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



**Ethiopia Field Epidemiology Training Program (EFETP)
Compiled Body of Works in Field Epidemiology**

By

Getachew Demissie Debele

**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**

June 2017

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Advisors

Professor Ahmed Ali

Mr. Gemechu Befa (MPHFE)

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Approval by Examining Board

Chairman, School Graduate Committee

Advisor

Examiner

Examiner

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Table of Contents

ACKNOWLEDGMENTS	IV
LIST OF TABLES.....	1
LIST OF ABBREVIATIONS.....	2
EXECUTIVE SUMMARY	5
CHAPTER- I	8
OUTBREAK INVESTIGATION.....	8
1.1 INVESTIGATION OF INFLUENZA LIKE ILLNESS (H1N1)	9
1.2 INVESTIGATION OF HUMAN CUTANEOUS ANTHRAX OUTBREAK.....	26
CHAPTER- II	47
SURVEILLANCE DATA ANALYSIS	47
2.1 SURVEILLANCE	48
DATA ANALYSIS OF SEVERE ACUTE MALNUTRITION, ARSI ZONE, OROMIYA REGION, ETHIOPIA, 2005-2007 E.C	48
CHAPTER- III	63
EVALUATION OF SURVEILLANCE SYSTEM	63
3.1 EVALUATION OF PUBLIC HEALTH SURVEILLANCE SYSTEM OF BALE ZONE, OROMIA REGION, ETHIOPIA, 2017	64
CHAPTER – IV	102
HEALTH PROFILE.....	102
4.1. HEALTH PROFILE DESCRIPTION OF AKAKI WOREDA, FINFINNE ZURIA OROMIA SPECIAL ZONE, OROMIA REGION ETHIOPIA, 2016.....	103
CHAPTER- V	130
SCIENTIFIC MANUSCRIPT FOR PEER REVIEW JOURNAL	130
5.1. SCIENTIFIC MANUSCRIPT FOR PEER REVIEWED JOURNALS	131
CHAPTER- VI	143
ABSTRACTS FOR SCIENTIFIC PRESENTATION	143
6.1 INVESTIGATION OF HUMAN CUTANEOUS ANTHRAX OUTBREAK	144
6.2 SURVEILLANCE DATA ANALYSIS OF SEVERE ACUTE MALNUTRITION	145
6.3 INVESTIGATION OF INFLUENZA LIKE ILLNESS (H1N1) OUTBREAK.....	146
CHAPTER – VII	147
NARRATIVE SUMMERY OF DISASTER SITUATION.....	147
7.1 NARRATIVE SUMMARY REPORT ON MEHER ASSESSMENT IN ARSI AND BALE ZONES, OROMIYA, ETHIOPIA, 2016	148
7.1.6. CONCLUSION	160
CHAPTER- VIII	163
PROTOCOL/PROPOSAL FOR EPIDEMIOLOGIC RESEARCH PROJECT	163

8.1 ASSESSMENT OF FACTORS AFFECTING UTILIZATION OF LATRINE, BERBERE WOREDA, BALE ZONE, OROMIA, ETHIOPIA, 2017.....	165
CHAPTER – IX	178
OTHER ADDITIONAL OUTPUT REPORTS	178
9.1. NARRATIVE SUMMARY REPORT OF AWD PREVENTION AND CONTROL ACTIVITIES DONE AT BERBERE WOREDA OF BALE ZONE, OROMIA REGION, FROM SEPTEMBER 2016- FEBRUARY	179
9.2. BERBERE WOREDA AWD OUTBREAK PREVENTION AND CONTROL PREPAREDNESS RAPID ASSESSMENT REPORT, FEBRUARY 2017 G. C.	183
9.3. WEEKLY BULLETIN OF PHEM REPORT FOR WHO EPIDEMIOLOGIC WEEK 25/2016, AND WEEK 3/2017 OROMIA REGIONAL HEALTH BUREAU.	198

List of Tables

0.1 Table 1.1. Proportion Of Some Variables For Influenza (H1n1) Outbreaks In Robe Woreda Prison, Arsi Zone, Oromia Region, Ethiopia From 24/2/2016 --2/3/2016.....	19
0.1table 1.3: Attack Rate Of Suspected Human Cutaneous Anthrax By Kebele, Sire Woreda Of Arsi Zone, Oromia Region, 2016.....	34
0.1table 2.1:- Hot Spot Woredas, Arsi Zone, Oromia, Ethiopia, And 2008 E.C.	50
0.2table 2.2.Total New Admissions Of (Sam), Arsi Zone, Oromia, Ethiopia 2005 - 2007 E.C	54
0.3table 2.3:- Prevalence Of Sam For Under Five Children Per 100 Population In Hotspot Woredas, Arsi Zone, Oromia, Ethiopia 2007 E.C.....	57
0.1table 3.1: Population Under Surveillance In Assessed Zone (Projected Population For2016).	72
0.2table 3.2: Availability Of Resource For Phem Surveillance At Different Level In Bale Zone, February, 2016....	76
0.3table 3.3: The Reporting Rates Of The Health Facilities In Bale Zone In 20 Weeks (Who Week 28/2016-47/2016)	79
4.0.1: Estimated Population By Kebeles And Age Category, Akaki Woreda, Finfinne Zuria Oromia Special Zone, Oromia Region, 2014/15.....	106
0.2table 4.2: Number Of Enrolled Students And Their Teachers By Sex In Akakiworeda, Finfinnezuria Oromia Special Zone, Oromia Region, 2015	108
0.3table 4.3 Infrastructures In Health Facilities, Akaki Woreda 2014/15.....	110
0.4table 4.4: List Of Health Facilities With Their Respective Catchment Health Posts In Akaki Woreda Finfine Zuria Oromia Special Zone, Oromia Region, 2015.....	110
0.5table 4. 5. Population And Vital Statistics In Akaki Woreda, Oromia Region, 2015	111
0.6table 4.6. Maternal And Child Immunization Coverage Akakiworeda, Oromia Region, 2015	112
0.7table 4.7: Types Of Water Sources In Akaki Woreda, Oromia Region, 2015	113
0.8 Table 4.8. Top Ten Leading Causes Of Outpatient Morbidity In Adult (Akaki Woreda, Oromia Region, 2015)	114
0.9table 4.9. Top Ten Leading Causes Of Outpatient Morbidity In Pediatrics (Akakiworeda, Oromia Region, 2015)	114
0.10table 4.10.Number Of Clients Tested For All Forms Of Tb By Sex And Positive In Akaki Woreda, Oromia Region, 2014/15.....	115
0.11table 4.11.Number Of Tested And Positive Clients For Hiv In Akakiworeda, Oromia Region, 2015	116
0.12 Table 4.12. No. Of Tested And Positive Clients For Hiv By Sex In Akaki Woreda, Oromia, 2014/15.....	116
0.13 Table 4.13. Number Of Tested And Positive Clients For Hiv By Age Group In Akaki Woreda, Oromia Region, 2014/15	116
0.14 Table 4.14. Distribution Of Human Resources Of All Categories In The Akaki Woreda Health Office, 2014/15	118

List of Acronyms

AAU-----	Addis Ababa University
AFI -----	Acute Febrile Illness
AFP -----	Acute Flaccid Paralysis
AHI-----	Avian Human Influenza
AIDS-----	Acquired Immune Deficiency Syndrome
ART -----	Anti Retroviral Therapy
AWD-----	Acute Watery Diarrhea
BPR-----	Business Process Re-engineering
BSc -----	Bachelor of Science
CBN -----	Community Based Nutrition
CC -----	Community Conversation
CDC -----	Center for Disease Control and Prevention
CFR -----	Case Fatality Rate
CHIS-----	Community Health Information System
CHS -----	College of Health Sciences
CSM -----	Convenient Sampling Method
DHS-----	Demographic Health Survey
DW -----	Deep Well
EC -----	Ethiopian Calendar
EFETP-----	Ethiopia Field Epidemiology Training Program
EOS-----	Enhanced Outreach Strategy
EPHA -----	Ethiopian Public Health Association
EPHI -----	Ethiopian Public Health Institute
EPI -----	Expanded Program of Immunization
EPTB -----	Extra Pulmonary tuberculosis
ETB-----	Ethiopian Birr
EWRR-----	Early Warning, Response and Recovery
FMoH-----	Federal Ministry of Health
GC-----	Gregorian Calendar
GP-----	General Practitioner
HA-----	Hemagglutinins

HAD ----- Health Development Army
HC----- Health Center
HDW ----- Hand Dug Well
HEW ----- Health Extension Worker
HFs ----- Health Facilities
HH ----- House Hold
HIV ----- Human Immune Virus
HMIS -----Health Information Management System
HP----- Health Post
ICCM ----- Infant and Child Care Management
IDS----- Integrated Disease Surveillance
IDSR-----Integrated Disease Surveillance and Response
IGA ----- Income Generating Activities
IHR-----International Health Regulation
IMR ----- Infant Mortality Rate
IP-----Incubation Period
ITN ----- Impregnated and Treated Net
KM----- Kilo Meter
MCH----- Mather and Child Health
MDGs----- Millennium Development Goals
MMR ----- Maternal Mortality Rate
MUAC----- Measuring Upper Arm Circumference
NA-----Neuraminidases
NMR ----- Neonatal Mortality Rate
NNT-----Neonatal Tetanus
OPD ----- Out Patient Department
OPV -----Oral Polio Vaccine
ORHB----- Oromia Regional Health Bureau
OTP----- Outpatient Therapeutic Program
PAB ----- Protected At Birth
PCR-----Polymerase Chain Reaction
PHEM-----Public Health Emergency Management

PICT ----- Provider Initiated Counseling and Testing
PLWHA ----- People Living With HIV/AIDS
PMTCT-----Prevention of Mother to Child Transmission
PTB ----- Pulmonary Tuberculosis
RDT ----- Rapid Diagnostic Test
RHB-----Regional Health Bureau
RMNCH----- Reproductive, Maternal, Newborn, and Child Health
RNA-----Ribonucleic acid
RVF----- Raft Valley Fever
SAM----- Sever Acute Malnutrition
SARS-----Sever Acute Respiratory Syndrome
SC-----Stablished Center
SHDW ----- Shallow Hand Dug Well
SNNP-----South Nations, Nationality and Peoples
SPH ----- School of Public Health
TB ----- Tuberculosis
TT ----- Tetanus Toxoid
USA-----United States of America
VCT----- Voluntary Counseling and Testing
VHF-----Viral Hemorrhagic Fever
WHO-----World Health Organization
ZHD-----Zonal Health Department

Executive Summary

The Ethiopian government policy emphasis on prevention measures of communicable and non-communicable diseases. In addition, many strategies and programs were set to enhance disease prevention activities. Ethiopian Field Epidemiology Training Program that adopted from the United States Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) is one of the programs focusing on capacity building of public health practitioners. The training enables trainers to conduct disease surveillance and implement prevention and control measures of prioritized diseases.

I stayed from October 2015 to May 2017 in Addis Ababa University School of Public Health-Field Epidemiology Training Program and at Oromia Regional Health Bureau Field Base. During my stay, I carried out two outbreak investigations, one surveillance data analysis, one surveillance system evaluation, one district health profile description, submission of three abstracts, one scientific manuscript for peer reviewed journals, one Meher assessment, one epidemiological research proposal, and two weekly epidemiologic bulletin for residency outputs. Even though I included only two weekly bulletins in this document, I produced totally 7 weekly bulletins during stay at field base.

We investigated two outbreaks (Human Cutaneous Anthrax and Influenza Like illness (H1N1) during field base residency. Descriptive and analytical epidemiology methods used to describe magnitude of the diseases and identify risk factors associated with diseases. Ten (10) cases of Influenza Like illness (H1N1) reported from Sire woreda of Arsi Zone, Oromia Region in 2016. We identified that low Livestock vaccination, low surveillance system activities (not timely reported), and shortage of emergency drugs supply, were contributed for anthrax outbreak in the woreda. We recommended routine vaccination of livestock in the area, Coordinated effort of both Health and livestock Development Offices at the Zone and Woreda should strength the surveillance system and conduct active surveillance regularly, Regional Livestock Development Office should access the vaccines support with supplies to such vulnerable areas. Additionally, there was Influenza Like illness (H1N1) outbreaks in Robe Woreda, Arsi zone, Oromiya Region that we had investigate in February 2016. During this outbreak, 16 H1N1 cases and no deaths reported. Overcrowding, poor ventilation, and weak awareness of prison's community attributed for Influenza Like illness (H1N1) in this Prison. We recommended that the H1N1 vaccine should have been provided to the community in accordance with Government distributions guidelines, and increase prison's community awareness on H1N1 prevention and control measures.

Surveillance data analysis of Severe Acute Malnutrition (SAM) for consecutive three years (2005 – 2007 E.C) conducted in Arsi Zone of Oromia Region. The cases decreased throughout the first two years, and increased at 2007 with decreasing death rate. We identified that strong screening and case management contributed for increased number of cases and declining deaths respectively.

We conducted surveillance system evaluation at Bale Zone of Oromia Region, (highlight) and in 2017. During this evaluation, surveillance of selected diseases (malaria and measles) assessed. The surveillance system activities at Zonal, Woreda and Health facility level were low. Poor data management, infrequent supportive supervision, absence of well-organized feedback, poor utilization of manuals and guidelines contributed for unsatisfactory of the system.

Health profile description carried in Akaki Woreda, Special Zone Surrounding Finfinne, and Oromia Region from February to March 2016. Low community awareness and less number of Health Centers were the contributing factors for low coverage. Enrolment of female students increased in primary school during 2015/16.

We prepared scientific manuscript for peer reviewed journals on Human Cutaneous Anthrax and Influenza Like illness (H1N1) outbreak investigation and response in Sire Woreda, and Robe Woreda Prison, Arsi Zone, Oromia Region.

Two abstracts were done for scientific conference submission; Human Coetaneous Anthrax Outbreak Investigation in Sire Woreda of Arsi Zone and Surveillance Data Analysis of Severe Acute Malnutrition and Response in Arsi Zone, Oromia Region.

Meher assessment was conducted in selected woredas of Arsi and Bale zones in Oromia Region during 2016 to identify humanitarian needs following emergency occurrence. Malnutrition anticipated being a major public health concern in Bale zone. There were measles outbreak in Bale Zone and AWD outbreaks in some districts of Arsi and Bale zones. We identified shortage of drugs and medical equipment at both zonal level and many districts of these zones.

Epidemiological research project proposal on assessment of Factors Affecting Utilization of Latrine, Berbere Woreda, Bale Zone, Oromia Region, was prepared. Unmatched case control study will be employed for this study. Cases will be those household, which have latrine but not using it yet, or households, which do not have latrine. Controls will be model households currently using latrine. One to two ratios of cases and controls will be selected. A total of 840-study subjects will be selected from rural kebeles, while the rest 44-study subjects will be selected from suburban kebeles. Knowledge of residents of selected kebeles socio demographic characteristics of the respondent, latrine condition, culture barriers against utilization of latrine and issues concerning the role of utilization of latrine in acute watery diarrhea transmission will be assessed using questionnaire adopted from different similar studies. The overall activities of study will be expected to finish in two months (June - July 2017). The total estimated budget required for the study is 89,200.00 ETH Birr.

I Conducted Report of AWD Rapid Assessment from February 10/2017 to April 9/2017 of Berbere woreda of Bale Zone, Oromia Region. The numbers of AWD by sex were Male 224(51.4%) and Females 212(48.6%) respectively. Male cases were higher than Female cases in the Woreda. The majority of cases were children of age under 15 years and adults of age above 35 years. Sixteen (16) kebeles were affected by AWD. High number of cases were admitted from Hambela kebele of Berbere Woreda which accounts 189(43.3%), followed by Haro Nanno 43(10%), and Gebe 36(8.3%) kebeles respectively.

I prepared seven weekly bulletins on PHEM report of Oromia Regional Health Bureau for WHO Epidemiologic week 25, 37, of 2016 and week 3, 4,5,18 and 19 of 2017. However, I included only two (week 25 of 2016 and week 3 of 2017) in this output. The health facilities report completeness for week 25 of 2016 was 92% and for week 3 of 2017 was 90% above the expected national level (80%). Suspected measles cases and confirmed malaria cases were increasing during week 25 of 2016, both confirmed malaria, and suspected cases of measles were decreasing.

CHAPTER- I

Outbreak Investigations

1.1 Investigation of Influenza Like illness (H1N1)

Authors: Getachew Demissie¹, Ahmed Ali², Gemechu Befu³

Address: EFETP, School of Public Health, Addis Ababa University

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: getachewdemissie4@gmail.com

Oromia Region +251913338945/+251921077928

Investigation of Influenza Like illness (H1N1) Outbreak in Robe Town Arsi Zone, Oromia, Ethiopia-2016

Abstract

Background: Influenza is a highly infectious viral illness. The name “influenza” originated in 15th century in Italy, from an epidemic attributed to “influence of the stars.” Influenza is a single-stranded, helically shaped, Ribonucleic Acid virus of the orthomyxovirus family. Basic antigen types A, B, and the nuclear material determines C. In January 2011, Center for Disease Control estimated that pandemic H1N1 influenza virus caused more than 60 million Americans to become ill, and led to more than 270,000 hospitalizations and 12,500 deaths. Influenza A viruses in Ethiopia were reported nine confirmed cases and one pending as of August 2009. On 24 February 2016, a suspected H1N1 influenza like illness outbreak reported from Robe Woreda, Arsi Zone, to Oromia Regional Health Bureau Public Health Emergency Management team. Investigation was made to confirm the outbreak, identify risk factors and implement control measures.

Methods: Unmatched case-control study conducted. Structured questionnaire used to collect data from 16 cases and 32 controls. Controls defined as any person in the prison without sign and symptom of the disease. Sixteen blood specimens collected for laboratory confirmation.

Results: Sixteen suspected H1N1 cases identified and no death documented. Five of sixteen swab specimens tested positive for influenza sub type A H1N1pdm09. The overall attack rate was 31.25%.

Conclusion: A confirmed influenza sub type A H1N1pdm09 outbreak occurred in the prison of Robe woreda, Arsi Zone, Oromia Region. The outbreak affected prisoners, and workers of the prison. Active surveillance should be strengthened by the Woreda Health Office for the disease to reduce the risk of future outbreak in the prison.

Key words: H1N1, Outbreak, Prison, Ethiopia

1.1.1 Introduction

Influenza is a highly infectious viral illness. The name “influenza” originated in 15th century in Italy, from an epidemic attributed to “influence of the stars.” The first pandemic or worldwide epidemic that clearly fits the description of influenza was in 1580. At least four pandemics of influenza occurred in the 19th century, and three occurred in the 20th century. The pandemic of “Spanish” influenza in 1918–1919 caused an estimated 21 million deaths worldwide. The first pandemic of the 21st century occurred in 2009–2010 [1].

Smith, Andrewes, and Laidlaw isolated influenza A virus in ferrets in 1933, and Francis isolated influenza B virus in 1936[1]. In 1936, Burnet discovered that influenza virus could grow in embryonated hens’ eggs. This led to the study of the characteristics of the virus and the development of inactivated vaccines. The protective efficacy of these inactivated vaccines was determined in the 1950s. The first live attenuated influenza vaccine licensed in 2003 [1].

Influenza is a single-stranded, helically shaped, RNA virus of the orthomyxovirus family. Basic antigen types A, B, and the nuclear material determines C. Type A influenza has subtypes that are determined by the surface antigens hem agglutinin (H) and neuraminidase (N). Three types of hemagglutinin in humans (H1, H2, and H3) have a role in virus attachment to cells. Two types of neuraminidase (N1 and N2) have a role in virus penetration into cells [1].

Influenza A causes moderate to severe illness and affects all age groups. The virus infects humans and other animals. Influenza A viruses are perpetuated in nature by wild birds, predominantly waterfowl. Most of these viruses are not pathogenic to their natural hosts and do not change or evolve. Influenza B generally causes milder disease than type A and primarily affects children. Influenza B is more stable than influenza A, with less antigenic drift and consequent immunologic stability. It affects only humans. Influenza C rarely reported as a cause of human illness, probably because most cases are subclinical. It has not been associated with epidemic disease [1, 2].

The nomenclature to describe the type of influenza virus expressed in this order: 1) virus type, 2) geographic origin where it was first isolated, 3) strain number, 4) year of isolation, and 5) virus subtype [2].

In April 2009, a novel influenza A (H1N1) virus appeared and quickly spread across North America. By May 2009, the virus had spread to areas of the world. Influenza morbidity caused by

2009 pandemic H1N1 virus remained above seasonal baselines, throughout spring and summer 2009 and was the cause of the first influenza pandemic since 1968 [2].

In the United States, the 2009 pandemic characterized by a substantial increase in influenza activity in spring 2009 that was well beyond seasonal norms. Influenza activity peaked in late October 2009, and returned to the seasonal baseline by January 2010. During this time, more than 99 percent of viruses characterized were the 2009 pandemic influenza A (H1N1) virus [2].

In January 2011, Center for Disease Control estimated that pandemic H1N1 influenza virus caused more than 60 million Americans to become ill, and led to more than 270,000 hospitalizations and 12,500 deaths [2]. Ninety percent of hospitalizations and deaths occurred in persons younger than 65 years of age. With typical seasonal influenza, approximately 90% of deaths occur in persons older than 65 years [3].

In response to the pandemic, a monovalent influenza vaccine produced and deployed in a nationwide vaccination campaign [3].

Typically, in an epidemic, influenza attack rates are lower than in pandemics. The major impacts observed in morbidity, with high attack rates and excess rates of hospitalization, especially for adults with respiratory disease. Absenteeism from work and school is high, and visits to healthcare providers increase. In the Northern Hemisphere, epidemics usually occur in late fall and continue through early spring. In the Southern Hemisphere, epidemics usually occur 6 months before or after those in the Northern Hemisphere [4, 5].

Influenza A viruses contain surface proteins called hemagglutinins (or HA) and neuraminidases (or NA). Scientists have identified subtypes of influenza viruses based on the genetic arrangement of these HA and NA proteins, as well as other factors. Although the 16 HA and 9 NA proteins may combine in many ways, only 2 subtypes currently spread among humans: H1N1 and H3N2. Technically, other subtypes can infect humans, but they don't spread from person to person regularly [4, 5]. Nine Influenza confirmed cases of influenza A viruses was reported in Ethiopia in August, 2009 [5].

H1N1 affected kebele of Robe Woreda, Arsi Zone, Oromia, 2016



Figure 1.1.- Map of Robe woreda and Robe town at which the prison found

1.1.2 Objectives

1.1.2.1. General objective

- To assess the magnitude and risk factor of influenza (H1N1) infection in Robe Woreda prison, Oromia Region, from 24 Feb.-03 March 2016, Ethiopia.

1.1.2.2. Specific objectives

- To describe the magnitude of influenza infection
- To determine the risk factors for the influenza infection

1.1.3 Methods

1.1.3.1 Study area

The study was conducted in Robe Prison, which is located in Robe Woreda, Arsi Zone, Oromia, Ethiopia. The Prison supported by the government and established 1997G.C. Since its establishment, it served as the center for seven woredas in the area. The prison has 482 prisoners of which 445 Males and 37 Females. In the prison, one separated block was for female prisoners of six different blocks. The prison is located four-kilo meter from the town in the southeast direction.

1.1.3.2 Study design

A case control study supported by descriptive study design.

1.1.3.3 Sample Size

Unmatched case control study in the ratio of 1:2(16 cases and 32 controls) was conducted.

1.1.3.4. Operational Definition

Suspected Case: - A person with an acute respiratory illness who mets one of the following

- Onset within 7 days of close contact with a person who has a confirmed case of H1N1 influenza virus infection
- Onset within 7 days of travel locally or internationally where there were one or more confirmed H1N1 influenza cases
- Resided in a community where there was one or more confirmed H1N1 influenza cases

Confirmed Case: - A person with an acute febrile respiratory illness, with laboratory confirmed H1N1 influenza A virus infection by PCR.

