengthening infectious disease surveillance and response capacity among its 46 Member States and requested that

Member States conduct assessments of their IDSR systems (*7*), the findings of which would act as a baseline for reform plans.
Integrated disease Surveillance and response is aimed to assist health workers to detect and respond to diseases of epidemic potential, of public health importance and those targeted for eradication and elimination. The information collected through this strategy will help district health teams to respond quickly to outbreaks, set priorities, plan interventions, and mobilize and allocate resources. The Integrated Disease Surveillance and Response strategy links community, health facility, district, regional and national levels with the overall objective of providing epidemiological evidence for use in making decisions and implementing public health interventions for the control and prevention of communicable diseases (7).

Surveillance is essential for the early detection of emerging (new) or re-emerging (resurgent) infectious diseases. In the absence of surveillance, disease may spread unrecognized by those responsible for health care or public health agencies. By the time the outbreak is recognized, it may be too late for intervention measures. Continuous monitoring is essential for detecting the 'early signals' of outbreak of any epidemic of a new or resurgent disease. For disease surveillance to prevent emerging epidemics, the time taken for effective action should be short (4).

In 1996, as part of the response to the growing public health problem with communicable diseases, Ethiopia introduced an integrated disease surveillance and response (IDSR) strategy focusing on 17 priority diseases. Ethiopia adopted the world health organization's IDSR strategy in 1998, and in October 1999, the ministry of Health (MOH) of Ethiopia and its development partners assessed the country's surveillance system and used the results to adapt a five-year national plan (8).

Since 2009 Ethiopia has introduced a new approach i.e. the public health emergency management (PHEM) to guide the prevention and control of any public health emergency problems within the country. Public health surveillance is part and parcel of the public health emergency management that helps to provide advance information of an incoming threat in order to facilitate the adoption of measures to reduce its potential health impact. Currently, the Federal ministry of health identified 20 diseases and health events to be reported immediately

(Acute Flaccid Paralysis (AFP), Anthrax, Avian Human Influenza, Cholera, Dracunculiasis, Measles Neonatal Tetanus (NNT), Pandemic Influenza A (H1N1), Rabies, Small pox, Severe Acute Respiratory Syndrome (SARS), Viral Hemorrhagic Fever, Yellow Fever) and Weekly (Dysentery, Malaria, Meningitis, Relapsing Fever, Typhoid Fever, Typhus, Malnutrition) at national level (9).

Information flow in Public Health Surveillance System:

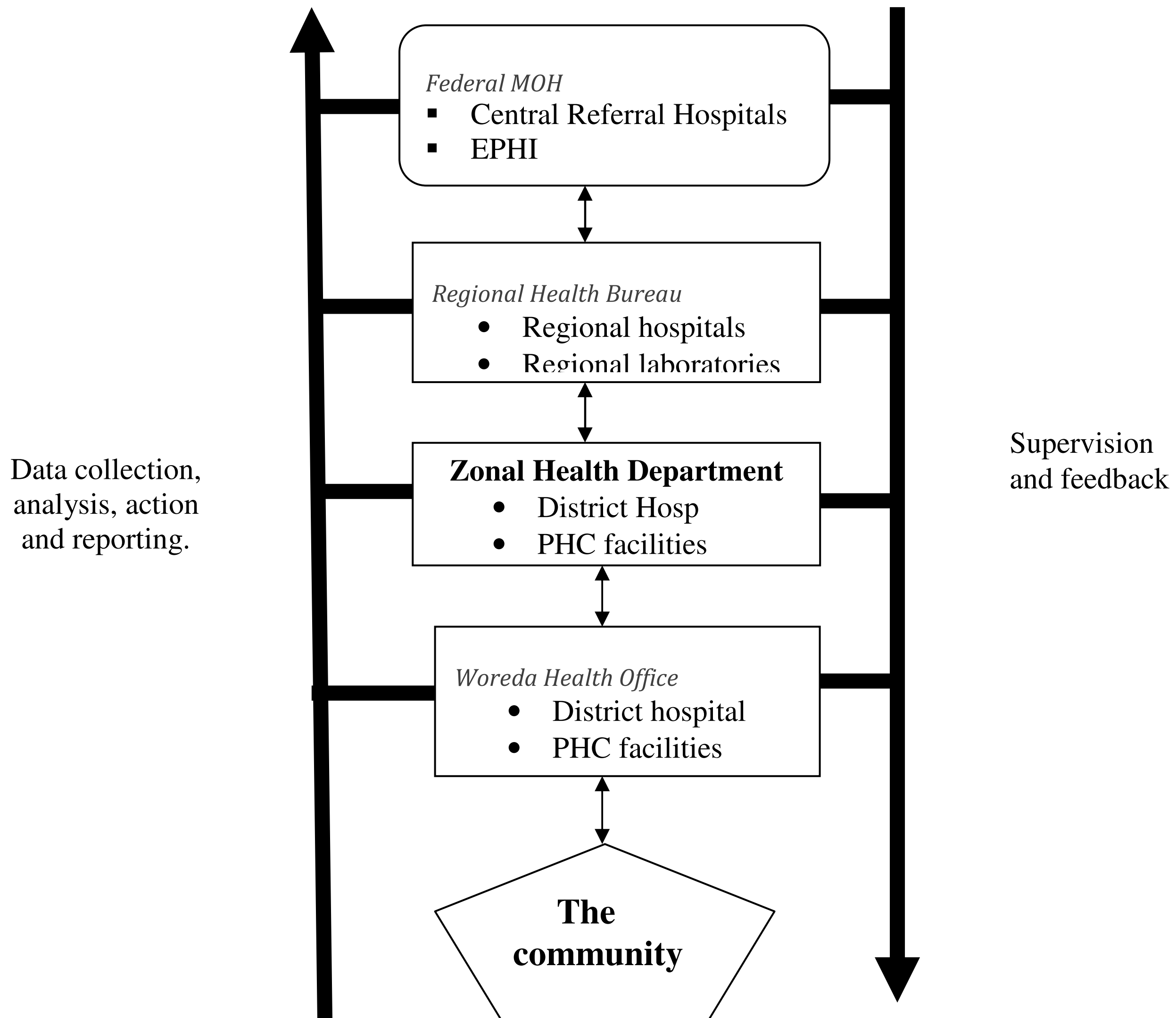

Figure 3.1.1 Data and information flow in IDSR indicating varying cycles at various levels(**Source**: Federal Democratic Republic of Ethiopia, National Technical Guideline Integrated Disease Surveillance and Response (IDSR), 2002)

The purpose of evaluating public health surveillance systems is to ensure that problems of public health importance are being monitored efficiently and effectively. Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness. Evaluation of a public health surveillance system focuses on how well the system operates to meet its purpose and objectives.

This evaluation was conducted with the purpose of describing the state of communicable disease surveillance in the region indicating how well the system was working to meet its purpose and objectives.

Objectives

General objective:

Evaluation of Epidemiological Diseases Surveillance System in Selected Districts in Tigray regional state, 2010

Specific objectives:

- To assess the surveillance core functions with regard to case detection and registration, confirmation, reporting, data analysis, epidemic preparedness and response, and feedback on selected priority diseases in the selected districts,
- To assess the status of surveillance support functions in relation to standards and guidelines, training, supervision, communication, and resources
- To review attributes of surveillance system with regard to timeliness, completeness, usefulness, data quality, simplicity, and acceptability

Methods

Study area: This surveillance system evaluation was conducted in Tigray Regional State. The region is located in the northern part of Ethiopia. According to the projection from the national 2007 census the region had an estimated population of 4.6 million people in the year 2009/10. Administratively the region is divided into 7 zones and 46 districts. The region comprises of 12 governmental Hospitals, 200 Health centers and 529 health posts (10).

Study period: the evaluation was carried out from 20th- 28th November 2010.

Study population: The study population of this evaluation included all governmental health facilities performing surveillance activities found within South Eastern zone and Mekelle City administration, health offices of South Eastern zone and Mekele City administration, and the regional health bureau.

Sampling procedure: The evaluation was undertaken at Tigray Regional Health Bureau, conveniently chosen one district health office called Enderta health office from South Eastern zone and Mekele city dministration health office, conveniently selected two health centers from Mekelle city administration and one health center and one health post from Enderta district. The reason for selection of these study sites on convenience basis was because of time and transport constraints we had.

Data collection: This surveillance evaluation consisted of two priority diseases under surveillance i.e Malaria and Measles.

The evaluation examined the performance of the surveillance **core activities** (case detection and registration, confirmation, reporting, data analysis/interpretation, epidemic preparedness, and response, feedback), **supportive functions** (standards and guidelines, training, supervision, communication, resources, coordination), and **attributes** (Timeliness, completeness, usefulness, reliability/data quality, simplicity, and acceptability) of a surveillance system.

The assessment tool for the core activities and support functions of surveillance system was adapted from the assessment protocol for national communicable diseases surveillance system, and epidemic preparedness and response, which was developed by the World Health Organization-Regional Office for Africa (WHO/AFRO) and for the attributes of surveillance system was based on an established framework developed by the Centers for Disease Control and Prevention (CDC), Atlanta, USA. These tools were reviewed and modified accordingly to suit the local context.

Data collection was performed by FELTP residents. Data were gathered through sets of semi-structured questionnaires that cover record review, interviews and certain observations at health facility, district/city health office and regional health bureau levels. A semi-structured questionnaire was administered to surveillance focal persons at health facility, district/city

health offices, and the regional health bureau. Documents reviewed during the assessment were patient registers, and copies of weekly surveillace reports at health facility level, immediately and weekly surveillance reports at district and regional levels. Observation have been also made on data management and organization, routine data analysis, use of standard case based and weekly report forms, availability of case investigation form, availability of surveillance guide lines and logbooks at all levels.

Data analysis

The collected data were compiled and analysed manually by principal investigators i.e. FELTP residents. Data were summarized and frequency distribution tables were also constructed for some of the variables.

Ethical consideration

Before conducting the present evaluation, verbal consent was obtained from the regional health bureau, District /city health offices and health facilities. Permission for conducting the interview was also obtained from the respondents' respective supervisors and the respondents as well.

Definition of terms

Completeness of reporting: Completeness in surveillance can have varying dimensions and may include the following: Completeness of reporting sites, completeness of case reporting and completeness of surveillance data.

Timeliness of reporting: Proportion of all expected reports in a reporting system received by a given due date.

Usefulness of the system: the ability of the surveillance system to meet the objective(s) for which it was designed.

Simplicity of the system: Simplicity refers to the structure of the system and the ease of implementation.

Acceptability of the system: Is a reflection of the willingness of surveillance staff to implement the system, and the end users of the data to accept and use the data generated by the system.

Reliability/data quality*:* The degree to which the results obtained by a measurement/ procedure can be replicated.

Validity: An expression of the degree to which the surveillance data measure the true incidence of cases in the population.

Findings

The Regional Health Bureau and 6 sites (2 distrct health offices, 3 health centers and 1 health post) were visited. All surveyed sites had surveillance personnel. Excluding the health post, of the 6 (Regional Health Bureau, 2 distrct health offices, and 3 health centers) surveyed sites, four (66.6%) of the sites surveyed didn't have documented plan for the objective of surveillance system activities.

1. **Assessment of core functions of surveillance system**

Case-detection and registration

The assessment indicated that a case definition was observed in all (4) visited health facilities for Malaria and Measles. At health facilities standard case definitions were posted in adult outpatients and under five year's departments. All visited health facilities had patient registery for recording cases. No health facility had a logbook to record reports of rumours of outbreaks. Two of the districts visited had logbook to record reports of rumours of outbreaks.

The regional health bureau, two of the districts (one is city administration) and all (4) health facilities visited said that they had a mechanism to capture information on outbreaks from the community. This was mainly through extension health workers, community health workers and volunteers (locally called "Abo-Selasa"). "Abo-Selasa" is a locally organized government structure at community level that means community volunteers get involved in all health activities including disease surveillance in thirty households assigned to them by the local government of the village.

Case confirmation

Except for Measles, all health facilities visited had the capacity to confirm malaria cases. On the other hand, the Regional Health Bureau, districts and all health facilities visited had the capacity to transport specimens for malaria and measles cases. All health facilities visited had

adequate diagnostic equipments and reagents for malaria while there was shortage of Malaria RDTs at the regional health bureau.

Reporting

Findings of present study revealed that health facilities and districts visited send report to the next higher level via hard copies during routine situation, but during emergencies they used telephone call. Where as the regional health buearu send report to the federal via electronic mail and telephone call.

All visited sites had adequate weekly report form, case based report form, line listing form and epidemic reporting forms during the last three months.

Data Analysis

The assessment found that data analysis was not practiced at all in all the sites visited to detect unusual event. The regional health bureau had set a clear epidemic threshold for Measles but not for Malaria. All health facilities and districts visited didn't set epidemic threshold for Measles and Malaria.

Epidemic Preparedness and response

In all the sites visited there were an established rapid response teams which will be activated only during outbreak. No sites visited had epidemic preparedness plan and budget line for epidemic response; nevertheless, they had emergency stocks of drugs and supplies for malaria and measles. Cross border communications during outbreaks is practiced with the surrounding facilities, districts, and regions. Yet, districts and health facilities do not practice notification of epidemics within 30 minutes to their next levels. Conversely, the regional health bureau notifies outbreaks/ epidemics in a period of two hours to Federal Ministry of Health.

No malaria outbreak was reported in all sites visited in the last year. Of the sites visited, Mekelle city health office reported measles outbreak in the last one year and this outbreak was not investigated. The regional health buearu had investigated measles outbreak reported from districts outside the study areas.

Feed back

The regional health bureau never provided written feedback targeted to diseases surveillance to districts during the last 1 year prior to this study. Likewise, the region health bureau never received written feedback from Federal Ministry of Health. No districts provided written feedback on diseases surveillance to the health facilities. Among health facilities visited two health centers (66.7%) responded they had received verbal feedback from districts during field. However, this feedback was not specific to surveillance.

2. Assessment of support functions of surveillance system

Supervision

The regional health bureau had never made planned supervisory visits targeted to surveillance to districts and health facilities during the last one year. The regional health bureau inturn never received supervisory visits from higher level with regard to diseases surveillance during the last one year. Of two health offices visited, Enderta district health office performed supervisory visit on diseases surveillance to health facilities at least once during the last one year.Yet, this supervison was limited to vaccine preventablediseases (Measles, Polio and Neonatal Tetanus). In addition this supervision was performed without supervisory check list.

Guidelines

This assessment found that except for health post all sites visited i.e the regional health bureau, 2 of the health offices, and 3 of the health centers had national disease surveillance guidelines and only two (33.3%) of the health centers had standard case management protocol and guideline for investigation of outbreak and case of malaria and measles respectively.

Training

Except for the surveillance focal person at one health center (Semha health center), all surveillance focal persons of the sites visited had received training on surveillance and basic epidemiology during the last 1 year precedeing the study. The surveillance personnel at Semha health center was implementing surveillance activities based on simple orientation given from his workmates. Proportion of health workers working in health facilities trained on surveillance and basic epidemiology ranges from 5% to 42%.

Material resources

Table 3.1.1 summarizes the information on selected material resources essential for the implementation of surveillance and epidemic preparedness available at health facilities, district/ city health offices and regional health bureau.

Table 3.1.1 Availability of resources for surveillnce in each sites visited November,2010

No	Type of resources	Name of health center						
		Semeha H.C	**Mekele H.C**	**Quiha H.C**	**Mekele H.O**	**Endereta H.O**	**Regional health bureau**	**%**
1	Electricity	2	1	1	1	1	1	82%
2	Motor cycle	2	2	2	2	1	2	17%
3	Vehicle	2	2	2	2	1	2	17%
4	Adequate Stationery	1	1	1	1	1	1	100%
5	Calculator	1	2	1	1	1	1	82%
6	Computer	2	2	2	2	1	1	33.3%
7	Printer	2	2	2	2	1	1	33.3%
8	Telephone service	1	1	1	1	1	1	100%
9	Fax	2	2	2	2	2	2	0%
10	Radio call	2	2	2	2	2	1	17%
11	Posters	1	1	1	1	1	1	100%
12	Megaphone	2	2	2	1	1	2	33.3%
13	Flipcharts or image box	2	1	2	1	1	1	66.7%
14	Generator	2	2	2	2	2	1	17%

Note: present – 1 absent – 2

3. Assessment of surveillance attributes

Timeliness

This assessment depicted none of the districts visited monitor timeliness of weekly surveillance reports received from health facilities. As a result it was difficult to evaluate the timeliness of reporting at district level. But at regional level monitoring of timeliness of weekly surveillance reports received from districts was observed. And the timeliness of reporting at reginal level during the 3 months preceeding the study was 90%.

Completeness

Completeness in this survey had two dimensions i.e. completeness of reporting sites and completness of surveillance data (no missing data). Completeness of reporting of malaria report at Regional health bureau, Enderta district health office, and Mekelle city health office during the 3 months preceeding the study was 93.2%, 86.7%, and 100% respectively. No malaria reports from the sites surveyed had missed information (table 3.1.2).

Table 3.1.2 Completeness of malaria reports of 3 months (Augst-October) 2010 by institution, Tigray Region

S. no.	Institution	% Malaria reports received last 3 month	% Malaria reports received last 3 months with no missing of information
1	Regional health bureau	93.2%	100
2	Endereta health office	86.7	100
3	Mekele health office	100	100

Usefulness

Surveillance data (information) is used for planning, implementing, and evaluating public health interventions and programs. Though the assessment team couldn’t find evidence for utilization of the data, the regional health bureau and Mekele city health office verbally explained that they utilize the surveillance data for planning, priority setting, and intervention purposes. Conversely, Enderta district health office and all health centers visited did not use the

malaria and measles data for their own consumption other than just reporting to immediate next level.

Simplicity

Simplicity was assessed interms of ease of the case definition, data collection and analysis of surveillance data. This assessment found that almost all respondents said that the case definitions (including the community case definition) and data collection of Malaria and Measles cases was simple. But, surveillance personnel at one of the health center in Mekelle city suggested that the case definition of malaria is very long. Data analysis was an obvious problem at all the sites visited. Surprisingly, the meaning and use of surveillance data analysis was not clearly understood at district and health facility level.

Acceptability

Out of the six interviewed surveillance personnels, five were interested in working with surveillance uint. But, one surveillance personnel at a health center was not satisfied/ interested in working as surveillance focal as there is less attention to surveillance. As he said, surveillance is not given big focuss like other programs e.g. HIV/ADIS).

Report accuracy/data quality

This was aimed at looking at the accuracy of data at different levels of the health system. The plan was to compare data from registers to the report that the facitlity had submitted to the district for one month, Facilities report compared to the report that the district had submitted to the region, districts report compared to the report that the region had submitted to central. Howevere, due to time constraint and different reporting style of districts we stick our selves to data from registers to the report that the selected health health had submitted to their respective districts. The team counted and compared malaria and measles cases recorded in clinical and laboratory registrers at three health centers for the previous one month to the reports these facilities had submitted to their respective districts for that month. Fortunately there was no reported measles case in all visited health centers (table 3.1.3).

The registered and reported number of malaria cases in Semha and Quiha health centers was comparable and consistent in the assessed four weeks time. In Mekele health center the inconsistency and mismatch was observed in the same time period. Here Mekele health center

has shown a difference of 6(150%) and 11(220%) malaria cases in third and fourth weeks respectively (table 3.1.3).

Table 3.1.3 Number of malaria cases registered and reported to district/city health office of October month 2003 E.C

	Name of Health center					
	Semha H.center		Mekele H.center		Kuha H.center	
	No. of malaria cases in Register	No. of malaria cases in Facility reports	No. of malaria cases in Register	No. of malaria cases in Facility reports	No. of malaria cases in Register	No. of malaria cases in Facility reports
Week1	1	1	9	9	3	2
Week2	1	1	17	17	5	4
Week3	1	1	4	10	0	0
Week4	4	4	5	16	1	1

Discussion

Public health surveillance systems provide information for action against infectious disease threats and evaluating these systems is necessary to ensure that problems of public health importance are being monitored efficiently and effectively.

Standardized case definitions for diseases under surveillance are important for providing uniform criteria for reporting cases. This study found that the availability of standard case definitions including the community case definitions for malaria and measles in all assessed health facilities was 100%. Furthermore, all health facilities visited had clinical registers for recording cases. The rates reported from the present study are highly satisfactory and can play pivotal role for successful implementation of the surveillance system.The assessment also found that all visited sites had a mechanism to capture information on outbreaks from the community. This was mainly through extension health workers, community health workers and volunteers (locally called “Abo-Selasa”).

Regarding capacity to collect and transport specimens for measles and malaria no health facility and district surveyed had problems. Moreover, all health facilities visited had adequate diagnostic equipments and reagent to confirm malaria in the last 6 months preceeding the study. However, confirmation of measles infection is done at central level.

Health facilities are required to submit surveillance reports to districts weekly/immediately, depending on the disease type. And districts and regions submit surveillance reports to next higher level the same way. In routine situation, health facilities and districts submitt weekly and immediately surveillance reports to next level via hard copies whereas during emergencies they used telephone call as well. It is only the regional health bureau that used E-mail to send reports to central level implying that prompt communication is possible between region and central level. None of the sites visited had lacked appropriate weekly reporting forms, case investigation forms and linelisting forms.

Diseases surveillance strategy recommends that data collected should be analyzed, interpreted and used for action. This assessment revealed that no site visited implement surveillance data analysis. This reveals the lack of one of the primary objective of the diseases surveillance. Failure to do surveillance analysis at each level may attribute to less attention given to data analysis, don't know the importance of surveillance data analysis or the incomplete training of surveillance personnel at all levels on the analytic methods that should be performed which are very useful to recognize significant changes. Similarly, except the regional health bureau (only for measles), no site visited had epidemic threshold values for malaria and measles, implying low capacity of early detection of outbreaks in almost visited sites.

Though there was rapid response team in all the sites visited, in general, the epidemic preparedness was weak. Except at regional level, there was no epidemic preparedness and response plan and budget line for epidemic preparedness and response at district and health facility level. Morover, conducting outbreak investigation was very limited at all level.

In a well-functioning surveillance system, the national level routinely provides feedback to the lower level. Consequently, the district should provide feedback to the generators of data for the

system to function properly. This assessment depicted, Provision of feedback targated to diseases surveillance activites was a big problem at all levels (distirict, region and central) which inturn can result in lose of motivation of staff to work in surveillance activities.

Surveillance activities should frequently be supported by regular and purposeful supervisory support. If we don't condut supervision, we will not able to pointout problems that hinder the system to meet its objectives. In this assessment, no evidence of systematic and regular supervision targeted to surveillance was observed at all levels of the visited sites.

Despite the fact that all the sites visited had the national surveillance guide lines and case management protocols, it was doubtful whether health care providers and surveillance personnels are using these guide lines during implementation of surveillance activites.

Among the 6 surveillance focal persons interviewed, 5 were trained on diseases surveillance and basic epidemiology during the last one year prior to the study, however; they are not applying their skills and knowledge to make the surveillance effective in reducing diseases morbidity and mortality.

Material resources are imperative for successful implementation of surveillance activities. This assessment found that majorty (5/6) visited sites didn't have a stand alone vehicle/motorcycle (table 3.1.1) for surveillance but they used from other deparments within the sector when events insist them. Besides, majority (66.7%) of the sites visited didn't have computer for data anlaysis and management. The inavailability of the above mentioned material resources at most sites visited can grossly hamper the implementation surveillance activites.

Timeliness of reporting is a key performance measure of public health surveillance systems. Monitoting of timeliness of weekly surveillance reports at district level was absolutely impractical (districts didnot record the actual dates that reports were received); as a result, it was impossible to calculate timeliness of health facilities reporting to district at both surveyed districts. The failure to monitor timeliness of weekly surveillance report at district level may be attributed to lack of understanding of the importance of timeliness of reporting by surveillance focal person. On the other hand, monitoting of timeliness of weekly surveillance reports was

good at regional level. And the timeliness of districts reporting to region during the 3 months preceding the study was 90% which is an acceptable rate. Taking malaria surveillance report as proxy indicator, overall, completeness of health facilities reporting to districts, districts reporting to region during the 3 months preceding the study was above 85% (table 3.1.2) which is acceptable. However, the timeliness and completeness of reporting of the regional health bureau to central level was not evaluated.

In the present study, use of surveillance data for public health action and decision making was totally impractical at all health facilities and 1 surveyed district. The regional health bureau and mekelle health office surveillance persons responded that they used surveillance data for planning, intervention and priority setting even though evidence was scarce.

The simpilicity of surveillance system was assessed in terms of the ease of case definition, data collection and analysis, for malaria and measles. Majority of the respondens agreed that malaria and measles case definitions and data collection was simple but surveillance data analysis was found to be giant problemat all levels which might be attribute to lack of training or incomplete training of surveillance personnel at all levels on surveillance data analysis.

Acceptability of surveillance system is largely subjective attribute that encompasses the willingness of persons on whom the system depends to provide accurate, consistent, complete, and timely data. This study revealed, all but one of the respondents were satisfied with the surveillance of malaria and measles, implying that the acceptability of the surveillance systems was good.

Thorough surveillance data quality check was not possible at all levels due to shortage of time and different reporting styles between ditricts (hinders comparision). In the present study surveillance data quality check was limited to three selected health centers, and examined whether malaria cases recorded in patient registers in these health centers within four weeks preceding the study match with those reported to thier respective districts. In two of the health centers namely; Semha and Quiha health center malaria cases recored in the registers within four weeks time preceding the study were consistent and comparable to those reported to the districts. On the other hand, malaria cases reported to district during four weeks period prior to

the study exceeded to those recorded in registers at mekele health center. In all weekly malaria reports of the visited sites, missing of information was unusual (table 3.1.3).

There were several limitations in this study. Firstly, limited time prevented us from conducting thorough evaluation, particularly we failed to do data quality check at all levels, examine correct filling of clinical registers at health facilities and applying of standard case definition to identify case. Secondly, the number of sites included in the study was too small and sampling method we used can also lead to bias. Thirdly, the assessment tool used in this report might need further refinement and was not field tested. Findings of the health post visited were not included in this report as it was difficult for comparison. Lastly, some of attributes of surveillance like acceptability, and simplicity rely on personal view.

Conclusions

- ✓ The surveillance system becomes driven by the need to collect and move data while little attention is given to using the data at each level of the health service for decision-making.

- ✓ Over all, epidemic preparedness was poor at all leves.

- ✓ Surveillance data analysis, provision of feedback and supervision targeted to surveillance activites were extremely weak in almost visited sites.

- ✓ Monitoring of timeliness of reporting of surveillance reports was better at regional level than district level.

- ✓ Material resources for implementation of surveillance were highly scarce, especially; at district and health facility level.

- ✓ Some of the core activities of surveillance like case detection and registration, case confirmation and support function of surveillance, availability of case management and surveillance guide lines, attributes of surveillance particularly completeness, simplicity and acceptability were acceptable.

Recommendations

The goal of enhancing notifiable disease reporting at each level of the health care system is to produce a system that values information for its role in guiding decision making. Therefore the following were recommended based on the findings:

- ✓ Surveillance data analysis and interpretation needs due attention to guide public health action and decision making at all levels.
- ✓ Regular and continous supervison and feedback targeted to surveillance activites should be in place at all levels.
- ✓ For promt response to public health emergencies there shoul exist an emergency preparedness and response plan at all leves.
- ✓ Monitoring of timeliness and completeness of reporting of surveillance data needs improvement.
- ✓ Material resources imperative for implementation of surveillance should available at all levels all the time.
- ✓ Last but not least further study on performance surveillance system must be conducted across the region.

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Chapter 4 – Health Profile Description Report

4.1. Health profile assessment of Enderta district, Tigray Region of the year 2009/2010, Dec 2010

Background Information

Enderta district is found at South Eastern zone of Tigray. The capital of the district is based at Quiha town and located at 12 km East of Mekelle, the regional capital. The district is bordered with Abiala, a district of the Afar regional state in the East, Degua temben in the west, Wukro kilte awila-elo and Atsibi-wemberta in the south and Hintalo Wajirat and Samre seharti in the North. Administratively the district is divided in to 17 kebeles and was inhabited by 123,063 population in the year 2002 E.C. The estimated population growth rate is 2.5% per annual. Primary health service coverage accounts 85%.

Objective

To assess and describe health related issues about health status, health indicators and to identify problems for priority setting.

