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

Ethiopian Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

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

By: Kiflu Itefa Negari

June, 2017

Addis Ababa

Ethiopia Field Epidemiology Training Program (EFETP)

Compiled Body of Works in Field Epidemiology

By:

Kiflu Itefa Negari

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

Advisors:
Dr. Addamu Addissie
Mr. Gemmechu Beffa

June, 2017
Addis Ababa

ADDIS ABABA UNIVERSITY

School of Graduate Studies

Compiled Body of Works in Field Epidemiology

By:

Kiflu Itefa Negari

Ethiopia Field Epidemiology Training Program
(EFETP)
School of Public Health, College of Health Sciences
Addis Ababa University

Approval by Examining Board

_____ _____
Chairman, School Graduate Committee

_____ _____
Advisor

_____ _____
Examiner

_____ _____
Examine

Acknowledgement

First of all, I would like to thank my almighty God for His wonderful care and protection throughout my life. Different individuals and organizations have contributed to the successful completion of these two years EFETP. First AAU, college of health sciences EFTP academic coordinators and staffs deserve especial thanks for their unreserved input during classroom teaching and facilitations.

Second I want to thank my mentors Dr. Addamu Addissie, Mr. Abdulnasir Abagero and Mr. Gemechu Beffa for their constructive comments to this compiled body of work. Thirdly I want to appreciate the staffs in EPHA for their best facilitation of financial issues during field works. My especial appreciation goes to Mr. Daniel Kaba, former ORHB PHEM core process manager, Mr. Gemmechu Shumi current ORHB PHEM core process manager, Mr.Dagnachew Alemu, Gemechu Guddina, Birhanu Kanate, Tesemma Debala and all ORHB PHEM staffs for their usual facilitation, hand on practice, debriefing and cooperation during field and office attachment. All zones and woreda health offices in oromia region where I collected different data for my output must be appreciated for their kind cooperation.

I want to appreciate Bishoftu General Hospital staffs for their courage, care and support during these training of two years.

I don‘t want to forget the discussions and support of Dr. Tariku Jibat lecturer at AAU College of Veterinary Medicine during study time.

I want to extend my gratitude to Dr. Tatek Bogale EFETP country coordinator for his unreserved facilitation of financial letters.

Finally I am proud of my wife sr. Mestawot Fantaye for her patience and caring of my kids when I was on field for long time.

Abbreviations and Acronyms

AAU	Addis Ababa University
AFI	Acute Febrile Illness
AFP	Acute Flaccid Paralysis
AIDS	Acquire immunodeficiency syndrome
ANC	Antenatal Care
ART	Anti-Retroviral Therapy
AR	Attack Rate
AURTI	Acute Upper Respiratory Tract Infections
AWD	Acute Watery Diarrhea
BCG	Bacillus Calmette-Guerin
BPR	Business Process Re-engineering
CAR	Contraceptive Acceptance Rate
CFR	Case Fatality Rate
CHS	College of Health Sciences
CSA	Central Statistics Agency
CSB	Corne Soy Blended
CSF	Cerebrospinal fluid
CSA	Central Statistics Agency
CTC	Cholera treatment Center
COC	Center Of Competence
DRMC	Disaster Risk Management Commission
DHN	Dehydration
DPPC	Disaster Preparedness and Prevention Commission
DVM	Doctor of Veterinary Medicine
EW	Early Warning
EPHA	Ethiopian Public Health Association
EFY	Ethiopian Fiscal Year
EPI	Expanded Program on Immunization

EPHI	Ethiopian Public Health Institute
EFETP	Ethiopian Field Epidemiology Training Programme
FMOH	Federal Ministry of Health
FEWS NET	Famine Early Warning Systems Network
GAM	Global Acute Malnutrition
GFD	General Food distribution
GTP	Growth and Transformation Plan
HGWZ	Horro Guduru Wollega Zone
HP	Health Post
HC	Health Center
HEW	Health Extension Workers
HRM	Human Resource Management
HIV	Human Immunodeficiency Virus
IRS	Indoor Residual Spray
ITN	Insecticide Treated Net
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations
IEC	Information Education Communications
LLITN	Long Lasting Insecticide Treated Net
LP	Lumbar Puncture
MAM	Moderate Acute Malnutrition
MCH	Maternal and child health
MDSR	Maternal Death Surveillance and Review
Nm	Neisseria meningitis
NNT	Neonatal Tetanus
NGO	Non-Governmental Organizations
ORHB	Oromia Regional Health Beaurau
OTP	Outpatient Therapeutic Program
OPD	Out Patient Department
PLW	Pregnant and Lactating Women
PHEM	Public Health Emergency Management

PCV	Pneumococcal Conjugative Vaccine
PHEM	Public Health Emergency Management
PHEM	Public Health Emergency Management
PPE	Personal Protective Equipment
PITC	Provider Initiated Test and counseling
PLWHA	People Living With HIV/ADS
PMTCT	Prevention of Mather to Child Transmission
PNC	Post Natal Care
QC	Quality Control
RDT	Rapid Diagnostic Test
SBA	Skilled Birth Attendant
SAM	Severe Acute Malnutrition
SC	Stabilization Center
SNNPR	Southern Nations, Nationalities and Peoples Region
SOP	Standard Operating Procedure
TFP	Therapeutic Feeding Program
TSFP	Targeted Supplementary Feeding Program
TBA	Traditional Birth Attendant
TVET	Technical and Vocational Education Training
VCT	Voluntary Counseling and Testing
WASH	Water Sanitation and Hygiene
WHO	World Health Organization
WFP	World Food Program
UNICEF	United Nation Children's Fund

Contents

List of Maps

List of Figures

List of Tables

EXECUTIVE SUMMARY

This compiled body of works in field epidemiology has nine chapters. Each chapter contains an output expected from EFETP resident during these two years training program (2016 and 2017 G.C) especially during field base attachments at Oromia regional health bearau, though the training in class room was 25% and contributed base for the field residency. As the field epidemiology training program is unique and competency based and hand on practice learning, all of the outputs are produced depending on real and challenges of public health problems.

Chapter one deals with the **outbreak investigation**. In this chapter two outbreak investigation reports were included; AWD and Measles. They were conducted in Bale zone. AWD outbreak investigation was conducted in Goro district with the aim of identifying possible source or risk factor associated with the occurrence of the outbreak and to guide public health interventions. Accordingly, presence of AWD sick person in the same village was an independent risk factor identified by logistic regression analysis whereas washing hand greater than three times in a day was proved to be protective by this study.

The other outbreak investigation report was Measles outbreak in Harena Bulluq district of Bale zone. Factors responsible for spread and transmission of the measles virus was contact history with measles like symptom 2-3 weeks before onset of sign and symptom while being vaccinated against measles was found to be protective. Through investigation and analysis of this outbreak the use of involving the community in surveillance, recent weakness of measles immunization program in some pocket areas such as Kumbi Kebele were some important topics learned.

In **chapter two**, **surveillance data analysis of suspected meningococcal meningitis** was presented. In this chapter, five years data reported weekly during 2011-2015 in Horro Guduru Wollega zone were described by time, place, person, incidence, mean and median. Consequently, the incidence of the disease was found to be high in females, 5-14 age group populations, during 2013 epidemic year and reports were limited to half of woredas in zone. So, conducting surveillance system evaluation of the disease in zone and improving the data archival system of health facilities were some major recommendations forwarded using this study.

Chapter three is about **evaluation of public health surveillance system in West Wollega zone** focusing on malaria and measles diseases as they are major public health problems in the study area and in our country.

The overall report completeness of West Wollega zone from WHO week 41/2016 to week 14, 2017 was **92.8**%. A total of 5578 confirmed malaria cases (4166 (75%) P. falciparum and 1412 (25%) P. vivax) with one death (CFR of 0.02%) were reported in the same time through routine surveillance in West Wollega zone accounting 9.5% of oromia region. Kondala, Babo Gambel,Mana Sibu woredas were the top three malarias areas in zone during this time which need special attention. 14 measles cases were also reported during the same time from Lata sibu district, Aira and Begi hospitals.

So the surveillance system of malaria and measles in West wollega zone is helpful in determining magnitude, trend, distribution and effectiveness of control program. But the system needs improvements in detecting and identification of outbreaks, completeness of report of some districts, hospitals and health posts.

Chapter four presents about **health profile description** of Gimbichu woreda of East shoa zone. This is also another important feature of field epidemiology where the general health status and health related data which affect the human health were described. Consequently, the woreda has an effective functioning health system and other sectors for the wellbeing of its communities.

Chapter five is where application of some scientific writing system of **Manuscript for Peer review journal** was presented. AWD outbreak investigation in Goro district was written as Manuscript.

Chapter six also deals with scientific writing of Abstracts for conference presentations.

Chapter seven is about the disaster assessment conducted in East and West Harerghe zones. Health and nutrition Meher Assessment was presented to show magnitude, severity and priorities for humanitarian crisis attributed to the priority epidemic diseases, drought and man- made disasters. As a result epidemic of AWD/Cholera and malnutrition were the major public health problems in both zones due to insufficient/absent rainfall, water shortage, and low latrine coverage and drought conditions. So multi sectoral, local and international NGO collaborations were immediate recommendations forwarded to the affected community by using the assessment.

In **chapter eight**, epidemiologic research proposal/project is presented to conduct a research on identified priority health problems encountered during field residency. Accordingly a research proposal was written on the title of **Prevalence and determinants of under nutrition among children 6-59 months in Chiro Rural district of West Harerghe** zone.

Chapter nine: Additional out puts such as training and bulletin preparation examples were presented.

CHAPTER ONE

1.1 Acute Watery Diarrhea/AWD Outbreak investigation in Goro district, Bale zone, oromia region, Ethiopia, February 2017

1.1.1 Abstract

Introduction-Acute Watery Diarrhea/AWD remains major challenges of disease and death in developing countries due to poor socio-economic growth. Goro district of Bale zone started to report suspected AWD cases in December 2016. We conducted outbreak investigation in the district to identify risk factors for transmission and implement appropriate control measures.

Methods-Descriptive study followed by 1:1un -matched case control study was applied from February 3-18/2017. Cases were defined as per national cholera guideline standard case definition and controls were residents of Goro district who is greater than or equal to two years and had no complain of clinical sign consistent with AWD one month prior to the outbreak. We used structured questionnaire to collect data from cases and controls, reviewed line list, used Epi info 7 to calculate odds ratio, Excel 2010 and ArcGIS 10 for data analysis.

Results- A total of 523 AWD cases and zero deaths were reported from December 09, 2016 – April 30, 2017 G.C. Seven of ten samples tested by RDT were positive for *V. Cholera* 01. More than half of cases were males and between 15-44 years age group. The overall attack rate of the outbreak was 4.8/1000 populations. Welta'i Negeya and Billi Akiya were the most affected kebles of the district with attack rate of 25.5 and 15.2 per 1000 populations respectively. Presence of AWD sick person in village AOR= 10.78, 95% CI (3.44-33.76) P value =0.0000 remain independent risk factors for transmission and spread of AWD in bivariate and logistic regression analysis while washing hand greater than three times in a day and time to fetch water from source less than one hour remain protective against the disease. No significant association between using river water as source of drinking and acquiring the disease in multivariate analysis due to small sample size or confounding. Behavioral change communication on hand washing, water purification methods and awareness of presence of AWD outbreak in village for all residents of the district is important to stop the spread of disease.

Key Words: Acute Watery Diarrhea, Ethiopia, Goro district. Words: 329

1.1.2 Introduction

Cholera is a diarrheal disease caused by infection of the intestine with the gram-negative bacteria *Vibrio cholerae*. It is one of the key indicators of social development and remains a challenge to countries where access to safe drinking water and adequate sanitation cannot be guaranteed. There are over 100 vibrio species known but only the ―cholerae" species with sero-group 01 and 0139 are responsible for cholera epidemics. The clinical features and response is the same regardless of sero-group during an outbreak (1).

Only 25% among the infected persons develops symptoms with the abrupt onset of copious watery diarrhoea, classically rice-water stools, with or without vomiting. Among people whom develop symptoms, 80% (i.e. 20% of total infected persons) have mild or moderate symptoms, while around 20% (i.e.: 5% of total infected) develop acute watery diarrhea with severe dehydration leads to loss of skin turgor, malaise, tachypnea and hypotension which can lead to death; if untreated . The infective dose is from 10^6- 10^8 bacteria depending on individual immunity status and gastric acid content. The incubation period also ranges from 2 hours to five days with average of 2-3 days (1, 2).

Cholera is transmitted by the fecal-oral route or contaminated food and water. Water may be contaminated at source (shallow well and surface water), during transport or at house-hold due to in appropriate handling. Foods such as cooked rice, millet, sorghum, shellfish, milk, lentils, potatoes, beans, eggs, chicken, raw vegetables and fruits are commonly associated with cholera transmission. The case-fatality rate in untreated cases may reach 30–50%. But appropriate rehydration can keep the CFR below 1% (1).

Corpses of cholera patients and cholera treatment centers can also be major source of infection if hygiene and isolation measures are insufficient.

Humans are the main reservoir of *Vibrio cholera* since asymptomatic carriers and patients carry about 100,000,000 bacteria/ml of feces or vomitus. Other potential reservoirs include: water, some molluscs, fish, and aquatic plants (1).

Risk factors for cholera infection are; Overcrowding (internally displaced people, refugee, camps, population gatherings, etc.), inadequate quantity and/or quality of water , inadequate personal

hygiene, poor washing facilities, inappropriate or poor sanitation, inadequate food safety, underlying diseases such as malnutrition, AIDS and environmental and seasonal factors. Low stomach acidity also increases chance of infection (1).

Cholera outbreak spread can be stopped by ensuring safe water supply (quantity and quality), environmental and personal hygiene, food safety, disinfection of contaminated surfaces, closes, utensils, health education. Cholera has been the second leading cause of outbreaks, among the epidemic prone diseases in Afghanistan (next to ARI), consumes lots of resources and make the people panic during outbreaks and epidemics (2, 6).

Since untreated stools from cholera patients are the primary source of environmental contamination, proper treatment and safe disposal of liquid waste, including patient‘s excreta and vomit, should be undertaken to prevent contamination and secondary spread of infection. Hand hygiene should be observed at all times, especially after any contact with excreta and before preparing or eating food (3).

According to updated cholera burden in endemic countries using spatial regression model estimate, there were 1.3 billion people at risk of cholera in 69 endemic countries including Ethiopia particularly 68,805,272 at risk and highest estimated annual number of deaths of 10,458 during 2008-2012 (4).

In addition to this, WHO also estimates 1.4 to 4.3 million cases of cholera resulting in an estimated 28,000-142,000 deaths, annually. Of the cholera cases reported to the WHO in 2014, 55% occurred in Africa, 30% in Asia and 15% in Americas. More than half of the global incidence of infection and death due to cholera is from children under the age of five (5).

Cholera is highly communicable disease occurring both as an endemic and epidemic form. Internationally there were seven cholera pandemics to date. Epidemics of cholera are characterized by sudden onset and cause major public health emergency.

Drinking untreated/unsafe water increased risk of cholera both in bi variable and multivariable analysis (unadjusted OR 4.82, 95% confidence interval (CI) 1.85-14.76) and (Adjusted OR 3.43, 95% CI, 1.07-11.04) respectively in study conducted in Serralion. But contact with cholera patients, attendance of funeral and public ceremonies were not statistically significant in acquiring cholera (7).

In outbreak investigation conducted in Afar regional state of Ethiopia during May 2009, a total of 1076 cases and 48 deaths were registered in the three districts of Afar with an attack rate (AR) and case fatality rate (CFR) of 0.85% and 4.4% respectively. Males constitute 87.8% and the age group15-44 was 52.1%. Risk factors for this outbreak was also found to be visiting areas with similar illness OR = 33.6 95% CI (7.13-158.15) before the onset of disease (8).

In Ethiopia, AWD cases were first seen in Moyale woreda of Borena zone, Oromia region on October 2015 and confirmed to be V. cholera (serotype Ogawa, Biotype EI Tor). Since then, it was spread to different woredas, zones and regions for about one year and half and continued to be major public health problem until today. In Oromia region alone, about *6,473* AWD cases and 64 deaths (CFR 0.98%) were reported affecting 14 zones, 13 towns and 116 woredas up to March 2017. Bale zone is the most affected of all oromia zones with 1711 cases (26.4%) and the first case was seen in this zone on May 7, 2016 in Meda Walabu woreda, confirmed by RDT.

We conducted AWD outbreak investigation in Bale zone, Goro district, Oromia region from 03/02/2017-18/02/2017 to identify the risk factors and implement appropriate control measures because the district has higher number of cases at that time in zone.

Objective of the Study

General Objective

To identify the risk factors associated with the outbreak and implement appropriate prevention and control measures.

Specific Objectives

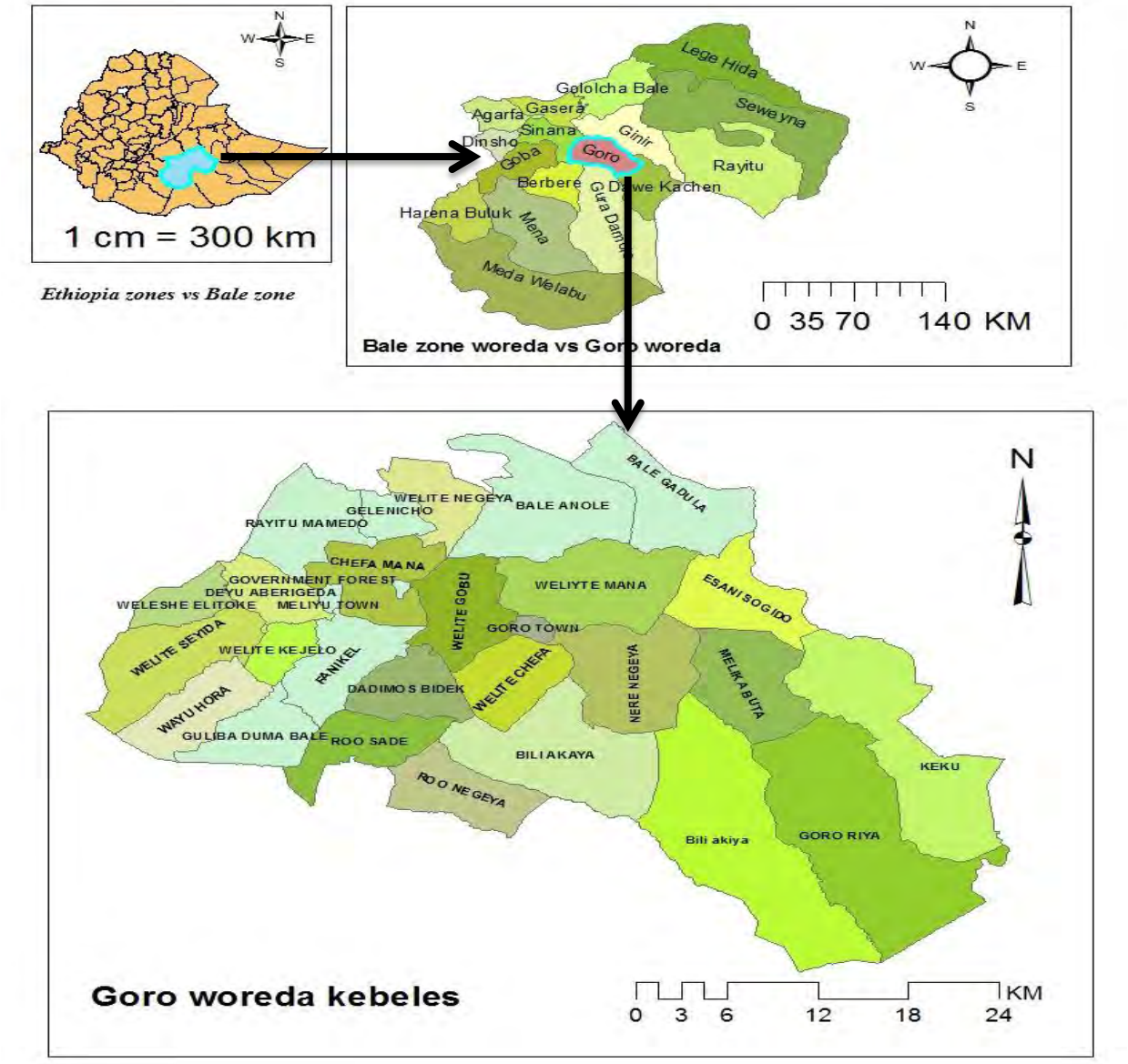
- To describe the cases by time, place and person hence identify risk groups.

- To identify risk factors for AWD transmission in the area
- To determine magnitude and severity of disease in district and provide basis for future outbreak investigations.
- To stop the transmission of disease by coordinating woreda task force.

1.1.3 Methodology

Study Area and period

The study was conducted in Bale zone, Goro woreda Oromia region from February 03/2017-18/2017. Figure1. We selected Goro district because it has many active cases at that time and most affected districts as it contributed 26.6% of the total zonal AWD cases followed by Berbere district (24%) until April 30,2017.



Map 1: AWD outbreak investigation area map (goro district, bale zone, oromia ethiopia).

Study Design

We used descriptive epidemiology followed by unmatched case control study to identify risk factors for outbreak.

Target population

The target populations were all Goro district population who greater than or equal to two years old.

Study Population

The study populations were all cases of AWD in Goro woreda which meet case definitions and selected community controls.

Sampling and Sample Size Determination

All cases reported by line list from December 9, 2016 up to April 30/2017 i.e. - 523 cases were used for descriptive epidemiology. For case control study, sample size was calculated using StatCalc function of epi info 7 assuming 40% of control exposure to risk factor, 95% confidence level, with study power of 80% and to detect odds ratio of 3.5 (risk factor for which intervention would have significant impact). Accordingly, 49 cases and 49 controls were the maximum sample size needed for the study and we recruited 50 cases and 50 controls.

Case definition for cases

A case of AWD was defined as any resident of Goro district who is greater than or equal to two years old develop acute watery diarrhea between January 25/2017- February 25/2017 to exclude recall bias because the time of outbreak was too long.

Definition for control group

Control group for this study were defined as any resident of Goro district who is greater than or equal to two years old, neighbor of cases and had no any symptom consistent with AWD since the start of the outbreak.

Data collection and Analysis: Both cases and controls were interviewed using structured questionnaire on exposure to possible risk factors five days before the onset of sign and symptom in cases and socio-demographic factors were also collected to compare cases and controls. Data was analyzed using Microsoft excel 2010 and epiinfo 7.1.4.0 software.

Ethical considerations: Support letter was written from Oromia Regional health bureau to zonal health department and from zone to District health offices. Moreover, objective of the study was briefly mentioned and Oral informed consent was obtained from the study participants or their

parents to participate in the study. Participants were treated with respect and willingly participated in the study without payment or cohesion. Confidentiality was assured and no personal details was recorded or produced on this documentation.

1.1.4 Results

Descriptive Epidemiology

From November 09, 2016 – April 30/2017 G.C. a total of **523 AWD c**ases were reported to Bale zonal health office from the district. The index case in this woreda was a female from Malka Butta kebele seen at Malka Butta HC on 9/11/2016. The health center then reported to woreda when two additional cases were seen on the same day and started to establish CTC and necessary preparations. Out of ten stool samples tested by RDT seven of them were found to be positive for V. Cholera 01. The overall attack rate of the outbreak was 4.8/1000populations.

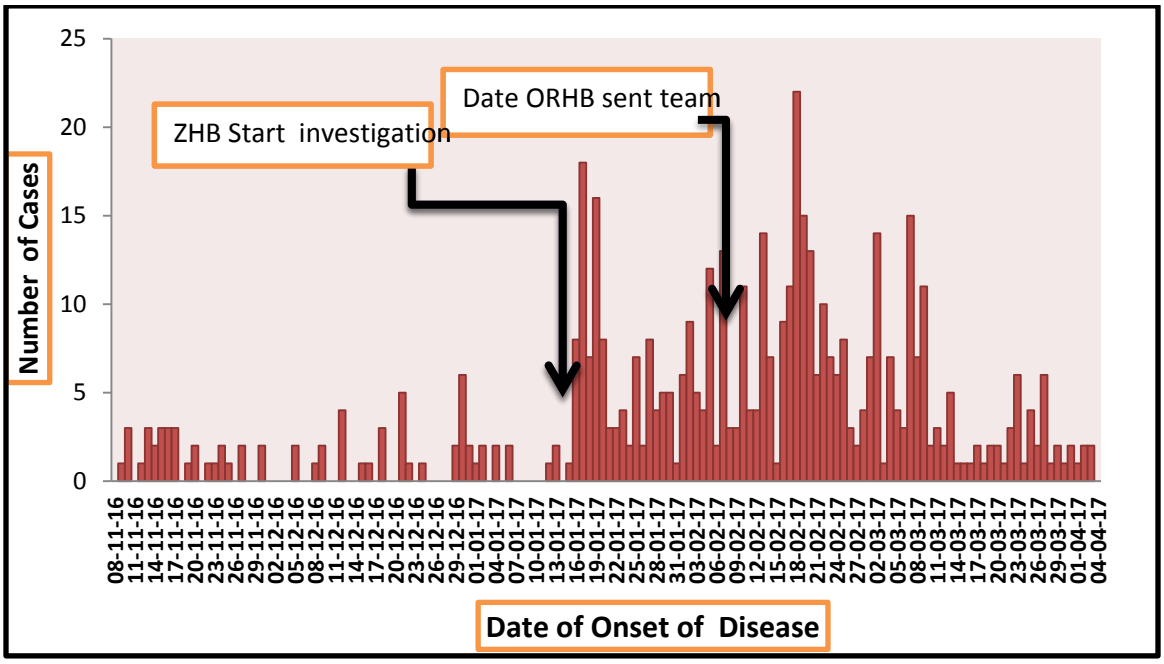


Figure 1: Epidemic curve of AWD cases in Goro woreda, Bale zone, Oromia region Ethiopia February 2017 G.C.

As seen above the type of epi-curve of AWD outbreak in Goro district was intermittent common source type indicating the interruption of prevention and control activities or no identification of common source of infection for the outbreak.

The cases were stable for about 9 weeks and increased steadily from W H O week 2/2017 then decreased during weeks 4, 6 and again increased getting maximum peak at W.H.O week 7/2017. Figure 2

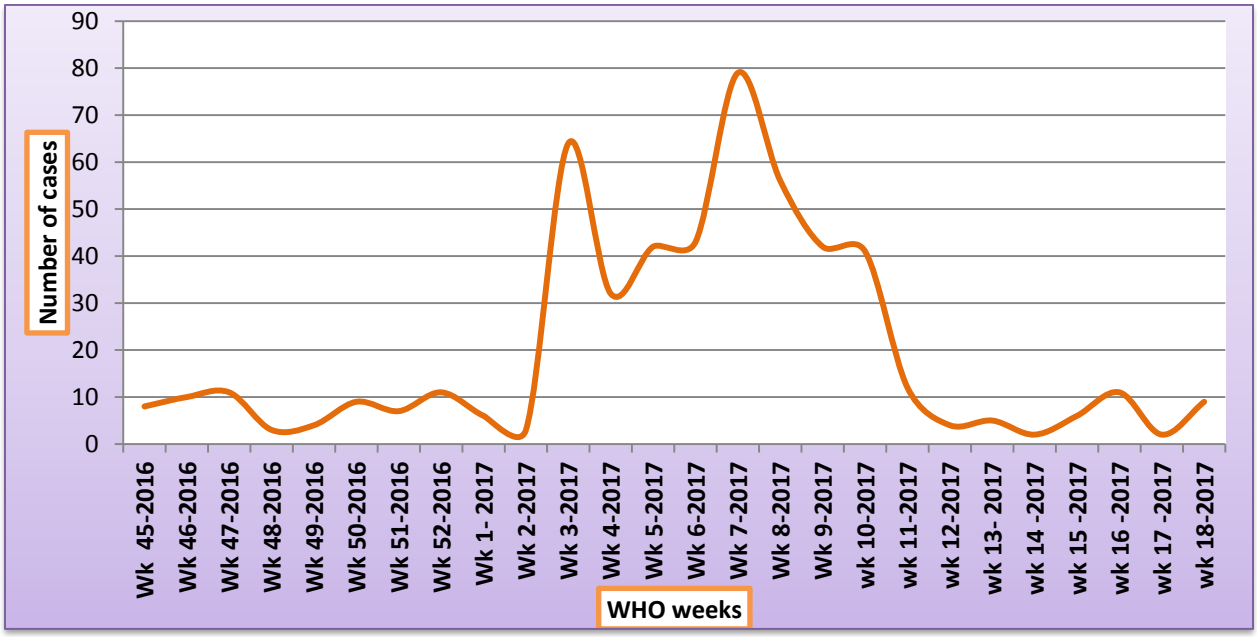


Figure 2: Trends of AWD cases in Goro district by WHO weeks Bale zone, oromia region, Ethiopia April, 2017G.C

The most affected kebeles were Bili Akiya and Welta'i Negaya with attack rate of 15.2/1000 and 25.5/1000 populations respectively although the outbreak covered about two third of total kebeles of woreda. Figure 3. The kebeles/villages most affected were located adjacent to each other, near to Mana river (probably contaminated) and index case was also seen in these villages.

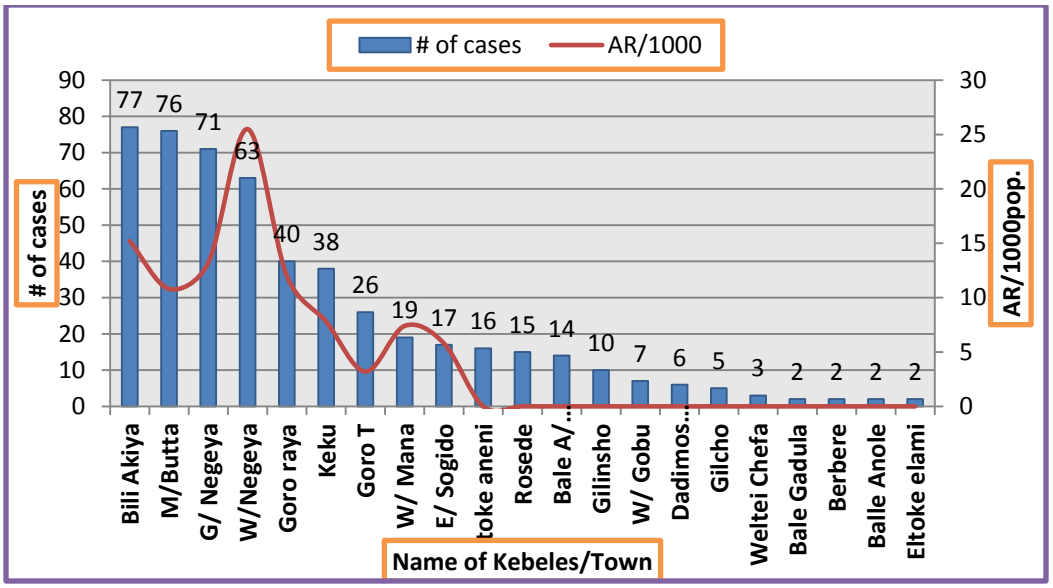
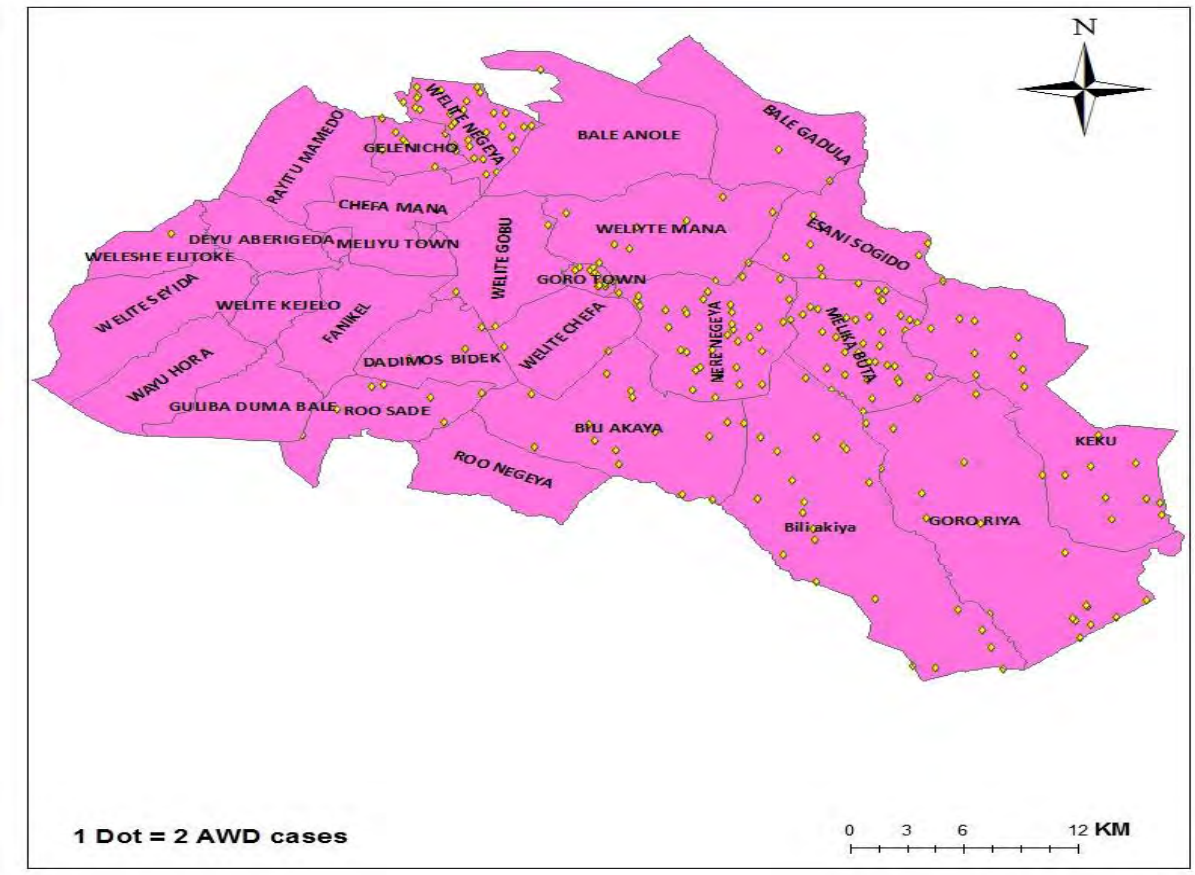


Figure 3: Distribution of AWD cases and Attack rate/1000 population by kebele in Goro district of Bale zone Oromia region, Ethiopia April, 2017 G.C.



Map 2 : Spot Map of AWD cases of Goro district kebeles showing distribution of AWD cases

More than half of cases (58%) were males and between 15-44 years age group (54%). Age group of 5-14 consists of 29% followed by age group of 45 and above (17%). Figure 5

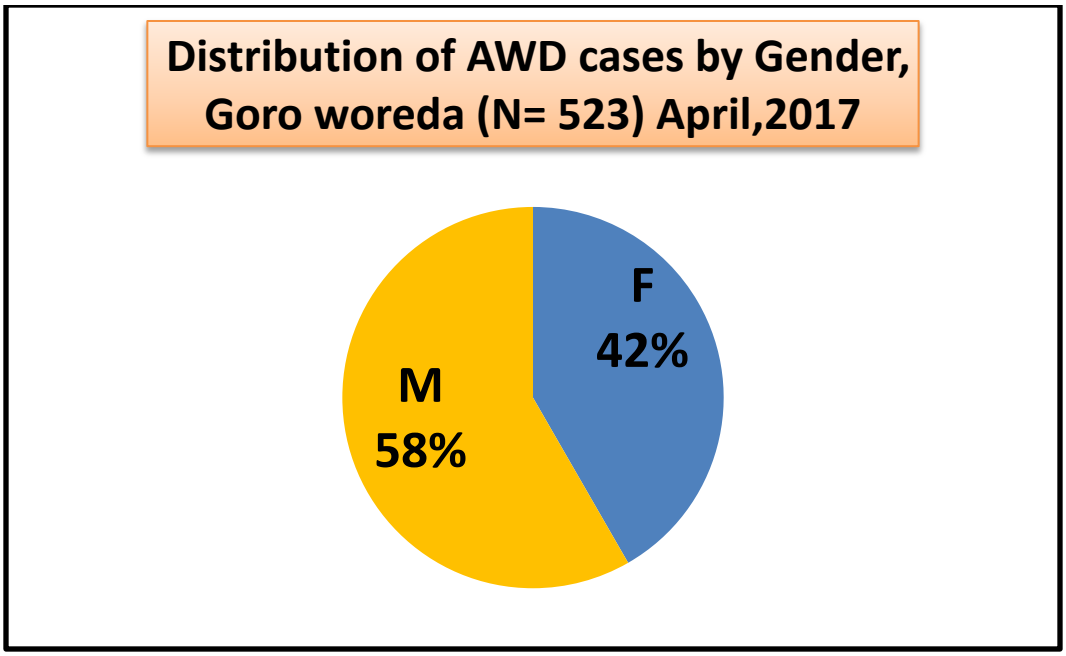


Figure 4: Distribution of AWD cases by gender Goro woreda Bale zone oromia region April, 2017.

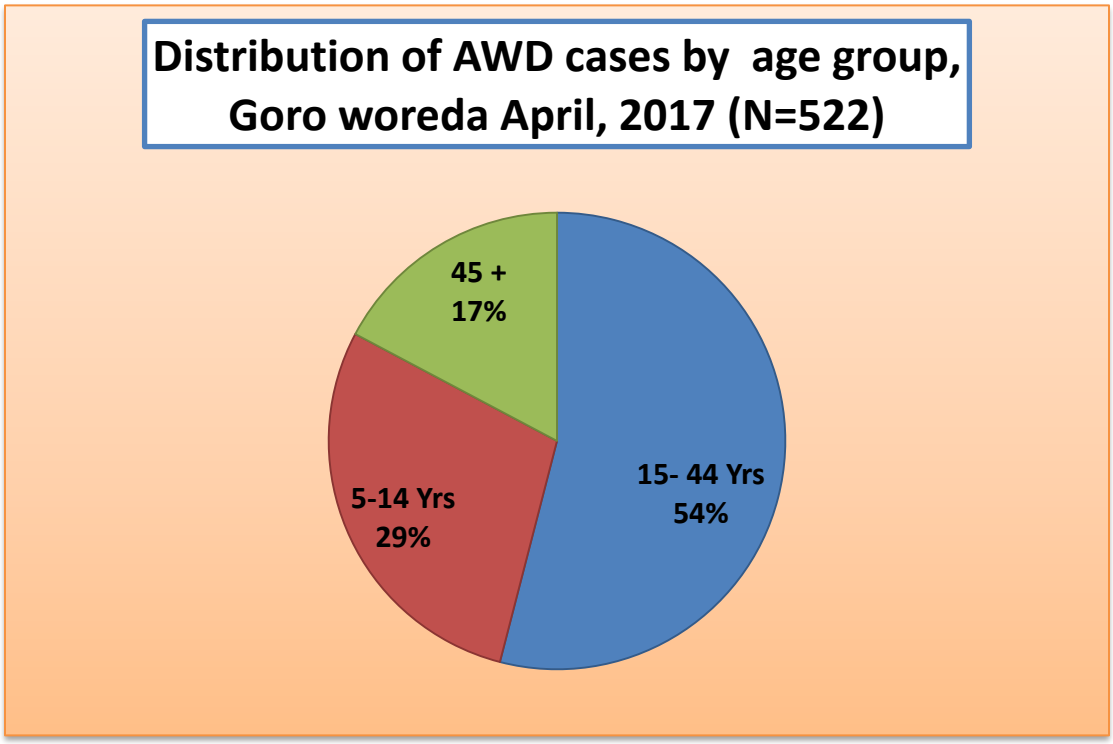


Figure 5: Distribution of AWD cases by age group Goro district April, 2017.

85% of cases were severely dehydrated indicates the severity of disease or inappropriate screening of cases, or awareness of affected community to seek health care early.