Probable case: - An individual with a clinically compatible illness or who died of an unexplained acute respiratory illness who is considered to be epidemiologically linked to a probable or confirmed case.

1.1.3.5. Data collection method

We used a structured questionnaire to collect information, including socio-economic demography, clinical status of the cases, the possible risk factors and awareness on mode of transmission and control/prevention measures for influenza (H1N1) infection. The national PHEM guideline and mobile (phone) camera were available. The data collected through face-to-face interview with the respondents (prisoners), by reviewing the line list data in the Health Facility.

1.1.3.6. Laboratory Investigation

Ethiopian Public Health Institute laboratory personnel collected swab specimens from sixteen suspected influenza (H1N1) patients for confirmation.

1.1.3.7. Environmental Investigation

General housing condition sleeping room, housing ventilation and hygienic condition of the cases and controls visually inspected.

1.1.3.8. Variable specification

Dependent variable	Independent variable
Influenza (H1N1) infection	Over-crowding
	Travel history
	Contact history
	Awareness on mode of transmission of Influenza (H1N1) infection
	Awareness on prevention/control of Influenza (H1N1) infection

1.1.3.9. Data analysis

Collected quantitative data were checked and entered on a computer and analyzed using Microsoft office Excel and Epi info 7.1

1.1.3.10. Ethical issues

Both Robe Woreda Health Office and Robe Town Prison have accepted for the investigation of Influenza (H1N1) outbreak through the formal letter from Arsi Zone Health Department and Oromia Regional Health Bureau. All the respondents were informed about the objectives of study and we got oral consent from them. In addition, the respondents were voluntary to take their photographs through our camera after verbal autopsy.

1.1.4. Results

1.1.4.1. Description of Influenza (H1N1) cases by place and person

The samples of sixteen cases were sent to EPHI for confirmation. We identified 5 laboratory confirmed and 11 epidemiologically linked Influenza (H1N1) cases in the prison of Robe Town of Arsi Zone between 24 February to 3 March 2016. There were no deaths. Five of sixteen swab specimens tested positive for influenza sub type A H1N1pdm09. The overall attack rate was 31.25%. We observed in their living room two prisoners were sleep together in one bed and 72 prisoners live in one class and all living rooms have only one small size window each for ventilation. Vaccination of influenza (H1N1) have not provided to the community.

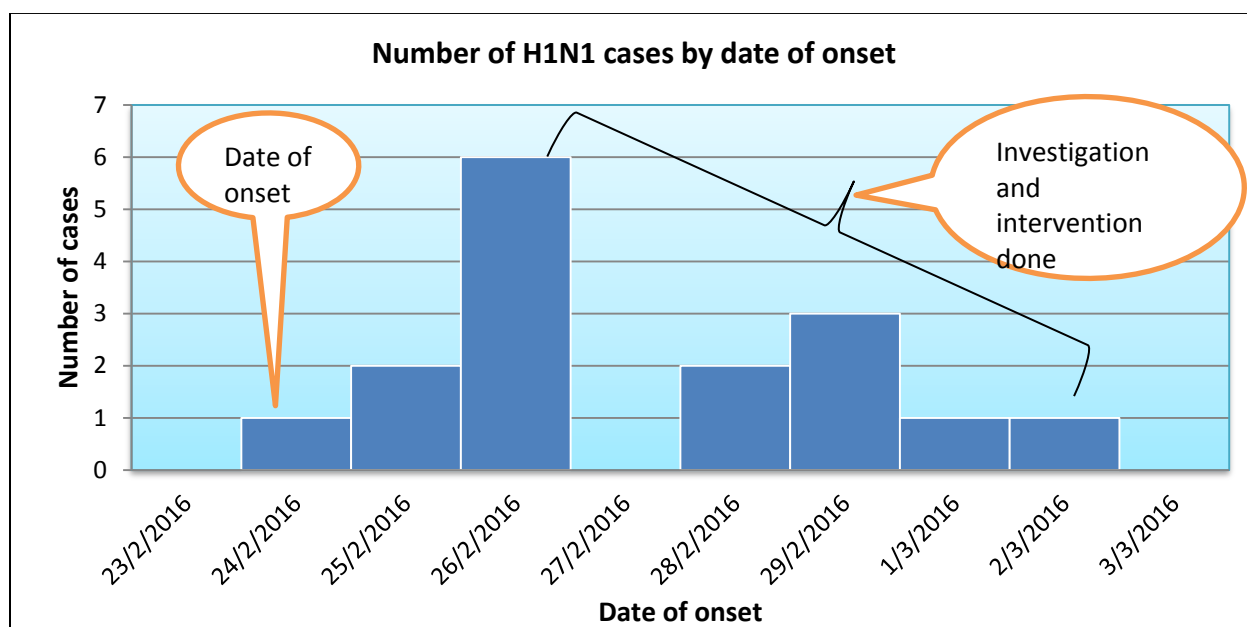


Figure 1.2 Number of Influenza H1N1 cases by date of onset, Robe Woreda prison of Arsi Zone, Oromia Region, 2016

First index of influenza like illness (H1N1) case was seen on January 23/2016. Highest numbers of cases registered on January 26/2016 that were (6) and no cases registered on January 27/2016. On March 2 and 3/2016, there was only one case each day.

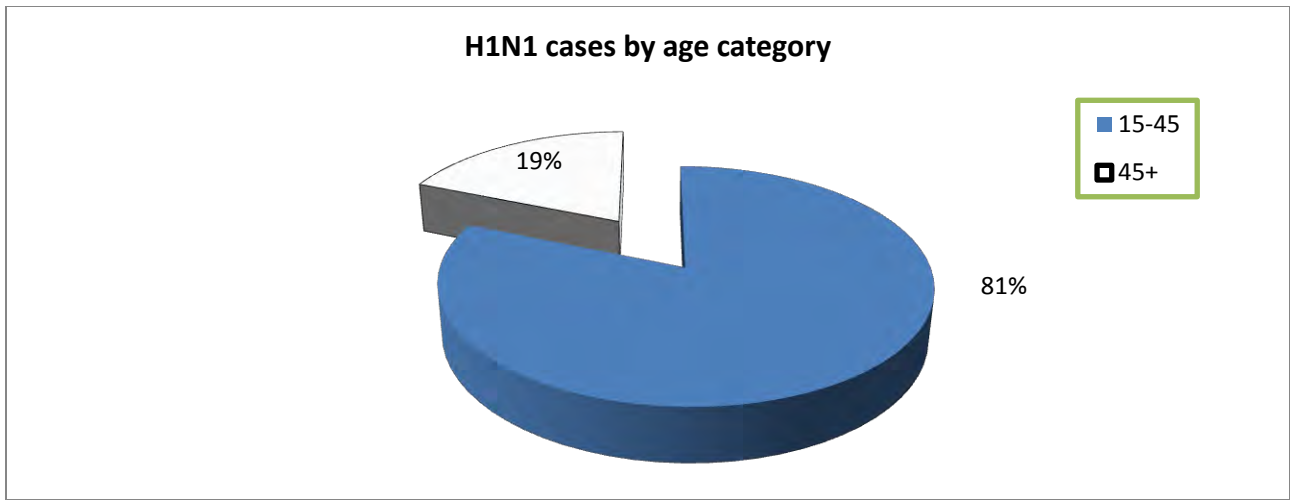


Figure 1.3 percentage of influenza H1N1 cases by age category

Eighty-one percent (13) cases were between the age of 15-45 and only (3) 19% of cases were at the age of 45 and above.

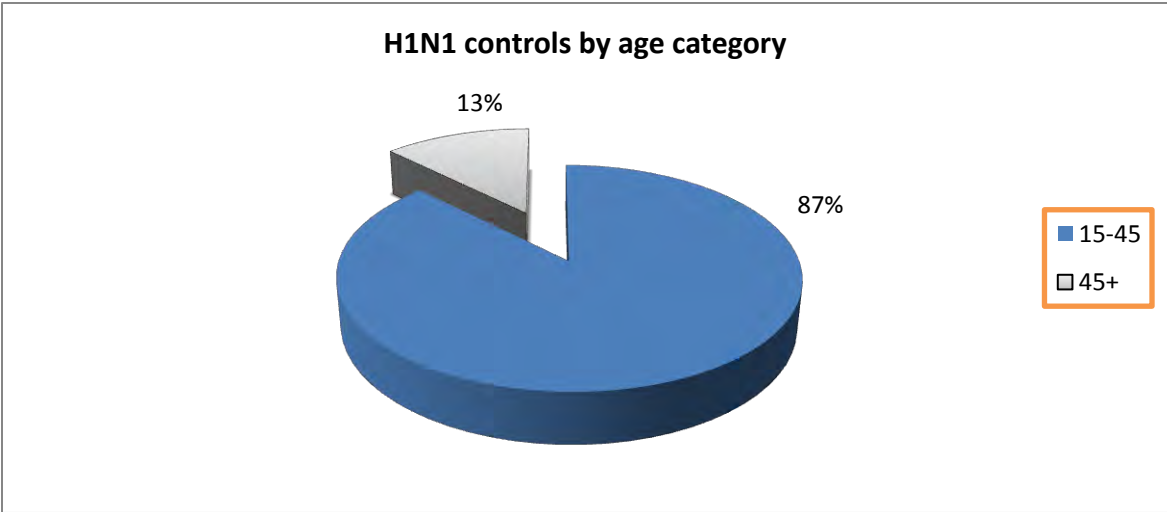


Figure 1.4 percentage of influenza H1N1 control by age category

Eighty-seven percent (28) controls were between the age of 15-45 and only four (13%) of controls were at the age of 45 and above.

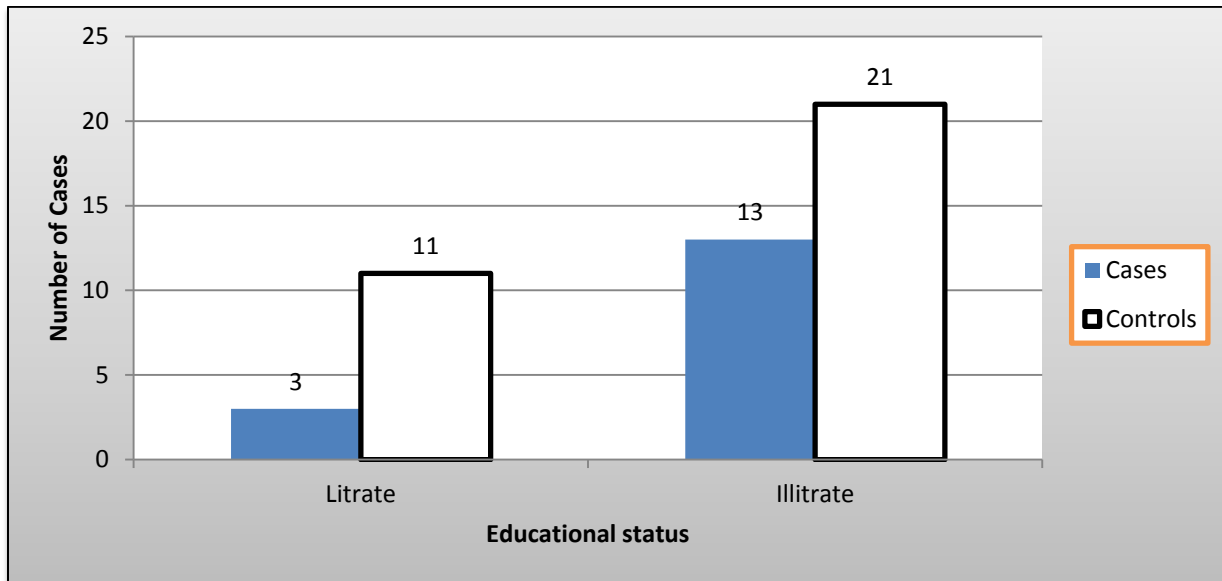


Figure 1.5: Educational status of cases and controls

Only nineteen percent (3) of cases were literate and 13(81%) of cases were illiterate. From controls, 11(34.4%) were literate and 21(65.6%) were illiterate.

As per the explanation made by head of the prison, health professionals did not follow the health status of prisoners regularly. They also explained that they had problem in referral linkage of the ill prisoner with the nearby health facilities because of identification problem of ill prisoner from healthy one. No one of the prison staff can respond about influenza like illness (H1N1) transmission and prevention method.

In addition to this, we observed no surveillance system was done in the prison and we made discussion with woreda health office about the need of surveillance of disease.



Figure 1.6:- Some parts of the prisoners living condition and their living rooms



Figure 1.7:- While investigation done at Robe town prison

1.1.4.2. Analytical analysis

We obtained 1:2 ratios of 16 cases (median age of 27 years) and 32 control (median age of 34 years). The factor associated with illness was contact with sick prisoners of Influenza (H1N1) that share the same room, compound and all activities.

Table1.1. Proportion of some variables for Influenza (H1N1) outbreaks in Robe Woreda prison, Arsi Zone, Oromia Region, Ethiopia from 24Feb.2016 –03 March 2016

SN	Variables		Cases (%)	Control (%)
1	Do you have any travel history to area with active influenza cases before on set of symptom?	Yes	4(25%)	2(6.25%)
		No	12(75%)	30(93.75%)
2	Do you have any contact history with some else with suspected or confirmed Flu patient?	Yes	5(31.25%)	14(43.75%)
		No	11(68.75%)	18(56.25%)
3	Do you have any contact history with sick or dead animals?	Yes	0(0%)	0(0%)
		No	16(100%)	32(100%)
4	Do you know the causes of influenza like illness or H1N1?	Yes	0(0%)	3(9.4%)
		No	16(100%)	29(90.6%)

From cases four (25%) and from controls 2(6.25%) were have travel history to the area with active influenza cases before onset of symptom. Five cases (31.25%) of cases and 14(43.75%) of

controls have contact history with some else with suspected influenza (H1N1) patient, because they have shared same compound and living room with these patients in the Prison.

Bivariate analysis on some risk factors of H1N1 outbreak

- Travel history OR 7.15, (95%CI= 1.68 - 75.31)
- Contact with sick person OR 2.06,(95%CI =1.47 – 25.32)

Travel history and contact with sick person have association with the H1N1 outbreak.

1.1.5. Discussion

Our investigation confirmed influenza sub type A H1N1pdm09 outbreak in the prison of Robe woreda in Arsi Zone, Oromia Region. The outbreak primarily affected prisoners who live in the prison. The overall living and hygienic condition of their room was poor ventilated, with only one small sized window for each room, and 72 prisoners in one single room.

Several factors may increase the chance of developing Influenza (H1N1) disease. In this investigation, we identified that the previous health status of many of newcomer prisoners was unknown because the index case was the new person who joined the prison and develop sign of influenza (H1N1) with in four days.

There was no well-organized health service and surveillance system in the prison and no clear referral linkage with the surrounding facility. In addition to that, none of the prison staff knows about the health status of the newcomer prisoner. When they join prison, they simply join the group. Therefore, this factor might have contributed to the occurrence for the disease in the area. On bivariate analysis, the risk factors statically associated with illness were having contact with Influenza patient.

1.1.6. Conclusion

A confirmed influenza sub type A H1N1pdm09 outbreak occurred in the prison of Robe woreda, Arsi Zone, Oromia Region. The outbreak primarily affected prisoners who were in the prison and the staff of the prison. We recommend active surveillance for the disease to reduce the risk of future outbreak in the prison.

1.1.7. Recommendations

- Health authorities should prioritize their control plans to target the most vulnerable groups within the population like Prisons and Schools.
- When prioritizing plans, prison and schools should have placed as highest priority on protecting human life and the well-being of the surrounding community.
- Surveillance system should have done regularly on prison and other public service provider institutes like Schools.
- The H1N1 vaccine should have provided to the community in accordance with Government distributions guidelines.

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1.1.9. Annex: Questionnaire

Influenza like illness outbreak Questionnaire

Patient's Name _____

Code _____

Date of data collection _____

Woreda _____

kebeles _____

Gote _____

I. Socio-demographic Characteristics

S. No	Questions	Alternatives
1.1	Sex	1. Male 2. Female
1.2	Age	Years _____ Months _____
1.3	If female, is she currently pregnant?	1. Yes 2. No 3. Do not know
1.4	Occupation	
1.5	Educational level	
1.6	Marital status	
1.7	Family size	
1.8	Is there is any sick person with fever, cough , headache , running nose/vomiting (Illness) family	1. Yes 2. No
1.9	If yes, number of sick person	-----
1.10	Specimen taken	Yes No

II. Clinical History of Diseases:

2.1	Case status	1. Case 2. Control if the answer is 2 go to question No.3.1
2.2	Date of illness on set	_____ (dd/mm/yy)
2.3	Date seen at health facility	_____ (dd/mm/yy)
2.4	Date of Admission if Inpatient	_____ (dd/mm/yy)

2.5	What was the symptom?	1.Cough8.Sneezing 2.Fever 9.Chest pain 3.Sore throat 10.Joint pain 4.Shortness of breath11.chills 5.Difficulty in breathing12.Headache 6.Vomiting13.Other (Specify 7.Diarrhea
2.6	Did you take treatment?	1.Yes 2.No
2.7	Outcome	1.cure 3.died 5.on treatment 2. improved4.Referred
3.1	Did you have any travel history 7 Days to areas with active influenza like illness cases before onset of symptoms.	1.Yes 2. No
3.2	Do you have any contact history with Someone else with suspected or confirmed Flu patient(s)?	1.yes 2.No
3.3	Do you have any contact history with sick or dead animals (wild or domestic):	1. Yes 2. No
3.4	2. Did you wash your hands after touching the dead animals and birds?	1.Yes 2.No 3.Unknow
3.5	was there death of birds/chicken in the kebeles	Yes No
3.6	Is your house well ventilated?	1.Yes2.No 3. Partially
3.7	Did you have participated at the wedding ceremony?	1. Yes 2. No
3.8	Did you have eaten or drunk at the wedding?	1. Yes 2. N0
3.9	Number of windows	
3.10	How many times do open windows per week	

IV. Knowledge of patient on influenza like illness

1	Do you hear about influenza like illness?	1.Yes 2.No
2	From whom did you heard	1.Friends 2.Family member 3 HEW 4 Teacher 5. Health workers 6. other _____
3	Do you know the causes influenza like illness?	1.Yes 2.No
4	If Yes? What it is?	1.virus 2.bacteria 3.contaminate food 4.from God 5. related to weather condition 6.Don't know 6.Others (Specify) _____
5	How do you think this disease transmit from person to persons (none proving)?	1. sneezing/coughing 2.Contact with patient 3.wind 4. Don't know 5.Other(specify)
6	What are the prevention methods of ILI?	1.limit your contact with others 2. hands washing 3. Cover mouth and nose during coughing and sneezing? 4. Don't touch any dead poultry 5. Hot fluid drinking 6. Don't know 7.other specify-----

1.2 Investigation of Human Cutaneous Anthrax Outbreak

Authors: Getachew Demissie¹, Ahmed Ali² +251911684399, Gemechu Befu³

Address: EFETP, School of Public Health, Addis Ababa University

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: getachewdemissie4@gmail.com

Oromia Region +251913338945/+251921077928

Investigation of Human Cutaneous Anthrax Outbreak in Sire Woreda, Arsi Zone, Oromia Region, 2016

Abstract

Introduction: Anthrax is primarily a disease of herbivores and is a bacterial disease caused by the spore-forming *Bacillus anthracis*, Gram positive, rod-shaped bacterium. The objective was to confirm the existence of Cutaneous Anthrax Outbreak.

Method: A Descriptive study design was used to describe the outbreak from September 1-7/2016.

Results: Ten human Cutaneous Anthrax cases were identified with two community deaths reported from September 1-7, 2016. Five cattle died showing symptoms of anthrax. The onset of the outbreak was on September 1/2016 and 2 Kebeles of the Woreda has affected. Males were more affected than females. Majority of the cases were age groups of 15 - 44 years, followed by 45-64 years old 3(30%) and one case was in the age group of 5-14 years. The mean age was 35 years. The overall attack rate in the District was 0.98 and the fatality rate was 0.2 per 10,000 populations. Koloba Shamela and Gesela Shashe Kebeles were affected.

Conclusion: The clinical presentation and epidemiological evidences indicated that cutaneous anthrax was a possible cause of illness and deaths among human beings and livestock of the area. Health sector and Livestock Development sector have to protect both human beings and livestock. And should implement awareness creation for the community and conducting routine immunization of animals.

Key word: Anthrax, Sire Woreda, Oromia,

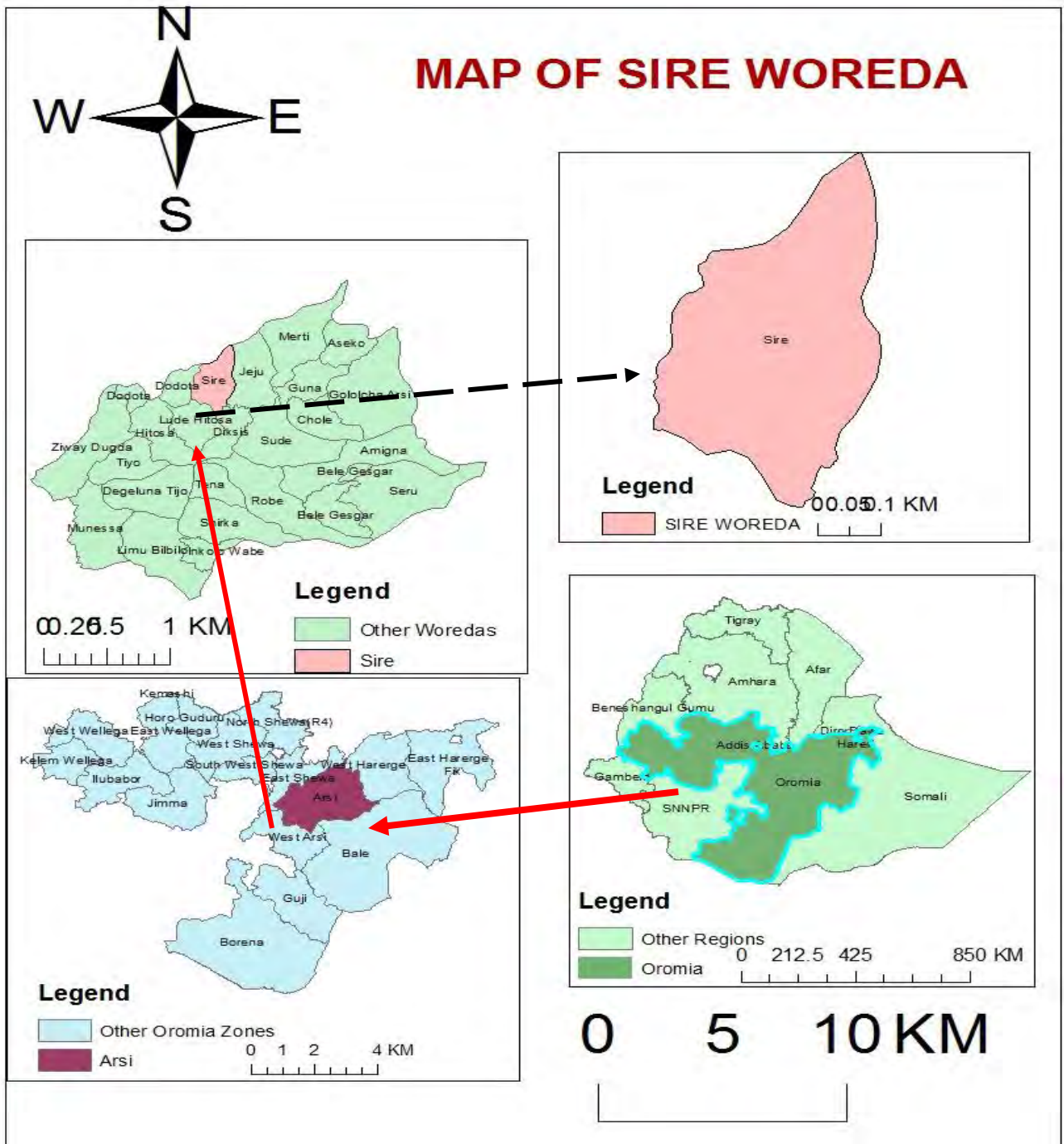


Figure: 1.2.1 Map of Sire Woreda, Arsi Zone, Oromiya, 2016

1.2.1 Introduction

Anthrax is primarily a disease of herbivores although few, if any, warm blooded species are entirely immune to it. From earliest historical records until the development of an effective veterinary vaccine mid-way through the present century together with the subsequent advent of antibiotics, the disease was one of the foremost causes of uncontrolled mortality in cattle, sheep, goats, horses and pigs worldwide. Humans almost invariably contract anthrax directly or indirectly from animals (1).