Methods

1. Existing records and reports in Endrta health office were reviewed
2. Concerned health office heads, experts, health professionals of multi-disciplinary character and experts of other sectoral offices (Education and Water) were interviewed
3. Observation of charts posted on the walls of the office for a list on top causes of morbidity, organizational structure (organogram) and others were evaluated.

District Health System (DHS)

A District Health System includes the interrelated elements in the district that contribute to health in homes, educational institutions, workplaces, public places and communities, as well as in the physical and psychosocial environment. A District Health System based on Primary Health Care (PHC) is a self-contained segment of the national health system. It includes all the relevant health care activities in the area, whether governmental or otherwise.

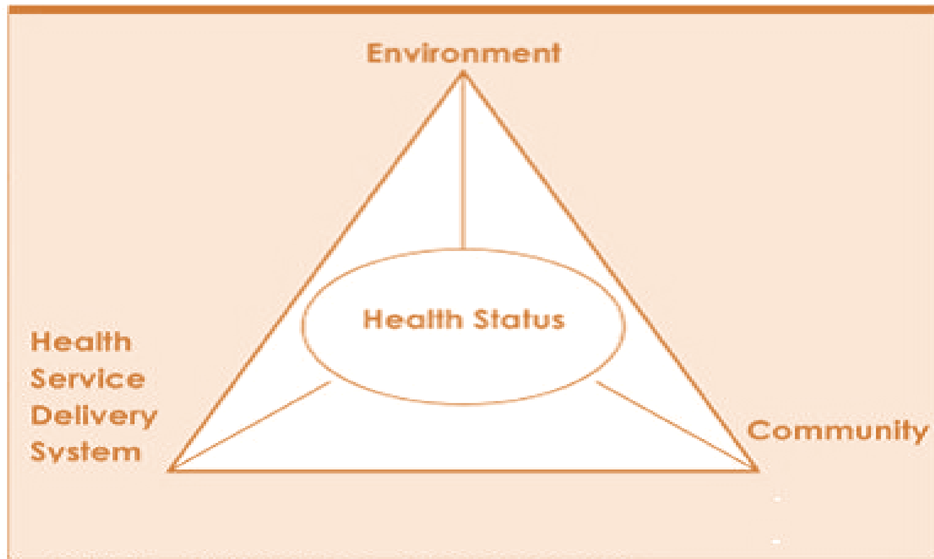

Figure 4.1.1 Interdependence of elements operating in a district health system

It includes self care and all health care personnel and facilities, whether governmental or non-governmental, up to and including the hospital at the first referral level and the appropriate support services (laboratory, diagnostic and logistic support). As the decentralized part of the national health system, the DHS represents a manageable unit, which can integrate health programs by allowing top-down and bottom-up planning and is capable of coordinating government and private sector efforts.

Following are the three main criteria for defining a District Health System unit:

- A clearly defined area with local administration and representation of different sectors;
- An area which can serve as a unit for decentralized inter-sectoral planning of health care; and

- A network of health facilities with referral support. The district is the basic administrative unit. The presence of district managers and supervisors led by the District health office head (DHOH) offers the opportunity to function as an effective team with support from the representatives of other sectors, Non-Government Organizations (NGOs), private sector as well as the community. In any health system, there are three important elements that are highly interdependent, namely: the community, the health service delivery system and the environment where the first two elements operate. Figure 1 above illustrates the interdependence of these elements.

Environment

This, for example, could be the context in which the health service delivery system operates. The contextual environment could be the political system, health-care policies and development policies. It could also include the socio-economic status or the physical environment, e.g. climatic conditions. All these elements have a bearing on the health status of the individual and the community, as well as the functioning of the health service delivery system.

Health Service Delivery System

This depicts how health facilities are distributed in the community, which could also have a bearing on coverage. Similarly, health services could be viewed in terms of their affordability and responsiveness to equity which contribute to the health status of the community.

Community

The characteristics of the society, such as culture, gender, beliefs and health-seeking behavior, together with the environment and health service delivery system, determine the health status. It is worth mentioning that information included in district health profiles takes into account the broader perspective of district health system.

Results

Enderta District had total population of 123,063 in 2002 EFY, of which about 50% were females, 3.5% under one children, 14.6% under five children, 43.7% under fifteen, 23.5% Women in childbearing (15-49 years), 3.8% pregnant women and 19.7% non pregnant women with an annual population growth of 2.5% (table 4.1.1)

Table 4.1.1 Demographic information of Enderta district in 2002 EFY, Tigray region

Demographic data	**Number/Percentage/Rate**
Total population • Female • Male	123,063 61,178 61,885
Annual population growth rate	2.5%
Average household size	4.4
Total households	27,969
Children <1 year	3.5% (4,366)
Children < 3 years	8.36%(10,288)
Children < 5 years	14.6%(17,967)
<15 years	43.7%(53,779)
Women in child bearing(15-49 years)	23.5% (28,920)
Pregnant women	3.8%(4,676)
Non-pregnant women	19.7% (24,243)

Kebeles like Shifta, Dergajen, Arato, Meseret and Lemlem were among the populious kebeles in the district (table 4.1.2)

Table 4.1.2 Population of Endetra district by kebele by 2002 EFY, Tigray Region

Kebele	Total population
Arato	9,864
Chelekot	5,811
Dergajen	10,211
May-alem	5,208
Meseret	8,752
Maygenet	5,100
Maytsedo	7,489
May-anbesa	6,501
Bebri	7,716
Didba	7,421
Felegemayat	4,656
Felegeselam	6,652
Shibta	10,455
Lemlem	8,489
Mahibere-genet	7,134
Mariamdehan	5,871
Mesebo	5,733
Total	**123,063**

Of the 17 kebeles 9 are malarious and about 58,442 of the population live in these kebeles (Table 4.1.3).

Table 4.1.3 Total malarious kebeles and population living in malarious areas in Enderta district

S.no	Kebele	Population
1	Chelekot	5,811
2	May-alem	5,208
3	Meseret	8,752
4	Maygenet	5,100
5	Didba	7,421
6	Felegemayat	4,656
7	Lemlem	8,489
8	Mahibere genet	7,134
9	Mariamdehan	5,871
	Total	**58,442**

District health system

The district health department is headed by a district health office head who is the manager of the district health system which comprises four case teams located in the health office running various programs. All are accountable to the head of the district health office. A health center management committee exists in each health center, the location of which is within the same setting. It has a health center head who manages three case teams some of which also have sub units managed under them.

Organogram

The organizational structure of district health office is given below:

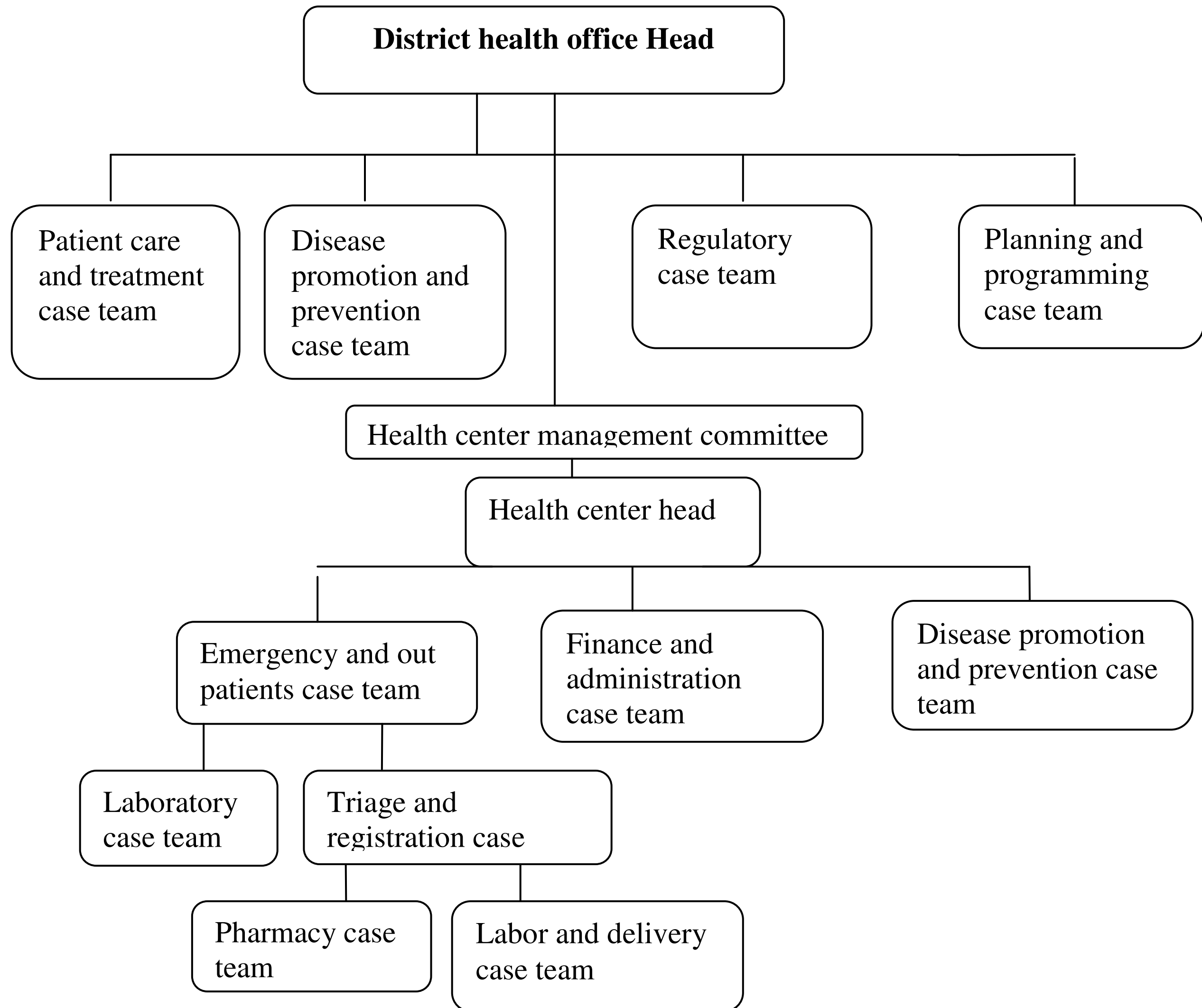

Figure 4.1.2 Organizational structure of District Health System, Tigray region

Health facilities

In 2002 EFY, the distric had 6 governmental health centers and 13 health posts and 1 private rural drug vender (Table 4.1.4).

Table 4.1.4 Number of health facilities in Endreta district by 2002 EFY

Type of health facility	Number		
	Gov	Private	NGO
Hospital	0	0	0
Health center	6	0	0
Clinic	0	0	0
Health post	13	0	0
Pharmacy	0	0	0
Drug shop	0	0	0
Rural drug vendor	0	1	0

The human resource distribution of Enderta district was composed of multi disciplinary professionals as shown in the table 4.1.5 which ranges from **3.8%** for mid wife nurses to **59.6%** for clinical nurses working in health centers (excluding Health extension workers, Community Health Agents and data clerks/managers) found within the district setting.

Table 4.1.5 Human resource under Endetrat district health office in 2002 EFY

Profession	Number
Midwife nurse	2
Clinical nurse	31
Lab technician/technologist	4
Pharmacy technician/pharmacist	4
Health officer	7
Environmental technician/officer	4
Health extension workers	36
CHAs	384
Data clerk/manager	1

From the table below (table 4.1.6) we can understand that health extension workers to population ratio look to be somewhat satisfactory compared to other professionals, especially for a medical Doctors whereby no one is present in such a huge number of population.

Table 4.1.6 Health staff to population ratio in Enderta district in 2002EFY

Doctor to population	**0:123,063**
Health officer to population	**1:20,511**
Nurse to population	**1:4558**
Health extension workers to population	**1:3418**

As to the standard set in the four tiers system one health post provides services, to 5000 people within its catchment. Here the population served by a health post is almost twice of what is expected and may demand two health posts for the intended services to continue smoothly.

Table 4.1.7 Health institutions to population ratio in Endetra district in 2002 EFY

Hospital to population	**0:123,063**
Health center to population	**1:20,510**
Health post to population	**1:9466.4**

Maternal and child health

a) Childhood immunization

In 2002 EFY the District had 6 static and 10 outreach sites for immunization. In this fiscal year the immunization coverage of eligible or target <1 children was 87.3% for BCG, 69.8% for measles, 92% for penta3 and 63.5% for fully immunized.

b) Maternal health

The antenatal care coverage by skilled health personnels and HEWs from plan was 24% and 33% respectively. However, the proportion of deliveries attended by skilled health personnels was 4%. The postnatal ca re coverage by skilled health personnels and HEWs from plan was 12% and 34% respectively. The contraceptive acceptance rate was 1bout 79.5%. The TT2

immunization coverage for pregnant and non-pregnant women was 46% and 77% respectively (table 4.1.8).

Table 4.1.8 Maternal health services delivered in Enderta district in 2002 EFY

Description	Number/percent
Antenatal care coverage by skilled health personnels	24%
Antenatal care coverage by HEWs	33%
Proportion of deliveries attended by skilled health personnels	4%
Deliveries attended by HEWs	202
Postnatal care coverage by skilled health personnels	12%
Postnatal care coverage by HEWs	34%
Family planning • Contraceptive acceptance rate	79.5%
TT2 pregnant	46%
TT2 non-pregnant	77%

Upper respiratory tract infections, diarrheal diseases and conjunctivitis were the first, second and third largest causes of outpatient morbidity in Enderta district in 2002 EFY (Table 4.1.9). However, there seems under reporting of data.

Table 4.1.9 Top ten causes of outpatient morbidity in Enderta district in 2002 EFY

Rank	Disease	Case	%
1	URTI	316	13
2	Diarrheal diseases	289	12
3	Conjunctivitis	269	11
4	Intestinal parasitosis	227	10
5	Other abdominal diseases	192	8
6	Common cold	164	7
7	Malaria	140	6
8	Gastritis	107	5
9	Skin diseases	95	4
10	Other skin diseases	76	3
	Total	**1,875**	

In 2002 EFY, the latrine and safe water supply coverage of Enderta district was 88% and 79.8% respectively (Table 4.1.10).

Table 4.1.10 Water and sanitation facilities in Enderta district in 2002 EFY

Description	Number/percent
Number of households with latrine	19,941
Number of households without latrine	3,900
Latrine coverage	88%
Number of kebeles accessed to safe water supply	14
Number of kebeles not accessed to safe water supply	03
Safe water supply coverage	79.8%

The ITNs coverage in the malarious kebeles was 100% and all malarious kebeles were covered with residual insecticide chemical spray. About 17,160 unit structures were covered by the spray. And the actual number of people living in sprayed unit structures was 44,924 (Table 4.1.11)

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Table 4.1.11 Malaria prevention and control activities of Enderta district in 2002 EFY

Description	Number/percent
Total number of households with at least two ITNs	**100%**
Total number of kebeles covered with residual insecticide chemical spray	**9**
Total number of unit structures sprayed with residual insecticide chemical spray	**17,160**
Number of people living in sprayed houses	**44,924**

Of 19 health facilities in Enderta district 13 health facilities (including HPs) provided VCT and only 6 health facilities provide PMTCT service in 2002 EFY. None of the facilities provided ART service (Table 4.1.12).

Table 4.1.12 HIV/AIDS services in Enderta district in 2002 EFY

Description	Number
Total number of health facilities	19
Total number of health facilities providing VCT service	6HCs and 7HPs
Total number of health facilities providing PMTCT service	6HCs
Total number of health facilities providing ART	0
Number of persons tested for HIV	34,536
Persons tested +ve	245
Number of PLWHA ever enrolled for ART	0
Number of PLWHA ever started on ART	0
Number of PLWHA ever currently on ART	0
Pregnant women tested for HIV	963
Pregnant women tested +ve	15
Number of HIV positive women receiving ARV prophylaxis	0
Number of HIV positive babies receiving ARV prophylaxis	0

In 2002 EFY Enderta district had 132 new cases of pulmonary tuberculosis with a cases detection rate of 78.6 (Table 4.1.13).

Table 4.1.13 Tuberculosis prevention and control performance in Enderta district in 2002 EFY

Description	Number/percent/rate
Number of patients registered	132
Case detection rate	78.6
Treatment success rate	15(no)
Treatment completion rate	102(no)
Cure rate	15(no)
Defaulter rate	1
Died	3
Failure	0

Socio-economic indicators

All health facilities in Enderta district have access to transport and communication. However, only 8 health facilities had access to electricity (Table 4.1.14).

Table 4.1.14 Health facilities with infrastructure in Enderta district in 2002 EFY

Health facility/office	**Number of health facilities with infrastructure**						**Remark**
	Road		**Electricity**		**Telephone**		
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	
Health center	6	0	5	0	6	0	
Health posts	13	0	3	10	13		
Health office	1	0	1	0	1	0	

Education

In 2002 EFY Enderta district had 65 elementary and 1 secondary schools with a total of 798 teachers. The district didn't have tertiary, vocational and any medical college (Table 4.1.15).

Table 4.1.15 Type and number of schools and number of teachers in Enderta district in 2002 EFY

Type of school	Number of schools	Number of teachers
Primary	65	786
Secondary	1	12
Tertiary	0	0
Vocational	0	0
Nursing school	0	0

Some international and local NGOs and UN organizations that provide support for the district health sector are indicated below (Table 4.1.16).

Table 4.1.16 Name of development and implementing partners collaborating with health sector in Enderta district, 2002 EFY

International	Local
UNICEF	REST
Save the children	Catholic
FAO	Redcross

The overall budget of Enderta district health sector in 2002 EFY was 2,498,699.47 ETB of which about 1,585,048.02 ETB was allocated for salary (Table 4.1.17). Often time no budget is allocated for specific programs by the local administration. Budget for specific programs like EPI, HIV/AIDS, TB/Leprosy, and hygiene and sanitation is provided by NGOs and UN organizations.

Table 4.1.17 Budget allocated for specific program/salary in Enderta district in 2002 EFY

Item	Amount in birr
Overall district health sector budget	2,498,699.47
Recurrent budget	
Salary	1,585,048.02
Malaria (particularly for spray)	41,771
EPI	Dat not available
HIV/AIDS prevention and control	Data not available
TB/Leprosy	0
Hygiene and sanitation	0
Drug supply	125,000
Any administration	
Capital budget	518,250

Priorities identified

The prioritization was on the basis of the team's personal view. Accordingly the following problems were distinguished as top prioritites.

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

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

3. 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.

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

Acknowledgments

We would kindly express our gratitude to all staff of Enderta district health office for their sincere cooperation in providing the required data for our assessment of the profile. We also thank Dr. Zegeye for facilitating the assessment to be accomplished very soon. Again we thank Dr. Adamu Addisie (Academic coordinator of Field Epidemiology Training Program) for he shared us the checklist for the work of this profile assessment which gave us a guide on how to be carried out. Dr. Richard luice (Resident Advisor of Field Epidemiology Training Program) is given many thanks on his technical advice on the works of the document. Ethiopian public health association is also given great full thanks in financing the field works.

Chapter 5– Abstracts for Scientific Presentation

5.1. Outbreak of Pandemic Influenza A (H1N1) — Illu Aba Bora Zone, Oromia Regional State, Ethiopia, November 2010

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Abstract

Background: In November 2010 an outbreak of acute influenza-like illness was reported among inmates housed in a prison near Gore town, Illu Aba Bora zone in Oromia region. The outbreak quickly spread to the wider community. A team from EHNRI was dispatched to verify the existence of outbreak, determine the etiology and assist in control and prevention activities.

Methods: Patient registers were reviewed from the health facilities to gather clinical and epidemiological information about suspected cases. Throat swabs from acutely ill patients with influenza-like illness were obtained from 22 individuals at 4 sites in different districts within Illu Aba Bora zone (Alle, Chora, Bedelle and Didesa). The selected sites were Gore prison (N=5), Abdella clinic (N=9), Bedelle health center (N=4) and Denbi health center (N=4). Specimens were stored and transported under refrigerated conditions until laboratory testing was conducted to detect influenza A, influenza B and different influenza A subtypes: seasonal A/H1, seasonal A/H3, swine influenza A and swine H1 [pandemic influenza A(H1N1) 2009]. Quantitative data were entered and analyzed using Microsoft office-excel and the qualitative data were narrated.

Results: From 28 October to 5 November 2010, 86 patients (79 prisoners from Gore prison camp and 7 residents of Gore town) presented with acute influenza-like illness at Gore health center. Patients' ages ranged from 2-56 years, with a median of 28 years. All reported fever and cough. The clinical attack rate among prisoners was 53% (79 out of 150 prisoners). No deaths were recorded. No pandemic influenza vaccination had been previously administered in Illu Aba Bora zone. Sixteen of 22 (73%) of the individuals sampled were positive for pandemic influenza A (H1N1) 2009 virus; none were positive for seasonal influenza viruses.

Conclusion: A laboratory-confirmed outbreak of pandemic influenza A (H1N1) 2009 was identified in 4 districts of Illu Aba Bora zone in Oromia Region; however, neither the source of introduction nor the index case could be identified. The outbreak demonstrated the difficulty in reporting an immediately notifiable disease that cannot be distinguished from any other acute respiratory illness based on clinical features alone. Laboratory-based surveillance for *any* influenza-like illness or severe acute respiratory illness (ILI/SARI surveillance) is necessary to conclusively determine etiology in outbreaks of respiratory disease.

Key words: pandemic influenza A (H1N1) 2009, influenza-like illness outbreak, Illu Aba Bora Zone, Oromia regional state, Ethiopia

Chapter 6 – Narrative Summary of Disaster Situation Visited

6.1. ' Belg' Pasteural / Agro-Pasteural Public Health and Nutrition emergency need assessment, Afar Region, *21 June-09 July 2010*

Executive Summary

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

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

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

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

SECTION I. ASSESSMENT OF PUBLIC HEALTH AND NUTRITION EMERGENCY SITUATION

Introduction

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

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

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

Regional Background Information

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

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

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

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

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

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

Purpose and Objectives of the Assessment

The overall purpose of the assessment process was to contribute and ensure appropriate and effective humanitarian planning and responses, which will lead to reduce morbidity, mortality and acute malnutrition in the most vulnerable areas of the region.

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

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

Methods

The Belg (Sugum) Public Health and Nutrition emergency need assessment has been conducted in 22 selected hotspot Districts of all Zones of Afar region from 21 June 2010 to 09 July 2010. Existing records and reports were reviewed to obtain data on leading causes of morbidities and mortalities, health human resources, immunization and ITN coverage epidemic prone diseases, malnutrition, current stocks emergency drugs and medical supplies using data collection checklists. Formal interviews was made with District officials and health professionals to obtain in-depth understanding about major health problems, occurrence, distribution, and duration of the disease outbreaks, current preparedness status, and response capacities.

Key Findings

Disease burden

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

Acute Watery Diarrhea (AWD)

Since 2006, a cumulative total of 17,179 suspected AWD cases and 353 deaths with cumulative CFR 2.05% have been reported from 22 Districts of Afar region. About 52% of the cases and 43% of deaths were reported in 2007, followed by in 2009 (6583 cases). Majority (89.7%) of the cases were reported from zone one and three (Figure 6.1. 1) with small to large sale investment farms, mainly from Amibara, Gawane, Buremudaitu, Asayita, Dubti and Elidar Districts.

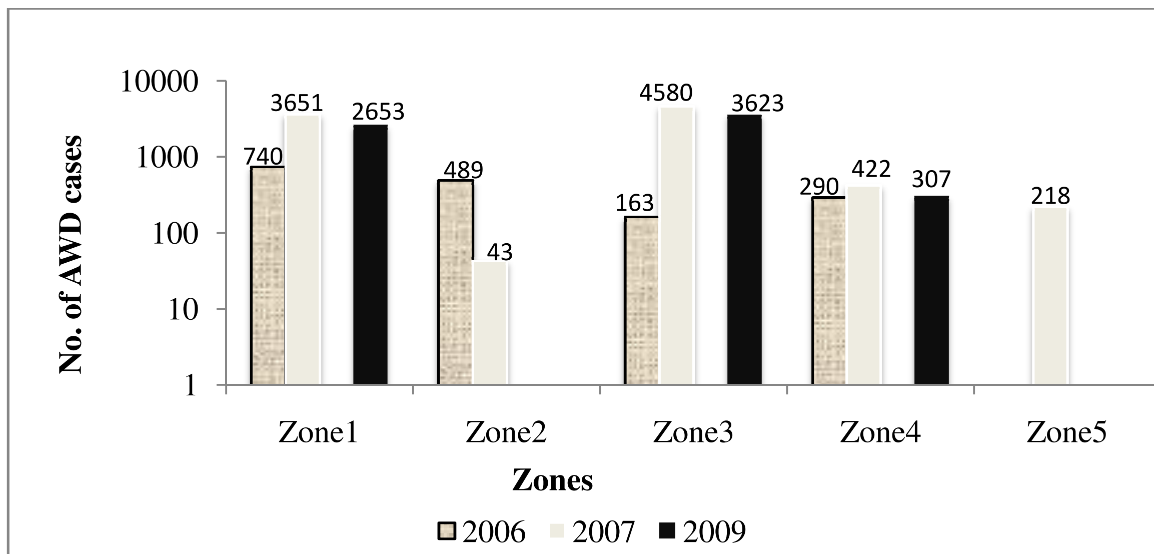

Figure 6.1.1 Distribution of AWD cases by zone, 2006-2009, Afar Region

In 2009, the outbreak period extended for nine months (Figure 6.1.2). The peak month of AWD outbreak was in June 2009 with slow declining trend and interrupted in December. Review of previous assessment reports and observation current situation WASH service coverage have

shown that, the main risk factor for spread of AWD outbreak were shortage safe drinking water and poor hygiene practices which further aggravated by the massive labour migrant population movement and lack of awareness on contagiousness of the disease.

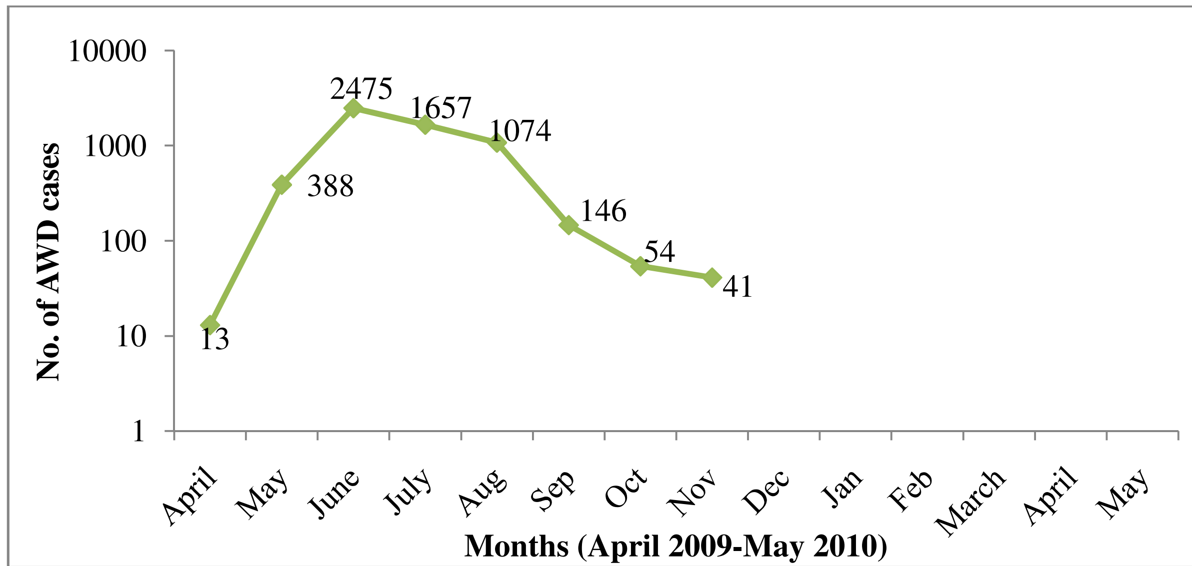

Figure 6.1.2 Monthly distribution of reported AWD cases (April 2009-May 2010), Afar Region, July 2010

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

There was increasing trends of CFR over the past four years. The annual cumulative CFR rate was 1.05% in 2006 and increased to 1.7%, 2.6% and 2.8% for 2007, 2008 and 2009, respectively. The reason behind an increase of rate of fatality might be associated with late treatment seeking of infected cases, which might arise from inadequate awareness about contagiousness of AWD, poor quality of case management as a result of low knowledge and skills from the side of health care providers. However, currently there is no ongoing AWD outbreak in all hot spot Districts of the region.