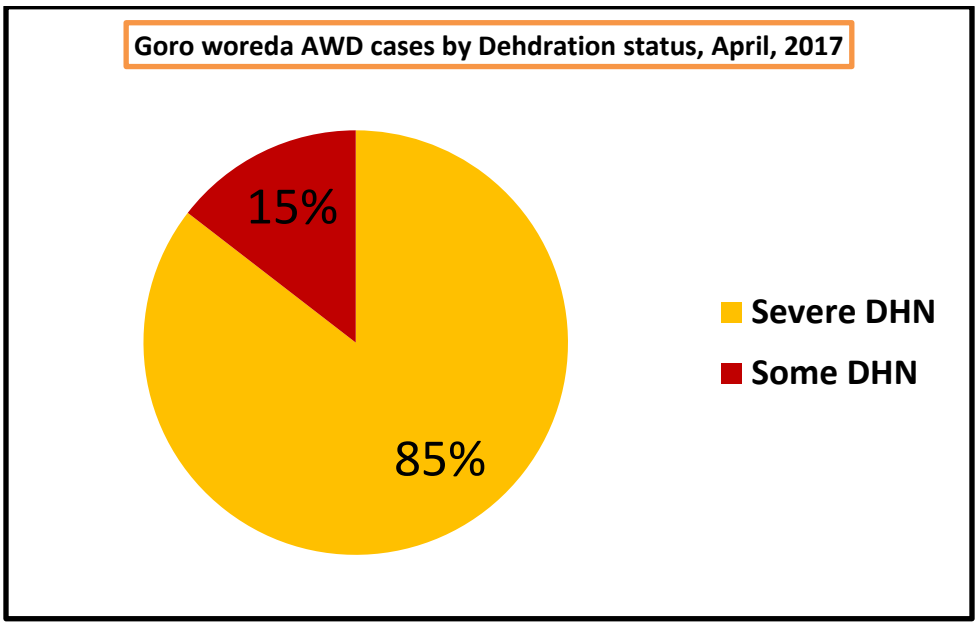


Figure 6: Goro district AWD cases by dehydration status

Case Control Study

For case control study, 50 cases and 50 controls were selected conveniently during admission to CTC and by house to house search. The mean age of cases was 26 years (range 2-60years) and those of controls were 28 years (range 9-60years).

Table 1: Demographic and some important characteristics of cases and controls

Variables		Cases	Controls
Sex	Male	27(54%)	23(46%)
	Female	23(46%)	27(54%)
Educational status	Illiterate	26(52%)	20(40%)
	Elementary and above	24(48%)	30(60%)
Marital status	Married	27(54%)	37(74%)
	Single	23(46%)	13(26%)
Age groups	<=5	3(6%)	0 (0%)
	5-14	12(24%)	3(6%)
	15-44	26(52%)	41(82%)
	44 & above	9(18%)	6(12%)
Family size	<=5	17(34%)	24(48%)
	>5	33(66%)	26(52%)
Contact history with patients in the past 5 days before onset of symptom	Yes	17(34%)	12(24%)
	No	33(66%)	38(76%)
Availability of water Rx chemicals in house	Yes	32(64%)	35(70%)
	No	18(36%)	15(30%)
Presence of hand washing facility near toilet	Yes	30(60%)	26(52%)
	No	20(40%)	24(48%)
Time in hours to fetch water from source	<=1hr	37(74%)	18(36%)
	>1hr	13(26%)	32(64%)
Frequency of hand washing in a day	<=3 times	20(40%)	10(20%)
	>3 times	30(60%)	40(80%)

In bivariate analysis presence of sick person in village OR=3.54, 95% CI (1.48-8.45), drinking from un protected source of water OR=3.50, 95% CI (1.15-10.63), frequency of hand washing greater than three times per day OR = 0.37, 95% CI (0.15-0.91), time to fetch water from source less than or equal to one hour OR = 5.05, 95%CI (2.14-11.9), contact history with patients within 5 days before the onset of symptom OR=1.6, 95% CI(0.68-3.90), defecation on open field OR=1.5, 95% CI (0.4-5.9) were risk factors for acquiring AWD while purifying drinking water OR =0.26, 95% CI (0.09-0.7) and availability of water treatment chemicals in house OR=0.7, 95%CI (0.33-1.75) were protective factors for disease.

Table 2: Bivariate analysis of risk factors for AWD outbreak in Goro district April, 2017

Risk factors	Category	Cases	Controls	COR & 95%CI
Presence of AWD sick person in village	**Yes**	**39**	**25**	3.54(1.48-8.45)
	No	**11**	**25**	
Using un protected source of water	**Yes**	**14**	**5**	3.50(1.15-10.63)
	No	**36**	**45**	
Living near contaminated river	**Yes**	**37**	**18**	5.05(2.14-11.90)
	No	**13**	**32**	
Washing hand greater than 3 times in a day	**Yes**	**43**	**47**	0.37(0.15-0.91)
	No	**7**	**3**	
Purifying drinking water	**Yes**	**31**	**43**	0.26(0.09-0.7)
	No	**19**	**7**	

By using logistic regression, presence of AWD sick person in village adjusted OR= 10.78, 95% CI (3.44-33.76) at P- value = 0.0001 remain independent risk factors for transmission and spread of AWD while washing hand greater than three times in a day and time to fetch water from source greater than one hour remain protective against infection.

Table 3: Multivariable analysis of independent risk factors for AWD outbreak at Goro district, Bale zone Oromia region, Ethiopia March 2017

Risk factors	AOR & 95% CI	P value
Purifying drinking water	0.60 (0.22-1.60)	0.32
Washing hand greater than 3 times in a day	0.33(0.12-0.92)	0.001**
Presence of sick person in village	10.78(3.4-33.7)	0.0001**
Drinking from unprotected source	2.45(0.67-8.91)	0.76
Living near contaminated river	0.17(0.05-0.52)	0.0008**

1.1.6 AWD Knowledge

Eighty six (86%) of controls had previous knowledge of AWD by acquiring the disease in their life or from friends as compared to 72% of cases. Eighty four (84 %) of cases stated that AWD is preventable disease as compared to 92% of controls. Seventy two (72%) of cases replied that AWD treatment center could be source of infection as compared to 42% of controls. This was affected by condition that cases get more knowledge during admission to CTC and could not be used as comparison of cases and controls. Hand washing habits before food, after toilet, after contact with dirty materials in both cases and controls were comparable except that after toilet is 74% for cases and 88% for controls. 86% of controls purify water for drinking as compared to 62% in cases which could make significant difference for contracting disease.

In addition to this most of interviewed cases and controls during house to house visit have water treatment chemicals in their home, but there was no awareness on utilization of water treatment chemicals or wrong perception that water treatment chemicals change the taste of water. This needs intensive behavioral change.

1.1.7 Public health interventions

The main purpose of outbreak investigation is to provide efficient and effective public health interventions timely to stop the spread of disease to other areas and decrease cases and deaths.

Accordingly major public health intervention undertaken at this district were establishment of AWD task force comprising of different government sectors, active case search and health education at house hold level, orientation of health professionals working in CTC, distribution of water treatment chemical by IRC and monitoring and evaluation activities.

1.1.8 Discussion

The outbreak stayed in the district for more than five months due to an interrupted intervention; shortage of the allocated budget and covered many kebeles/ villages because of presence of AWD sick person in village, shortage of pure water supply and low awareness towards prevention according to discussion with woreda health office deputy head.

There were many AWD cases per day around WHO weeks 3 and 7/2017 which was not seen in other areas and most likely attributed to common source of infection or exposure. But this outbreak investigation has less power to identify common sources like sharing common source such as food or attending public gatherings. This may be due to small sample size of both cases and controls, failure to conduct environmental investigation and presence of the AWD outbreak in other woredas of Bale zone.

The difference in attack rate of kebeles/villages in district might be due to access to pure water supply or using river as source of drinking water, personal and environmental sanitation and presence of daily laborers.

The overall attack rate of this outbreak was less than that of AWD outbreak investigation conducted in Afar region in 2009 and the proportion of age group affected (15-44) was almost the same (8). The higher proportion of cases in this age group and males could be due to the fact that males and adults always stay outside of home which increases the chance of eating or drinking outside than females and lower age groups which in turn increases contamination (6).

The study also indicated that presence of AWD sick person in village, drinking water from unprotected source or river and time to fetch water from source less than one hour (individuals living near Mana river) as independent risk factors or sources for infection and spread of the outbreak. The association between time to fetch water from source less than or equal to one hour and acquiring the

disease in bivariate analysis can be explained as John Snow‘s cholera outbreak investigation or individuals living/using near contaminated river are more affected by the disease than those living at distance from river or confounding since it lacks significance at multivariable analysis. Frequency of hand washing greater than or equal to three times per day is protective against the disease and agrees with the fact that it decreases possibility of fecal-oral route transmission (1).

Different studies conducted in different areas in Africa (eg. Serralion, Kenya, central African Republics) revealed that different factors like drinking untreated/unsafe water, consumption of street foods/drinks and consumption of ice made from contaminated water as source of infection (7). But in this outbreak investigation, no common source or specific factor responsible for transmission and spread of the disease identified due to longer time of the outbreak and covering many kebeles/ villages.

1.1.9 Limitations

Since AWD entered Ethiopia first on November 2015 through Moyale district of Borena zone and confirmed by laboratory, culture confirmation was not conducted in different areas. This is because the time of outbreak in one woreda and other was not more than 45 days apart to be considered as separate outbreak. So Goro districts‘ AWD outbreak was not confirmed by culture identification or environmental investigation conducted and epidemiological linkage and RDT result was used.

General AWD control and prevention measures were done by giving due attention than identifying specific risk factors by outbreak control team or rapid response team.

Presence of the same outbreak in other woredas of zone prevented us to follow Goro district‘s outbreak situation and collect other information on daily basis.

Asymptomatic cases may be included as controls as large proportion of cholera cases are asymptomatic and no screening of controls available.

1.1.10 Conclusion

AWD outbreak affected Goro district more than any other districts in zone for longer time period, but no deaths reported. More than half of cases were males and between age group of 15-44 might

be due to higher frequency of being outside of home than females and lower or higher age groups respectively. There was also interruption of prevention and control activities due to shortage of budget as seen in the absence of cleaner or guard assigned to Malka Buta HC CTC during visit which could result in higher number of cases.

The risk factors identified for the transmission and spread of the disease were presence of AWD cases in the village, less frequent hand washing and not purifying drinking water.

1.1.11 Recommendations

Once there is AWD outbreak in woreda prevention and control measures should not be interrupted even one day until zero cases are reported continuously for thirty days. This is also possible if there was no outbreak in neighboring district, zone or region. Otherwise many cases will flow like Goro district in one day.

The outbreak may not affect many kebeles/villages if risk factor reduction like pure water supply, latrine construction and utilization as well as social mobilization were done at the same time in all kebeles.

- CTC should be standardized and have all necessary resources like human power, water supplies at all time.
- ”Hand washing day campaign” to initiate the community awareness on hand washing and presence of AWD outbreak in the district or zone could play important role to stop spread and transmission of disease.
- Health education on water purification system should be continuously given for community.

1.1.12 References

1. Guideline on CHOLERA OUTBREAK MANAGEMENT Ethiopian Health and Nutrition Research Institute Federal Democratic Republic of Ethiopia, May 2011 Addis Ababa.
2. Operational guideline for Cholera epidemic response In Afghanistan, 2012
3. Scientific Committee on Enteric Infections and Foodborne Diseases Epidemiology, Prevention and Control of Cholera in Hong Kong. Centre for Health Protection June 2011.
4. Ali M, Nelson AR, Lopez AL, Sack DA (2015) Updated Global Burden of Cholera in Endemic Countries. PLoS Negl Trop Dis 9(6)
5. The Global Public Private-Partnership for Hand washing http://globalhandwashing.org/ August 2016.
6. Guideline for cholera control World Health Organization, Geneva 1993
7. Epi-Aid # 2010-074 Trip Report: Sierra Leone Cholera Outbreak Investigation, 2012.
8. Belay Bezabih BEYENE et al. Epidemiology of Acute Watery Diarrhea Outbreak and Challenges of Control—Afar, Ethiopia, 2009, International Invention Journal of Medicine and Medical Sciences (ISSN: 2408-7246) Vol. 1(10) pp. 162-169, October, 2014.
9. Federal Democratic Republic of Ethiopia Central Statistical Agency Population Projection of Ethiopia for All Regions At Wereda Level from 2014 – 2017. August 2013 Addis Ababa, Ethiopia.

1.2 Measles outbreak investigation in Harena Bulluq district, Bale zone of Oromia region Ethiopia, January 2017

1.2.1 Abstract

Introduction: Measles remains major public health problem world-wide accounting for 164,000 deaths and around 20 million infections each year despite the availability of a safe and cost-effective vaccine. Suspected outbreak of measles was reported in November 2016 from Harena Bulluq district of Bale zone and we investigated to confirm and identify risk factors for outbreak.

Methods: We used descriptive study followed by 1:1 un-matched case control study from January 16-26/2017. 60 cases and 60 controls were interviewed with structured questionnaire for possible exposures before the cases develop sign and symptoms. Data were entered into epi info 7 for analysis.

Result: A total of 108 suspected measles cases were identified with one death. Sixty seven (67%) of the cases were under five years and 81% were unvaccinated. Four of five blood samples sent to reference laboratory were positive for measles IgM antibodies. Overall attack rate was 10 and 112 per 10,000 populations for woreda and kumbi kebele respectively. In bi-variable analysis; having contact history with suspected measles case OR: 5.69, 95% CI (2.54-12.74) and presence of measles case patient in the family OR: 44.1, 95% CI (14.9-130.3) were significantly associated with contracting measles. On multivariate analysis, contact history with measles 2-3 weeks before rash onset and being vaccinated for measles remain independent risk factors for acquiring and protecting against the disease respectively.

Conclusion: A confirmed measles outbreak hit Kumbi kebele due to low vaccination status in under five year‘s age group. Age Specific Attack Rate for less than five years age groups was 4.9% and the highest. Contact history with measles case was independent risk factor for transmission and spread of the disease while vaccination for measles was protective factor. Monitoring of vaccination status of hard to reach areas like kumbi kebele is mandatory.

Key words: measles, outbreak, case control, Harena district, Ethiopia Words: 288

1.2.2 Introduction

Measles remains one of the top 10 causes of death among young children despite the availability of a safe and cost-effective vaccine. Worldwide, there are approximately 20 million cases of measles and 164,000 deaths from measles infection each year (1).

The incubation period usually lasts 10 days (with a range from 7 to 18 days) from exposure to the onset of fever. The disease is characterized by prodromal fever, conjunctivitis, coryza, cough and the presence of Koplik spots (reddish spots with a white center) on the buccal mucosa. The sign and symptoms are caused by an allergic response due to the union of sensitized lymphoid cells and measles antibody with the virus in the skin and these allergic reactions in turn lead to immunosuppression and susceptibility to other infections or complications (1).

In industrialized countries, complications occur in around 10-15% of cases and include diarrhea, otitis media, pneumonia, croup and, typically, encephalitis. The frequency of complications in developing countries is less well known. At least three-quarters of cases in developing countries can be expected to have one complication and some have multiple systems involvement (2).

The three major causes contributing to the high case-fatality rate are pneumonia, diarrhea and croup. Measles can also lead to life-long disabilities, including blindness, brain damage and deafness. Low vitamin A status has been associated with a higher rate of complications and a higher death rate. Most measles deaths (98%) occur in developing countries and the case fatality rates are normally estimated to be 3-5%, but may reach 10-30% in outbreak situations. This compares with 0.1% in many industrialized countries (2).

Transmission is airborne, by droplet spread or by direct contact with the nasal and throat secretions of infected persons. Measles is one of the most highly communicable diseases in man, with a basic reproductive rate of 17-20 (i.e., the introduction of one case of measles in a completely susceptible community generates 17-20 new cases). Alternatively, secondary attack rates among susceptible household contacts have been reported to be 75%–90% and outbreaks have been reported in populations where only 3% to 7% of the individuals were susceptible (3).

Risk factors or determinants of measles virus include:- Low or absence of vaccination, living in overcrowded urban areas, large family size, travel history to measles area, types and locations of social interactions, immuno-compromized individuals. (4).

At the World Health Assembly in 2005, global goal for measles control was established as part of the Global Immunization Vision and Strategy to achieve a 90% reduction in measles mortality by 2010 compared with 2000. As a result, as of 2008, four of the six WHO regional offices have a measles elimination goal AMRO (America), EURO (Europe), EMRO(Eastern Mediterranean), WPRO (Western Pacific Region) and two have a mortality reduction goal (AFRO, SEARO) Africa and South East Asia (5).

The introduction of measles vaccine into routine immunization programmes results in a marked reduction in incidence of the disease and its associated morbidity and mortality. When high levels of vaccine coverage are attained (i.e. vaccine coverage >80%), measles incidence decreases and the intervals between outbreaks are lengthened (e.g., 4-8 years) when compared to those observed during the pre-vaccine era (e.g., 2-4 years) (2).

The National Immunization Programme, established in Ethiopia in 1980, and currently provides measles immunization service through static and outreach sites nationwide. The current routine immunization schedule recommends a dose of measles vaccination at 9 months of age (3).

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. However, system-wide barriers related to geographic coverage still remain as gaps, requiring bridging approaches such as the Enhanced Outreach Strategy2, even as the country moves towards a more equitable geographical coverage with construction and staffing of 16,251 additional peripheral health facilities (11).

Another milestone attributable for further improvement of routine immunization 2008 through 2010 includes strengthening of links between health services and the community through the Health Extension Program and implementation of Enhanced Routine Immunization Activities (ERIA) in zones with large number of unvaccinated children and pastoralist regions in 2009 (4).

Although, case-based measles surveillance was initiated in Ethiopia in 2003 and measles is one of the weekly reportable diseases, the number of reported cases of measles was low. This is due to community perception of measles as common childhood illness or self-healing disease and delayed health seeking behavior resulting in health professionals diagnose only complications of measles (4).

Despite global and regional efforts to reduce measles mortality and morbidity, measles outbreak has been seen in different parts of the world at different times especially in Africa region.

In 2004, of the 1,590 districts under case-based surveillance, 80 (5%) reported outbreaks of measles. In 2005, 47 (2.5%) districts reported outbreaks out of 1,850. In 2006, 178 (6%) of 2,923 districts reported outbreaks, which spanned across 29 countries. In 2006, 178 (6%) of 2,923 districts reported outbreaks, which spanned across 29 countries. The most affected countries were: DRC (62,933 cases/868 deaths), Nigeria (2,919 cases/18 deaths), Ethiopia (1,665 cases/0 deaths) and Tanzania (1,606 cases/8 deaths). The most affected countries were: DRC (62,933 cases/868 deaths), Nigeria (2,919 cases/18 deaths), Ethiopia (1,665 cases/0 deaths) and Tanzania (1,606 cases/8 deaths) (13).

In outbreak investigation conducted in Zinbabwe, Zaka district in 2010, 126 cases and 5 community deaths (CFR of 4%) were reporeted. Factors associated with this outbreak were also identified as contact with a case AOR=41.14(95%CI: 7.47-226.54), being unvaccinated AOR= 3.96(95%CI: 2.58-6.08) and not receiving additional doses of vaccine AOR 5.48 (95%CI: 2.16-11.08 (6).

In outbreak investigation conducted in Northern Gonder of Amhara region Age-specific attack rate of infants <1 year of age and children between 1-4 years of age had significantly higher than those aged 5 years and above (12).

Unpublished compiled body of works in Field Epidemiology training program reports also shows that there were repeated outbreaks of measles in different zones of Oromia region including Guji, Bale, Ilu Ababor and East Wollega zones during the period between 2011-2014 (8, 9, and 10).

This outbreak of December 2016 in Bale zone, Harena Bulluq woreda is also the second since 2011.

Objective of the study

General Objectives: The main objective of the outbreak investigation was to verify and control the spread of the disease in woreda and recommend prevention measures for current and future epidemics of the disease in the area.

Specific Objectives:

- To confirm the existence of outbreak in woreda
- To describe cases by time, place and person to determine magnitude of disease
- To identify possible risk factors for the outbreak.
- To implement measles prevention and control measures

1.2.3 Methodology

Study Area and Period

We conducted the investigation in Kumbi kebele, Harena Bulluq district, Bale zone of Oromia region from January 16-26/2017.

Study Design

Descriptive epidemiology of all line listed cases followed by unmatched case- control study design was applied on 60 cases and 60 controls.

Target population

All population of Haranna Bulluq woreda was the target population for measles outbreak investigation.

Study Population

During this outbreak investigation, all confirmed and suspected measles cases, deaths and selected community controls were study population.

Sample size Determination and Sampling

For case-control study, 60 cases and 60 controls were selected conveniently based on geographical accessibility. The sample size was calculated using Stat calc function of Epi-info version 7. Using the confidence level of 95%, power of 80%, and assuming a 35% expected control exposure to measles like disease in community and to detect OR 3, 61cases and 61 controls were required.

Inclusion criteria

Cases: Any resident of Kumbi Kebele, who fulfill measles case definitions with active sign and symptom of measles during data collection.

Controls: A control was any resident of Kumbi Kebele who did not develop signs and symptoms of measles and neighbor to a case.

Exclusion criteria

Cases: Those who were unconscious were excluded.

Controls: Those who were family members from the same household were excluded.

Case definition

Measles suspected cases at community level:

A community member should report any person with rash and fever to a health worker and advise the person to go to a health facility during outbreak of measles.

Suspected measles case:

Any person with fever and maculopapular (non-vesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles .

Confirmed measles case:

A suspected case with laboratory confirmed (positive IgM antibody) and that had not received measles vaccination within the 4 weeks before the specimen collection or epidemiologically linked to confirmed cases in an outbreak.

Measles outbreak:

In Ethiopia, a measles outbreak is declared when three or more laboratory confirmed measles IgM - positive cases occur in a health facility or district in a month.

Epidemiologically linked case: A suspected measles case that was not blood sample taken for serologic confirmation and is linked (in place, person and time) to a laboratory confirmed case.

Measles death:

For surveillance purposes, a measles death is defined as any death from an illness that occurs in a confirmed case or epidemiologically linked case of measles within 30 days of the onset of rash.

Operational definition

Literate: for this investigation we labeled literate those study subjects that have the skill to read and write.

Illiterate: study subjects who cannot able to read and write.

Data collection: We used structured questionnaire to collect information from cases and controls on demographic characteristics and exposure or risk factors on disease. Discussion with district PHEM focal person, Angetu HC director and Kumbi HP health extension workers was also conducted to seek additional information on setting of outbreak. In addition to this cold chain management system of Kumbi HP was also observed for contribution of vaccine efficacy.

Ethical consideration

Support letter was written from Oromia Regional health bureau to zonal health department and from zone to District health offices. Moreover, objective of the study was briefly mentioned and Oral informed consent was obtained from the study participants or their parents to participate in the

study. Participants were treated with respect and willingly participated in the study without payment or cohesion. Confidentiality was assured and no personal details was recorded or produced on this documentation.

Data Dissemination

Finding of this investigation in soft copy was communicated with Oromiya Regional Health Bureau PHEM core process, Bale Zonal health office and Addis Ababa University EFETP department. Additionally, the soft copy of the document was also sent to FETP Resident Advisors, Mentors and Field Supervisors.

Coordination

Bale zone health office received suspected measles outbreak report from Harena Bulluq district health office on 29/11/2016 and reported to Oromia Regional health bureau public health emergency management (PHEM) core process. At the same time the office sent a team comprising of WHO zonal technical officer with necessary drugs and supplies to the affected site on 15/12/2016. The team assessed the situation and collected blood specimens from five cases and sent it to EPHI for confirmation.

1.2.4 Result

Description of cases by time, place and person

Over the period of outbreak (November 29, 2016- January 2017) we identified 108 suspected and confirmed measles cases and one death. Four of the five samples taken for laboratory were positive for measles IgM. The index cases were two children presented with rash and fever at Angetu Health Center on 29/11/2016 from Kumbi Kebele (Kereta Gare, small structure of kebele). Travel and contact history of index cases was not known because there were few cases before index cases and the location of Kumbi kebele is in between dense Harena forest.

The case fatality rate was 0.92% and cumulative attack rate was 10.5/10,000 populations for woreda and 113 /10,000 population for kumbi kebele. Among the total cases 51% of them were females and **67 %** were under five-year age groups. The Age Specific Attack Rate for less than five

years age groups was 4.9% and the highest. **Eighty one percent** of cases were not vaccinated for measles in their life while 8% of them had unknown vaccination status and the rest had history of vaccination.

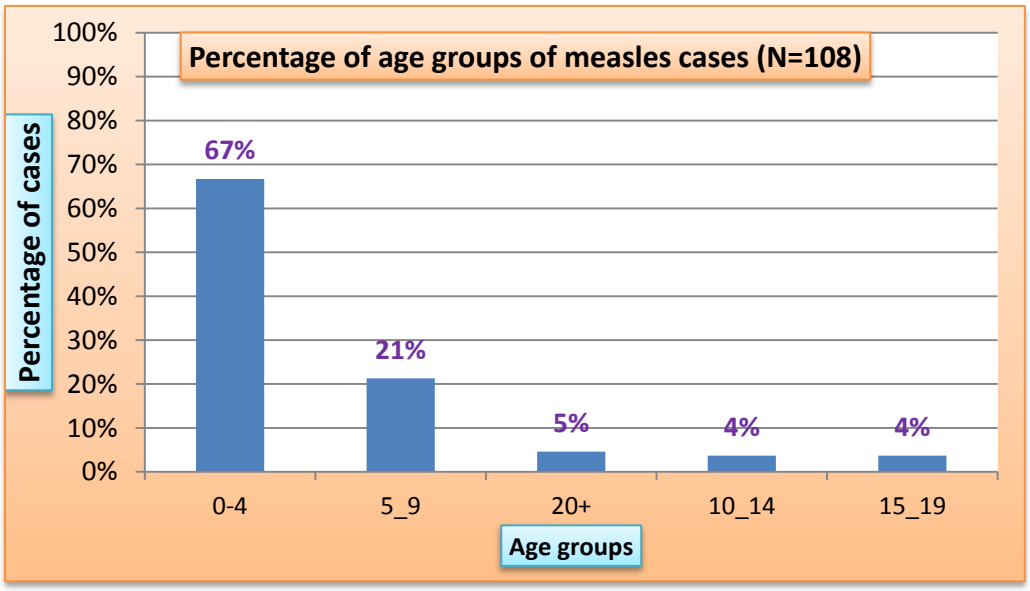


Figure 7: Distribution of measles outbreak cases by age groups Harena Bulluq District, Bale zone, Oromia region, Ethiopia January 2017.

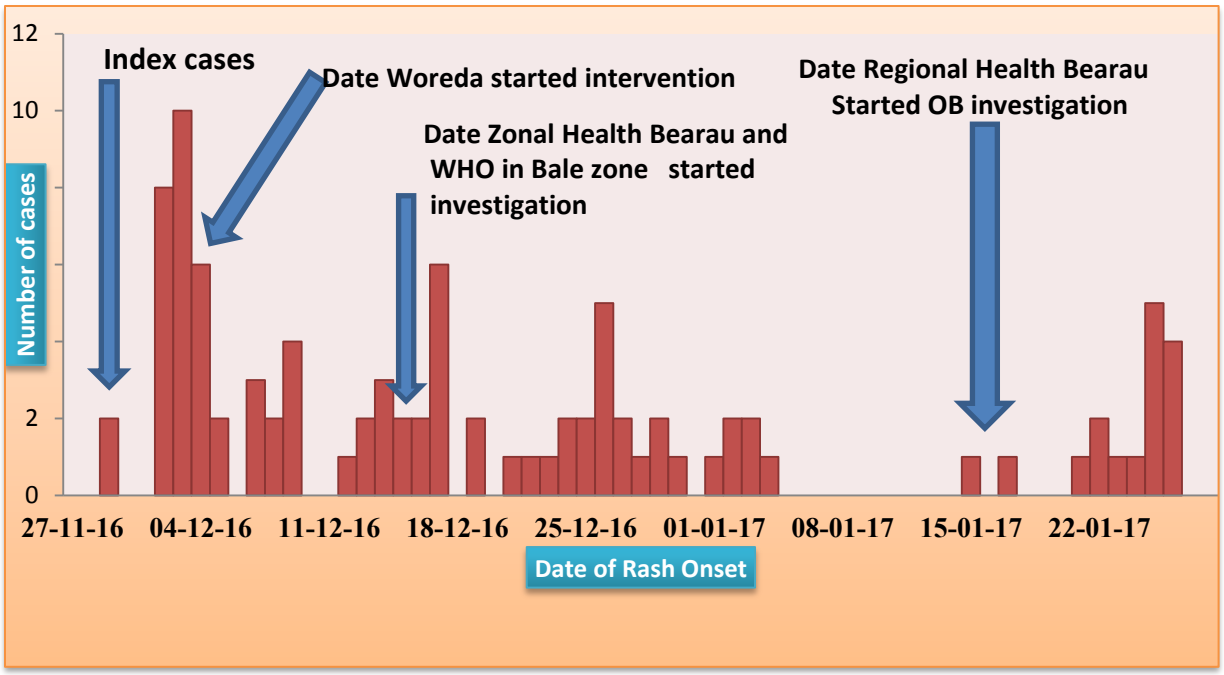


Figure 8: Epi-curve of Measles Outbreak in Harena Bulluk woreda, Bale zone, Oromia region, Ethiopia January 2017.

As shown above the epidemic-curve of the outbreak is propagated type due to the location of Kumbi Kebele in separated Harena forest that prohibited frequent contact of most of cases. The peak at the beginning of the epi-curve was due to late detection of outbreak and zero cases on some days may be due to reporting problem or intervention for detected cases. The last peaks were identified during outbreak investigation by active case search method.

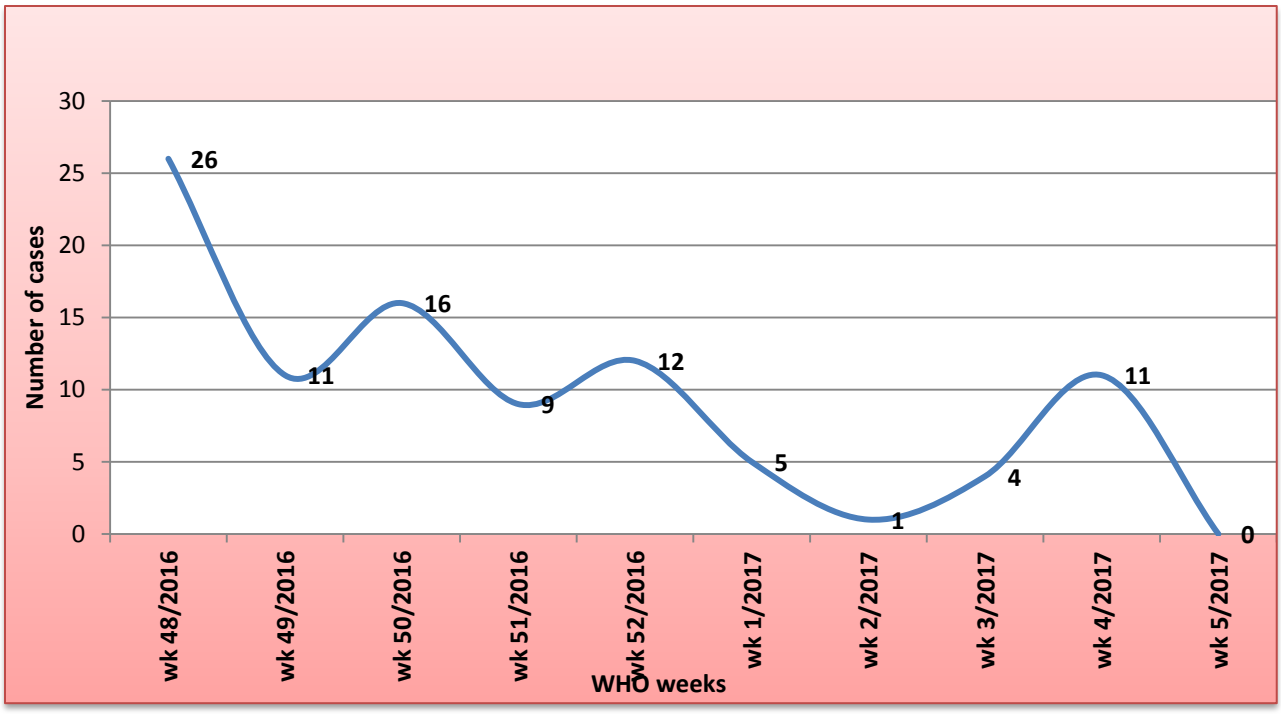


Figure 9: Number of Measles cases by WHO Weeks at Harena Bulluq Woreda, Bale zone, Oromia region, Ethiopia January 2017.

The number of cases of measles got peak during WHO epidemiologic week 48/2016 and became getting lower and lower during subsequent weeks. The outbreak stayed in the community one month before health worker detected it making the number of cases to shoot rapidly.

Case control Study

In this investigation a total of 59 cases and 60 controls were analyzed for case control study. The median age of cases was four years (range 5 months to 18 years). Median age of controls was five years with range 1year to 57 years. Fifty one percent (30) of cases were males while 27(45%) of controls were also males. The mean illness duration before visiting health facilities for cases was three days (minimum one days and maximum six days).

In bi-variable analysis; having contact history with a person suspected to have measles before 2 -3 weeks OR: 5.69,95% CI (2.54-12.74),being age less than five years OR 2.16, 95% CI (1.01-4.61) and presence of measles case patient in the family OR: 44.1, 95% CI (14.9-

130.3) were significantly associated with contracting measles. However, vaccination against measles OR: 0.07, 95% CI (0.028-0.18) and knowing modes of transmission of measles OR: 0.07, 95% CI (0.028-0.18) were protective factors for contracting measles.

Table 4: Bivariate analysis of risk factors for measles outbreak at Harena Bulluq woreda Bale zone Oromia region January 2017

Risk factors	Category	Cases	Controls	COR and 95%CI	p-value
Age group less than five years	Yes	42	32	2.16(1.01-4.61)	0.044*
	No	17	28		
Contact history 2-3 weeks before onset of symptom of cases	Yes	46	23	5.69(2.54-12.74)	0.0000*
	No	13	37		
Literate family	Yes	9	17	0.45(0.18-1.12)	0.08
	No	50	43		
Knowing modes of transmission of measles	Yes	30	47	0.28(0.12-0.63)	0.00017*
	No	29	13		
Presence of sick person in family	Yes	49	6	44.1(14.9-130.3)	0.000*
	No	10	54		
Being vaccinated for measles virus	Yes	7	39	0.0725(0.028-0.18)	0.0000*
	No	52	21		

Using adjusted odds ratio or logistic regression contact history 2-3 weeks before onset of sign and symptom of cases remain an independent risk factor for contracting measles while vaccination against measles remain protective factor for contracting measles. Age less than five, literate family and knowing modes of transmission of measles were not statistically significant on multivariate analysis.

Table 5: Independent risk factors for acquiring measles in Harena Bulluq district Bale zone Oromia region January 2017

Risk factors	AOR	Lower CI	Upper CI	P value
Being age less than five years	0.9566	0.2911	3.1429	0.9417
Contact history within 2-3weeks before onset of sign and symptom	10.7108	3.9292	29.1972	**0.0000
Literate family	0.5106	0.1158	2.2511	0.3745
Knowing modes of transmission for measles	1.9790	0.6039	6.4848	0.2597
Presence of sick person in family	0.0648	0.0207	0.2031	0.0000
Being vaccinated for measles	0.1808	0.0508	0.6427	**0.0082

1.2.5 Public Health Interventions

The woreda health office in collaboration with Angetu Health Center assigned clinician to Kumbi Health Post to manage cases of measles at health post level and refer complicated cases to Health Centers. Accordingly, 94.5% of cases were managed at Kumbi health post by supportive treatment like Vitamin A supplementation, TTC eye ointment and appropriate antibiotics while the rest complicated cases were referred to Angetu HC for better management. Active case searching was also conducted during house to house visit and referred cases to health post.

Routine vaccination coverage of Measles at woreda level for the past three years 2014,2015 and 2016 shows 1891(63%), 3610(111%) and 3453(103%) respectively. In addition to this, Measles SIA was conducted in April 2016 which covered wide age range of 6-179 months as well as in December, 2015 in drought affected areas 6-59 months of age have been vaccinated and Harena Bulluk woreda got both opportunities with coverage beyond 97% at both rounds. But the challenge about this outbreak is that the actual number of total population in this kebele and the number found at woreda, used for planning has 3000 difference and crossing Harena forest to access this population is also another challenging.

From the field observation; from Kumbi health post motor bike can reach at dry season to the affected community. Motor bike reaches any villages in the kebele during dry season. As a witness we used rental motor bike from health post to Adami Village with contract base of 150 ETB (Motor

bike with motorist) .Motorists are cooperative or willing enough to help with optimal price. But two important things are challenging or hard to HEWs; 1. Rainy season

2. To go alone in dense Herena`s forest at any time may difficult for HEWs. People are newly resided at the center of the forest. As a result, HEWs need to go more than 5km through dense forest to get children .Unless, experienced motorist or local volunteer on barefoot help the HEWs, it may be difficult for HEWs to work alone.

1.2.6 Discussion

An outbreak of measles virus occurred in Harena Bulluq district due to low vaccination coverage in Kumbi kebele. Highest proportion cases in < 5 years age group shows recent vaccination coverage weakness in contrast to **high administrative coverage which does not consider total population or ground level evidence**. If high level of vaccine coverage are attained i.e. >80%, measles incidence decreases and the interval between outbreak is also lengthened to 4-8years (3). However in Harena Bulluk this outbreak is the second since 2011 G.C.

This outbreak stayed in the community one month before detection by health workers due to geographic nature of kebele in dense forest or poor surveillance system. People living in this area were also deforesting the land and hide themselves from Kebele leaders or members who could help children to get vaccine.

The outbreak have been covered many kebeles but the geographical location of the kumbi kebele in the forest and the mobility of residents of kebele prevented wide spread of disease or vaccination coverage in surrounding areas also played crucial role to spread of the disease.

The case fatality rate for this outbreak was less than expected in developing countries and outbreak investigation conducted in Zimbabwe due to proper case management after detection of outbreak in woreda (6).

Regarding risk factors for the outbreak, contact history with measles cases 2-3weeks before onset of sign and symptom, lack of vaccination and presence of sick person in the family were positively associated with contracting the disease in bi-variable analysis while knowing modes of transmission for measles was protective for contracting the disease.

Contact history with measles 2-3 weeks before the onset of symptom remain an independent risk factor for contracting measles as measles is highly infectious disease in man with basic reproductive rate of 17-20 (3). Being vaccinated for measles has also 0.18 times lower chance of contracting the disease than those not vaccinated in this study is consistent with measles is vaccine preventable disease (4).

Knowing modes of transmission for measles, literate family and presence of sick person in family lack statistical significance in multivariate analysis due to small number of cases and controls in two by two table cells, or confounding factor.

Limitations

Vaccination status for cases and controls were recorded depending on respondents‘ recall which may be in accurate or results in recall bias.

The study was conducted too late after the occurrence of the outbreak and information about index cases could not be found appropriately.

1.2.7 Conclusion

Risk factors for this outbreak was found to be no or low vaccination status as evidenced by higher number of cases in under five years age group and statistically significant association with being unvaccinated.

1.2.8 Recommendations

- Strong communication among district surveillance officer, health extension workers and kebele leaders is crucial for early detection of outbreaks rising in such pocket areas.
- Enhancing routine and outreach immunization services by district EPI and MCH coordinators based on real population data especially for those hard to reach and pocket areas is mandatory.
- Health extension workers must request vaccine supply depending on birth cohort in their kebele and Angetu HC should also provide regular supervision to the health post.

- Community awareness should be done on isolation of cases at house hold level during such limited outbreaks.