Anthrax is a bacterial disease caused by the spore-forming *Bacillus anthracis*, a Gram positive, rod-shaped bacterium. When conditions are not conducive for growth and multiplication of the bacilli, they tend to form spores. The spore forms are markedly resistant to biological extremes of heat, cold, pH, desiccation, chemicals (and thus to disinfection), irradiation and other such adverse conditions [1]. Therefore, the spore forms are the predominant phases in the environment and it is very largely through the uptake of spores that anthrax is contracted [1].

Within the infected host the spores germinate to produce the vegetative forms which multiply, eventually killing the host. A proportion of the bacilli released by the dying or dead animal into the environment (usually soil under the carcass) sporulate, ready to be taken up by another animal. The major sources of human anthrax infection are direct or indirect contact with infected animals, or occupational exposure to infected or contaminated animal products [2].

Humans become infected in one of three ways- cutaneous, inhalation and gastrointestinal. In Cutaneous route, the organisms gain access through small abrasions or cuts and multiply locally with an inflammatory response [3]. Incubation period varies from few hours to even up to 60 days. For Cutaneous anthrax, Incubation period (IP) ranges from few hours to 3 weeks, but most often it is 2 to 6 days; for gastrointestinal anthrax, the average IP(incubation period) is 3-7 days. In inhalation anthrax, the median incubation period is 4 days, but may be up to 10 or 11 days [1, 3].

Anthrax infection in humans provides permanent immunity and second attacks are rare [3]. Though in general, the case fatality rate (CFR) due to anthrax has been reduced due to antibiotics, but all three forms are potentially fatal if untreated and CFR is substantial in situation of use anthrax as biological weapon[3].

Cutaneous anthrax accounts for more than 95% of human cases. It begins 2-5 days after infection as a small papule resemble an insect bite developing within a few days into a vesicle filled with dark bluish

black fluid[3]. Rupture of the vesicle reveals a black Escher at the base with a very prominent inflammatory ring around the Escher. These were sometimes referred as malignant pustule. The lesion was classically found on the hands, forearms or head and is painless. Rarely did it find on the trunk or lower extremity. Generally, cutaneous lesions are single, but sometimes two or more lesions are present. The Cutaneous form is more often self-limiting and with treatment, CFR is < 1percentage cases are fatal. There are approximately 10-100 thousand human incidences annually throughout the world with significant numbers of cases in Chad, Ethiopia, Zambia, Zimbabwe and India [3, 4]. Anthrax is endemic throughout Africa, causing considerable livestock and wildlife losses and severe, sometimes fatal, infection in humans. Predicting the risk of infection is therefore, important for public health, wildlife conservation and livestock economies. However, because of the intermittent and variable nature of anthrax outbreaks, associated environmental and climatic conditions, and diversity of species affected, the ecology of this multi host pathogen is poorly understood [4].

Zambia has experienced an outbreak of Anthrax with a total of 233 suspected cases and 6 community deaths (CFR: 2.6%) reported from Chama District, Eastern Province between August and September 4, 2012 [5]. All patients had a history of contact (by ingestion or touch) with Hippo meat mysteriously dying in the upstream of the Luangwa River. The majority of cases presented with skin lesions compatible with Cutaneous Anthrax [5].

Animal anthrax is endemic disease in Ethiopia occurring usually in May and June every year (anthrax season) in several farming localities of the country, although suspected cases of livestock anthrax are reported from several districts, few of those are officially confirmed [6].

In Ethiopia, there was Anthrax outbreak in Afar Region in 9 August 2000 [7]. WHO has received reports of clusters of cases of suspected anthrax from the Region; no systematic epidemiological investigation has carried out (7).

The common use of traditional medicine for anthrax in Ethiopia indicates that the disease was well recognized by rural communities, but little are known about its prevalence, epidemiology and public health significance (8-10). According to the Federal Democratic Republic of Ethiopia Ministry of Health surveillance data, a total of 1,096 suspected human anthrax cases and 16 deaths (with a CFR of 1.5%) were reported from four regions (Tigray, Amhara, Oromia, and SNNP) during 2010/11 [11]. On Weekly PHEM Report from the Oromia Regional Health Bureau, ten-suspected anthrax cases and two deaths, report submitted in WHO epidemiological weeks 34 to the Regional level. The report included Sire Woreda of Arsi Zone. Under the Ethiopian Surveillance System, one case of anthrax is an outbreak and must be reported to Ministry of Health immediately[10]. We tried to communicate the Regional

Health Bureau PHEM officers in ORHB regarding the existence of an outbreak in the above-mentioned Zone and Woreda and if so to send us the line lists of cases and deaths. Accordingly, the Regional PHEM officers confirmed the existence of the outbreak, but line lists of cases from the Zone not yet received due to various reasons mentioned by the officer such as access for communication. We secured the Arsi Zone Health Department head, both PHEM officers land line, and cell phone numbers, because of late unsent report from all side, on September 7, 2016, a team of two residents went to the Zone and District to investigate the outbreak.

1.2.1 General Objective

The main objective of the study was to investigate cutaneous Anthrax outbreak and recommend control measures for affected Kebeles in Sire Woreda of Arsi Zone, Oromia, Ethiopia, September 01-07/2016.

1.2.1.1 Specific Objectives

- To investigate the existence of Cutaneous Anthrax outbreak in Sire Woreda
- To describe the magnitude of the Cutaneous Anthrax outbreak
- To support the local efforts already on the ground and take appropriate intervention measures.

1.2.2. Materials and Methods

1.2.2.1 Study area and population

Sire Woreda is one of the Woredas in the Arsi Zone, Oromia Region. It named after the landscape up lifted like bed and surrounded by gorge. As part of the Arsi Zone, Sire Woreda is bordered on the south by Diksis and Sude Woredas, on the west by Dodota and Lode Hetosa Woredas , on the north by Fantale Woreda of East Shoa Zone, on the east by the Jeju Woreda. The Keleta River separates it from Dodota and Fentale Woredas. The Administrative center is Sire town 72Km far from Assella, Capital Town of the Arsi Zone, with a total population of 102,449. Eighty-Seven percent of the population resides in rural Kebeles and the remaining in urban. The majority of the inhabitants practice Muslim,(61%), 30% practice Orthodox Christianity, and 9% were Protestants. It is situated on 1800 meter above sea level with an average temperature of 27°C. The Woreda has 22 Kebeles from which 20 are agro pastoralists and the rest two are town kebeles. There are three ethnic groups in the Woreda namely Oromo, Amhara and Gurage respectively in the order of their population size rank. The main food sources for households in this livelihood area are agriculture product (wheat, barley, bean and maize), livestock products (milk, butter, meat). Sleeping materials of the communities is mainly cattle hide and wooden bed.

1.2.2.2 Study design

A Descriptive cross sectional study design with focused group discussion was employed to describe the Cutaneous Anthrax outbreak from September 1 –7/2016.

1.2.2.3 Case Definition;

Suspected case: - any person living in the affected Kebeles with acute onset characterized by several clinical forms of Cutaneous: skin lesion evolving over 1 to 7 days from a papular through a vesicular stage, to a depressed black scar, invariably accompanied by edema that may be mild to extensive

Confirmed Case; - any person with localized form of Cutaneous: skin lesion evolving over 1 to 7 days from a papular through a vesicular stage, to a depressed black scar, invariably accompanied by edema that may be mild to extensive and confirmed by laboratory.

1.2.2.4 Data collection method

We conducted focused group discussion with the community members and officials, discussion with Zonal Health Office, Public Health Emergency Management (PHEM) officer and Zonal and Woreda Livestock Resource Development Office Heads, reviewing the surveillance data, and reorienting the case definitions to the specific type of anthrax. We used Microsoft excel for entering and analysis of data.

1.2.2.5 Ethical Issues

Support letter obtained from the Oromia Regional Health Bureau (ORHB). A letter submitted to the Zonal and Woreda Health Offices in order to obtain their approval for data collection. Consents also secured from study participants. Confidentiality assured and Participants treated with respect and willingly participated in the study, with no payment or cohesion. Verbal consents to take photographs were obtained from parents and affected families.

1.2.3 Results

Regarding Cutaneous Anthrax Outbreak Situation in the Zone, Between September 1-7/2016, the Zonal Health Department received 10 suspected Cutaneous anthrax cases and two community deaths from the Sire Woreda two Kebeles, namely Gesela Shashe and Koloba Shamela.

However, after our team arrived and searched for more active cases, no additional new cases found. Totally, 10 suspected human Cutaneous anthrax cases were identified with two deaths between September 1-7, 2016. The onset of the outbreak was on 27 August 2016, but reported on 1 September 2016 as index case.

The causes of the reported anthrax, both from the index case medical records and observation of cases found during the investigation was having a meal and contact of slaughtered cattle meat being shared among their neighborhood and using its product like hide for sleeping purposes after four to six days. This practice was observed in all the interviewed cases of that community which they responded that even though they are seeing the cattle is dying by discharging blood from cattle orifice (nose and mouth), which killed five cattle (officially reported number from the Woreda Livestock Development Office) they used to eat the meat of slaughtered sick animal. The figure below indicates the epidemic curve and the pattern.

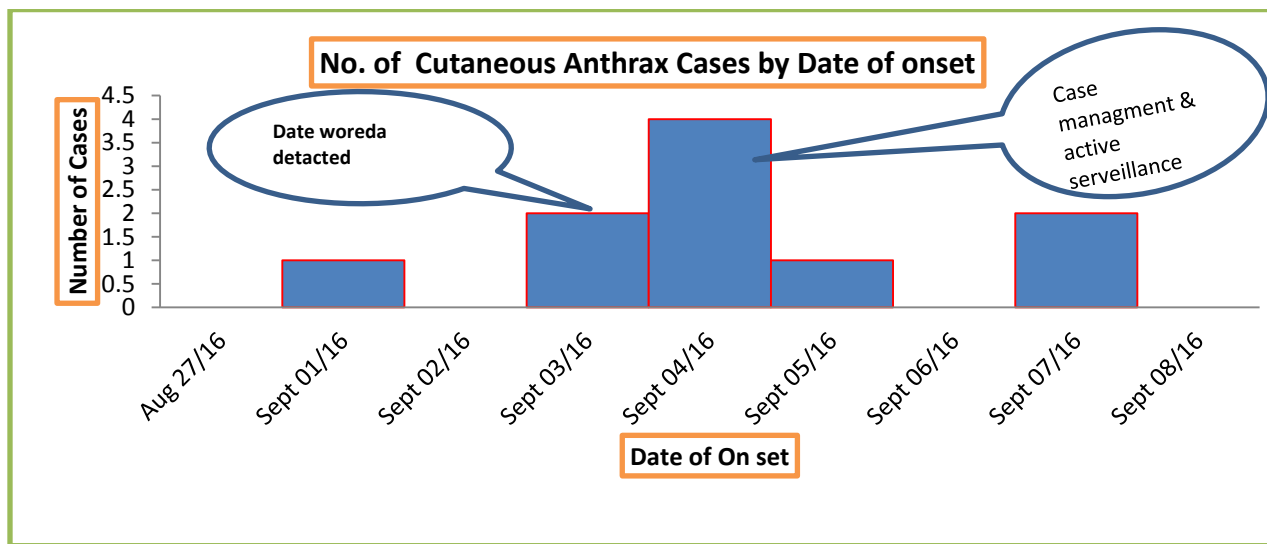


Figure 1.2.2: Number of Cutaneous Anthrax cases by date of onset, Sire Woreda of Arsi Zone, Oromia Region, 2016

Index case registered at the health facility on September 1/2016 and the highest number cases registered on September 4/2016. There were no cases on September 2 and 6/2016.

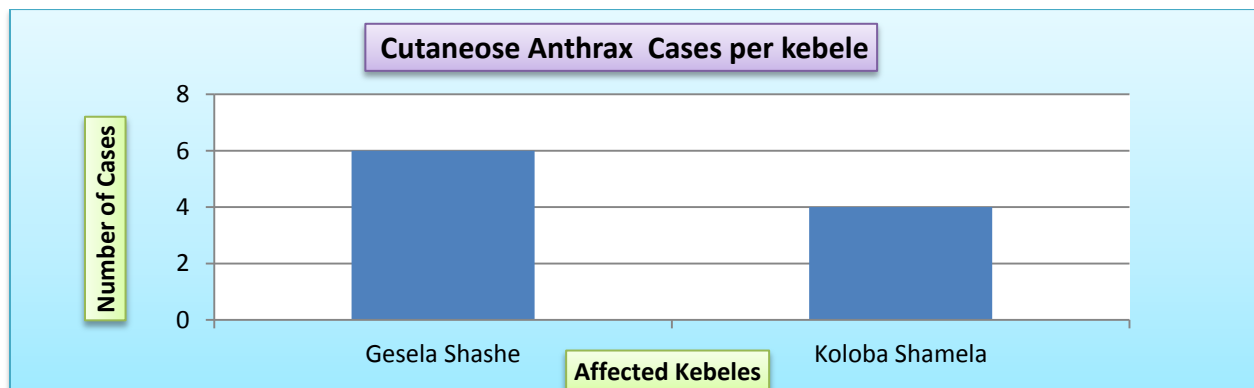


Figure 1. 2 .3: Distribution of Cutaneous Anthrax outbreak affected Kebeles in Sire Woreda of Arsi Zone, Oromia Region, 2016

Gesela Shashe is the first affected Kebele in the Woreda totally reporting 6 cases from September 1 up to September 7/2016 where as Koloba Shamela Kebele reported 4 cases from September 1-7/2016.

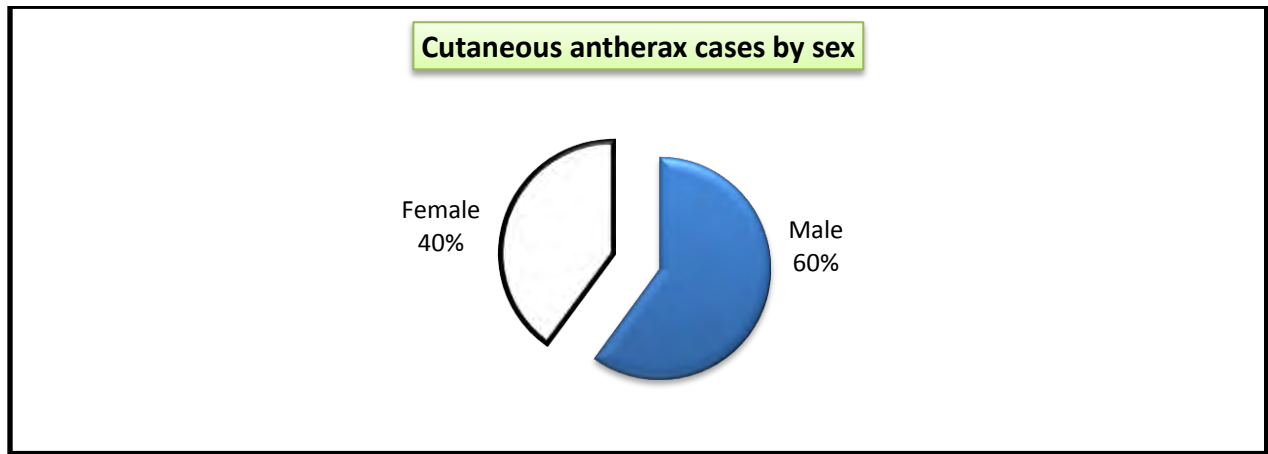


Figure 1.2.4: Proportion of cases by sex, Sire Woreda of Arsi Zone, Oromia Region, 2016

Six (60%) of the cases were males and males were more affected than females 4(40%).

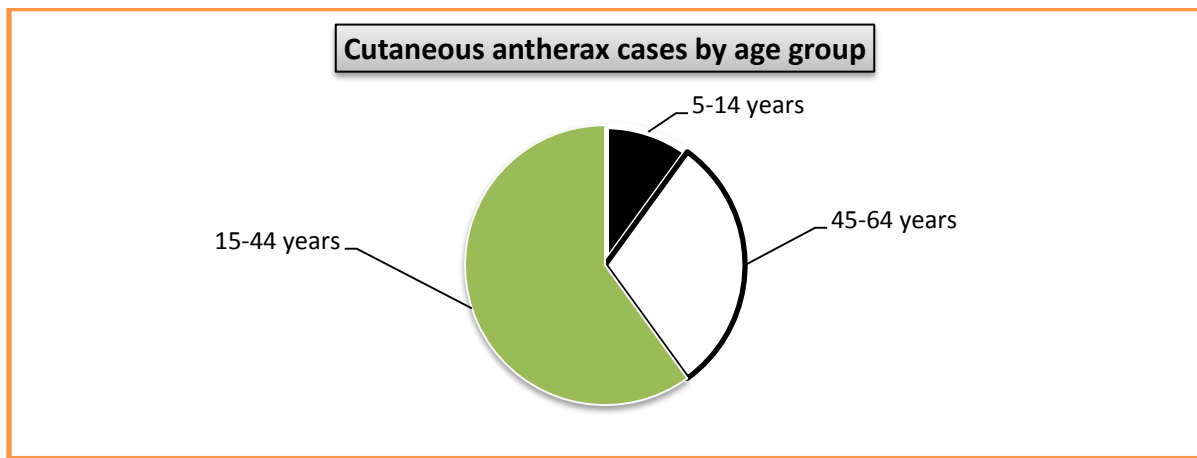


Figure 1.2.5: Proportion of cases by age group, Sire Woreda of Arsi Zone, Oromia Region, 2016

From total cases (six cases) were in the age groups of 15 - 44 years, followed by 45 – 64 years old three cases, and the remaining case was in the age group of 5-14 years; that was nine years old. The mean age was 35 years.

Table 1.2 Attack rate of Suspected Human Cutaneous Anthrax by sex in Sire Woreda of Arsi Zone, Oromia Region, 2016

Sex	Total Population of affected woreda	Cases	Attack rate per 10,000
Male	50,200	6	1.2
Female	52,249	4	0.8
Over all	102,449	10	0.98

The overall attack rate in the District was 0.98 and the fatality rate is 0.2 per 10,000 populations with males highly affected than females (Table 1).

Table 1.3: Attack rate of Suspected Human Cutaneous Anthrax by Kebele, Sire Woreda of Arsi Zone, Oromia Region, 2016

Kebele	Total Population	Number of Cases	AR/Attack rate per 10,000
Gesela Shashe	13,348	6	4.5
Koloba Shamela	10,247	4	3.9
Total	23,595	10	4.2

When we see the attack rate by affected Kebeles per 10,000 populations, Gesela Shashe Kebele recorded more attack rate than Koloba Shamela Kebele with the attack rate of 4.5 and 3.9 per 10,000 people respectively.

During our visit of the affected Kebeles, two active cases were found showing typical signs of cutaneous anthrax. Those active cases presented a typical anthrax skin lesion (Black Eschar), Ulcer and vesicle ring, oozing and edematous. The most affected area was the hand and legs.

All Suspected cases and the active cases have been given antibiotics. However, in our visit we found that two cases were not completely cured. There were no laboratory investigations done at the time of the investigations since all of the cases identified were already on treatment and recovering from the infection. Therefore, no samples were taken.



Figure 1.2.6: Some of the active cases of cutaneous anthrax in Koloba Shamela Kebele of Sire Woreda, 2016

1.2.4 Public Health Intervention

1.2.4.1 Major activities during our visit at Arsi Zone Health Department

- To obtain relevant information regarding the outbreak (Cutaneous Anthrax outbreak) in the Zone, we conducted discussion with the Zonal Health Department officials (Zonal Head, PHEM Core Process Focal and workers).
- During discussion, we learned about the presence of suspected Anthrax in the Zone and they told us they reported to the Region about the situation.
- We obtained line-list of 10 cases with hard copy from the Zonal Health Office, which is not organized and compiled properly.
- We reviewed line-list to track areas affected by the outbreak in Sire Woreda where all of the cases were reported.
- We encourage the Zonal Health Officials to keep up good communication with the Regional Health Bureau for early responses and resources pooling, to ensure prompt cases management.

After we reviewed the available line-list and confirmed the occurrence of the suspected outbreak in Sire Woreda, we recommended the Zonal Health Department to alert all Woredas and initiate active surveillance for early case detection, with our active engagement.

1.2.4.2 At Sire Woreda Health Office

- Conducted discussion with Woreda Health Officials about the situation
- We obtained line-list of additional 10 cases from the Woreda which was sent to the zone

- The Zonal and Woreda health offices health workers, health extension workers, and livestock development health workers in the community have sensitized the community on prevention and control activities against eating dead animals and that they should notify the authorities, and bury all dead animals immediately.
- Antibiotic treatment have been given for all cases
- Conducted an active case search in collaboration with the community level women development army leaders.
- The veterinary (livestock development) office has carried out a mass vaccination for animals in all the affected areas.
- Awareness to avoid the herd animals from the known contaminated area by the fluids of dead or slaughtered sick cattle's.



Figure 1.2.7: While awareness raising activity conducted in the community and Elementary School of Gesela Shashe Kebele, Preparatory school of Sire Woreda, 2016



Figure 1.2.8: While awareness raising activity conducted for woreda officials at Sire Woreda, 2016



Figure 1.2.9: While interviewing the affected family at Gesela Shashe Kebele, Sire woreda, 2016

1.2.5. Gaps Identified

- According to the National PHEM Guideline, timely reporting of outbreak at all levels is not functional.
- Early response not provided from the Arsi Zone Health Department.
- Surveillance data analysis for action was not done timely.
- Livestock resource development office
 - ✓ Were not conduct vaccination of livestock as per its schedule.
 - ✓ Has shortage of vaccine for Livestock.
 - ✓ Has shortage of refrigerator for vaccine storage and management at Woreda level.

1.2.6. Discussion

Totally, 10 suspected human Cutaneous anthrax cases were identified with two deaths during the investigation period and suspected Cutaneous anthrax cases were reported for the first time in the area where almost all of the community member's day-to-day life is with animal breeding and agriculture activity.

Even though there is vaccine for livestock to prevent the disease, shortage of diluents to conduct vaccination brought such consequences on human as well as livestock resource loss whose impact not only on the owners but also the country as well.

Taking into consideration the fact that exposure of cattle might be attributed to anthrax spores in the soil, while grazing, the outbreak of the human cases could be due to contact with cattle products. Anthrax cases had not been previously reported in the current outbreak area; however, it is possible that undiagnosed cases in livestock or wildlife might have occurred previously in those areas. It is also possible that known carcass sites further away could have been the source of the spores, which transported through waterways, natural drainage patterns to the locations of the outbreak.

In the outbreak, the majority of cases were in the age group of 15-44 and 5-9 years old, comprising six and three respectively in each age group. The remaining one case was at the ages of 5-14 years old. The mean age was 35 years. The overall attack rate in the district was 0.98 and the fatality rate was 0.2 per 10,000 populations. Koloba Shamela and Gesela Shashe Kebeles affected respectively.

In our investigation, six of the cases were males by gender, indicates that males were more affected than females 4.