Measles

Measles is one of the vaccine preventable diseases that have been repeatedly reported in epidemic proportion in the region. In 2008, six Districts reported measles outbreak and in 2009 10 Districts reported outbreak. A cumulative total of 494 suspected cases of measles have been reported in 2008 and 2009. Majority (54.7%) of the cases were from zone 4 followed by zone one (23%), and the remaining cases were from zone two and zone five of the region (Figure 6.1 3). Among the reported cases, 45 of them were reported since September 2009 from zone 1, 2, 3 and 4.

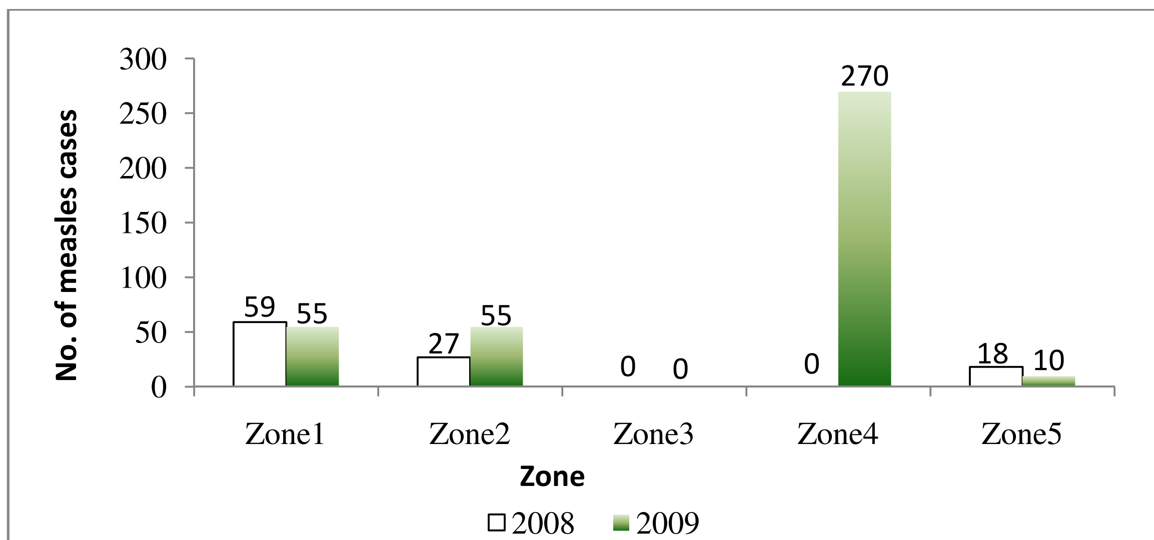

Figure 6.1.3 Reported Measles cases by zone 2008-2009, Afar Region

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

Malaria

Malaria is the top leading causes of morbidity in the region in general and currently assessed Districts in particular. Even though cases were reported throughout the year from all zones, case

load varies from zone to zone. A total of 99,867 cases of malaria were reported from the visited Districts in the last nine months. Majority of the cases (45780 cases, 45.8%) were reported from zone 3 followed by zone 5 (22230 cases, 22.3%) and zone 1 (11940 cases, 12%).

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

Monthly distribution of malaria cases varies from zone to zone. There was a fluctuation in the monthly distribution of malaria cases over the past nine months (Fig 6.1.4) characterized by an increase in the number of cases from September to November 2009, and following the same trend in January and February 2010.

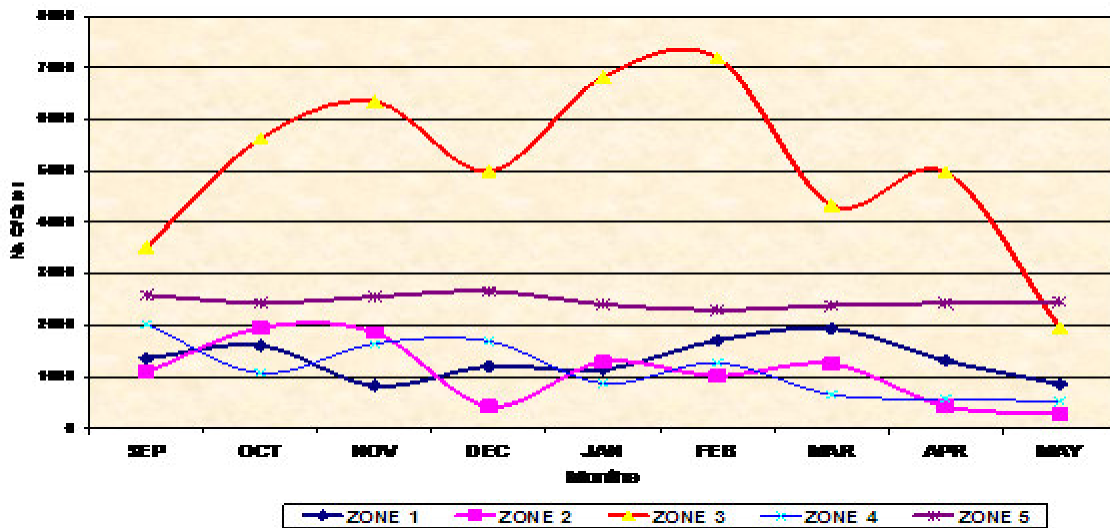

Figure 6.1.4 Monthly Malaria cases by zone, (Sep2009-May 2010), Afar Region

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

The Status of EPI Program

Immunization against childhood killer diseases reduces outbreaks of vaccine preventable diseases including measles. As shown in Figure 5, the overall vaccination coverage in the year 2001 EFY was very low (Penta3 = 56.4% and measles = 70.1%). Compared to others, zone one achieved better coverage and very low in zone 2 of the region. In general, the current coverage level does not provide adequate protection for non-immune children against measles outbreak. Therefore, intensifying routine immunization, conducting supplementary immunization, monitoring of outbreaks and strengthening of outbreak response were indicated.

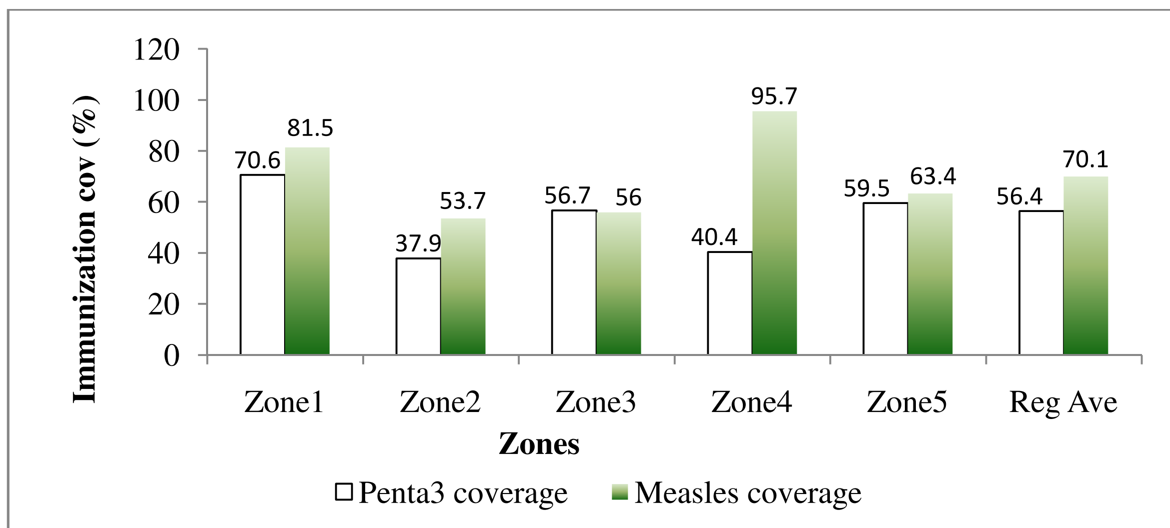

Figure 6.1.5 Measles and penta3 immunization coverage by zone, Afar Region

Preparedness and Response Capacity of the Region

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

Availability of contingency drugs, medical supplies, logistics and budget have an effect on the effectiveness of outbreak control/response actions. Reviews of the Districts' drugs and supply

stocks have shown that, there was no emergency stock to respond to outbreaks of epidemic prone diseases. Shortage of life saving emergency drugs and medical supplies for management of AWD, Measles complication, Malaria and meningitis out breaks were common problems across all the assessed Districts.

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

Table 6.1.1 Distribution of health workers by professional category in selected districts, Afar Region, July 2010

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

Note: ND = no data

Malnutrition Situation

Malnutrition is one of the leading causes of health problem in the region. In addition, District health offices have reported that, health facilities used to diagnose some cases of malnutrition at outpatient department (OPD) and refer to hospitals. According to the data from the visited District health offices, Since January 2010, a total of 1129 SAM cases were registered by Asayita (147 cases), Gawane (247 cases), Amibara (460 cases), Dulecha (21 cases), Dalol (254 cases) Districts. Currently, nutrition interventions are ongoing in Gawane, Amibara and

Dulecha Districts by humanitarian partners such as CARE Ethiopia, in Bidu and Kori Districts by Mobile Health team with the support of UNICEF. Limited data precluded the team to come up with detail description of the magnitude and future prospects of malnutrition in the region.

Conclusions

- In 2009, 11 Districts have been affected by AWD and 10 Districts affected by Measles outbreaks with corresponding case load of 6583 and 3921 cases, respectively. The outbreak extended for consecutive nine months from April to Dec2009 with high case load in June, July, August months. Two hundred and forty-one cases of AWD and 45 measles cases were reported in the last four months of 2009.
- Increased trends of malaria case from September to November in 2009 and January to March months of 2010 in zone 2, 3 and 4; relatively high case load has been observed in zone 3 followed by zone 5 of the region.
- Low immunization coverage ($Penta_3$ = 56.4% and Measles = 70.18%)
- Malnutrition was also a prevailing and seems acute in three of the visited Districts in the region.
- Shortage emergency drugs, medical supplies, trained health workers and contingency budget.
- Weak multi-sectoral coordination at District level

Limitaions

The findings of this report didn't include the report of WASH and food assessment as the teams assigned to assess WASH and food delayed to collect data and write report.

Risk Factor Analysis

Table 6.1.2 Health and nutrition emergencies likely to occur, observed immediate risk factors and population at risk in Afar Region, July 2010

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

Possible Hazards and Recommended Emergency Response Actions

Table 6.1.3 Emergency responses for possible public halth hazards

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

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

Section II: Regional Health Public Health Emergency Prepardness and Response Contingency Plan

General

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

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

AWD Outbreak Response

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

The AWD prevention and response plan encompasses activities such as provision of items for early detection and reporting, prevention of spread of the outbreak, as well as essential drugs, medical supplies, CTC kits, strengthening case management, infection prevention, surveillance

system, capacity building and coordination in most at risk Districts at an estimated cost of ETB 5,115,515.00 and about 24,160 at risk population will be benefited.

Measles Outbreak Response

Child malnutrition and inadequate/low measles immunization coverage were identified to be some of the risk factors that increase the likelihood of occurrence of measles outbreak in the region. Four zones have been experienced outbreaks of measles in the past 2008, and 2009. The outbreaks have affected mainly children under-five years followed by 5-14 years and above 15 years, with an attack rate of 2%. About 13,658 measles cases are likely to occur in 22 hot spot Districts of the region. To interrupt the occurrence and distribution of measles outbreak in at risk Districts, and to reduce its undesirable outcome, the plan addressed focal supplementary measles immunization, provision of drugs and supplies for measles case management, improving technical capacity of the health workers on case detection, confirmation, reporting in an integrated manner with other outbreak prone diseases such as meningitis and malaria. A total of 13,658 measles cases and 696,989 children aged 6 month to 14 years will be benefited from the case management services and supplementary immunization, respectively, with an estimated cost of 720,891.00 ETB.

Meningitis Outbreak Response

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

Malaria outbreak Response

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

Table 6.1.4 Summary of public health emergency response requirements

Intervention areas	Activities	Number of Beneficiaries	Requirements in Birr	Remarks
AWD case management and infection prevention	Improve quality of AWD case management and infection prevention through prompt provision of drugs and medical supplies	24,160	5,115,515.00	
Malaria outbreak prevention and response	Improve quality of malaria case management through prompt provision of drugs and medical supplies	31,682	3,308,626.00	
Measles outbreak prevention and response	Improve quality of measles case management through prompt provision of drugs and medical supplies Improve immune status of highly at risk population groups (children 6 month – 14 years)	13,658 696,989	720,891.00	Cost of measles Vaccine, AD syringe and safety box not included
Meningitis outbreak prevention and response	Improve quality of meningitis case management through prompt provision of drugs and medical supplies Improve immune status of highly at risk population groups (population age 2 -70 years)	4,654 1,108,845	1,309,023.00	Cost of Meningitis Vaccine, AD syringe and safety box not included
Strengthening inter-sectoral coordination	Organize monthly multi-sector and inter-regional coordination meetings	-	64,470.00	
Strengthening of the	Provision of capacity building trainings on AWD case management and infection	-	553,350.00	

Health system	prevention, PHEM, Communication and community mobilization, and reporting			
Community capacity building	Intensify health education in native community and labor workers to increase awareness on prevention and control of epidemic diseases using multiple media	-	42,000.00	
Strengthen IDSR system	Procure and provide communication (Radio) to 8 remote Districts and surveillance data management equipment To 21 hot spot Districts	Hot spot Districts	510,000.00	
Total			11,623,875.00	

Total Cost = USD 860,390.00, (USD1 = ETB13.51)

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Chapter 7 – Protocol/Proposal for Epidemiologic Research Project

7.1. Assessing immunization data quality from routine reports in Assosa district, Benishangul Gumuz region, 2010

Summary

Background: Immunization is an important means of controlling diseases and has been considered as one of the most cost effective health intervention. Worldwide, administrative data tend to be the primary source used by health information systems to estimate immunization coverage and to guide decision-makers and Expanded Program on Immunization (EPI) managers in planning and monitoring immunization programs and assessing their performance. Worldwide immunization coverage shows an increase in the past years but the validity of the official reports for measuring change over time has been questioned. Accurate immunization information is essential for EPI managers to track and improve program performance.

Objective: The aim of the study is to assess immunization data quality from routine reports in Assosa district; Benishangul Gumuz region.

Methods: The study will be conducted in Assosa district, Benishangul Gumuz region from July 2010 through Jan 2011. Facility and district based retrospective descriptive study design which will be complemented by qualitative method will be employed to undertake the study. The sample size for the study will include district health office, 2 health centers and 50% (15) of health posts. Both quantitative and qualitative approaches will be used to collect data. The quantitative data will be collected through pretested check list. The qualitative data will be collected through semi-structured tool guided interview. Quantitative data (tally sheets, facility and district reports) will be entered into SPSS version15 and analyzed. Frequencies and cross-tabulations will be computed between the different sources of data. Qualitative data will be analyzed using thematic/ content analysis by creating themes based on the interview guide.

Work plan and budget break down: The study will be conducted from July2010 -Jan 2011. Data collection will take place on December, 2010. Data analysis and writing up report will be carried out on January, 2010 and about **28,835.00** Eth. Birr is needed to accomplish the project.

Introduction

Background:

Immunization is an important means of controlling diseases and has been considered as one of the most cost effective health intervention [1]. Immunization is provided in most countries through the Expanded Program on Immunization (EPI) and as a part of the primary health care approach. Different approaches are used to enhance immunization coverage such as fixed vaccination posts, outreach services, mobile and national immunization days [2].

Worldwide, administrative data tend to be the primary source used by health information systems to estimate immunization coverage and to guide decision-makers and Expanded Programme on Immunization (EPI) managers in planning and monitoring immunization programmes and assessing their performance. They are also the primary source used by national authorities to fill in the WHO/UNICEF joint reporting forms (JRF) on vaccine-preventable diseases, a major source of information on global coverage and immunization systems performance [3].

The Ethiopian EPI program was launched in 1980, with the objective of achieving 100% immunization coverage of all children under two by 1990. However, in 1986, the coverage target was reviewed to 75% and the target age group was changed to under one but progress in increasing coverage has been slow [4, 5]. With the introduction of new approaches known as Reaching Every Districts (RED) and sustainable outreach services (SOS) for immunization in 2003, improvement has been documented [5].

Statement of the problem

Worldwide immunization coverage shows an increase in the past years but the validity of the official reports for measuring change over time has been questioned [6,7]. For example, the World Health Organization (WHO) experts showed that there was a tendency to overstate the number of fully immunized children against vaccine preventable diseases [6, 8].

There has been growing concern about the reliability of health information based on the reports from the service facilities. Several efforts have been made to develop appropriate health information systems to generate accurate statistics from the service provision

levels [9-11]. However, inaccurate reporting from the service facilities is observed in many countries.

In the WHO document *EPI Information System Global Summary*, September 1998, a featured article analyzed six routine child immunization coverage estimates, reported from 217 countries, and examined the consistency and reliability of the reported values over the period 1991 to 1996. Although not exhaustive or definitive in detecting inaccuracies, the analysis identified 30% of the reported values as "outliers". This magnitude of potential inaccuracy, combined with the fact that 24% of the expected 6000 reports were missing, indicates that the quality of country immunization coverage estimates does need to be assessed in more detail [12].

Similarly, Ethiopia is also suffering from reporting problems elsewhere. Therefore, the purpose of the study is to assess the quality of the immunization data from routine reports in Assosa district. Since accurate immunization information is essential for EPI managers to track and improve program performance. The findings of this study will assist EPI managers to understand the problems associated with immunization data quality in routine reports and used as an input to improve some areas of the program in the future. Besides, the findings of this study will serve as baseline information.

Literature review

Data that are recorded accurately at the facility level should correspond to data reported at the district level. Study carried out in Mozambique in one district (Cuamba) in Niassa Province showed that differences were found for all vaccine types when comparing facility report with the tally sheets. Most of the facility reports showed higher values compared with the tally sheets. For example, for BCG, the values ranged from 224% higher to 7% lower and the average was 44% higher whereas for DTP+HepB, they ranged from 474% higher to 19% lower with an average of 95% higher. For measles they ranged from 268% higher to 8% lower and the average was 72% higher for facility reports when compared with the tally sheets. Again the study showed that number of all vaccines types were different in three sets of data when comparing tally sheets, facility reports and district reports. The vaccines reported by the health facilities showed an increase averaging 7% for all vaccine types compared to the tally sheets. Differences were also seen between the numbers of vaccines from the facility reports when compared with the district

reports. These changes were 0.4% for BCG and 2.8% for measles, whereas the DPT+HepB showed a decrease of 0.5% [13].

Overestimation of immunization coverage by administrative data has also been reported in Burkina Faso [14] and Cameroon [15], as well as in a sample of case study countries including Uganda, India and the Philippines [16], while administrative data have underestimated coverage rates in surveys done in Panama [17] and Zimbabwe [18].

In Nepal there were some indications of inaccuracy of national immunization coverage based on the reports from the PHCSOs and DHO. According to the reports, 632,000 children below 12 months of age received BCG in 1989; the corresponding number was 610,000 in 1990 and 572,000 in 1991. However, a census report showed that the number of children below 12 months of age in 1991 was 565,000 [19]. The number of children of this age was probably less in the previous years. If the reported immunization Figures are applied to the population from census data, immunization coverage with BCG exceeds 100% in 199. Similar Figures are found for all vaccine types in this year.

Several studies have reported inconsistencies in data reporting as well as poor support mechanisms to ensure data quality at the district level [20-22]. For example a study done in Nepal found that data obtained from the facility registers were lower than the data reported at the district level; showing a tendency of over-reporting to the higher levels [23]. Similarly, in a quality data audit (DQA) of forty-one low income countries, Xavier et al. demonstrated that most frequent weaknesses in most information systems are inconsistency of data recording, late reporting and lack of feedback in relation to data recording and reporting performance [24]. Furthermore, other studies showed that errors in reporting were due to lack of supervision and feedback from the superior levels as well as inadequate incentives to health workers [20, 21].

The study in Mozambique; Cuamba district showed that health workers received supervision visits at intervals of less than 3 months. A routine practice during supervision visits was data quality assessment for the outpatient services but none related to data consistency between the tally sheets and the facility report. For the EPI, supervisors concentrated more on the consistency checks between data in the facility reports and the number of vaccines received during the same

period. It was also said that supervisors were looking for miscalculations in the rows and columns of the facility report. Feedback mechanism was rare [13].

The study carried out in Pakistan, Lahore district have clearly demonstrated that though community health workers have appropriate level of knowledge about the reporting instruments, however due to lack of feedback, data recording exercise is considered as worthless task by these health workers [25].

Objectives

General objective

- Assessment of immunization data quality from routine reports in assosa district, Benishangul Gumuz region,from July 2010-Jan 2011

Specific objectives

- To examine the level of consistency of immunization data among different sources (tally sheet /registration, facility, and district reports) within the district
- To identify or characterize the existing support mechanisms to ensure data quality on immunization in the district.
- To examine views /perceptions of health workers and/ or health care managers towards data quality related to EPI in the district/facility.

Methods

Study area and period

The study will be conducted in Assosa district, Benishangul Gumuz region from July2010-Jan2011. The district is located at 687Km from Addis Ababa. It is one of the most populous districts in the region. According to the National 2007 census the district has a total population of 87,366. Administratively the district is divided into 74 kebeles [26]. It comprises of 33 public health facilities of which 31 are health posts (HPs), and 2 health centers (HCs). All except one health post provide static immunization service. The immunization coverage of the district in the year 2002 E.C. was Measles 68% and Penta3 92% [27].

Study design

Facility and district based retrospective descriptive study design which will be complemented by qualitative method will be employed to undertake the study.

Study population and study participants

The study population of the survey will be all public health facilities of the district that were providing immunization service from the period July2009-June 2010 and still providing the service, and district health office. The study subjects will be those geographically accessible selected public health facilities providing EPI service during the survey and the district health office.

Inclusion criteria:

Geographically accessible public health facilities that were providing EPI service from July2009-June 2010 and still providing the service will be eligible for the study.

Exclusion criteria:

Public health facilities started provision of EPI service after June 2010, facilities found in geographically inaccessible areas, and non functional facilities during the survey will not be part of the study.

Sample size and sampling procedure

The sample size for the study will include district health office, 2 health centers and 50% (15) of health posts. The selection of health posts will be made on convenience basis, taking time and transport constraints into consideration. At facility level one respondent from each facility working on EPI present during the survey period and at district level the district EPI coordinator will be purposefully selected for the study.

Data collection procedures

Both quantitative and qualitative approaches will be used to collect data. The quantitative data will be collected from three different sources: tally sheets/registration, facility and district reports from July2009-June 2010 through pretested check list. The immunizations to be assessed will be BCG, the third dose of DTP-HepB+Hib, the three doses of Polio, measles vaccine and fully immunized in children less than one year of age. The qualitative data will be gathered through semi-structured interview guide with health workers from the selected health facilities and the district EPI coordinator regarding the support mechanisms to ensure immunization data quality (about supervision visits, and feedback) and their perception towards data quality.

Data analysis procedures

Quantitative data (tally sheets, facility and district reports) will be entered into SPSS version15 and analyzed. Frequencies and cross-tabulations will be computed between the different sources of data. Qualitative data will be analyzed using thematic/ content analysis by creating themes based on the interview guide.

Data quality Management

The questionnaire to collect qualitative data from health workers and district EPI coordinator will be translated from English to Amharic. Data collection tools will be pretested outside the study area. Necessary changes in the tools will be made accordingly.

To assure the quality of the data, data collectors and supervisors will be trained. Every day; all of the collected data will be reviewed and checked for completeness and relevance by the supervisors and principal investigator. Data cleaning will be done by running frequency of variables using SPSS version 15 for windows by the principal investigator.

Operational Definitions

Immunization: antigens administered in children less than one year age (BCG, Penta3, OPV3 and measles)

Data quality: the accuracy of administered data across the three different sources (tally sheets/registration, facility and district reports)

Supervision: it is the process of directing and supporting staff to enhance the performance of the health care providers leading to the improved health services.

Tally sheet: are forms on which health workers make every time they administer a dose of vaccine and it is a basis for monitoring and reporting.

Facility: health institution (health post, health center etc) that provide health services to the community.

Variables:

4.9.1. Dependent variable:

- ✓ level of consistency of immunization data

4.9.2. Independent variables:

- ✓ Support mechanisms to ensure immunization data quality,
- ✓ Perception of health workers/ health care mangers towards immunization data quality

Ethical consideration

Ethical approval will be obtained from institutional review board of Addis Ababa University, College of Health Sciences. The Benishangul Gumuz regional health bureau will give permission and write a letter to the district and respective health institutions. Then, study permit will be granted from the district and each health institution in accordance with the letter from the regional health bureau. Verbal consent will be asked from each informant prior to the interviews and data will be collected anonymously to ensure confidentiality. Informants will be assured that the data will be handled exclusively by the investigators and no one will be able to recognize them in the report. Full informed consent will be obtained from all participants with each method of data collection.

Dissemination of results

The findings of this study will preliminarily be submitted to school of public health; Addis Ababa University. Moreover, it will also be submitted to Benishangul Gumuz regional health

bureau, and Assosa district health office to be used as an input to improve some areas of the program in the future.

Tentative work plan

Table 7.1.1 Work plan for assessing immunization data quality from routine reports in Assosa district, Benishangul Gumuz region, 2010

	Activities	Time frame							
		July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
1	proposal writing								
2	Proposal review or revise								
3	Final proposal submission								
4	Securing ethical clearance and support letter								
5	Provision of training to data collectors								
6	Pre test and finalizing of tools								
7	Data collection								
	Data entry and cleaning								
8	Analysis & Interpretation								
9	Report writing and submission								
10	Disseination of the evidence								

Budget break down

Table 7.1.2 Costs estimated for assessing immunization data quality from routine reports in Assosa district, Benishangul Gumuz region, 2010

Personnel Cost					
Title	**Qualification**	**Quantity**	**Rate**	**Duration of work**	**Total (ETB)**
Data collectors training	B.Sc. & Dip. Health workers	3	150.00	2	900.00
Data collectors	B.Sc. & Dip. Health workers	3	150.00	15	6,750.00
Supervisors	B.Sc. health workers	1	200.00	15	3,000.00
Principal investigator	EFELTP Resident	1	200	20	4,000.00
Sub total					**14,650.00**
Equipment and supplies					
	Item	**Unit**	**U. price**	**Quantity**	**Total**
Stationary materials	A-4 paper	Pack	70.00	1	70.00
	CD	Each	15	5	75.00
	Pen	Each	2.00	5	10.00
	Pencil	Each	1.00	5	5.00
	Sharper	Each	5.00	5	25.00
	Clip board	Each	20.00	5	100.00
	Bag	Each	350	1	350
	Mobile card	Each	100.00	3	300.00
Print,binding &Photocopy	Questionnaire	Each	5.00	200	1000.00
	Report	Each	50.00	5	250.00
Sub total					**2,185**
Transport	Fuel	Littre	15.00	*Addis- Assosa round trip =900kmx2=1,800 km Within the district for data collection = 1,200 km Subtotal = 3,000 km Total km =3,000 km/5x15birr	9,000.00
	Driver	Person	150.00	20	3,000.00
Subtotal					**12,000.00**
Total cost					**28,835.00**

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Chapter 8 – Other Additional Output Reports

8.1. Acute Watery Diarrhea outbreak response supportive supervision in Oromia Region, West Harage Zone, August 2009

Introduction

West Hararge zone is one of the Oromia regional government zones located in the eastern part of the country. West Hararge has 13 districts. Oromifa is the official language. More than 80% of the population residing in the rural area and are farmers producing Maize, Sorghum, Chat and other cash crop products. Some districts population are considered to be pastoralist like miesso district.

West Harerge has been affected with AWD recently with index case from one of the districts called Guba qoricha on 11/11/2001 E.C. After two days, cases were reported from the nearby district called Mieeso and later on three additional districts reported cases. From the start of the outbreak the District with the Zonal EPR coordination body started to respond accordingly. Twenty eight Kebeles (16%) in Five affected districts namely Mieso, Guba Koricha Chiro, Anchar, Gemechis were affected.