1.2.9 References

1. Global Burden of Infectious diseases, Oklahoma State Department of Health Acute Disease Service Public Health Fact Sheet.
2. WHO Guidelines for Epidemic Preparedness and Response to Measles Outbreaks, Geneva, Switzerland May, 1999.
3. Guideline on measles surveillance and outbreak management , 3rd edition, Ethiopian Health and Nutrition Research Institute Federal Democratic Republic of Ethiopia January 2012, Addis Ababa, Ethiopia
4. Habtamu Belete Akalu, Review on Measles Situation in Ethiopia; Past and Present, Journal of Tropical Diseases, 2015.
5. Response to measles outbreaks in measles mortality reduction settings, Immunization, Vaccines and Biological, WHO 2009.
6. Kufakwanguzvarova W Pomerai1, Robert F Mudyiradima2 and Notion T Gombe1 Measles outbreak investigation in Zaka, Masvingo Province, Zimbabwe, 2010.
7. Senait Kebede et.al Trends of major disease outbreaks in the african region, 2003-2007, East Africa/1 Journal of Public Health Volume 7 Number 1 March 2010.
8. Abyot B. Woyyessa et al. Compiled Body of works in Field Epidemiology and Laboratory training program AAU, April 2012, Addis Ababa
9. Dagnachew A. Hurrissa et al. Compiled Body of works in Field Epidemiology and Laboratory training program AAU, June 2014, Addis Ababa.
10. Gemechu Shume et al. Compiled Body of works in Field Epidemiology and Laboratory training program AAU, June 2014, Addis Ababa
11. Ethiopia national Expanded Programme on Immunization, Comprehensive multi-year plan 2016 – 2020 Federal Ministry of Health, Addis Ababa April, 2015.
12. Mer'Awi Aragaw et al. Measles outbreak in Simada District, South Gondar Zone, Amhara Region, May - June 2009, Ethiop. J. Health Dev. 2012; 26 (2).
13. Senait K. et al Trends of major disease outbreaks in the African region, 2003-2007, East Africa/1 Journal of Public Health Volume 7 Number 1 March 2010.

CHAPTER TWO

Surveillance Data Analysis of suspected Meningococcal Meningitis in Horro Guduru Wollega Zone (HGWZ), Oromia region, Ethiopia from 2011-2015 G.C.

2.1 Abstract

Meningococcal meningitis, commonly known as cerebrospinal meningitis, caused by N. Meningitis, is the only form of bacterial meningitis that causes outbreaks. Though epidemics of meningococcal meningitis were occurring in Ethiopia for over a century ago, surveillance data analysis was not performed at zonal level to identify magnitude and trend of disease for possible intervention. This surveillance data analysis was conducted to fill such gap. Five years retrospective data (from 2011-2015) weekly report of suspected meningococcal meningitis in Horro Guduru Wollega zone were collected , analyzed and interpreted from March 1-April 28/2016.

A total of 339 suspected cases of meningococcal meningitis and five deaths were reported with mean annual incidence of 9.6/100,000 population and CFR 1.47 %. Majority of cases were reported during 2013 epidemic year from only five woredas, are females and from age group of 5-14. Surveillance system evaluation of suspected meningococcal meningitis must be conducted to improve accuracy and uniformity of reporting system in all health facilities in zone. Unless data archival system of health facilities is improved, it is difficult to study retrospectively for magnitude and distribution of communicable diseases. So it is crucial to improve data management system of health facilities in zone.

2.2 Introduction

Meningococcal meningitis is a contagious disease caused by Gram-negative diplococci bacteria called; Neisseria meningitides (Nm).It is more common clinical form, especially during outbreaks; outcomes are good if appropriately treated. At any time, 5-10% of the population may be nasopharyngeal carriers of N. meningitidis. Carrier rates increase from about 2% in children under five to 25% in the late teens and hence the attack rates too. Carrier is increased in smokers, overcrowded households, new military recruits and in first year residents of university hostels. (3)

Meningococcal meningitis, commonly known as cerebrospinal meningitis, is the only form of bacterial meningitis that causes outbreaks. The largest outbreaks occur mainly in the semi-arid areas of sub-Saharan Africa, designated the African ―meningitis belt.‘‘, an area that stretches from Senegal in the west to Ethiopia in the east. This hyper-endemic area is characterized by ***particular climate and social habits***. During the dry season, between December and June, because of dry windy conditions and higher incidence of upper respiratory tract infections, the local immunity of the pharynx is diminished thereby increasing the risk of meningitis. At the same time, the transmission of N. Meningitidis is favored by overcrowding and large population displacements. Favorable conditions for the spread of meningococcal meningitis epidemics include overcrowding, poor nutritional status and dry climatic conditions. These factors help explain some of the large outbreaks that occur during this season in the meningitis belt area. Due to herd immunity (whereby transmission is blocked when a critical percentage of the population had been vaccinated, thus extending protection to the unvaccinated), these outbreaks occur in, cyclic mode. Epidemics of meningococcal meningitis previously occurred every 8-12 years, however in recent years they have been occurring yearly. (4)

There are 12 serogroups of *N. meningitidis* that have been identified, 6 of which (A, B, C, W, X and Y) can cause epidemics. Geographic distribution and epidemic potential differ according to serogroup.

The bacteria are transmitted from person-to-person through droplets of respiratory or throat secretions from carriers. Close and prolonged contact – such as kissing, sneezing or coughing on someone, or living in close quarters (such as a dormitory, sharing eating or drinking utensils) with an infected person (a carrier) – facilitates the spread of the disease.

The average incubation period is 4 days, but can range between 2 and 10 days. *Neisseria meningitidis* only infects humans; there is no animal reservoir. The most common symptoms are a stiff neck, high fever, sensitivity to light, confusion, headaches and vomiting. Even when the disease is diagnosed early and adequate treatment is started, 5% to 10% of patients die, typically within 24 to 48 hours after the onset of symptoms. (5)

Meningococcal meningitis is a very serious and fatal disease. Endemic attack rates in sub-Saharan Africa range from under 10 - 20 per 100, 000 population. Epidemic attack rates in Africa can be as high as 1000 per 100 000 population. **80%** of cases of meningococcal meningitis occur in those under 30 years of age. Without appropriate treatment, the case-fatality rate in meningococcal meningitis can be as high as 50%; with treatment this can be reduced to 5–15%. Due to these facts, the disease must be seen as a medical emergency and efforts must be coordinated to acquire the necessary logistics and supplies during epidemic times to initiate timely and appropriate treatment to all cases.(6)

There are an estimated 1.2 million cases of meningococcal infection per year, with a death of ~135,000 worldwide. Disease patterns vary widely over time and between geographical areas, age groups, and bacterial serogroups. Most disease is caused by a few genetically defined clonal complexes of *N. meningitidis* that can emerge and spread worldwide (7).
A 20-year retrospective analysis of epidemic meningitis surveillance data in Burkina Faso, Mali, and Niger shows that the average annual incidence rates per 100 inhabitants and case fatality rates for the study period were respectively: Burkina Faso: 76 (14.4%); Mali: 22.2 (10.2%); and Niger: 95.9 (8.2%). Average attack rates at district level during epidemic years were 211 per 100 000 in Niger, 158 per 100 000 in Burkina Faso and 50 per 100 000 in Mali. Case-fatality ratios are higher in non-epidemic years when compared to epidemic years and epidemics last an average of 5 weeks in Mali, 7 weeks in Burkina Faso, and 10 weeks in Niger (2).

Ethiopia is one of the countries which are most affected with bacterial meningitis. The first reported outbreak in Ethiopia dates back to 1901, followed by outbreaks in 1935, 1940s, 1950s, 1964 and 1977. The largest epidemics in Ethiopia were reported in 1981 and 1989, each of which affected almost 50,000 people. So far, meningococcal meningitis epidemics in Ethiopia have been caused by groups A and C serotype (predominantly by group A) *Neisseria meningitidis*. In many parts of the country the disease is hyper endemic with 10-50

cases/100,000 population per year. Usually epidemics in Ethiopia originate from countries to the west except during the 1988-89 epidemics, which spread with pilgrims returning from Mecca. Earlier reports also revealed distinctive distribution of the disease in place (geographic areas involved) and time (seasonal variation in relation to temperature and rainfall patterns). The major epidemics in the last two decades however did not follow the distinctive pattern. Rather they were characterized by irregularities and unexpected occurrences. Epidemics affect almost all regions of the country and the timing of the epidemic had no distinct pattern probably due to climatic changes, environmental degradation and massive population movements. The epidemics and overall disease patterns are often poorly understood due to lack of effective and reliable routine disease surveillance system and accurate data in the country.(8)

In most epidemics the younger age group is the most affected. Data from the epidemics in Addis Ababa in 2000 show that the attack rate was highest (68.5/100,000) in children under 5 year of age. However, death rate and case fatality rate were highest for the older age group, in young adults (15-29 years) and in over 30 year olds. Overall about 85% of cases occurred in children and young adults. (8)

From week 01 to 48 of the 2014 epidemic season, 20,644 suspected cumulative meningitis cases have been reported with 1,791 deaths, representing a CFR of 8.7%. The updated data from Ethiopia shows that many Woredas (District) of Yirgalen Town in the SNNPR has surpassed the epidemic threshold at week 47 (AR 14.2 and two Woredas in the Oromiya Region have surpassed the alert threshold at week 48: Goba-Town and Mettu during this period (10).

Unpublished compiled body of work in field epidemiology on surveillance data analysis of meningococcal meningitis conducted in Ethiopia from 2005-2012 identified a total of 8866 suspected cases with annual incidence of 1.4/100,000 inhabitants and 174 deaths (CFR of 2%). Of the total 6210 (70%) cases and 117 (67.2%) deaths were reported during hot and dry season from December to June. But, there were also increases in cases and deaths unusual to the meningitis season between August and November, 2006 due to local outbreak in SNNP region, Gamo Gofa zone, Kucha woreda and Wolayta zone, Damota woyda Woreda (8).

Another unpublished compiled body of works in field epidemiology on surveillance data analysis of suspected meningococcal meningitis conducted in Oromia region from 2009-2013 showed a total of 2498 suspected cases and 66 deaths (CFR 2.6%) with annual incidence of

1.64% were identified. During this time the highest number of cases were reported from Horo Guduru Wollega zone 394(15.8%), West Arsi Zone 377(15.1%), and Guji zone 260(10.4%) with annual incidence of 12.04, 3.25, 3.37 per 100,000 population respectively. The highest number of cases from Horo Guduru wollega was attributed to the epidemics of meningococcal meningitis in May 2013 outbreak with 244 cases and 2 deaths (CFR 0.8%) from Hababo Guduru woreda. The overall attack rate was 46/10,000 and the highest rate was among children aged 5-14 years (AR=79/10,000) during this outbreak situation (9).

Meningococcal meningitis is one of weekly reportable public health priority diseases with potential to occur both as an epidemic and endemic in Ethiopia. The information generated from analysis of five years (2011 – 2015) surveillance data of meningococcal meningitis in Horo Guduru wollega is important to know the burden and trends of the disease pre and post outbreak of 2013. In addition, it also helps to identify the available gaps in the surveillance system and provide recommendations based on findings.

Objective of the study

General Objective

- To analyze epidemiology of meningococcal meningitis in Horo Guduru wollega zone from 2011-2015.

Specific objectives

- ✓ To determine magnitude and trend of meningococcal meningitis in Horo Guduru wollega zone from 2011 -2015.
- ✓ To describe meningitis cases by time, person and geographic distribution.

2.3 Methods

Case definitions

Suspected cases of meningococcal meningitis:

An illness with sudden onset of fever (>38.5°C rectal or >38.0°C axillary) and one or more of the following: neck stiffness, altered consciousness and other meningeal sign or petechial or puerperal rash. In patients less than one year, meningitis is suspected when fever accompanied by bulging fontanel.

Probable case: A suspected case as defined above and turbid CSF (with or without positive Gram stain) or ongoing epidemic and epidemiological link to a confirmed case.

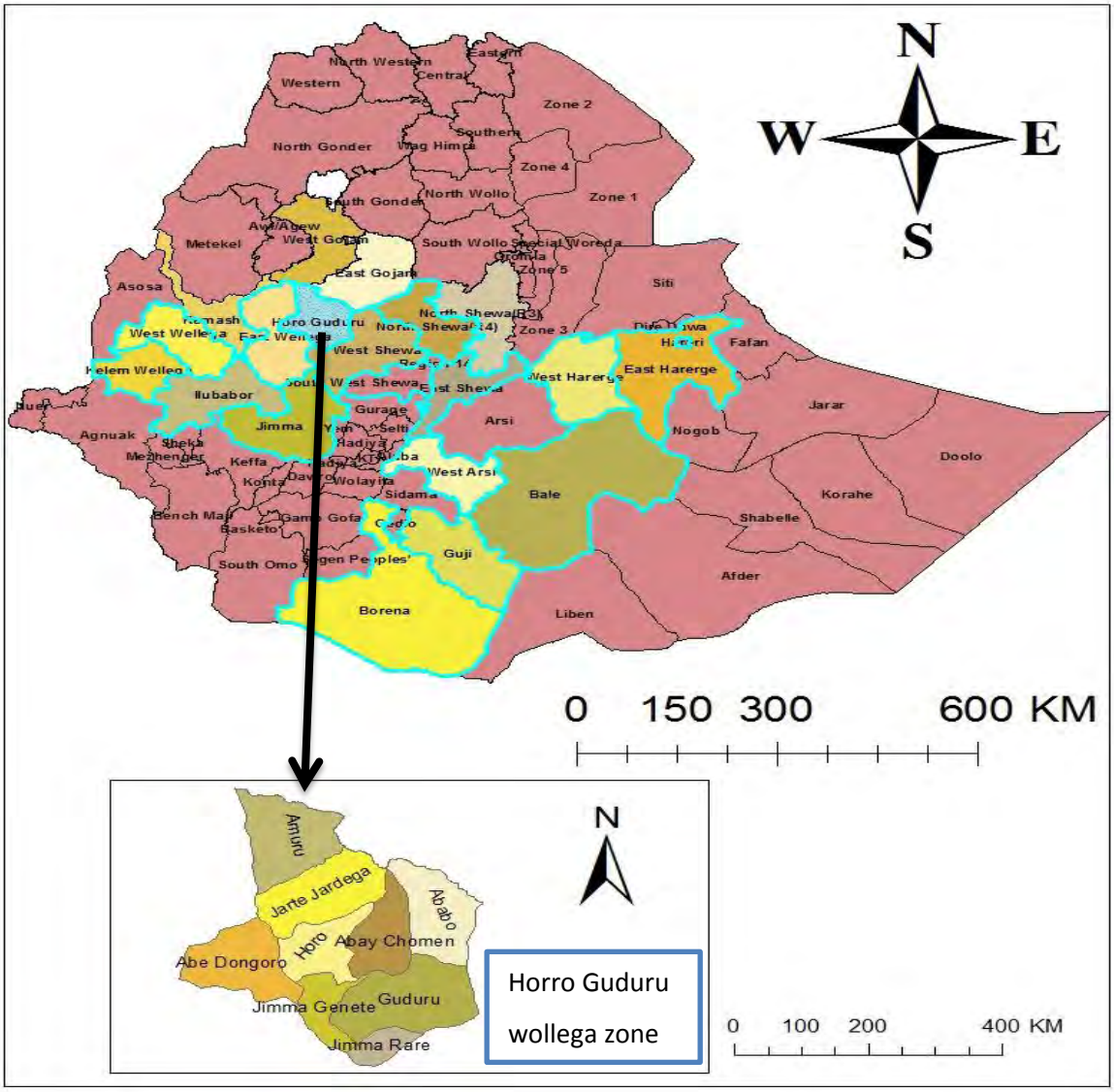
Confirmed case: A suspected or probable case with laboratory confirmation by isolation of N. meningitidis from cerebrospinal fluid or blood

Study Design

Retrospective descriptive study design was used to analyze five years suspected meningococcal meningitis data in Horro Guduru Wollega zone.

Study Area

The study was conducted in Horo Guduru Wollega zone of oromia regional state located 315km to the north west of Addis Ababa, the capital of Ethiopia. It was formed as zone in 1999 E. C containing 10 woredas and 178 kebeles. It contains three climatic zones; high land (7.5%), midland (54.7%) and lowland (37.3%). The altitude of zone ranges from 1100-3200m above sea level and the average annual rain fall is 1500-2000mmHg. There is one zonal hospital, 50 health centers and 183 health posts in zone.



Map 3: Map of Ethiopia zones to showing administrative map of Horro Guduru Wollega Zone

Target Population

The target populations were all population of Horo Guduru Wollega zone.

Study Population

The study populations were all patients seen in Horro Guduru Wollega zone health facilities from 2011-2015 G.C.

Study participants/ Subjects

Study participants or subjects are all suspected cases of meningococcal meningitis reported from all health facilities in zone to zonal PHEM department during the study period.

Study period

Meningitis surveillance data from 2011– 2015 was compiled, analyzed and interpreted from March 1 – April 28/ 2016 G.C.

Data collection methods

Secondary data on meningitis for the last five years (2011 – 2015G.C.) from Horo Guduru Wollega PHEM department was collected and reviewed using structured checklists.

All five years weekly surveillance reports sent from all woredas in zone were analyzed to describe the burden and distribution of meningitis in zone. To confirm the validity of data both electronic and hard copy was compared during data collection. In addition to this, interview with zonal and Shambu hospital IDSR focal persons were conducted to clarify the data.

Data processing and Analysis

Microsoft Excel 2010 was used to summarize, organize and analyze the collected data.

Dissemination of Result

Soft copies of results were distributed to zonal PHEM department and Oromia regional health beurau.

2.4 Results

A total of 339 suspected meningococcal meningitis cases and five deaths were reported to zonal PHEM department from 5 woredas during 2011-2015 with annual incidence rate of 49.6/100,000 populations and CFR of 1.47%. The highest incidence rate was reported in 2013, followed by 2014, 2011, 2015 and 2012. The case fatality rate was higher (8.8%) during 2014 due to lower number of cases and higher number of deaths than epidemic year 2013 (0.78%). Seventy seven percent (263) of the cases were inpatient and 3 deaths were from Shambu Hospital in 2014 and 2 deaths were from Hababo Guduru and Jimma Rare woreda during 2013 epidemic year. There was zero (no death) reported due to suspected meningococcal meningitis during 2011, 2012 and 2015 years. None of the cases of suspected meningococcal meningitis reported during the study period were laboratory confirmed or has epidemiological linkage with confirmed cases except those of May 2013 epidemic season.

From a total of 10 woredas in zone only five of them were reporting suspected meningococcal meningitis cases during the past five years. These are Hababo Guduru 229 (67.5%), Shambu hospital 85 (25%), Abay Choman 23(6.8%), Guduru and Jima Rare each 1(0.3%).

Table 6: Number and incidence of suspected meningococcal meningitis cases and deaths from 2011-2015 in HGW zone, oromia region

Year	Population at risk	No of cases	No of deaths	Cases %	Deaths %	Incidence /100,000	Deaths /100,000	CFR %
2011	646,911	25	0	7.4	0	3.8	0	0
2012	667,448	10	0	3	0	1.5	0	0
2013	676,452	254	2	75	40	37.5	0.3	0.78
2014	695,557	34	3	10	60	4.8	0.4	8.8
2015	715,222	16	0	4.6	0	2.2	0	0
Total	680318	339	5	100	100	49.8	0.7	1.48

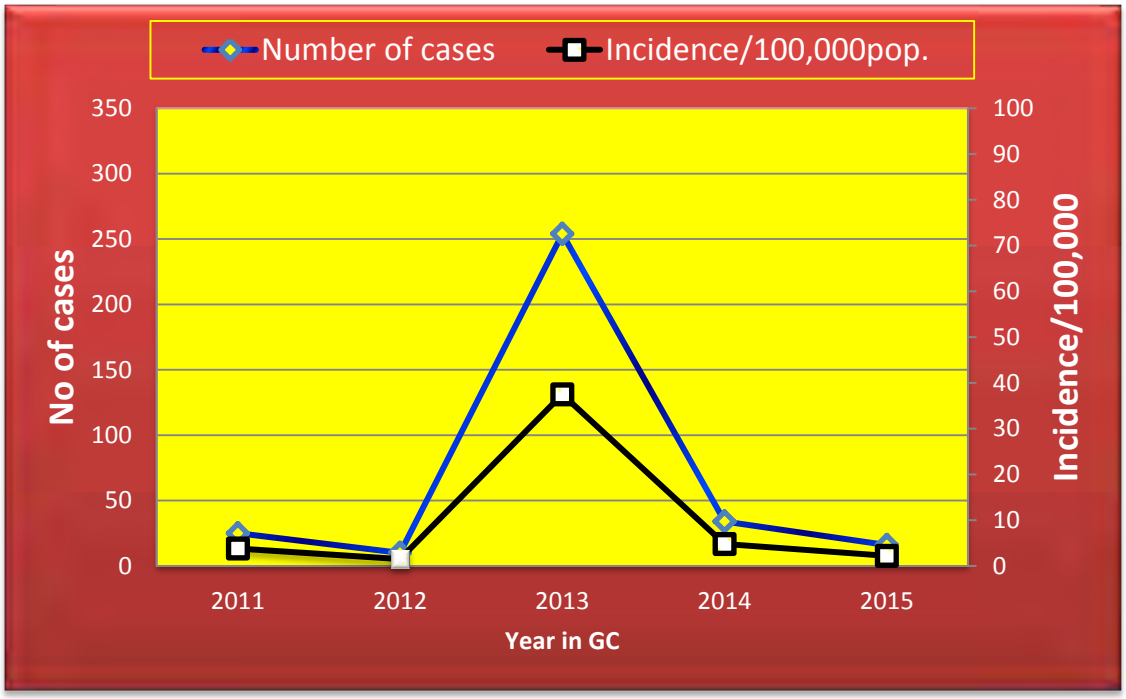


Figure 10: Number and incidence of suspected meningococcal meningitis cases in Horo Guduru wollega zone from 2011-2015G.C

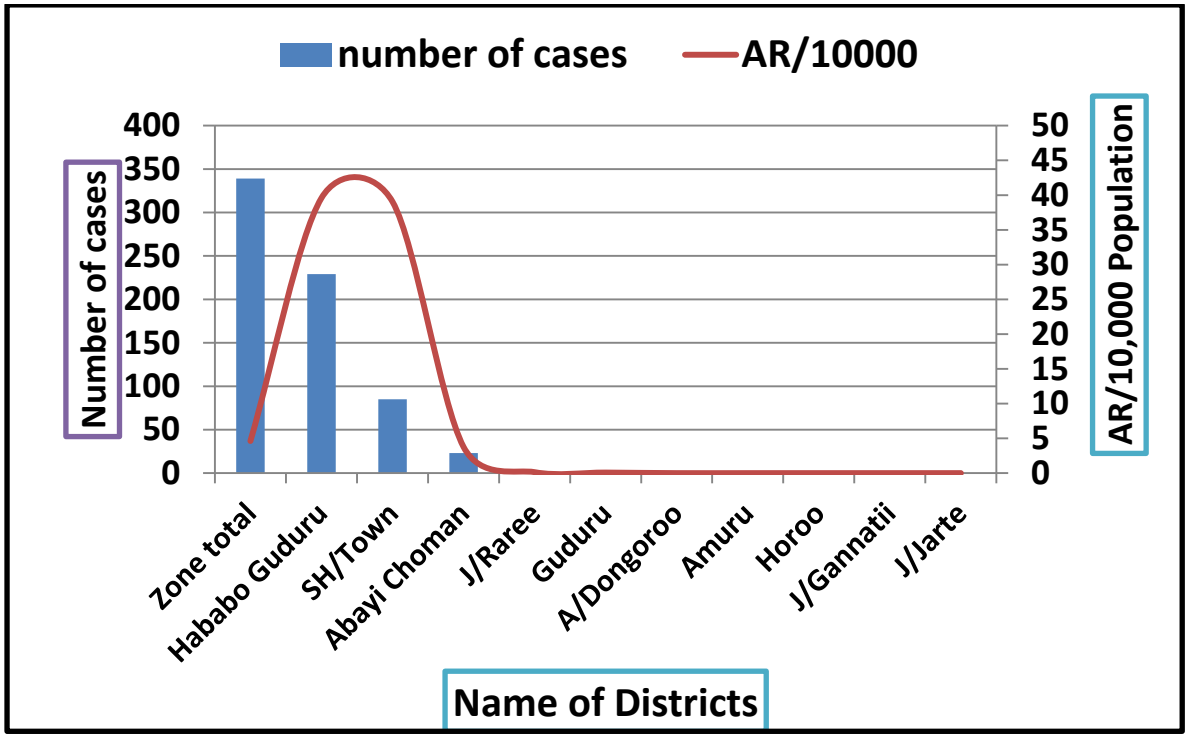


Figure 11: Number and AR of suspected meningococcal meningitis in Horro G/Wollega zone districts from 2011-2015 G.C

Even though it is difficult to get full information on personal characteristics of all suspected meningococcal meningitis cases; out of 254 cases reported by line list during epidemic of 2013; 99 (38.9%) were males while (155) 61.1% were females and the age groups of suspected cases were 15.5%, 51.2%, 30.5%, 2.8% respectively for < 4 years old, 5-14 years, 15-44 years and > 44 years age group during 2013 outbreak. Figure11. The attack rate of suspected meningococcal meningitis in each age group could not be determined because of the difficulty to get total population of each age group.

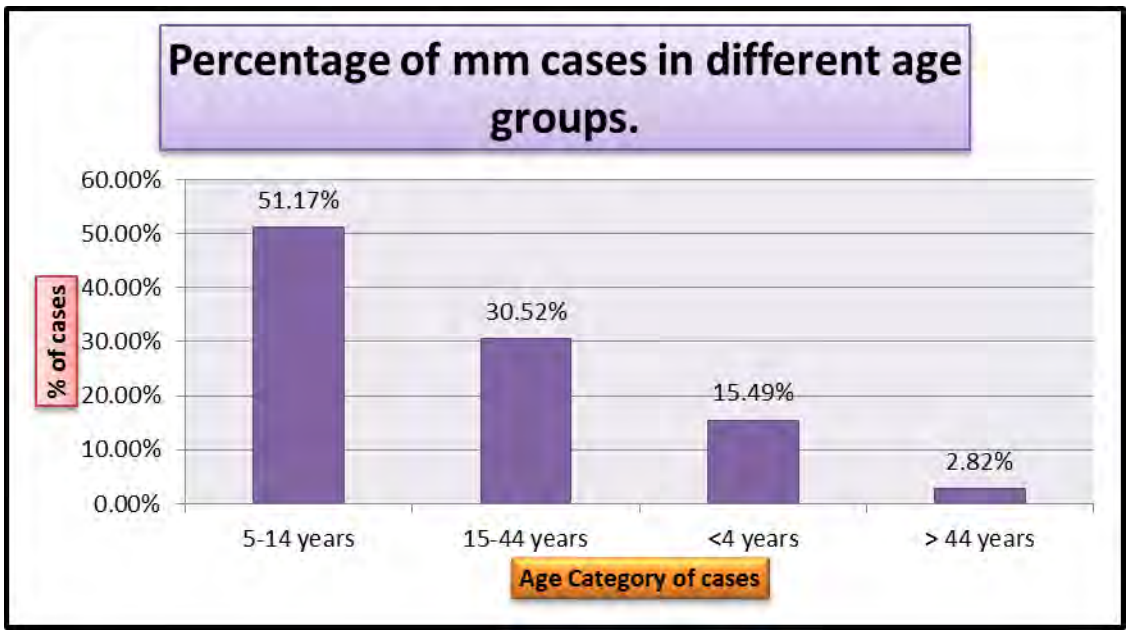


Figure 12: Percentage of suspected meningococcal meningitis in different age groups during outbreak of May 2013 in Hababo Guduru woreda Horro G/W/Zone

With respect to seasonal variation (monthly basis), the distribution of suspected meningococcal meningitis cases during study period did not show significant variation except that of peak increase on May 2013 due to epidemic period. Figure 12 and Table 6

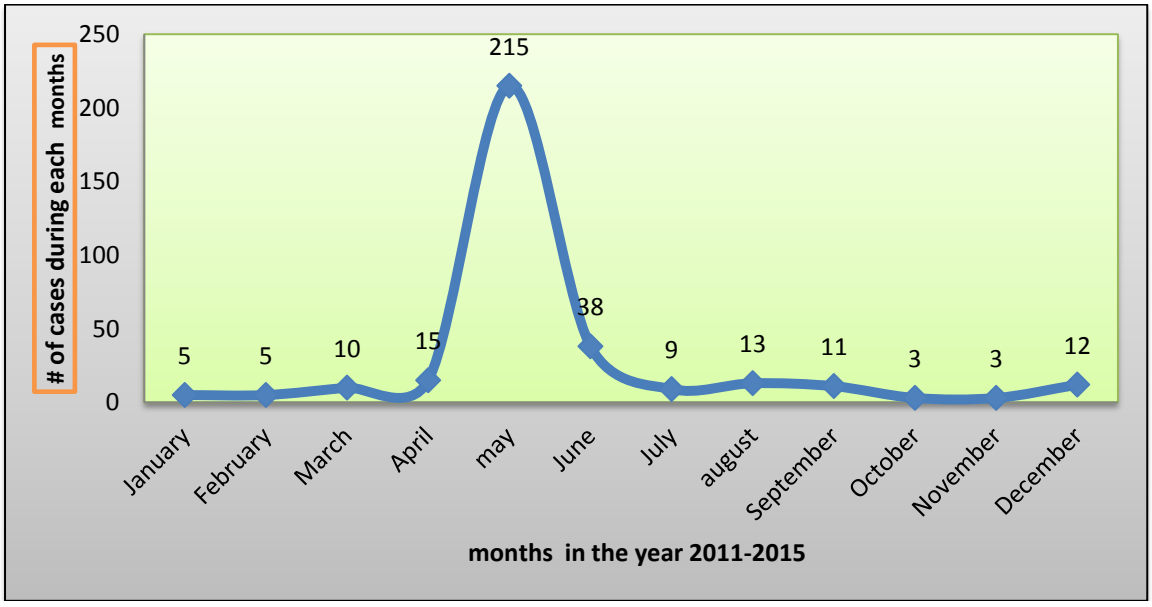


Figure 13: Cumulative number of cases of suspected meningococcal meningitis during each months of the year 2011-2015 in HGW zone to show seasonal variation.

Table 7: Number of cases of suspected meningococcal meningitis during each months of the years 2011-2015 G.C

Year	Number of cases during each month in a year.												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
2011	1	0	0	5	4	2	1	3	6	0	0	3	25
2012	0	1	2	2	3	0	0	0	1	1	0	0	10
2013	0	0	2	3	203	27	6	5	2	1	2	3	254
2014	3	4	2	2	5	6	0	4	1	1	1	5	34
2015	1	0	4	3	0	3	2	1	1	0	0	1	16
Total	5	5	10	15	215	38	9	13	11	3	3	12	339

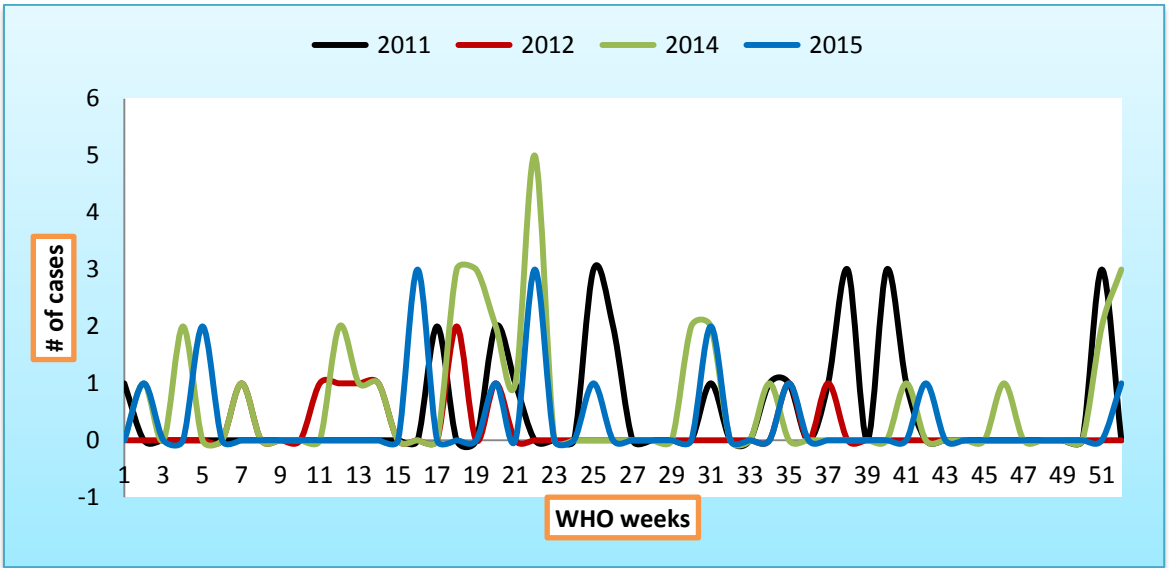


Figure 14: Number of cases of suspected meningococcal meningitis during weeks of the year from 2011-2015 (Non epidemic year)

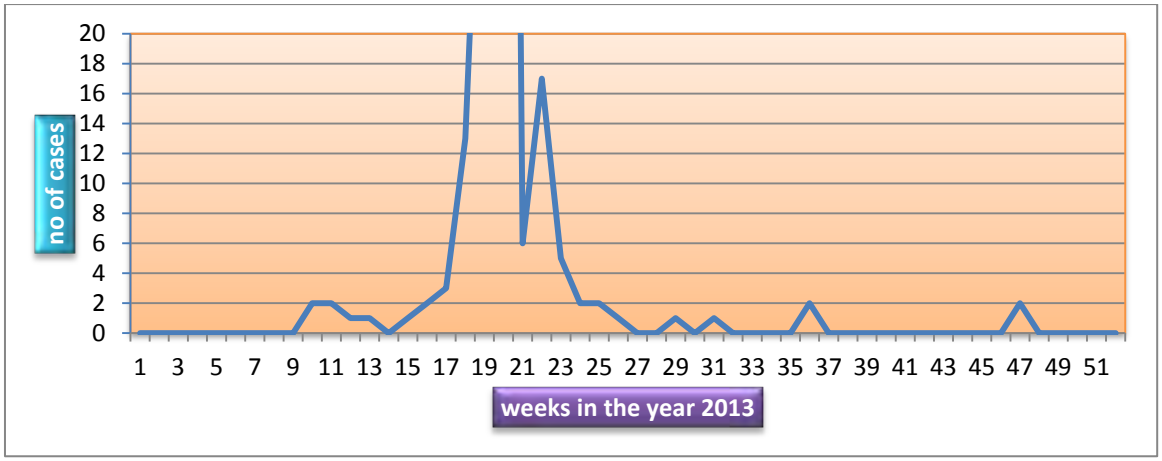


Figure 15: Number of cases of suspected meningococcal meningitis during weeks of the 2013 epidemic year.

As we can see from the above two charts, the number of cases of suspected meningococcal meningitis during non-epidemic years (2011, 2012, 2014 and 2015) showed al- most uniform distribution across all weeks. However, during the epidemic year (2013) the number of cases has been zero up to week 10, started to increase from week 15 and become maximum at week 19. The number of cases has also been highest during week 22 of the year 2014.

2.5 Discussion

Generally, the occurrence of the cases of suspected meningococcal meningitis during the analysis period followed uniform distribution across all years except for the 2013 year showed maximum number of cases due to the outbreak of May 2013. The incidence rate of suspected meningococcal meningitis cases in this data analysis is greater than that of national surveillance data analysis of suspected meningococcal meningitis cases (9) due to difference in population or specific location of Horro Guduru Wollega zone in meningitis belt area. The incidence rate of this surveillance data analysis was also greater than that of 2009-2013 conducted in oromia region (10). Zero and low reporting of some woredas may be attributed to awareness of some health professionals or preference of patients to be treated at hospital than health centers due to severity of the disease. This means; it may not indicate that the occurrence of case was limited to those reporting districts. Or reporting of cases was by place of treatment rather than place of residence. In addition to this strength of the surveillance system of the disease has also major contribution to initiate health workers to actively search cases and report.

Greater than half (51.1%) of the cases were from the age group of 5-14 years agrees with the fact that 80% of meningococcal meningitis occurs in less than 30 years old age groups due to higher percentage of nasopharyngeal carriers in younger age groups or frequent contacts (6).

2.6 Limitation of the study

Since weekly IDSR report format has no age and sex column or health facilities could not archive patient registration appropriately, we could not able to analyze by personal characteristics like sex and age group.

2.7 Conclusion

The magnitude of suspected meningococcal meningitis in zone was highest during 2013 epidemic year and also increased in 2014, became low during 2015. It was during 2012 year that the lowest incidence of suspected meningococcal meningitis was registered. The increased incidence /epidemic of 2013 may be due to favoring factors like over crowdedness, climate etc. but it was not well known why the incidence was decreased during 2012. Zero and low reporting of some woredas may be attributed to awareness of some health professionals and preference of patients to be treated at hospital than health centers.

2.8 Recommendation

- Surveillance system evaluation of suspected meningococcal meningitis must be done in zone to determine its attributes.
- Laboratory diagnosis of meningococcal meningitis must be strengthened to exclude surveillance artifacts.
- Registration system of the in patient service of health facilities must be improved to study retrospectively many years‘ data.
- National PHEM should consider age, sex variables on IDSR report format

2.9 References

1. WHO Meningococcal meningitis Fact sheet N°141 Updated November 2015

2. Mamoudou H. Djingarey et al A 20-year retrospective analysis of epidemic meningitis surveillance data in Burkina Faso, Mali, and Niger.

3. Guidelines for the management, prevention and control of Meningococcal meningitis in South Africa 2011.

4. National guideline on meningococcal meningitis surveillance and outbreak management. Ethiopian Health and Nutrition Research Institute Public Health Emergency Management Center, November, 2013 Addis Ababa, Ethiopia

5. Meningococcal meningitis Fact sheet N°141 Updated November 2015 WHO

6. Yemane B. Epidemiology and Ecology of Health and Disease In Ethiopia page 444

Nadine G. Rouphael and David S. Stephens *Neisseria meningitidis:* Biology, Microbiology, and Epidemiology

7. Arslan Ahmed Etiology of bacterial meningitis in Ethiopia, 2007 – 2011: a retrospective study

8. Elsabetee M. et al Epidemiology of Meningococcal Meningitis-Ethiopia, 2005-2012

9. Gebeyehu D. et al Epidemiology of Suspected Meningococcal meningitis in Oromia Region, Ethiopia, 2009 – 2013.

10. WHO Inter country support team-west Africa weekly feedback bulletin on cerebrospinal meningitis November 2014.

CHAPTER THREE

Public Health Surveillance System Evaluation of Malaria and Measles in West Wollega Zone, Oromia region Ethiopia, March, 2017

3.1 Executive Summary

Public health surveillance is the ongoing systematic collection, analysis, interpretation, and dissemination of health data for those who need to know. Surveillance system evaluation of malaria and measles was conducted in west wollega zone from April 3-13/2017 to determine functions and effectiveness of surveillance in zone.

Cross-sectional description, evaluation and review of secondary data was applied on surveillance system using semi-structured questionnaire, direct observation, and discussion with PHEM focal persons and health professionals engaged in surveillance. Districts, health facilities and health posts were selected depending on malaria case load and availability during data collection.

The overall report completeness of West Wollega zone from WHO week 41/2016 to week 14, 2017 was **92.8**%. A total of 5578 confirmed malaria cases 4166 (75%) P. falciparum and 1412 (25%) P. vivax) with one death (CFR of 0.02%) were reported in the same time through routine surveillance in West Wollega zone accounting 9.5% of oromia region. Kondala, Babo Gambel, Mana Sibu woredas were the top three malarias areas in zone during this time which need special attention. 14 measles cases were also reported during the same time from Lata sibu district, Aira and Begi hospitals.