It is observed that there is problem in surveillance system of the Woreda and Zone. Surveillance data were not in place in timely and complete manner which contradict the national PHEM guideline standard.

1.2.7. Limitation of the study

The existence of the outbreak in the area was not reported immediately from Woreda to Zone and line list was not organized into Soft copy for analysis. The study was not supported with laboratory test due to late report to the Zone.

1.2.8. Conclusion

The clinical presentation and epidemiological evidences indicated that Cutaneous anthrax was a possible cause of illness and deaths among human beings and in livestock of the area even though there is no laboratory confirmed result. The outbreak has affected two Kebeles (Gesela Shashe and Koloba Shamela).

1.2.9. Recommendation

- ◆ Coordinated effort needed to indicate the community towards the mode of transmission of the disease and enhance prevention.
- ◆ There should be routine vaccination of livestock in the area to prevent animal to human transmission of disease.

- ◆ Both Health and livestock Development Offices at the Zone and Woreda should strength the surveillence system and conduct active surveillence regularly.
- ◆ The Regional Livestock Development Office should access the vaccines support with supplies to such vulnerable areas.

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Data collection tools for suspected Human Anthrax outbreak investigation in Sire woreda, Arsi Zone, Oromia Region, Ethiopia from September 1-7, 2016 G.C.

Part I - Identification

ID number of Patient/Control: _____, Date of interview: _____, Region _____
 Zone _____ Woreda _____ Kebele _____ Got _____ Phone _____

(Circle the relevant answer)

This information was taken from. **1. Case** = Gender , 1) Male 2) Female
2. Control = Gender , 1) Male 2) Female

First name _____ Middle name _____

Date of birth ____ / ____ / ____.

Section 1: Socio-demographic/Economic Characteristics

S. No	Questions	Alternatives
1.01	Sex	1. Male 2. Female
1.02	Age	years _____ Months _____
1.03	Occupation of the patients (Circle all the relevant answer)	1. Pastoralist or Animal husbandry, 2. Farmer 3. Homemaker 4. Student 5. Butcher, 6. Daily laborer 7. Merchant 8. Governmental 9. Other (specify) _____
1.04	Family Occupation (Circle all the relevant answer)	1. Pastoralist or Animal husbandry, 2. Farmer 3. Homemaker 4. Student 5. Butcher, 6. Daily laborer 7. Merchant 8. Governmental 9. Other (specify) _____
1.05	Religion	1. Muslim 2. Orthodox 3. protestant 4. Catholic 5. Other (specify) _____
1.06	Ethnic group	1. Oromo 2. Amhara 3. Tigre 4. Other (specify) _____
1.07	Educational level of the patient/control	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.08	Educational level of the family	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.09	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 who gets ill within 7 days after eating meat of sick animals or close contact with animals that have bleeding from nose, mouth and anus (suspected human case of anthrax) in the family? Yes ____, No ____ . If yes, number of sick person _____.

1.12. Did the animal dwelling separated from the human dwelling? ____, if yes; how much distance far from human dwelling _____,

1.13. Did the house have Window? ____ If yes; how many Window/s the house has? ____

1.14. How many sleeping rooms the families have? _____.

1.15. What is the floor of human dwelling (home)?

1. Soil Sealed by animal dung,
2. Soil only (not sealed).
3. Masonry and Cemented
4. Other specify _____,

1.16. The super structure of the house was made from what?

1. Soil and wood Sealed by animal dung,
2. Soil and wood only (not sealed).
3. Masonry and Cemented
4. Other specify _____

Section 2 - General history of current illness (House-to-House Interview) (For Cases Only)

a. Headache	1. Yes 2. No 3. Don't now	i. Bloody vomiting	1. Yes 2. No 3. Don't now
b. Fever;	1. Yes 2. No 3. Don't now	j. Abdominal pain	1. Yes 2. No 3. Don't now
c. Chills	1. Yes 2. No 3. Don't now	k. Leaking wound (oozing)	1. Yes 2. No 3. Don't now
d. Loss of appetite	1. Yes 2. No 3. Don't now	l. Swelling around injection site /swelling of limbs	1. Yes 2. No 3. Don't now
e. General swelling	1. Yes 2. No 3. Don't now	m. Itching	1. Yes 2. No 3. Don't now
f. Nausea	1. Yes 2. No 3. Don't now	n. Bloody diarrhea	1. Yes 2. No 3. Don't now
g. Diarrhea (non-bloody)	1. Yes 2. No 3. Don't now	o. Breathing Difficulties	1. Yes 2. No 3. Don't now
h. Vomiting (non-bloody)	1. Yes 2. No 3. Don't now	p. Other (please describe below)	1. Yes 2. No 3. Don't now

Section 3 - Potential exposures (Cases and Control)

3.01. Does your occupation contact with animals or agriculture?

If yes Specify _____.

3.02. Do you have cattle/Domestic animals? ___ Yes ___, No ___.

3.03. Are the domestic animals/cattle regularly taken vaccination? _____. If yes, how many times annually? _____,if no Why? _____. List the species of domestic animals vaccinated _____.

3.04. Did you aware of suspected animals with anthrax dead or slaughtered in your locality/area?

3.05. Did you have contact with any parts of dead/slaughtered animal of suspected/confirmed anthrax cases? ___, date of the animal died _____.

- **Who was** disposed the dead animals/carcass _____
- **How was** the dead animals/carcass disposed? _____
- **Where** was the animals/carcass disposed? _____
- Was the dead/slaughtered animals vaccinated before? **1,Yes 2.No**
- If yes _____ times/annually.

The following questions related to the 2 weeks prior to onset of illness:

3.06. Have you been involved in any activities that might expose wounds to soil e.g. gardening, renovation, camping, outdoor sports, recreational activities, etc., in the **2 weeks prior** to illness?

1. Yes ___, 2. No ___, 3. Don't know _____

3.07. Have you had any contact with livestock/body fluids of livestock in the **2 weeks prior** to illness?

1. Yes _____ 2. No _____ 3. Don't know _____

3.08. Have you had any contact with animal products such as untreated animal hair, wool, hides, or animal skin drums in the 2 weeks prior to illness?

1. Yes ___ 2. No ___ 3. Don't know _____.

3.09. Have you eaten the flesh or any products of suspected anthrax affected slaughtered cattle or other animal products in the 2 weeks prior to illness?

1. Yes _____ 2. No _____ 3. Don't know _____.

If yes in what form you ate? 1. Raw meat (Qurt), 2. Tibs(roasted meat) , 3. Keywet, 4. Other _____

3.10. Who first touch the raw meat/flesh of anthrax suspected cattle /ox in the house? _____, if other person; Name: _____. Suspected anthrax Status: _____.

3.11. Have you participated in disposing /slaughtering (underline 1), the suspected anthrax affected animal dead/slaughtered? _____.

If yes, specify your activities _____.

3.12. Where did the anthrax suspected animal slaughtered? _____.

3.13. Is there river down ward from the slaughtered or disposed dead animal? _____. If yes, how far from the surrounding river? _____. If relevant, take the sample and picture from the area.

3.14. Have you travelled away from home or overseas in the 2 weeks prior to illness?

Yes ___ No ___ Don't know ___.

Section 4: Knowledge of the Community about Anthrax Disease

S/N	Question	Answer
4.01	Have You ever heard about anthrax disease?	1. Yes
		2. No
4.02	Do you know modes of transmission for Anthrax?	1. Yes
		2. No
		3. If yes specify _____
4.03	Where do you go first when you get ill?	1. Health Facility
		2. Traditional Healers
		3. Holy Water
		4. Stayed at home
		5. Other :(Specify) _____
4.04	Whom do you think can be affected by Anthrax?	1. Children < 5 years
		2. Children < 18 years
		3. Women of any ages
		5. Other (specify): _____
4.05	What do you think Anthrax can be cured?	1. Using modern medicine
		2. Using traditional Medicine
		3. Other(Specify) _____
4.06	How do people people get Anthrax?	1. Contact with a B. Anthrax from ill person
		2. Direct Contact with the Domestic Animals (Cattle) affected by the anthrax Bacilli
		3. Through consuming uncooked meat
		4. Through inhalation of powder, dusts
		5. From God
		6. Bad attitude of other people
		7. Other(Specify)
4.09	What do you think Anthrax can be Prevented?	1. By preventing themselves from contact with animals affected by B. Anthrax.
		2. By eating cooked meat
		3. By regularly Vaccinating the Domestic animals

Part II - Clinical Information

Information that follows to be obtained from clinical records/sources

Clinical details: Hospital _____ Consultant _____

Telephone number _____

General signs			
a) Fever;	1.Yes 2.No 3. Don't now	f. Altered consciousness	1.Yes 2.No 3. Don't now
b) Systemically unwell	1.Yes 2.No 3. Don't now	g) Cough	1.Yes 2.No Don't now 3.
c) Oropharyngeal lesion	1.Yes 2.No 3. Don't now	h) Shortness of breath	1.Yes 2.No Don't now 3.
d) Sweating	1.Yes 2.No 3. Don't now	i) Skin lesion	1.Yes 2.No Don't now 3.
e) Localized or generalized edema	1.Yes 2.No 3. Don't now		

GP name _____ telephone number _____

Date of Diagnosis _____

Section 5 – Symptoms

5.02. Does the patient have a localized skin lesion?

Yes 1 ___ No 2) ___ — If patient does not have a lesion, skip to next Section .

Signs associated with localized lesion			
a) Pain	1.Yes 2.No 3. Don't now	d) Lymphadenopathy	1.Yes 2.No 3. Don't now
b) Tenderness	1.Yes 2.No 3. Don't now	e) Skin necrosis	1.Yes 2.No 3. Don't now
c) Oedema	1.Yes 2.No 3. Don't now	f) Skin abscess	1.Yes 2.No 3. Don't now

5.03. Please give details of any other signs associated with localized lesion

6. Hospital admission history (for case only)

6.01. a) Was patient hospitalized? Yes 1 ___ No 2 ___

b) If yes, date hospitalized ___ Date ___ Month ___ Year

6.02. a) While in hospital, was the patient prescribed antibiotics? Yes 1 ___ No 2 ___ " If no, skip to Q6.03

b) If yes, what date did they start to take antibiotics? ___ Date ___ Month ___ Year

c) If yes, what antibiotics (list all) _____

6.03. a) Was surgical debridement performed. Yes 1 ___ No 2 ___ " If no, skip to Q6.04

b) If yes, dates of surgery ___ Date ___ Month ___ Year

6.04. a) Was the patient admitted to intensive care. Yes 1 ___ No 2 ___ " If no, skip to Q6.05

b) If yes, date admitted ___ Date ___ Month ___ Year

c) Date re-admitted (if applicable) ___ Date ___ Month ___ Year

6.05. a) Was the patient given anthrax immunoglobulin (AIG) **Prophylaxis**? Yes 1 ___ No 2 ___ " If no, skip it.

b) If yes, on what date was the first dose given? ___ Date ___ Month ___ Year

c) How many doses have been given? ___ doses

Section 7: Samples taken for microbiology

7.01. Does the sample taken from cases a) **Yes** ___ b) **No** ___ **if no** don't fill the next table.

7.02. What samples were obtained for microbiological diagnosis? _____.

LABORATORY SPECIMENS OBTAINED:				
Nasal swab	Yes	No	Unknown	If yes, sent to :
Blood/serum	Yes	No	Unknown	If yes, sent to :
Skin biopsy or wound culture	Yes	No	Unknown	If yes, sent to :
Specimens available now?	yes	No	Unknown	If yes, what is available and where?

Lab Result					
Specimen	Date Obtained	Test Ordered	Laboratory	Result	Current Location of Specimen
Nasal Swab					
Blood/serum					
Skin biopsy or wound culture					
Other, specify					

CHAPTER- II

Surveillance Data Analysis

2.1 Surveillance Data Analysis of Severe Acute Malnutrition, Arsi Zone, Oromiya Region, Ethiopia, 2005-2007 E.C

Abstract

Background: Malnutrition is one of the leading causes of child death in developing countries including Ethiopia. Arsi Zone, Oromiya Region is highly prone to severe acute malnutrition since the past decades. This study intended to analyze severe acute malnutrition (SAM) reports of this zone to understand its trends and propose recommendation.

Methods: Cross-sectional descriptive study conducted during collection of SAM data. Three years (2005 - 2007 E.C) report of SAM from the Zone and Regional database reviewed. Different variables such as, SAM admissions, deaths, cured, total discharges in different age category with respect to time and place were included in the analysis of SAM report.

Results: In Arsi Zone 34,587 total admissions of SAM reported at Outpatient Therapeutic Program (OTP) and establishing Center (SC) in the last consecutive three years (2005 - 2007 E.C). Among these cases, 33,522 (94.46%) of them were new admission. Children 6-59 months of age constituted 33,064 (97%) of all new admissions. Admissions from severe acute malnutrition were decreasing from 2005 to 2006, which were 11,620 and 9,908 respectively and then increased to 13,059 at 2007. From the past consecutive three-year's report of SAM in the Zone 64 deaths with a fatality rate of 0.2 % reported. The annual fatality rate inclined from 0.14 % in 2005 to 0.31% in 2006 and then declined to 0.11 in 2007.

Conclusion and Recommendation: Although the number of deaths seems to decrease, Therapeutic Feeding Program (TFP) admissions were increase from 2005 to 2007 E.C. This may be due to enhanced screening activity and improved cases management. The case management of SAM should strengthen. The existing reporting formats also need to revise to include sex category, pregnant, and lactating mothers.

Keywords: Severe Acute Malnutrition, Surveillance Data Analysis, Arsi, Ethiopia

2.2 Introduction

Malnutrition is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. This state is clinically manifest or detect only by biochemical, anthropometric or physiological tests. There are four forms of malnutrition: namely; under nutrition, specific deficiency, and imbalance and over nutrition. The numbers of possible underlying causes of malnutrition seem endless and their interrelationships are complex [1].

However, one way of identifying these causes is to identify the three positive conditions necessary for adequate nutrition or, more precisely, necessary for adequate dietary intake and absence of disease. These are adequate access to food (household food security); adequate care of children and women: adequate access to health services & a healthy environment. In many Countries, nutrition policy and intervention aimed at young child, pregnant and lactating women [2].

Reducing malnutrition among children under the age of five remains a huge challenge in developing countries. An estimated 230 million under-five children are believed to be chronically malnourished in developing countries. Malnutrition contributes to over 50% of all child deaths worldwide each year [3].

In Sub-Saharan Africa, 41% of under-five children are malnourished and deaths from malnutrition are increasing on daily basis in the Region [3].

In Ethiopia, severe acute malnutrition is among one of the 21 notifiable and weekly reportable diseases in the Public Health Emergency Management system. Although the Ethiopian Government has adopted a crosscutting approach to nutrition over the last decade, there is no specific nutrition policy [4].

While the problem of malnutrition in Ethiopia relatively well documented, its specific determinants not well understood. Nationally, 44 % of children under age five are stunted, and 21 % of children are severely stunted [4]. Regional variation in the prevalence of stunting in children is substantial. Stunting levels are somewhat above the national average in the Amhara (52 %), Tigray (51 %), Afar (50 %), and Benishangul-Gumuz (49 %) regions and are lowest in Addis Ababa and the Gambela region (22 and 27 %), respectively [1,4].

In ArsiZone, malnutrition has been a priority health issue repeatedly for several decades. Nutritional assessment which was carried out in this zone in 2007 EFY, identified that due to yield reduction and water shortage all rural Woredas of the zone are classified as hot spot area for SAM. Among these 25 woredas, 6 of them categorized under priority one, 13 put as priority two, five put as priority three and the rest one woreda put as non hot spot woreda .

At the end of 2007 E.C., there were 595 Outpatient Therapeutic Programs (OTP) and 97 Established Centers (SC) in the Zone. The average annual new admission report of severe acute malnutrition during the past three years is 11,529.

0.1 Table 2.1:- Hot Spot Woredas, Arsi Zone, Oromia, Ethiopia, and 2008 E.C.

S.N	Name of Woredas	Hot Spot Category	
		Priority 1	Priority 2
1	Aseko	✓	
2	Gololcha	✓	
5	Guna	✓	
4	Jaju	✓	
3	Seru	✓	
6	Zeway Dugda	✓	
8	Amigna		✓
12	Bale Gesgar		✓
11	Chole		✓
9	Dodota		✓
13	Honkolo Wabe		✓
10	Merti		✓
7	Robe		✓
14	Shirka		✓
18	Sire		✓
17	Sude		✓
16	Tena		✓
15	Tiyo		✓

According to data obtained from Zonal Health Department, from the total twenty-five Woredas of Arsi Zone, six Woredas categorized under priority one, twelve Woredas under priority two, five Woredas under priority three and only one Woreda categorized under non-hot spot Woredas.

Map of Hot-spot Woredas, Arsi Zone as of 2016 G.C.

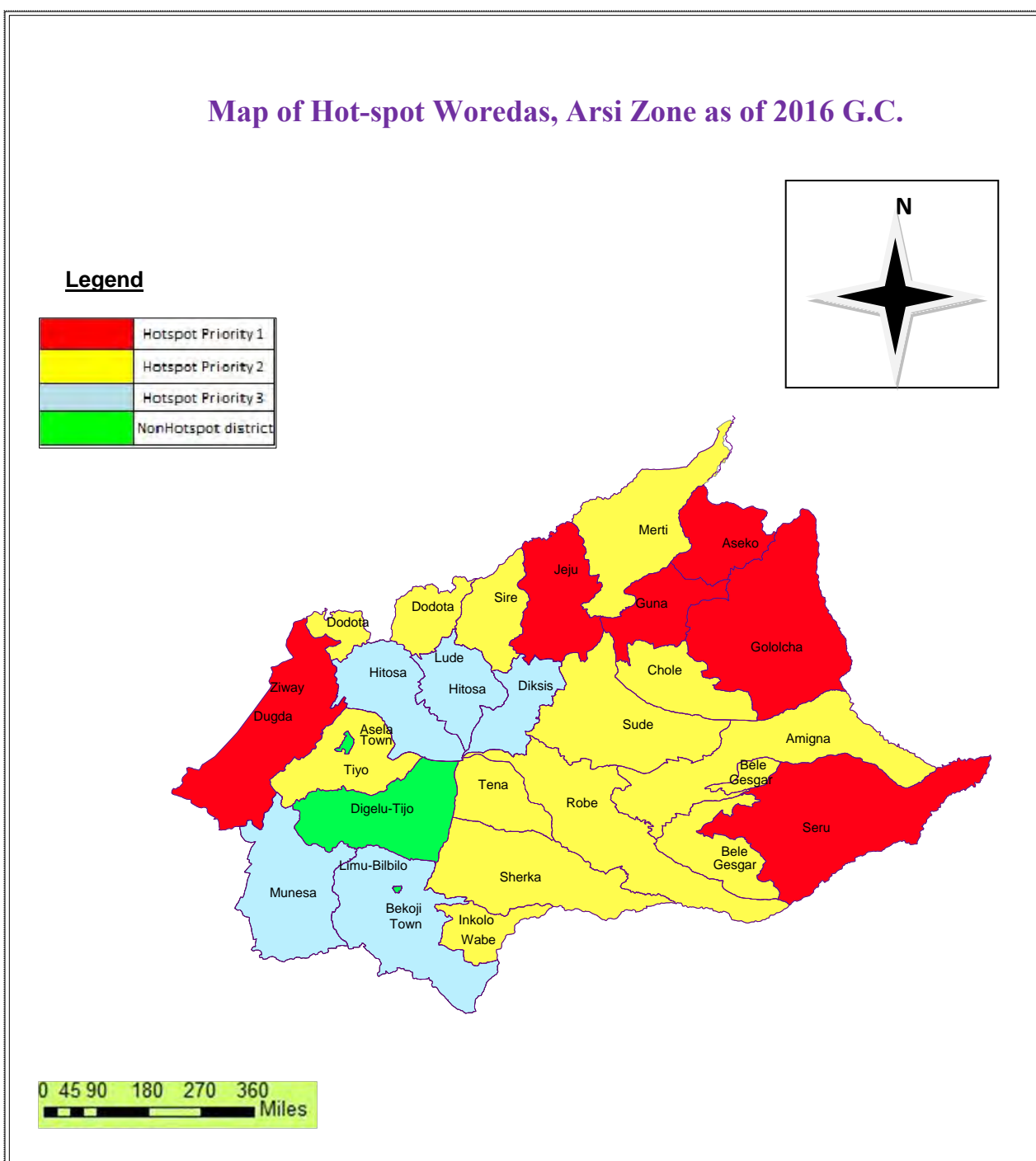


Figure 2.1: Map of Hot- spot Woredas of Arsi Zone, Oromia, Ethiopia, 2016

Based on the data from Arsi Zonal Health Department, (Aseko, Gololcha, Guna, Jeju, Seru, and Zeway Dugda) Woredas were under category of priority one. Woredas which were under category of priority two are (Amigna, Bale Gesgar, Chole, Dodota, Honkolo Wabe, Merti, Robe, Shirka, Sire, Sude, Tena, and Tiyo) and (Diksis, Hetosa, Limu-Bilbilo, Lode hetosa, and Munesa)

Woredas were under category of priority three. Digaluna Tijo was the only non-hot spot Woreda from the Zone during the year 2008 E.C.

2.3. Study Rationale

Routine analysis of surveillance data is a key function for detecting/identifying outbreaks, monitoring disease trends, and evaluating the effectiveness of disease control programs and policies. Results from data analysis can trigger public health action when incidence of diseases is increasing.

2.4. Objectives

2.4.1. General Objective

- To analyze three years (2005 - 2007 EFY) data of severe acute malnutrition (SAM) and describe trends of morbidity and mortality of the disease, Arsi Zone, Oromia, Ethiopia.

2.4.2. Specific Objectives

- To understand prevalence of Severe Acute Malnutrition.
- To identify morbidity and mortality of the problem by person, time, and place over the last consecutive four years.

2.5. Methods and Materials

2.5.1. Study Area

Arsi Zone of Oromia Regional State was the study area for Severe Acute Malnutrition surveillance data analysis.

2.5.2. Case Definitions

Suspected SAM: -Children of age from 6 months to 5 years with MUAC less than 11cm and/or with bilateral edema regardless of their MUAC (4).

Confirmed SAM:-Children with MUAC less than 11cm and/or children with bilateral edema regardless of their MUAC (4).

2.5.3. Study Period

Secondary data of Malnutrition for the past three years (2005-2007 E.C) collected analyzed and interpreted from June 20 to August 30/2016.

2.5.4. Study Design

Descriptive cross-sectional study design was conducted.

2.5.5. Study Population

All population of age between age group 6 month to 5 years in Arsi Zone, which was estimated to be 3,140,962 according to 2007 EFY projection, was included in the study.

2.5.6. Study Subjects

All population of age group 6 months to 5 years with Sever Acute Malnutrition

2.5.7. Data Collection Procedure

We collected Secondary data of malnutrition for the last consecutive three years from Zonal PHEM and Family Health departments, Regional MCH database reviewed and collected using structured checklist. In addition, we reviewed hard copy of SAM reports at Zonal Health Office.

2.5.8. Data Analysis Procedure

The collected data analyzed using Microsoft Excel in respect to important variables. Severe acute malnutrition data was presented in time, place and person.

2.5.9. Data Variables

During data collection and analysis, variables such as age category, admission type, therapeutic feeding sites with respect to time and place considered accordingly.

2.5.10. Data Dissemination

The study finding prepared to be share with AAU/School of public health/Department of EFETP Coordinators and mentors, ORHB and Arsi Zonal Health Department in both hard copy and electronic soft copy.

2.6. Results

During the last three years (2005-2007 E.C), 34,587 total admissions of severe acute malnutrition identified at OTP and SC programs in Arsi Zone, Oromiya Region. Among these admissions, 33,522 (96.92%) of them were newly admitted. Among total new admissions, 94.29 % of them screened with MUAC measurement (figure 5). SAM cases are high from September to November in all analyzed years. The prevalence of SAM in under five years children was 2.6 % in 2005, 2.2 % in 2006, and 2.8 % in 2007 E.C. OTP admission sites increased from 564 in 2005 E.C to 595 in 2007 E.C.