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

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

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

Objectives

- To assess the outbreak response and provide technical support in the control of the outbreak
- To assess the extent of AWD outbreak in West Harerge zone

Methods

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

Findings

Surveillance and Case Management

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

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

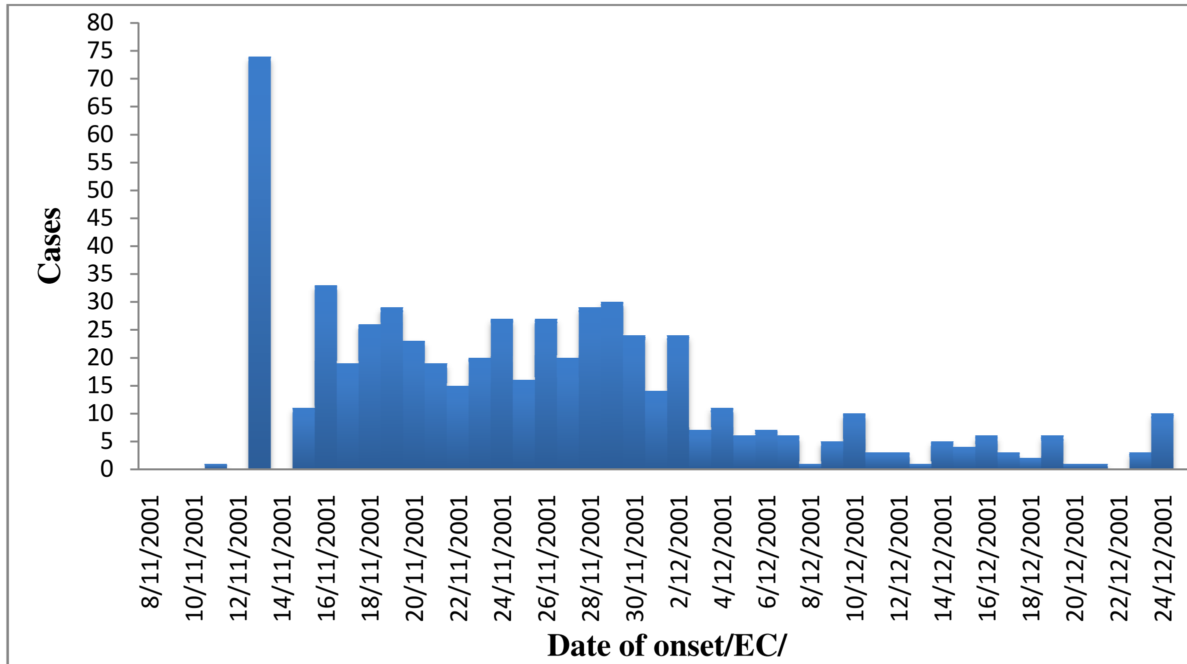

Figure 8.1.1 Epicurve curve of AWD outbreak in W/Hararge Zone Oromia region 18 July-31 August 2009

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

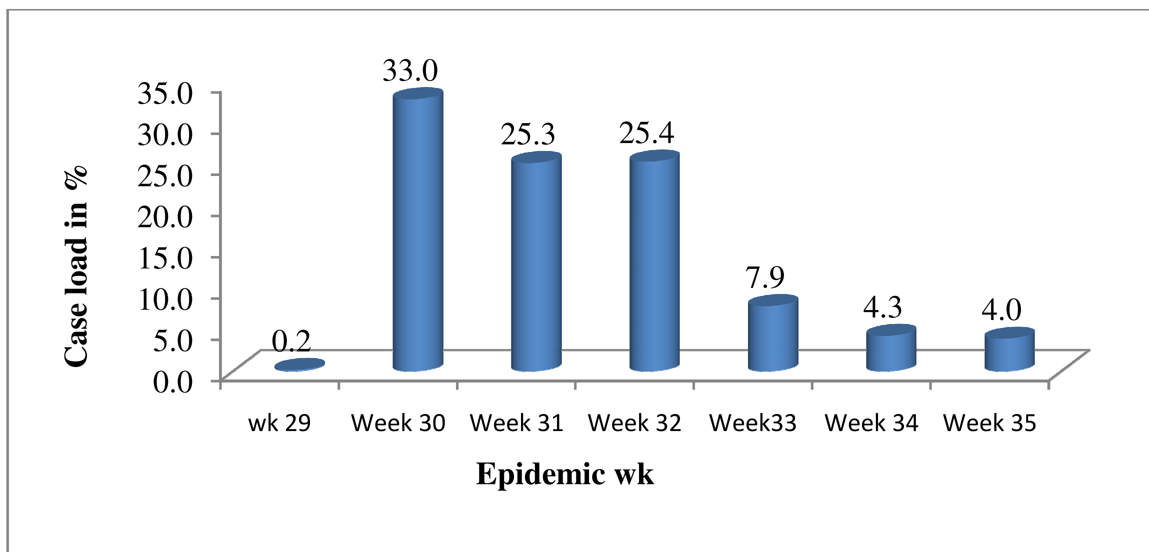

Figure 8.1.2 Weekly AWD case load in W/Harage Zone Oromia Region wk29-35, 2009

From the start of the outbreak (11/11/2001 E.C.) until 25/12/2001 E.C. West Harage Zone reported 583 AWD cases and 11 deaths from five districts.

Table 8.1.1 AWD affected districts in W/Hararge by CFR and AR, 18 July-31 August 2009

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

Attack rate in kebeles of the affected districts differed from kebele to kebele. In the most affected district, Mieso twenty one kebeles reported the attack rate from 37 per, 1000 population to less than 1 per 1,000 populations. The case fatality rate also differed from kebele to kebele. Kebeles located near by the the river crossing the affected kebeles had the highest attack rate.

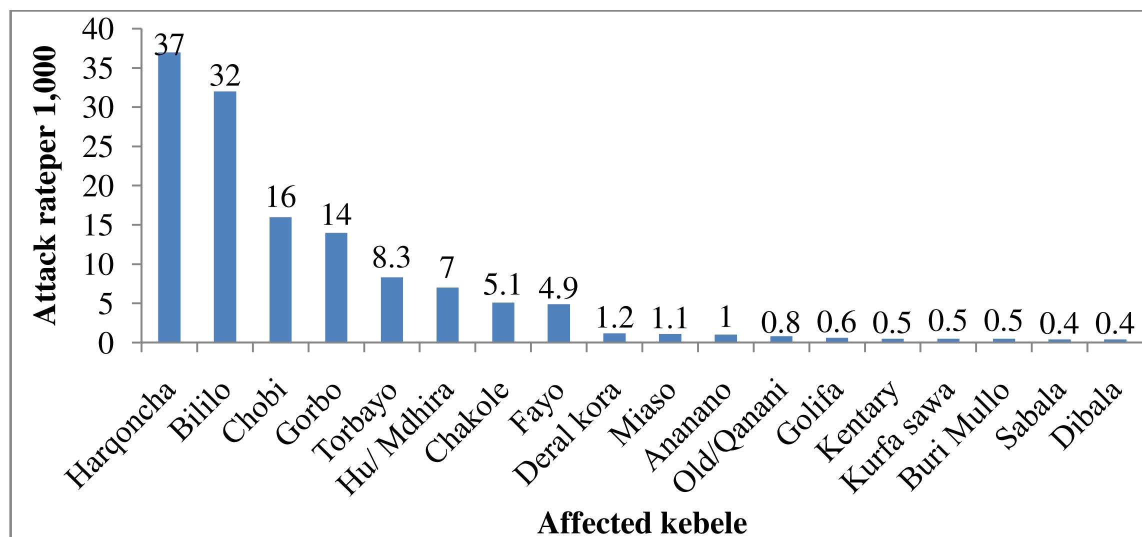

Figure 8.1.3 Attack rate by kebele in Miesso district, W/Harrge Zone, Oromia Region, 18 July-31 August 2009

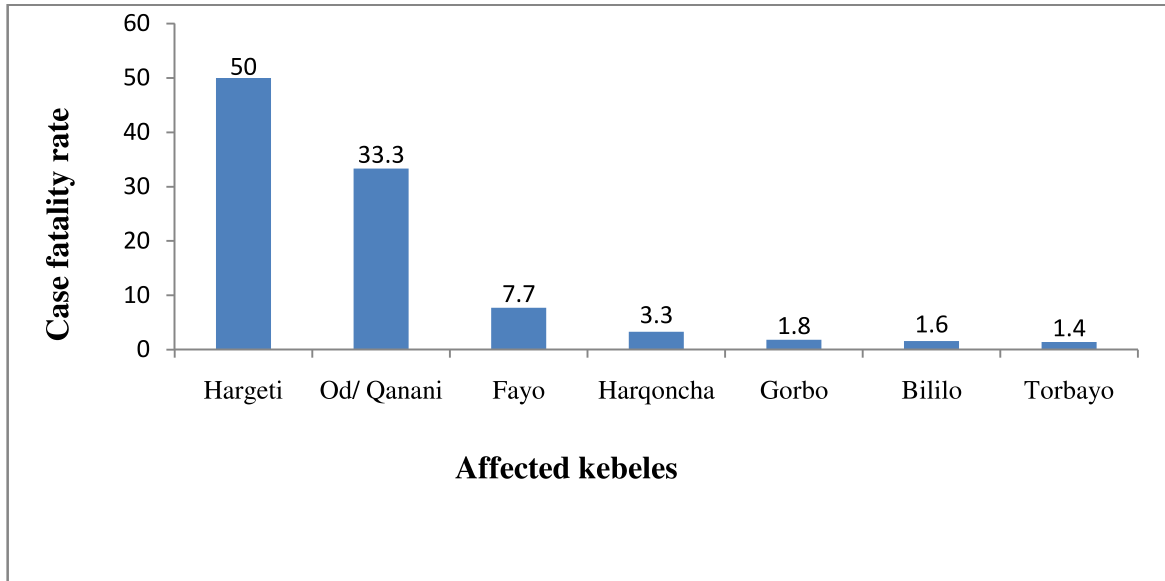

Figure 8.1.4 AWD outbreak case fatality rate by kebele in Mieso district, West Harerge, 18 July-31 August 2009

The most affected age group in this outbreak was 5-14 years of age while the list one was greater than 45 years of age. The male to female ratio of cases was 1.14.

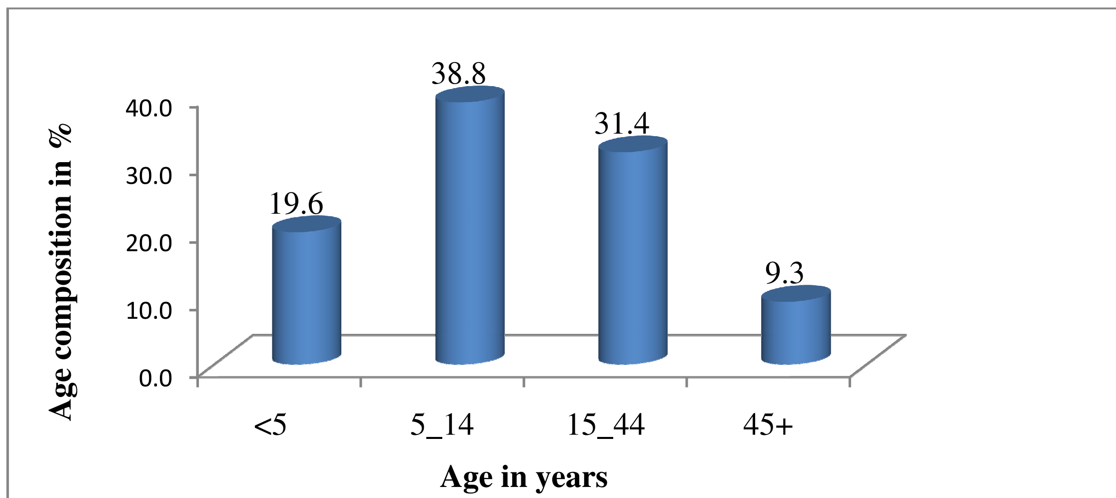

Figure 8.1.5 Age distribution in W/Hararge AWD outbreak 18 July-31 August 2009

Geographical distribution within the affected districts showed that 16.5% (N=170) of the total kebeles in the five affected districts reported cases and majority (45.7%) of kebeles were from miesso district.

Table 8.1.2 Affected kebeles by district in West Harage as of 25/12/2001E.C

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

Sanitation status: The Zonse health office had reported low sanitation coverage with very minimal latrine utilization before the outbreak. Mieso district had the least coverage (16%) before the outbreak. After the outbreak, the Zone mobilized the community and started to build latrine (reached nearly 70% and above in all affected districts) and convinced the community for proper utilization.

The Zonal Task force as well as the district task forces identified focal persons for the flow of information. Almost all information was gathered through telephone. At the zonal office data were entered and analyzed using excel. At district level data management was done manually.

Good Practice

- Monitoring charts were used for daily follow up
- Spot map developed by the zonal health office helped the EPR task force to identify the districts at risk and direct its intervention accordingly
- The Case based report utilized at all level
- Focal persons at the visited sites were trained and oriented
- Disinfection of the CTC site and also patients homes conducted

- Health workers were trained on case management and surveillance
- Presence of case management protocol in CTCs
- Continuously assignment of staff at CTCs in all affected districts/minimum 2 HW, Guard, Cleaner, and spray man
- Presence of drugs & supplies at least at minimum level at each case treatment centers
- Case treatment centers established (5) and case management was undertook according to protocol.
- Referral established to Chiro Hospital for complicated cases
- Availability ORS at HP which will encourage the availability of oral rehydration points(ORP)
- Health workers devotion in case management process

Draw back

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

Action taken

- On job orientation was given to health workers in considering AWD with other concomitant diseases
- Efforts were made to bring all district sector offices together and reached in agreement to share their contribution in control of the outbreak.
- Tried to discuss the need of completeness of reporting and also filling out the documents at CTCs and District Health offices.
- Given advice to evaluate the stock and refill the gap requesting the Zonal Health office.

- Discussed with the CTC's staffs on the two death reports of Nehase 23,2001 E.C. from Miesso and Harqoncha CTCs
- After debriefing the zone decided to replace health workers working at Miesso and Guba Koricha CTCs

Coordination

The Zonal EPR reactivated immediately after the report of AWD from Mie'sso on 20/7/2009.

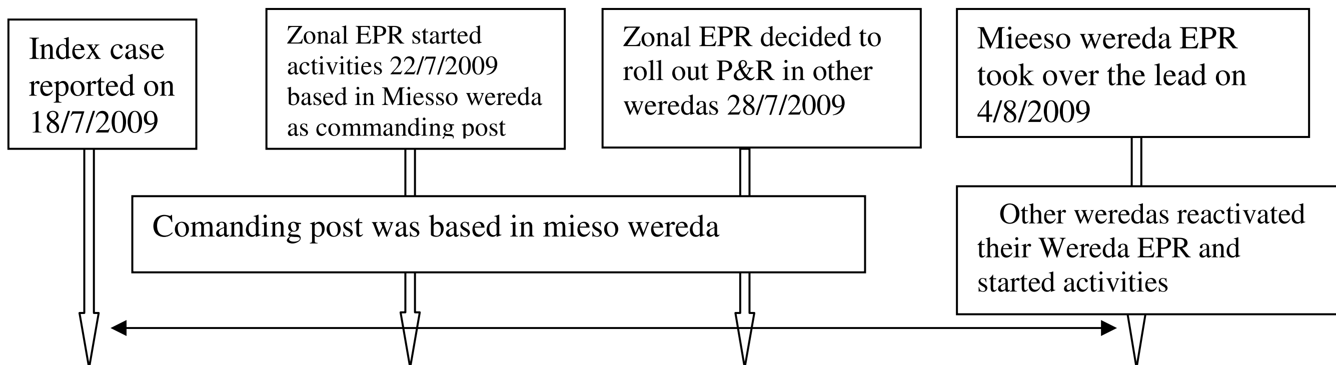

Figure 8.1.6 Timeliness of events in responding AWD outbreak in W/Harerge

Zonal and district EPR intervention by date

The Zonal EPR committee/task force/ held a meeting on 13/11/2001 E.C. at Zonal administrative office and decided to coordinate the response for the outbreak in Mi'esso district, the first largest affected district.

The task force identified subcommittees like: Surveillance, Case management, Logistic and finance, Social Mobilization and Awareness Creation, Hygiene and Sanitation. The zonal task force includes all sectoral offices and NGO, working in the zone.

Good practice

- Zonal EPR task force commenced its activities within 72 hours
- NGO,s like IMC, IRC, Care and Goal involved in the response
- Identified priority district/district at risk from the start of outbreak/

- Zonal and District Water offices responded as expected (potable water supply by water tinkering, specially; for miesso district and water treatment chemical supply)
- Development Agents of Agriculture involved in social mobilization
- Involvement of kebele administrator
- Monitoring done by task forces using checklists
- Partners were found responsive to all calls
- Continuity of the taskforces observed in some districts like Anchar, Gemechis ,Guba Koricha & Chiro district
- The Zonal Health office was working proactively in respect to the coordination activities
- Water sector involvement stated to be strong/took responsibility of ensuring of potable water supply and water treatment chemicals/
- All the visited and affected District's task forces through their District Cabine allocated Fund for the response of the emergencies

Draw backs

- Districts' Coordination task forces didn't meet and evaluate the response activities in the last 2 wks before the team from federal arrived and didn't keep their meeting regularity
- No inter district coordination forum like Mieso of W/harage and Somali region
- No intra district coordination forum or communication/among districts within the zone
- Some subcommittees' like logistic and finance didn't update their plan and coordinate resources
- The education sector involvement was found not strong enough as it was preparation period to start its academic year.

Solution given

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

Hygiene and Sanitation at CTCs and communities

Good practice

- The existence of at least one tents at CTC levels
- Presence of guard in 24 hrs and sprayer for 12 hrs
- There were separate latrine for cases at CTCs
- In three CTCs there were private bathing units
- Cleaners employed full time 24hrs
- In most CTCs water was available
- The medical staff employed only to work in the CTCs
- Presence of hand washing facilities with chlorinated water at key points
- Disinfection process is well organized at CTCs and also at the house hold level of infected patients.
- Latrine construction was encouraging in all visited districts.
- In Miesso district villages and kebeles were identified by their water source
- Ensured potable water supply through water tankering in most affected villages of Miesso
- In Miesso district water treatment chemicals (wuha agar, Pur and Aquatab) distributed to the most affected villages & kebele and chlorination of water source Miesso city
- The closed water pipe lines were opened and functional like in Torboyo, Gorbo and Chobi

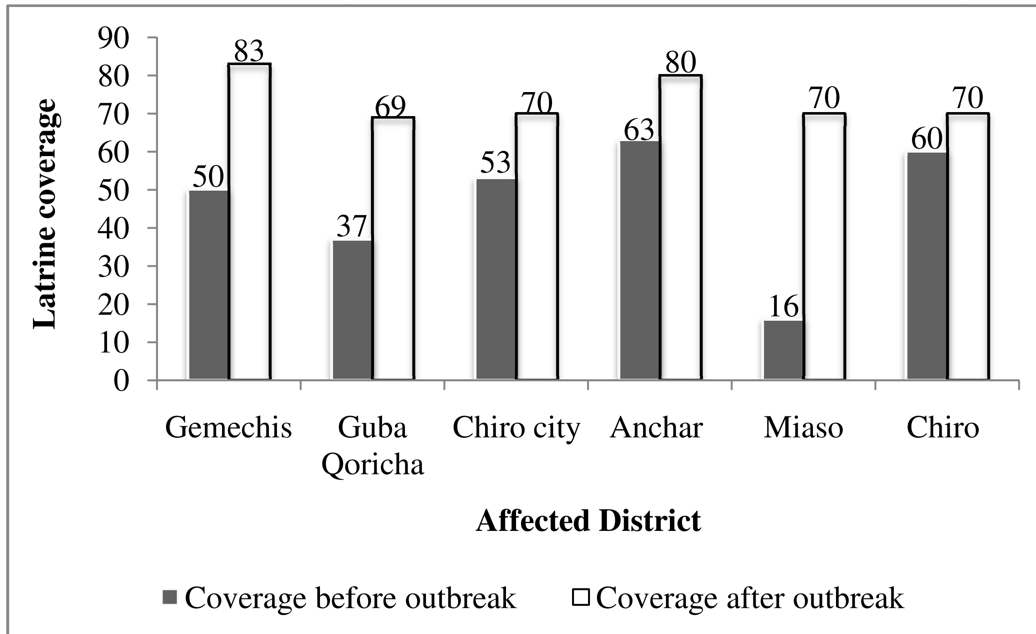

Figure 8.1.7 Latrine coverage of the AWD affected districts with in W/Harerge zone before and after the outbreak August, 2009

Drawback

- Inappropriate distribution of Cholera Beds among CTCs
- Cholera beds were not kept in store
- Delayed response to the request of refilling water treatment chemichals or Pure water supply
- Difficulty in disinfecting some households due to shortage of Vehicles and also poor communication with neighboring district

Advocacy and communication

Good practice

- Copies of key messages for AWD prevention & control have been disseminated to kebeles
- Most of the communities were aware of about AWD prevention and control methods
- Epidemic management committee was organized at kebele level

- All visited districts have been using check list during their field movement

Drawback

- House to house education not yet started

Conclusions

The districts and Zonal Health office coordinated response was encouraging (started within 48-72 hours though weakening of the coordinated response effort was also observed near to the end of the outbreak.

Monitoring of the situation by Zonal health office was encouraging, data were entered and analyzed by computer, Map was done and use of river water was identified as major possible risk factor. The case management system was in good shape but all the districts had shortage of safe and adequate water, and poor latrine utilization.

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

Recommendations

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

Rotation of health workers from CTCs should be done timely so as to avoid overwhelming in handling cases and referral system for complicated cases must be strengthened.

The concerned bodies should assign vehicles to hard to reach districts (like for Anchar district) and support with finance. Active case search and disinfection activities should be strengthened. Safe and adequate water supply must be ensured. Strengthening of inter regional/Between Somali and W/Harage) and intra Zonal coordination in the prevention, surveillance and response is necessary.

Figure 8.1.8 Map of Mieso district that shares majority of AWD cases in W/Harerge zone

Figure 8.1.9 Latrine in Gemechis district, W/Harage

Figure 8.1.10 Coordination meeting in Mieso district, W/harage

Acknowledgment

We would like to thank West Harerge zonal health office, all visited district health offices and all health workers in visited CTCs for providing valuable information during the supervision.

8.2 Assessment of AWD Outbreak and its Response in Bale Zone, Oromia Regional State December 2009

Introducton

Bale is one of the 17 zones in Oromia regional state and located at 445 km from Addis Ababa in the south-east direction. There are about 20 districts in the zone and 380 kebeles covering a geographical land surface of 57, 329 km2 approximately. Bale zone has a climatic condition, 52% representing 'kola', 31% is 'woyina-dega' and 17% 'dega'. According to the 2002 E.C projection 1,422,485 population are living in the zone. Out of this 725,467 are males. With regard to the life style of the population, farmers and pastorals constitute 90% of the total population.

In this zone, there are around 510 health facilities providing health care services for the local community. Of these facilities 351are governmental health facilities (2 hospitals, 28 HC, 321 HP), and the remaining are private clinics, drug stores and venders, and Drug and medical equipment distributers. There are also more than 950 health professionals of all categories working in this zone.

The major health problems in Bale zone are respiratory tract infections, diarrheal diseases and acute febrile illnesses including malaria. As to the Acute Watery Diarrheal disease, Bale has been considered to be virgin zone meaning that there was no AWD case report from this area for more than two years. But, currently a number of AWD cases were seen in Gololcha district following a religious festival celebrated at Dirre Shek Hussein historic place and thus, the zone experienced AWD outbreak declared on 30 November 2009. Accordingly, two joint teams from Regional Health Bureau and FMOH/EFELTP that consists of 6 health workers (Physicians, Epidemiologists, Public health & Environmental Health professionals) were organized and dispatched to the site for the assessment of the outbreak and to provide technical support in the control of the outbreak.

Objectives

- to assess the extent of AWD outbreak in Bale zone
- to coordinate the epidemic response and provide technical support in the control of the outbreak
- to identify and fill observed gaps & challenges by involving all stakeholders

Methodology

The assessment of the outbreak was conducted from 4 December through 12 December, 2009. During the stay the team visited 8 districts (out of 13 affected districts) and 10 AWD cases treatment centers/ CTCs. Relevant information was collected through discussion with zonal and distric administration, zonal and distric health offices, health workers, and local community leaders, observation of cases management practices at CTCs, site observation (particularly the Dirre Shek Hussein) and document reviews. Right after visiting of each district, districts were debriefed about the situation and finally comprehensive written feedback was submitted to the zone health office.

Results

Overall Situation

Dirre Shek Hussein (DSH) is a religious historical place in Gololcha District, Bale Zone where there are biannual religious festivals around the mosque. There was a festival celebrated on 18/ 03/2002 E.C. with estimated number of visitors 40,000-50000 people from different corners of the country (as the local health care providers estimated).

The overall sanitary condition of the area was very poor; with only 4 public latrines (of poor quality), no adequate safe water supply- 9 unprotected ponds and only 1 stand pipe (but opened only on the festival day for fuel reason). These 9 ponds are perceived as holy water sources (“Haroo Zamzam“) and the believers took water from these sources untreated. Moreover, majority of the visitors used open field defecation.

For the worst, there was a rainfall and flooding of the area on 19/ 03/ 2002 E.C. and these ponds were over flooded and grossly contaminated with the dirt from the surrounding. As reported by

the local and zonal health department, the zone has no previous cases of AWD in the past 2 years, and this outbreak was assumed to be imported via the visitors of the festival.

Descriptive Epidemiology

Verification of the Diagnosis: Stool samples were collected at the Oromia Regional Laboratory (Adama) from five AWD suspected cases from Dirre Shek Hussein and found to be positive for Cholera Enaba 01.

The epidemic was started on 20/03/2002E.C (based on date of onset of symptoms) and reported to the Zonal Health Department on 21/03/2002 E.C. The outbreak was first started and reported from Gololcha district, particularly Dirre Shek Hussien kebele and in two weeks period 13 out of 20 districts reported AWD cases within the zone.

As of 02/04/2002E.C a total of 528 cases were seen at the CTCs but only 463 cases were reported to the zonal health Department. Of these 21were facility deaths and 3 community deaths (but the immediate cause of death was not clearly settled by the HWs as there were cases of diarrhoea with malnutrition, aspiration pneumonia, peritonitis, etc)

Based on the report from the Zonal HD, the CFR was 4.8% which is beyond the acceptable rate of AWD outbreak.

The sex distribution of the cases was comparable with 51.6% (239) males; and the age distribution was higher in age group 15-44 yrs (43.8%/ 203) and above 45yrs (35.2%/163). This was because majority of the visitors were adults.

The peak of the outbreak was 3 days after the start of the outbreak; i.e. on 23 and 24/03/02E.C. (Figure 8.2.1)

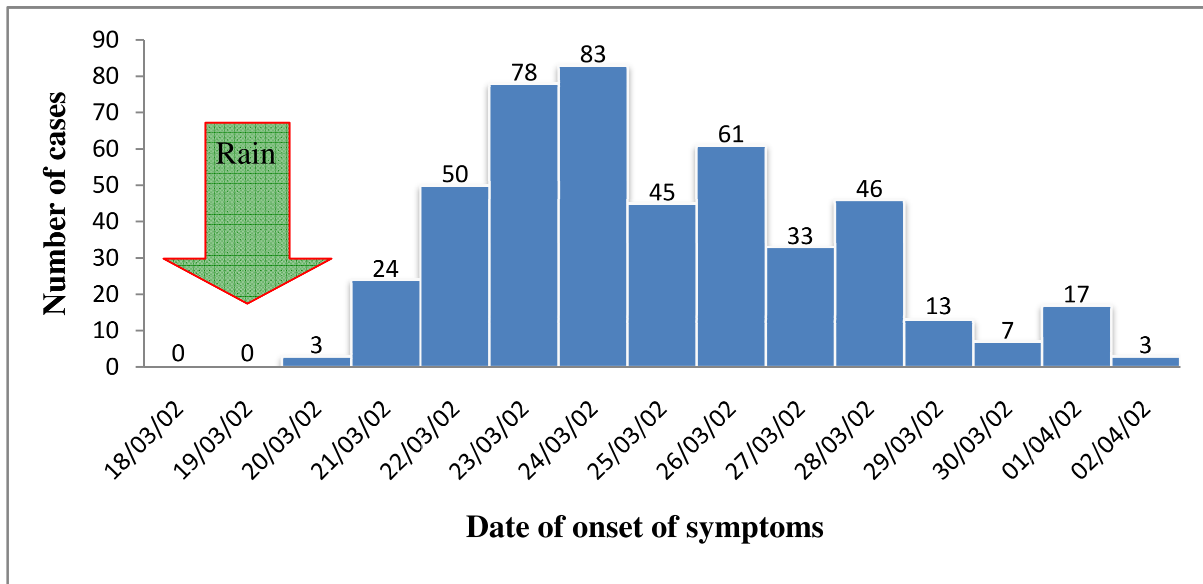

Figure 8.2.1 Epidemic curve of AWD outbreak cases in Bale Zone, Oromia Region, from 20/03/02-02/04/02 E.C.