Surveillance system of malaria and measles in West wollega zone is helpful in determining magnitude, trend, distribution and effectiveness of control program. But the system needs improvements in detecting and identification of outbreaks, completeness of report of some districts, hospitals and health posts.

3.2 Introduction

Public health surveillance is the ongoing systematic collection, analysis, interpretation, and dissemination of health data. It is also defined as ―Information for Action". A functional disease surveillance system is essential for defining problems and taking action. Proper understanding and use of this essential epidemiological tool (public health surveillance) helps health workers at the woreda and health facilities to set priorities, plan interventions, mobilize and allocate resources, detect epidemics early, initiate prompt response to epidemics, and evaluate and monitor health interventions. It also helps to assess long term disease trends (1).

Objectives of surveillance:

-To detect epidemics/outbreaks so that they can be controlled in a timely manner,

-To predict epidemics so that health services can plan to respond, prevent where possible, treat and control priority diseases,

-To monitor trends of priority diseases in order that changing trends inform policy decision,

-To evaluate an intervention so that effective and efficient actions/policies are identified and supported (2).

Data from a public health surveillance system can be used to:

• guide immediate action for cases of public health importance;

• measure the burden of a disease (or other health-related event), including changes in related factors, the identification of populations at high risk, and the identification of new or emerging health concerns;

• monitor trends and burden of a disease (or other health-related event), including the detection of epidemics (outbreaks) and pandemics;

• guide the planning, implementation, and evaluation of programs to prevent and control disease, injury, or adverse exposure;

• evaluate public policy;

• detect changes in health practices and the effects of these changes;

• prioritize the allocation of health resources;

• describe the clinical course (natural history) of disease; and

• provide a basis for epidemiologic research (3).

Core functions of surveillance include, ***case detection, case registration, case confirmation, reporting, data analysis and interpretation, and public health response including reports and feedback from the systems to the data providers, stakeholders and decision-makers*.**

The support functions are those that facilitate implementation of the core functions and included the following: ***Availing standard, guidelines and communication facilities, training, supervision, resources (human, financial, logistical), monitoring and evaluation, coordination (3).***

The core functions of surveillance are the same at community, district or health facility levels although the broadness may be different.

Public health agencies use surveillance data to describe and monitor health events in their jurisdictions, set priorities, and to assist in the planning, implementation, and evaluation of public health interventions and programs (4).

Public Health Emergency Management (PHEM) is one of the core processes identified by the Federal Ministry of Health during BPR implementation. It is the **process of anticipating, preventing, preparing for, detecting, responding to, controlling, and recovering from the consequences of public health threats in order that health and economic impacts are minimized**. PHEM is designed to ensure rapid detection of any public health threats, preparedness related to logistic and fund administration, and prompt response to and recovery from various public health emergencies, which range from recurrent epidemics, emerging infections, nutritional emergencies, chemical spills, and bioterrorism. This core process is comprised of four sub-processes which are: **Public Health Emergency Preparedness, Early Warning, Response, and Recovery**. Surveillance of priority epidemic disease is major component of early warning system of PHEM (1).

Although PHEM core process provides healthcare with a system that is effective and efficient its implementation and effectiveness had not been evaluated on regular basis at different levels.

Evaluation is the periodic assessment of the relevance, effectiveness and impact of activities in the light of the objectives of the surveillance and response systems.

Evaluation of surveillance & response systems serves to:

- ensure that the surveillance system meets the objectives for which it was formulated;
- document the status of, and any change in the performance of the system;
- provide an evidence-base on which to modify surveillance objectives, implementation strategy and planned activities;
- enable planning of resource allocation;
- provide explanations for achievements and failures in the system;
- provide specific recommendations for improving the system.

The components of surveillance and response systems targeted for evaluation comprise:

- ✓ the priority diseases targeted for surveillance
- ✓ the structure of the system
- ✓ core functions of the system
- ✓ support functions of the system
- ✓ quality or attributes of the system (5).

Rationale of the Study

The definition of public health surveillance is not limited to the level of health facility or health office. In principle, surveillance health information is collected on weekly basis at each level of health system in the country; must be analyzed, interpreted and used for decision at each level. But this is not the case in our country because of lack of awareness, training, motivation, commitment and resources.

Malaria and measles are two of priority public health importance diseases due to high epidemic potential and available control measures in Ethiopia to be reported on weekly and immediately basis respectively.

Approximately, 52 million people (68%) live in malaria risk areas in Ethiopia making the country one of the most malaria epidemic-prone in Africa (6). And this makes malaria number one health problem in Ethiopia with an average of 5 million cases a year. The disease causes 70,000 deaths each year and accounts for 17% of outpatient visits to health institutions.

Oromia regional state is the most populous region in the country where 93% of its woredas and 64.8% kebeles are malariuos. Seventeen million people are at risk in Oromiya with annual clinical cases numbering between 1.5 - 2 million. This accounts for 20 – 35% of outpatient visits, and 16% of hospital admissions in the region where 18-30% of annual deaths are caused by malaria (Ayinalem Adugna).

Western Wollega administrative zone is one of the top five malaria case load in the region according to weekly IDSR report and where surveillance system evaluation not conducted yet.

Objectives of the study

General objectives

To evaluate and determine status of malaria and measles surveillance system in Western wollega zone.

Specific Objectives

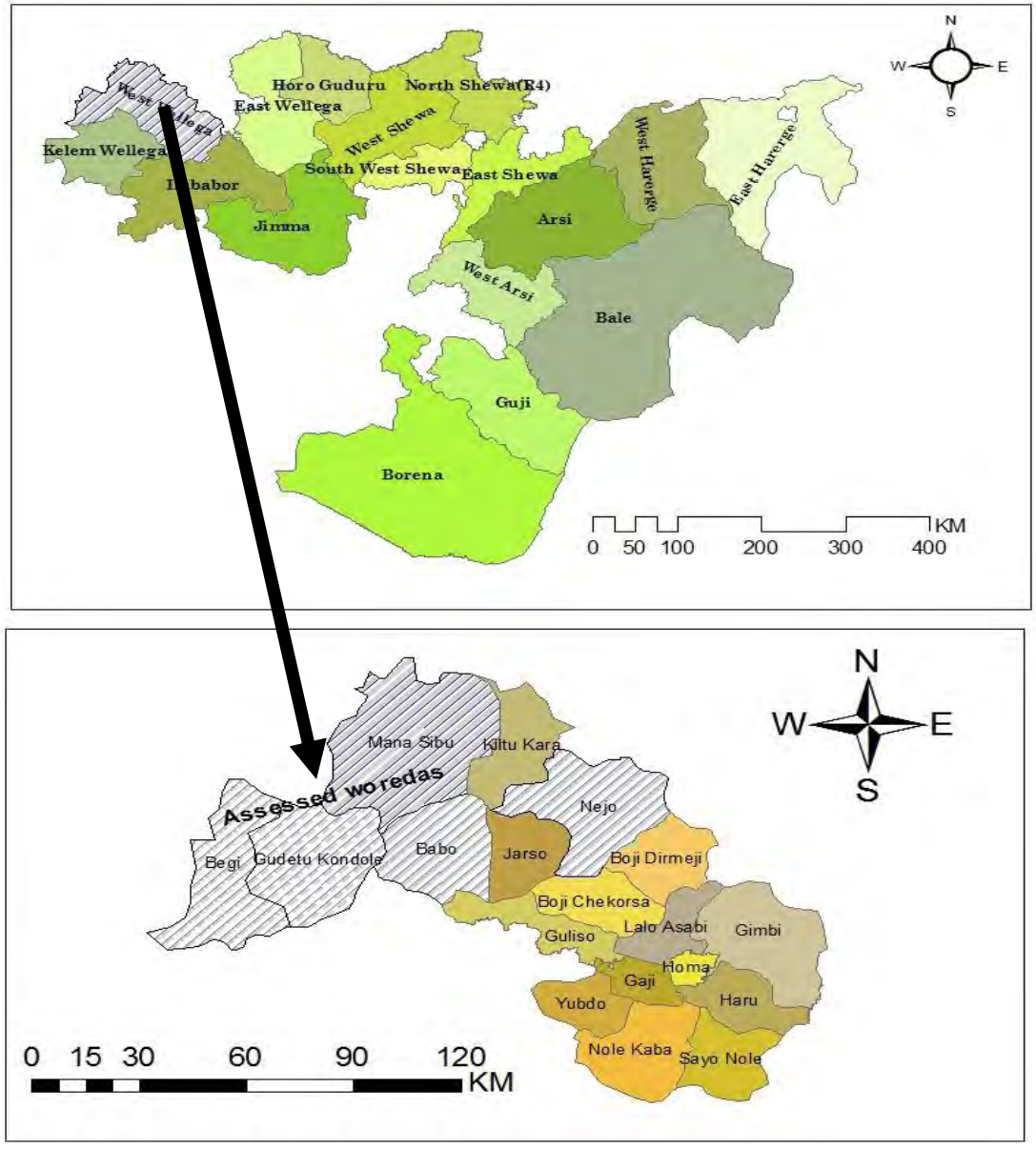
- ➢ To provide basis for surveillance system evaluation in zone.
- ➢ To assess the usefulness of surveillance system in determining malaria and measles trend, detect outbreaks and evaluate effectiveness of control measures in zone.

- To assess the core and support functions of surveillance system in zone.
- To determine the attributes of surveillance system in zone.
- To identify gaps in surveillance system implementation in zone and provide possible recommendation.

3.3 Methodology

Study Area

The study was conducted in selected health offices and health facilities of Western wollega zone of oromia regional state. Map 3.



Map 4 : Map of West Wollega zone showing Assessed woredas for surveillance system evaluation oromia region, Ethiopia, 2017 G.C.

Study Design

Cross-sectional descriptive study design was conducted from April 3 -13, 2017 G.C to evaluate the system.

Study Subjects

The study subjects of surveillance system evaluation were zonal, selected woreda health offices and health facilities in zone.

Sample Size and Sampling Technique.

To make this surveillance system evaluation easy, representative and fruitful a total of 33 study subjects (one zonal health office, five districts, two hospitals, nine health centers, nine health facility Laboratories and five health posts were selected depending on malaria case load, availability during data collection and distance from zone. Table 10

Table 8: Health facilities and districts selected for surveillance system evaluation in West Wollega zone April 2017, oromia, Ethiopia.

S.N	Selected Woredas	Selected Hospitals	Selected Health centers	Selected Laboratories	Selected Health Posts
1.	Begi	-	1.Begi HC 2.Kobor HC 3. Shombo HC	1. Begi HC Lab 2. Kobor HC Lab.	1.Tagaba HP
2.	Kondala	-	1. Hopha HC 2. Gaba Dafino	1. Hopha HC Lab. 2. Gaba Dafino HC Lab	1. Jimbila HP 2. Tarka HP
3.	Mana-Sibu	Mendi Hospital	1. Mendi HC 2. Harawwe HC	1. Mendi Hospital lab. 2. Mendi HC Lab. 3. Harawwe HC Lab.	-
4.	Nedjo Rural	Nedjo Hospital	1. Amuma Gute HC	1. Nedjo Hospital Lab.	1. Amuma Gute HP
5.	Babo Gambel	-	1. Babo HC	1. Babo HC Lab.	1. Igu Dabaqa HP

Data collection technique

CDC updated guideline for evaluating public health surveillance system was used to measure attributes of surveillance system. Key informant interview, observation and review of weekly IDSR report were used during study period.

3.4 Results

Involvement of Stake Holders

The surveillance system included all stake holders or entities which were reporting weekly IDSR report starting from Health post to zonal level, government and non-government health

facilities, malaria and EPI focal persons for assessment of uses of surveillance data. There is no inter-sectoral collaboration of PHEM and other offices at zonal level to provide early warning and response functions.

Description of the surveillance system of Western Wollega Zone

Western Wollega zonal health office is one of the oromia regional health bearau affiliate zones located at 420 Km from Addis Ababa to the West direction and has total population of 1,800,052.

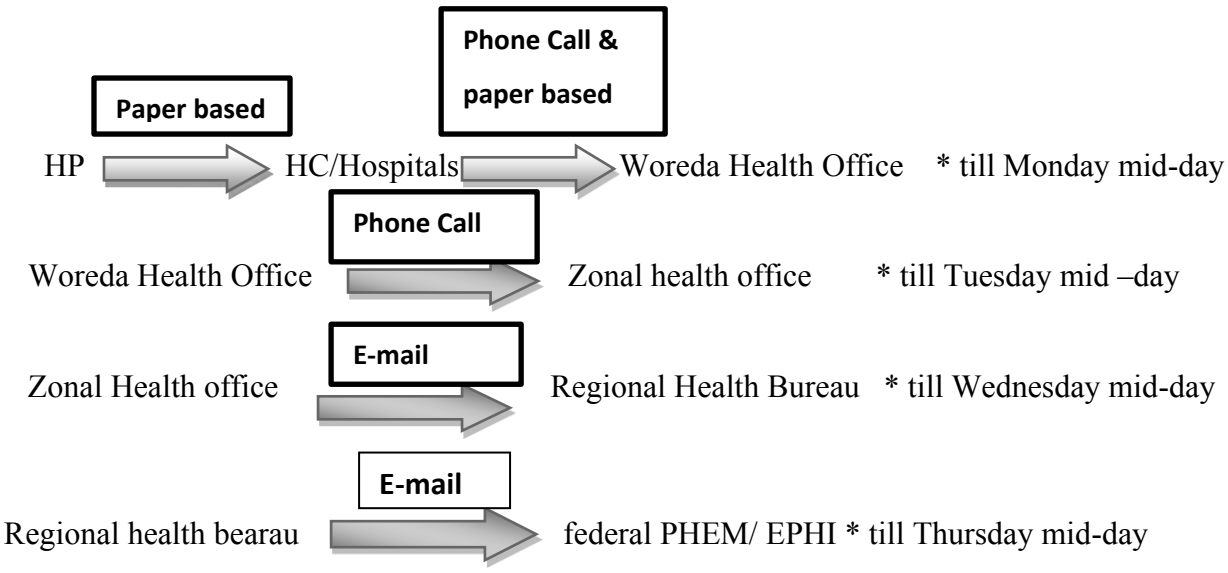
The zone has 23 districts, 6 hospitals, 66 Health centers, 488 Health posts and 31different level private health facilities. The health service coverage of zone is 94% by health centers and greater than 100% by Hospitals and health posts.

The zonal health office is organized in to different departments including maternal and child health, regulatory, communicable disease control, HRM and Health Facilities support. The Public health emergency management, TB, Malaria, HIV and WASH programs are under deputy head and communicable disease control process owner.

The surveillance system of the zone has two focal persons at zonal level and one at all districts and health facilities. At health post level health extension workers are dedicated to report weekly IDSR report in addition to routine health services.

PHEM as one core process in Federal democratic republic of Ethiopia, Ministry of Health is based on IHR 2005 declaration and follows the declarations at regional, zonal and district level.

Communication and reporting system:



Malaria is major public health problem in west wollega zone and under weekly reportable diseases due to its high epidemic potential and existing control program. So surveillance

(systematic collection, analysis, interpretation, dissemination and acting up on result) of data is important to determine the magnitude, distribution, incidence, severity and hospitalization of disease.

Accordingly, from WHO week 41/2016 (September 2016) to week 14, 2017 (April 2017) a total of 5578 confirmed malaria cases 4166 (75%) P. falciparum and 1412 (25%) P.vivax with one death (CFR of 0.02%) was reported through routine surveillance in West Wollega zone accounting 9.5% of oromia region. The overall Positivity rate during this time was **8.8**%. The overall report completeness of this zone from week 41/2016 to week 14, 2017 was **92.8**%. The completeness and timeliness of this zone during the past 14 weeks was above target except for timeliness of week 2, 2017 which was zero.

Weekly IDSR report completeness and timeliness was not calculated at zonal level on **weekly** basis and hence completeness and timeliness of week 2, 2017 was calculated for all woredas and health facilities. Zone total report completeness and timeliness for week 2, 2017 was found to be **80%** and **64%** respectively. Four hospitals (Ghimbi public and Adventist, Aira and Mendi) and three districts (Begi, Yubdo and Boji Dirmaji) were not reported during WHO week 2 and contributed for low zonal completeness and timeliness. Figure15.

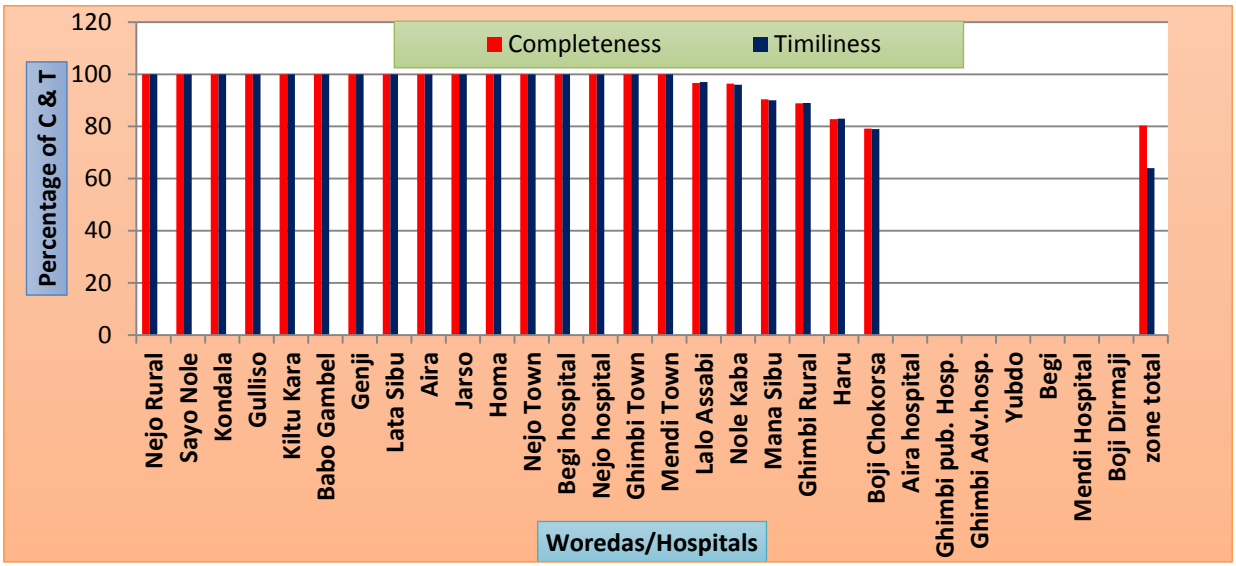


Figure 16: Completeness and Timeliness of West Wollega zone woredas/Hospitals, Week 2. 2017.

As observed above the completeness and timeliness of some woredas or hospitals were zero and no feedback given for those woredas or hospitals indicating that the surveillance system is not fully functioning and hence no data, no decision.

On the other hand, weekly IDSR report has made simple to show distribution of malaria cases among districts in zone. As a result, Kondala, Babo Gambel,Mana Sibu woredas were the top three malarias areas according to weekly IDSR report of week 41/2016- 14/2017 which need special attention. Figure 10. But at district level since weekly IDSR report format has only number of cases there was no data available to show distribution of cases among kebeles because different kebeles were organized under one health center and the report is sent by health center.

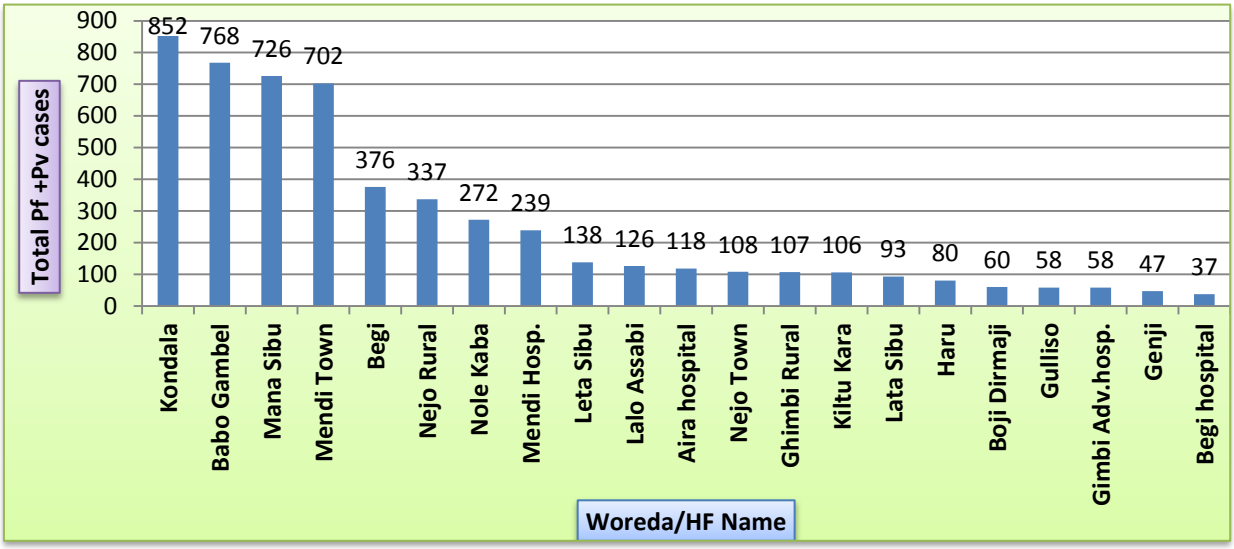


Figure 17: Distribution of confirmed malaria cases among woredas of West Wollega zone from WHO wk 41/2016-wk 14/2017 Oromia region, Ethiopia April 2017.

According to weekly IDSR report, cases of malaria were also high during WHO weeks 41 and 46 coinciding with seasonal malaria transmission. Figure 11

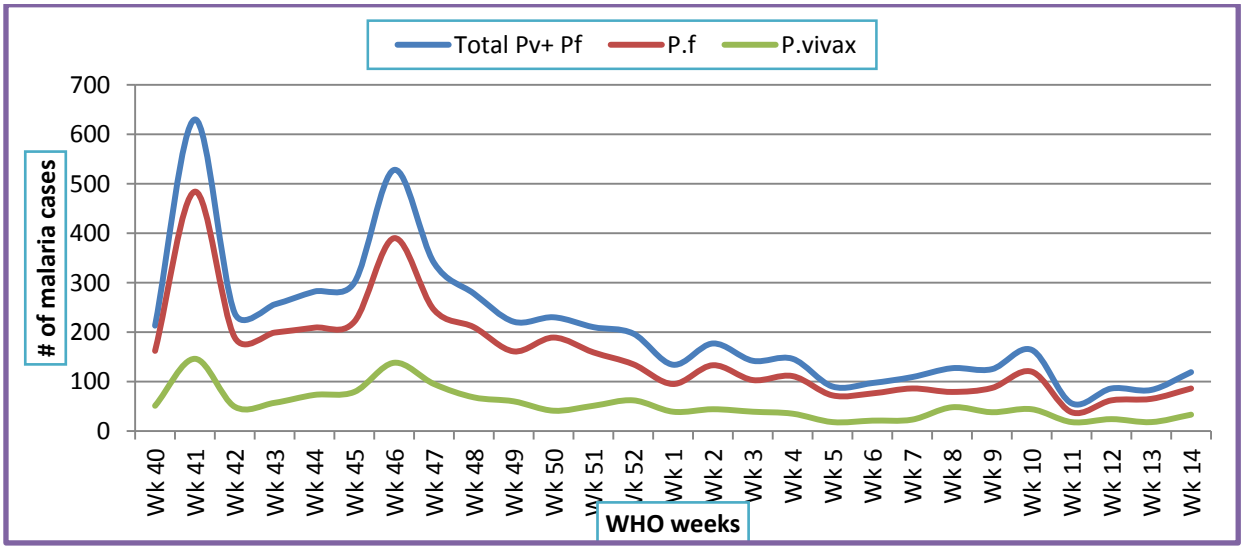


Figure 18: Trend of malaria cases in West Wollega zone by WHO weeks, April 2017, Oromia region, Ethiopia.

Measles is also another public health problem with high epidemic potential among immediately reportable diseases in Western Wollega zone. During the past three years measles outbreak has been challenging in West Wollega especially in Nedjo district. But, during this year, 14 measles cases were reported from different woredas (11 from Lata Sibu, one each from Begi and Aira hospitals and Sayo Nole woreda).

Availability of Guidelines, Manuals or Surveillance objectives

At zonal level PHEM has guidelines and manuals for epidemic prone diseases and plan for detection and reporting of diseases such as measles, NNT, AFP, as well as follow up of timeliness and completeness of weekly IDSR report of woredas and health facilities and training of PHEM focal persons of districts and hospitals. The zonal PHEM has also clear vision and mission of Public health emergency management with strategies such as active case searching and capacity building for PHEM focal persons and providing timely feed-back for districts.

Accordingly, training of PHEM focal persons 66 (96%), training on MDSR 144 (76%), monitoring timeliness of report of districts (85-100%), 96% at zone level were some achievements of PHEM plan of six months.

Follow up of report completeness and timeliness of private health facilities is challenging issue in zone which ranges from 47%-82% (Sayo Nole 47%, Mandi town 67%, Nedjo Rural 67%, Begi 54%, Boji Dirmaji 56%, Ganji 54%).

There was also outbreak of acute gastro enteritis in zone currently in Babo Gambel, Sayyo Nole, Gulliso and Yubdo woredas which was not confirmed by laboratory until this data was collected. But zone responded within 48 hours by establishing epidemic management committee, allocating budget and necessary drugs and materials. Surveillance unit of zone also produced four feedback reports in the last year and two supervisory visits in the last six months.

Attributes of Surveillance System

1. Usefulness: Surveillance system of zone helped to determine magnitude, severity, mortality and assessment of effect of control measures for priority diseases like malaria and measles. As a result, 6676 malaria cases and two deaths, 18 measles cases were reported in the last six months.

2. Simplicity: Compilation of report form consume greater than 15 minutes at zone level.

All assessed districts responded that the case definition for malaria and measles is so simple that all health professionals can detect cases, fill data and report on time weekly IDSR reports

(within 5-10‘-Nedjo, 10-15‘ Manasibu, >15‘- Begi, kondala, Babo Gambel). But laboratory confirmation for measles and AFP takes more than months and even most of the time there was no feedback or result.

3. Flexibility: Current reporting format for IDSR report can be used for other newly occurring disease without difficulty at zone level. Experts at zone level feel comfort to implement change in existing procedure for case detection and reporting of priority disease.

All respondents at district level replied that the format for surveillance system is flexible to add new diseases in option rows, but no place for new variables such as age or sex.

4. Data Quality: Six percent (6%) of report has unknown or blank spaces shows low quality at zone level. Report form for weekly IDSR is complete in assessed reporting sites at district level. Report validity is cross- checked by health development army in some woredas like Babo Gambel to decrease false report.

5. Acceptability: Although all reporting sites were engaged in reporting weekly IDSR report 94% of the time, there was no report some time in some districts and hospitals due to low commitment, training or low understanding of the purpose of reporting or aging of some health posts.

6. Representativeness: The surveillance system reaches up to community level through HEW, but there was no report from private health facilities some- times resulting in lower representativeness of cases in the community.

7. Timeliness: 92% reporting sites report on time at zone level. All assessed health centers and health posts send their report on time for districts.

8. Completeness: Few health posts are not reporting weekly IDSR due to old aging (eg. 3/18 in Babo Gambel woreda) and COC examination of HEW during assessment.

9. Stability: The surveillance system was functional all time as far as health professionals are in health facilities or health offices and conditions such as renewing of health posts and report formats are availed.

10. Sensitivity: The case definition for malaria is broad in that it captures all AFI cases resulting in low positivity rate. For example from WHO week 41/2016-week 14/2017 there were 3340 confirmed malaria cases in five districts and two hospitals and the total RDT and Microscope examined at the same time were 22679 with positivity rate of **14.7%.** So another gold standard method is needed for calculation of positive predictive value of malaria surveillance.

Description and Evaluation of Surveillance System at District Level

Table 9: Evaluation of selected districts for surveillance system in West Wollega zone, Oromia region, Ethiopia, 2017

Evaluation criteria	Begi woreda	Kondala woreda	Mana Sibu woreda	Nedjo woreda	Babo Gambel
Presence of Disease specific and/or PHEM guideline (Y/N)	Yes	Yes	Yes	Yes	Yes
Capacity to transport sample to higher level Lab	Yes	Yes	No	Yes	Yes
Guidelines or SOP for Specimen collection, handling and transport	Yes	Yes	No	Yes	Yes
Analysis of IDSR data	Yes	Yes	Yes	No	Yes
Presence of outbreak in past 6 months in woreda	No	No	No	No	Yes
Epidemic preparedness plan	Yes	Yes	No	Yes	No
Shortage of drugs and supplies during last year	Yes	No	No	No	Yes
Presence of rapid response team or epidemic management committee	Yes , command post	Yes	Yes	Yes	Yes
Budget for epidemic response	No	No	No	Yes	No
Initiation of disease control and prevention activities based on local data	No	Yes	No	No	Yes
Feedback reports for health facilities	Yes	No	No	No	Yes
# of supervision conducted during past 6 months	2	Yes	6	2	12
Training of health professionals on PHEM	Yes	Yes	No	No	Yes
Bicycle	No	No	Yes	No	No
Motor cycle	No	No	No	Yes	No
Vehicles	No	No	No	No	No
Stationary	Yes	Yes	Yes	Yes	Yes
Computer & printer	Yes	Yes	No	Yes	Yes
Telephone service	Yes, cell phone	Yes	Yes	Yes	Yes
Posters for IEC	Yes	Yes	Yes	Yes	Yes
Presence of spray pump, PPE	Yes	Yes	Yes	Yes	Yes
IDSR focal person in epidemic management committee	Yes	Yes	Yes	Yes	Yes
Are you satisfied with current surveillance system	Yes	No	Yes	Yes	No

As observed on table all assessed districts have diseases specific guideline or PHEM guideline, epidemic response team, posters for IEC and PHEM focal person is member of woreda epidemic management committee. Mana Sibu woreda has neither capacity to transport sample

for epidemic management nor SOP for collection and transportation. All woredas can analyze IDSR data on weekly basis by time, place and person except Nedjo. Mana Sibu and Babo Gambel woredas have neither epidemic preparedness plan nor allocated budget for epidemic response.

Two of the five districts PHEM focal persons are not satisfied with current surveillance system due to lack of supervision from higher level, absence of review meeting and assume that PHEM has no focus from higher level.

Table 10: Description and Evaluation of Surveillance System in Selected Health Facilities in West Wollega zone, Oromia region Ethiopia, April 2017 G.C

Evaluation criteria	Begi HC	Gaba Dafino HC	Mandi HCs	Amuma Gute HC	Babo HC	Shombo HC	Kobor HC	Harawwe HC	Hopha HC	Mendi Hos.	Nedjo Hos.
Presence of Disease specific and/or PHEM guideline (Y/N)	Yes	Yes	No (soft copy)	No	Yes	No	NR	No	No	No	Yes
Capacity to transport sample to higher level Lab	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Analysis of IDSR data	Yes	No	Yes	No	Yes	Yes	No	Yes	No	No	Yes
Standard case definition for malaria and measles	Yes	No	Yes	No	Yes	partial	partial	Yes	partial	No	Yes
Standard case management protocol for epidemic prone disease	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes
Initiation of malaria or measles control and prevention activities based on local data	No	No	No	No	Yes	Yes	No	No	No	No	Yes
Feedback reports from district/town/zone	No	No	No	Yes	Yes	Yes	No	Yes	Yes	No	No
# of supervision of HP/HC conducted during last 6 months	6	Yes	NA	6	12	Yes	6	Yes	Yes	No	No
Training of health professionals on PHEM	No	No	Yes	No	Yes	No	yes	Yes	No	No	Yes
Bicycle	Yes	No	No	Yes	No	No	No	Yes	No	No	No
Motor cycle	Yes	No	No	No	No	Yes	Yes	Yes	No	No	No
Stationary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Computer & printer	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	partial	Yes	No
Telephone	Yes,	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

service	cell pho ne										
Posters for IEC	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Presence of spray pump, PPE	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes

The table shows that almost half of visited health facilities have standard case definition for malaria and /or measles, standard case management protocol for epidemic prone diseases, feed-back report from higher level and perform weekly data analysis of IDSR report and trained on PHEM. On the other hand, few of visited health facilities have PHEM/malaria or measles guidelines, implemented disease prevention and control measures depending on weekly IDSR report data analysis and have functional motor cycle for conducting active case search and other services. Majority of visited health facilities conducted supervision of the health posts which provide them weekly report as evidenced by documented supervision feedback in some health posts. (Jimbila HP of Hopha HC catchment, Kondala woreda)**.**

Evaluation of surveillance system at laboratory level

Laboratories play vital role in confirming of diagnosis or outbreaks and identification of major species circulating in community and hence direct prevention and control measures of public health problems. But these needs pre conditions like trained human resources, quality assured laboratories, adequate supplies and infrastructures.

In assessed health facility laboratories, there was adequate laboratory room and infrastructures to diagnose malaria. But measles is confirmed at central laboratory EPHI after sample collection and transportation was done by peripheral health workers. The bottle neck here is that the result of measles laboratory diagnosis is not received by peripheral laboratories.

Laboratories which do not implemented internal and/or external quality control program such as Mendi hospital lab., Hopha health center laboratory (Kondala woreda) are at risk of reporting false results which results in effective public health intervention.

Table 11: Assessment of laboratories for surveillance system evaluation of malaria and measles in selected health facilities of west wollega zone, oromia region, Ethiopia April 2017

Evaluation criteria	Nedjo hosp. lab	Mendi hosp. lab	Begi HC lab	Gaba Dafino HC lab	Mendi HC lab.	Harawwe HC lab	Hopha HC Lab.
Building or # of rooms	5 rooms adequate	3 rooms /adequate	1	2/ adequate	1	2	1
# Of lab. personnel	11	7	2	2	2	1	1
Training on malaria	No	No	Yes	Yes	Yes	Yes	No
Shortage of reagents & supplies in the last 6 months	Yes	Yes	No	Yes	No	Yes	No
Completeness of request forms	No	No	No	Yes	No	Yes	No
List of diseases to be reported immediately & weekly	No	No	No	Yes	Yes	No	No
Internal QC program	Yes	No	Yes	Yes	Yes	Yes	No
External QC Program	Yes	No	No	No	Yes	Yes	No

Description and Evaluation of Surveillance system at health post level.

Health posts are at the most territory of surveillance system and need continuous support. They are nearest to community where public health problems are occurring daily. So they must be alert to observe clusters of disease or rumors in the community and communicate timely to their respective health centers in surveillance system.

During this assessment most of health posts were closed and HEWs were not available due to COC examination. As a result only five health posts are included in evaluation.

Table 12: Assessment of selected health posts during evaluation of surveillance system in West Wollega zone, Oromia region, Ethiopia, April 2017.

Evaluation criteria	Tarko Garje HP	Jimbila HP	Igu Dabaka HP	Amuma Gute	Tagaba HP
Presence of PHEM/Malaria, measles guideline	Yes	No	Yes	No	No
Standard case definition for malaria and measles	Yes	Yes	Yes	No	No
Feed-back of supervision in last 6 months	Yes	Yes	Yes	Yes	Yes
Training on surveillance and epidemic management	No	Yes	Yes	No	No
Shortage of antimalarial drugs, RDT, or vaccine in the last 6 months	No	No	No	Yes	Yes
Presence of malaria monitoring chart	Yes	Yes	Yes	No	No

3.5 Discussion

In general the surveillance system of malaria and measles in West Wollega zone helps to determine magnitude, severity, distribution and control and prevention effectiveness for those diseases. But there were times when the system fails to confirm the outbreaks and direct control and prevention methods such as the current outbreaks of acute gastroenteritis in some districts. There was also no observed data analysis such as in bulletin form at zone level which results in low/zero reporting completeness in some hospitals and districts.

The district level surveillance system for malaria and measles did not show easily accessible data (computerized data archival system) to show distribution, magnitude, trend and prevention and control measures effectiveness in different kebeles of woreda. This is attributed to storage of IDSR data by hard copy making the analysis of data time consuming

and complex. There was no uniform malaria monitoring chart in assessed districts or health facilities. In addition to this, there was also discrepancy between WHO epidemiologic week and Ethiopian weeks. Eg . Actual WHO week was 14, but on monitoring chart it was 34 because they started in July (Ethiopian budget year).

Health facilities are where actual cases of malaria and measles encounter on daily basis. So they have to be ready in early and correct identification of cases, treatment and notification as per guideline. In this regard, most health facilities did not show availability of guidelines, standard case definitions, initiation of prevention control measures depending on data. This may be due to awareness or training of health professionals, commitment and attitude towards epidemic prone diseases.

Laboratories which implemented quality assurance system ensure the reliability and accuracy of patient diagnosis and sustainability of services. Training of laboratory personnel on malaria laboratory diagnosis and certification of health facility helped surveillance system of malaria to be built on concrete ground as evidenced by zero false positivity and negativity rates in some health facility laboratories. But those laboratories that are not trained on malaria laboratory diagnosis and enrolled in successive quality improvement or did not started internal quality control programs by themselves may result in inaccurate diagnosis and hence wastage of resources to control disease and above all put life of patients at risk. So best experience seen in some health centers or hospitals must be shared to others especially newly constructed health facilities.

Health posts also need great attention in surveillance system of malaria and measles to diagnose, treat and report cases correctly. They provide early warning and detection of epidemic in their locality by monitoring malaria line graph (trend).

3.6 Conclusion

Public health surveillance is the ongoing systematic collection, analysis, interpretation, and dissemination of health data for action. It involves different levels in Ethiopia starting from federal, regional, zonal, districts, health facilities and health posts with different level health professionals and must be implemented uniformly. The quality of surveillance information produced at federal level depends on the data generated at peripheral level on daily basis and accumulated at district, zonal and regional level. So everyone in surveillance system need to be alert, courage and responsible to collect, report, analyze, interpret, disseminate and **USE** surveillance data for public health intervention. Finally, the surveillance system of malaria and measles are useful to detect outbreaks, determine magnitude and distribution of the

morbidity and mortality of the disease in the area assuming that all reporting sites participate continuously and uniformly.

3.7 Limitations

Absence of some HEW during data collection causes low health post involvement in the surveillance system evaluation.

3.8 Recommendations

PHEM plan at zone level, monitoring of quality assessment and training of malaria laboratory diagnosis started in most health facilities should be strengthened and continued for all malarias areas especially Mendi Hospital.

Health facilities and health posts which do not report weekly IDSR should be identified at district and zone level and renewing of some health posts is important.

Malaria monitoring chart should be filled in all health facilities uniformly and continuously.

3.9 References

1. Public Health Emergency Management Guidelines for Ethiopia 2012, Ethiopian Health and Nutrition Research Institute Public Health Emergency Management Centre February 2012 Addis Ababa, Ethiopia.

2. Technical Guidelines for Integrated Disease Surveillance and Response in the African Region, October 2010

3. Updated Guidelines for Evaluating Public Health Surveillance Systems Recommendations from the Guidelines Working Group, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES Centers for Disease Control and Prevention (CDC) Atlanta, GA 30333.

4. Communicable disease surveillance and response systems Guide to monitoring and evaluating, World Health Organization 2006.

5. Principles of Epidemiology in Public Health Practice *Third Edition,* an Introduction to Applied Epidemiology and Biostatistics, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES Centers for Disease Control and Prevention (CDC) Office of Workforce and Career Development Atlanta, GA 30333

6. National malaria guidelines third edition Federal Democratic Republic of Ethiopia, Ministry of Health Addis Ababa, January, 2012.

CHAPTER FOUR

Health Profile Description

Gimbichu Woreda Health Profile Description report, East Shoa zone, Oromia rgion, February 2016

4.1 Executive Summary

Health profile is a system of collecting and summarizing health and health related events to describe health conditions, demographic, socioeconomic, political, educational, cultural and other aspects of particular geographic area of interest or a district.