Table 2.2. Total new admissions of (SAM), Arsi Zone, Oromia, Ethiopia 2005 - 2007 E.C

Years	Number of admissions		
	OTP	SC	OTP+SC
2005	11366	254	11620
2006	9561	347	9908
2007	12523	536	13059
Total	33450	1137	34587

New admissions of SAM cases which were 11,620 in 2005 E.C., decreased to 9,908 in 2006 E.C. and again increased to 13,059 (12.4%) in 2007 E.C. in Arsi Zone, Oromia Region.

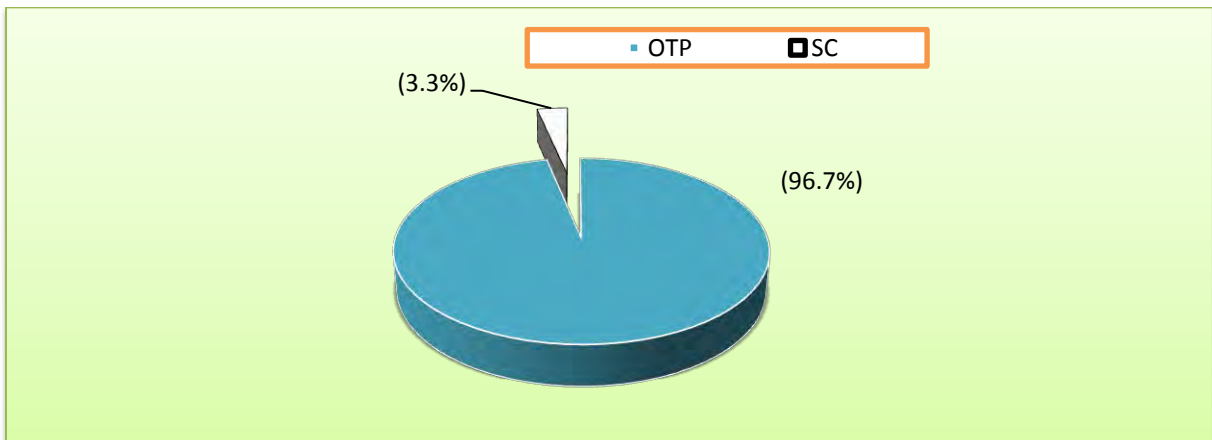


Figure 2.2: Total new admissions of SAM at OTP and SC programs in Arsi Zone, Oromiya, Ethiopia 2005-2007 E.C

From the total admissions of 34,587 SAM cases at OTP and SC, 33,450(96.7%) of cases were treated at OTP program, and 1,137(3.3%) of cases were treated at SC in three consecutive years (2005-2007 E.C.) in Arsi Zone, Oromia Region as shown in figure 2.

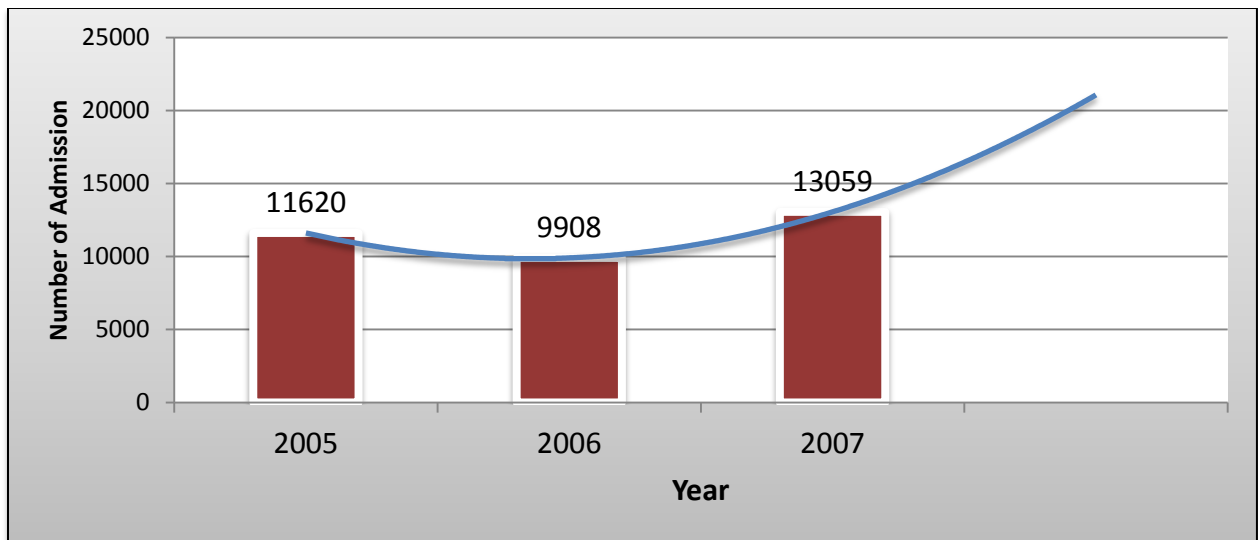


Figure 2.3: Total new admissions of SAM Arsi Zone, Oromiya, Ethiopia 2005 - 2007 E.C

The number of new admission of SAM cases decreased from 11,620 in 2005 to 9,908 (15%) in the year 2006 E.C., but it increased again to 13,059(32%) in the year 2007 E.C. Arsi Zone, Oromia Region as shown in Figure 2.

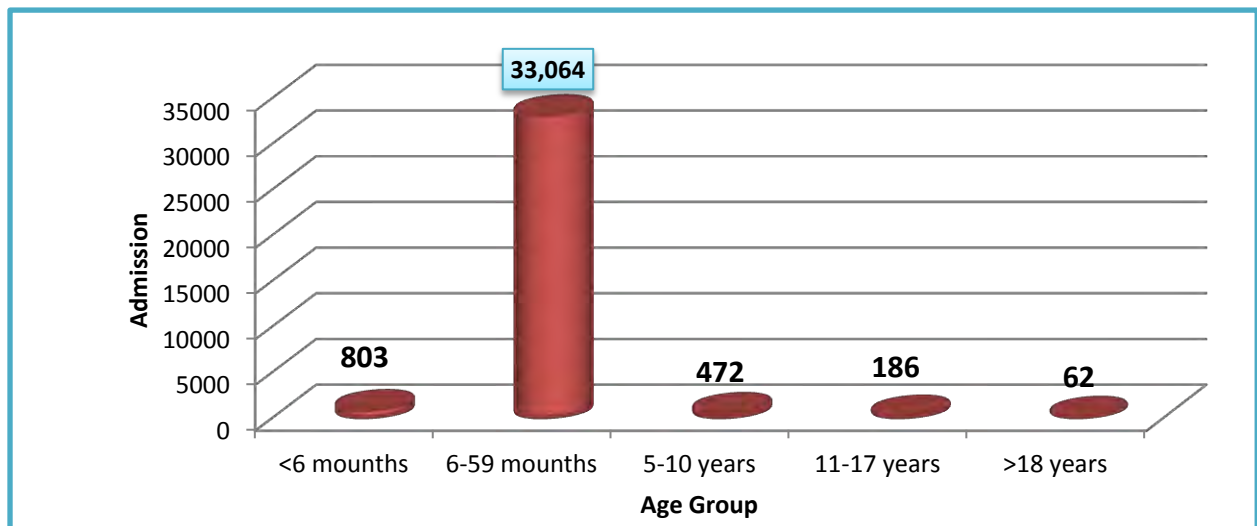


Figure 2.4:- Total new admissions of SAM, by age Arsi Zone, Oromia, Ethiopia 2005 - 2007 E.C

From the total new admissions of SAM cases of Arsi Zone, Oromia Region, in three consecutive years (2005-2007 E.C.), 33,064(95.6%) of cases were children 6-59 months old (figure 3).

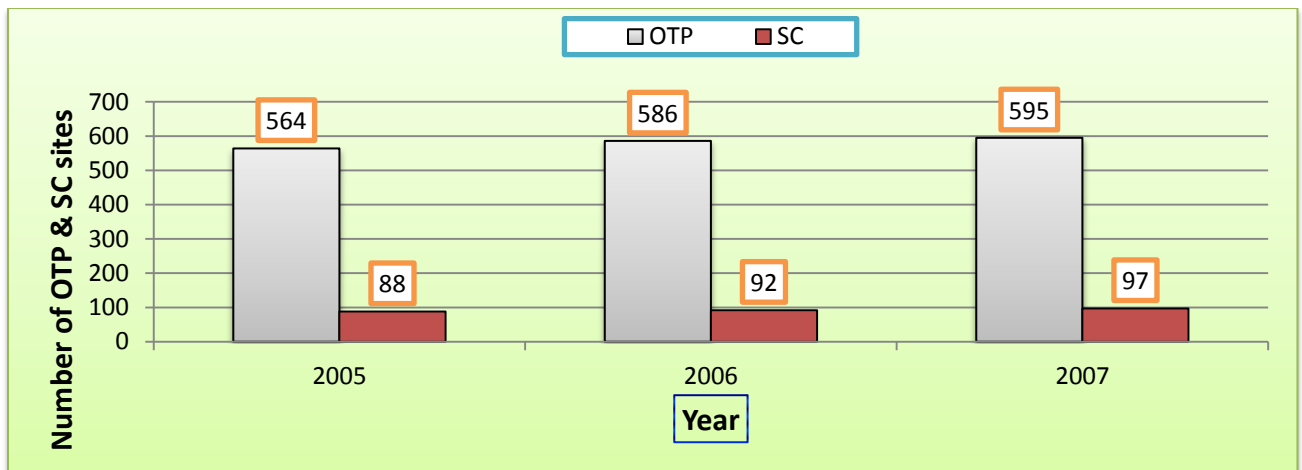


Figure 2.5:- Number of OTP and SC sites, Arsi Zone, Oromia, Ethiopia, 2005 – 2007 E.C.

Number of OTP and SC sites were increased by 31(6%) and 9(10.23%) respectively from 2005 to 2007 E.C., in Arsi Zone, Oromia Region as shown in Figure 4.

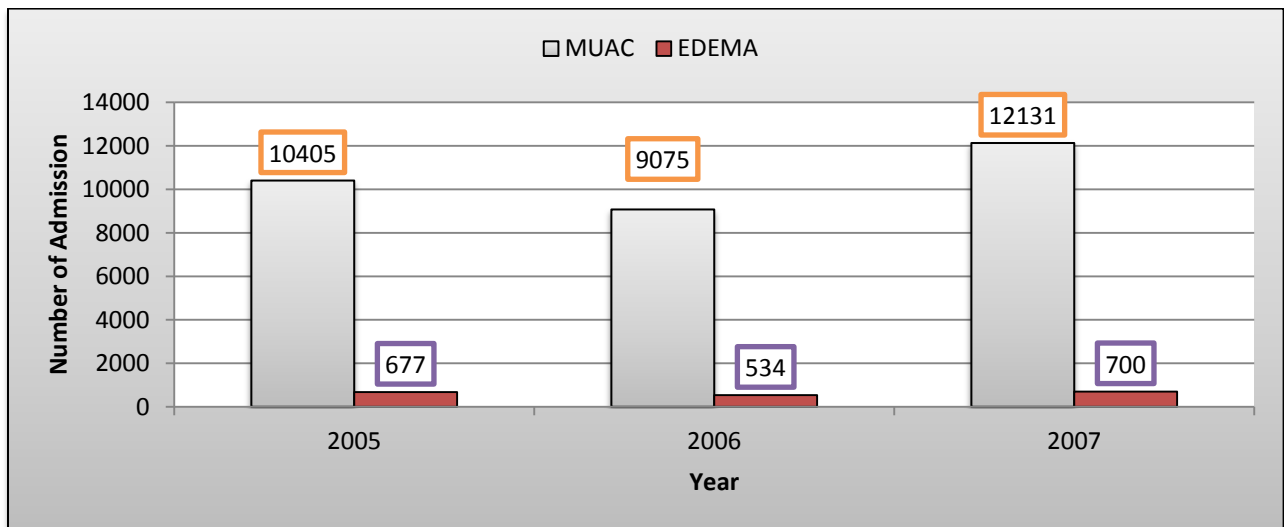


Figure 2.6:- Admissions of SAM identified by MUAC and EDEMA in Arsi Zone, Oromia, Ethiopia 2005- 2007 E.C.

Admission of SAM cases identified by MUAC and EDEMA decreased from 2005 to 2006 E.C. and increased in 2007 E.C. in Arsi Zone, Oromia Region.

Table 2.3:- Prevalence of SAM for under five children per 100 population in hotspot Woredas, Arsi Zone, Oromia, Ethiopia 2007 E.C.

S.N	Name of Woreda	Under five years Children	Total Admissions	Prevalence Rate per 100 population
1	Zeway Dugda	20158	4103	20.4
2	Aseko	16106	3117	19.4
3	Jaju	20984	3665	17.5
4	Seru	9200	1349	14.7
5	Amigna	14098	1809	12.8
6	Dodota	12709	1486	11.7
7	Gololcha	32854	3627	11.0
8	Chole	17160	1815	10.6
9	Robe	31951	3339	10.5
10	Merti	17567	1538	8.8
11	Guna	14670	1204	8.2

Among hotspot priority, one and some priority two Woredas of Arsi Zone, the prevalence rate of SAM admissions in children less than five years was highest in Zeway Dugda Woreda (20.4%) and followed by Aseko (19.4%) and Jaju (17.5%) woredas in 2007 E.C. The least (8.2%) prevalence rate reported from Guna woreda of Arsi zone.

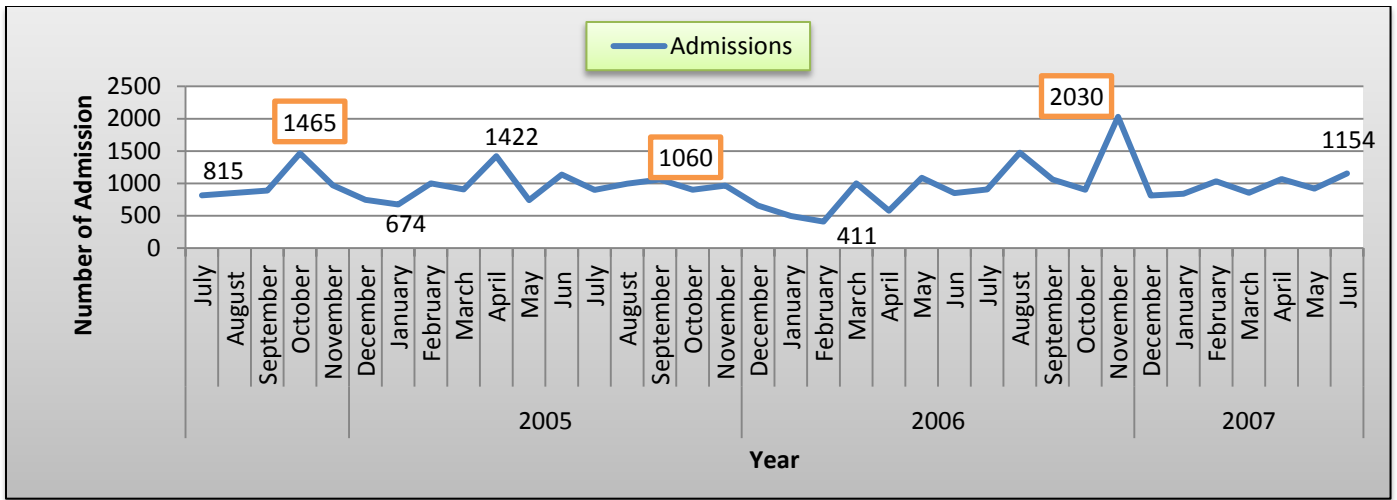


Figure 2.7: Trends of new admissions of SAM by month, Arsi Zone, Oromia, Ethiopia 2005-2007 E.C.

As the trend indicated in the figure 6 above, from the past three years, (2005-2007 E.C.) numbers of new admission of cases of malnutrition increased from September to November months of the year.

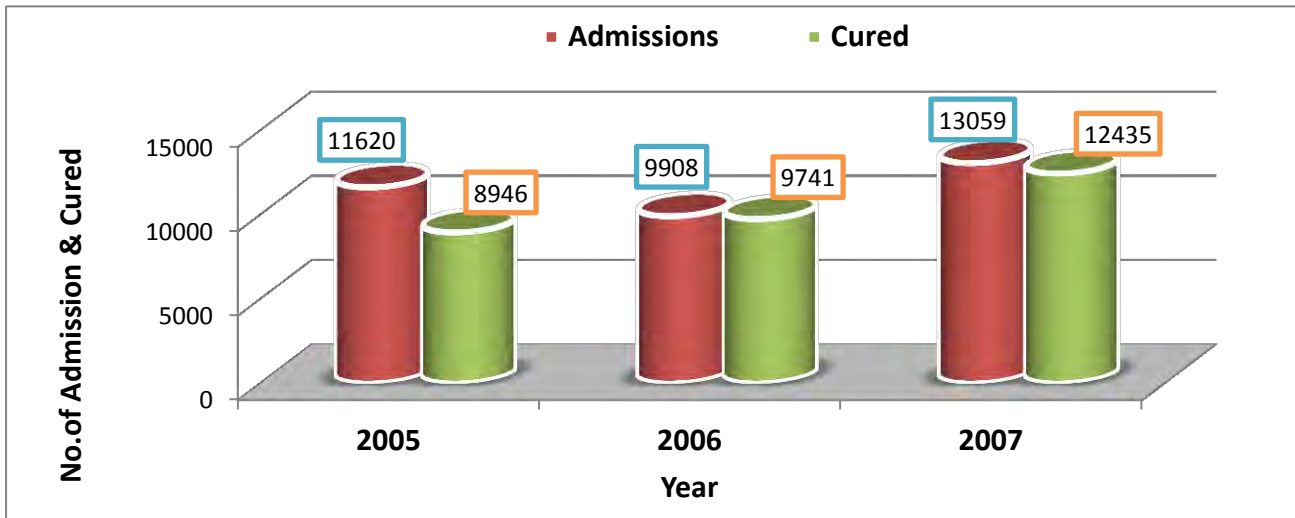


Figure 2.8: Total admissions and cured from SAM in Arsi Zone, Oromia, Ethiopia 2005-2007 E.C.

Of the total new admissions of SAM cases of Arsi Zone, Oromia Region, in 2007 E.C., 95.2 % of them confirmed as cured and less than the 2006 by 3.09% and exceeded the 2005 by 18.22% respectively.

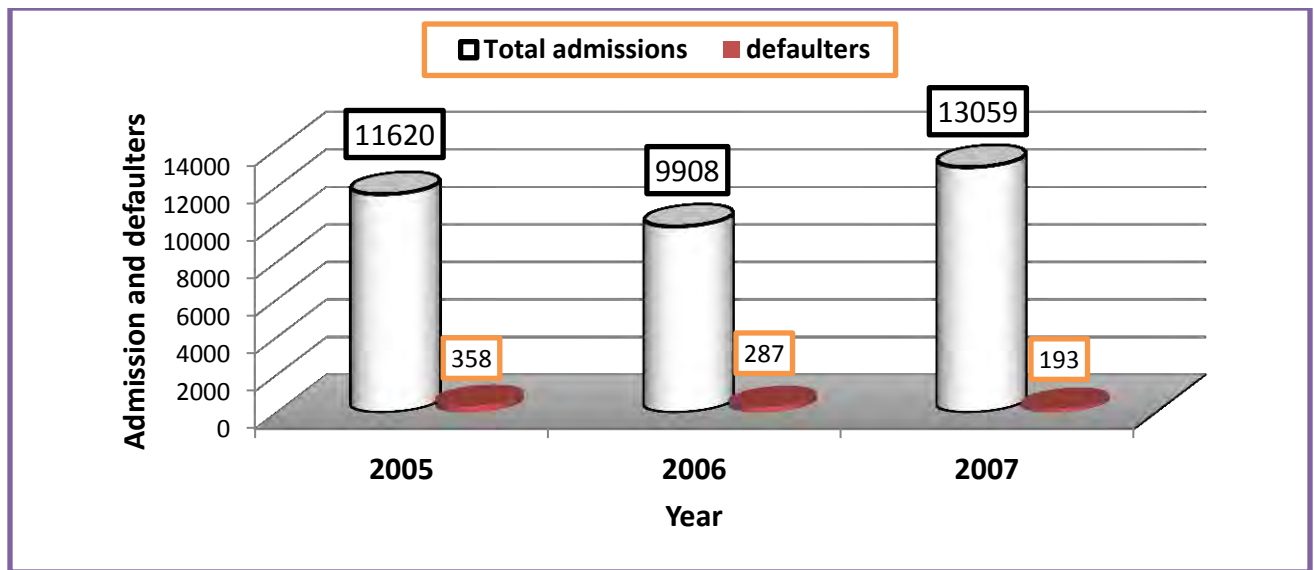


Figure 2.9: Total admissions and defaulters of SAM Arsi Zone, Oromia, Ethiopia 2005 - 2007 E.C.

Among total admissions of 11,620 in 2005, 358 (3.1%) of them, which was the highest from three years, reported to default before they have finished their therapeutic feeding program.

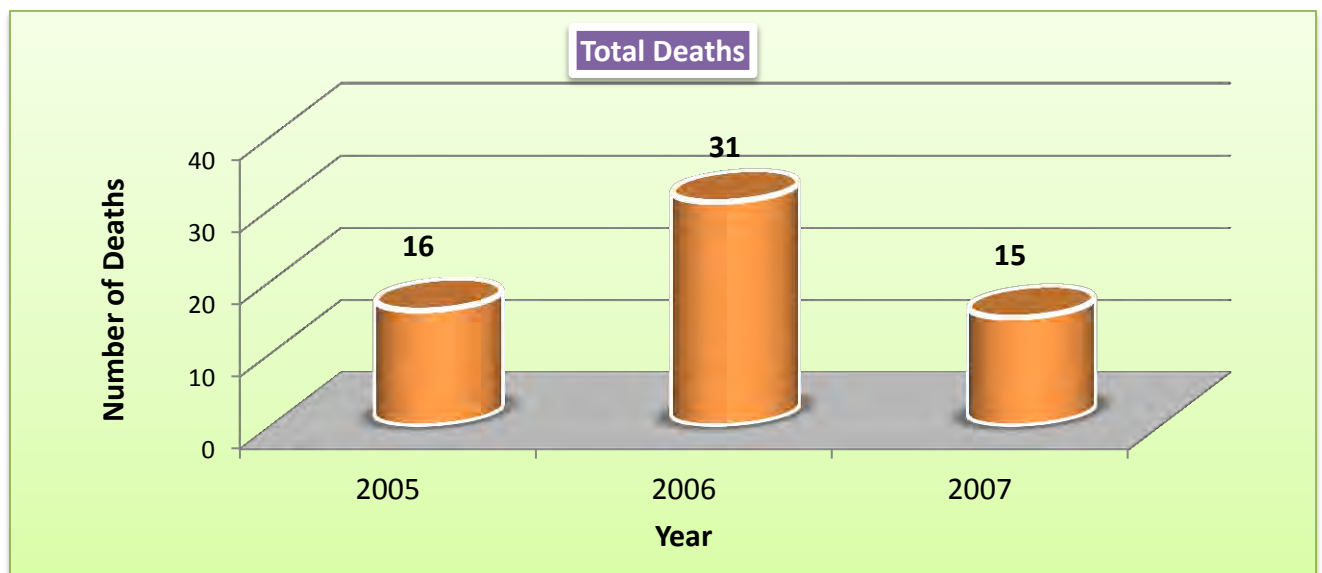


Figure 2.10: Total deaths of SAM by year, Arsi Zone, Oromia, Ethiopia 2005-2007 E.C

Deaths increased from 2005 to 2006 E.C. by 15(93.8%) and decreased from 2006 to 2007 E.C., again by 16(51.6%). as indicated at figure 8 above.