NB: Total number of AWD cases used in the above epidemic curve was 463 which were based on Zonal Health office report (B/s the team was not able to get date of onset of symptoms and other information for all 528 cases)

Majority of the cases especially in the first few days were travelers/ guests of the festival and late in the outbreak i.e. one week after the onset cases were seen from the surrounding dwellers/ community. Based on the CTC reports, above 75% of the cases were from two districts- Gololcha and Ginnir (table 8.2.1).

Table 8.2.1 Distribution of AWD cases by district in Bale zone as of December 11, 2009 (02/04/2002 E.C.), Oromia Regional State (n=528)

S.No	Name of District	No of CTC	No of cases	No of Deaths (Facility)	Remark
1	Gololcha	3	320	20	
2	Ginnir	2	58	0	
3	Goba	1	22	0	
4	Agarfa	2	36	0	1 community death
5	Dinsho	1	15	1	1 community death
6	Gura-Dhamole	1	4	0	
7	Gasera	1	22	0	
8	Lege-Hidha	1	18	0	
9	Robe Town	1	8	0	
10	Goro	-	1	0	
11	Sinnana	-	1	0	
12	Berbere	1	18	0	
13	Sewena	1	4	0	1 community death
14	Harena-Buluk	-	1	0	
	Grand Total	**15**	**528**	**21**	

Assessment of the Outbreak Response

At the time of report of the outbreak to the ZHD, the zonal and district administrative bodies were having meeting in the zone for other administrative issues. This meeting was stopped and the Zonal and district councilmen were dispatched to their respective districts for outbreak response.

Coordination

The overall rapid response team (RRT) coordination was poor and not systematically assigned as MoH guideline for AWD outbreak Response.

There were only two committees in each district:

- The awareness creation and social mobilization team
- The technical team/ case management

Case management

There were adequate number of CTCs in each district but all were substandard in set up and case management.

Major Challenges and Gaps identified during the assessment

- Inadequate preparedness during the festival to prevent the occurrence of the outbreak
- Poor coordination and inadequate response at all levels
- There were no teams to organize and respond for surveillance and case tracing, hygiene and sanitation activities, and address logistic issues
- The water department of the districts were not as such involved in the response, for this reason; shortage of adequate and safe water supply was observed; particularly, in the most affected Gololcha district, particularly Dirre Shek Hussein kebele
- Shortage of drugs and medical supplies and mal distribution of the available resources
- High case fatality rate
- Health care providers were not trained
- CTCs were established with one tent in all but 2 districts
- Poor documentation and reporting of cases

- Technical gaps at the CTCs staff and poor CTC setup
    - Poor sanitation of CTCs
    - No disinfection of patient's home
    - Shortage of health workers
- Lack of food for admitted patients
- Transportation problem for evacuation of the guests from the area
- Shortage of budget

Actions taken by the team:

1. As soon as the joint team arrived Zonal Health Office/ZHO (on 26/03/02 morning), the team held meeting with Zonal Health office Head & other concerned staffs and discussed on the extent of the AWD outbreak.
2. The team also assessed the response to the outbreak, organization of the committee (RRT) and coordination of control activities carried out so far at zonal level.
3. Gap identification with regard to the response following the above brief discussion at ZHO.
4. On the same date, the team joined meeting held by the Zonal Administration Office and sensitized the council members on the condition of the outbreak in the zone and discussed on the resolution of the identified gaps. Accordingly, consensus was reached on the emergency of the outbreak and it was agreed to intensify the response and control activities at zonal level by:
    - Reorganizing the response committee (RRT) as per the national guideline
    - Community mobilization and active case finding through active involvement of other sectors at all levels and using the grass root kebele structure
    - Addressing the identified gaps with the concerned body
    - Daily evaluation of the response & control activities
5. The team visited 8 districts affected by the outbreak (total affected districts 13) and 10 CTCs. Technical assistance and onsite trainings were given for health workers at district Health Office and CTCs to address the technical gap and the observed high CFR in majority of the CTCs. Besides, AWD treatment protocol, TGL, and leaflets were distributed to the visited health institutions.

6. Sensitization and mobilization of the district Administraitve bodies on the epidemic conditions. Discussion and meeting with these administrative bodies in resolution of gaps whenever a gap was identified in any of the districts/CTC.
7. Reactivation and establishment of RRT in all visited districts
8. Negotiation with hospital managers for shifting of trained HWs to Districts/CTCs having shortage of trained HW on AWD case management.
9. Mobilization of resources from the zone and district – medications, food
10. Arranging transportation means with concerned bodies and urgent evacuation of guests to avoid long stay in Dirre Shek Hussein site
11. The joint team along with ORHB higher officials conducted discussion with religious leaders and local administrators to find out permanent solution for the protection of the “holy water”. As a result, consensus was reached on urgent protection of the “holy water” ponds and the religious leaders permitted treatment of the water (chlorination).
12. AWD surveillance data analysis and interpretation for timely decision making
13. Feedback and debriefing at each of the visited sites

Recommendations

Zonal level:

- ✓ Strengthen the coordination of the response and RRT
- ✓ Provision of adequate medications and supplies to affected as well as other districts for prompt response
- ✓ Early preparedness on such festivals to prevent the occurrence of outbreak
- ✓ Improve infection prevention practices, particularly at CTCs and community level (conduct house-hold disinfection)
- ✓ Ensure adequate and safe water supply for the affected community, particularly for D/Shek Hussein area
- ✓ Investigate for the immediate cause of death for the reported mortality and report on deaths only attributable to AWD

- ✓ Ongoing assessment of the outbreak and institute possible intervention to contain the outbreak
- ✓ Improve reporting practice and use of information for decision making during outbreaks
- ✓ Standardize CTC set-ups across the zone i.e. reorganization as per the national standard
- ✓ Maintain the current social mobilization activities and strengthen active case finding in the zone
- ✓ Give due attention to remote and unaffected districts for early preparedness

Regional level:

- ✓ Provide basic training on the management and control of AWD outbreak for HWs in Bale zone
- ✓ Ensure adequate medications and supplies at zonal level
- ✓ Ensure adequate safe water supply in Dirre Shek Hussein village for the larger community, and during the bi-annual festival
- ✓ Facilitate protection of the ponds and treatment of the "holy water" and; also facilitate construction of additional latrines at this festival site
- ✓ Refurnishing the newly constructed and completed nucleus Health centre in this village
- ✓ Financial support for the Zone based on their proposal

Acknowledgements

We would like to acknowledge the Bale Zonal Adminstration, Bale Zonal Health Office, Ginnir Hospital, Goba Hospital and all HWs in the visited districts/CTCs for their cooperation and providing valuable information during the assessment.

8.3. Measles Outbreak—Welkait and Tsegede districts, Tigray Region, Ethiopia, August to October, 2010

Abstract

Background: Measles is a highly infectious viral disease that causes high morbidity and mortality in many developing countries. In Africa and Asia more than 20 million measles cases are reported annually. Ethiopia introduced measles vaccination as part of the expanded program on immunization (EPI) in 1980; however, measles outbreaks continue to occur frequently in the country. This Measles outbreak data analysis was aimed at describing the magnitude of the outbreak in terms of person, place and time.

Methods: A secondary data of Measles Outbreak of Welkait and Tsegede districts was obtained from the regional health bureau. Data was entered and analyzed using micro soft Excel.

Results: The first case was reported from Welkait district with onset of rash on 13 August 2010. There were 169 suspected measles cases reported from both Welkait and Tsegede districts. Majority of the cases (55%) were from Welkait district. Of the 169 cases 56.2% were male, 10.7% infants and 44.4% under five years. The median age of cases from Welkait and Tsegede districts was 8.5 and 5 years respectively. The overall fatality rate was 5.3% (9/169). Majority of cases (60.4%) had not history of measles vaccination and 22.4% of cases reported at least one dose of measles vaccination. Out of 10 serum samples taken from both districts for laboratory confirmation 9 were positive for IgM.

Conclusion: Laboratory confirmed measles outbreak was identified in Welkait and Tsegede districts with an overall high case fatality (5.3%). Majority (60.4%) of cases had not history of measles vaccination besides majority (151/169) of the cases were individuals above 1 years of age.

Key words: Measles outbreaks, Welkait and Tsegede, Tigray, Ethiopia

Introduction

Measles is a highly infectious viral disease caused by a Morbillivirus and for which humans are the only reservoirs. It includes prodromal symptoms of fever, malaise, cough, coryza (runny nose), and conjunctivitis. Within 2 - 4 days of the prodromal symptoms, a rash made up of large, blotchy red spots (maculo-papular rash) appears behind the ears and on the face. The rash spreads to the trunk and extremities and typically lasts 3-7 days. Individuals with measles are infectious 4 days before through 4 days after rash onset. Incubation period is about 10 to 12 days with a range of 7-18 days. Transmission is by respiratory droplets or direct contact. When the measles virus is introduced into a non-immune population, nearly 100% of individuals will become infected and develop a clinical illness. In areas with tropical climate, most cases of measles occur during the dry season and in areas with temperate climate the peak is during the late winter and early spring (1).

Unimmunized children under five years of age, and especially infants, are at highest risk for measles and its complications, including death. Common complications include severe diarrhea, Pneumonia, inflammation of the middle ear and Encephalitis. Complicated measles is likely in poorly nourished children, especially those who do not receive sufficient vitamin A, who live in crowded conditions, and whose immune systems have been weakened by HIV/AIDS or other diseases. Measles is a major cause of blindness among children in Africa and other areas of the world with endemic measles (2).

Although a vaccine has been available since 1959 (3), measles remains an important cause of morbidity and mortality in children, particularly in developing countries where more than 95% of measles-associated deaths occur (4-6).

Natural measles infection tends to induce higher antibody levels than does measles vaccination. Depending upon the titter of passively acquired maternal antibodies, young infants are usually protected against measles for several months. Maternal antibody protection decays by six to nine months of age, leaving infants increasingly susceptible to measles (7).

Measles is prevented by immunization with measles vaccine. To reduce the risk of infection in hospitals, all children between the ages of six and nine months who have not received measles vaccine and who are admitted to a hospital should be immunized against measles. If the children's parents do not know whether they have received measles vaccine, the child should still be immunized. If a child has received measles vaccine before nine months of age, a second dose should be administered at nine months or as soon as possible after nine months (2).

In 1980, Ethiopia introduced measles vaccination as part of the Expanded Program on Immunization (EPI). One dose of measles vaccine is recommended at 9 months of age. In view of the disease burden, the Ministry of Health (MOH) of the Federal Democratic Republic of Ethiopia in collaboration with the Regional Health Bureaus (RHBs) and partners started implementing the accelerated measles control strategy in 1998. Measles control Strategies for sustained measles morbidity and mortality reductions in Ethiopia include, Strong routine immunization of > 90% of children aged 9 to 11 months; Provide a second opportunity for measles vaccination; Case-based measles surveillance and improved case management(8).

Detection of an outbreak relies on the ability of the responsible authority to recognize an increase in measles cases significantly above the number normally expected. This recognition is simpler if a routine surveillance system collects either summary or case-based information on clinical and confirmed cases of measles. In the absence of an effective surveillance system it may be difficult to detect small or limited outbreaks. (9)The objective of this Measles outbreak data analysis was to describe the magnitude of the outbreak in terms of time, place, and person.

Methods

Outbreak location: Measles outbreak was reported from Welkait and Tsegede districts from Aug-Oct, 2010. The districts are located in Western zone of Tigray region and are neighbors to each other. Besides, these districts share border with districts in North Gondar of Amhara region. Welkait and Tsegede districts had a population of 150,764 and 112,013 in the year 2009/10 respectively. Measles vaccination coverage of welkait and Tsegede districts was 66.9% and 80.7% respectively in the year 2009/10.

Analysis type: Descriptive epidemiology was used to describe the magnitude of the outbreak in the two districts.

Data collection, entry and analysis: A secondary Measles outbreak data of the two districts (Welkait and Tsegede) was obtained from Tigray regional health bureau, Public Health Emergency Management case team. Data was entered and analysed using micro soft Excel.

Case definition

Suspected measles case: - A person who presented with Rash with fever and cough, runny nose or conjunctivitis or if A clinician suspects measles

Confirmed measles case: - A person who presented with Rash with fever and cough, runny nose or conjunctivitis and positive for IgM from central laboratory

Results

During the outbreak a total of 169 Measles cases were reported from Welkait and Tsegede districts. Of all 55% (93/169) of cases were reported from Welkait district (Figure 8.3.2). Among 169 cases 56.2% were male, 10.7% infants and 44.6% children 1-5 years. Age range of cases was from 3 months to 50 years in both districts, with median age of 5 years for Welkait and 8.5 years for Tsegede. One hundred and two (60.4%) of cases weren't vaccinated for measles vaccine at all and 28(22.4%) cases had at least one dose of measles vaccination. The overall case fatality was 5.3 %(9/169).

Among 50 kebeles in both districts about 19 kebeles reported measles cases. The first measles case (index case) was reported from Welkait district, Adi gaba Kebele whose farming area was in Embagala Kebele bordering Kebele of North Gondar and the date of onset of rash was on 24/08/2010 and it was reported by the community. Nine blood serum samples were collected from both districts from different Kebeles and send to central laboratory and all were positive for Measles.

The epidemic curve (Figure 8.3.1) below showed that the outbreak duration was from 24/08/2010 through 20/10/2010. There were two peaks in the beginning of September and beginning of October. There were also days with zero report.

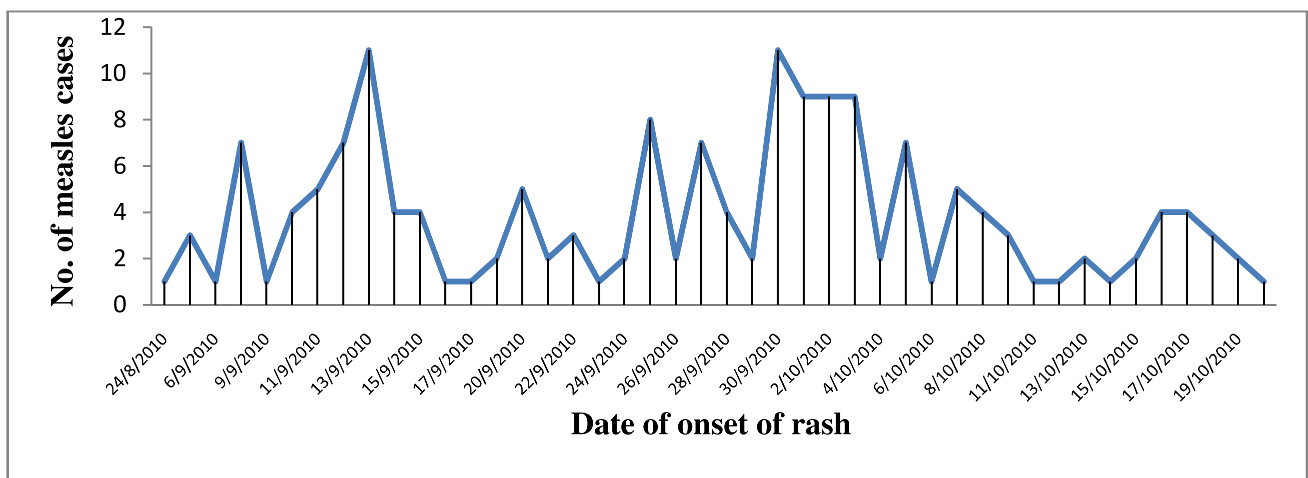

Figure 8.3.1 Epidemic curve of Measles cases in Welkait and Tsegede districts, Western zone, Tigray Region, Aug-mid Oct 2010

Majority (60%) of the cases were reported from Adigaba and Awra kebeles, the rest were shared by 6 kebeles within the district (Figure 8.3.2).

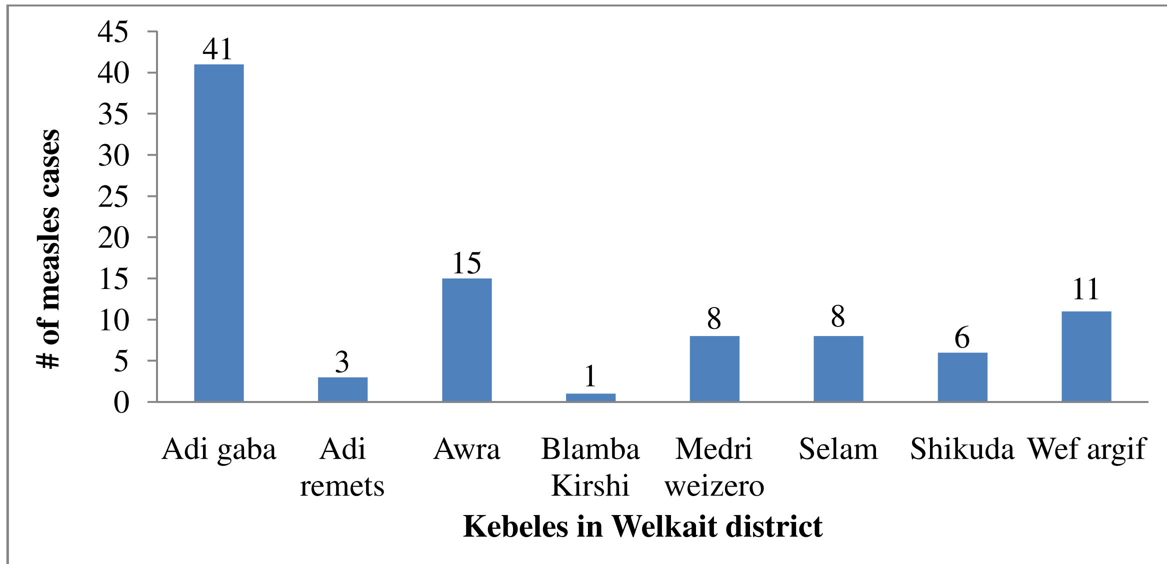

Figure 8.3.2 Number of reported Measles cases by kebele in Welkait District, Western Zone, Tigray Region, 24 Aug- 19 Oct 2010

About 49% of the cases in Tsegede district were reported from two kebeles namely; Hinta Bela and Dara and the rest from 9 kebeles (Figure 8.3.3).

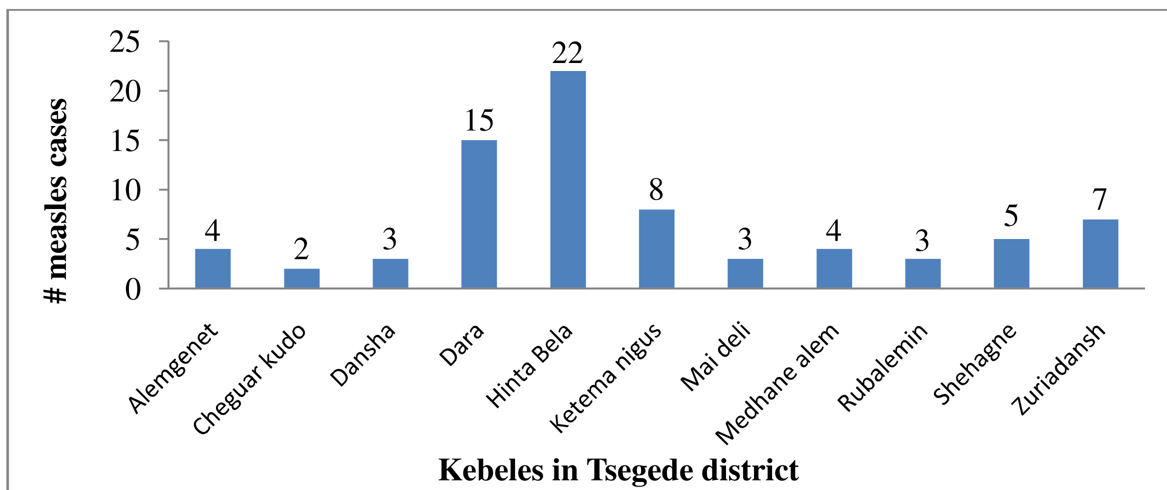

Figure 8.3.3 Number of reported Measles cases by kebele in Tsegede District, Western Zone, Tigray Region 13 Sep-18 Oct 2010

Majority (102/169) of the cases had not history of measles vaccination, 28 cases had one dose of measles vaccine, 10 cases two dose of measles vaccine and 29 cases whose measles vaccination was status unknown. Of the unvaccinated cases majority were between the age 1-5 years and greater than 5 years of age (Table 8.3.1).

Table 8.3.1 Age and vaccination status of Measles cases in Welkait and Tsegede districts, Western zone, Tigray region, October 2010

Age	Vaccination status of cases				Total
	unvaccinated	One valid dose of measles vaccine	two valid dose of measles vaccine	unknown status	
<1 year	18(100%)	0	0	0	**18**
1-5 years	29(42.3%)	22(32.8%)	9(13.4%)	7(10.5 %)	**67**
>5 years	55(65.5%)	6(7.1%)	1(1.2%)	22(26.2%)	**84**
Total	**102**	**28**	**10**	**29**	**169**

Discussion

Laboratory confirmed measles outbreak was identified in the two districts namely: Welkait and Tsegede. In both districts majority of the cases were clustered to few kebeles and the outbreak affected all age groups. Majority (60.4 %) of the cases were those who had not previous history of measles vaccination which shows low measles vaccination coverage in the previous years in the districts. But there were also cases who had received two dose of measles vaccination which in turn brings a question about the vaccine efficacy. Moreover; there were infants experienced measles at an age below the limit for first vaccine dose in the national immunization schedule.

Among the diseased individuals almost half (84/169) were those people above 5 years of age which indicates that there are a number of accumulated susceptible individuals in the community which can be a risk factor for future outbreaks.

The overall case fatality in the two districts was higher than the national measles case fatality rate which was 4% in 2007(National guideline for measles guideline and outbreak Investigation, FMOH 2007). The high cases fatality might be due to a delay in seeking medical care or else poor case management.

The outbreak in the two districts lasted longer duration which can result in high transmission of the disease in the community.

Conclusions

Laboratory confirmed measles outbreak was identified in Welkait and Tsegede districts with an overall high case fatality (5.3%). Among the total cases majority (60.4%) had not history of measles vaccination besides majority (151/169) of the cases were people above 1 years old. In both districts cases were highly clustered to few kebeles.

Recommendations

Routine immunization should be strengthened to the point that measles outbreak cannot occur. Moreover, measles supplementary immunization and catch up campaigns are also indispensable to increase herd immunity in the communities. Studies on cold chain, EPI coverage and awareness of the community towards immunization are mandatory.

Acknowledgements

We express our great full thanks to Tigray regional health bureau, especially Mr. Tekleab G/selassie for providing this measles outbreak data. We would also like to Dr. Richard Luce, EFELP resident advisor for his review and comments on the abstract upon its submission to Epidemic Intelligence Services (EIS).

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Annexes:

Annex1.2.1 Line List of laboratory confirmed Cholear cases Shashemene, May2009

Zone West Arsi District Shashemene Specimen taken **Stoo**l Result **all Positive for VCI (Inaba)**

Kebele / PA's Town, House No.	Sex	Age	Date seen at health facility	Date of onset of disease	(Yes/No)	History Of Contact(Yes/No)	Similar illness in the family	Dehydrations status)	Treatment given			Date of specimen collected	Outcome A(live) D(ead)	Labserial no	Date reporetd
									ORS	IV	AB				
Umbure	F	45	20/9/2001	19/9/2001	No	No	No	VSD	yes	yes	Yes	20/9/2001	A	78 Oro 06/09	1/6/2009
Chebi	F	28	21/9/2001	19/09/2001	No	No	No	SD	Yes	no	no	21/9/2001	A	85Oro06/09	1/6/2009
Chebi	M	3	19/9/2001	19/9/2001	No	No	No	SD	Yes	no	no	19/9/2001	A	84oro06/95	1/6/2009
K.Rogicha	F	22	19/9/2001	19/9/2001	No	Yes	No	SD	Yes	Yes	Yes	19/09/2001	A	83 oro 06/09	1/6/2009
K.Rogicha	M	4	20/9/2001	19/9/2001	No	Yes	No	SD	Yes	Yes	Yes	19/09/2001	A	86 Oro 06/95	1/6/2009
K.Rogicha	F	8	20/9/2001	18/9/2001	No	Yes	Yes	SD	Yes	no	Yes	20/9/2001	A	81oro06/09	1/6/2009
Chebi	F	55	20/9/2001	20/9/2001	No	No	No	VSD	Yes	Yes	Yes	20/9/2001	A	82 oro 06/09	1/6/2009
K.Rogicha	M	5	20/9/2001	20/9/2001	No	Yes	Yes	SD	Yes	Yes	Yes	20/9/2001	A	80 oro 06/09	1/6/2009
K.Rogicha	M	6	20/9/2001	20/9/2001	No	Yes	Yes	SD	Yes	Yes	Yes	20/9/2001	A	79 oro 06/09	1/6/2009

Annex1.2.2: Questionnaire for case control study on AWD outbreak in Shashamane district of West Arsi zone, Ormia Region May 25 – June 10, 2009

I. Identification:

1. Full Name of Respondents ________________________
2. Sex ____________ C. Age ____________ C. Occupation _____________

D. Address

a. Name of zone __________________
b. Name of Districts _______________
c. Name of Kebele ________________

II. Respondent condition: if No go to question no 12

1. Are you sick
   a. Yes b. No if no go to number
2. If yes, symptoms of the disease
   a. Diarrhea b. Vomiting c. Diarrhea and Vomiting
3. If diarrhea present number of episodes per day
   a. Three b. Four c. Five and above
4. Date of onset of disease _______________________
5. Date seen at health facility _______________________
6. Hydration status
   a. No dehydration b. Some dehydration c. Severe dehydration

III. Contact History:

7. Did you have any travel history to other area before the illness
   a. Yes b. No
8. History of contact to a person of the same symptoms
   a. Yes b. No
9. Other sick person in the family
   a. Yes b. No
10. Did you eat food outside your home?
    a. Yes b. No
11. If yes what kind of food?
    a. Raw fruits like, mango, banana, orange, Vegetables, salad, sugar cane etc

b. Sanbusa

c. Other

IV. Drinking water source:

12. From where you can get drinking water?

a. River b. Pond c. Well

b. Pipe

e. Other specify ______________________________

13. What treatment mechanism do you use for drinking at home?

a. boiling b. chlorination c. nothing d. other

14. Is water treated at the source?

a. Yes b. No

15. If yes, how often?

a. Every month b. Every quarter c. Every six month d. During emergency

16. Was there any metrological event, heavy rain, and flood?

a. Yes b. No

17. Is the water source located down the waste disposal sites and/or latrine?

a. Yes b. No

V. Latrine usage

18. Do you have latrine in your compound

a. Yes b. No

19. If yes, do you use it

a. Yes b. No

20. If yes, how often do you use it

a. Always b. Some times c. Never

VI. Hand washing practice:

21. Do you wash your hands after using latrine

a. Yes b. No

22. If yes, how often

a. Some times b. Always c. Never

23. Do you wash your hands before preparing and ate food?

a. Yes b. No

VI. Information and community awareness:

24. Do you have heard any information about AWD
    a. Yes b. No
25. If yes, from where the information get
    a. Community leaders b. Health Extension workers
    c. others specify ____________________________

What measures do you propose to control AWD, please specify it

____

____

Annex1.3.1 Line list of cases of influenza like illness whose specimens taken and tested