All health and health related data in Gimbichu woreda of East shoa was collected from health sector, agriculture, education, water and energy, finance, tourism and culture office using structured data collection tools from Feb.9-19/2016. Document review, observation and discussion with key informant persons have been used for more clarification of data. Data was described using tables, charts, graphs and narratives as necessary and their effects on human health was assessed.

Gimbichu district has 33 rural and 2 urban kebeles with total population of 105,348; 53,306(50.6%) males and 52,042(49.4%) females. Health service coverage of woreda is 100% for health centers and health posts. Acute upper respiratory infection was the top leading cause of morbidity or OPD visit both in male and female while pneumonia was top leading cause of morbidity in under five years in 2007 EFY. Maternal and child health indicator coverage of woreda for contraceptive acceptance rate, ANC 1st visit, ANC 4th visit, syphilis screening, skilled birth attendant, delivery by HEW, fully immunization was 87.7%, 89.7%, 77.3%, 35%, 70.7%, 0.1%, 93.1% respectively. TB case detection rate was 43.3%. The total number of students enrolled in 2008 EFY from primary to secondary school is 24,696; 13,053 male and 11,643(47%) females and school dropout rate was 3.6%.

Good performance achieved in maternal health, child immunization and food security in agriculture should be sustained further.

There should be a system to cross-check communicable disease control programs and top leading causes of morbidity.

TB case detection rate and delivery by HEW should be upgraded.

4.2 Introduction

Health profile is a system of collecting and summarizing health and other health related events to describe health conditions, demographic, socioeconomic, political, educational, cultural and other aspects of particular geographic area of interest. It is described quantitatively and qualitatively to know the health status of citizen and factors affecting their health (1).

In one health concept, different sectors work together to attain optimal health for people, animals and environment because health of human is highly affected by its environment. So preparation of health profile description is a valuable input for each sector to work on identified gaps of health problems.

It is also basic for planning and undertaking appropriate public health interventions; and is doorway point for operational public health researches. Stake–holders of health and health related issues will access evidence based information from well compiled health profile. It is valuable channel of communication between politicians, experts, and citizens.

Preparing health profile helps to:

- ✓ Identify problems, proposes areas for improvement and stimulates action.
- ✓ Identify collaborators needed to produce alliance for health.
- ✓ Highlight health problems and initiate partners to find solution.
- ✓ Stimulate public and media interest and improve health issues understanding.
- ✓ Provide high quality and effective information for decision making.(1)

Creating a health profile gives citizens a roadmap for making their environment a healthier place to live, learn, work and play.

Health problems are worse in the rural areas of Ethiopia than urban areas due to so many factors like poor economic status, low health service coverage, lower educational status, inadequate nutrition and poor infrastructure(5). Even there may be great differences between neighboring districts on health status of population due to climatic, population size, awareness of population, commitment of political leaders and so many factors. Therefore such problems must be identified, described and prioritized for possible solutions for each districts through comprehensive health profile.

In England there is a 4-page profile for each Local Authority, which includes:

- ✓ an ‗At a glance' summary description of people's health in the area, including information on locally identified priorities
- ✓ maps and charts showing how the health of the area compares to the national view, and information on health inequalities within the local authority
- ✓ charts presenting changes in death rates over a 10-year period, compared to rates for England
- ✓ a ‗spine chart' health summary showing the difference in health between the area and the England average for 32 indicators within 5 domains (Our communities, Children's and young people's health, Adults' health and lifestyle, Diseases and poor health and Life expectancy and causes of death (2). However, in Ethiopia, such valuable information is usually not complete and not available at different levels or woreda levels (3). Gimbichu woreda health profile description report is one of such documents prepared to address the aforementioned issues.

Objectives of Health Profile Description

General objective

- ➢ To assess, describe, identify and prioritize public health problems of Gimbichu Woreda.
- ➢ To prepare health profile of Gimbichu Woreda.

Specific Objectives

- ✓ Analyze data collected from health sector and others sectors in Gimbichu Woreda and describe its health impact on community of woreda.
- ✓ To identify and prioritize health problems of woreda.

4.3 Methodology

Study Design

Descriptive cross sectional study was conducted to identify and indicate the woreda health service status as well as to identify the major health problem of the area and to set recommendations for the identified major problems.

Study area

Gimbichu is one of western administrative woreda of east shoa zone located 90km from Adama town to the northwest, 65km to north east of Addis Abeba and 37km to the north of Bishoftu town.

Data collection and analysis technique

All health and health related data in Gimbichu woreda was collected using structured data collection tools from Feb.9-19/2016. Document review, observation and interview with key informant persons were used for more clarification of data. Data was described using tables, charts, graphs and narratives as necessary.

Ethical consideration

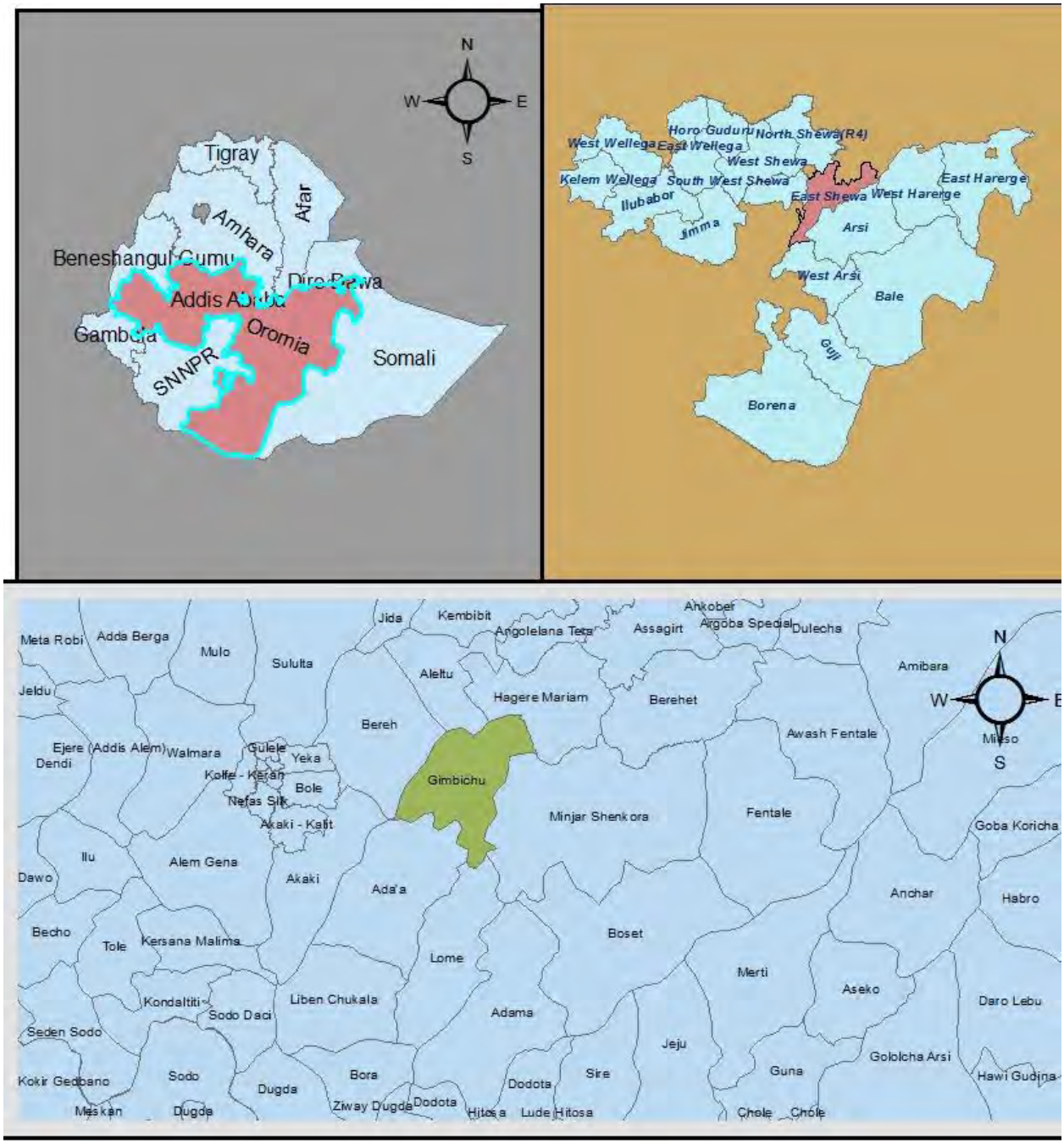
Support letter was written from Oromia Regional health bureau to East shoa zonal health office then, to Gimbichu woreda health office, and then to all concerned sectors according to their level to cooperate during the data collection period. All collected data are used only for the description of health profile and important information was kept confidential.

4.4 Result

Geography and Climate

Gimbichu district shares boundary with Amhara national regional state and Lume woreda in the East, Barak Aleltu and Akaki woreda in the west, Lume and Adea woredas in the south and Amhara regional state in the north direction. The District Town, Chefe Donsa is found at about 65 kilometers northeast by Sandefa and about ***85*** kilometers northeast by Bishoftu town from capital City of Ethiopia, Addis Abeba. Chefe Donsa is ***90*** kilometers from zone capital town, Adama through Bishoftu town.

The altitude of Gimbichu District ranges between 1500m above sea level and 2700m above sea level. It consists of three agro-climatic zones: ***Dega, Weyna Dega and Kolla,*** which comprise about ***52%(17 kebeles)***, ***27%(9 kebeles)*** and ***21%(7 kebeles)*** of the area of the District, respectively. Astronomically, Gimbichu District lays between ***$39^0$5'30"*** and ***$39^0$20'45"*** East Longitude and between ***$8^0$52'15"*** and ***$9^0$7'30"*** North Latitude. The average annual temperature and rainfall are 13-21^{0}c and 800-1000ml respectively.



Health profile description done

0 15 30 60 km

Map of Ethiopia Showing oromia region, East Shoa zone and Gimbichu Woreda

Map 5 : Administrative map of Gimbichu district.

Administrative and political structure

During derg regime the district is included in Yerer-Karayu Awuraja. After the transitional government of Ethiopia was caught the Authority from Derg, Gimbichu district was formed from 66 peasant association and 1 urban dwellers association in 1984 E.C. Its capital town is Chefe donsa and it was inaugurated during minilik regime in 1903 E.C. Currently, Gimbichu is divided into 33 Peasant Association (kebeles) and 4 Urban Dwellers Association (kebeles) in the new reform during 1995 E.C. Its District town Chefe Donsa has been started as Administrative Municipal City since 1991 E.C. and it has two kebeles (01 and 02). The two other towns, namely Dobi and Imbur formed as Municipal City in 2003/2004 E.C.

(Source: Gimbichu woreda Finance and Economic development office).

Facilities/ Infrastructure

Gimbichu woreda has 167.7km gravel road, 33.3km dry weather road and 4 kebeles without road due to challenging topography of those kebeles namely: Aleltu, Somsa kombolcha, Diyoom and Anfar Chamer. But Anfar chamer and Aleltu road are on construction and 50% finished according to interview with Gimbichu woreda road authority office. Regarding electricity, 2 urban kebeles and 5 rural kebeles have hydro-electric power while 30 kebeles do not have electricity. They use solar energy and fuel as source of light and power especially in rural health centers. Telecommunication services are available in Gimbichu woreda with mobile network coverage in all kebeles and 25 wireless telecommunication service at rural kebeles, one digital telecommunication service only in district‘s capital town; Chefe donsa. Postal and bank services are also available in Chefe donsa town. There are also many tourist attraction centers, cultural and religious ceremony areas which make Gimbichu woreda unique. These include: Girmi cave, Italian cave (probably used during Italian war), Hulluqo cave, neck rock (like the shape of human neck), st.Georges church (>200years),”Irecha” celebration centers at different kebeles in woreda are among others.

Regarding water, energy and mineral office, despite its inauguration in 2003 EFY in Gimbichu woreda, the office has achieved major activities like: safe water supply coverage according GTP I standard (1.5km radius) in rural kebeles are 94.45% at the end of 2007EFY and in urban kebeles 96%. However, according GTP II standard, safe water supply access which was 1.5km radius has been reduced to 1km radius in rural kebeles and in urban kebeles water supply must reach at house to house level. As a result, safe water supply coverage in urbanl was 60.58% and 36.66% in rural kebeles and the woreda as a whole is 53.52%. Depending on this base line at the end of 2008EFY, the woreda water, energy and mineral office has planned to reach 67.28% in urban kebeles and 45% in rural kebeles and totally rural and urban kebeles 56.14%.

Table 13: Gimbichu woreda water, energy and mineral office GTP II safe water supply standard 2007 EFY.

SN	Level of city	Population	Safe water supply standard	
			Distance	Individual consumption/day
1	Rural kebeles	Actual population	1km	25L
2	Level 5 city	<20,000	250m	30L
3	Level 4 city	20,000-49,999	House level	40L
4	Level 3 city	50,000-99,999	House level	60L
5	Level 2 city	100,000-999,999	House level	80L
6	Level 1 city	>1,000,000	House level	100L

To achieve this goal Gimbichu woreda water, energy and mineral office was constructing different projects and has reached about 212 water sources:- 12 deep wells, 33 shallow wells, 138 hand dug well, 29 protected spring wells by 2008EFY. These can improve health status of population by reducing incidence and prevalence of waterborne diseases.

Demographic Information

According to CSA population estimation the total population of Gimbichu district is 105,348 with 53,306 (50.6%) males and 52,042 (49.4%) females. Total urban population is 8761(8.3%) and the rural population is 96,587 (91.7%). The average family size of the District is ***5-6*** persons per household for rural and ***4-5*** person per household for urban.

Ethnicity, Language and Religion

With regard to ethnic composition, Gimbichu District has two main ethnic groups. The majorities or about 70% of the people in the District belong to Oromo ethnic group; the second largest group belongs to Amhara (about 29%). The District also comprises small numbers of Guraghe (1%) and Tigire.

In Gimbichu, the mother-tongue language would be mostly consistent with the ethnicity of the people. Hence, Afaan Oromo and Amharic are the mother tongues for 70% and 30% of the people in the District, respectively according to Basic Data Collected from kebeles by District Finance and Economic Development Office.

People in the Gimbichu district are affiliated to four religions, namely, Orthodox Christianity, protestant, Islam and Tradition. The religions constitute 96%, 2%, 1% and 1% of the total population of the district, respectively. Hence, the District is predominantly by Orthodox Christianity.

Economy and Income

Major economic source for woreda is agriculture. Generally there are 301 small scale micro enterprises with total members of 3528; 2641 males and 887 females in 2007EFY. From 4513 unemployed persons in 2008 year 1629 persons employed into 153 new small scale enterprise with un employment rate of 36.0%. The per capita income and the proportion of farmers, merchants, and government employee data were not available in woreda.

Agriculture

The major source of income and living way of Gimbichu woreda population is agriculture as usual in Ethiopia because approximately 92.5% of population lives in rural. Agriculture is known to supply with food grains, cash crops, milk and dairy products, and meat products among other things. The agricultural sector of Gimbichu is composed of mainly crop production, livestock and poultry and a few farmers perform beekeeping. So Gimbichu woreda is characterized by subsistence mixed farming system.

The total area of Gimbichu woreda is about 75,071 hectares or 754.31km^2 which 48916 hectares are cultivable land, 3753 hectares grazing or pasture land, 10998 hectares bush and forest land, 2268 hectares settlement, 8348 hectares is hills and mountain land and 788 hectares are for others.

Table 14: Major types of crops and their average annual production per year in 2007/2008 EFY, Gimbichu woreda, April 2016

SN	Major Types of crops	Annual production/year in 2007/2008 EFY
1	Wheat	1,527,843
2	Chick pea	571,266
3	Teff	305,656
4	Lentils	235,826
5	Grass pea	43032
6	Bean	18,086
7	Barley	15,284
8	Haricot bean	5654
9	Fenogrip	4295
10	Sorghum	1123
11	Maize	429
	Total	2,728,494

Wheat, teff, lentils and grass pea are produced approximately by all of farmers in woreda. The woreda is also known for its production of vegetables and fruits.

Table 15: Major types of vegetables produced in woreda in 2007/2008 EFY.

SN	Major types of vegetables in woreda	Annual quintal production/2007/2008yr
1	Onion	113,190
2	Tomatoes	81,900
3	Guraghe cabbage	45,500
4	Garlic	31688
5	Cabbage	29,785
6	Green peper	24,140
7	Pepper	21,483
8	Beet root	20,445
9	Carrot	17712
	Total	385,843

In this woreda there are also other fruits which are produced such as: apple (350 quintals/2007/08 production), mango (600quintals/2007/08 year, avocado 875quintals/2007/08 year, banana (6529quintals/2007/08 year production.

The woreda is also known for its animal production like cattle(121,317), goat(18,416), sheep(52,368), poultry(50,000), horses(6298),mule (769),donkeys(29,383), camels(31) which are currently registered on woreda veterinary clinic.

To keep the health of animal well the government also has about 13 D types and 1 C type veterinary clinic in the woreda with 2 DVM and 16 animal health assistant professionals. The animals were also vaccinated against zoonotic disease like anthrax in year 2007 EFY.

Table 16: Gimbichu woreda veterinary clinic anthrax vaccination plan of animals 2007 EFY.

SN	Types of animals	vaccination in 2007 EFY	
		Plan	Achievement
1	Cattle	30,000	36,100 (120%)
2	Goat	3500	4000 (114%)
3	Sheep	30,000	34,450 (114%)
4	Horses	1000	1307 (130%)
5	Mules	500	378 (76.5%)
6	Donkeys	12,553	16,120 (128%)

Education

In Gimbichu woreda there are 54 total governmental and 2 KG private schools. Among 54 schools in woreda 51 are primary schools (grades 1-8), 2 high schools (grade 9 and 10) and 1 preparatory school. There is one TVET college on construction in woreda. The total number of students enrolled in 2008 EFY from primary to secondary school is 24,696; 13,053 male and 11,643(47%) females. From the total enrolled in this year 902 students (3.6%) dropped out their education (461 males and 441 females) due to different reasons:-

1. 410 transferred with official letter (207 males 203 females)
2. 151 students due to temporary employment(daily laborers) (87 males and 64 females)
3. 110 students due family workload (59 males and 51 females)
4. 101 students due to disease. (56 males 45 females)
5. 74 students due to low support or income of family (32 males and 42 females).
6. 26 students due to marriage (5 males and 21 females).
7. 14 students due to drought condition (2 males and 12 females).
8. 12 students due to religious education of orthodox Christian (10 males and 2 females)
9. 4 students due to death (3 males and 1 female).

Since educational status of population affects health of an individual, joint collaboration of multi-sectorial organization is needed to reduce school dropout rate.

In woreda there are 427 teachers; 289 males and 138 females. Regarding school health there is HIV/AIDS and Red Cross clubs in all schools. 13 schools have adequate safe water supply while 41 (75.9%) schools do not have safe water supply. All of the schools have latrine while 45 of them are not standard latrine i.e. male and female separately. The average number of students in class /section is 52 students indicating no risk of over crowdedness

Gimbichu woreda health service delivery system

Organizational Structure

Gimbichu district health office is the basic administrative unit of health system in woreda and lead Health facilities of the district. It is responsible for planning, financing, monitoring and evaluating of all health programs and service deliveries in the District. It is organized in to four case teams reporting directly to woreda health office head. These are communicable disease control case teams, Family health support; health facilities support case team, and Human resource and capacity building case team. In addition to this the woreda also implemented community health insurance which provides free health service for farmers and those paid insurance prior.

Table 17: Name of Health Centers and Kebeles Covered with Health Centers Gimbichu woreda 2007EFY

No.	Name of health Center	kebeles included under Health centers
1	**Chefe Donsa Health Center**	Bui, Habru Seftu, M/Gora,Kersa,Germama Koka, Lemlem Chefe, Adadi Gole And Chefe Donsa 01 And 02
2	**Dobi Health Center**	Uso Cheleleka, Dobi Bosonu, Girmi, Finchawa, Dire
3	**Areda Health Center**	Goro Tigiri, Adadi Ejere, Q/Hama, Tullu Fera And Bishan Tino Kedida
4	**Goro Tigiri Health Center**	Bitow Mitak, Areda Gora, Burko Ula Ula, Jogol ,Aleltu, Qulquwal Ayamba, Cheffe Silmany ,Bago Titamba, Somsa Kombolcha, Anfar Chamari, Diyom Ayamba

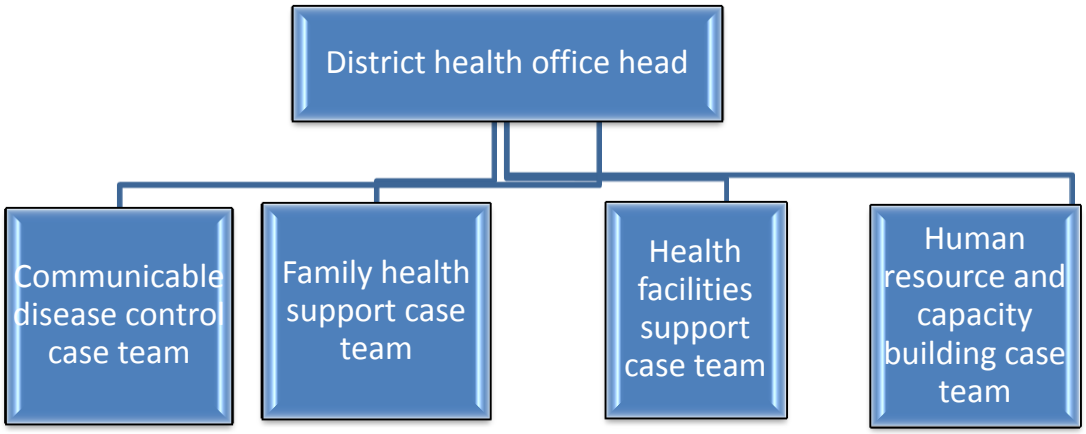


Figure 19: organizational structure of Gimbichu woreda health office 2008EFY.

The district has 4 health centers and 33 health posts making health service coverage of the district 100% for HC and Health posts. All health centers have in patient service with 4-6 beds. There are also 1 medium private clinic and 6 small private clinics in the district. All health centers have transport and water supply access while 2 health centers have no electricity. The transport access is also available for all health posts in woreda. Health facilities are also staffed with appropriate health professionals like; health officers, environmental science professionals, clinical nurses, laboratory professionals, pharmacy professionals, midwifery nurses, public health nurses, health extension workers, emergency care nurse and supportive staffs.

Vital Statistics and Health Indicators

Table 18: population and Vital statistics of Gimbichu woreda 2007 EFY

S.no	Indicators	Number	Percentage
1	Total population	105,348	100
2	Male	53,306	50.6
3	Female	52,042	49.4
4	Urban	8761	8.3
5	Rural	96587	91.7
6	Total live births	3486	3.3
7	Under 1yrs old	3486	3.3
8	Under 5yrs old	17786	16.9
9	Women 15-49yrs	23924	22.7
10	Pregnant women	3781	3.58
11	Infant mortality rate/1000	No data	-
12	Neonatal mortality rate	No data	-
13	Under 5yrs mortality rate	No data	-
14	Maternal mortality rate/100,000	No data	-
15	Crude birth rate/1000	33/1000	
16	Crude death rate	No data	-

Table 19: Type and number of Gimbichu Woreda health professionals and profession to population ratio

SN	Type of profession	Number	Profession to population ratio (Gimbichu woreda)	National profession to population ratio (2005EFY) indicator	Remark
1	Physicians	0	0:105,348	1: 100,000	zero
2	Health officers	12	1:8779	1:10,000	adequate
3	Environmental health professionals	2	1:52674	1:25,000	Inadequate
4	Laboratory professionals	5	1:21070	-	-
5	Nurses all types	33	1:3192	1:5000	Adequate
6	Midwifery nurses	9	1:2658 females	-	-
7	Pharmacy professionals	10	1:10535	-	-
8	Health extension workers	56	1:1881	1:2500	Excess
9	Public health nurses	4	1:26337	-	-

Table 20: Ten top diseases among male, females and under five years in Gimbichu woreda 2007 EFY.

Rank	Male	Female	Under five years
1	Acute upper respiratory infection	Acute upper respiratory infection	Pneumonia
2	Pneumonia	Acute febrile illness	Diarrhea(non- blood)
3	Diarrhea (non- bloody)	Diarrhea	Acute upper respiratory infection
4	Helminthiasis	Dyspepsia	Infections of the skin and subcutaneous tissue
5	Acute febrile illness	Pneumonia	Diarrhea with blood (dysentery)
6	Diseases of musculoskeletal system	Infection of skin and subcutaneous tissue	Other or unspecified diseases of eye and adnexa
7	Trauma	Urinary tract infection	Diarrhea with dehydration
8	Other unspecified infectious and parasitic diseases	Disease of musculoskeletal system	Acute febrile illness
9	Typhoid fever	Typhoid fever	Other or unspecified diseases of skin and subcutaneous tissue
10	Dyspepsia	Helmenthiasis	Helminthiasis

Health Budget Allocation

Health budget allocation shows government‘s political commitment towards achievement of GTP II through appropriate healthcare financing and capital budget.

Table 21: Proportion of Government and health sector budget for Gimbichu woreda from 2005-2008EFY.

SN	year	Total woreda budget	Woreda budget for health sector	Proportion of health sector budget	Variation of budget by year
1	2008	72,762,261	8,602,974	11.8%	-5.56
2	2007	48,549,680	3,033,178	6.24%	6.84
3	2006	39,191,798	5,126,838	13.08%	0.66
4	2005	31,582,884	4,340,856	13.74%	13.47

When we see the actual government budget for health sector, it seems increasing but the proportion of health sector budget is decreasing from 13.74 to 11.8% through 2005-2008 year respectively. This may be attributed to the absence of new construction or project in the year 2007 and 2008 EFY.

Table 22: Amount of budget for Gimbichu woreda health sector from 2005EFY-2008EFY.

SN	year	Recurrent	salary	Capital budget	Total budget
1	2005	741,000	3,940,856	400,000	4,340,856
2	2006	1,350,000	3,677,838	99,000	5,126,838
3	2007	1,825,500	2,196,378	-	3,033,178
4	2008	2,395,400	6,207,574	-	8,602,974

Status of primary Healthcare Components

Maternal and child health

Family planning

Out of 23924 total 15 - 49 years reproductive women age group in woreda 21003 used family planning methods as repeated and new acceptors making contraceptive acceptance rate 87.7%. More than half of repeat and new acceptors use injectable method.

Ante Natal Care (ANC)

From total of 3781 pregnant women in 2007year , 3395 have received antenatal care service at least one times during their pregnancy to make ANC coverage 89.7%, while 2922 women (77.3%) received antenatal care four times during their pregnancy in 2007EFY. 1190 (35%) of pregnant women attended ANC at least one times have been tested for syphilis.

2676(70.7%) pregnant women have attended their delivery by skilled personnel while 4/3781(0.1%) pregnant woman attended delivery by health extension workers. Among total 3781 expected deliveries 1712(45.3%) have attended early PNC service within the first 7 days of delivery. About 192 (5.0%) pregnant women have also received comprehensive abortion care in this year.

Table 23: Maternal health indicators coverage of Gimbichu woreda health office, East Shoa Oromia region, Ethiopia April 2016

Indicators	Target population	Number	Coverage
Contraceptive acceptance rate(CAR)	23924	21003	87.7%
ANC first visit	3781	3395	89.7%
ANC fourth visit	3781	2922	77.3%
Screening for syphillis	3395	1190	35%
Skilled birth attendant (SBA)	3781	2676	70.7%
Delivery by HEW	3781	4	0.1%
PNC within 7 days of delivery	3781	1712	45.3%
Abortion care	3781	192	5.0%

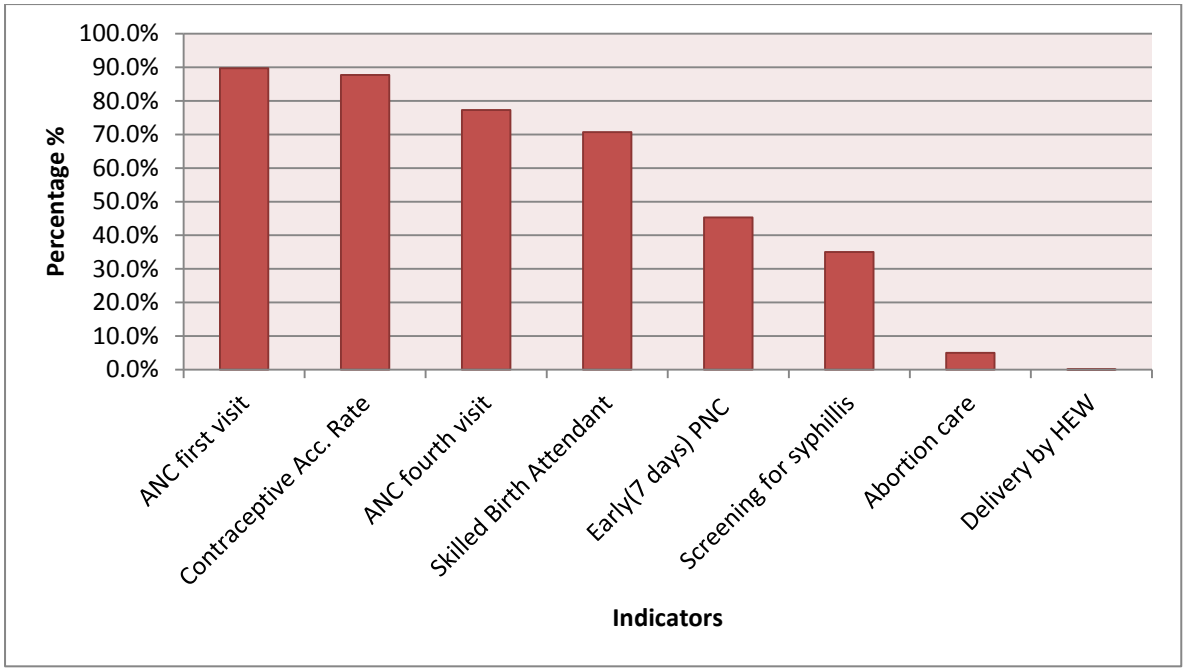


Figure 20: Gimbichu woreda maternal health indicators performance in 2008EFY

Child Health

Immunization coverage

Immunization services play crucial role to reduce infant/ child morbidity and mortality rates in millennium development goal. So the woreda has planned on 3486 children eligible for immunization in 2007EFY and achieved more than 90% for all antigens as shown on the following table.

Table 24: Gimbichu district health office under 1 year immunization coverage in 2007EFY.

Type of antigen	Number	Percentage
Penta 1	3498	100.3%
Penta 3	3348	96.0%
PCV 1	3498	100.3%
PCV 3	3348	96.0%
BCG	3529	101.2%
Measles	3263	93.1%
PAB	3474	99.6%
Fully immunized	3246	93.1

Table 25: Trend of immunization activities (performance) in Gimbichu woreda from 2003-2007EFY.

Year EFY	Penta 1	Penta 3	Measles	Fully immunization	Skilled birth attendant
2003	83%	83%	64%	64%	6%
2004	85%	79%	80%	80%	7%
2005	91%	90%	86%	86%	13
2006	91%	91%	84%	83%	45%
2007	99.7%	95%	93%	93%	71%

Environmental Health Condition

Regarding environmental health condition safe water supply coverage of woreda was presented in facilities and basic infrastructure. In woreda out of 23,187 households 23177 households have latrine while 22839 households are utilizing latrine appropriately making latrine coverage and utilization rate 99.9% and 95.2% respectively in 2007 EFY.

Endemic diseases

A. Malaria

In Gimbichu woreda there are 8 kebeles at risk of malaria with a total population of 16361. These are: Anfar chamer, Aleltu, Begotit amba, Bitewu mitak, Chefe salmegn, Dihoom, Kulkual amba, and Somsa kombolcha. Important interventions like IRS and LLITN distribution were undertaken in 2007. So malaria cases are very low in this woreda with three P. falciparum and five P. vivax confirmed cases occurred during the reporting year.

B. TB/ Leprosy

Total TB cases diagnosed in the year 119, PTB cases 45, clinically diagnosed PTB negative cases 32, clinically diagnosed EPTB cases 39, and bacteriologically confirmed relapse PTB cases detected was 3.

TB case detection rate = 119/275= 43.3%

Defaulter = 0

Death on treatment 2

Treatment failure = 2

MDR TB cases 0

There was no data or incomplete data to calculate TB treatment success rate and cure rate.

TB positive tested for HIV – 85; male 58 and female 27

Number of TB patients positive for HIV =6; 3 males and 3 females

There was also 1 patient with Leprosy case detected in this woreda during 2007EFY.

C. HIV/AIDS

In woreda there were 38 new HIV infections in 2007 year which makes HIV incidence approximately 38/100000. The prevalence of HIV in woreda was 0.002 or 2/1000 population. Out of 36,465 new and repeat OPD visits reported to woreda health office in 2007 EFY 13278 (36.4%) patients have received PITC service. Or out of 31543 new OPD visit reported to woreda health office 13278(42%) of them have taken PICT service and 1831(5.8%) patients have taken VCT service. Of 13278 tested at OPD 14 or 0.1% are positive while for VCT 14 or 0.76% were positive. 68% of HIV positive persons are females and 65% of them fall in 25-49 age group.

Epidemic prone Diseases

With regard to priority epidemic prone diseases in this woreda 7 confirmed malaria cases, 482 dysentery cases, 900 typhoid fever cases, 286 epidemic typhus cases, 3 suspected measles cases, 29 SAM cases are reported in the past 7 months in this year.

4.5 Discussion

As it is the backbone of the country, the agricultural sector in Gimbichu district played a crucial role by producing different types of crops like wheat, barley, teff, chick peas and different types of vegetables and fruits due to appropriate temperature and climate which contribute to prevention of disease from the very beginning if consumed in a balanced way and hence reduce morbidity and mortality. In this regard, the woreda distributes its surplus productions to other areas frequently as source of income and exchange for other important commodities which fulfill the needs of society. The district also has a lot of animals which serve as source of food and income that are vaccinated against zoonotic disease like anthrax by animal health professionals and hence risk of human infection is minimized.

Being the source of budgetary and controlling system of all sectors in the district, the finance and economic development also provides accurate and evidence based data for each sectors.

The health sector of Gimbichu district is also showing progressive improvements in areas of maternal and child health, communicable and epidemic disease control, environmental health and sanitation during the last five years.

The top leading causes of morbidity in 2007 was acute upper respiratory infection both in male and female, while the second is acute febrile illness in female and pneumonia in male. The higher acute febrile illness in females may be due to the susceptibility of females to urinary tract infection than males. Despite the fact that PCV immunization coverage is about 96%, pneumonia remains top leading causes of morbidity in children under five years old. This may be due to under estimation of target children for vaccination. The lower achievement of syphilis screening test (35%) for pregnant women during ANC visit may be attributed to lack of reagent, work load of laboratory technicians, or lower attitude of health professionals to the use of screening. Delivery by health extension worker is very low (0.1%) in woreda. 42% achievement of PICT service during OPD visit may be due to shortage of HIV test kit and refusing of clients. Concerning maternal health and children immunization coverage, the woreda achieved best performance as compared to national and regional government. But TB case detection rate of woreda (43.3%) is lower than the regional (60%) and national (58.9%) (4).This may be attributed to lower screening or suspecting cough cases of health professionals.

4.6 Limitations

No inpatient data to calculate mortality rates for all ages.

Frequent field visit of some woreda health officers pose great impact on the completeness and timeliness of health profile description report.

4.7 Conclusion

The health status of a given population is a reflection of its population‘s environmental conditions, culture, economy, education, religious, infrastructures, political and professionals commitments, food security and eating habits and vice versa. Different government sectors work on the same community from different directions to the wellbeing of society which accelerates or decelerates the achievement of health sector knowingly or unknowingly.

This is what was observed in Gimbichu woreda from cross sectional health profile assessment.

Acute upper respiratory infection is the top leading causes of morbidity both in male and females in woreda while TB detection rate was low. Malaria and HIV incidence are also low woreda.

4.8 Recommendations

- Good performance achieved in maternal health, children immunization, epidemic disease control and food security in agriculture should be sustained further.
- Safe water supply coverage in woreda must be upgraded quickly.
- Intensive behavioral change is needed to decrease school dropout rate in woreda.
- There should be a system to cross-check communicable disease control programs and top leading causes of morbidity.
- TB case detection rate and delivery by HEW should be upgraded.
- Since all health centers in woreda have in patient services, important data like top leading causes of admission and mortality should be available.
- There should be memorandum of understanding /term of reference or meeting of all sectors of woreda at least annually to discuss on health sector performance of woreda as they all work on the same community.

4.9 References

1. City Health Profiles: how to report on health in your city.
2. www.health profile.com.
3. Abyot Bekele Woyessa, Compiled Body of Works in Field Epidemiology 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 30-April -2012 Addis Ababa
4. Federal Ministry of Health, Health and Health Related Indicators 2005 E.C (2012/2013) Version 2, Oct 2014
5. Compiled Body of Works in Field Epidemiology By Haftom Taame 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. May, 2013 Addis Ababa.

CHAPTER FIVE

Scientific Manuscript for Peer review Journal

5.1 Acute Watery Diarrhea/AWD outbreak investigation in Goro District, Bale zone Oromia region, Ethiopia February, 2017

5.2 Abstract

Introduction-Acute Watery Diarrhea/AWD remains main challenges of mortality and morbidity in developing countries where there was poor socio-economic growth. Goro district of Bale zone started to report suspected AWD cases in November 2016. We conducted outbreak investigation in the district to confirm it, identify risk factors for transmission and implement appropriate control measures.

Methods-Descriptive study followed by 1:1un -matched case control study was applied from February 3-18/2017. Cases were defined as national cholera guideline standard case definition and controls were residents of Goro district who are greater than or equal to two years, neighbor to the cases and had no complain of clinical sign consistent with AWD during previous month of the data collection. We used structured questionnaire to collect data from cases and controls, reviewed line list, used Epi info 7 to calculate odds ratio.

Results - Five hundred twenty three (523) AWD cases and zero deaths were reported from November 09, 2016 – April 30, 2017 G.C. More than half of cases were males and between 15-44 years age group. The overall attack rate of the outbreak was 4.8/1000populations. Welta'i Negeya and Billi Akiya were the most affected kebles of the district with attack rate of 25.5 and 15.2 per 1000 populations respectively. Presence of AWD sick person in village AOR= 10.78, 95% CI (3.44-33.76) P value =0.0000 remain independent risk factors for transmission and spread of AWD in logistic regression analysis while washing hand greater than three times in a day and time to fetch water from source less than one hour remain protective against the disease. There was no significant association between using river water as source of drinking and acquiring the disease in multivariate analysis. Priority must be given for those living near river for construction of latrine and water treatment chemical distribution.

5.3 Introduction

Cholera is a diarrheal disease caused by infection of the intestine with the gram-negative bacteria *Vibrio cholerae*. It is medical emergency that causes profuse, painless, rice watery diarrhea resulting in rapid dehydration, circulatory collapse and death (CFR 50%) within few hours unless treated.

About 20% of those who exposed to infective dose of these bacteria develop sign and symptom and 2-5% of those who develop symptom result in severe dehydration. Large proportion (75%) do not develop symptom at all and remain carrier in their stool and transmit the disease for about four weeks. Another 20% develop a diarrheal illness that is indistinguishable from diarrhea caused by other organisms. These characteristics pose great impact on control of disease (1).

Cholera is transmitted by the fecal-oral route but overcrowding (internally displaced people, refugee, camps, population gatherings, etc.), inadequate quantity and/or quality of water , inadequate personal hygiene, poor washing facilities, inappropriate or poor sanitation, inadequate food safety, underlying diseases such as malnutrition, AIDS and environmental and seasonal factors increases chance of infection (1).

WHO estimates 1.4 to 4.3 million cases of cholera resulting in an estimated 28,000-142,000 deaths, annually. Of the cholera cases reported to the WHO in 2014, 55% occurred in Africa, 30% in Asia and 15% in Americas. More than half of the global incidence of infection and death due to cholera is from children under the age of five (2).