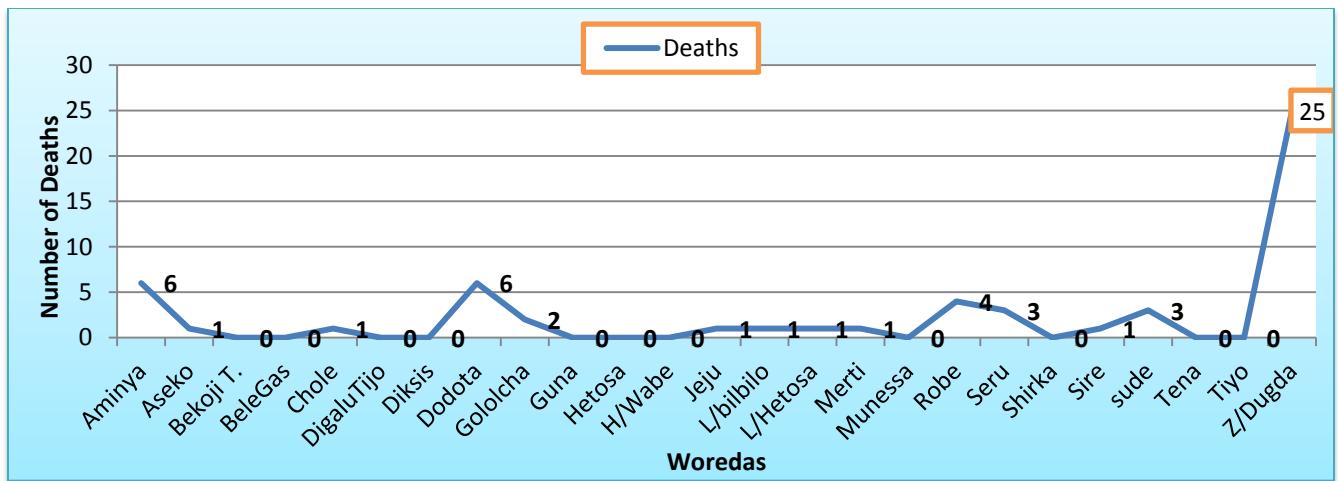


Figure 2.11: Number deaths of SAM by Woreda, Arsi Zone, Oromiya, Ethiopia 2007 E.C

High numbers of deaths reported from Zeway Dugda Woreda as compared to other woredas of Arsi Zone Oromia Region in 2007E.C. this indicated the magnitude of SAM in the Woreda. Similarly, Prevalence Rate of total admission for less than five years children per 100 populations in the Woreda indicated high rank from Zone as mentioned in table 3.

2.7. Discussion

The proportion of malnutrition is highest in the age group of 24-35 months (34%) and lowest among those under six months (10%) [1]. From this surveillance data analysis of SAM, it is possible to understand that children 6-59 months old highly suffered from severe acute malnutrition.

Increasing admissions of SAM may be associated with the deterioration of food security due to low rain in the Belg Season and intensive EOS screening conducted at community level at different times. In the studied zone, number of deaths has decreased. This may be due to intervention programs well conducted in the last three years. For examples in 2007 E.C, 471,013 (99.34% from plan) children those age of 6-59 months were supplied with Vitamin A and 348,980 (>100%) with age of 2-5 years were de-wormed. In addition, expansions of OTP and SC sites occurred at the same time as decreasing of severity and deaths from SAM in the Zone. From previous consecutive three years (2005-2007 E.C.) data, it was understood that cases of malnutrition are high between September and November months of the year. This is may be due to shortage of yields become severe during this period of months.

2.8. Conclusion

Malnutrition is a major public problem over the last three years in Arsi Zone. Cases were highest in 6-59 months and lowest among less than six months age of children. Of the hotspot priority one woredas of the the zone, the prevalence rate was highest in Zuway Dugda woreda. Documenting and compiling report for a long period was very poor at zonal level.

2.9. Limitations/Gaps

Zonal level PHEM unit did not compile and analyze SAM reports regularly.

Some data were not available at zonal level, for example, data of 2008 E.C. year was not available except the few data.

Even though SAM reports for the past consecutive three years were well organized and complete, there is no organized report at zonal level in both electronic software and hard copy.

2.10. Recommendation

- All reports should be compiled and analyzed timely (weekly, monthly, annually) at all levels to understand disease trends and take action.
- Trends of a disease (especially nutrition based) should compile and analyzed by woreda and health facility in regular base, so that problem prioritization and its implementation enhance.
- OTP and SC sites should be expanding mainly in highly affected woredas.
- The weekly or monthly SAM report should be communicated with higher officials timely for decision-making purposes.

2.11. References

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CHAPTER- III

Evaluation of Surveillance System

3.1 Evaluation of Public Health Surveillance System of Bale Zone, Oromia Region, Ethiopia, 2017

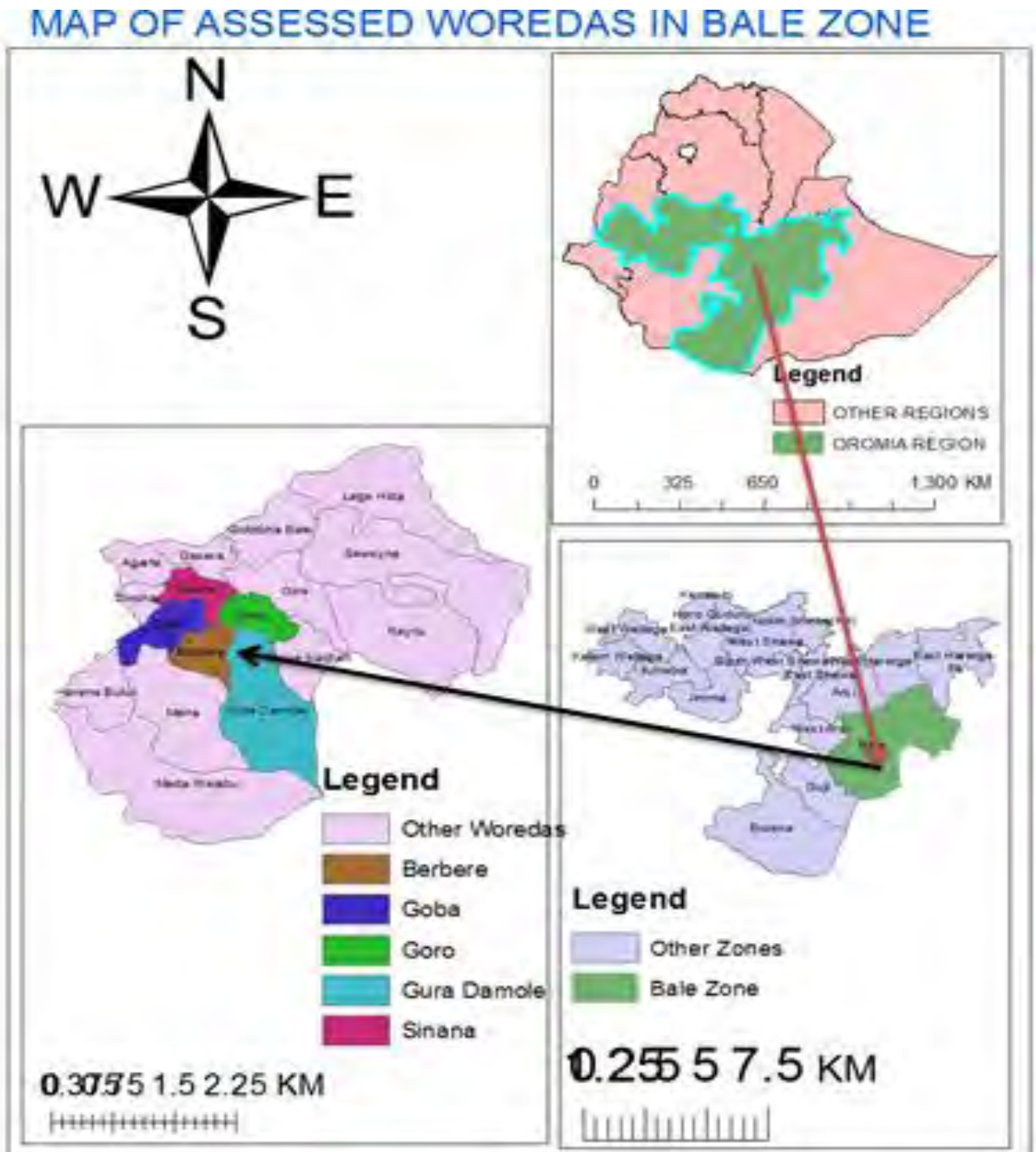


Figure 3.1; - Map of assessed Woredas in Bale Zone, Oromia, Ethiopia, 2017

3.1.1 Introduction

Public health surveillance is an ongoing systematic collection, analysis, interpretation and dissemination of data regarding a health related event for use in public health action to reduce morbidity and mortality, and to improve health [1]. Data disseminated by a public health surveillance system can be used for immediate public health action, program planning, evaluation, and formulating research hypothesis. Public health surveillance system has been developed to address a range of public health needs. They include variety of data sources essential to public health action [2]. These systems vary from a system collecting data from a single source to an electronic system that receive data from many sources in multiple formats to complex surveys. This system is useful, if it contributes to measure the burden of 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 in the 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 of disease; and provide a basis for epidemiologic research [1].

Ethiopia has tried a multiple strategies to have functioning and effective surveillance system. Too often, however, surveillance data for communicable diseases neither reported nor analyzed promptly. As a result, the opportunities to take action with an appropriate public health response and save lives missed. However, in cases where adequate information is collected; it is often not available for use at the local level. Aware of these problems African States adopted integrated disease surveillance (IDS) as a regional strategy (resolution AFRO/RC48/R2) for early detection and efficacious response to priority communicable diseases for the African region in September 1998, during the 48th Regional Committee for Africa meeting in Harare, Zimbabwe. Ethiopia as a member state, endorsed this initiative, and frequent revising of the list of priority diseases [4].

Since 2008 the Federal Ministry of Health (FMOH) has launched a reform and restructuring of the health sector in to different core processes, and in particular the disease surveillance and response with the concept of Business Process Re-engineering (BPR). This helps the surveillance of priority diseases to be a dependable system as Public Health Emergency Management (PHEM) center. The goal of PHEM was to better track and monitor diseases of public health concerns [4].

Moreover, as member state of the World Health Organization (WHO), Ethiopia is in the preparatory phase to implement the International Health Regulation (IHR) which was declared by member states in 2005. These all are good opportunities to strengthen surveillance. The FMOH of Ethiopia identified 21 top priority diseases which are epidemic prone, of international concern and diseases that have eradication and elimination programs for surveillance activities. These diseases are monitored by a designated bodies through available means of communication- telephone, paper based reporting etc. These diseases are mandatory notifications which are immediately reportable diseases and routine surveillance reported weekly [3].

Malaria and measles are two of these 21 priority diseases reported on the weekly bases. They are significant disease burdens to the public. In 2003 EFY, nationally, 478,058 (18.3%) of the total of suspected malaria cases were reported from Oromia Region. Out of 2,142,207 laboratory tested, 43.3% were positive (24.6% *Plasmodium falciparum* and 18.7% for *Plasmodium vivax*)[3].

Measles outbreaks were becoming more frequent and widespread in the country. In 2003 EFY, 38,288 suspected measles cases and 182 deaths were reported from all regions except Somali. The highest number of suspected measles cases was reported from South Nations Nationality People`s Region (SNNP) 24,401, followed by Oromia 8,105. The average national Case Fatality Rate (CFR) was 0.5%.

The overall purpose of surveillance of these diseases is to monitor the trend against the annual trends, and to identify deviation from the threshold at the earliest point in time and have prompt response. Furthermore, as early warning system, it guides prevention actions like immunization, vector control and so on [5].

For these purposes, each of these diseases has case definition(s) and integrated diseases reporting formats defined by the FMOH and the WHO; and reporting is institutionalized into the health facilities and health offices [3].

The purpose of evaluating public health surveillance is to ensure that problems of public health importance are being monitored efficiently and effectively. Public health surveillance system should evaluate periodically and the evaluation should include recommendations for improving quality efficiency and usefulness. The evaluation of public health surveillance system should involve an assessment of system attributes including simplicity, flexibility, data quality, accessibility, sensitivity, predictive value positive, representativeness, timeliness and stability [2].

3.1.2 Rationale:

Malaria and measles are the major diseases of the Bale Zone with high frequency of epidemic and public health concern. But there is a delay in detection and reporting system. For example, measles outbreak in Harena Buluk and Meda Walabu Woredas, Bale Zone in 2016 was reported three weeks after the investigation and they did not report all measles epidemic in the same Woreda. We believe that these two diseases could be used as proxy indicators of the surveillance system of the zone.

3.1.3. Objectives

3.1.3.1 General objective

- To evaluate the surveillance system of Bale Zone, Oromia, Ethiopia, 2017

3.1.3.2 Specific objectives

- To assess core surveillance activities such as case detection, reporting, analysis and response in Bale Zone
- To evaluate the attributes of the surveillance system of the selected diseases in Bale Zone
- To assess the usefulness of surveillance system in early detection of diseases and outbreaks and decreasing morbidity and mortality
- To assess major challenges of quality and stability of surveillance system

3.1.4 Methods

3.1.4 .1 Study area

We selected this Zone for its far distant from the region and difficulty in accessing to some woredas within the zone and the relative low performance of surveillance activities in 2016 reports as well as repeated occurrence of outbreaks. It has 18 woredas with a total population estimated to be more than 1.8million.

3.1.4 .2 Study design

A cross-sectional descriptive study design was used.

3.1.4 .3 Study Subjects

The study subjects were the health facilities (Hospital, Health Centers, and Health Posts) and health offices (woreda health offices and zonal health department).

3.1.4 .4. Sample Size and Sampling

Bale Zone Health Department, five Woreda Health Offices, one district hospital (Robe Hospital), five health centers and five health posts were included in the sample. We selected the woredas and health facilities by Random Sampling Method and finally a total of 16 sites were selected and assessed during the study period.

3.1.4 .5 Data collection technique

We collected the data using semi-structured questionnaire, qualitative interview, and observation of tools for surveillance and secondary data review.

3.1.4 .6 Data analysis

We entered and analyzed the data using the Microsoft Office Excel.

3.1.4 .7 Data quality control

We cross checked the obtained data at different levels (i.e. Regional Health Bureau, zone Health Department, Woreda Health Offices and Health facilities) before summarizing at each level for its accuracy and consistency.

3.1.4 .8 Data dissemination

We prepared and shared the written report of both hard and soft copies to Addis Ababa University/School of Public Health, Oromia Regional Health Bureau, Bale Zone Health department and all visited woreda health offices, Ethiopia Public Health Association (EPHA) and Ethiopia Field Epidemiology Training Program mentors.

3.1.5 Results

3.1.5.1 Meeting with stakeholders

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

3.1.5.2. Importance of the surveillance system

Malaria: In Oromia region, around 75% of the land mass was malarious putting more than 22, million populations at risk of infection. In 2008 EFY, 210,686 confirmed malaria cases were reported from the region during January 2016 to December 2016. Among the total cases, 127,128 (60.34%) of them were plasmodium falciparum. In Bale Zone, from 18 Woredas, 14 (78%) of them are reporting malaria.

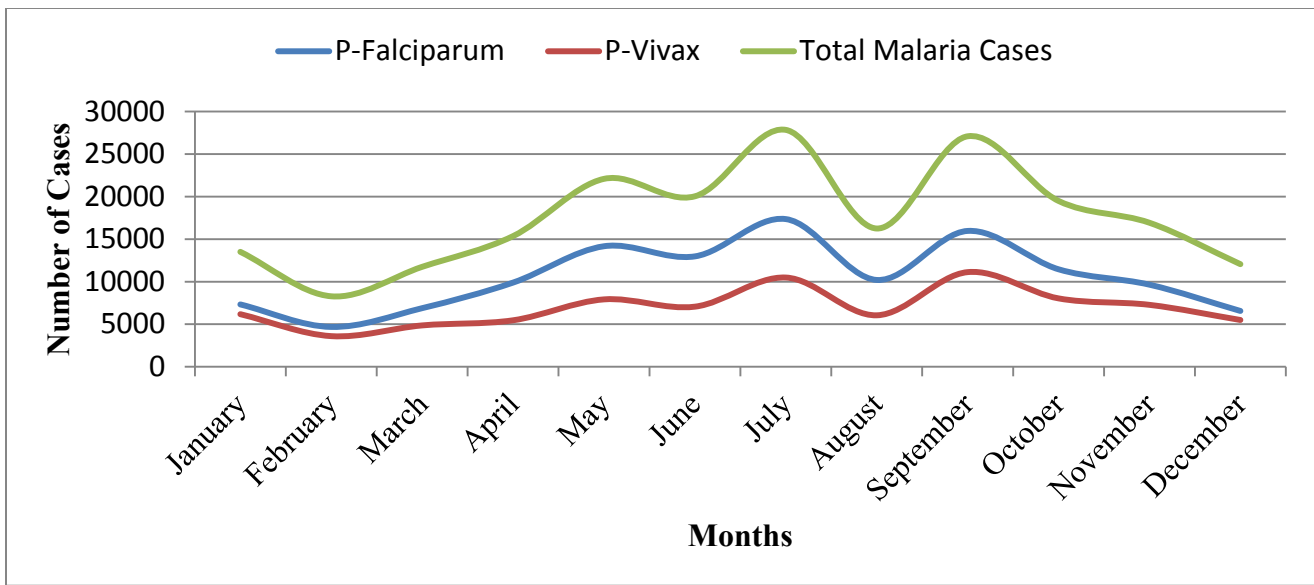


Figure 3.2: Trends of malaria cases by Species - Oromia Region, January 2016- December 2016

The trends of all types of malaria increased from May to September 2016 in Oromia Region.

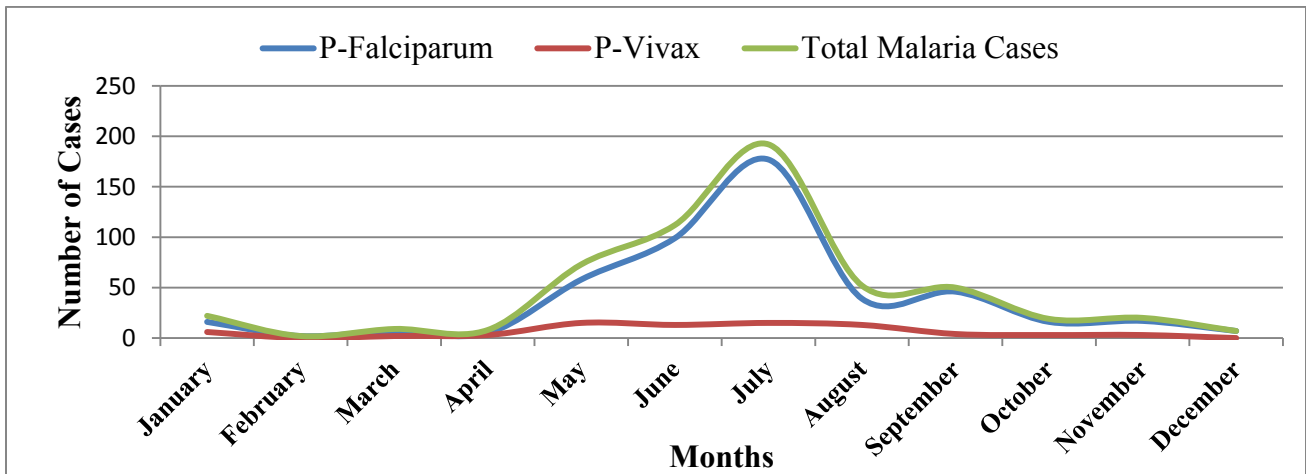


Figure 3.3: Trends of confirmed malaria cases by Species - Bale Zone, Oromia Region, January 2016 - December 2016.

The trends of Plasmodium Vivax malaria was increased from May to August 2016 in Bale Zone of Oromia Region.

Measles: Seven thousand six hundreds twenty-five measles suspected cases and one death reported from Oromia Region, January 2016 - December 2016.

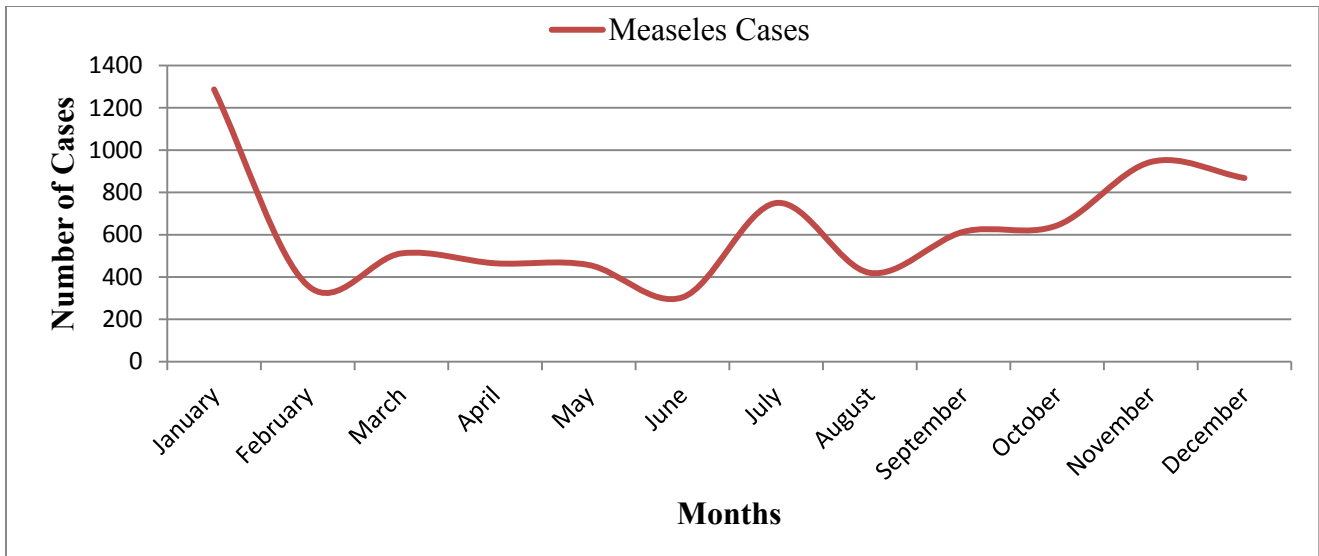


Figure 3.4: Trends of measles cases by Month in Oromia Region, January 2016 - December 2016

Trends of measles cases decreased from January to February 2016 and increased from June to December 2016 in Oromia Region. Two hundred twenty six measles cases reported from Bale Zone Health Department during January 2016 – December 2016.

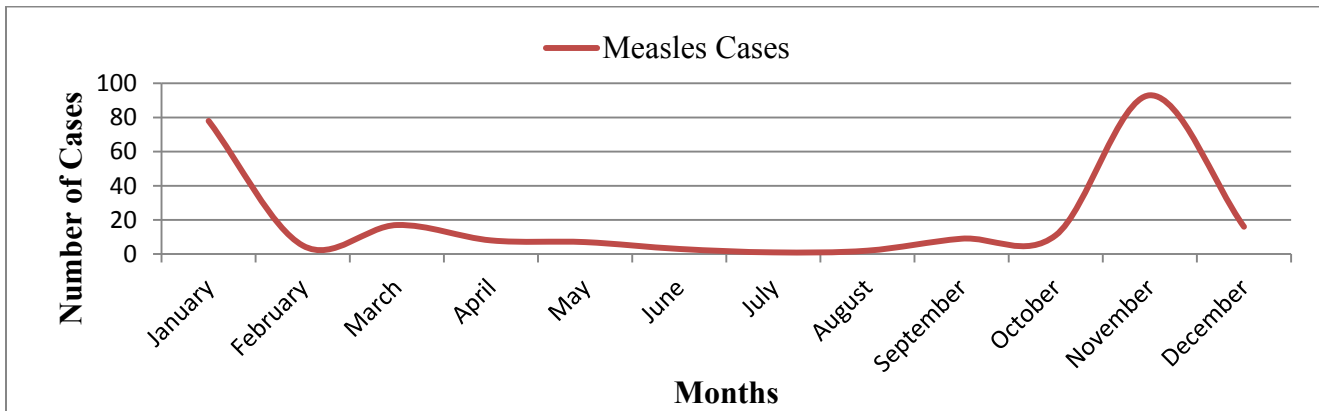


Figure 3.5: Trends of measles cases by Month in Bale Zone, Oromia Region, January 2016 to December 2016

Trends of measles cases were decreased from January to September 2016 and increased from October to November 2016 in Bale Zone of Oromia Region.