S.no	Name	District/kebele	Age	Sex	symptoms onset date	Date specimen collected	treatment given	Out come	Test result	C/C
1	Sherif Kedir	Gore prison	25	M	1/11/2010	7/11/2010	Anti-biotic and antipyretics	Not improved	pos.pH1N1	cough, fever ,runny nose, headache
2	Arjefo Ayana	Gore prison	29	M	2/11/2010	7/11/2010	Anti-biotic and antipyretics	Not improved	pos.pH1N1	cough, myalgia, runny nose, sore throat
3	Begidu Regassa	Gore prison	24	M	2/11/2010	7/11/2010	Anti-biotic and antipyretics	Not improved	pos.pH1N1	cough, runny nose, fever, headache
4	Shifa Kelifa	Gore prison	20	M	29/10/2010	7/11/2010	Anti-biotic and antipyretics	Not improved	pos.pH1N1	cough, back pain ,fever , runny nose
5	Tamiru Taye	Gore prison	32	M	2/11/2010	7/11/2010	Anti-biotic and antipyretic	Not improved	pos.pH1N1	cough, fever, headache, myalgia, runny nose
6	Nuredin Yadeta	Abdella	25	M	6/11/2010	8/11/2010	No	NA	pos.pH1N1	fever, cough, shortness of breath, sore throat
7	Mustofa Mohammed	Abdella	55	M	1/11/2010	8/11/2010	No	NA	Not detected	cough, sore throat, headache, runny nose
8	Bedria Fedia	Abdella	60	F	4/11/2010	8/11/2010	No	NA	pos.pH1N1	fever, headache, back pain, cough
9	Mekiya Kedir	Abdella	45	F	1/11/2010	8/11/2010	No	NA	pos.pH1N1	cough, sore throat, fever, headache
10	Halima Mohammed	Abdella	15	F	4/11/2010	8/11/2010	No	NA	pos.pH1N1	cough, sore throat, fever, headache, runny nose
11	Zeytuna Hassen	Abdella	16	F	5/11/2010	8/11/2010	No	NA	Not detected	fever, cough, sore throat ,runny nose
12	Taju Jemal	Abdella	32	M	6/11/2010	8/11/2010	No	NA	pos.pH1N1	cough, fever, runny nose, headache
13	Amira Ali	Abdella	7	F	4/11/2010	8/11/2010	No	NA	pos.pH1N1	fever, cough, runny nose
14	Birke Frisa	Abdella	35	F	5/11/2010	8/11/2010	No	NA	Indeterminate	cough, fever, sore throat, headache
15	Mohammed Yilma	Bedelle	28	M	2/11/2010	8/11/2010	Anti-biotic and antipyretic	Not improved	Not detected	dry cough, headache, nose bleeding, burning sensation, thirsty
16	Mitike Anegagregn	Bedelle	17	F	1/11/2010	8/11/2010	Anti-biotic and	Not improved	pos.pH1N1	shortness of breath,

							antipyretics			headache, chest pain, back pain, fever, cough, runny nose
17	Wakjira Diressa	Bedelle	42	M	31/10/2010	8/11/2010	Anti-biotic and antipyretic	Not improved	pos.pH1N 1	cough, fever, headache, runny nose
18	Guday Gemede	Bedelle	25	F	26/10/2010	8/11/2010	Anti-biotic and antipyretics	Not improved	Not detected	cough, fever, runny nose
19	Rijalu Ambarago	Denbi	18	M	2/11/2010	8/11/2010	No	NA	pos.pH1N 1	fever, headache, anorexia ,cough, runny nose
20	Yusuf Bonenja	Denbi	18	M	5/11/2010	8/11/2010	No	NA	pos.pH1N 1	cough, fever, runny nose , headache
21	Sedenur Mohammed	Denbi	30	M	5/11/2010	8/11/2010		NA	pos.pH1N 1	cough, runny nose, sore throat, myalgia
22	Semira Alkadir	Denbi	9	F	5/11/2010	8/11/2010	No	NA	Not detected	Fever, headache, runny nose. cough

Annex1.3.2: Line list of suspected cases of pandemic influenza A (H1N1) Gore prison and Gore town of Ale district, Illu Ababora zone from record review, Nov 2010

S.no	Name of patient	sex	age	date seen at health facility	C/C	Treatment given
1	Abde Tariku	M	21	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
2	Abdi Hussen	M	30	2/11/2010	Fever, sore throat, Headache, Shortness of breath	anti biotic and antipyretics
3	Abdi Tariku	M	26	30/10/2010	Fever, Dry cough, sore throat, Backache, Shortness of breath	anti biotic and antipyretics
4	Abdirahman Kedri	M	20	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
5	Abdisa Jeka	M	30	28/10/2010	Fever, cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
6	Abdulnur Faris	M	22	2/11/2010	Fever, Cough, Runny nose, sore throat, Headache, Backache	anti biotic and antipyretics
7	Abebe Tariku	M	23	29/10/2010	Fever, Dry cough, Runny nose	anti biotic and antipyretics
8	Abebe Tariku	M	28	5/11/2010	Fever, Dry cough, Runny nose, sore throat	anti biotic and antipyretics
9	Adamu Terefe	M	35	28/10/2010	Fever, Dry cough, Shortness of breath	anti biotic and antipyretics
10	Afewerki Ayiza	M	27	30/10/2010	Fever, Dry cough, Runny nose, sore throat	anti biotic and antipyretics
11	Ahmed Aumer	M	43	28/10/2010	Fever, Dry cough, Runny nose	anti biotic and antipyretics
12	Alemayehu Dano	M	32	5/11/2010	Fever, cough, Headache, Backache, Shortness of breath	anti biotic and antipyretics
13	Alemu Ferisa	M	37	3/11/2010	Fever, Dry cough, Headache, Backache, Shortness of breath	anti biotic and antipyretics
14	Amsalu Degaga	M	27	28/10/2010	Fever, Dry cough, Runny nose	anti biotic and antipyretics
15	Anbadio Qono	M	25	28/10/010	Fever, cough, Shortness of breath	anti biotic and antipyretics
16	Asinake Firsa	M	2	5/11/2010	Fever, Dry cough, Backache	anti biotic and antipyretics
17	Banja Gebeyehu	M	39	28/10/2010	Fever, Dry cough, Shortness of breath	anti biotic and antipyretics
18	Befikadu Bonso	M	28	3/11/2010	Fever, Dry cough, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
19	Begdu Regasa	M	23	2/11/2010	Fever, Dry cough, Runny nose, sore throat	anti biotic and antipyretics
20	Belachew Muluneh	M	33	2/11/2010	Fever, Dry cough ,Backache, Shortness of breath	anti biotic and antipyretics
21	Belayneh Dejene	M	19	29/10/2010	Fever, Dry cough, Runny nose, Headache, Backache, Shortness of breath	anti biotic and antipyretics
22	Biritu Teka	M	27	2/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
23	Demelash Desalegn	M	39	30/10/2010	Fever, Dry cough, Runny nose, Shortness of breath	anti biotic and antipyretics
24	Dereje Andalo	M	35	3/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics

25	Desalegn Alemayo	M	38	28/10/2010	Fever, Dry cough, sore throat, Headache, Backache	anti biotic and antipyretics
26	Dinnare Kidene	M	29	29/10/2010	Fever, Dry cough, Runny nose, Shortness of breath	anti biotic and antipyretics
27	Diriba Firsa	M	20	30/10/2010	Fever, Dry cough, Headache, Backache	anti biotic and antipyretics
28	Docco Tumee	M	33	5/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
29	Eshetu Endale	M	31	4/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
30	Eshetu Feyera	M	28	3/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
31	Eshetu Kedir	M	38	29/10/2010	Fever, Dry cough, Runny nose	anti biotic and antipyretics
32	Girma Irkisa	M	36	3/11/2010	Fever, dry cough, runny nose, headache, backache, shortness of breath	anti biotic and antipyretics
33	Habtamu Degaga	M	32	4/11/2010	Fever, Dry cough, Runny nose, Shortness of breath	anti biotic and antipyretics
34	Habtamu Bekele	M	29	28/10/2010	Fever, Dry cough, Backache	anti biotic and antipyretics
35	Habtamu Kamir	M	27	5/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache ,Shortness of breath	anti biotic and antipyretics
36	Habtamu Tadele	M	20	30/10/2010	Fever, Dry cough, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
37	Hujulu Hukiri	M	36	1/11/2010	Fever, Dry cough, Runny nose, Headache, Backache, Shortness of breath	anti biotic and antipyretics
38	Itana Jifar	M	30	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Backache, Shortness of breath	anti biotic and antipyretics
39	Jiwar Bekele	M	19	28/10/2010	Fever, Dry cough ,Runny nose, sore throat, Headache, Shortness of breath	anti biotic and antipyretics
40	Kedir Melese	M	25	5/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache	anti biotic and antipyretics
41	Ketema Kesito	M	40	28/10/2010	Fever, Dry cough, Headache, Backache, Shortness of breath	anti biotic and antipyretics
42	Kifle Endeg	M	39	2/11/2010	Fever, Dry cough, Runny nose	anti biotic and antipyretics
43	Mahari Kasaye	M	33	1/11/2010	Fever, Dry cough, Runny nose, sore throat, Shortness of breath	anti biotic and antipyretics
44	Mehamed Mustofa	M	43	29/10/201	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
45	Melaku Meshesha	M	36	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
46	Melaku Truneh	M	18	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
47	Melkamu Gezayi	M	29	5/11/2010	Fever, Dry cough, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
48	Mengesha Asnake	M	56	28/10/2010	Fever, Dry cough, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
49	Mitku Aschenaki	M	30	29/10/2010	Fever, Dry cough, Runny nose, Backache, Shortness of breath	anti biotic and antipyretics
50	Nasir Faris	M	18	30/10/2010	Fever, Dry cough, Runny nose, Backache, Shortness of breath	anti biotic and antipyretics
51	Nuredin Abdu	M	23	30/10/2010	Fever, Dry cough	anti biotic and antipyretics

52	Nuredin Hussen	M	24	28/10/2010	Fever, Dry cough, Runny nose, sore throat,	anti biotic and antipyretics
53	Reshid Jemal	M	22	30/10/2010	Fever, Dry cough, Runny nose	anti biotic and antipyretics
54	Reta Lema	M	41	2/11/2010	Fever, Dry cough, Headache, Backache, Shortness of breath	anti biotic and antipyretics
55	Reta Merdasa	M	25	28/10/2010	Fever, Dry cough, Runny nose, sore throat	anti biotic and antipyretics
56	Seifu Jebril	M	34	29/10/2010	Fever, Dry cough, Headache, Backache, Shortness of breath	anti biotic and antipyretics
57	Shemsu Husen	M	38	1/11/2010	Fever, Dry cough, Runny nose, sore throat, Shortness of breath	anti biotic and antipyretics
58	Shibru Dibaba	M	31	30/10/2010	Fever, Dry cough, Runny nose, sore throat, Shortness of breath	anti biotic and antipyretics
59	Shifa Kelifa	M	25	29/10/2010	Fever, Dry cough, Runny nose, sore throat, Backache, Shortness of breath	anti biotic and antipyretics
60	Shiferaw Taye	M	32	2/11/2010	Fever, Dry cough, Runny nose, sore throat, Backache, Shortness of breath	anti biotic and antipyretics
61	Sintayehu Aslemaki	M	19	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
62	Sintayehu Belay	M	21	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
63	Sintayo Asico	M	20	5/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
64	Sintayo Belay	M	18	3/11/2010	Fever, Dry cough, Runny nose, Headache, Backache, Shortness of breath	anti biotic and antipyretics
65	Tagel Asefa	M	19	3/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
66	Tajudin Mohamed	M	48	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
67	Tamru Taye	M	32	2/11/2010	Fever, Dry cough, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
68	Tamru Tesema	M	29	4/11/2010	Fever, Dry cough, Runny nose	anti biotic and antipyretics
69	Tariku Tadesse	M	30	29/10/2010	Fever, Dry cough, Runny nose, Headache, Backache	anti biotic and antipyretics
70	Tazik Gebeyo	M	24	29/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Shortness of breath	anti biotic and antipyretics
71	Tekalign G/Michael	M	28	4/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Shortness of breath	anti biotic and antipyretics
72	Tekalign Getaneh	M	31	3/11/2010	Fever, Dry cough, Runny nose, sore throat	anti biotic and antipyretics
73	Teklu Tadese	M	22	2/11/2010	Fever, Dry cough, Runny nose, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
74	Tesfaye Debebe	M	27	1/11/2010	Fever, Dry cough, sore throat, Headache, Backache, Shortness of breath	anti biotic and antipyretics
75	Tezera Bekele	M	35	30/10/2010	Fever, Dry cough, Runny nose, sore throat, Shortness of breath	anti biotic and antipyretics
76	Tilahun Mengesha	M	23	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
77	Wondmu Sintayo	M	30	28/10/2010	Fever, Dry cough, Runny nose, sore throat, Headache	anti biotic and antipyretics
79	Zahir Isaa	M	30	28/10/2010	Fever, Dry cough, Runny nose,	anti biotic and antipyretics

80	Aliya Awel	F	20	2/11/2010	Sore throat, dry cough, headache,fever, back pain,myalgia,	anti biotics and antipyretics
81	Melesiya Awel	F	15	2/11/2010	Fever,dry cough, myalgia	anti biotics and antipyretics
82	Abdo Abrar	M	40	29/10/2010	Myalgia,fever, sore throat, cough,	anti biotics and antipyretics
83	Hasenat Abdu	F	5	1/11/2010	fever,headache,myalgia,cough, runny nose	anti biotics and antipyretics
84	Medina Aliyi	F	37	2/11/2010	Fever,headache,myalgia, runny nose,back pain, abdominal pain, diarrhea, cough	anti biotics and antipyretics
85	Getachew Tesfa	M	20	2/11/2010	headache, runny nose, fever,myalgia, dry cough	anti biotics and antipyretics
86	Sitotaw Melkamu	M	2	28/10/2010	fever, cough, myalgia	anti biotics and antipyretics

Annex 3.1.1 A Questionnaire for Evaluation of surveillance system at Health facility level

Name of interviewer__________ Date interviewing ___________Name interviewee ________

1. **General information**

1.1. Hospital /Health center /Health post

1.2. District name: __________________

1.3. Health facility name: _________________

1.4. Profession/position: _________________

1.5. Does your health facility have surveillance focal person?

 yes No not applicable

1.6. Is there any written documentation of the objectives of a surveillance system available? (**Observe**)

 yes No I do not know

2. **Case-detection and Registration**

2.1. Do you have any means / mechanism to capture information from the community / or other informal sources

 yes No I do not know

2.1.1. If yes, what type of means do you have?________________

2.2. Do you have standard case definitions for malaria and/or measles?

 yes No I do not know

2.2.1. If yes, are they posted (**Observe**)? yes No

2.3. Does the health facility have logbook to record rumours of outbreak?

 Yes No

2.4. Does the health facility have appropriate clinical registration?

 Yes No

3. **Case Confirmation**

3.1. Do you have the capacity to collect specimen for case confirmation of malaria and/or measles? yes No I do not know

3.2. Does your facility perform External quality assurance for malaria?

 yes No I do not know

3.3. Are laboratory diagnostic reagents for malaria present and maintained in your health facility? □Yes □ No □ I do not know

3.4. Are supplies for malaria and/or measles specimen collection and transportation present and maintained in your health facility? □Yes □ No □ I do not know

3.5. Proportion of malaria and/or measles outbreaks that are laboratory confirmed within last year (**specify**)_______

4. **Data Reporting**

4.1. What type of communication facility do you use for reporting to next level?

□Hard copy report □E-Mail □ Fax □Radio □telephone □Other

4.2. Number of measles reports sent to district previous 3 months__________

4.3. Number of malaria reports sent to district previous 3 months____ /12 reports

4.4. Did your health facility use case based reporting forms for measles in the past 1 year?

□yes □ sometimes □ No □I do not know

4.5. Proportion of outbreak of malaria and/or measles detected in previous 1 year that were notified to the next higher level within 30 minutes surpassing the epidemic threshold___

4.6. Does your health facility have appropriate surveillance forms at any times during the past 3 months? (**Observe**)

4.6.1. Weekly report form □Yes □ No □I don't know

4.6.2. Case based report form □Yes □ No □I don't know

4.6.3. Line listing □Yes □ No □I don't know

4.6.4. Epidemic report form □Yes □ No □I don't know

5. Data Analysis

5.1. Do you do malaria and/or measles surveillance data analysis at your facility/organization level? (**Observe**)

Time □yes □ No □ I do not know

Place □yes □ No □ I do not know

Person □yes □ No □ I do not know

5.2. Does your health facility have clear and defined epidemic threshold values for malaria and/or measles?

□yes □ No □ I do not know

5.2.1. If yes, do you monitor? (**Observe**) □yes □ No □ I do not know

6. Outbreak Investigation

6.1. Did you have any suspected malaria and/or measles outbreak in the last 1 year?

□yes □ No □ I do not know

6.1.1. If yes, how many suspected outbreaks did you have in the last year? ____________

6.1.2. How many of the suspected outbreaks were investigated? ____________

6.1.3. Did you look for any risk factor during investigation?

□yes □ No □ I do not know

7. Epidemic Preparedness and response

7.1. Do you have any written report of epidemic preparedness plan? (**Observe**)

□yes □ No □ I do not know

7.2. Did your health facility experience shortage of drugs and supplies for the most recent malaria and/or measles outbreak within 3 months

□yes □ No □ not applicable

7.2.1 If yes, what was the shortage? _______________________________________

7.3. Are emergency stocks of drugs and supplies available?

□yes □ No □ I do not know

7.4. Do you have a budget line for epidemic response?

□yes □ No □ I do not know

7.5. Does your facility/ organization have a rapid response team?

□yes □ No □ I do not know

7.6. Did your facility/ organization implement prevention activities based on local malaria and/or measles data? (**Observe**)

□yes □ No □ I do not know

7.7. How fast did you respond to epidemic reports in your locality?_________

7.8. Does your health facility have experience of cross-border communication during outbreaks? □yes □ No □ not applicable

8. Feedback

8.1. Have you received written feedback from district during the last 1 year?

□yes □ No □ I do not know

8.1.1. If yes, how many written feedback reports did you receive from district during the last 1 year? (**Observe**) ______________

9. Supervision

9.1. How many times have you been supervised in the last 1 year? ____________

9.2. How many supervisory visits were you planned in the last 1 year? (**Observe**) ________

9.3. How many supervisory visits have you made in the last 1 year? (**Observe**) ___________

9.4. How many supervisory visits you made for each health posts? (**Observe**) __________

9.5. Do you use supervisory check list (**observe**) □yes □ No

10. Standards and guidelines

10.1. Is there a national guideline for surveillance at your health facility?

□yes □ No □ I do not know

10.2. Does your health facility have standard case management protocol for malaria and/or measles? □yes □ No □ I do not know

10.3. Does your laboratory unit have SOP's for collection, packaging, and referral of specimen's malaria and/or measles? □yes □ No □ I do not know

10.4. Does your health facility have guidelines for investigation of malaria and/or measles outbreaks? □yes □ No □ I do not know

11. Training

11.1. Did you get training in surveillance and basic epidemiology?

□yes □ No

11.1.1. If yes, when was the training? _____________

11.2. What proportions of the health workers have surveillance training?_____________

12. Resources

Are the following resources indicated in the table below available in your facility/organization? (Mark **X** where appropriate)

No	Type of resources	Present	Absent	Remarks
1	Electricity			
2	Motor cycle			
3	Vehicle			
4	Adequate Stationery			
5	Calculator			
6	Computer			
7	Printer			
8	Telephone service			
9	Fax			
10	Radio call			
11	Posters			
12	Megaphone			
13	Flipcharts or image box			
14	Generator			

13. Timeliness

13.1. How many malaria weekly reports did you send to district during the last 3 months timely? **(Observe)** ______

13.2. How many measles reports did you send to district immediately during the last 3 months? **(Observe)** ______

13.3. Number of outbreaks initiated verification process within 30 minutes?__________

14. Completeness

14.1. How many malaria weekly reports did you send to the district within the last 3 months? (**Observe**)______

14.2. How many immediately measles reports did you send to the district within the last 3 months? (**Observe**)______

14.3. Does your health facility complete all the variables of the malaria and measles reporting formats? (**Observe**)

□yes □ No □do not know

15. Usefulness

15.1. Do you use malaria and/or measles surveillance data /information for?

15.1.1 Planning □yes □ No □do not know

15.1.2 Priority setting □yes □ No □do not know

15.1.3 Interventions □yes □ No □do not know

15.1.4. Others (**Specify**) ______________________________

16. Simplicity

16.1. Do you think that the surveillance system is simple to understand?

16.1.1 Case definition □yes □ No □do not know

16.1.2 Data collection □yes □ No □do not know

16.1.3 Data analysis □yes □ No □do not know

16.1.4. If case definition is no, of which disease is difficult to understand the case definition_______

17. Acceptability

17.1. Do you think that surveillance system is acceptable by health workers?

□ Yes □ No □not much

17.2. Are you satisfied working in the existing surveillance system?

□yes □ No

18. Reliability

18.1.Do you think that surveillance reports with reported cases correspond (with an acceptable error margin) to the records in the register over the same time period?

□ Yes □ No □not sure

Reports of previous 1 month

Disease conditions	Number of cases recorded		Number of deaths recorded	
	Register review	Facility reports	Register review	Facility reports

Annex3.1.2: A Questionnaire for Evaluation of Surveillance System at District Level

District name ____________Name of interviewer___________Date____________

Name of interviewee ____________Profession/position ________

1. **General information**
   1.1. Number of health facilities: Hospital___ Health center ___ Health post______
   1.2. Is there any written documentation of the objectives of a surveillance system available? (**Observe**) ☐yes ☐ No ☐ I do not know

   1.3. Is there legal mechanism to enforce surveillance for priority diseases?
   ☐Yes ☐ No ☐ I do not know

2. **Case-detection and Registration**
   2.1. Do you have any means / mechanism to capture information from the community / or other informal sources? ☐yes ☐ No ☐ I do not know

   2.1.1. If yes, what type of means do you have?________________
   2.2. Do you have standard case definition for malaria and/or measles? (**Observe**)
   ☐yes ☐ No ☐ I do not know
   2.3.Does the district have logbook to record rumours of outbreak?
   ☐Yes ☐ No

3. **Case Confirmation**
   3.1. Are laboratory diagnostic reagents for malaria and /or measles present and maintained in your district? ☐Yes ☐ No ☐ I do not know
   3.2. Are there malaria and/or measles outbreaks that are lab confirmed in the last 1 year?
   ☐yes ☐ No ☐ I do not know ☐ not applicable
   3.3.Proportion of malaria and/or measles out breaks that are laboratory confirmed within last year____
   3.4. Are supplies for specimen collection and transportation present and maintained in your district? ☐Yes ☐ No ☐ I do not know

3.5. Do you have a documented list of referral laboratories for confirmation of malaria and/or measles? □yes □ No □ I do not know

4. **Data Reporting**

4.1. What type of communication facility do you use for reporting to next level?

□Hard copy report □Radio □Telephone □Mail □ Fax □Other

4.2. Proportion of measles cases that were reported to regional level using case based reporting forms in the previous 1year_________

4.3.Proportion of malaria and measles epidemics detected in previous 1 year that were notified to the regional level within 1 hour surpassing the epidemic threshold_

4.4. Number of reports received at district level in the last 3 months? (**Observe**)

4.4.1. For measles________

4.4.2. For malaria:________ /12 reports

4.5. Does your district have appropriate surveillance forms at any times during the past 3 months? (**Observe**)

4.5.1. Weekly report form □Yes □ No □I don't know

4.5.2. Case based report form □Yes □ No □I don't know

4.5.3. Line listing □Yes □ No □I don't know

4.5.4. Epidemic report form □Yes □ No □I don't know

4.6. Number of reports sent to region during the last 3 months (**Observe**)

4.6.1. For measles _______

4.6.2. For malaria_________ /12reports

5. **Data Analysis**

5.1.Do you analyze malaria and measles data at your district by (**observe**)

5.1.1. Time □yes □ No □ I do not know

5.1.2. Place □yes □ No □ I do not know

5.1.3. Person □yes □ No □ I do not know

5.2.Does your district have clear and defined epidemic threshold values for epidemic prone diseases? □yes □ No □ I do not know

5.2.1. If yes, what is the threshold? ___________________________________

6. Outbreak Investigation

6.1. Did you have any suspected outbreak in the last year?

□yes □ No □ I do not know

6.2.How many of the suspected outbreaks were investigated? ______________

6.3.Did you look for any risk factor/s during investigation?

□yes □ No □ I do not know

7. Epidemic Preparedness

7.1.Does the district have a rapid response team for epidemics?

□yes □ No □ I do not know

7.2.Do you have any written report of epidemic preparedness plan? **(Observe)**

□yes □ No □ I do not know

7.3.Does your district have budget line for epidemic response?

□Yes □ No □ I do not know

7.4.Did your district experience shortage of drugs and supplies for the most recent malaria and/or measles outbreak within the last 1 year?

□yes □ No □ I do not know □Not applicable

7.4.1. If yes, what were the outbreaks and the shortage? ______________

7.5.Are emergency stocks of drugs and supplies for malaria and/or measles available at district level? □yes □ No □ I do not know

8. Epidemic Response

8.1.Did epidemic management committee evaluate its preparedness and response activities during the past 1 year (Observe written report to confirm)?

□Yes □ No □ I do not know

8.2.Did your district have experience of cross-border communication during outbreaks any time in the past? □Yes □ No □ I do not know

9. Feedback

9.1. Do you get a periodic feedback from the regional level?

□Yes □ No □ I do not know

9.2. How many written feedback reports did you receive from the region during the past 1 year? (**Observe**) __________

9.3. Do you give a periodic performance feedback to health facilities?

□Yes □ No □ I do not know

9.4. How many written feedback reports did you produce during the past 1 year? (**Observe**)____________

10. Supervision

10.1. Do you conduct a planned supervision to health facilities on a regular basis?

□Yes □ No □ I do not know

10.2. Proportion of supervisions conducted according to plan (how many were planned and how many implemented) _______/_________

10.3. Do you use supervisory check lists during supervision?

□Yes □ No □sometimes

10.4. Observe supervision report or any evidence of supervision in the previous 1 year

10.5. How many times have you been supervised in the previous 1 year?_______

11. Standards and guidelines

11.1. Is there a national surveillance manual/guideline at your district?

□yes □ No □ I do not know

11.2. Does your district have standard case management protocol for malaria and/or measles? □yes □ No □ I do not know

11.3. Does your district surveillance unit have guidelines for investigation of outbreaks? □yes □ No □ I do not know

11.4. Does your district use guidelines for infection control?

□Yes □ No □ I do not know

12. Training

12.1. Have you ever been trained in surveillance and basic epidemiology?

□yes □ No

12.2. Does your district have surveillance training manuals at hand? (**Observe**)

□yes □ No

12.3. Does your district have surveillance training plan for this fiscal year?

□Yes □ No

12.4. Did you conduct the training according to the plan?

□Yes □ No

12.4.1. If no, what was the reason? ____

13. Resources

Are the following resources (indicated in the table below) available in your district? (Mark **X** where appropriate)

No	Type of resources	Present	Absent	Remarks
1	Electricity			
2	Motor cycle			
3	Vehicle			
4	Adequate Stationery			
5	Calculator			
6	Computer			
7	Printer			
8	Telephone service			
9	Fax			
10	Radio call			
11	Posters			
12	Megaphone			
13	Flipcharts or image box			
14	Generator			
15	Movie projector with screen			

14. Timeliness

14.1. Proportion of health facilities submitted weekly malaria reports to the district on time in the previous 3 months________________

14.2. Proportion of expected immediately measles reports to the districts on time in the previous 3 months________________

14.3. Proportion of outbreaks notified to the regional level within 1 hour of detection since last year_____

14.4. Proportion of outbreaks with verification process initiated within 1 hour of detection______

15. Completeness

15.1. Proportion of total expected weekly malaria surveillance reports that were received within previous 3 months at district level regardless of timeliness(**observe**)________

15.2. Proportion of malaria and/or measles reports received with no missing of the required information (variables) within previous 3 months at district level (**observe**) __

15.3. Proportion of total expected surveillance reports that were reported to regional level within previous 3 months regardless of the timeliness of reporting (**observe**)____

15.4. Proportion of reports sent with no missing of the required information (variables) within previous 3 months to regional level (**observe**) ________

16. Usefulness

16.1. Do you use surveillance data /information for?

16.1.1. Planning, ☐yes ☐ No ☐do not know

16.1.2. Priority setting ☐yes ☐ No ☐do not know

16.1.3. Interventions ☐yes ☐ No ☐do not know

16.1.4. Monitoring and evaluation of programs ☐yes ☐ No ☐do not know

16.2. Observe for any sample that is planned for priority setting and intervention using the available data ☐ Yes ☐ No ☐do not know

17. Simplicity

17.1. Do you think that the surveillance system is simple to understand?

17.1.1. Case definition Yes No not much

17.1.2. Data collection Yes No not muc

17.1.3. Data analysis Yes No not much

17.2. If the answer for case definition is no, of which disease is it_____________

18. Acceptability

18.1. Do you think that surveillance system is acceptable at district level?

 Yes No not much

18.2. Are you satisfied working in the existing surveillance system?

yes No

19. Reliability

19.1. Do you think that surveillance reports with reported cases correspond (with an acceptable error margin) to the records in the register over the same time period?