In Ethiopia, AWD cases were first seen in Moyale woreda of Borena zone, Oromia region on October 2015 and confirmed to be V. cholera (serotype Ogawa, Biotype EI Tor). Since then, it is spreading to different woredas, zones and regions for about one year and half and continued to be major public health problem until today. In Oromia region alone, about *6,473* AWD cases and 64 deaths (CFR 0.98%) were reported affecting 14 zones, 13 towns and 116 woredas up to March 2017. Bale zone is the most affected of all oromia zones with 1711 cases (26.4%) and the first case was seen in this zone on May 7, 2016 in Meda Walabu woreda, confirmed by RDT.

We conducted AWD outbreak investigation in Bale zone, Goro district, Oromia region from 03/02/2017-18/02/2017 to identify the risk factors and implement appropriate control measures because the district has higher number of cases at that time in zone.

5.4 Methodology

Study area and period

The study was conducted in Bale zone of oromia region from February 03-18/2017. Bale zone is located 430km to the south east of Addis Ababa, capital of Ethiopia and Goro district is located to the East of Robe town, zonal capital.

Study design

Descriptive study design followed by unmatched cases control study was applied to quickly identify risk factors for disease transmission.

Sample Size, Sampling technique and Data Analysis

For this outbreak investigation, a case of AWD was defined as any resident of Goro district who is greater than or equal to two years old develop acute watery diarrhea between January 25/2017 – February 30/2017 to avoid recall bias on exposure factors.

For descriptive epidemiology, all cases reported by line list up to April 30/2017 was analyzed using Microsoft soft excel 2010. Attack rate of the outbreak was calculated for district and each kebeles by using total population.

For case control study, sample size was calculated using StatCalc function of Epi info 7 assuming 40% of control exposure among risk factors and 95% confidence level with study power of 80% to detect odds ratio of 3.5. As a result 49 cases and 49 controls were the maximum sample size needed for the study and we recruited 50 cases and 50 controls. Structured questionnaire was used to interview both cases and controls for possible exposure factors before five days of onset of symptom of cases. Collected data were entered in to Epi info version 7 software and frequencies, odds ratio, adjusted odds ratio calculated.

5.5 Results

Descriptive epidemiology

From December 09, 2016 – April 30, 2017 G.C. a total of **523 c**ases were reported to Bale zonal health office from the district. Seven of ten samples tested by RDT were positive for V. Cholera 01. The overall attack rate of the outbreak by woreda was 4.8/1000populations. Most of kebeles were affected by outbreak but Bili Akiya and Welta'i Negaya were the most affected with attack rate of 15.2/1000 and 25.5/1000 populations respectively.

Table 26: Attack rate of AWD cases by selected kebeles, Goro woreda , Bale zone oromia region April, 2017 G.C

S.N	Name of kabeles	Total Population	Number of cases	Attack rate/1000 populations
1.	Malka Buta	7021	76	10.8
2.	Bili Akiya	5081	77	15.2
3.	Keku	4872	38	7.8
4.	Goro Raya	3336	40	12
5.	Elani Sogiddo	2924	17	5.8
6.	Gere Negeya	5393	71	13.2
7.	Welta'i Negeya	2471	63	25.5
8.	Welta'i Imana	2571	19	7.4
9.	Goro Town	8012	26	3.2
10.	Gilinsho	1221	10	8.2

The outbreak also stayed in the district for more than five months and is still ongoing sporadically in some kebeles. Cases seem intermittent type for about two months and started to increase steadily after 16/01/2017 indicating continuous common source outbreak. Figure 21

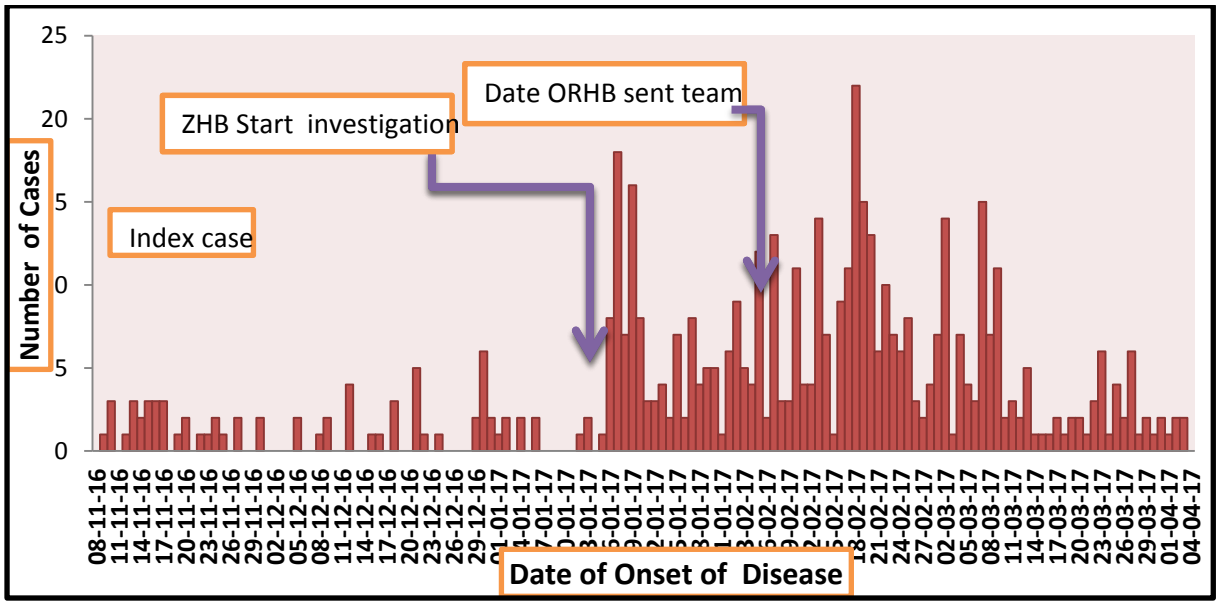


Figure 21 : Epidemic curve of AWD cases in Goro woreda, Bale zone, Oromia region Ethiopia April, 2017 G.C.

Greater than half of cases were males (58%) and between age group of 15-44 years (54%).

Case control study

The mean age of cases was 26 years (range 2-60years) and those of controls were 28 years (range 9-60years). A demographic characteristic of cases and controls was summarized in table 26.

Table 27: Demographic and some important characteristics of cases and controls

Variables		Cases	Controls
Sex	Male	27(54%)	23(46%)
	Female	23(46%)	27(54%)
Educational status	Illiterate	26(52%)	20(40%)
	Elementary and above	24(48%)	30(60%)
Marital status	Married	27(54%)	37(74%)
	Single	23(46%)	13(26%)
Age groups	<=5	3(6%)	0 (0%)
	5-14	12(24%)	3(6%)
	15-44	26(52%)	41(82%)
	44 & above	9(18%)	6(12%)
Family size	<=5	17(34%)	24(48%)
	>5	33(66%)	26(52%)
Contact history with patients in the past 5 days before onset of symptom	Yes	17(34%)	12(24%)
	No	33(66%)	38(76%)
Availability of water Rx chemicals in house	Yes	32(64%)	35(70%)
	No	18(36%)	15(30%)
Presence of hand washing facility near toilet	Yes	30(60%)	26(52%)
	No	20(40%)	24(48%)
Time in hours to fetch water from source	<=1hr	37(74%)	18(36%)
	>1hr	13(26%)	32(64%)
Frequency of hand washing in a day	<=3 times	20(40%)	10(20%)
	>3 times	30(60%)	40(80%)

Presence of sick person in village COR=3.54, 95%CI (1.48-8.45), drinking from unprotected source COR = 3.50 95% CI (1.15-10.63), time to fetch water from source less than or equal to one hour COR= 5.05, 95% CI (2.14-11.90) were risk factors for acquiring AWD, while purifying water for drinking OR =0.26, 95% CI (0.09-0.7) and washing hand greater than 3 times in a day were protective factors for disease in bivariate analysis.

By using logistic regression, presence of AWD sick person in village AOR= 10.78, 95% CI (3.44-33.76) at P value = 0.0000 remain independent risk factors for acquiring AWD while washing hand three times in a day AOR = 0.33, 95% CI (0.12-0.92) remain protective against contracting AWD.

Table 28: Independent risk factors for Acquiring of AWD in Goro district March 2017

Risk factors	AOR	Lower CI	Upper CI	p-value
Purifying drinking water	0.60	0.22	1.60	0.3146
Washing hand greater than 3 times in a day	0.33	0.12	0.92	**0.0339
Presence of sick person in village	10.78	3.44	33.76	**0.0000
Drinking from unprotected source	2.45	0.67	8.91	0.1712
Open field defecation	2.05	0.53	7.90	0.2945
Living near contaminated source	0.17	0.05	0.52	**0.0018

Major public health intervention undertaken at this district were establishment of AWD task force comprising of different government sectors, active case search and health education at house hold level, orientation of health professionals working in CTC, distribution of water treatment chemical by IRC and monitoring and evaluation activities.

5.6 Discussion

The outbreak stayed longer time in the district due to an interrupted intervention; inadequate budget allocated for prevention and control activities and also covered many kebeles because

of shortage of pure water supply, low latrine coverage and low awareness towards prevention.

This outbreak investigation has less power to detect common sources infections like sharing the same water/ food source and attending public gatherings as shown on epidemic curve. This may be due to small sample size of both cases and controls, recall bias of cases, inconvenience to conduct environmental investigation, presence of the same outbreak and measles outbreak in other woredas of Bale zone.

However, the study revealed that presence of AWD sick person in the same village, washing hand less than three times in a day, living near river or less time to fetch water from river were independent risk factors for the spread of the disease.

Different studies conducted in different areas in Africa (eg. Serralion, Kenya, central African Republics) revealed that different factors like drinking untreated/unsafe water, consumption of street foods/drinks and consumption of ice made from contaminated water as source of infection (3). But this outbreak investigation identified presence of AWD sick person in a village as risk factor. This difference may be due to the longer time that the outbreak stayed in the community and large proportion of asymptomatic carriers.

Goro district of Bale zone was affected by this outbreak more than any woredas in the region. This was due to interrupted intervention of the district and inappropriate CTC infection control measures, presence of sick person in village and etc.

Goro districts‘ AWD outbreak was not confirmed by culture laboratory or environmental investigation due to previous confirmation in other districts.

5.7 References

1. Guideline on CHOLERA OUTBREAK MANAGEMENT Ethiopian Health and Nutrition Research Institute Federal Democratic Republic of Ethiopia, May 2011 Addis Ababa.

2. The Global Public Private-Partnership for Hand washing http://globalhandwashing.org/ August 2016.

3. Epi-Aid # 2010-074 Trip Report: Sierra Leone Cholera Outbreak Investigation, 2012.

4. Belay Bezabih BEYENE et al. Epidemiology of Acute Watery Diarrhea Outbreak and Challenges of Control—Afar, Ethiopia, 2009, International Invention Journal of Medicine and Medical Sciences (ISSN: 2408-7246) Vol. 1(10) pp. 162-169, October, 2014.

5. Ali M, Nelson AR, Lopez AL, Sack DA (2015) Updated Global Burden of Cholera in Endemic Countries. PLoS Negl Trop Dis 9(6): e0003832.doi:10.1371/journal.pntd.0003832.

6. Guideline for cholera control World Health Organization, Geneva 1993

CHAPTER SIX

Abstracts for Scientific presentation

Authors: Kiflu I. Negari[1], Dr. Addamu A.[2], Gemechu B[3].

Address: [1]EFETP, School of Public Health, Addis Ababa University, [2]AAU, School of Public Health, EFETP Academic Coordinator, [3] Arsi zonal health Bearau

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: kimf2002@gmail.com Tel: +251913047578

6.1 Surveillance Data Analysis Report of Suspected Meningococcal Meningitis in Horo Guduru Wollega Zone Oromia region, Ethiopia 2011-2015 G.C

Introduction: Meningococcal meningitis is the only form of bacterial meningitis that causes outbreaks all over the world and particularly in African Meningitis Belt. Epidemics of meningococcal meningitis were occurring in Ethiopia for century ago. We conducted surveillance data analysis at zonal level to determine magnitude and trend of disease.

Methods: We collected five years secondary data (2011-2015 G.C) weekly report of suspected meningococcal meningitis in the Zone and analyzed by Microsoft Excel from March 1-April 28 /2016. Incidence rate, CFR, calculation

Results: A total of 339 suspected cases of meningococcal meningitis and five deaths were reported with mean annual incidence of 0.5/100,000 population and CFR 1.47 % in zone in the last five years. The 2013 epidemic season contributed for majority of cases. Of 254 cases reported during this year, 155 (61.1%) were females, 51.1% were from 5-14 years age group. Hababo Guduru woreda (67.5%) and Shambu hospital (25%) were reported highest number of cases in zone.

Discussion, Conclusion and Recommendations

Half of the cases were 5-14 years age group agrees with the fact that 80% of meningococcal meningitis occurs in less than 30 years due to higher percentage of nasopharyngeal carriers in these age group. Zonal PHEM should conduct surveillance system evaluation of suspected meningococcal meningitis to improve its attributes. Health facilities should strengthen data archival system to study retrospectively magnitude and trend of the disease.

Key words: Meningitis, surveillance, Horro Giduru Wollega, Ethiopia

Words = 220

6.2 Measles outbreak investigation in Harena Bulluq district, Bale zone of Oromia region Ethiopia, January 2017

Authors: Kiflu I. Negari[1], Dr. Addamu A.[2], Gemechu B[3].

Address: [1]EFETP, School of Public Health, Addis Ababa University, [2]AAU, School of Public Health, EFETP Academic Coordinator, [3] Arsi zonal health Bearau

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: kimf2002@gmail.com Tel: +251913047578

Abstract

Introduction: Measles remains major public health problem world-wide accounting for 164,000 deaths and around 20 million infections each year despite the availability of a safe and cost-effective vaccine. Suspected outbreak of measles was reported in Harena Bulluq district of Bale zone and we investigated to confirm and identify risk factors for outbreak for appropriate control measures.

Methods: We used descriptive study followed by 1:1 un-matched case control study from January 16-26/2017. A case was defined as per national guideline for measles in Ethiopia. Control was defined as any resident of Kumbi Kebele who did not develop signs and symptoms of measles and neighbor to a case. 60 cases and 60 controls were interviewed with structured questionnaire for possible exposures before the cases develop sign and symptoms. Data were entered into epi info 7 for analysis.

Result: A total of 108 suspected measles cases were identified with one death (CFR= 0.9%). Sixty seven (67%) of the cases were under five years and 81% not vaccinated. Four of five blood samples were positive for measles IgM. Overall attack rate was 10 and 112 per 10,000 populations for woreda and kumbi kebele respectively. Having contact history with a person suspected to have measles adjusted OR: 10.71 95% CI (3.92-29.19) P-value of 0.0000 remain independent risk factor for contracting the disease while being vaccinated against measles was protective factor for the disease.

Conclusion: A confirmed measles outbreak hit Kumbi kebele due to low vaccination status in under five year‘s age group. Age Specific Attack Rate for less than five years age groups was 4.9% and the highest. Especial outreach vaccination campaign should be arranged for hard to reach areas once per year to increase the vaccination status of the community.

Key words: measles, outbreak, Harena Bulluq, Ethiopia, Case control

Words: 282

CHAPTER SEVEN

Disaster Assessment

Health and Nutrition Meher Assessment Report of East and West Harerghe Zones Oromia region, Ethiopia, November 2016

7.1 Executive Summary

Health and nutrition community needs assessment is an early warning system that involves description of the status and profile of health of local people, identification of the major risk factors and causes of ill health and actions needed to address those problems. Health and nutrition assessment was conducted in East and West Hrerghe zones from November 20 to December 10 with multi agencies and government institutions like Agriculture, health, water, and education using focused group discussion, observation and structured checklist to estimate severity and magnitude of health and nutrition emergency problems in selected woredas. Accordingly, there was ongoing outbreak of AWD in both zones that affected most of woredas (CFR of 2.7% West Harerghe and 1.2% East Harerghe) since July 2016 and until to the date of this assessment 590 and 729 AWD cases were reported in both zones respectively. The case load of SAM and MAM are decreasing in both zones as compared to respective months of 2015 though it is the highest compared to other zones in the region. In East Harerghe zone, 16,635 SAM cases and in West Harerghe zone 12,114 SAM cases reported in the past six months. Strong multi sectoral and inter regional collaboration for AWD outbreak is needed.

7.2 Introduction

PHEM is a broad idea involving a process of anticipating, preventing, preparing for, detecting, responding to, controlling and recovering from consequences of public health threats in order that health and economic impacts are minimized. According to new BPR structure in FMOH Ethiopia, it is comprised of four sub processes which are: Public Health Emergency Preparedness, Early Warning, Response, and Recovery. These processes are inter-related and continuous from one another.

Preparedness activities and tasks are those things that should be done prior to the occurrence of emergency. Development of plans, procedures, protocols, and systems; Putting in place the necessary logistics and funding; provision of training; and educating the public on related measures to be taken to prevent and control the event are among preparedness tasks (1).

Early warning is the identification of a public health threat by closely and frequently monitoring identified indicators and predicting the risk it poses on the health of the public and the health system.

Major indicators of early warning include:

- An increase in the number of cases beyond expected /occurrence of outbreaks,
- Unexplained morbidity and mortality,
- Malnutrition,
- Evidence of increase in zoonotic disease and/or related vectors,
- Environmental changes such as air pollution, water quality changes, contamination,
- Drought, flood, severe weather (metrological information),
- Agricultural events such as reduced harvest, occurrence of pests or diseases,
- Refugees, internally displaced people, disruption of health services and infrastructure.

Early Warning (EW) system collects and consolidates data on crop assessments, epidemic/outbreaks, nutritional status of vulnerable groups, livestock conditions, impact of precipitation on crops and livestock, market situation, magnitude of food shortages and measures taken for mitigation such as General Food Distribution (GFD) (1).

The major public health risks identified by PHEM core process in the Ethiopian health system according to the order of their priority – from high to low include;

- Epidemics of communicable disease
- Drought conditions with malnutrition
- Food contamination
- Flood (1)

Health and nutrition community needs assessment is an early warning system that involves description of the status and profile of health of local people, identification of the major risk factors and causes of ill health and actions needed to address those problems (*3*).

Humanitarian need assessment/community risk assessment is a participatory process for assessing hazards, vulnerabilities, risks, ability to cope, preparing coping strategies and finally preparing a risk reduction options implementation plan by the local community and professionals. Humanitarian need assessments use scientific information and predictions and participatory debates to identify, analyze and evaluate risk environment of a particular community, reach consensus amongst the community on actions that are needed to manage the risks (3).

Health and nutrition assessment is conducted twice a year in Ethiopia before rain season (Belg assessment) and after rain season (Meher Assessment). Different multi agencies like UN (UNICEF, WFP, WHO), FWSNET, local NGO's and government institutions like Ministry of health, Ministry of education, Ministry of agriculture, Ministry of water, energy and mineral office are involved in the assessment. National Disaster Risk Management Commission plays leading role to assess the magnitude, severity, type and effects of summer rainfall/drought on human health and nutrition.

Identifying and prioritizing public health problems and their risk factors by Meher assessment helps to response humanitarian need.

Objectives of Health and Nutrition Emergency Meher Assessment

General objective

- To estimate the severity, magnitude, extent or status of health problems and risks in assessed population to respond urgently.

Specific Objectives

- Describe health and nutrition problems in zones and recommend possible solutions.
- Identify woredas mostly affected by drought induced health and nutrition emergency and recommend priority actions for humanitarian need of 2017.
- Evaluate health and nutrition emergency intervention and performance of past and current year in both zones.
- Identify the trend of priority epidemic disease and status of associated risk factors and malnutrition cases in zone.

- To estimate effect of drought and safe water coverage on magnitude of health and nutrition problems.

7.3 Methodology

National Disaster Risk Management Commission gave brief orientation for all teams and deployed to their assigned regions. Similarly, Oromia regional DPPC deployed its teams after another half-day debriefing on situation of the meher season in the region. **Debriefing and discussion** with emergency task force committee at zonal and woreda level continued. The team divided in to three groups to collect more information by **observation** and prepared **checklist** from 11 selected woredas in East and West Harerghe zones. These woredas include: Babile, Chinakson, Gursum, Gola Oda and Girawa from East Harerghe and Doba, Burka Dintu, Hawwi Guddina, Guba Koricha, Boke and Gumbi Bordede fromWest Harerghe zones were selected depending on low rainfall condition, low production and low land kebeles they possess. The respective teams collected data on rainfall, production of crops, livestock condition, market prices, health and nutrition, education, WASH and collected protection activities from November 25- December 5, 2016.

7.4 Result

Socio-Demographic Profile

The total population of West and East Harerghe zones is **5,905,431** and **3,006,442** (51%) are males. From the total population 1339840 (22.7%) were women of reproductive age groups (15-49 years) while **994,036** (16.8%) were under five years and **210,088 (**3.5%) were pregnant women. These groups (females, children and pregnant women) are vulnerable to drought-induced malnutrition and outbreak of communicable diseases. Therefore, they need special care and treatment during routine health services and supplementary programs like vaccination etc.

Coordination and management System

There were PHEM officers at zonal, woreda, hospital and health center level to manage public health emergencies and report weekly epidemic priority diseases in both zones.

Multi sectoral task force coordination and public health emergency preparedness plan are in place although there was no budget allocated for PHEM. However, there is emergency fund in all woreda to use during emergency by agreement of woreda task force members.

Diarrhea (non- bloody), Pneumonia, Acute Upper Respiratory Tract Infections(AURTI), Diarrhea with dehydration, Moderate Acute Malnutrition (MAM) are top five causes of

morbidity in under five children in 2008E.C. Acute febrile illness is also among top five causes of morbidity in above five population.

There was no data found on top five causes of morbidity in East Harerghe zone.

Malaria, AWD, Measles, rabies and malnutrition are the major public health problems anticipated to cause epidemic/Outbreaks in both zones. Hence there is ongoing epidemic of AWD (590 cases) and 16 deaths (CFR of 2.7%) and 729 cases and 9 deaths (CFR of 1.2%) in West and East Harerghe zones respectively since July 2016. Even though there are enough emergency drugs and medical supplies for malaria, AWD, Measles and malnutrition for one month there are shortage of RDT for meningitis, LP set, TI bottle, routine antibiotics at SC/OTP sites in both zones.

Table 29: Top five causes of morbidity in visited woredas of West and East Harerghe zones in 2008 EFY.

Woredas visited	Top five causes of morbidity in under five years				
	1	2	3	4	5
Burka Dintu	Diarrhea	Pneumonia	Acute Upper Respiratory tract Infection (AURTI	Diarrhea with bloody	SAM
Guba Koricha	Pneumonia	Diarrhea (non - bloody)	AFI	SAM	Helminthiasis
Hawwi Guddina	Pneumonia	Diarrhea	AURTI	Malaria	Skin Infection
Boke	Diarrhea	Phemonia	AURTI	Diarrhea with no DHN	SAM
Gumbi Bordede	Diarrhea	AURTI	Pneumonia		SAM
Doba	Diarrhea	Pnemonia	AURTI	SAM	AFI
Babile	Diarrhea	AURTI	Pnemonia	Skin Diseases	Others

Trends of Priority Epidemic Diseases and Their Risk factors

Malaria

There are 843 peasant association/kebeles, which are malarious with a total population of 4,735,010 in both zones. LLIN coverage is below 80% and IRS is 92%, which may reactivate malaria outbreak again in West Harerghe zone, while LLITN is above 80% and IRS is 79% in East Harerghe. From June to October 2016 a total of 2440 malaria cases were reported to West Harerghe health office through routine surveillance system while 9174

malaria cases were reported to East Harerghe health office. Regarding supplies and drugs of malaria there is shortage of coartem in East Harerghe zone.

AWD/Acute Watery Diarrhea

There was ongoing AWD outbreak in West Harerghe zone affecting 13 woredas (590 cases) and 16 deaths (CFR of 2.7%) since July 2016. The most affected woreda in this zone is Doba with 428 cases (72.5%) due to index case first seen in the woreda and no preparedness activities done. Figure 16.

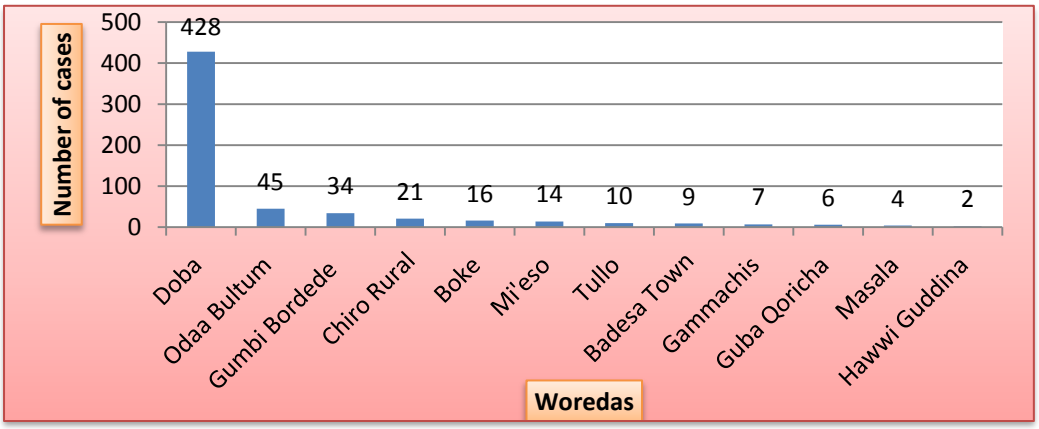


Figure 22: Distribution of AWD cases per woreda in West Harerghe Zone November 2016**.**

Latrine coverage, utilization and safe water coverage are; 61%, 59% and 45% respectively that aggravate the outbreak in addition to high caseload of malnutrition and drought situation.

Similarly, there was also AWD outbreak (729 cases) and 9 (nine) deaths in East Harerghe zone and affected 95% of districts since July 2016.

Latrine coverage, utilization and safe water coverage are; 68%, 40% and 46.8% respectively in East Harerghe that may also aggravate the outbreak in addition to high cases of malnutrition and drought situation.

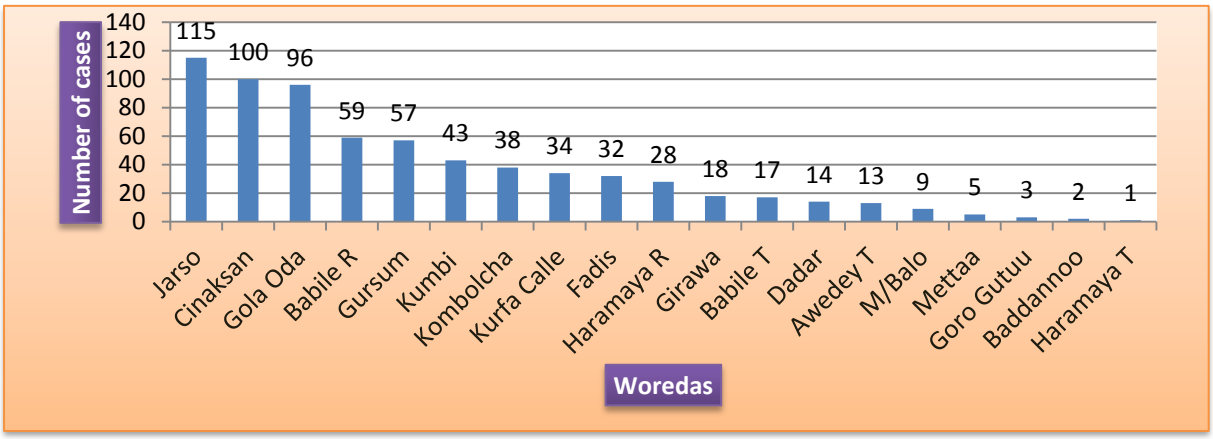


Figure 23: Distribution of AWD cases by woreda in East Harerghe Zone November 2016

Measles

Even though there were no outbreak of measles reported in both zones there were 24 and 19 cases reported in the past 6 months in West and East Harerghe zones respectively which may need special attention due to the presence of high cases of malnutrition. Routine immunization coverage for measles is 93% and 102% for West and East Harerghe zones respectively. There was no Supplementary Immunization Activities (SIA) conducted in past year in West Harerghe zone as opposed to East Harerghe zone.

Meningococcal Meningitis

There were no meningococcal meningitis outbreak during the past six months in both zones but there were 20 and 7 cases reported to zone through routine surveillance in West and East zones respectively. So, preparedness; both supplies and capacity building is necessary to overcome the anticipated cases in the coming dry season. No immunization activities against meningococcal meningitis performed during past year.

Table 30: Summary of priority epidemic prone diseases in East and West Harerghe Zones from May - October 2016

Months	Malaria		Measles		Meningitis		SAM (Severe Acute Malnutrition)	
	East Harerghe	West Harergh e	East Harergh e	West Harerghe	East Harergh e	West Harergh e	East Harer ghe	West Harergh e
May 2016	801	323	7	2	1	4	3442	2108
June 2016	798	456	7	3	1	5	3160	2308
July 2016	1307	561	1	5	1	2	2943	2125
Aug. 2016	1426	459	0	5	0	6	2762	2105
Sept. 2016	2645	335	4	5	3	2	2424	1989
Oct. 2016	2197	306	0	4	1	1	1904	1479
Total cases	**9174**	**2440**	**19**	**24**	**7**	**20**	**16635**	**12,114**

Nutrition

All woredas of East and West Harerghe zones are hot spot priority 1 according nutrition emergency classification. According to Oromia DRMC debriefing 44% of national malnutrition cases are contributed by oromia region and 32% of regional malnutrition cases are from East and West Harerghe zones only. In East Harerghe zone, 16,635 SAM cases reported in 616 OTP sites and 120 SC sites in the past six months. OTP and SC are running in all Health Posts, health centers and hospitals respectively with 100% coverage. The trend of SAM admission were decreased in both zones as compared to the same months of 2015 year due to ongoing nutritional intervention and better production in high and midland woredas in 2016 than 2015 year. **Figure 24.**

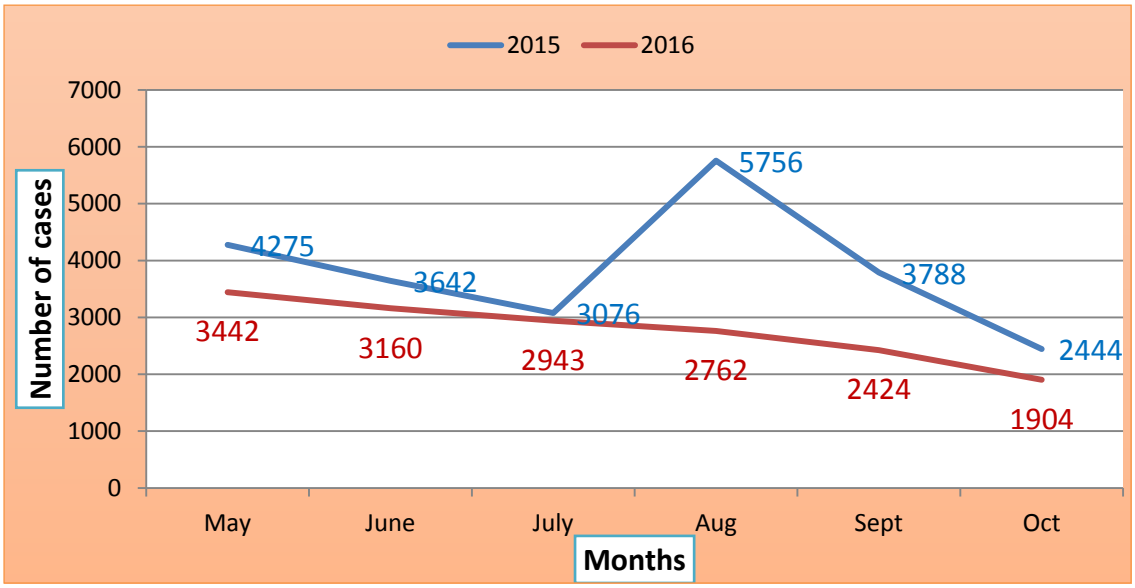


Figure 24: Comparative SAM Admission of respective six months of 2016 vs. 2015 in East Harerghe Zone, Oromia region, November 2016.

Woredas visited during assessment also have 100% OTP and SC coverage and the trend of admission is the same as zonal health office report.

In West Harerghe zone, 12,114 SAM cases reported in the past six months in 529 OTP sites (in 80 HCs and 449 HPs) and 82 SC sites (in 80 HCs and 2 Hospitals). Average Monthly and Weekly SAM admission is 2000/month and 500 /week respectively in the past six months. **Figure 25.**

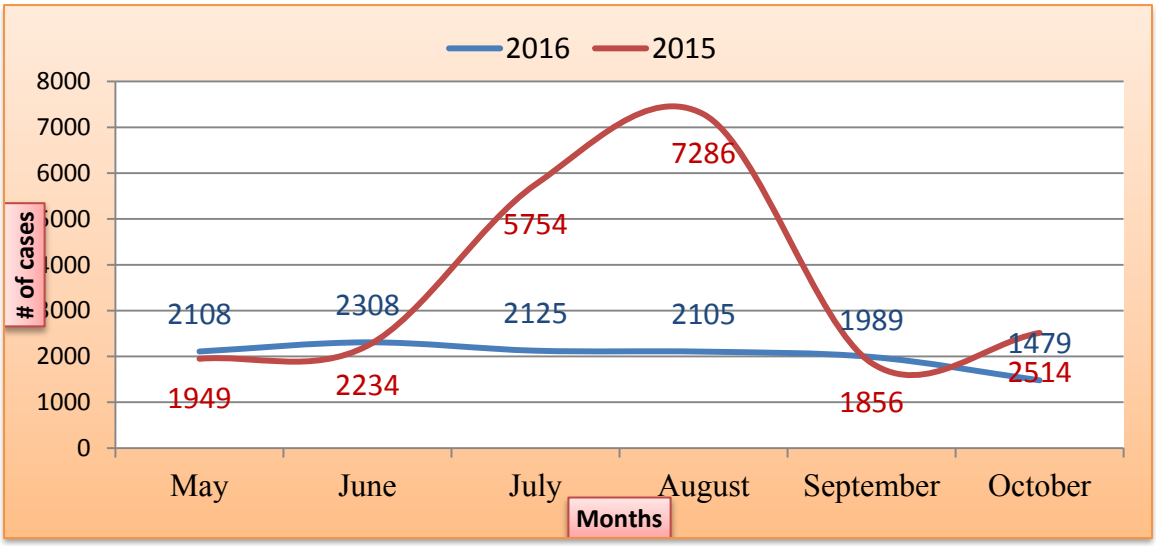


Figure 25: Comparative SAM Admission of respective six months of 2016 vs. 2015 in West Harerghe Zone, Oromia region, November 2016.

The admission and performance of the TFP was good and had achieved sphere minimum standard (recovery rate >75%, defaulter rate <15% and death rate <10%) for each month in both zones.

MAM Management

All children aged 6-59 months with MUAC 11-11.99cm, all children transferred from OTP program and other vulnerable groups, such as malnourished pregnant women and lactating women with infants under 6 months of age were managed in the TSFP.

Children are referred from OTP to TSFP when attain the transfer-discharge criteria. Also children from TSFP are linked to OTP.

Individuals with moderate malnutrition (MAM) without medical complications are supported with CSB++ Blended Food.

Two thousand two hundred sixty three (2263) children referred from OTP to TSFP in October 2016 in East Harerghe zone.

Like the SAM, the Admission of MAM cases were decreasing from May to October 2016 with the exception of the month of August where the highest number recorded due to household food depletion in this month in both zones. Figure 5.

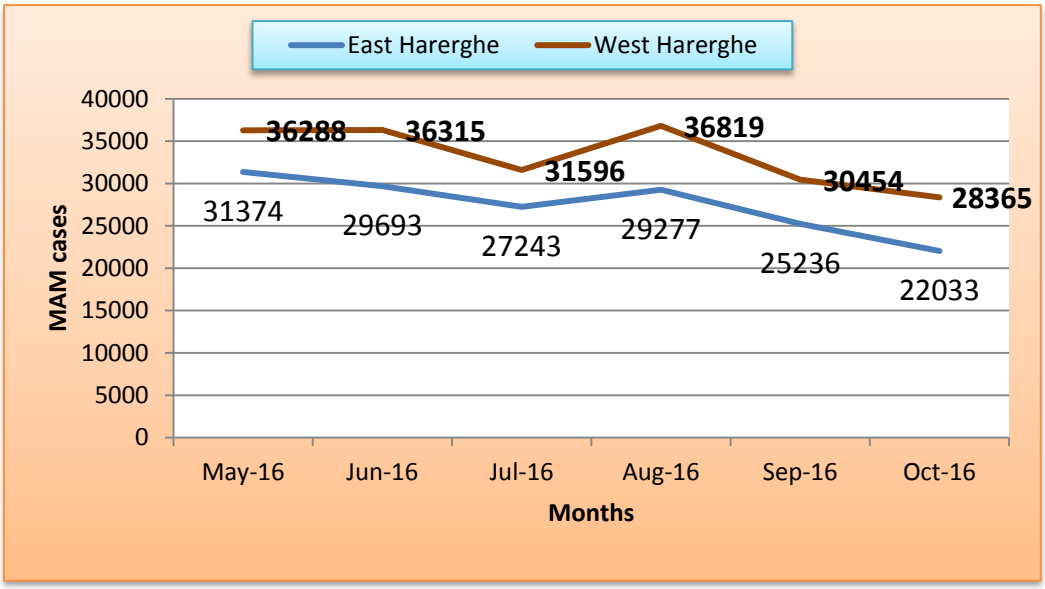


Figure 26: Trends of MAM cases in West and East Harerghe zones from May to October 2016, Oromia region Ethiopia.

Screening Performance

Screening of children 6-59 months and PLW has been well performed during the past six months (May to October 2016) making the coverage 98.6 to 100% on the monthly basis in East Hararghe Zone. The last screening conducted in October 2016, in which 529,983 (98.8%) children 6-59 months and 129628 (100%) PLWs screened. The Proxy GAM for children 6-59 months has decreased from May to July and increased in August, again from August, September to October started to decline indicating that the nutritional situation is getting slightly better. For PLWs, also the GAM reaches Peak in August and dropped again towards September and October.

In West Harerghe zone, the last screening was conducted in October with coverage of 355653(93%) and 82709(94 %) for children of 6-59 months of age and PLWs respectively. The Proxy GAM for both children 6-59 months and PLWs have decreased from May to Oct in which the last Actual percentage of GAM in the month of October for children 8. Proxy GAM rate for PLWs is 26 in October.

Proxy GAM rate has also similar trend in visited woredas except; Hawi Gudina (SAM, PLW) and Burka dimtu woreda (MAM, GAM) cases are high due to:-

- Low crop production / failure
- prevalence of concomitant diseases such as diarrhea
- delay of supplementary food supplies

Major Challenges / Gaps Observed

- There are hard to reach woredas, that affected AWD intervention during the outbreak, for example in Doba, Hawi Gudinana (West Harerghe), Kumbi, Jarso (East Harerghe)
- GAM rate near to alarming in few woredas Burka dimtu 14% & Meiso 13% (West Harerghe)
- Low crop production in Hawigudina and Burka dimtu.
- Lack of budget for health professionals working in CTC.
- CFR of AWD is 2.7% in West Harerghe, which is above acceptable (< 1 percent).
- TSFP supplies are not timely delivered to site or delayance of TSFP suplimentation (example: Guresum & Golo oda).
- Coverage of potable water supply is low in both zones; challenges the prevention and control of waterborne diseases like AWD and other diarrheal diseases.
- High cases of malnutrition in both zones in turn increased AWD cases and deaths.
- Most of HCs haven‘t water supply; has problem on SC and other services in the health facilities
- Lack of organized, uniform and complete malnutrition data between health office and DRMB
- Latrine coverage & utilization is low in both zones.