3.3 Description of the surveillance system

3.3.1 Systems in place

In Ethiopia, the health information system for surveillance of communicable and non-communicable diseases organized in two main categories, the surveillance system under Public Health Emergency Management core process (PHEM) and the Health Information Management System (HMIS). These systems are set at the central level Ministry of Health (MoH) and

extending down to the regions and health facilities (periphery) levels including all governmental, non-governmental and some private health facilities.

Public Health Emergency Management (PHEM) defined as the process of anticipating, preventing, preparing for responding to and recovering from the impact of epidemics and health consequences of natural and manmade disasters. The sub processes identified for the process include Preparedness, Early Warning, Response and Recovery (EWRR). The early warning sub-process contains the Integrated Public Health Surveillance. This surveillance focuses on diseases, which have epidemic potential, diseases under eradication and elimination, diseases of international concern, and malnutrition. Whereas the HMIS collects all the general health related data from the health facilities including those disease under surveillance.

3.3.2. Targeted Diseases under surveillance

The Public Health Emergency Management core process targets 21 selected diseases such as: AFP/Polio, Measles, Cholera, Guinea Worm, Neonatal Tetanus, Small Pox, Yellow fever, Anthrax, Viral Hemorrhagic Fever and Rabies are to be reported immediately on detection and weekly as zero report. Meningitis, Malaria, Typhoid fever, Epidemic typhus, Relapsing fever, Dysentery and Severe malnutrition are to be reported weekly.

The evaluation assessed the surveillance system of one immediately reportable (Measles) and one weekly reportable disease (Malaria).

3.3.3. Purpose of the surveillance system

The overall objective of the surveillance system is to improve the ability of health workers to detect early and respond to priority communicable diseases, effective and timely decision-making based on evidence, increases efficient utilization of available resources for preventing and controlling communicable diseases and improving the health status of the population under surveillance [4].

3.3.4. Objectives of surveillance system

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.

3.3.5. Objectives of measles and malaria surveillance

To detect cases and respond quickly when their alert threshold is observed

To strengthen the report of cases and diseases whenever outbreaks of these diseases are occurred

3.3.6. Case definitions

According to the PHEM guideline, there are two case definitions; standard case definitions and community case definitions:

3.3.7. Standard case definitions

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

Measles: 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.

3.3.8. Community case definitions

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

Malaria: Any person with fever or fever with headache, back pain, chills rigor, sweating, muscle pain, nausea and vomiting.

Measles: Any person, with fever and rash that starts from face.

3.3.9. Population under surveillance

The national public health emergency management targets all the population in the country to be under surveillance for all the twenty-one priority diseases. The Oromia Region cascade the same structure, with a total population of more than 36million in 2016 (projected from the 2007 national census).

0.1Table 3.1: Population under surveillance in assessed Zone (Projected population for2016).

S.N	Area Under Assessment	Total population	Health Service Coverage (%)
1	Berberere Woreda	119,033	84
2	Goba Woreda	52,983	93
3	Goro Woreda	109,842	96
4	Gura Damole Woreda	37,918	75
6	Robe Hospital	121,969	100
5	Sinana Woreda	153,650	98

The population of Bale zone is estimated to be about 1.8million in 2016 based on the projection from the 2007 Ethiopian Censes. Administratively Bale Zone is divided into 18 districts and one special town. In this Zone, three public hospitals, 84 health centers and 370 health posts have been participating in the surveillance system.

The overall health services coverage of the zone is 89.2%. In all assessed woredas, the respondents agree that the surveillance represent community that is more rural and they have satisfactory health seeking behavior.

3.9.10. Case detection and registration

Among the visited health facility, four (40%) of the Health Posts, two (40%) of Health Centers and one visited hospital have posted cases definition for measles, but all of them have no standard case definition of malaria, SAM and NNT except Robe Hospital. However the understanding of the cases definitions by the health care providers was good, as they explaining us while we interviewing them at the time of the field visit.

The clinical register was found in all of the visited health facilities, but in 6 (37.5%) of health facility, handling of these registers was poor (i.e. not registered cases properly and continuously). Concerning weekly PHEM reports, only five (31.25%) of the assessed facilities has reported consistence data with their clinical register records to the higher level during the evaluation of one month period reports (four weekly reports) but the rest nine (68.75%) of health facilities clinical register record were not consistent with their reports.

All health centers and hospital have the cold chain capacity, guideline and trained human power to collect and ship samples for measles to the respective regional or national laboratories. Although most of the health facilities collected and transported the sample to the regional or national laboratory for confirmation, they didn't get back the results timely. This might resulted in difficulty for timely intervention as well as can divert heath workers perception. Most of the respondents were complained the necessity of collecting sample if it was no more useful for timely intervention

3.3.11. Reporting

The national public health emergency management and its partners are responsible for preparing and distributing different reporting form to regional health bureaus to be used for reporting by all levels of the system. At the time of the assessment two (40%) of the health centers and three (60%) of the health posts have lacked the reporting form. They used hand prepared and photo

copied forms to report the data. Health posts are using mobile SMS and hard copy to send report to the health centers and health centers send the report to the district health office by the same means. All district health offices are using mobile SMS and additionally use hard copy to send the report to the zonal health office. Bale Zonal Health Office sends the report to the region through email.

3.3.12. Data analysis

In all of the assessed health offices and health facilities, there was no responsible person placed for data analysis except for Zonal Health Department and Regional Health Bureau. Among the visited health facilities and woredas none of them was analyzed and used the data collected for surveillance activities. Instead, they used raw numbers to compare the incidences of diseases with the previous experiences at the woredas and health facilities level. Only Zonal Health Department and Regional Health Bureau analyze and follow the trends to compare the incidence rate for both malaria and measles appropriately. All the visited woredas did not established an action threshold for malaria.

3.3.13. Outbreak investigation

All the respondents from assessed health office responded that they had investigated different outbreaks at different time and used the findings for intervention traditionally, but there was no any documented report or standard procedures for outbreak investigation available during the assessment.

Measles outbreaks were reported from two woredas of Bale Zone [Meda walabu and Harena Buluk] in the last six months prior to the assessment and the woredas; ZHD, RHD and EFETP residents investigated both outbreaks.

3.3.14. Epidemic preparedness and response

The zonal health office has soft copy of draft emergency preparedness and response plan for epidemic prone diseases but it was not completed. All assessed district health offices have no written and well-organized emergency preparedness and response plan. Among the assessed district health offices three (60%) of them have no drugs and supplies necessary for emergency management during the assessment. Moreover, all districts including the zonal health office have experienced shortage of drugs and supplies necessary for emergency management. All districts and the zone have no specific budget line for emergency management and response. Regarding existence of epidemic management committee four of the districts and the zonal health office have established the committee and all assessed districts including the zone responded that they

have rapid response team. There were no documents or meeting minutes found at the time of the evaluation at all districts and Zone Health Office.

3.3.15. Feedback

None of the visited woredas health offices had experience of dissemination of the surveillance specific information feedback to the respective health facilities in written form; but 60% of them were disseminated comprehensive (integrated) activities performance feedback to the Health facilities on quarter bases. Bale Zone health department distributed written monthly feedback to the Woreda Health Offices. There were also written feedback given from regional health bureau to zonal health department on a quarterly basis. In the last one year for weekly or immediately reportable disease and there was also regular telephone follow up from the regional health bureau to zonal health departments directly or through WHO surveillance focal person assigned to specific zone depending on the situation.

3.3.16. Supervision

During the past six months prior to this assessment the zonal health office in collaboration with WHO have conducted a onetime supervision on surveillance activities for the districts and health facilities. Among the assessed health sectors, all district health offices (five-woreda health offices one time, ten health facilities (six of them two times and four of them one time) and (three health posts one time) have been supervised for their surveillance activities. Due to lack of logistics (financial, vehicles) only three of the assessed districts have conducted one supportive supervision to their respective health facilities on integrated activities including surveillance in the past six months prior to this evaluation. None of the health centers has conducted supportive supervision for their respective health posts.

3.3.17. Training

At Zone level, all technical staffs working in PHEM unit and one EPI coordinator were trained on IDSR surveillance system.

All Public Health Emergency Management focal persons (representatives) as well as Maternal and Child Health coordinators of the assessed woredas Health Office had taken short-term training on surveillance four to five days on the new guideline by the regional health bureau and partners. At the health facilities level, only focal person assigned for surveillance was trained, and on site orientation was given to most of the technical staffs on measles, malaria and on other diseases under surveillances by World Health Organization and Zone surveillance officers. There

is no appropriate formal training given to HEWs on surveillance, rather simple onsite orientation were given to them only on the reporting format

3.3.18. Material resources available for surveillance

Table 3.2: Availability of resource for PHEM surveillance at different level in Bale Zone, February, 2016

Institution	Resources at Health institute							
	Electricity	Motor Cycle	Bicycle	Vehicle	Computer	Printer	Fax	Telephone
ZHD (N=1)	100			100	100	100	100	100
WoHO(N=5)	100	100		40	100	100	0	100
HC (N=5)	80	80		0	80	80	0	80
HP (N=5)	0		40		0	0	0	0
Total (N=16)	70	90	40	47	70	70	40	70

Resources for data management, communication, and logistics were all available at the region and zonal level. However, they all became scarce at the peripheral health facility. The PHEM/surveillance units at the woreda and health facility level did not have communication ways- like, fax machines, internet and so on. At zonal level, the PHEM unit has its own computer for data management and telephone for communication, but woreda has no dedicated computer or telephone for data management and communication for specific to PHEM unit. At health facility level there was no separated room for PHEM focal person to organized data appropriately. Most of the visited health centers and hospital used under five clinics or emergency room as PHEM unit and the rest used other department for data management. The logistic and sever budget constraints were observed at all the visited sites. Lacks of these logistics were mentioned frequently as the reasons for poor supervision, and monitoring of the health facility reports. None of the assessed health post has any means of communication for reporting rather than their own phone and even there is lack of access to network in some of them. This might affect the timeliness of reports of both immediately and weekly reportable diseases.

3.3.19. The Laboratory

The laboratory capacity to collect, transport, test, and role in the surveillance of malaria and measles were assessed both at the health facility and at regional health research laboratory level. The region has two regional health research laboratories, which used in the outbreak investigation and confirmation at their capacities. The regional public health research laboratories were responsible for quality assurance of facility level laboratories in their respective zones. They referred virology samples (measles) and samples for further analysis to the Ethiopian Public Health Institute (EPHI) until this assessment conducted.

Hospital and health centers laboratories were able to test malaria both by microscopy and RDT and able to collect samples for measles. At health posts the HEW can use only RDT for the confirmation of malaria and call to the health centers to come and collect for measles samples. Malaria can be confirmed at all levels of the health facility. Health post used RDT for confirmation of malaria where as health centers and hospitals used Microscopy (used RDT only in the absence of electric power or reagents).

3.3.20 Description of attributes of the surveillance system

3.3.20.1 Usefulness

In all visited health office and health facilities respondents has a common understanding of early detection of epidemics of diseases under surveillance as the major use of the surveillance system. More over the respondents believe that the surveillance system help to detect the outbreak of the selected disease on time, estimate magnitude of the morbidity, mortality, factors related to those diseases and to permit assessment of the effect of the prevention and control program.

3.3.20.2 Simplicity

The simplicity of a public health surveillance system refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives (6). Respondents from all visited district health offices including zonal health office, from all health facilities and 85% of health extension health workers understand the case definitions for selected priority diseases (measles, AFP, malaria and malnutrition). In addition, they believe that community case definitions are easy to understand at community level. Regarding the route of data flow all respondents agree that it is simple and clear as it was indicated in the PHEM guideline and were familiar with when and to whom the report will send.

In addition, all participants of the evaluation responded that surveillance reporting formats are also clear and simple except two (15%) health extension workers responded that the formats are not easy to use due to language barrier. Among the assessed health facilities 81.25% of them said, it takes 10 -15 minutes to fill the weekly reporting format.

3.3.20.3. Flexibility

As the current reporting format contains additional spaces named others at the end for both weekly and immediately reportable diseases, it can make it flexible to accommodate newly occurring health events/disease to fill on without any difficulty. Existing reporting format was updated during the time IDSR was changed to the current PHEM to include newly emerged diseases such as Avian Influenza, Pandemic Influenza and SARS. All Zonal and district level respondents agreed that implementation of National PHEM guideline will not be difficult with changes in existing procedure of case detection, case definition and report forms.

3.3.20.4 The quality of data

We assessed the quality of data in terms of completeness and validity of the recorded data on the registry and formats. Based on this when we look the internal completeness of the data some of the measles case based formats in the health facilities missed to fill variables like sex, age, date seen at health facility and address of the patient. In addition to this, number of cases recorded on the registry had difference with reported case to the next higher.

At the health post level, most of HEWs were not well trained on the surveillance system and might not give attention to the importance of some variable or considered as it is not important as such. At zonal health department all the information needed to be reported in weekly report format was complete including zero report.

3.3.20.5 Acceptability

The acceptability of the surveillance system assessed based on the engagement of the reporting agents and active participation in the case detection and reporting. In the zone, the engagement of the reporting agents and active participation in the case detection and reporting was below accepted by the WHO standard (80%). It was 78.1% reporting rate of the health facilities during 20 reporting WHO weeks (week 28/2016-47/2016). The major reasons for some health staff for not regularly participating in the surveillance activity might be poor means of communication, lack of feedback and/or delay in laboratory results.

0.2Table 3.3: The reporting rates of the health facilities in Bale Zone in 20 weeks (WHO week 28/2016-47/2016)

WHO Weeks	Health Post			Health Center			Hospitals			Total		
	E	R	C (%)	E	R	C (%)	E	R	C (%)	E	R	C (%)
Week-28	370	229	61.9	84	5	61.9	3	3	100	457	284	62.1
Week-29	370	186	50.3	84	48	57.1	3	3	100	457	237	51.9
Week-30	370	279	75.4	84	65	77.4	3	3	100	457	347	75.9
Week-31	370	271	73.2	84	67	79.8	3	3	100	457	341	74.6
Week-32	370	266	71.9	84	62	73.8	3	3	100	457	331	72.4
Week-33	370	276	74.6	84	68	81.0	3	3	100	457	347	75.9
Week-34	370	276	74.6	84	68	81.0	3	3	100	457	347	75.9
Week-35	370	337	91.1	84	79	94.0	3	3	100	457	419	91.7
Week-36	370	253	68.4	84	60	71.4	3	3	100	457	316	69.1
Week-37	370	297	80.3	84	73	86.9	3	3	100	457	373	81.6
Week-38	370	265	71.6	84	63	75.0	3	3	100	457	331	72.4
Week-39	370	219	59.2	84	55	65.5	3	3	100	457	277	60.6
Week-40	370	309	83.5	84	69	82.1	3	3	100	457	381	83.4
Week-41	370	290	78.4	84	68	81.0	3	3	100	457	361	79.0
Week-42	370	296	80.0	84	70	83.3	3	3	100	457	369	80.7
Week-43	370	367	99.2	84	83	98.8	3	3	100	457	453	99.1
Week-44	370	320	86.5	84	79	94.0	3	3	100	457	402	88.0
Week-45	370	330	89.2	84	79	94.0	3	3	100	457	412	90.2
Week-46	370	318	85.9	84	77	91.7	3	3	100	457	398	87.1
Week-47	370	332	89.7	84	77	91.7	3	3	100	457	412	90.2

3.3.20.6. Representativeness

The representativeness of the surveillance system related to the health service coverage, the reporting rate of the health facilities, the health seeking behavior of the community, and the technical capacity of the health care providers. The health service converges of the visited woredas ranges from 75% to 98%. The health seeking behavior of the communities also changed from time to time due to awareness creation by HEWs rounding house to house in all of the rural households.

3.3.20.7 Timeliness and completeness

Timely report of surveillance data is important for early public health interventions. Timeliness of the public health surveillance usually considered that time interval between the onset of health-related event and the reporting of the event within the time specified in national PHEM guideline to the public health agency responsible for immediate control effort, prevention of continued exposure or program planning. The minimum expected reporting timeliness is 80% as per recommendation of the national PHEM guideline.

The average weekly reporting rate/completeness of the zone was 78.10% in the past five months prior to the assessment (Figure.6).

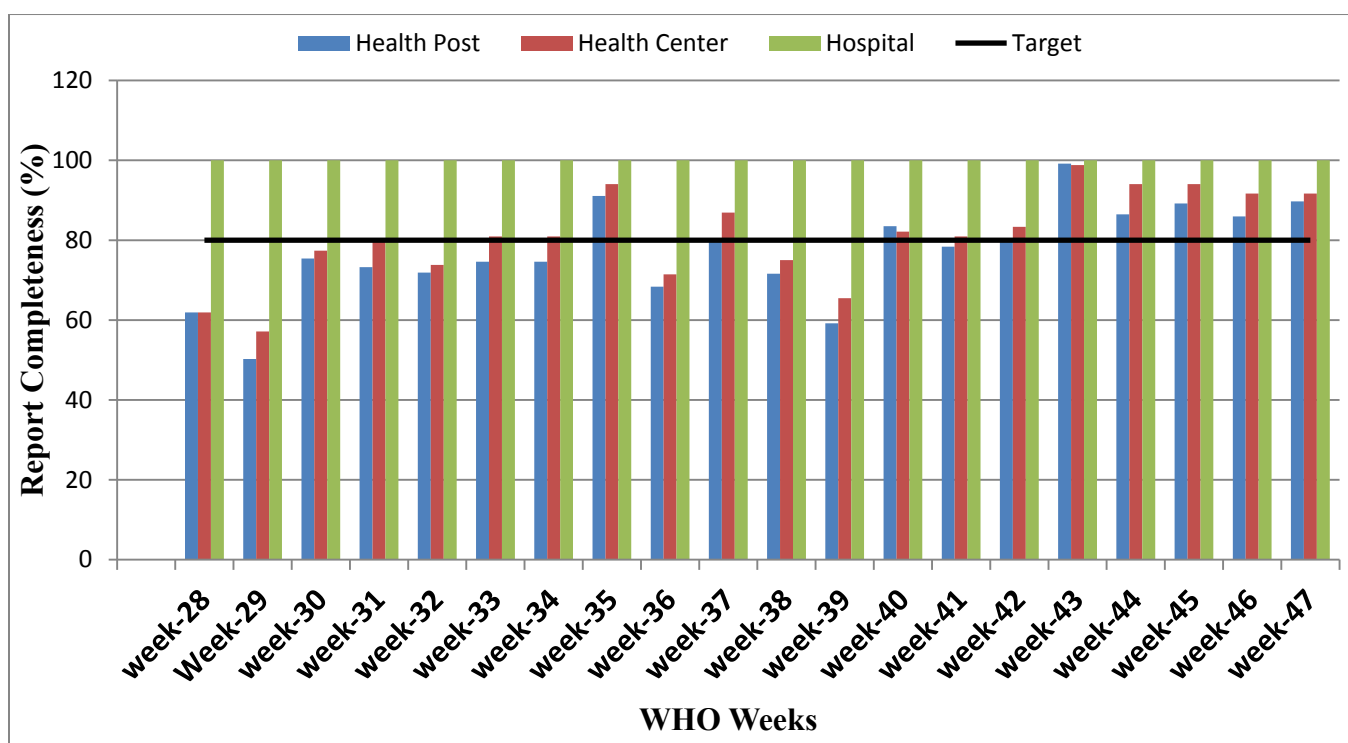


Figure 3.6: Zonal timeliness and completeness of PHEM weekly report of-Bale Zone, Oromia Region, August 1 to December 30, 2016

3.3.20.8 Stability

Stability refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system [1]. A lack of dedicated resources might affect the stability of a public health surveillance system.

3.4. Discussion

We conducted a brief meeting with responsible persons (Head of institution, PHEM focal person) before assessing the objective of the study and its significance, and highlighted information after assessment, at all level. The evaluation should assess how well the public health surveillance system is integrated with other surveillance and health information systems. Integration encourages best use of scarce resources, and activities can be combined taking advantage of similar surveillance functions, skills, resources, and target population [5].

The data analysis description might indicate who analyzes the data, how they are analyzed, and how often. This description could also address how the system ensures that appropriate scientific methods are used to analyze the data. Surveillance data collection was done weekly and/or immediately based on disease type. The collected data is not an end by itself. It should be analyzed, interpreted and used for decision making starting from local (generators of the data) to the central level in order for the values of the data to be realized. Public health emergency management (PHEM) data was analyzed regularly only at regional and zonal level on weekly basis for action. Woreda health offices and health facilities did not analyzed PHEM data to detect any irregularity in the reports. Regular monitoring of trends was also seen at zonal and regional level on priority disease (malaria, measles) on weekly basis.

Public health surveillance system should operate in a manner that allows effective dissemination of health data so that decision makers at all levels can readily understand the implications of the information.

In Bale Zone most of the assessed health facility has shortage of standard reporting formats during the assessment period. The data reported from peripheral health facility to the woreda was also not well organized and documented. The reporting rate of the zone was 78% in the last five months prior to assessment. In the absence of this segment, accurate information about disease occurrence might be missed so that cannot be assessed. More ever, the collected data was also not analyzed at woredas and health facilities levels. This makes difficult to pick disease of highly public health sensitive or the true outbreak may be hidid when we did the analyses at the higher levels (woredas and zone). Such weak performance could be due to poor monitoring, supportive supervision, incentive mechanism and feedback system in the surveillance activities.

Supportive supervision helps to strengthen the capacity of staff and ensure that the right skills are used appropriately, the necessary logistics are in place, and that planned activities are implemented according to schedule. Supervision is an important support function that ensures

success in the implementation of a surveillance system. In Bale Zone supportive supervisions were done with the integration of other activities/program on quarter basis, and sometimes intermittently done specific to PHEM with WHO officers on monthly basis.

Training have vital role in improving the surveillance and response to any outbreak/disaster in the local area. In Bale Zone, all HEWs didn't take standard training on the PHEM system rather than short sensitization with the integration of other programs and onsite orientation. This may affect the quality of the reports and surveillance system as whole.

A public health surveillance system is dependent on a clear case definition for the health-related event under surveillance. The use of a standard case definition increases the specificity of reporting and improves the comparability of the health related event reported from different sources of data, including geographic areas. Public health emergency management manual was available in most of visited health facility. Standard case definitions for measles were not seen in most of the health facilities and not at all for malaria. However, the understanding of the case definition by both HWs and HEWs was satisfactory for the evaluated diseases.

Written epidemic preparedness and response plan was seen only at the zonal and regional level but not available in all assessed woredas. Epidemic management committees are formally established in all woredas and zone based on the guideline, but none of visited site have minute of meeting for epidemic management committee and did not evaluate their preparedness and experience as per the guideline of the national and regional recommendation. The response to an outbreak always focused on case management only. This might be due to lack of budget line and others logistic for emergency management. This all hindered and undermined the proper investigation and response expected for epidemic prone diseases.