 Yes No not sure

Weekly report accuracy (district to region)

Disease conditions	Number of cases recorded		Number of deaths recorded	
	District reports	Regional report	District reports	Regional report

Annex3.1.3: **A Questionnaire for Evaluation of Surveillance System at Reginal Level**

Name of interviewer ______________Date _______Name of interviewee ____________

1. **General information**

1.1.Profession/position ______________

1.2.Number of health facilities:

1.2.1. Gov.(Hospita,health center and health post)l ____

1.2.2. Private (Hospital, and clinic)_________

1.3. Is there any written documentation of the objectives/plan of disease surveillance system in the region? (**Observe**) ☐Yes ☐ No ☐ I do not know

1.4. Is there legal mechanism to enforce surveillance for priority diseases?

☐Yes ☐ No ☐ I do not know

2. **Case-detection and Registration**

2.1. Does your region have any means / mechanism to capture information of unusual event from the community or other informal sources?

☐Yes ☐ No ☐ I do not know

2.1.1. If yes, what type of means do you have?_______________________________

2.2. Does your region have standard case definitions for malaria and/or measles? (**Observe**) ☐Yes ☐ No ☐ I do not know

2.3.Proportion of districts with Standard Case Definition for malaria and/or measles________

2.4.Does the region have logbook to record rumours of outbreak?

☐Yes ☐ No

3. **Case Confirmation**

3.1. Are laboratory diagnostic reagents present and maintained in your region?

☐Yes ☐ No ☐ I do not know

3.2. Are supplies for specimen collection and transportation present and maintained in your region? ☐Yes ☐ No ☐ I do not know

3.3. Proportion of malaria and/or measles out breaks that are laboratory confirmed within last year (**specify**)_______

3.4. What proportion of health facilities (HF) Performing external quality assurance for malaria?__

3.5. What proportions of health facilities that have the capacity to transport specimens for malaria and/or measles to a higher level lab?__________

3.6. What proportions of health facilities that have guidelines for specimen collection, handling, and transportation to the next level?_________

4. Data Reporting

4.1.What type of communication facility do you use for reporting to central level?

☐hard copy report ☐E-mail ☐ Fax ☐Radio ☐Electronic ☐Other

4.2. Proportion of measles cases that were reported to central level using case based reporting forms in the previous 1year__________

4.3. Proportion of malaria and measles epidemics detected in previous 1 year that were notified to the central level within 1 hour surpassing the epidemic threshold_________

4.4. Number of reports received at regional level in the previous 3 months

4.4.1 For measle__________/

4.4.2. For malaria:________ /12 times reports

4.5. Does your region have appropriate surveillance forms at any times during the past 3 months? (**Observe**)

Weekly report form	☐Yes	☐ No	☐I don't know
Case based report form	☐Yes	☐ No	☐I don't know
Line listing	☐Yes	☐ No	☐I don't know
Epidemic report form	☐Yes	☐ No	☐I don't know

5. Data Analysis

5.1. Does your region analyze malaria and measles surveillance data by (**Observe**)

Time	☐Yes	☐ No	☐ I do not know
Place	☐Yes	☐ No	☐ I do not know
Person	☐Yes	☐ No	☐ I do not know

5.2. Does your region have clear and defined epidemic threshold values for malaria and measles? □Yes □ No □ I do not know

5.2.1.If yes, what is the threshold? ____________

6. **Outbreak Investigation**

6.1. Did you have any suspected outbreak of malaria and/or measles in the past 1 year?

□Yes □ No □ I do not know

6.1.1. How many of the suspected outbreaks are investigated _________

6.1.2. Number of outbreaks in which risk factors were looked for _______

6.1.3. Number of outbreaks in which findings were used for action ________

7. Epidemic Preparedness

7.1. Does your region have Rapid Response Team (RRT)?

□Yes □ No □ I do not know

7.2. Do you have any written report of epidemic preparedness plan? (**Observe**)

□Yes □ No □ I do not know

7.3. Does the region have budget line for epidemic response?

□Yes □ No □ I do not know

7.4. Has the region had ____________________at all times in past 1 year?

7.4.1. Emergency stocks of drugs □Yes □ No □ I do not know

7.4.2. Vaccines □Yes □ No □ I do not know

7.4.3. Supplies □Yes □ No □ I do not know

7.5. Did your region have experienced shortage of drugs and supplies for the most recent outbreak within the previous 1 year? □Yes □ No □ I do not know

7.5.1. If yes, what was the outbreak and the shortage? ________________________________

8. Epidemic Response

8.1. Does epidemic management committee evaluate its preparedness and response activities during the past 1 year (Observe written report to confirm)?

□Yes □ No □ I do not know

8.2. Did your region has experience of cross-border communication during outbreak

□Yes □ No □ I do not know

8.3. Observe that regional level responded within 2 hours of notification of most recently reported outbreak within a year (from written reports with trend and intervention)

□Yes □ No □ I do not know

9. Feedback

9.1. Do you get a periodic feedback from central level?

□Yes □ No □ I do not know

9.2. How many feedbacks written reports did you receive from central during the last 1 year? (**Observe**) _________

9.3. Do you give a periodic feedback to districts?

□Yes □ No □ I do not know

9.4. How many feedbacks written reports did you produce during the last 1 year? (**Observe**)___________

10. Supervision

10.1. Do you conduct a planned supervision to your districts on a regular basis?

□Yes □ No □ I do not know

10.2. Proportion of supervisions conducted according to plan (how many was planned and how many was implemented) ______________

10.3. Do you use supervisory check list during supervision?

□Yes □ No □sometimes

10.4. Observe supervision report or any evidence of supervision in the previous 1 year

10.5. How many times have you been supervised in the previous 1 year?___________

11. Standards and guidelines

11.1.Does your region have surveillance standard guidelines?

□Yes □ No □ I do not know

11.2. Does your region have guidelines for investigation of malaria and/or measles outbreaks?

□Yes □ No □ I do not know

11.3. Does your region have standard case management protocol for malaria and measles?

□Yes □ No □ I do not know

11.4. What Proportion of districts is with standard case management protocol malaria and measles _____?

11.5. Does your region use guidelines for infection control?

□Yes □ No □ I do not know

11.6. Does your region have SOP's for laboratory units (malaria and measles)?

□Yes □ No □ I do not know

12. Training

12.1. Do you have training on disease surveillance /IDSR?

□Yes □ No

12.1.1. If yes, when was the training?_____________________________

12.2. Does your region have surveillance training plan for this fiscal year?

□Yes □ No

12.3. Did you conduct the training according to the plan?

□Yes □ No

12.1.2. If no, what was the reason? _______________________________________

12.2. Does your region have surveillance training manual?

□Yes □ No

13. Resources

Are the following resources indicated in the table below available in your region? (Mark **X** where appropriate)

No	Type of resources	Present	Absent	Remarks
1	Electricity			
2	Motor cycle			
3	Vehicle			
4	Adequate Stationery			
5	Calculator			
6	Computer			

7	Printer			
8	Telephone service			
9	Fax			
10	Radio call			
11	Posters(malaria and measles)			
12	Megaphone			
13	Flipcharts or image box			
14	Generator			
15	Internet access			

14. Timeliness

14.1. Proportion of districts submitted weekly malaria reports to the region on time in the previous 3 months________________

14.2. Proportion of expected immediately measles reports received on time from districts in the previous 3 months________________

14.3. Proportion of outbreaks notified to the central level within 1 hour of detection since last year________

14.4. Proportion of outbreaks with verification process initiated within 2 hour of detection____

15. Completeness

15.1. Proportion of total expected weekly malaria surveillance reports that were received within previous 3 months at regional level regardless of timeliness(**observe**)________

15.2. Proportion of malaria and/or measles reports received with no missing of the required information (variables) within previous 3 months at regional level (**observe**) ____

15.3. Proportion of total expected surveillance reports that were reported to central level within previous 3 months regardless of the timeliness of reporting (**observe**)___________

15.4. Proportion of reports sent with no missing of the required information (variables) within previous 3 months to central level (**observe**) ______

16. Usefulness

16.1.Do you use surveillance data /information for?

16.1.1. Planning ☐Yes ☐ No ☐I do not know

16.1.2. Priority setting ☐Yes ☐ No ☐I do not know

16.1.3. Intervention ☐Yes ☐ No ☐I do not know

16.1.4. Others (specify) ____

16.2.Observe for any sample that is planned for priority setting and intervention using the available data ☐ Yes ☐ No ☐I do not know

17. Simplicity

17.1.Do you think that the surveillance system is simple to understand with regard to:

17.1.1. Case definition ☐ Yes ☐ No ☐Not much

17.1.2. Data collection ☐ Yes ☐ No ☐Not much

17.1.3. Data analysis ☐ Yes ☐ No ☐Not much

17.1.4. If case definition is no, which disease is difficult to understand_____________

18. Acceptability

18.1.Do you think that surveillance system is acceptable at regional level?

☐ Yes ☐ No ☐not much

18.2. Are you satisfied working in the existing surveillance system?

☐yes ☐ No

19. Reliability

Do you think that surveillance reports with reported cases corresponding (with an acceptable error margin) to the records in the register over the same time period and observe

□ Yes □ No □not sure

Report of previous one month(weekly)

Disease conditions	Number of cases recorded		Number of deaths recorded	
	Total District report	Region report	Total District Report	Region report

Annex3.1.4. Questionnaire for Evaluation of surveillance system at Health post level

General information
Hospital /Health center /Health post
District name ________________________
Health post name________________________
Name of interviewer_____________________Date____________________
Name of interviewee _________________________Profession/position ______________
Telephone no. of interviewee (land line/cell phone) ___________________

Do you have training of surveillance system/IDSR?

☐yes ☐ No
If yes, when was the training?_________________________

Is there a national manual/guideline of surveillance at your health facility?

☐yes ☐ No ☐ I do not know

Case-detection and Registration

Have you heard of notifiable diseases under surveillance?
☐yes ☐ No ☐ I do not know

If yes, do you know no. of notifiable disease?
☐yes ☐ No ☐ I do not know

How many are they? _______________

What are they? List them _______________

Do you have any means / mechanism to capture information from the community / or other informal sources
☐yes ☐ No ☐ I do not know

If yes, what type of means do you have?________________

Do you have standard case definitions for notifiable diseases available?

☐yes ☐ No ☐ I do not know

Data Reporting
What type of communication facility do you use for reporting to next level?

☐Hard copy report ☐Mail ☐ Fax ☐Radio ☐telephone
☐Other

Outbreak Investigation

Did you have any suspected outbreak in the last year?

□yes □ No □ I do not know

If your answer is yes, how many suspected outbreaks did you have in the last year? ____________

Annex6.1.1. Detail plan for emergency drugs, medical supplies and other response items requirements by zone/districts

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

General Assumptions: At risk districts= those affected at least once since 2006, Attack rate = 2%, Severe cases=50%, Adult = 80%, Children=20% RL=120bag per 20 sever cases, ORS 650 sachets per 100 cases, pregnant women=2%, Doxycyline= 3capsules,

CTC=!CTC with 10 bed , bed occupancy rate=3 days, monthly admission 100, six months admission=600, Wastage factor =15%, 2 dollar per sever case

Zone	District	Population (July 2009)	Expected cases	Severe dehydration	RL/NS bag of 1000ml	ORS [satchets]	Doxacycline 100 mg caps, 1000 per tin [Tin]	PNGT	ANGT	IV Cannula	Scalp Vein	Amoxacilline 250mg/5ml susp,100 ml/bottle	RDT Kit of 20 tests for epidemic detection	CTC	Total Cost of drugs, supplies and CTC Kit	Operational cost-case management	Inter district resource moblization	Total Cost
		A	B = 2%A	C = 50% B	D= C x 6	E = 6.5 x B	F= 3 x B	G =0.03 xC	H = 0.1xC	I= 0.8xC	J= 0.09xC	L= 2x0.2xC	M=5 kitof 20tests for each district	N	O	P	Q=5person*30day*200birr	
Zone 1	Dubti	69,925	1,399	682	4,707	10,454	2	24	78	628	71	314	5	1		18,419	30,000.00	
	Elidar	85,103	1,702	830	5,729	12,723	3	29	95	764	86	382	5	2		22,417	30,000.00	
	Asayita	50,543	1,011	493	3,402	7,556	2	17	57	454	51	227	5	1		13,314	30,000.00	
	Afambo	25,832	517	252	1,739	3,862	1	9	29	232	26	116	5	1		6,805	30,000.00	
	Mile	99,328	1,987	969	6,686	14,850	3	33	111	892	100	446	5	2		26,164	30,000.00	
	Chifra	97,508	1,950	951	6,564	14,577	3	33	109	875	98	438	5	2		25,685	30,000.00	
	Adda'ar	58,425	1,169	570	3,933	8,735	2	20	66	524	59	262	5	1		15,390	30,000.00	
	Kori	23,465	469	229	1,580	3,508	1	8	26	211	24	105	5	1		6,183	30,000.00	
			10,203	4,977		76,264												
		Total items			34,341	152,529	17	172	572	4,579	515	2,289	35	11		0	0.00	
		Unit Cost in Eth. Birr			26.55	0.8	180.09	2.48	0.24	2.47	0.56	6.35		50898		0	0.00	N+O+P
		Total Cost in Eth. Birr			**911,750**	**122,023**	**3,092**	**426**	**137**	**11,310**	**288**	**14,538**		**559,878**	**1,623,442**	**432,545**	**240,000.00**	**2,295,987**
Zone 2	Afedra	34,690	694	347	2,394	5,186	5	12	40	319	248	160	5	1		9,366	30,000.00	
	Dalule	88,167	1,763	882	6,084	13,181	12	30	101	811	630	406	5	2		23,805	30,000.00	
	Zone-2 Total	**122,857**	**2,457**	**1,229**	**8,477**	**18,367**	**17**	**42**	**141**	**1,130**	**877**	**565**	**10**	**3**		**0**	**0.00**	
		Unit Cost in Eth. Birr			26.55	0.8	180.09	2.48	0.24	2.47	0.56	6.35		50898		**0**	0.00	
		Total Cost in Eth. Birr			**225,068**	**14,694**	**3,053**	**105**	**34**	**2,792**	**491**	**3,589**		**152,694**	**402,520**	**33,171**	**60,000.00**	**495,691**
Zone 3	Amibara	67,747	1,355	661	4,561	10,128	2	23	76	608	68	304	5	2		17,846	30,000.00	
	Gewane	33,524	670	327	2,257	5,012	1	11	38	301	34	150	5	1		8,831	30,000.00	
	Bure Mudayitu	34,030	681	332	2,291	5,087	1	11	38	305	34	153	5	1		8,964	30,000.00	
	Dulacha	22,143	443	216	1,491	3,310	1	7	25	199	22	99	5	1		5,833	30,000.00	
	Argoba	23,696	474	231	1,594	3,543	1	8	27	213	24	106	5	1		6,237	30,000.00	

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

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

At risk districts= all districts, Attack rate = 2%, Severe cases=15%, 30% (P.Vivax), 70% (P.fal), RL=5bag *.2% total pop, pregnant women=4%, Under five=16%, Wastage factor =15%, Quinine = 10 ampule per severe case, Dextrose 40%=8 ampules per severe case, 3 days admission, 5 health workers per districts trained of case management for sever and complicated malaria cases for five days.

Zone	District	Population (July 2009)	Expected cases	Severe case	RL/DW bag of 1000ml	Coartem 24 tab blister/pack	Chloroquine 150mg tin of 1000 tab	Quinine injection (of 10 ampule) Pack	Quinine 300mg tab pack of 100	Chloroquine syrup of 60ml bottle	Dextrose 40% of 20ml (ampule 20), pack	Paracitamol 500mg tab (tin of 1000)	Paracitamol suspension 100ml bottle	RDT kit	Total Cost of drugs, and supplies	Operational cost-case management (27 Birr/sever case/day)	Inter-district Moiliztio cost
		A	B = 2%A	C = 15% B	D= B x 5x 0.7x1.15x0.15	E = Bx0.7X1.15	F=10 x B x0.3x1.15/1000	G = C X 10X1.15	H = C x 24X1.15/1000	I= BX0.3X.16x1bots	J= 8xCX1.15/20	K= 10 xBX0.84X1.15/1000	L=Bx0.16x1.15 X1 bottle	M=Bx1.15	N	O=Cx3days x 27Birr	
Zone 1	Dubti	69,925	1399	210	844	1,126	5	241	58	77	96	14	257	1,608		16,992	15,000
	Elidar	85,103	1702	255	1,028	1,370	6	294	70	94	117	16	313	1,957		20,680	15,000
	Asayita	50,543	1011	152	8	814	3	174	42	56	70	10	186	1,162		12,282	15,000
	Afambo	25,832	517	77	312	416	2	89	21	29	36	5	95	594		6,277	15,000
	Mile	99,328	1987	298	1,199	1,599	7	343	82	110	137	19	366	2,285		24,137	15,000
	Chifra	97,508	1950	293	1,177	1,570	7	336	81	108	135	19	359	2,243		23,694	15,000
	Adda'ar	58,425	1169	175	705	941	4	202	48	65	81	11	215	1,344		14,197	15,000
	Kori	23,465	469	70	283	378	2	81	19	26	32	5	86	540		5,702	15,000
		Total items			**5,558**	**8,213**	**35**	**1,760**	**422**	**563**	**704**	**99**	**1,877**	**11,733**		**123,961**	**120,000**
		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr			**147,552**	**110,959**	**3,569**	**58,729**	**28,553**	**4,168**	**118,219**	**2,030**	**7,791**	**316,790**	**798,360**		
Zone 2	Afedra	33,844	677	102	409	545	2	117	3	37	47	7	125	778		8,224	15,000
	Bidu	25,625	513	77	309	413	2	88	2	28	35	5	94	589		6,227	15,000
	Erebeti	38,068	761	114	460	613	3	131	3	42	53	7	140	876		9,251	15,000
	Aba'ala	39,864	797	120	481	642	3	138	3	44	55	8	147	917		9,687	15,000
	Dalule	88,167	1763	265	1,065	1,419	6	304	7	97	122	17	324	2,028		21,425	15,000
	Megale	29,529	591	89	357	475	2	102	2	33	41	6	109	679		7,176	15,000
	Berhale	82,842	1657	249	1,000	1,334	6	286	7	91	114	16	305	1,905		20,131	15,000
	Kuneba	56,909	1138	171	687	916	4	196	5	63	79	11	209	1,309		13,829	15,000
		Total Items			**4,768**	**6,357**	**27**	**1,362**	**33**	**436**	**545**	**76**	**1,453**	**9,082**		**95,948**	**120,000**

		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr			**126,585**	**85,884**	**2,763**	**45,457**	**2,210**	**3,226**	**91,503**	**1,571**	**6,030**	**245,201**	**610,430**		
Zone 3	Awash	32,064	641	96	387	516	2	111	3	35	44	6	118	737		7,792	15,000
	Amibara	67,747	1355	203	818	1,091	5	234	6	75	93	13	249	1,558		16,463	15,000
	Gewane	33,524	670	101	405	540	2	116	3	37	46	6	123	771		8,146	15,000
	Bure Mudayitu	34,030	681	102	411	548	2	117	3	38	47	7	125	783		8,269	15,000
	Dulacha	22,143	443	66	267	357	2	76	2	24	31	4	81	509		5,381	15,000
	Argoba	23,696	474	71	286	382	2	82	2	26	33	5	87	545		5,758	15,000
		Total Items			**2,574**	**3,433**	**15**	**736**	**18**	**235**	**294**	**41**	**785**	**4,904**		**51,809**	**90,000**
		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27		0	
		Total Cost in Eth. Birr			**68,351**	**46,374**	**1,492**	**24,545**	**1,193**	**1,742**	**49,409**	**849**	**3,256**	**132,400**	**329,611**		
Zone 4	Teru	79,157	1583	237	956	1,274	5	273	7	87	109	15	291	1,821		19,235	15,000
	Yalo	49,861	997	150	602	803	3	172	4	55	69	10	183	1,147		12,116	15,000
	Ewa	49,584	992	149	599	798	3	171	4	55	68	10	182	1,140		12,049	15,000
	Awra	37,565	751	113	454	605	3	130	3	41	52	7	138	864		9,128	15,000
	Golina	52,312	1046	157	632	842	4	180	4	58	72	10	193	1,203		12,712	15,000
		Total Items			**3,242**	**4,323**	**19**	**926**	**22**	**296**	**371**	**52**	**988**	**6,175**		**65,240**	**75,000**
		Unit Cost in Eth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr			**86,072**	**58,397**	**1,878**	**30,909**	**1,503**	**2,193**	**62,218**	**1,069**	**4,100**	**166,725**	**415,065**		
Zone5	Sumu Robi	34,274	686	103	414	552	2	118	3	38	47	7	126	789		8,335	15,000
	Hadele Ela	37,742	755	113	456	608	3	130	3	42	52	7	139	868		9,171	15,000
	Telalak	40880	818	123	494	658	3	141	3	45	56	8	150	940		9,934	15,000
	Dawe	45578	912	137	550	734	3	157	4	50	63	9	168	1,048		11,075	15,000
	Dalifage	38931	779	117	470	627	3	134	3	43	54	8	143	895		9,460	**60,000**
		Total Items			**2,384**	**3,179**	**14**	**681**	**16**	**218**	**272**	**38**	**727**	**4,541**		**47,976**	
		Unit Cost inEth. Birr			26.55	13.51	101.4	33.37	67.6	7.4	167.93	20.6	4.15	27			
		Total Cost in Eth. Birr			**63,295**	**42,943**	**1,381**	**22,730**	**1,105**	**1,613**	**45,753**	**786**	**3,015**	**122,605**	**305,226**		

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

General Assumptions: At risk districts = those affected at least once since 2006, Attack rate=2%, Severe cases= 10%, Adults =20% of all case, under 15=44%, <5=16% for scalp vein canulla, vitaminA=200,000 Iu caps*3 doses, Cirprofloxacine for adult severe cases, Admitted patients=6 vials of crys. Penicilline/day, children= 80% of all cases, RL/D5W/NS of 500 ml=1 bag/day/severe cases 5 days

Zone	District	Population (July 2009)	Most vulnerable populatoion (age under 15)	Expected cases	Severe case	RL/NS bag of 500ml	Crystaline Pencillien 1mil.IU/ vial box of 100 vials	TTC eye ointment 1%0f 100 tube	Vitamin A of 200,000IU tin of 1000capsule	Dextrose 40% of 20ml of 20amp	Paracitamol 125mg/5 ml bottle	IV Cannula	Scalp Vein	Amoxaciline 250mg/5ml susp,100 ml/bottle	Ciprofloxacine 500mg tab of 10 (strip)	Measeles vaccine, vials of doses	AD syringe for vaccination 3ml; Box of 100	Safety Box of discarding 100 syringe	Total Cost of drugs, & supplies	Operational cost	Inter-district Moiliztio cost
		A	B=Ax0.44	C = 2%B	D = 10% C	E= D x 5*1.15	F=Dx0.8x 5days x6vialx 1.15/50	G = C*1.15/100	H= Cx3x1.15/1000	I=(5x2x D*1.15)/20	J = 1xCx1.15	K=Dx 1.15	L= Dx0.16x1.15	M= Dx1x0.16x1.15	N=Dx0.2x10x 1.15/10	O=Ax0.44x 1.15	P=Ax0.44 x 1.15/100	Q=Ax0.44x1, 15/100	O	P=D*27	
Zone 1	Dubti	69,925	30767	615	62	354	15	7	2	35	708	71	11	11	71	3,538	354	354		1,661	10,000
	Elidar	85,103	37445	749	75	431	18	9	3	43	861	86	14	14	86	4,306	431	431		2,022	10,000
	Asayita	50,543	22239	445	44	256	11	5	2	26	511	51	8	8	51	2,557	256	256		1,201	10,000
	Afambo	25,832	11366	227	23	131	5	3	1	13	261	26	4	4	26	1,307	131	131		614	10,000
	Mile	99,328	43704	874	87	503	21	10	3	50	1,005	101	16	16	101	5,026	503	503		2,360	10,000
	Chifra	97,508	42904	858	86	493	21	10	3	49	987	99	16	16	99	4,934	493	493		2,317	10,000
	Adda'ar	58,425	25707	514	51	296	12	6	2	30	591	59	9	9	59	2,956	296	296		1,388	10,000
	Kori	23,465	10325	206	21	119	5	2	1	12	237	24	4	4	24	1,187	119	119		558	10,000
		Total items				2,581	108	52	15	258	5,163	516	83	83	516	**25,813**	2,581	2,581		**12,121**	**80,000**
		Unit Cost in Eth. Birr				14.23	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**36,731**	**4,590**	**139**	**8,936**	**43,347**	**21,424**	**1,275**	**99**	**525**	**2,788**	**0**	**0**	**0**	**119,855**		
Zone 2	Afedra	33,844	14891	298	30	171	14	3	1	17	343	34	5	5	34	1,713	171	171		804	10,000
	Bidu	25,625	11275	226	23	130	11	3	1	13	259	26	4	4	26	1,297	130	130		609	10,000
	Erebeti	38,068	16750	335	33	193	16	4	1	19	385	39	6	6	39	1,926	193	193		904	10,000
	Aba'ala	39,864	17540	351	35	202	17	4	1	20	403	40	6	6	40	2,017	202	202		947	10,000
	Dalule	88,167	38793	776	78	446	37	9	3	45	892	89	14	14	89	4,461	446	446		2,095	10,000
	Megale	29,529	12993	260	26	149	12	3	1	15	299	30	5	5	30	1,494	149	149		702	10,000
	Berhale	82,842	36450	729	73	419	35	8	3	42	838	84	13	13	84	4,192	419	419		1,968	10,000

	Kuneba	56,909	25040	501	50	288	24	6	2	29	576	58	9	9	58	2,880	288	288		1,352	10,000
		Total Items				**1,998**	**167**	**40**	**12**	**200**	**3,996**	**400**	**64**	**64**	**400**	**19,979**	**1,998**	**1,998**		**9,382**	**80,000**
		Unit Cost in Eth. Birr				14	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**28,431**	**7,105**	**108**	**6,917**	**33,551**	**16,583**	**987**	**77**	**406**	**2,158**	**0**	**0**	**0**	**96,322**		
Zone 3	Amibara	67,747	29809	596	60	343	29	7	2	34	686	69	11	11	69	3,428	343	343		1,610	10,000
	Gewane	33,524	14751	295	30	170	14	3	1	17	339	34	5	5	34	1,696	170	170		797	10,000
	Bure Mudayitu	34,030	14973	299	30	172	14	3	1	17	344	34	6	6	34	1,722	172	172		809	10,000
	Dulacha	22,143	9743	195	19	112	9	2	1	11	224	22	4	4	22	1,120	112	112		526	10,000
	Argoba	23,696	10426	209	21	120	10	2	1	12	240	24	4	4	24	1,199	120	120		563	10,000
		Total Items				**917**	**77**	**18**	**5**	**92**	**1,833**	**183**	**29**	**29**	**183**	**9,166**	**917**	**917**		**4,304**	**50,000**
		Unit Cost in Eth. Birr				14.23	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**13,043**	**3,259**	**49**	**3,173**	**15,392**	**7,608**	**453**	**35**	**186**	**990**	**0**	**0**	**0**	**44,188**		
Zone 4	Teru	79,157	34829	697	70	401	33	8	2	40	801	80	13	13	80	4,005	401	401		1,881	10,000
	Yalo	49,861	21939	439	44	252	21	5	2	25	505	50	8	8	50	2,523	252	252		1,185	10,000
	Ewa	49,584	21817	436	44	251	21	5	2	25	502	50	8	8	50	2,509	251	251		1,178	10,000
	Awra	37,565	16529	331	33	190	16	4	1	19	380	38	6	6	38	1,901	190	190		893	10,000
	Golina	52,312	23017	460	46	265	22	5	2	26	529	53	8	8	53	2,647	265	265		1,243	10,000
		Total Items				**1,359**	**113**	**27**	**8**	**136**	**2,717**	**272**	**43**	**43**	**272**	**13,585**	**1,359**	**1,359**		**6,379**	**50,000**
		Unit Cost in Eth. Birr				14	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**19,332**	**4,831**	**73**	**4,703**	**22,813**	**11,276**	**671**	**52**	**276**	**1,467**	**0**	**0**	**0**	**65,495**		
Zone5	Sumu Robi	34,274	15081	302	30	173	14	3	1	17	347	35	6	6	35	1,734	173	173		814	10,000
	Hadele Ela	37,742	16606	332	33	191	16	4	1	19	382	38	6	6	38	1,910	191	191		897	10,000
	Telalak	40880	17987	360	36	207	17	4	1	21	414	41	7	7	41	2,069	207	207		971	10,000
	Dawe	45578	20054	401	40	231	19	5	1	23	461	46	7	7	46	2,306	231	231		1,083	10,000
	Dalifage	38931	17130	343	34	197	16	4	1	20	394	39	6	6	39	1,970	197	197		925	10,000
		Total Items				**999**	**83**	**20**	**6**	**100**	**1,998**	**200**	**32**	**32**	**200**	**9,989**	**999**	**999**		**4,690**	**50,000**
		Unit Cost inEth. Birr				14.23	42.6	2.7	577	167.93	4.15	2.47	1.2	6.35	5.4						
		Total Cost in Eth. Birr				**14,214**	**3,552**	**54**	**3,458**	**16,774**	**8,291**	**493**	**38**	**203**	**1,079**	**0**	**0**	**0**	**48,156**		