7.5 Conclusion and recommendations

Currently there is ongoing outbreak of AWD in both zones;

Therefore:

- Establishing and strengthening a functional multi sectoral PHEM forum and its PHEM preparedness and response plan in each Woreda.
- Cross border meeting with neighboring regions on AWD outbreak intervention led by national team.
- Upgrade latrine coverage & utilization.
- Improve WASH activities in collaboration with zonal, regional, national and NGO partners working in the area.

Even though admission trends of the past six months of SAM and MAM cases are decreasing in both zones;

- WFP and DRMC must continue on humanitarian support on availing food for affected woredas as significant decrease in SAM cases has observed as compared with last year.

- Zonal health office should improve the quality of monthly screening and linkage to nutrition intervention programs.
- Strengthen provision of TSF supplies monthly for MAM cases on timely basis& close monitoring mainly on screening.
- Continue coordination with DRMC and other partners on nutrition emergency response; exchange of information or screening data for early TSFP response.
- All malnutrition related data should be available and easily usable for decision-making.

7.6 References

1. Public Health Emergency Management, Guidelines for Ethiopia, Ethiopian Health and Nutrition Research Institute Public Health Emergency Management Centre February 2012 Addis Ababa, Ethiopia.

2. Emergency nutrition intervention guideline, Emergency Coordination (ENCU) of Early Warning Department of Disaster Prevention and Preparedness Commission Addis Ababa Ethiopia, August 2004.

3. Ann Rowe et.al Community Health Needs Assessment, An introductory guide for the family health nurse in Europe Part 1: A pack for practitioners.

CHAPTER EIGHT

Epidemiologic Research Project/Proposal

Prevalence and determinants of under nutrition among children 6-59 months age in Chiro Rural district, West Hararghe Zone, Oromia region, Ethiopia, June, 2017

8.1 Abstract

Under nutrition is one of the world‘s most serious but least addressed health problems. In developing countries nearly one-third of children are underweight or stunted (low height for their age). Under nutrition interacts with repeated cycles of infectious disease, causing an estimated 3.1 million preventable maternal and child deaths annually and its economic costs in terms of lost national productivity and economic growth are huge.

The objective of this study is to measure prevalence and determinants of under nutrition in study populations and guide the public health interventions in the area using cross sectional method.

The study will be conducted in September 2017 in Chiro rural district after approval and allocation of budget. Sample size for the study will be calculated by single population proportion formula assuming 45.8% prevalence of stunting in the area, 5% level of significance and non-response rate, 80% power of study, 400 mothers to child pairs is needed. The total study subjects will be divided proportionally depending on total population in four kebeles selected from district by Simple random sampling technique and the study subjects in each kebele will also be selected by simple random sampling technique. Data will be collected by standard questionnaire adopted from previous studies and pre testing in areas not included in the sample. Data collectors will be trained for two days on study objectives, methodology and anthropometric measurements. Standard instruments will be used for anthropometric measurements and daily check-ups followed for equipment. Data will be analyzed by SPSS.

The total estimated budget to complete the study is 50,043.4 ETB.

8.2 Introduction

Under nutrition is an acute or chronic condition where a deficiency or imbalance of energy, protein and other micronutrients cause measurable and adverse effects on body composition, function and clinical outcomes (1). It is also the result of undernourishment, poor absorption and/or poor biological use of nutrients consumed. In children, the outcome is growth (weight or height) faltering and/or specific symptoms and signs of micronutrient deficiency disorders (2).

Under nutrition is one of the world‘s most serious but least addressed health problems. In developing countries nearly one-third of children are underweight or stunted (low height for their age). Under nutrition interacts with repeated bouts of infectious disease, causing an estimated 3.1 million preventable maternal and child deaths annually (Black et al, 2013), and its economic costs in terms of lost national productivity and economic growth are huge (1).

Malnutrition commonly affects all groups in a community, but infants and young children are the most vulnerable because of their high nutritional requirements for growth and development. Another vulnerable group of concern is pregnant women, given that a malnourished mother is at high risk of giving birth to a Low Birth Weight (LBW) baby who will be prone to growth failure during infancy and early childhood, and be at increased risk of disease and early death. Malnourished girls, in particular, risk becoming yet another malnourished mother, thus contributing to the intergenerational cycle of malnutrition (3).

Prevalence of underweight, stunting and wasting in children less than five years is estimated by comparing actual measurements to an international standard reference population. The new WHO Child Growth Standards confirm that children born anywhere in the world who are given the optimum start in life have the potential to develop to within the same range of height and weight. Differences in children's growth to age five are therefore more influenced by nutrition, feeding practices, environment, and health care than genetics or ethnicity(4).

Under nutrition continues to be a major public health problem throughout the developing world, particularly in southern Asia and sub-Saharan Africa. It is the most important risk factor for the burden of disease in developing countries directly causing about 300,000 deaths per year and indirectly responsible for about half of all deaths in young children (5).

Causal framework for under nutrition

The most commonly used causal framework of malnutrition is UNICEF frame work for improving child nutrition. This frame categorizes causes of under nutrition as **Immediate, underlying and basic causes**. Immediate causes are direct causes such as: inadequate dietary intake or diseases. Underlying causes include; house hold food insecurity, inadequate care

and feeding practices, unhygienic house hold or environment and inadequate health services. The third and indirect cause is basic causes which include; house hold access to adequate quantity and quality of resources (land, employment, income, education, and technology), inadequate financial, human, physical and social capital and socio-cultural, economic and political context (6).

These causes have geographic variations and need to be measured at different places for specific intervention.

8.3 Literature Review

Different studies have been conducted in different areas in the country to identify determinants and prevalence of under nutrition.

Nutrition Causal Analysis (NCA) study under taken in East Hararghe zone of Ethiopia from April to August 2014 in Fedis and Kersa districts to provide understanding of the possible causes of acute malnutrition of children 6 - 59 months. Accordingly, environmental sanitation, care givers work load, short birth spacing, feeding habits, low utilization of health services were some of major causes for child under nutrition. Others such as lack of awareness, impact of climate change, diseases and etc were categorized as important causes of malnutrition (7).

A study conducted in Haramaya district indicated that prevalence of stunting, wasting and underweight among children less than five years old were 45.8 %, 10.7 % and 21 % respectively. The study also identified risk factors for under nutrition as living in rural kebles AOR= 2.45, 95 % CI (1.25-6.66), birth order 6 and above AOR =1.99, 95 % CI (1.05-3.77). Living in the lowland Kebeles, AOR = 3.29, 95 % CI(1.2-8.8) and children having diarrhea, (AOR = 2.48, 95 % CI(1.28-4.78)); mothers with Body mass index (BMI) < 18.5 (AOR = 2.17, 95 % CI(1.17-3.81)); mothers who did not have ANC visit during pregnancy (AOR = 3.47, 95 % CI (1.49-7.8) were more likely to be underweight than their counterparts (8).

A community based cross sectional study conducted in Eastern Ethiopia, Somali region Dollo Ado district revealed that the prevalence of malnutrition was high with 42.3% of the children wasted, 34.4% for stunted and 47.7% underweight (9).

A study conducted in Jimma zone in April 2015 to determine risk factors for severe acute malnutrition in less than five years children revealed that maternal illiteracy (OR=3.25, 95% CI 1.47-7.17) and birth interval less than one year (OR=4.33, 95% CI=2.09-8.94) where highly associated with malnutrition. Lack of exclusive breastfeeding (AOR=3.22, 95% CI 1.31-7.91),

monthly income less than 50$ (AOR=5.98, 95% CI 2.62-13.66), discarding the colostrum (AOR=7.30, 95%CI 2.07-16.37) and bottle feeding (AOR=2.68, 95% CI 1.26-5.70) were found to be independent predictors for the occurrence of severe acute malnutrition (10).

Study conducted in West Oromia hospitals also identified risk factors for acute malnutrition as diarrheal diseases in the previous two weeks [AOR (95 % CI) =3.94 (2.01–7.73)], mothers habit of less frequent hand washing [AOR (95 % CI) =14.39 (7.33–28.22)], did not exclusively breastfed [AOR (95 % CI) = 2.63 (1.29–4.82)], having large family sizes [AOR (95 % CI) =2.59 (1.34–5.0)], absence of latrine [AOR (95 % CI) =2.99(1.23–7.06)], illiterate mothers [AOR (95 % CI) =2.16(1.14–4.11)] and febrile illness in the previous two weeks [AOR (95 % CI) =1.89 (1.0–3.59)] (11).

8.4 Statement of the Problem

Despite the millennium development goal in many countries to eradicate poverty and end hunger, under nutrition is one of the world‘s most serious health problems.

Globally, there were an estimated 162 million children < 5 years stunted, 99 million under weight and 51 million wasting in 2012 and over 90% of the world‘s stunted children live in Africa and Asia (1).

Under nutrition weakens the immune system, stunts physical growth and cognitive development and have a lifelong and intergenerational effect on educational attainment and economic potential for individuals, families and whole nations (1).

In Ethiopia, more than two out of every five children are stunted, 28% of child mortality is attributed to under nutrition, 16% of all repetition in primary schools is associated with stunting, and the annual costs associated with child under nutrition are estimated at Ethiopian birr (ETB) 55.5 billion, which is equivalent to 16.5% of GDP (13). So eliminating stunting with such operational researches is necessary step for growth and transformation in the country.

Unpublished annual report of 2015 severe acute malnutrition by National Disaster Risk Management of Ethiopia figure out that 44% of national malnutrition cases were from Oromia region and 32% of malnutrition cases of the oromia region were from East and West Harerghe zones.

The objective of this study is to measure the prevalence and determinants of under nutrition in study subjects and guide the public health interventions in the area.

8.5 Methods and Materials

Study Area and period

The study will be conducted in Chiro district, West Hararghe zone from September - October 2017.

Study Design

Community based cross sectional study design will be employed from September 2017.

Sample size and Sampling Techniques

The sample size of the study will be calculated using single population proportion formulas and assuming 5% level of significance, 80% power of study. Using study conducted in Haramaya district as reference for prevalence of stunting in the area to be 45.8% (8) and 5% non-response rate, the sample size will be 400 mother child pairs. Four kebeles from the district will be selected by simple random sampling or lottery method. The total study participants will be divided proportionally among selected kebeles/villages depending on number of under –five year population. The study subjects in each kebele will be selected by walking to the center of kebele and spinning pencil, following the direction of tip of pencil to find first house hold with child 6-59 months age. For house hold with more than one child between 6-59 months again lottery method will be used for taking anthropometric measurements.

Data collection and analysis procedures

Data will be collected after two days brief orientation about objective of the study, methodology and anthropometric measurement for data collectors. The questionnaires will also be pre tested in 5% of study population in other areas of the study. To assess the physical growth and nutritional status of the children, measurements of height and weight will be taken of all of the children. Salter hanging spring scales with graduations of 100g and a capacity for 26 kg will be utilized for measuring the weight of the children with minimum clothing and no shoes to the nearest 0.1kg. Recumbent length measurement will be taken for children under two years of age while for children above two years stature will be measured in a standing position in centimeters to the nearest of 0.1cm.

Collected data will be cleaned and entered in SPSS software for analysis and the result of study will be disseminated to regional health bearau of Oromia, zonal health bearau of West Hararghe Chiro Rural district where data was collected as well as official local NGO‘s to act up on risk factors.

Operational Definitions

Malnutrition and adults-Malnutrition occurs when the Body Mass Index (BMI (weight/height2)) is less than 18.5

Malnutrition and children-

Acute malnutrition/wasting

- Children > 28 days and < 1 year: < -2 standard deviations (SD) for weight/age.
- Children > 1 year: < -2SD for weight/height
- All children: > 1 SD fall in growth curve in the last 3 months

Chronic malnutrition/Stunting

- All children: < -2SD for height/age
- Children < 4 years: 0.5-1 SD fall in the past year for height/age
- Children > 4 year: 0.25 fall in the past year for height/age

Variables

Dependent variable

Under nutrition (stunting, wasting and underweight) and its prevalence

Independent variables

Paternal educational status, marital status, ANC follow up, hand washing habit, breast feeding condition, complementary feeding, environmental sanitation, child sex, age, diarrhea before two weeks, birth order and etc.

Ethical approval

Ethical clearance letter will be written after approval of proposal by team at Oromia regional health bearau. Data will be collected after oral consent is given by mother or care giver. The collected data is used only for the sake of this study and important information will be kept confidential.

8.6 Work Plan

Table 31: Tentative work plan to study prevalence and determinants of under nutrition in West Hararghe zone, Ethiopia, May 2017

Activities	Responsible body	Time frame					
		July	August	September	October	November	December
Finalization of proposal & submission	PI						
Review of proposal and approval of budget	Regional research team and Stake holders						
Data collection training and pre test	PI						
Data collection	Assigned professionals						
Data cleaning, entry and analysis	PI						
First draft writing and consultations	PI & research team						
Finalizing report and dissemination	PI						

8.7 Budget

Table 32: Budget required for conducting the study of prevalence and determinants of under nutrition in West Hararghe zone, Oromia region May 2017

Items needed	Unit	Unit price ETB	Quantity Needed	Total price for quantity	Remark
Data collectors	Days	150	20	3000	
Supervisors	Days	200	5	1000	
Principal investigator	Days(20)	400	1	8000	Traveling days
Secretary	Days (7)	70	1	490	
Fuel	Liters	20	900	18000	
Deriver per diums	Days	170	20	3400	
Duplication paper (A4)	Pack	150	5	750	
Note book	Pieces	15	27	405	
Pen	Pieces	7	27	189	
Pencil	Piece	3	20	60	
Flip chart	Pieces	20	3	60	
Training hall	Days	500	2days	1000	
Perdium for data collectors	Days	150*20	2days	6000	
Perdium for supervisors	Days	200*5	2days	2000	
Perdiem for PI	Days	400	2days	800	
Deriver	Days	170	2days	340	
Total budget				45,494	
Contingency (10%)				4549.4	
Grand total				50,043.4	

8.8 References

1. Jessica Meeker, Stephen Thompson, Inka Barnett Nutrition Topic Guide October 2013, Health and Education Advice and Resolution Team
2. Addressing child under nutrition: evidence review, Austrian Government Office of Development Effectiveness and foreign affairs, March 2014
3. Blössner, Monika, de Onis, Mercedes. *Malnutrition: quantifying the health impact at national and local levels.* Geneva, World Health Organization, 2005.
4. Addressing the underlying and basic causes of child under nutrition in developing countries: what works and why?
5. Olaf Müller, Michael Krawinkel, Malnutrition and health in developing countries, Systematic review.
6. Addressing child under nutrition: evidence review; Published by the Office of Development Effectiveness, Australian Government Department of Foreign Affairs and Trade, Canberra, March 2014.
7. ACF International, 2014, Nutritional Causal Analysis, East Hararghe Zone, Fedis and Kersa Woredas, Ethiopia. August, 2014, Final Report.
8. Hiwot Yisak et.al. Prevalence and risk factors for under nutrition among children under five at Haramaya district, Eastern Ethiopia, 2015 open Access BMC.
9. Solomon Demissie, Amare Worku. Magnitude and Factors Associated with Malnutrition in Children 6-59 Months of Age in Pastoral Community of Dollo Ado District, Somali Region, Ethiopia. *Science Journal of Public Health,* Vol. 1, No. 4, 2013, pp. 175-183.
10. Habtamu Oljira, Risk factors for severe acute malnutrition in under five children in Jimma zone, Ethiopia April 2015. Downloaded from www.medrech.com
11. Amsalu Bokore Ayana et al. Determinants of acute malnutrition among children aged 6–59 months in Public Hospitals, Oromia region, West Ethiopia: a case–control study, BMC Nutrition2015**1**:34
12. Jessica Meeker, Stephen Thompson, Inka Barnett Nutrition Topic Guide October 2013, Health and Education Advice and Resolution Team.
13. The Social and Economic Impact of Child Under nutrition in Ethiopia, Summary report, EPHI, FMOH Ethiopia 2015.

CHAPTER NINE

9.1 Additional outputs

ORHB PHEM core process weekly bulletin

Biiroo Eegumsa Fayyaa Oromiyaatti Adeemsa Hojii Ijoo Hoggansa Balaa Tasaa Fayyaa Hawaasaa, Qu'annoo fi Qorannoo Fayyaa

Highlights of the Week

- **Weekly severe acute malnutrition (SAM), confirmed malaria cases and measles cases were decreased by 61 (3.4%), 239 (15%) and 11 (13%) respectively as compared to week 7 while dysentery cases were increased by 619 (38%).**
- **Acute Watery Diarrhea (AWD) cases were increased as compared to Week 7.**

I. Introduction

This bulletin serves to summarize weekly surveillance data and performance of ORHB/PHEM on epidemic prone diseases and other public health emergencies. It comprises completeness, timeliness, trends of priority diseases and response activities. It also provides feedback on surveillance activities for WHO week 7, 2017.

II. Weekly Surveillance Report

Report completeness and timeliness of government health facilities were **87%** and **96%,** respectively**.** Report completeness and timeliness of all zones and towns were above the target except for West Guji, West Arsi, Bale and South West Showa zones. Report completeness was decreased by 6% as compared to week 7**.**

Oromia Regional Health Bureau, PHEM Core Process WHO week 8/2017 Bulletin

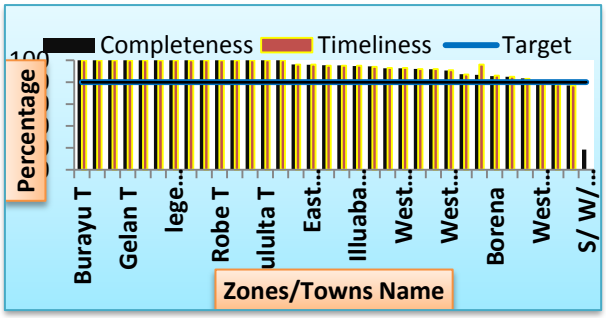


Fig. 1: Report completeness and timeliness by zones and towns, Oromia Region, week 8, February, 2017.

Regional report completeness of the past nineteen consecutive weeks were above the target except for the completeness of week 42 (72%) and 2 (79%) (fig.2).

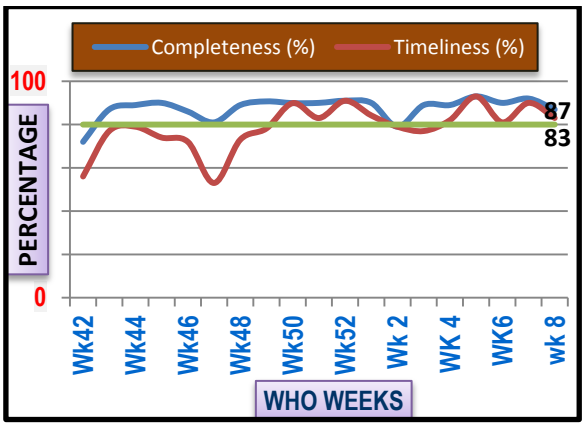


Fig.2:-Trends of regional surveillance report completeness and timeliness by week, Oromia, week 42/2016-week 8 February , 2017

III. Diseases Or conditions

1.Malaria

In this week, a total of 1382 clinical and confirmed malaria cases were reported. Among the total clinical

and confirmed malaria cases 1,376 (99.5%) of them were confirmed cases. Of the total confirmed cases, 789 (75%) of them were plasmodium falciparum. Confirmed malaria cases were decreased by 239 (15%) as compared to week 7. A total of 19097 cases were laboratory tested, yielding a positivity rate of 7.2%.

The highest number of confirmed malaria cases were reported from East Shoa 167 (12%) followed by Kelem Wollega 158 (11%), West Wollega 127 (9%) and Guji 86 (6%) zones. Woredas with slide positivity rate of > 40% are highlighted for follow up.

Table-1: Distribution of malaria case load and posativity rate reported by top malaria Zones and woredas of Oromia region by week 8, February, 2017

Zone Name / District name	Suspected Fever cases Examined by RDT or Microscopy	P.F + P.V	Positivity rate	Case proportion from region / Zones
E/ Shoa	2562	**167**	**6.5**	**12**
Fantale	391	43	10.9	
Bosat	414	26	6.3	
Adama	507	26	5.1	
Adami T/J/Kombolch	405	25	6.2	
K/ Wollega	**809**	**158**	**19.5**	**11**
Dale Wabera	**161**	**73**	**45.3**	
Gidami	115	31	26.9	
Anfillo	**48**	**22**	**45.8**	
West Wollega	**2053**	**127**	**6.2**	**9**
Mendi Hospital	128	24	18.7	
Mendi Town	122	24	19.7	
Babo Gambel	183	21	11.5	
Guji	**496**	**86**	**17.3**	**6.2**
Odo Shakiso	**61**	**33**	**54.0**	
Shakisso Town	61	16	26.2	
East Wollega	**883**	**84**	**9.5**	**6.1**
Gida Ayyana	123	13	10.6	
J/Arjo	110	13	11.8	
Leka Dulecha	**25**	**12**	**48**	
Arsi	**655**	**77**	**11.7**	**5.6**
Dodota	102	15	14.7	
Aseko	**28**	**12**	**42.8**	
Gololcha	24	10	41.6	
Region Total	**19097**	**1382**	**7.2**	

Trends of regional confirmed malaria cases in the last eleven consecutive weeks are indicated below (fig: 3).

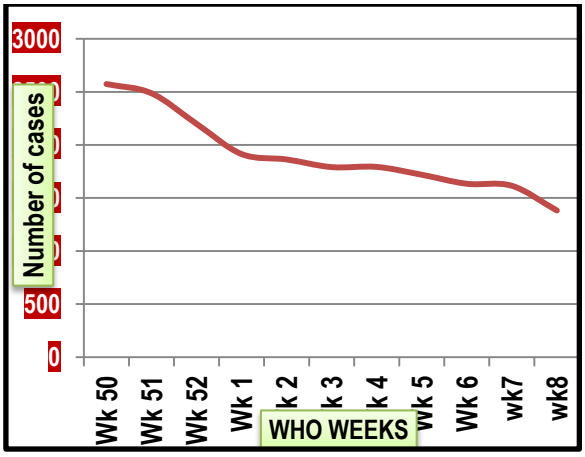


Figure 3: Trends of confirmed malaria cases by week, Oromia Region, week 50/2016 to week 8, February , 2017

2. Dysentery

In this week, a total of 2246 dysentery cases were reported. Cases were increased by 619 (38%) as compared to week 7. The highest number of cases were reported from Jimma town 792 (35.3%), Borena 135 (6.0%), East Shoa 110 (5%) and West Shoa 106 (4.7%) zones. Trends of dysentery cases for the last twelve consecutive weeks are shown below (fig: 4).

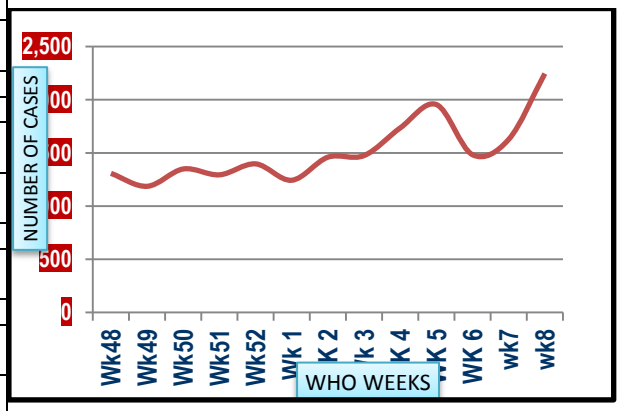


Figure 4: Trends of dysentery cases by WHO weeks, Oromia Region, week 48/2016 to week 8, February, 2017

3. Measles

In this week, a total of 73 suspected measles cases were reported to the region showing decreasing trend by 11 (13.0%) as compared to week 7. Most of the cases were reported from Jimma zone 42 (57.5%) followed by South W/Shoa and West Harerghe each 8 (10.9%). Limu Seka Woreda 35 (83.3%) and Limu Hospital 5(11.9%) from

Jimma Zone; St. Lukas hospital 8(100%) from South West Shoa Zone; and Hawwi Gudina and Miesso each 3 (37.5%) from West Hararghe zone were woredas that contributed for high number of cases. Trends of the past twelve consecutive weeks of suspected measles cases were shown below (fig: 5).

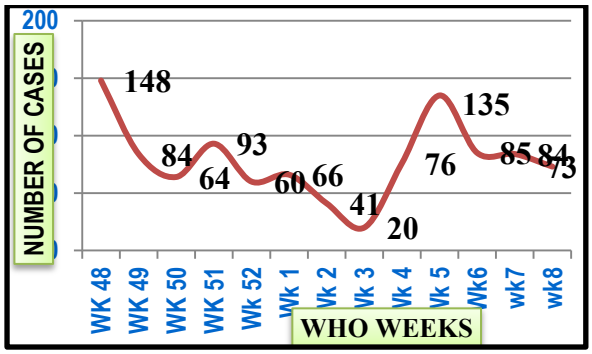


Figure 5: Trends of suspected measles cases by time, Oromia Region, week 48/2016 to week 8, February, 2017

4. Acute Flaccid Paralysis (AFP)

In this week, a total of five suspected AFP cases were reported to the region. Anfillo woreda from Kellem Wollega, Ilu Gelan from West Shoa, Kimbibit from North Shoa, Babo Gambel from west Wollega and Ambo Town reported one case each.

5. Malnutrition

In this week, a total of 1754 new severely acute malnutrition (SAM) cases were reported to the region. Of the total cases, 172(9.8%) of them were treated at stabilization center. SAM cases were decreased by 61(3.4%) as compared to week 7 (fig: 6). Most of the cases were reported from East Hararge 411 (23.4%), followed by West Arsi 209 (11.9%), West Hararghe 202(11.5%), Bale 176 (10.0%), Guji 166 (9.5%), and West Guji 139(7.9%). Gola Oda 97 (23.6%), Girawa 54(13.1%) and Fedis 37 (9.0%) from East Hararge zone; Shashmane Rural 104 (49.7%), Shalla 65 (31.1%) and Wondo 7(3.3%) from West Arsi; Chiro Rural 36 (17.8%), Gemmechis 28 (13.8%) and Oda Bultum 21 (10.4%) from West Harerghe Ginir 31(17.6%), Dolo Mena 30 (17.0.1%) and Sawena 23 (13.0%) from Bale zone; Uraga 25(15.0%), Goro Dola 23 (13.8%) and Wadara 21 (12.6%) from Guji zone; and Kercha 32 (23.0%), Hanbala 26 (18.7%) and Bule Hora 20 (14.4%) from West Guji zone; were woredas that reported high case load.

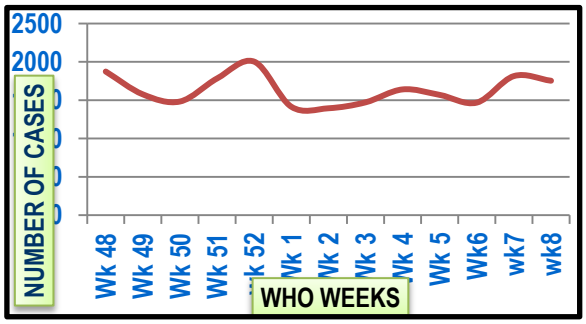


Fig 6: Trends of regional SAM cases by time, Oromia Region, week 48/2016 to week 8, February, 2017

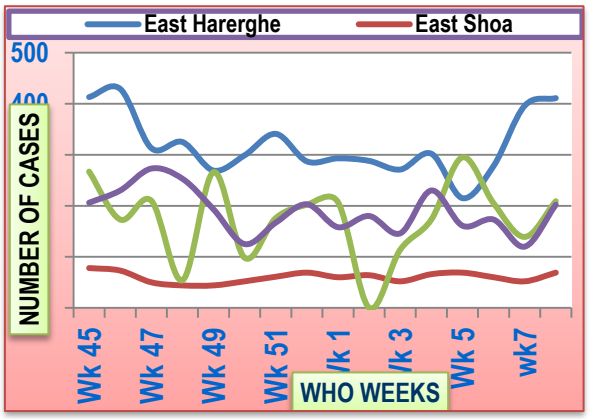


Fig 7: Trends of SAM cases of some selected zones, by WHO week,45/2016 to week 8/2017 Oromia Region, February, 2017.

6. Meningococcal Meningitis

In this week, a total of 16 suspected meningococcal meningitis cases were reported to the region. Cases were reported from Gelamso Hospital 4, Chiro Hospital 2 (West Harerghe), Jimma town (3), Seka Chokorsa woreda 1, Limmu Hospital 1 (Jimma zone), Bule Hora hospital 2 (West Guji).

7. Anthrax

In this week, two suspected anthrax cases were reported to the region from Ziway Dugda woreda of Arsi zone.

8. Relapsing Fever

In this week, seven Relapsing fever cases were reported to the region from Adama Town 4, Dama woreda of Guji zone 2 and one case from Yabelo town of Borena zone.

9. Maternal Deaths

In this week, a total of eleven suspected maternal deaths were notified.

Three maternal deaths from Guji zone (Goro Dola 2 and Uraga 1), two from West Wollega zone (Aira hospital and Nedjo Rural), Jimma zone O/Beyan woreda, West Arsi Kokosa woreda, North Shoa Wuchale woreda, Bedele hospital, Assella town and Chiro hospital each of them reported one maternal death.

10. Acute Watery Diarrhea (AWD) Cases

Regionally, since the occurrence of AWD outbreak, a total of 5,969 suspected cases were reported up to WHO week 8/2017; where 14 zones, 13 administrative towns and 115 districts have been affected while 109 of them were declared as free of AWD outbreak except six woredas: Berbere, Goro, Harena Buluk, Delo Mena, Dawe Kachen of Bale Zone and Siraro woreda of W/Arsi Zone. In this week, a total of 64 new AWD admissions and zero death were reported from Bale zone (44 from Goro woreda, 18 from Berbere, and 2 cases from Dawe Kachen woreda).

11. Guinea Worm (GW)

In this week, zero Guinea Worm case was reported.

12. Typhoid Fever

In this week, a total of 7004 suspected typhoid fever cases were reported to the region. Cases were increased by 358 (5.4%) as compared to last week report. Most cases were reported from West Wollega 1019 (14.5%), Nekemte town 605 (8.6%), East Shoa 463 (6.6%), and West Arsi 451(6.4%) zones.

14. Other cases

In this week, a total of 257 scabies, 124 gastroenteritis cases, nine animal bites and one suspected chicken pox were reported to region.

IV. Response Activities

- **Based on weekly surveillance report, feed-back is often given to all zones and towns timely.**
- **AWD situation is being monitored by taking daily report of active cases from affected zones.**
- **AWD prevention and control activities have been underway in all active woredas by regional, zonal and woreda expertise.**
- **Health and nutrition taskforce meeting is conducted every two weeks regularly with partners and challenges have been alleviated.**
- **Any rumors have been received, verified and risks have been communicated timely.**

N.B. This bulletin is attached here only to show how it was performed. However, there were 4 bulletins performed by aforementioned resident.

9.1.2 Training of zonal PHEM focal persons and media and communication experts at Adama town

Three days training of oromia region PHEM focal person, media and communication experts was also conducted on priority epidemic prone diseases and surveillance to increase the awareness of media and communication experts and hence reach to the community in different channels. I also prepared slide presentation on Measles disease causes, symptoms, transmission, prevention and current situation of measles in the region.

Oromia Regional Health Bureau Training Proposal on Major Epidemic Prone Diseases and WASH for zonal and regional Media Experts, Oromia region, 2017

Introduction

The burden of disease in our country is mainly due to preventable communicable diseases, which are the common causes of morbidity, mortality & disability. The National health Policy gives due attention to the control & prevention of preventable communicable diseases and epidemic prone diseases as well. However, currently outbreak of Measles, Meningitis, Malaria, Malnutrition and AWD has been occurring in our region. In addition, there is a gap to effectively communicate on the prevention and control of those outbreak prone diseases for the general community.

The best strategy to prevent & control of those outbreaks is to strengthening surveillance as it provides evidences on which to base decisions on public health interventions and effectively deliver prevention and control messages for the general community.

Therefore, in order to achieve effective disease surveillance system and communication in our region providing awareness creation workshop on those listed outbreak prone diseases and WaSH strategy for zone and regional media personnel is crucial.

Objectives of the Training

To fill the capacity of media personnel and News agency on basic public health priority diseases and WaSH program which helps to deliver SMART message on the prevention and control of those outbreak prone diseases for general community.

Selection criteria

1. From Each Zone and Town Administration, Deputy Head of Zonal Health Department and one expert from Zonal Communication Department will be selected to participate in the training.
2. In addition, participants will be invited from; Oromia TV, Fana, Education Media, Oromia Education Bureau and News agency found in Oromia region (Gazexa Oromia, Kallacha Oromia, Gazeta Barissa).

Methods of the Training

- The methods of conducting the training will involve introductory presentation by facilitators, small group discussion, group presentation and discussion at plenary sessions with the whole group.
- Facilitators will present a detail presentation on each topic (Measles, AWD, Malaria, Meningitis, Nutrition and WaSH).
- Each participant will receive a complete set of the training material.

Result

A total of 131 participants were engaged in the training and the training was completed with active participation for three days. The presenters were from UNICEF, WHO and ORHB PHEM experts. The topics covered were: AWD/cholera, Measles, Malaria, Malnutrition, Scabies, MDSR, Rota virus, WASH, social mobilization and communication for development.

10.1 List of Annexes used in the data collection for all outputs

10.1 AWD outbreak investigation Questionnaire

Consent Form

Title: Suspected Acute Watery Diarrhea Outbreak Investigation Goro district, Bale zone ,Oromia, Ethiopia, January 2017G.C

Introduction: Hello, my name is..... . I am a member of AWD outbreak Investigation team. Thank you for taking the time to speak with us today. We are investigating AWD outbreak occurred in Abaya woreda of Borana Zone. We are very interested in your experiences and your point of view.

Purpose: To identify etiologic agent and assess the risk factors of AWD outbreak in _____ woreda of Bale Zone.

Procedure: If you agree to take part, this interview will take about 30 minutes of your time. There are two parts. First, we will ask you about demographic information of you and your family, knowledge you have on acute watery diarrhea, your history of acute watery diarrhea, water, sanitation and hygiene information and your feeding practice.

Second, we will ask you for a stool and drinking water samples to test for acute watery diarrhea causative agents in your stool and drinking water. We need only small amount of samples. The samples will be tested at Abaya Health Center and Ethiopian Public Health Institute using a code so that no one will know about your results. All information collected during this study will be kept private and will only be known by the investigators.

Benefits: this project will help you and other people living in _____Woreda. We will use these results to prevent and control AWD outbreak in the woreda.

Risks: there is no risk to you from answering the questions or allowing us to take water and stool samples.

Privacy: we will keep information about you private. We will not collect your name. Only the investigators will have access to the data and only for investigation purpose. We will not use any information that might identify you when we present or publish the study‘s results.

Payment: there is no cost to you for being part of the project. The approximate time that this study will take is 30 minutes. There will be no involvement past today.

Participant Agreement: The project has been explained for me and my house hold members. I have been given a chance to ask questions. I feel that all my questions have been answered. Being in this study is my choice. I may change my mind and leave the study any time during the interview.

AWD Outbreak investigation Questionnaire in Goro district , Bale zone Oromoia Region February 2017 **ID Number_____**

No.	Question	Coding Classification | 132
1.1	Status	1 Case 2. Control
1.2	Responder	_____
1.3	Address	Region_____ Zone_____ Woreda_____ Kebele_____Got_____House No_____
1.4	GPS coordinate of the house	Latitude Longitutde
1.5	Ethnicity	1.Oromo 2.Somale 3.Tigre 4.Gurage 5.Amhara 6.Wolayita 8.Other(Specify)_____
1.6	Age	_____ Year (s) _____Month(s)
1.7	Sex	1.Male2.Female
1.8	Occupation	1.Farmer 2.Merchant 3.Student 4. House wife 5.Unemployed 6. Pastoralist 7. Gov't Employee 8.Private Employee 9.Daily Laborer 10. Not applicable 11.Other_____
1.9	What is your religious	1. Orthodox 2. Protestant 3. Muslim 4.Catholic 5. other_____
1.10	What is your marital status?	1. Single 2. Married 3.Widowed 4.Divorced 5. NA
1.11	Level of Education	1.Illiterate 2.Read and writing only 3.Elementary school(1-8) 4.Secondary School(9-12) 5.Tertiary School(college+)
1.12	How many family members residing with you?	_____
1.13	Do you know acute watery diarrheal disease?	1.Yes2.No
1.14	How do you think acute watery diarrheas transmit from person to persons (none proving)?	1.Contaminated food 2.Contaminated water 3.Contact with patient 4.Other(specify) _____
1.15	What are you doing when you face acute watery diarrhea (none proving)?	1. Go to health facility 2.Seek traditional healer 3.Use ORS 4.Use holy water5. stay at home 6. Other(specify)
1.16	Do you think AWD treatment center is source of infection/possible risk factor for AWD transmission?	1.Yes 2.No 3. I don't know
1.17	Do you think AWD is preventable disease?	1. Yes 3. I don't know2.No
1.18	How do you prevent AWD (none proving)?	1.Using toilet 2.Eating cooked food 3.Using purified water 4.Hand washing 5.Vaccine 6.Other(specify) _____
1.19	How often do you wash your hands in a day?	1. Before eating 2. After visiting latrine 3.After washing child's defecation 4. After contact with dirty materials 5.