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

At risk districts=those affected at least once since 2006, Attack rate=0.3% (WHO/CDS/EPR/2007.3), severe cases =50%, 50% of severe need NG tubes, children <1=3.6% tot pop, RL= 2 bags per day for 4 days,1 case*5 bags of RL 1000ml oily CAF, RDT kit of 20 tests for each episodes of outbreak, 1 case *5 vials of crystalline pen500mg, 1 vial AC vaccine for 50 persons, 87% of the pop(= rural) treated with oily CAF, If 50% of the cases will be admitted and treated with Pen G, Ceftraxone, 2 dollar per capita per severe case

Zone	District	Population (July 2009)	Expected cases	Severe cases	RL/DNS bag of 1000ml	Crystaline Penicilline (500 mg Vial) box of 100	Ceftriaxone inj.of 1gm of 50vials	Oily Chloramphenicol of 3gm vial; box of 50	Paracitamole 500mg tab; tin of 1000 tabs	Paracitamole susp.of 100ml bottle of 125mg/5ml	PNGT each	ANGT each	IV Cannula	Scalp Vein	Dextrose 40% of 20ml of 20amp	AC Vaccine (vial of 50 dose)	Vaccione Diluant of 50 ml vial; Box of 50	AD syringe for vaccination 3ml; Box of 100	Safety Box of discarding 100 syringe	RDT kit of 20 tests	Total Cost of drugs and supplies	Operational cost	Inter-district Resource mobilization
		A	B = 0.3%A	C = 50% B	D= C x 2x4x1.15	E = 18 vial/dayx 4dxCx0.5x1.15	F= 2 gm/dx 4dxCx0.5x1.15	G=Bx0.87x1vialx1.15	H=Bx0.84x10tabx1.15/1000	I=Bx0.16x1bottx1.15	J=Cx0.036x1.15	K =Cx0.5x0.96x1.15	L= BX1.15	M=Bx0.036x1.15	N=Bx1ampx4dx1.15/20	O= 0.7xAx1.15/50	P=Ax0.7x1.15/50	Q=Ax0.7x1.15/100	R=Ax0.7x1,15/100	1kit for each district	N	O	
Zone 1	Dubti	69,925	210	105	965	43	10	210	2	39	4	58	241	9	48	1,126	1,126	563	563	1		5,664	15,000
	Elidar	85,103	255	128	1,174	53	12	255	2	47	5	70	294	11	59	1,370	1,370	685	685	1		6,893	15,000
	Asayita	50,543	152	76	697	31	7	152	1	28	3	42	174	6	35	814	814	407	407	1		4,094	15,000
	Afambo	25,832	77	39	356	16	4	78	1	14	2	21	89	3	18	416	416	208	208	1		2,092	15,000
	Mile	99,328	298	149	1,371	62	14	298	3	55	6	82	343	12	69	1,599	1,599	800	800	1		8,046	15,000
	Chifra	97,508	293	146	1,346	61	13	293	3	54	6	81	336	12	67	1,570	1,570	785	785	1		7,898	15,000
	Adda'ar	58,425	175	88	806	36	8	175	2	32	4	48	202	7	40	941	941	470	470	1		4,732	15,000
	Kori	23,465	70	35	324	15	3	70	1	13	1	19	81	3	16	378	378	189	189	1		1,901	15,000
		Total items			**7,040**	**317**	**70**	**1,531**	**15**	**282**	**32**	**422**	**1,760**	**63**	**352**	**8,213**	**8,213**	**4,107**	**4,107**	**8**		**41,320**	**120,000**
		Unit Cost in Eth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			**186,906**	**13,495**	**380**	**0**	**305**	**1,169**	**79**	**101**	**4,347**	**76**	**59,110**	**0**	**0**	**0**	**0**	**0**	**265,967**		
Zone 2	Afedra	33,844	102	51	467	42	5	102	1	19	2	28	117	4	23	545	545	272	272	1		2,741	15,000
	Bidu	25,625	77	38	354	32	4	77	1	14	2	21	88	3	18	413	413	206	206	1		2,076	15,000
	Erebeti	38,068	114	57	525	47	5	114	1	21	2	32	131	5	26	613	613	306	306	1		3,084	15,000
	Aba'ala	39,864	120	60	550	50	6	120	1	22	2	33	138	5	28	642	642	321	321	1		3,229	15,000
	Dalule	88,167	265	132	1,217	110	12	265	3	49	5	73	304	11	61	1,419	1,419	710	710	1		7,142	15,000

	Megale	29,529	89	44	408	37	4	89	1	16	2	24	102	4	20	475	475	238	238	1		2,392	15,000
	Berhale	82,842	249	124	1,143	103	11	249	2	46	5	69	286	10	57	1,334	1,334	667	667	1		6,710	15,000
	Kuneba	56,909	171	85	785	71	8	171	2	31	4	47	196	7	39	916	916	458	458	1		4,610	15,000
		Total Items			**5,449**	**490**	**54**	**1,185**	**11**	**218**	**25**	**327**	**1,362**	**49**	**272**	**6,357**	**6,357**	**3,179**	**3,179**	**8**		**31,983**	**120,000**
		Unit Cost in Eth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			**144,668**	**20,891**	**294**	**0**	**236**	**905**	**61**	**78**	**3,365**	**59**	**45,752**	**0**	**0**	**0**	**0**	**0**	**216,308**		
Zone 3	Amibara	67,747	203	102	935	84	9	203	2	37	4	56	234	8	47	1,091	1,091	545	545	1		5,488	15,000
	Gewane	33,524	101	50	463	42	5	101	1	19	2	28	116	4	23	540	540	270	270	1		2,715	15,000
	Bure Mudayitu	34,030	102	51	470	42	5	102	1	19	2	28	117	4	23	548	548	274	274	1		2,756	15,000
	Dulacha	22,143	66	33	306	28	3	66	1	12	1	18	76	3	15	357	357	178	178	1		1,794	15,000
	Argoba	23,696	71	36	327	29	3	71	1	13	1	20	82	3	16	382	382	191	191	1		1,919	15,000
		Total Items			2,500	225	25	544	5	100	11	150	625	22	125	2,916	2,916	1,458	**1,458**	5		**14,672**	**75,000**
		Unit Cost in Eth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			**66,368**	**9,584**	**135**	**0**	**108**	**415**	**28**	**36**	**1,544**	**27**	**20,989**	**0**	**0**	**0**	**0**	**0**	**99,233**		
Zone 4																							
	Teru	79,157	237	119	1,092	98	11	238	2	44	5	66	273	10	55	1,274	1,274	637	637	1		6,412	15,000
	Yalo	49,861	150	75	688	62	7	150	1	28	3	41	172	6	34	803	803	401	401	1		4,039	15,000
	Ewa	49,584	149	74	684	62	7	149	1	27	3	41	171	6	34	798	798	399	399	1		4,016	15,000
	Awra	37,565	113	56	518	47	5	113	1	21	2	31	130	5	26	605	605	302	302	1		3,043	15,000
	Golina	52,312	157	78	722	65	7	157	2	29	3	43	180	6	36	842	842	421	421	1		4,237	15,000
	Total Items				3,705	333	37	806	8	148	17	222	926	33	185	4,323	4,323	2,161	**2,161**	5		**21,747**	**75,000**
	Unit Cost in Eth. Birr				26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
	Total Cost in Eth. Birr				**19,167**	**2,768**	**39**	**0**	**31**	**120**	**8**	**10**	**446**	**8**	**6,061**	**0**	**0**	**0**	**0**	**0**	**28,658**		
Zone5	Sumu Robi	34,274	103	51	473	43	5	103	1	19	2	28	118	4	24	552	552	276	276	1		2,776	15,000
	Hadele Ela	37,742	113	57	521	47	5	113	1	21	2	31	130	5	26	608	608	304	304	1		3,057	15,000
	Telalak	40880	123	61	564	51	6	123	1	23	3	34	141	5	28	658	658	329	329	1		3,311	15,000
	Dawe	45578	137	68	629	57	6	137	1	25	3	38	157	6	31	734	734	367	367	1		3,692	15,000
	Dalifage	38931	117	58	537	48	5	117	1	21	2	32	134	5	27	627	627	313	313	1		3,153	15,000
		Total Items			2,724	245	27	593	6	109	**12**	**163**	**681**	**25**	**136**	**3,178**	**3,178**	**1,589**	**1,589**	**5**		**15,990**	**75,000**
		Unit Cost inEth. Birr			26.55	42.6	5.4		20.6	4.15	2.48	0.24	2.47	1.2	167.93								
		Total Cost in Eth. Birr			**72,327**	**10,445**	**147**	**0**	**118**	**452**	**30**	**39**	**1,682**	**29**	**22,874**	**0**	**0**	**0**	**0**	**0**	**108,144**		

Annex6.1.2. Detail plan for capacity building, strengthening of surveillance system and inter-sectoral coordination

Activities	unit	quantity	number of days	cost						
				DSA	Transport	Stationery	Refreshment	Miscellaneous	Capital equipment cost	Total
In-service training on AWD case management and infection prevention	number	110	7	115,500.0	33,000.0	9,900.0	16,500.0	8,745.0	0.0	183,645.0
Integrated In-service training on PHEM for 70 health workers	number	70	8	82,000.0	21,000.0	6,300.0	14,000.0	6,165.0	0.0	129,465.0
In-service training on communication skills and social mobilization for 220 health extension workers (10 HEWs from 22 AWD hot spot districts)	number	220	4	132,000.0	22,000.0	13,200.0	22,000.0	9,460.0	0.0	198,660.0
Organize emergency coordination meeting once per month at regional and District levels (6 meetings at region and 22 x 6 meetings at District = 138 sessions)	session	15	138	0.0	0.0	0.0	41,400.0	2,070.0	0.0	43,470.0
Produce IEC materials (1000 posters and 3000 Leaflets) in Afar Language on AWD prevention and control and distribute to Kebeles	item	1000 posters, 3000 leaflets	0	5,000.0	5,000.0	20,000.0	0.0	1,500.0	0.0	31,500.0
Coordination of labor force (migrant labourers) sensitization on AWD outbreak at their home region (departure) and at investment farm (destination)	visit	2	0	10,000.0	6,000.0	1,000.0	3,000.0	1,000.0	0.0	21,000.0
Organize health education (AWD prevention, control, early treatment seeking) using Mobil Video van at investment farm/sites	visit	1		5,000.0	3,000.0	1,000.0	1,000.0	500.0	0.0	10,500.0
Training of 33 policy radio operators on surveillance report for 6 days	number	33	6	24,750.0	9,900.0	1,650.0	3,300.0	1,980.0	0.0	41,580.0
Procure and install radio-communication equipment at 8 remote Districts	number	8	0	0.0	0.0	0.0	0.0	0.0	400,000.0	400,000.0
Procure and provide surveillance data management equipment(Desk Top Computer) for 21 Districts and RHB surveillance unit	number	22	0	0.0	0.0	0.0	0.0	0.0	110,000.0	110,000.0
Total cost by line item				**374,250.0**	**99,900.0**	**53,050.0**	**101,200.0**	**31,420.0**	**510,000.0**	**1,169,820.00**

Annex8.3.1 Line list of Measles cases Tsegede district, Westren Zone, Tigray Region, Aug-Sep 2010

Ser. No	Kebelle	sex	Rash onset date	Age	No. of valid measles doses (0,1,2,99)	blood taken yes/no	results pos/Neg	outcome 1=alive 2=dead 99=unknown	Comment
1	Dara	F	10/11/2010	1&6/12 year	0	No		1	Treatment given
2	Dara	F	9/13/2010	7 year	0	No		1	Treatment given
3	Dara	F	9/13/2010	5 year	0	No		1	Treatment given
4	Dara	M	9/13/2010	11 Month	0	No		1	Treatment given
5	Dara	M	9/15/2010	11 year	0	No		1	Treatment given
6	Dara	M	9/15/2010	3 year	0	No		1	Treatment given
7	Dara	F	10/15/2010	8 year	0	No		1	Treatment given
8	Dara	M	10/15/2010	2 year	0	No		1	Treatment given
9	Dara	F	10/16/2010	27 year	0	No		1	Treatment given
10	Dara	M	10/16/2010	22 year	0	No		1	Treatment given
11	Dara	M	10/16/2010	20 year	0	No		1	Treatment given
12	Dara	F	10/17/2010	25 year	0	No		2	Unknown
13	Dara	F	9/20/2010	11 year	0	No		2	Unknown
14	Dara	M	9/20/2010	28 year	0	No		2	Unknown
15	Dara	M	10/20/2010	12 year	0	No		1	Treatment given
16	Hinta Bela	M	9/21/2010	25 year	0	No		1	Treatment given
17	Hinta Bela	F	9/25/2010	1 year	0	No		1	Treatment given
18	Hinta Bela	F	9/25/2010	2 year	0	No		1	Treatment given
19	Hinta Bela	F	9/25/2010	23 year	0	No		1	Treatment given
20	Hinta Bela	M	9/25/2010	20 year	0	No		1	Treatment given

21	Hinta Bela	M	9/25/2010	18 year	0	No		1	Treatment given
22	Hinta Bela	M	9/25/2010	17 year	0	No		1	Treatment given
23	Hinta Bela	M	9/25/2010	2 year	0	No		1	Treatment given
24	Hinta Bela	F	9/27/2010	6 month	0	No		1	Treatment given
25	Hinta Bela	F	9/27/2010	25 year	0	No		1	Treatment given
26	Hinta Bela	F	9/27/2010	3 year	0	No		1	Treatment given
27	Hinta Bela	M	9/27/2010	6 month	0	No		1	Treatment given
28	Hinta Bela	F	9/30/2010	3&6/12 year	0	No		1	Treatment given
29	Hinta Bela	F	9/30/2010	6 month	0	No		1	Treatment given
30	Hinta Bela	M	9/30/2010	3 month	0	No		1	Treatment given
31	Hinta Bela	M	9/30/2010	21 year	0	No		1	Treatment given
32	Hinta Bela	M	9/30/2010	25 year	0	No		1	Treatment given
33	Hinta Bela	M	9/30/2010	6 year	0	No		1	Treatment given
34	Hinta Bela	M	9/30/2010	3&8/12 year	0	No		1	Treatment given
35	Hinta Bela	M	9/30/2010	2 year	0	No		1	Treatment given
36	Hinta Bela	M	9/30/2010	18 year	0	No		1	Treatment given
37	Hinta Bela	F	10/1/2010	8 year	1	No		1	Treatment given
38	Ketema nigus	F	10/1/2010	2 year	9	Yes	1	1	Treatment given
39	Ketema nigus	F	10/1/2010	20 year	9	Yes	1	1	Treatment given
40	Ketema nigus	F	10/1/2010	7 month	0	No		1	Treatment given

41	Ketema nigus	F	10/1/2010	11 Month	0	No		1	Treatment given
42	Ketema nigus	M	10/1/2010	4 month	0	No		1	Treatment given
43	Ketema nigus	M	10/1/2010	5 month	0	No		1	Treatment given
44	Ketema nigus	M	10/1/2010	6 month	0	No		1	Treatment given
45	Ketema nigus	F	10/2/2010	8 month	0	No		1	Treatment given
46	Cheguar kudo	F	10/2/2010	10 year	1	Yes	1	1	Treatment given
47	Cheguar kudo	F	10/2/2010	2 year	0	No		1	Treatment given
48	Shehagne	M	10/2/2010	10 year	0	No		1	Treatment given
49	Shehagne	M	10/2/2010	17 year	0	No		1	Treatment given
50	Shehagne	M	10/2/2010	7 year	0	No		1	Treatment given
51	Shehagne	M	10/2/2010	16 year	0	No		1	Treatment given
52	Shehagne	M	10/2/2010	2 year	0	No		1	Treatment given
53	Alemgenet	F	10/3/2010	22 year	0	No		1	Treatment given
54	Alemgenet	F	10/3/2010	20 year	0	No		1	Treatment given
55	Alemgenet	F	10/3/2010	24 year	0	No		1	Treatment given
56	Alemgenet	M	10/3/2010	1&8/12 year	0	No		1	Treatment given
57	Rubalemin	M	10/3/2010	22 year	0	No		1	Treatment given
58	Rubalemin	M	10/3/2010	1&1/12 year	0	No		1	Treatment given
59	Rubalemin	M	10/3/2010	20 year	0	No		1	Treatment given
60	Zuriadansh	M	10/3/2010	25 year	0	No		1	Treatment given

61	Zuriadansh	M	10/4/2010	2 year	0	No		1	Treatment given
62	Zuriadansh	F	10/5/2010	20 year	0	No		1	Treatment given
63	Zuriadansh	F	10/5/2010	17 year	0	No		1	Treatment given
64	Zuriadansh	M	10/5/2010	26 year	0	No		1	Treatment given
65	Zuriadansh	M	10/7/2010	22 year	0	No		1	Treatment given
66	Zuriadansh	M	10/7/2010	22 year	0	No		1	Treatment given
67	Medhane alem	M	10/7/2010	9 year	0	No		1	Treatment given
68	Medhane alem	F	10/7/2010	12 year	0	No		1	Treatment given
69	Medhane alem	F	10/7/2010	13 year	0	No		1	Treatment given
70	Medhane alem	M	10/7/2010	20 year	0	No		1	Treatment given
71	Mai deli	F	10/8/2010	3 year	1	No		1	Treatment given
72	Mai deli	M	10/8/2010	2&6/12 year	1	No		1	Treatment given
73	Mai deli	M	10/8/2010	5 year	1	No		1	Treatment given
74	Dansha	F	10/10/2010	1 year	0	No		1	Treatment given
75	Dansha	F	10/10/2010	28 year	0	No		2	Unknown
76	Dansha	M	10/10/2010	2&6/12 year	0	Yes	1	99	Treatment given

Annex 8.3.2: Line list of measles cases in Welkait district, Western zone, Tigray, Sep-Oct 2010

Ser. No	Kebelle	sex	date of rash onset	Age	No. of valid measles doses (0,1,2,99)	blood taken yes/no	results pos/Neg	out come 1=alive 2=dead 99=unknown	comments
1	Awra	F	9/8/2010	50 year	99	Yes	1	1	Treatment given
2	Awra	F	9/8/2010	4 year	99	No		1	Treatment given
3	Awra	M	9/8/2010	1 year	99	No		1	Treatment given
4	Awra	M	9/9/2010	5 year	1	No		1	Treatment given
5	Awra	F	9/10/2010	6 year	99	No		1	Treatment given
6	Awra	F	9/12/2010	9 year	1	No		1	Treatment given
7	Awra	M	9/12/2010	4 year	1	Yes	1	1	Treatment given
8	Awra	M	9/12/2010	2&9/12 year	0	No		1	Treatment given
9	Awra	F	9/13/2010	2 year	99	No		1	Treatment given
10	Awra	F	9/26/2010	1 year	0	No		1	Treatment given

11	Awra	M	9/13/2010	20 year	99	No		1	Treatment given
12	Awra	M	9/20/2010	1&5/12 year	1	No		1	Treatment given
13	Awra	M	10/1/2010	13 year	1	No		1	Treatment given
14	Awra	M	9/30/2010	14 year	99	No		1	Treatment given
15	Awra	M	9/30/2010	3 year	99	No		1	Treatment given
16	Shikuda	F	9/20/2010	30 year	99	No		1	Treatment given
17	Shikuda	M	9/21/2010	28 year	99	Yes	1	1	Treatment given
18	Shikuda	M	9/20/2010	3 year	1	No		1	Treatment given
19	Shikuda	M	9/24/2010	7 year	99	No		1	Treatment given
20	Shikuda	M	9/25/2010	17 year	99	No		1	Treatment given
21	Shikuda	M	9/27/2010	1 year	2	No		1	Treatment given
22	Adi gaba	F	9/8/2010	7 month	0	No		1	Treatment given
23	Adi gaba	M	8/13/2010	28 year	99	No		1	Treatment given

24	Adi gaba	M	9/8/2010	1 year	1	No		1	Treatment given
25	Adi gaba	F	9/8/2010	9 year	0	No		1	Treatment given
26	Adi gaba	F	9/10/2010	9 year	99	No		1	Treatment given
27	Adi gaba	F	9/10/2010	1 &1/12 year	0	No		1	Treatment given
28	Adi gaba	F	9/6/2010	4 year	1	No		1	Treatment given
29	Adi gaba	M	9/12/2010	5 year	2	No		1	Treatment given
30	Adi gaba	M	9/12/2010	9 year	99	No		1	Treatment given
31	Adi gaba	M	9/13/2010	38 year	0	No		1	Treatment given
32	Adi gaba	M	9/13/2010	40 year	0	No		1	Treatment given
33	Adi gaba	F	9/10/2010	30 year	99	No		1	Treatment given
34	Adi gaba	F	9/14/2010	4 month	0	No		1	Treatment given
35	Adi gaba	M	9/13/2010	1 year	0	No		1	Treatment given
36	Adi gaba	M	9/13/2010	9 year	0	No		1	Treatment given

37	Adi gaba	F	9/13/2010	23 year	99	No		1	Treatment given
38	Adi gaba	M	9/14/2010	3 year	1	No		1	Treatment given
39	Adi gaba	M	9/14/2010	5 year	0	No		1	Treatment given
40	Adi gaba	F	9/13/2010	30 year	0	No		1	Treatment given
41	Adi gaba	F	9/11/2010	8 year	99	No		1	Treatment given
42	Adi gaba	F	9/11/2010	5 year	99	No		1	Treatment given
43	Adi gaba	M	9/11/2010	3 year	1	No		1	Treatment given
44	Adi gaba	F	9/12/2010	5 year	0	No		1	Treatment given
45	Adi gaba	F	9/12/2010	18 year	99	No		2	Unknown
46	Adi gaba	M	9/11/2010	7 month	0	No		2	Unknown
47	Adi gaba	F	9/11/2010	38 year	0	No		2	Unknown
48	Adi gaba	F	9/15/2010	4&8/12 year	1	Yes	1	1	Treatment given
49	Adi gaba	F	9/16/2010	3&4/12 year	1	Yes	1	1	Treatment given
50	Adi gaba	F	9/18/2010	3 year	0	No		2	Unknown
51	Adi gaba	M	9/23/2010	5 year	0	No		1	Treatment given

52	Adi gaba	M	9/18/2010	17 year	9	No		1	Treatment given
53	Adi gaba	M	9/26/2010	16 year	9	No		1	Treatment given
54	Adi gaba	M	9/14/2010	4 month	0	No		2	Unknown
55	Adi gaba	F	10/3/2010	16 year	9	No		1	Treatment given
56	Adi gaba	F	10/5/2010	16 year	0	No		1	Treatment given
57	Adi gaba	M	10/5/2010	19 year	9	No		1	Treatment given
58	Adi gaba	M	9/28/2010	17 year	0	No		1	Treatment given
59	Adi gaba	F	10/5/2010	14 year	0	No		1	Treatment given
60	Adi gaba	F	10/4/2010	24 year	0	No		1	Treatment given
61	Adi gaba	F	10/6/2010	10 year	1	No		1	Treatment given
62	Adi gaba	F	10/7/2010	13 year	0	No		99	Treatment given
63	Selam	M	9/27/2010	1 year	99	No		1	Treatment given
64	Selam	M	9/27/2010	4 &6/12 year	0	No		1	Treatment given

65	Selam	F	9/22/2010	5 year	1	No		1	Treatment given
66	Selam	M	9/22/2010	1 &6/12 year	1	No		1	Treatment given
67	Selam	M	9/15/2010	10 year	99	No		1	Treatment given
68	Selam	M	9/24/2010	1 &1/12 year	0	No		1	Treatment given
69	Selam	F	9/23/2010	12 year	99	No		1	Treatment given
70	Selam	M	9/22/2010	11 year	0	No		1	Treatment given
71	Wef argif	M	9/28/2010	20 year	0	No		1	Treatment given
72	Wef argif	F	9/29/2010	4 year	2	No		1	Treatment given
73	Wef argif	F	10/5/2010	2&3/12 year	2	No		1	Treatment given
74	Wef argif	M	9/28/2010	10 year	0	No		1	Treatment given
75	Wef argif	M	10/2/2010	1 &10/12 year	0	No		1	Treatment given
76	Wef argif	F	9/28/2010	20 year	0	No		1	Treatment given

77	Wef argif	M	9/29/2010	3 year	2	No		1	Treatment given
78	Wef argif	M	10/17/2010	4 year	2	No		1	Treatment given
79	Wef argif	M	10/14/2010	1&4/12	1	No		1	Treatment given
80	Wef argif	F	10/13/2010	2&3/12	1	No		1	Treatment given
81	Wef argif	M	10/13/2010	2 year	1	No		99	Treatment given
82	Adi remets	M	10/12/2010	2 year	1	No		1	Treatment given
83	Adi remets	M	10/7/2010	14 year	1	No		1	Treatment given
84	Adi remets	F	10/8/2010	8 months	0	No		1	Treatment given
85	Blamba Kirshi	M	10/6/2010	9 & 17/30 months	1	No		1	Treatment given
86	Medri weizero	M	10/18/2010	7 month	0	No		1	Treatment given
87	Medri weizero	M	10/17/2010	4 year	1	No		1	Treatment given
88	Medri weizero	M	10/17/2010	4 year	1	No		1	Treatment given

89	Medri weizero	F	10/17/2010	3 year	1	No		1	Treatment given
90	Medri weizero	F	10/18/2010	9 month	0	No		1	Treatment given
91	Medri weizero	M	10/18/2010	4 year	2	No		1	Treatment given
92	Medri weizero	F	10/19/2010	3year	2	No		1	Treatment given
93	Medri weizero	F	10/19/2010	6year	2	No		1	Treatment given

Curriculum vitae

1. Personal Information

Name: Beyene Kidu Tsige

Sex: Male

Date of birth: Oct 22, 1984

Place of Birth: Yechila, Tigray, Ethiopia

Nationality: Ethiopian

Marital status: Single

Religion: Christian

Language: Tigrigna, Amharic, English

2. Educational background

- Grade 1-4 Werkamba elementary school,Tigray (Sep1991-Jun1995)
- Grade 5-6 Quiha elementary school, Tigray (Sep1995-Jun 1997)
- Grade 7-12 Woldenugusse Junior Secondary School, Tigray (Sep 1997-Jun2003)
- Bachelor of Science in Environmental Health: University of Gondar(Nov 2003-July 2006)

3. Experience

- Oct 2006-Oct 2007 Hygiene and Sanitation coordinator, and Nov 2007-Aug2008 Malaria and other Communicable Diseases prevention and Control and Diseases surveillance coordinator, Kurmuk District Health Office,Benishangul Gumuz regional state
- Sep 2008-Jan2009 Malaria and other Communicable Diseases prevention and Control coordinator, Menge District Health Office, Benishangul Gumuz regional state

4. Short courses and trainings

- Certificate in basic computer skill: MA Information Technology and Business College, Assosa, Ethiopia March 2007
- Training on District Health Information Soft Ware Jan 2/2008-Jan11/2008, Assosa ,Ethiopia

5. **Additional skills**
    - Basic computer skill (MS- Word, Excel, Access, power point), Epi Info
6. **Reference**
    - Mamo Wubshet, Head Department of Environmental Health and Occupational Health: University of Gondar

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: Beyene Kidu

Signature: ________________

Place: _________________

Date of Submission: ______________

The thesis has been submitted for examination with my approval as a university advisor.

Name of advisor: ______________________________

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Date: ______________________________