No.	Question	Coding Classification | 132
		After Salat 6. others
1.20	Have you ever been sick of AWD?	1.Yes2.No
1.21	How many times you were sick of AWD in the last one year?	1.Once 2.Twice 3.More than two times
1.22	Date and year of last sickness with AWD?	_____dd/mm/yyyy99. I don't know
1.23	Where did you get treatment (none proving)?	1. At health facility 2.At home3.At holy water site 4.Traditional healer 5. Others,_____
1.24	How long you were sick of the diseases?	_____days
1.25	Was there sick family member of AWD in the past 5 years with the same complaints?	1. Yes 2.No 3. Not Applicable
1.26	Age and sex of family members affected.	1.___M/F __ 2 __M/F___ 3.__M/F____ 4. __M/F ____ 5.__M/F ____
1.27	Was there death in your family due to AWD in the past 5 years?	1.Yes2.No
1.28	Do you have history of acute watery diarrheal disease recently?	1.Yes 2.No
1.29	When did the symptoms begin?	_____ dd/mm/yyy _____hour
1.30	Frequency of defecation per day	_____times
1.31	Do you have the following symptoms?	1.Watery diarrhea 2.Vomiting 3.General body weakness 4.Loss of consciousness 5.Muscle cramp 6.Other(specify)_____
1.32	Have you been treated with antibiotic for your recent complaints?	1.Yes 2.No
1.33	What antibiotics did you take?	1. _____ 2. I don't know
1.34	Where did you take the antibiotics?	_____
1.35	Where did you admit	1. CTC 2. Hospital 3. Private clinic 4. Others (specify), _____
1.36	Is there any sick other person in your house?	1. Yes 2. No
1.37	If yes, is that before or after your symptoms began?	1, Before, 2 After 3. At the same time
1.38	Is there AWD sick person in your village?	1. Yes 2. No 3 I don't know
1.39	Did you have contact history with the same compliant in the past 5days before your symptoms onset	1.Yes2.No
2.	**Travel and Exposure History**	
2.1	Did you travel in the past 5 days outside of your village before your symptoms onset?	1.Yes 2.No
2.2	If, yes where	_____
2.3	Did you participate in funeral ceremony of AWD death	1.Yes2.No
2.4	When did you participate in funeral ceremony of AWD death	_____dd/mm/yyy
2.5	Where did you participate in funeral ceremony of AWD death	_____
2.6	Did you attend other public ceremonies /events(weeding, religious, bather , telethon)	1.Yes 2.No
2.7	2.8 What kind of food did you served at the ceremonies/ event?	2.9 _____
2.10	What kind of drink did you served at the	

No.	Question	Coding Classification | 132
	ceremonies/ event? (if water mention sources)	_____
2.11	Where do you defecate?	1. Toilet2. open field
2.12	If answer to Q6.1 is ―toilet" who own it?	1. Private `2. Communal 3. Public
2.13	show me the toilet	1. Clean 2.Unclean 3.Ventilated 4.Sign of utilization
2.14	If the answer to question number 6.1 is OFD, can you tell me the reason?	1. No toilet 2. Culture 3.Bad odor 4. Fear of falling down 5.Too far from my house 6. Physically damaged (toilet) 7.Other(specify)_____
2.15	Is there facility to wash your hand after defecation near toilet?	1.Yes 2.No
2.16	When do you wash your hand (none proving)?	1.After toilet 2.Before food 3.After cleansing child 4.Before preparing food 5.Before feeding child 6.Other(specify) _____
2.17	What items are you using for hand washing?	1. Plain water 2. Soap 3. Ash 4.Other(specify)_____
2.18	What is the water source for your house hold for drinking purpose?	1. Pipe water 2.Spring 3.Hand dug well 4.Deep well 5.Pond 6.River 7. Lake 8. Bottled water 9.Other(specify) _____
2.19	What is the water source for your house hold for washing utensils?	1.Pipe water 2.Spring 3.Hand dug well 4.Deep well 5.Pond 6.River 7.Lake 8.Other(specify) _____
2.20	What is the water source for your house hold for cooking food?	1.Pipe water 2.Spring 3.Hand dug well 4.Deep well 5.Pond 6.River 7.Lake 8.Other(specify) _____
2.21	How many hours/minutes will take you or your family to fetch water from the water source?	_____hours _____minute 98. I cannot estimate
2.22	What type of container are you using to fetch water from the source?	1.Jerry cane 2.Bucket 3.Ensira(Gan) 4.Other(specify) _____
2.23	What type of water container are you/your family is using in your house for storage?	1.Jerry cane 2.Bucket 3.Ensira(Gan) 4.Rotto 5. Other(specify) _____
2.24	How was the water accessed from the storage container?	1.Pour 2.Dip with cup 3.Other(specify)_____
2.25	Does the container have cover/lid (observe)?	1.Yes2.No
2.26	Do you clean your water containers regularly?	1.Yes2.No
2.27	What materials do you use to wash your water containers?	1.Soap 2.Only water 3.Ash 4.Other(specify) _
2.28	How often do you wash your water containers?	1.Every day 2.Every other day 3.Once per week 4.Other(specify) _____
2.29	Do you think the water you are using is safe?	1.Yes2.No
2.30	Could you purify the water?	1.Yes2.No
2.31	What methods of water purification do you use (none proving)?	1.Boiling 2.Filtration 3.Sedimentation 4.Water chemicals 5.Other(specify)_____
2.32	For what purposes do you purify water (none proving)?	1.For drinking 2.For cooking 3.For washing hand 4.For cleaning food utensils 5.Other(specify) _____
2.33	Is there water purification chemical available in your community?	1.Yes2.No

No.	Question	Coding Classification | 132
2.34	What is the cultural food in your area?	1.Rice 2.Enjera with wot 3.Porridge 4. Bread 5. Other(specify) _____
2.35	Do you eat raw/uncooked food?	1.Yes2.No
2.36	In the past 5 days of your symptoms onset what kind of uncooked food did you eat?	1. Raw meat4. Raw green vegetables 2. Raw tomato 5. Raw fish meat 3. Raw milk 6. Other(specify) _____
2.37	What kind of cooked food did you eat in the past 5 days of your symptoms onset?	1.Enjer with wot 2.Roasted meat 3.Other(specify) _____
2.38	Do you re-heat cooked food if not eaten immediately?	1.Yes 2.No
2.39	Where do you keep the cooked food?	1.Room temperature 2.Refrigerator 3.Other(specify) _____
2.40	What are you doing with the leftover foods (none proving)?	1.Reheat and eat 2.For domestic animals 3.Giving for beggars 4.Street children 5.Dump in waste substance 6.Other(specify) _____
2.41	Is there fish supply in your village?	1.Yes 2.No
2.42	Do you eat raw fish?	1.Yes 2.No
2.43	Did you eat food from other house in the past 5 days of your symptoms	1.Yes2.No

10.2 Measles outbreak investigation questionnaire in Bale zone, Harena Bulluq district

Questionnaires for Case - control study on Measles outbreak in Harena Bulluq Woreda, Bale zone Zone, Oromia Region, Ethiopia, January 2017.

Case status: Case _____, Control_____

Case/Control Name_____, Date of Data collection_____

Region_____ Zone_____ Woreda_____ Kebele _____ Got _____ Phone_____

Socio-demographic Characteristics

S. No	Questions	Alternatives
1.1	Sex	1. Male 2. Female
1.2	Age	years_____ Months_____
1.3	Occupation of the patients	1. Farmer 2. Housewife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.4	Family Occupation	1. Farmer 2. Housewife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.5	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. Other (specify)_____
1.6	Ethnic group	1. Oromo 2. Tigre 3. Amhara 4. Other (specify)
1.7	Educational level of the patient	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.8	Educational level of the family	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.9	Marital status	1. Single 2. Married 3. Divorced 4. Widowed

		5. Separated, 6 N/A
1.10	Family size	_____
1.11	Is there any sick person with rash, fever, running nose/conductivities (illness)? In the family?	1. Yes 2. No
1.12	If yes, number of sick person	_____

II. Clinical History of Diseases:

2.1	What was the symptom?	1. fever 2. Rash 3. cough, 4. coryza (runny nose), 5. conjunctivitis (red eyes) 7. Ear discharge 8. pneumonia 10. Vomiting 11. Others_____
2.2	**ONLY if complication**	a) Pneumonia:☐ yes no ☐ b) Cornea: ☐ yes no ☐ c) Blindness : ☐ yes no ☐ d) Convolution ☐ yes no ☐ e) Otitis media (ear discharge): ☐ yes no ☐ f) diarrhea : ☐ yes no ☐ g) Feeding problem☐ yes no ☐
2.2	Date of rash on set	__/__/____
	Duration of rash_____	
2.3	Date seen at health facility	__/__/_____
2.4	Did you (he/she) take treatment?	1. Yes 2. No
2.5	If yes, treatment taken	1.ORS 2. Antibiotics 3.Vitamin A

		4. Supplementary food 5. TTC ointment 6. Anti pyretic 7. Others given_____
2.6	Location when rash started.	District_____Kebele_____
2.7	Status of the case patient after treatment	1. cure 2. partially 3. deteriorated/disabled 4. death
2.8	Did you visit health facilities? ☐ yes no ☐, if yes date	____/____2013
2.9	Illness duration before visiting the health facility	_____ in days/hours

III. Risk factors

3.1	Did you ever vaccinated for measles?	1. Yes 2. No 3. Unknown 4. Not applicable
	If yes last vaccination date	1. patient recall_____ dd/mm/yy 2. vaccination card_____ dd/mm/yy
3.2	Number of vaccine doses received	1. one dose 2. two dose 3. three and above
3.3	Age of vaccination at first vaccinated.	_____
3.4	If not vaccinated why?	☐ lack of knowledge about vaccination campaign, ☐ absence during vaccination campaign, ☐ other, specify

3.5	Did you have any travel history 7-18 days to areas with active measles cases before onset of symptoms?	1. Yes 2. No If Yes where _____
3.6	Did you contact with a person with measles symptoms within the last 2-3 weeks?	☐ yes ☐ no
3.7	Do you have any travel history four days before and after rash onset	1. Yes 2. No If yes where _____
3.8	Do you have any contact history with someone else four days before and after rash onset	1. yes 2. No If yes with whom_____
3.9	If Yes to question 3.5 place of travel	1. School 2. Neighbor 3. Market 4. Other_____
3.10	Do you know modes of transmission for measles?	1. Yes 2. No 3. If yes specify_____
3.11	Did you ever have measles infection?	1. Yes 2. No 3. Don‘t know
3.12	Nutritional status of the cases	1. Normal 2. Moderate 3. Severely malnourished
3.14	What is the estimated area of the house?	_____
3.15	House condition?	☐ ventilated ☐ not-ventilated
3.16	Distance from house to HC?	☐ greater than 5 km ☐ equal or less than 5 km
3.17	Where did you go first when you get ill?	1. Health Facility 2. Traditional Healers

		3. Holy Water 4. Stayed at home 5. Other :(Specify)_____
3.18	How do you think people get measles?	1. Contact with a virus from ill person 2. From God 3. Bad attitude of other people 4. Other(Specify)
3.19	Do you Know measles is vaccine preventable?	1. Yes 2. No 3. Don‘t Know
3.20	Whom do you think can be affected by measles?	1. Children of aged less than 5 years 2. Children of aged less than 18 years 3. Women of any ages 4. Any age groups of both male and women 5. Other (specify):_____
3.21	How do you think measles can be cured?	1. Using modern medicine 2. Using traditional Medicine 3. Holly water 4. By feeding nutritious foods 5. Keeping the sick person indoor 6. Other(Specify)_____

10.3 **Questionnaire for evaluation of surveillance system Western Wollega Zone, Oromia, Ethiopia March, 2017**

1. Zonal Level Questionnaire

Region _____ Zone_____ Woreda _____ # of Hos._____ # of HC____ # of HP _____ # of Private HF_____

Total population _____ urban _____ rural _____ Male _____ Female _____ , < 15 yrs.

Respondent_____

Interviewer: _____

Date_____

General

1. Is there a national manual for surveillance? Yes/ No

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

3. Do you have standard case definitions for the Country's priority diseases like AWD, AFP polio), malaria, RF, typhoid fever, Epidemic fever, malnutrition and measles? Yes / No

4. If yes, **Obs** [1 to n priority diseases] is the standard case definition for each priority disease like malaria, measeles, meningitis ..._____

5. Is the central level responsible for providing surveillance forms to the health facilities? Yes/

No

6. ***If yes***, have you lacked appropriate surveillance forms at any time during the last 6 months?

Yes / No

7. What are the reporting health facilities for the surveillance system?

a. Public health facilities b. NGO health facilities

c. Military health facilities d. Private health facilities

e. Others_____

8. Number of total districts that has reported weekly and immediately report in the last 3 months compared to expected number? _____

9. Number of Health post, Health centers, Hospitals, NGO health facility, Others (private) sent weekly report in the last three months compared to expected number?

Weekly: _____

Immediately: _____

10. Number of weekly reports received on time: ____/12 times the number of woredas

11. Was there any report of the immediately reportable diseases in the past 1 month?

Yes/ No

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

than 1 hours b. 2-12 hours c. 1- 2 days d. 3- 7 days e. After 1 week

13. How do you report to the next high level and receive from districts? a. Mail b. Fax C. telephone d. Radio e. Electronic f. Other

14. Does the zone level describe data by person (case based, outbreaks, and sentinel)? Yes/ No

If yes, (Obs) Observed description of data by age and sex

15. Do you describe data by place? Yes/No

16.Do you describe data by time? a. yes b. no c. don't know

If yes, observe description of data by time:

_____

17. Do you perform trend analysis? Yes/ No

If yes, Obs, line graph of cases by time and list disease(s) for which line graph is

18. Observed a._____ b._____ c._____ d._____ e._____

19. Does the zone have an action threshold defined for Measles and malaria? Yes / No

20. Who is responsible for the analysis of the collected data? _____

21. . How often do you analyze the collected data?

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

22. Do you have an appropriate denominators established? Yes / No

23. **If yes, Obs** presence of demographic data (E.g. population by woreda and hard to reach groups)

Outbreak Investigation

24. Is there any outbreak in the zone in the last year? Yes/No

If no, skip to Q # 30

If yes, number of outbreaks investigated:_____

25. List of diseases:_____.

26. Number of outbreaks investigated and which risk factors were looked for:_____.

27. Number of outbreaks in which findings were used for action [Observe report] _____

28. Number of woredas that looked for risk factors [observe in reports]

29. Number of woredas that used the data for action [observe in final report] _____

Epidemic preparedness(relevant for epidemic prone diseases)

30. Does the zone established epidemic management committee? Yes/No

31. Do you have plan for epidemic preparedness and response? Yes/No

If yes, Obs, a written plan of epidemic preparedness and response

32. Has the zone had emergency stocks of drugs, vaccines, and supplies at all times in past 1 year? Yes/ No

33. Has the zone experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? Yes/ No

34. Does the standard case management protocol for malaria and measles exists in all health facilities? Yes/No

35. Is there a budget line for epidemic response? Yes / No

If **yes, Obs**. minutes (or report) of meetings of epidemic management committee

36. Does the zone have a rapid response team for epidemic? Yes/ No

Response to epidemics

37. Does the epidemic committee responded within 48 hours of notification from zone level? Yes/No

If yes, Obs(from written reports with trend and intervention)

Feedback

38.Does a report is regularly produced to disseminate surveillance data from the zone? Yes/No

If, yes Obs: the presence of a report of **s**urveillance data

39. How many feedback reports has the zone level produced in the last year?_____

Supervision

40. Did you conduct supervision last 6month? Yes/No

41. If yes, how many supervisory visits have you made in the last 6 months?____

42. If no, what is reasons for not making all required supervisory visits.

_____

_____

_____

Training

42. Have you received any post-basic training in epidemic management? Yes/No

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

Training tittle time place trainer/organizer

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

43. How many of your staffs trained in surveillance? _____

Resources

44. For data management

a) Computer & Printer Yes No

b) Photocopier Yes No

c) Data manager/secretary Yes No

d) Statistical package Yes No

45. Communications availability

a) Telephone service Yes No

b) Fax Yes No

c) Radio call Yes No

d) Internet Yes No : If yes, connections availability ;Yes No or private or government.

Surveillance

46. Is there a budget line for surveillance in zone? Yes No

If yes, is it sufficient Yes No

47. If No, what option did you use at zonal level?_____

How could surveillance be improved? _____

_____.

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

a._____

b._____

c. _____

Woreda (Intermediate Level) Questionnaire

Woreda_____

Respondent_____

Date _____

Interviewer _____

General Information

1. Is there a national PHEM /IDSR Guide line Or manual at this site? Yes/No

If yes, **Obs** national PHEM /IDSR Guide line/manual:_____

2. Does the woreda have the **capacity** to transport specimens to a higher level lab? Yes/No

If No, Reason _____

3. Does the woreda have guidelines Or SOP for specimen collection, handling and transportation to the next level? Yes / No

4. Have you lacked forms recommended for the country's priority disease at any time during the last 6 months? Yes/ No

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

Weekly: _____ /12 times the number of health facilities

Immediately: _____/ times the number of health facilities

6. Number of weekly reports submitted on time: ____/12 times the number of health facilities (**On Monday)**

7. Number of immediately reports submitted on time: _____/3 times the number of health facilities (**within 30minutes of events)**

8.How do you report Weekly or immediately to the next level?

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

9. How can reporting system be improved?

_____

___

_____.

10. Did you analysis IDSR data? Yes/No

a) If yes, Is data describe by person for any case based, outbreaks or sentinel? Yes/No

If yes, Obs description of data by age and sex

b) Is description of data by place (locality, village, work site etc)? Yes / No

If yes, Obs. description of data by Place

c) Is the description of data by time? Yes/ No

If yes, observed description of data by time?

11. Is there a trend analysis for the following disease?

a) Malaria Yes/ No

b) Measles Yes/No

If yes, **Obs**. line graph of cases by time

12. Do you have an action threshold for any of the country priority diseases? Yes/ No

If yes, what is it? _____cases _____% increase _____rate

(Obs for 2 priority diseases)_____

13. Do you have appropriate denominators? Yes/ No

If yes, Obs. demographic data at site (E.g. total population by village, <5 yrs,---)

14. Who is responsible for IDSR data analysis? _____ ___

15. How often do you analyze the IDSR data?

a. Daily b. Weekly c. Every 2 weeks

d. Monthly e. Quarterly f. As needed……..

Outbreak investigation

16. Is there any Outbreak or suspected in the woreda in the past year /6 months? Yes/No

If yes, number investigated_____ (Observe reports and take copies if possible)

Epidemic preparedness

17. Does the woreda has epidemic preparedness plan? Yes/No

If, yes,(**Obs)** a written plan of epidemic preparedness and response.

18. Has the woreda had emergency stocks of drugs and supplies at all times in past 1 year? Yes/No

If yes, Obs, Observed the stocks of drugs and supplies at time of assessment

19. Has the woreda experienced shortage of drugs, vaccines or supplies during the most recent

epidemic (or outbreak)? Yes/ No

20. Is there a budget line or access of funds for epidemic response? Yes/ No

21. Does the woreda have a rapid response team for epidemics? Yes/No

If yes, **Obs**Observed minutes (or report) of meetings of epidemic management

22. Did epidemic response team evaluated their preparedness and response activities during the past year? Yes/ No

If yes, (observe written report to confirm)

Responses

23. Has the woreda implemented prevention and control measures based on local data for at least one reportable disease or syndrome? Yes/No

24. Percent of epidemic that responded by woredas within 48 hours of notification of most recently reported outbreak?_____

Feedback

25. How many feedback written reports has the woreda produced in the last year?_____

ObsObserved the presence of a written report that is regularly produced to disseminate

Supervision

26. Did you supervise the health facilities in the last 6 month? Yes/No

If yes, how many times have you been supervised in the last 6 months?_____

(Obs supervision report)

27. If No, the most usual reasons for not making all required supervisory visits.

(Text)

Reason 1_____

Reason 2_____

Reason 3_____

Training

28. Have you been trained on PHEM/IDSR disease surveillance? Yes/No

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

Training tittle	time	place	trainer/organizer
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

29. What percent of your staffs in the woreda trained on PHEM/IDSR surveillance?____%

Resources

30. Logistics Available

a) Bicycles Yes/No

b) Motor cycles Yes/No

c) Vehicles Yes/No

d) Stationery Yes/No

e) Computer & Printer Yes/No

31. Communication available

a) Telephone service Yes/No

b) Fax Yes/No

c) Radio Yes/No

d) Computers that have modems Yes/No

32. Information education and communication materials

a) Posters Yes/No

b) Megaphone Yes/No

c) TV Screen Yes/No

d) Projector (Movie) Yes/No

39. Availability of hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

Surveillance

40. Is there an IDSR focal person in the woreda epidemic management committee? Yes/ No

41. Are you satisfied with the current surveillance system? Yes /No

If no,why? _____

Surveillance Attributes

I. Simplicity:

1. Is the case definition easy for case detection by all level health professionals? □ Yes □ No

2. Does the surveillance system allow all levels of professionals to fill data? □ Yes □ No

3. Does the surveillance system help to record and report data on time? □ Yes □ No

4. Does the surveillance system have necessary information for investigation? □ Yes □ No

5. Does the surveillance system allow updating data on the cases? □ Yes □ No

6. How long does it take to fill the format? □ <5 min □5 to 10 min □ 10 to15min □ >15 min

7. How long does it take to have laboratory confirmation? ----------

II. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? □ Yes □ No

2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? □ Yes □ No , Add your explanation ----------

3. Is the system easy to add new variables? □ Yes □ No

4. Is the surveillance system easy to integrate with other systems? □ Yes □ No

5. Is the surveillance system easy to add new disease on report? □ Yes □ No

6. Is the system easy to add new information technology? □ Yes □ No

III. Data quality

1. Are all reported forms Complete? □ Yes □ No

2. If answer for Q1 is No, how many unfilled spaces are in your 2008 EFY report? ----------

3. Percentage of unknown or blank responses to variables from the total reports of 2004 EFY report---

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

5. Is the recorded data clear to read and understand? □ Yes □ No

6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2004 EFY report? --------

7. Percent of records which are difficult to read/ understand. ----------

IV. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? □ Yes □ No

2. If yes, how many are active participants (of the expected)? ----------

3. If No, what is the reason for their poor participation in the surveillance activity?

A) Lack of understanding of the relevance of the data to be collected

B) No feedback / or recognition given by the higher bodies for their contribution

C) Reporting formats are difficult to understand

D) Report formats are time consuming

E) Other: ----------

4. Were all participants using the standard case definition to identify cases? □ Yes □ No

5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? □ Yes □ No

6. Were all the health professionals aware about the surveillance system? □ Yes □ No

7. Was all PHEM officers send report on time? □ Yes □ No

V. Representativeness

1. Was the surveillance system enabled to follow the health and health related events in the whole community? □ Yes □ No

2. If answer for Q1 is no, who do you think is well benefited by the surveillance system? □ The urban □ the rural □ both

3. Are all the Socio demographic variables included in the surveillance reporting format? □ Yes □ No

4. If the answer for Q3 is No, which a) Sex---- b) age group---C) ethnic group----d) religion---- is less represented?

VI. Timeliness

1. Are all reporting sites reporting on time? □ Yes □ No

2. Percent of reporting sites that report on time. ----------

VII. Completeness

Are all reporting sites reporting? □ Yes □ No

2. Percent of Health facilities that send report of each week in 2004 EFY. ----------

VIII. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance? □ Yes □ No

2. Was there lack of resources that interrupt the surveillance system? □ Yes □ No

3. Was there any time /condition in which the surveillance is not fully operating? □ Yes □ No

4. If the answer for Q3 is yes, explain why? ----------

IX. Sensitivity

5. Does the malaria case definition able to pick all cases? □ Yes □ No

6. What was the total Malaria cases occurred in your woreda in 2008 EFY? _____

7. What were the total numbers of suspected malaria cases examined by RDT or Microscopy? ____

8. How many of those cases were laboratory confirmed? PF_____ PV_____ Mixed_____ Total_____

9. Were there Malaria epidemic in your woreda in 2008? □ Yes □ No

10. If yes, how many out breaks? ----------

X. **IS THE SURVEILLANCE SYSTEM USEFUL?**

1. To detect outbreaks early on time to permit accurate diagnosis? □ Yes □ No

2. To estimate the magnitude of morbidity and mortality? □ Yes □ No

3. Permit assessment of the effect of prevention and control programs? □ Yes □ No

4. To estimate research intended to lead to prevention and control? □ Yes □ No

Health facility Questionnaire (Hospital /Health center)

Identifiers

Woreda_____

Name of health facility_____

Type of health facility _____

Respondent_____

Date _____

Interviewer: _____

General Information

1. Is there PHEM/IDSR national Guide line or manual at this site? Yes / No

If yes, Obs; for the existence **PHEM/IDSR** national guide line or manual

2. Is there a clinical register in health facilities? Yes/ No

If yes, **Obs**the existence of a clinical register

3. Is there the health facilities correctly register cases during the previous 30 days?

Yes/No

If yes, **Obs**; the clinical register

Do you have a standard case definition for: (each priority disease)

a) Measles Yes/No

b) Malaria Yes/No

If yes, Obs the standard case definition for: (each priority disease)

4. Does health facilities use standardized case definitions for the country‘s priority diseases**.** Yes/ No

If yes, Obs; the respondent correctly diagnosing one of the country‘s priority diseases using a standard case definition (Interview about of these)

5. Does the health facilities have the capacity to collect the following specimens?

a) sputum Y N N/A

b) Stool Y N N/A

c) Blood Y N N/A

d) CSF Y N N/A

6. If yes, Obs the presence of materials required to collect

a) Stool Yes No N/A

b) blood/serum Yes No N/A

c) CSF Yes No N/A

7. Do you have the capacity to handle sputum, stool, blood/serum and CSF until shipment at

this facility? Yes No N/A

If yes, Obsthe presence of status cold chain at health facility

8. Does the health facility has the capacity to ship specimens to a higher level lab?

Yes No N/A

If yes, Obs presence of transport media for stool at health facility.

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

Yes No N/A

If yes, what the reason? _____

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

a. **Obs** Measles Yes No N/A

b. **Obs** Malaria Yes No N/A

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

Obs Weekly: _____ /12 times the number of health facilities sites

Obs immediately: _____/--- times the number of health facilities sites

12. **On time (use national deadlines)**

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

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

13. How do you report?

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

14. How can reporting be improved? Your suggestion

_____

_____

_____

15. Do you describe data by person, place and time (outbreaks, sentinel) Yes No N/A

If yes, Obs data

16. Is there trend analysis Performed? Yes No N/A

If yes, Obs line graph of cases by time

17. Do you have an action threshold for any of the priority diseases? Yes No N/A

If yes, what is it (Ask for 2 priority diseases)?

Malaria cases ____ % increase

Measles cases____ % increase

18. Who is responsible for data analysis? _____

19. How often do you analyze the collected data?

a) Daily b) Weekly c) Every 2 weeks d) Monthly e) Quarterly

f) As needed……..

20. Presence of demographic data at site (E.g. population <5 yr., population by village, total Population) Yes / No

Epidemic preparedness

21. Is there standard case management protocol for epidemic prone diseases at health facilities? Yes No N/A

If yes, Obs the existence of a written case management protocol for 1 epidemic prone disease

Epidemic response

22. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No N/A

Feedback

23. Have you received feedback report in the last year from higher level? Yes No

If yes, how many feedback reports has the health facility received in the last year? ___

Obs; at least 1 report received

24. Have you conduct meeting with community in the last 6 month? Yes No N/A

If yes, how often? a) Weekly b) every two weeks c) monthly d) quarterly e) as needed

Supervision

25. Did you supervise health posts in the last 6months? Yes No N/A

26. If yes, how many times have you been supervised in the last 6 months?_____

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

27. Did you get any supportive supervision from higher level in the last 6 months? Yes No N/A

If yes, Obs; supervision report or any evidence for appropriate review of surveillance

Training

28. Have you been trained in disease surveillance and epidemic management? Yes No N/A

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

_____.

29. Number of Staffs trained in disease surveillance and epidemic management_____.

Resources

30. Logistics

a) Electricity Yes No

b) Bicycles Yes No

c) Motor cycles Yes No

d) Vehicles Yes No

31. For data management

a) Stationery Yes No

b) Calculator Yes No

c) Computer Yes No

d) Software Yes No

e) Printer Yes No

32. Communications available

a) Telephone service Yes No

b) Fax Yes No

c) Radio call Yes No

d) Computers Yes No

33. Information education and communication materials

a) Posters Yes No

b) Megaphone Yes No

c) TV Yes No

d) Other: Yes No

34. Hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

35. List Personal Protection materials (PPE) available in health facility_____ _____ _____

_____

Surveillance Attributes

I. Simplicity:

1. Is the case definition easy for case detection by all level health professionals? □ Yes □ No

2. Does the surveillance system allow all levels of professionals to fill data? □ Yes □ No

3. Does the surveillance system help to record and report data on time? □ Yes □ No

4. Does the surveillance system have necessary information for investigation? □ Yes □ No

5. Does the surveillance system allow updating data on the cases? □ Yes □ No

6. How long does it take to fill the format? □ <5 min □5 to 10 min □ 10 to15min □ >15 min

7. How long does it take to have laboratory confirmation? ----------

II. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? □ Yes □ No

2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? □ Yes □ No , Add your explanation ----------

3. Is the system easy to add new variables? □ Yes □ No

4. Is the surveillance system easy to integrate with other systems? □ Yes □ No

5. Is the surveillance system easy to add new disease on report? □ Yes □ No

6. Is the system easy to add new information technology? □ Yes □ No

III. Data quality

1. Are all reported forms Complete? □ Yes □ No

2. If answer for Q1 is No, how many unfilled spaces are in your 2008 EFY report? ----------

3. Percentage of unknown or blank responses to variables from the total reports of 2004 EFY report---

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

5. Is the recorded data clear to read and understand? □ Yes □ No

6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2004 EFY report? --------

7. Percent of records which are difficult to read/ understand. ----------

IV. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? □ Yes □ No

2. If yes, how many are active participants (of the expected)? ----------

3. If No, what is the reason for their poor participation in the surveillance activity?

A) Lack of understanding of the relevance of the data to be collected

B) No feedback / or recognition given by the higher bodies for their contribution

C) Reporting formats are difficult to understand

D) Report formats are time consuming

E) Other: ----------

4. Were all participants using the standard case definition to identify cases? □ Yes □ No

5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? □ Yes □ No

6. Were all the health professionals aware about the surveillance system? □ Yes □ No

7. Was all PHEM officers send report on time? □ Yes □ No

V. Representativeness

1. Was the surveillance system enabled to follow the health and health related events in the whole community? □ Yes □ No

2. If answer for Q1 is no, who do you think is well benefited by the surveillance system? □ The urban □ the rural □ both

3. Are all the Socio demographic variables included in the surveillance reporting format? □ Yes □ No

4. If the answer for Q3 is No, which a) Sex---- b) age group---C) ethnic group----d) religion---- is less represented?

VI. Timeliness

1. Are all reporting sites reporting on time? □ Yes □ No

2. Percent of reporting sites that report on time. ----------

VII. Completeness

Are all reporting sites reporting? □ Yes □ No

2. Percent of Health facilities that send report of each week in 2008 EFY. ----------

VIII. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance? □ Yes □ No

2. Was there lack of resources that interrupt the surveillance system? □ Yes □ No

3. Was there any time /condition in which the surveillance is not fully operating? □ Yes □ No

4. If the answer for Q3 is yes, explain why? ----------

IX. Sensitivity

5. Does the malaria case definition able to pick all cases? □ Yes □ No

6. What was the total Malaria cases occurred in your woreda in 2004 EFY? _____

7. What were the total numbers of suspected malaria cases examined by RDT or Microscopy? ____

8. How many of those cases were laboratory confirmed? PF_____ PV_____ Mixed_____ Total_____

9. Were there Malaria epidemic in your woreda in 2004? □ Yes □ No

10. If yes, how many out breaks? ----------

X. IS THE SURVEILLANCE SYSTEM USEFUL?

1. To detect outbreaks early on time to permit accurate diagnosis? □ Yes □ No

2. To estimate the magnitude of morbidity and mortality? □ Yes □ No

3. Permit assessment of the effect of prevention and control programs? □ Yes □ No

4. To estimate research intended to lead to prevention and control? □ Yes □ No

Health Post Level Questionnaire

Identifiers

Woreda_____

Name of health Post_____

Respondent_____

Date _____

Interviewer _____

General Information

1. Is there PHEM/IDSR national Guide line or manual at this site? Yes No

If yes, Obs PHEM/IDSR national guide line or manual:

2. Is the health post has a clinical register? Yes No N/A

3. Are cases correctly registered in the health post? Yes No N/A

If No, state the reason; _____

If yes, Obs; the correct filling of the clinical register during the previous 30 days

4. Do you have a standard case definition for: (each priority disease)

a) Measles, Yes No N/A

b) Malaria? Yes No N/A

If yes, Obs; the standard case definition for: (each priority disease)

5. Do you use standardized case definitions for the priority diseases? Yes/No

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

6. Have you lacked appropriate surveillance forms at any time during the last 6 months? Yes/ No

7. Does the health post reported accurately cases from the registry into the summary report to go to higher level? Yes/No

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

a) **Obs** Measles Y N N/A

b) **Obs** Malaria Y N N/A

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

Obs Weekly: _____/12 times the number of sites

Obs immediately: _____/-- times the number of sites

9. On time (use national deadlines)

Obs; Number of weekly reports submitted on time:-_ /12 times health post.

Obs ; Number of immediately reports submitted on time: ___/-- times from health post .

10. How do you report?

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

11. How can reporting be improved?

Suggest

_____

_____

_____

12. Do you describe data by person, place & time (outbreaks, sentinel) Yes/ No Not applicable

Epidemic response

13. Has the health post implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No N/A

Feedback

14. Have you received feedback in the last 6month? Yes No N/A

15. How many feedback reports has the health post received in the last year? ___

If yes Obs; Observed at least 1 report at the health post from a higher level during the past year on the data they have provided

16. Have you conduct meeting with community members in the 6month? Yes No N/A

17. If yes, how many meetings has this health post conducted with the community members in the past six months? _____

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

18. If No, list the reason _____

_____.

Supervision

19. Have you been supervised by higher level in the last 6 months?

20. If yes, how many times have you been supervised in the last 6 months? _____

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

Training

21. Have you trained in disease surveillance and epidemic management? Yes No N/A

22. Number of staffs trained_____

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

_____.

Resources

23. Logistics

a) Electricity yes No N/A

b) Bicycles yes No N/A

c) Motor cycles yes No N/A

24. Data management

a) Stationery yes No N/A

b) Calculator yes No N/A

c) Computer Software &Printer Yes No N/A

25. Communications

a) Telephone service yes No N/A

b) Fax yes No N/A

c) Radio call yes No N/A

d) Computers that have modems Yes No N/A

26. Information education and communication materials

a) Posters yes No N/A

b) Megaphone yes No N/A

c) Flipcharts Image box yes No N/A

d) Other: _____ yes No N/A

27. **Hygiene and sanitation materials**

a) Spray pump yes No N/A

b) Disinfectant Yes No N/A

28. **List of Personal Protection Equipment (PPE)**

_____

_____

Satisfaction with surveillance system

29. Are you satisfied with the surveillance system? Yes No N/A

If no, how can the surveillance systems will be improved? Suggest_____

_____.

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

_____

_____

Surveillance Attributes

I. Simplicity:

1. Is the case definition easy for case detection by all level health professionals? □ Yes □ No

2. Does the surveillance system allow all levels of professionals to fill data? □ Yes □ No

3. Does the surveillance system help to record and report data on time? □ Yes □ No

4. Does the surveillance system have necessary information for investigation? □ Yes □ No

5. Does the surveillance system allow updating data on the cases? □ Yes □ No

6. How long does it take to fill the format? □ <5 min □5 to 10 min □ 10 to15min □ >15 min

7. How long does it take to have laboratory confirmation? ----------

II. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? □ Yes □ No

2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement? □ Yes □ No , Add your explanation ----------

3. Is the system easy to add new variables? □ Yes □ No

4. Is the surveillance system easy to integrate with other systems? □ Yes □ No

5. Is the surveillance system easy to add new disease on report? □ Yes □ No

6. Is the system easy to add new information technology? □ Yes □ No

III. Data quality

1. Are all reported forms Complete? □ Yes □ No

2. If answer for Q1 is No, how many unfilled spaces are in your 2008 EFY report? ----------

3. Percentage of unknown or blank responses to variables from the total reports of 2004 EFY report---

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

5. Is the recorded data clear to read and understand? □ Yes □ No

6. If answer for Q5 is No, how many records are not clear/are difficult to understand in 2004 EFY report? --------

7. Percent of records which are difficult to read/ understand. ----------

IV. Acceptability

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? □ Yes □ No

2. If yes, how many are active participants (of the expected)? ----------

3. If No, what is the reason for their poor participation in the surveillance activity?

A) Lack of understanding of the relevance of the data to be collected

B) No feedback / or recognition given by the higher bodies for their contribution

C) Reporting formats are difficult to understand

D) Report formats are time consuming

E) Other: ----------

4. Were all participants using the standard case definition to identify cases? □ Yes □ No

5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format? □ Yes □ No

6. Were all the health professionals aware about the surveillance system? □ Yes □ No

7. Was all PHEM officers send report on time? □ Yes □ No

V. Representativeness

1. Was the surveillance system enabled to follow the health and health related events in the whole community? □ Yes □ No

2. If answer for Q1 is no, who do you think is well benefited by the surveillance system? □ The urban □ the rural □ both

3. Are all the Socio demographic variables included in the surveillance reporting format? □ Yes □ No

4. If the answer for Q3 is No, which a) Sex---- b) age group---C) ethnic group----d) religion---- is less represented?

VI. Timeliness

1. Are all reporting sites reporting on time? □ Yes □ No

2. Percent of reporting sites that report on time. ----------

VII. Completeness

Are all reporting sites reporting? □ Yes □ No

2. Percent of Health facilities that send report of each week in 2004 EFY. ----------

VIII. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance? □ Yes □ No

2. Was there lack of resources that interrupt the surveillance system? □ Yes □ No

3. Was there any time /condition in which the surveillance is not fully operating? □ Yes □ No

4. If the answer for Q3 is yes, explain why? ----------

IX. Sensitivity

5. Does the malaria case definition able to pick all cases? □ Yes □ No

6. What was the total Malaria cases occurred in your woreda in 2008 EFY? _____

7. What were the total numbers of suspected malaria cases examined by RDT or Microscopy? ____

8. How many of those cases were laboratory confirmed? PF_____ PV_____ Mixed_____ Total_____

9. Were there Malaria epidemic in your woreda in 2008? □ Yes □ No

10. If yes, how many out breaks? ----------

X. IS THE SURVEILLANCE SYSTEM USEFUL?

1. To detect outbreaks early on time to permit accurate diagnosis? □ Yes □ No

2. To estimate the magnitude of morbidity and mortality? □ Yes □ No

3. Permit assessment of the effect of prevention and control programs? □ Yes □ No

4. To estimate research intended to lead to prevention and control? □ Yes □ No

Laboratory Level Questionnaire for Surveillance System Evaluation

General information

Name of the laboratory _____

Address of the laboratory: Telephone_____ Fax_____

e-mail_____

Level of the Laboratory: Community, Health Facility District , Regional, National

Affiliation of the Laboratory: Public/Private /Academic /Religious Institution / NGO

Building Facilities and utility services

1. Is the laboratory in a free-standing building or part of larger structure?

2.How many rooms with bench space are there in the laboratory?

3. Does the Laboratory has the following services available? Electricity/Running water

4. Is there a back-up power source in case of power failure Yes/No

(e.g. emergency generator)?

5. If yes, what systems are protected?

Refrigerators/freezers Yes/ No

Computers Yes/No

Other(specify) _____

6. What types of communications systems are available?

Post, Telephone Fax Satellite phone E-mail

7. Total number of Laboratory staffs

Medical Laboratory Professionals

MSc_____

BSc_____

Diploma_____

Assistants (not doing tests)_____-

Data clerks Cleaner_____

Cleaner, Guards and Drivers_____

8. Has training been conducted for your staff on laboratory on:-

Malaria Yes No

Meningitis Yes No

Measles Yes No

9. Investigation and management of other epidemic prone diseases (briefly describe)

_____

10. If yes when was the last training been conducted for your laboratory staff?

_____

Reagents

1. Where are you getting your reagents?
    1. From a commercial supplier
    2. From another laboratory
    3. Supplied by Regional/Zonal/District/health office

2. Was there shortage of reagents in the last six month, which are used for identifying diseases?

Yes/No

3. If Yes What Are the most important reasons?

Lack of funds Under purchasing Others(specify)_____

4. What type of water is used for preparation of media and reagents?
    1. Deionized Distilled
    2. Distilled
    3. Tap water

Specimen collection, labeling and handling

1. Do request forms contain ALL of the following patient information: specimen source, date and time of collection, type of test requested? Yes No

2. Are specimens that are received labeled with the patient‘s name and unique identifiers? Yes No

3. Does the laboratory have a logbook/electronic record of all specimens sent for diagnostic testing? Yes No

4. Are specimens discarded after testing, or are they stored? Discarded Stored

5. Does your laboratory refer bacteriology isolates or serum samples to a reference laboratory?

Yes No

6. If yes, for what purpose; 1. Confirmation 2. Identification of unknown organism 3. Test not performed on site

7. Number of sample referred in the last six months?

Trans-isolate Yes No

Cary and Blair Yes No

Viral transport medium

Other (describe):

Reporting procedures

1. Are records kept of the number and type of tests performed and results? Yes No

2. Does the laboratory have a list of diseases that are supposed to be reported to the Ministry of Health? Yes No

3. Does the lab staff know what diseases should be reported? Yes No

4. Does the lab provide regular reports of patients with notifiable diseases to any of the following?

Ministry of Health offices/institutions? Yes / No / NA

District Health Office Yes / No / NA

Regional Health Bureau Yes / No / NA

National / MOH level Yes / No / NA

5. If reports are submitted, how frequently?

Weekly Monthly Quarterly

Quality control procedures and programs

1. Does the laboratory use any system for internal quality control? Yes No

2. Does the laboratory participate in any external quality assurance or proficiency schemes? Yes No

3. If yes, result of EQA of malaria for the previous quarter _____

4. Was there any general laboratory supervision conducted to this laboratory? Yes No

5. If yes, how many times do you visited by higher levels for the last one year?

one times two times three and more

6. Does your laboratory have a system for regularly monitoring of quantities of reagents and supplies so that there is warning if stocks are low? Yes No NA