3.5. Conclusions

The analysis of the PHEM data was done at ZHD and RHB, but nonexistent both at woreda and health facility level. The reporting rate of the Bale Zone was below expected (<80%) in the last five month (WHO week 28/2016 to week 47/2016) and surveillance data analysis was limited to Regional and Zone level.

There is poor surveillance (PHEM) specific supportive supervision at all level, rather than integration with other activities/program. This was due to lack of budget for surveillance and related logistics. The feedbacks given from higher to their respective lower health facility were not continuous in the last five months.

Most of the visited sites have surveillance manual. Standard case definitions for measles were also seen in most of the health facilities. All of the PHEM focal persons were trained on the new PHEM guideline in all visited sites but not given to all HEWs at the health post level. Weekly and monthly PHEM data (report) was not consistent with their clinical register in most of the visited health facility.

All visited health facilities (Hospital, Health center and Health post) have diagnostic capacities to support for malaria, but they send measles samples to regional/national laboratory and the response from the laboratories is always much delayed.

Epidemic management committee was formally established in all woredas and zones based on the guideline. But none of visited site have minute of meeting for epidemic management committee and did not evaluate their preparedness and experience as per the guideline of the national and regional recommendation. The response to an outbreak was always prioritizing on case management rather than an investigation for risk factors. This all hinder and undermines the proper investigation and response expected for other epidemic prone diseases.

3.6. Recommendations

Surveillance data should be analyzed, interpreted and used for decision making at all levels (local to central).

Regular monitoring of program specific supportive supervision and continuous feedback system should be strengthened for more improvement of the completeness and timeliness and/or surveillance system as whole.

Formal training on new PHEM guideline has to planned and given to all HEWs at the health post level. In order to improve diseases detection, capacity building of health care providers both at health centers and woreda levels on reporting system, data management and analysis were essential.

Availability of reporting formats and registration book should be checked and provided on regular basis at each level of health facility.

Epidemic committee should be alerted all the time in respect to preparedness and response and also post epidemic evaluation has to be strengthened.

Budget should be secured for surveillance activities at all level.

3.7. References

1. Centers for Disease control and Prevention. Updated Guideline for Evaluating Public Health Surveillance Systems: Recommendation from the Guidelines working Group. MMWR 2001; 50(No.RR-13)
2. Federal democratic and republic of Ethiopia, Ministry of health, Ethiopian public health institute public health emergency management guideline, 2009
3. Public Health Emergency Guidelines for Ethiopia, Ethiopian Health and Nutrition Research Institute, Public Health Emergency Management Centre, February 2012
4. Ministry of Health, Federal Democratic Republic of Ethiopia. National Integrated Disease Surveillance and Response Guideline, Version 1.1. September 2002
5. Surveillance evaluation of integrated surveillance and response system South-West Shoa zone (Unpublished), December 2010

3.8. Annex: Questionnaire

Questionnaire for Evaluation of Surveillance System- Bale Zone, Oromia, Ethiopia, 2017

1.1 Regional/Zonal Level Questionnaire

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 and measles? **Yes / No**
4. If yes, **Observe** [1 to n priority diseases] is the standard case definition for each priority disease _____
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 reports in the last 3 months compared to expected number
Weekly: ___/12 **times** the number of woredas
Immediately: -----/**times** the number of woredas
9. Number of weekly reports received on time: ___/12 **times** the number of woredas
10. Was there any report of the immediately reportable diseases in the past 1 month? **Yes/ No**
11. **If yes**, with in what time is the report received after detection of the case/diseases?
 - a. Less than 1 hour
 - b. 2-24 hour
 - c. 1- 2 days
 - d. 3- 7 days
 - e. After 1 week
12. How do you report to the next high level?
 - a. Mail
 - b. Fax
 - C. Telephone
 - d. Radio
 - e. Electronic
 - f. Other
13. Does the zone level describe data by person (case based, outbreaks, and sentinel)? **Yes/ No**
If yes, (Observe) Observed description of data by age and sex
14. Describe data by place, time and person? Yes/No
15. Perform trend analysis? **Yes/ No**
If yes, Observe , line graph of cases by time and list disease(s) for which line graph is
16. Observed a. _____ b. _____ c. _____ d. _____ e. _____
17. Do the zone have an action threshold defined for Measles and malaria? Yes / No
18. Who is responsible for the analysis of the collected data? _____
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. Do you have an appropriate denominators establish the threshold? Yes / No
21. **If yes**, Observe presence of demographic data (E.g. population by wored and hard to reach groups)

Outbreak Investigation

22. Is there any outbreak in the zone in the last year? Yes/No
If yes, number of outbreaks investigated: _____
23. List of diseases: _____
24. Number of outbreaks investigated and in which risk factors were looked for: ____.
25. Number of outbreaks in which findings were used for action [Observe report] _____
26. Number of woredas that looked for risk factors [observe in reports] _____
27. Number of woredas that used the data for action [observe in final report] _____

Epidemic preparedness(relevant for epidemic prone diseases

28. Dose the zone established epidemic management committee? **Yes/No**
29. Do you have plan for epidemic preparedness and response? **Yes/No**
If yes, Observe, a written plan of epidemic preparedness and response
30. Has the zone had emergency stocks of drugs, vaccines, and supplies at all times in past 1 year? **Yes/ No**
31. Has the zone experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? **Yes/ No**
32. Doses the standard case management protocol for malaria and measles exists in all health facilities? **Yes/No**
33. Is there a budget line for epidemic response? **Yes / No**
If yes, Obs. minutes (or report) of meetings of epidemic management committee
34. Does the region have a rapid response team for epidemic? **Yes/No**

Response to epidemics

35. Dose the epidemic responded within 48 hours of notification from zone level? Yes/No
If yes, Observe (from written reports with trend and intervention)

Feedback

36. Dose a report is regularly produced to disseminate surveillance data from the zone? **Yes/No**
If, yes Observe: the presence of a report of surveillance data
37. How many feedback reports has the zone level produced in the last year? _____

Supervision

38. Did you conduct supervision last 6month? Yes/No
39. **If yes**, how many supervisory visits have you made in the last 6 months? ____
40. **If no**, what are reasons for not making all required supervisory visits?
(Text) _____

Training

41. Have you received any post-basic training in epidemic management? **Yes/No**
If yes, specify when, where, how long, by whom? _____

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

Resources

43. for data management

- a) Computer & Printer Yes/No
- b) Photocopier Yes/No
- c) Data manager Yes/No
- d) Statistical package Yes/No

44. Communications availability

- a) Telephone service Yes/No
- b) Fax Yes/No
- c) Radio call Yes/No
- d) Internet Yes/No

Surveillance

45. Is there a budget line for surveillance at zone? Yes/No

If yes, is it sufficient Yes/No?

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

How could surveillance be improved? _____

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

- a. _____
- b. _____
- c. _____

Attributes and level of

a) Usefulness:

48. Total population under surveillance in the zone _____

49. How many cases and deaths reported in the zone last year?

Malaria cases _____ Deaths _____

Measles cases _____ Deaths _____

50. Does the surveillance system help?

- a) To detect outbreaks of these selected priority diseases early? Yes / No
- b) To estimate the magnitude of morbidity, mortality and factors related to these diseases? Yes/ No
- c) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity:

51. Do you feel that additional data collected on a case are time consuming? Yes/No

52. How long it takes to fill the format? a, <5 minute b-10-15minuts c- >15 minutes

c) Flexibility:

53. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

54. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? **Yes/ No**

If yes, how? _____

d) Data Quality:

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

56. Are the reporting site / data collectors trained/ supervised regularly? **Yes/ No**

If, Observe: Review the last months report of these diseases

57. Average number of unknown or blank responses to variables in each of the reported forms

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

e) Acceptability:

59. Do you think all the reporting agents accept and well engaged to the surveillance activities?

Yes/No

If yes, how many are active participants (of the expected to)? _____

60. If no, what is the reason for their poor participation in the surveillance activity?

a) Lack of understanding of the relevance of the data to be collected

b) No feedback / or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) Representativeness:

61. What is the health service coverage of the woreda/ zone/ region? _____%

62. Do you think, the populations under surveillance have good health seeking behavior for these diseases? **Yes/ No**

63. Who do you think is well represented by the surveillance data? **Urban / rural**

g) Timeliness:

64. What proportion of woredas reports in acceptable time? -----%

h) Stability

65. Was the new BPR restructuring affected the procedures and activities of the surveillance of these diseases? **Yes/No**

66. Was there lack of resources that interrupt the surveillance system? **Yes/No**

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, Observe 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 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, Observe description of data by age and sex
 - i)** Is description of data by place (locality, village, work site etc)? Yes / No
If yes, Obs. description of data by Place
 - j)** Is the description of data by time? Yes/ No
If yes, Observe 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**, Observe. 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
(Observe for 2 priority diseases) _____
13. Did you have appropriate denominators? Yes/ No
If yes, Observe 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 year6 months? Yes/No
 If yes, number investigated _____ (Observe reports and take copies if possible)

Epidemic preparedness

17. Dose the woreda epidemic preparedness plan? Yes/No
If, yes, (Observe) 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, Observe, 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, Observe 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. Present 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? _____

Observed 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? _____ (Observe 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 trained PHEM/IDSR disease surveillance? **Yes/No**

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

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 a 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? _____.

Attributes

a) Usefulness

42. Total population of the woreda under surveillance _____

43. How many cases and deaths reported in the woreda from the following disease past 6 months?

a) Malaria cases _____ Deaths _____

b) Measles cases _____ Deaths _____

44. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes / No

b) To estimate the magnitude of morbidity, mortality and factors related to these diseases? Yes/ No

c) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity:

45. Do you feel that data collections on a case report form are time consuming? Yes/No

46. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility:

47. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes / No

48. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes/ No

If yes, how _____.

d) Data Quality:

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

50. Are the reporting site / data collectors trained/ supervised regularly? Yes/No

If yes, Observe: Review the last months report of these diseases

51. Average number of unknown or blank responses to variables in each of the reported forms

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

e) Acceptability:

53. Do you think all the reporting agents accept and well engaged to the surveillance activities?

Yes/No If yes, how many are active participants (of the expected to)? _____

53. 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.

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) Representativeness:

54. What is the health service coverage of the woreda? _____%

55. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No

56. Who do you think is well represented by the surveillance data? Urban / rural

g) Timeliness:

57. What proportion of health facilities reports in acceptable time? -----%

h) Stability:

58. Was there lack of resources that interrupt the surveillance system? Yes/No

If yes, how did you manage it? _____

59. What do you suggest to overcome such problems? _____

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, Observe; for the existence PHEM/IDSR national guide line or manual

2. Is there a clinical register in health facilities? Yes/ No

If yes, Observe the existence of a clinical register

3. is there the health facilities correctly register cases during the previous 30 days? Yes/No

If yes, Observe; the clinical register

Do you have a standard case definition for: (each priority disease?)

a) Measles Yes/No

b) Malaria Yes/No

If yes, observe the standard case definition for: (each priority disease)

4. Dose of health facilities use standardized case definitions for the country's priority diseases. Yes/ No

If yes, Observe; the respondent correctly diagnosing one of the country's priority diseases using a standard case definition (Interview about of these)

5. Dose 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,** Observe 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, observe the presence of status cold chain at health facility

8. Dose the health facility that has the capacity to ship specimens to a higher level lab?

Yes No N/A

If yes, Observe 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. Observe Measles Yes No N/A

b. Observe Malaria Yes No N/A

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

Observe Weekly: _____/12 times the number of health post sites

Observe immediately: _____/--- times the number of health post sites

12. on time (use national deadlines)

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

Observe 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. Describe data by person, place and time (outbreaks, sentinel) Yes No N/A

If yes, Observe data

16. Is there trend analysis Performed? Yes No N/A

If yes, Observe 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, Observe 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? ____

Observe; 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? _____
Observe; 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, Observe ; supervision report or any evidence for appropriate review of surveillance

Training

28. Have you 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
-

Attributes

a) Usefulness

36. Total population of the woreda under surveillance _____
37. How many cases and deaths reported in the woreda from the following disease past 6 month?
- a) Malaria cases _____ Deaths _____
 - b) Measles cases _____ Deaths _____
38. Does the surveillance system help?
- d) To detect outbreaks of these selected priority diseases early? Yes / No
 - e) To estimate the magnitude of morbidity, mortality and factors related to these diseases? Yes/ No
 - f) Permit assessment of the effect of prevention and control programs? Yes/ No

b) Simplicity

39. Do you feel that data collections on a case report form are time consuming? Yes/No
40. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility

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

If yes , how _____.

d) Data Quality

43. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? **Yes/ No**
44. Are the reporting site / data collectors trained/ supervised regularly? Yes/No
- If, Observe: Review the last months report of these diseases
45. Average number of unknown or blank responses to variables in each of the reported forms

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

e) Acceptability

47. Do you think all the reporting agents accept and well engaged to the surveillance activities? **Yes/No**

If yes, how many are active participants (of the expected to)? _____

48. **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.
 - c) Reporting formats are difficult to understand
 - d) Report formats are time consuming
 - e) If Others: _____.

f) Representativeness

49. What is the health service coverage of the woreda? _____%

50. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? **Yes/ No**

51. Who do you think is well represented by the surveillance data? Urban / rural

g) Timeliness

52. What proportion of health facilities reports in acceptable time? -----%

h) Stability

53. Was there lack of resources that interrupt the surveillance system? Yes/No

If yes, how did you manage it? _____

54. What do you suggest to overcome such problems? _____.

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, Observe 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, Observe; 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, Observe; 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. Dose 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) Observe Measles Y N N/A

b) Observe Malaria Y N N/A

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

Observe Weekly: _____/12 times the number of sites

Observe immediately: _____/-- times the number of sites

9. on time (use national deadlines)

Observe; Number of weekly reports submitted on time:-_ /12 times health post.

Observe ; 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. 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 , Observe 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? _____

Observe 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 supervised by higher level in the last 6 months?

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

Observe; 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)

Attributes

a) Usefulness

31. Total population of the woreda under surveillance_____

32. How many cases and deaths reported in the woreda from the following disease past 6month?

a) Malaria cases _____Deaths _____

b) Measles cases _____Deaths _____

33. Does the surveillance system help?

a) To detect outbreaks of these selected priority diseases early? Yes No N/A

b) To estimate the magnitude of morbidity , mortality and factors related to these diseases? Yes No N/A

c) Permit assessment of the effect of prevention and control programs? Yes No N/A

b) Simplicity

34. Do you feel that data collections on a case report form are time consuming? Yes No N/A

35. If yes, how long it takes to fill the format? a, <5 minute b- 10-15minuts c- >15 minutes

c) Flexibility

36. Do you think that the current reporting formats used for other newly occurring health event (disease) without much difficulty? Yes No N/A

37. Do you think that any change in the existing procedure of case detection, reporting, and formats will be difficult to implement? Yes No N/A

If yes, how_____.

d) Data Quality

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

39. Are the reporting site / data collectors trained/ supervised regularly? Yes No N/A

If, Observe: Review the last months report of these diseases

40. Average number of unknown or blank responses to variables in each of the reported forms

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

e) Acceptability

42. Do you think all the reporting agents accept and well engaged to the surveillance activities?

Yes No N/A

If yes, how many are active participants (of the expected to)? _____

43. **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.

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

f) Representativeness

44. What is the health service coverage of the woreda? _____%.

45. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes No N/A

46. Who do you think is well represented by the surveillance data? Urban / rural

g) Timeliness

47. What proportion of health facilities reports in acceptable time-----?

h) Stability

48. Was there lack of resources that interrupt the surveillance system? Yes No N/A

If yes, how did you manage it? _____

49. What do you suggest to overcome such problems? _____.

CHAPTER – IV

Health Profile

4.1. Health profile description of Akaki Woreda, Finfinne Zuria Oromia Special Zone, Oromia Region Ethiopia, 2016

4.1.1. Introduction

Health profile is a system of collecting, organizing and summarizing health and other health related events to describe health and other health related conditions, demographic, socioeconomic, political, cultural and other aspects of particular geographic areas of interest. This health profile assessment is both a process and a product. It is a process of gathering and interpreting information from multiple and diverse sources in order to develop a deep understanding of the health of a community. In addition, a process uses these results to develop strategies to improve the health status of the community.

The health profile provides an overview of the situation and trends of priority health problems and the health systems profile, including a description of different institutional frameworks, key issues and challenges of the woredas. It is important to obtain enough, accurate and reliable data of particular geographic area (woreda) in order to develop meaning full developmental plan. Organizing, summarizing and analyzing of health and health related data of the woreda is important to prioritize problems of studied area and plan on identified problems. These summarized and prioritized data is important for public health surveillance officials for planning, implementation and evaluation of public health surveillance programs.

As of 2011 study done in California shows health profiles provide quick and easy access to the most commonly requested health indicators from the California Health Interview Survey (CHIS). The profiles present estimates to track changes in insurance status, disease prevalence, health behaviors and overall health status over time and enables frequent release of health estimates that will help policymakers, media, health advocates and others better respond to current events and the impact of a changing economic and social climate on health (1).

The *Zambian Health profile* presents in one-place shows the best and latest evidence to enable an assessment of progress in improving reproductive, maternal, newborn, and child health (RMNCH) and achieving Millennium Development Goals 4 and 5. The profile presents the most recent available information on selected demographic measures, coverage rates for priority interventions across the continuum of care, and indicators of equity, policy support, human resources, and financial flows (2).

Its purpose is to promote evidence-based health policymaking through a comprehensive and rigorous analysis of the dynamics of health situations and health systems in the woreda. Therefore, the main objectives of this document are to present compiled information concerning physical and socio-economic condition of the woreda and its health profile constraints.

The main sources of data used for the preparation of the document are AkakiWoreda administration, Agriculture, Health, Educational, Water Resource, Culture and Tourism, and Energy Office and Finance Office. The document covers almost the data and activities for the period 2014/2015 G.C, or 2007 E.C. and all the years are according to the Gregorian calendar.

4.1.2. Objectives

4.1.2.1 General objective

To assess and describe health and health related data of AkakiWoreda.

4.1.2.2 Specific objectives

To summarize health and health related data of AkakiWoreda

To identify health service status of the woreda in 2014/15

To understand basic infrastructures of the woreda

To identify major health problems of AkakiWoreda

4.2. Methods

4.2.1 Study Area

Akaki Woreda, Fifinne Zuria Oromia Special Zone Oromia Region, Ethiopia, 2015

4.2.2 Study Period

All required data of last year (2014/15 G.C) collected, analyzed and interpreted from Feb 3, 2016 to February 13/2016.

4.2.3 Study Design

Descriptive cross sectional study design was used.

4.2.4 Data collection methods

Health and other health related data of last year (2014/15 GC) were collected and reviewed from woreda health office, education office, water & sanitation office, woreda administrative office, Culture and tourism office and different literature and publications to incorporate other unavailable information. Hard copy and Softcopy reviewed to generate different data. In addition, interviewing and discussion with concerned bodies also conducted.

4.2.5 Data analysis procedures

Data compiled and analyzed using Microsoft Excel software.

4.3 Results

4.3.1. Historical Background

Akaki is one of the woredas of former East Shoa Zone in Oromia Region. Currently it is one of the woredas of Oromia Special Zone. Historically, name of the Woreda came from the biggest river “Akaki” which crosses the woreda from West to Southeast.

Akaki woreda is bordered on the North by Berekworeda, on the south by Liben woreda, , on the East Adea Woreda and Bishoftu Town, on the West Sebeta Awas Woreda and on the Southwest by the Addis Ababa City and Gelan Town administration. To the Southern part of the woreda the biggest river —Awash” touch some parts of the boundary of Akaki Woreda.

4.3.2 Geography and climate

Akaki Woreda is found at 37 Kilometer away from Addis Ababa to the eastern part of Oromia Region which lays between 08⁰,44’,19.58” to 08⁰,46’,09.5” North latitude and 38⁰,46’,24.7” to 38⁰,47’,02” East longitude . The area of the woreda is 41,341 KM². The Akaki Woreda is surrounded by four other woredas and two town administrations (Bishoftu from east and Gelan Town and Addis Ababa City from west. In addition, the Akaki woreda itself surrounded one town administration, which is Dukem. The altitude of the woreda is 1500-3100 Meters above the sea level. The climatic condition of the woreda is 2% Dega/High land, 98% Woyina Dega/Mid land and 0% Kola/Low land. Annual temperature estimated to be between 15^oc and 27^oc. Annual range of rainfall is 800-1800 mm.

4.3.3 Administrative and political structure

Administratively, the woreda has twenty-eight (28) rural kebeles and one town administration, which is known as —Au Sera” 45km from main road to the south direction. All woreda's administrative offices were found in Dukem Town administration.

The —Oromo Gada system” historical place —Oda Nabe” was found in the woreda. —Yerēf Mountain is also found in the woreda, which has forest that can be used as a living place for different types of wild animals.

4.3.4 Demographic Information

The total population of the woreda is estimated to be 76,486 of which 36,596 are male and 39,008 are female in 2007 E.C. Among these total population, 97.5 % are residing in rural areas. Among the total population under 1year, less than 5 and less than 15 years constitute 2,463(3.22%), 12,567(16.43%) and 36,415(47.61%) respectively. The older age group (>65) consists 3,626(4.74%) of the total population. The productive age group childbearing women (15-49 years of age) account for (16903) 22.1% of a population. Regarding religion distribution, most woredas' populations are Orthodox Christians 68.86% followed by protestant 21.2%, while 9% of the population are Islam, and 1.04% are others.

4.0.1: Estimated population by kebeles and age category, Akaki Woreda, Finfinne Zuria Oromia Special Zone, Oromia Region, 2014/15

S.N	Name of kebeles	Total Population of 2007 EC	Total HH (4.8%)	<1 year (3.1%)	<5 yrs (16.4%)	<15yrs (48%)	>65yrs (4.74%)	Women (15-49 yrs) (22.1%)
1	Koticha	5,504	2,949	177	904	2,621	261	2,616
2	Gamada	5,262	2,819	169	865	2,505	249	2,501
3	Hechuu	4,325	2,317	139	711	2,059	205	2,056
4	Gelan Arabsa	4,028	2,158	130	662	1,918	191	1,915
5	Boji silto	3,969	2,126	128	652	1,890	188	1,886
6	Aba Samuel	3,737	2,002	120	614	1,779	178	1,776
7	Abu Loya	3,613	1,935	116	594	1,720	172	1,717
8	Oda Koticha	3,516	1,884	113	578	1,674	167	1,671
9	Dera Idoro	3,459	1,853	111	568	1,647	164	1,644
10	Insilaalee	3,458	1,852	111	568	1,646	164	1,643
11	Ya'a Nacho	3,403	1,823	110	559	1,620	161	1,618
12	Dewera Chirri	3,133	1,679	101	515	1,492	149	1,489
13	Oda Nabe	2,941	1,576	95	483	1,400	139	1,398

S.N	Name of kebeles	Total Population of 2007 EC	Total HH (4.8%)	<1 year (3.1%)	<5 yrs (16.4%)	<15yrs (48%)	>65yrs (4.74%)	Women (15-49 yrs) (22.1%)
14	Abu Achiro	2,431	1,303	78	399	1,158	115	1,156
15	Abu sera	2,428	1,301	78	399	1,156	115	1,154
16	Abayi Silto	2,166	1,160	70	356	1,031	102	1,029
17	Ya'a Abayi	2,149	1,151	69	353	1,023	102	1,021
18	Dewrwa Tino	1,915	1,026	62	315	912	91	910
19	Abu Lugna	1,799	964	58	296	857	86	855
20	Koftu	1,744	934	56	286	830	83	829
21	Kombolcha	1,743	934	56	286	830	83	828
22	Dangago	1,683	902	54	277	801	80	800
23	Dufa	1,642	880	53	270	782	78	781
24	Borata Guji	1,572	842	51	258	749	75	747
25	Abu Garbi	1,496	802	48	246	712	71	711
26	Bilbilo	1,414	758	46	232	673	67	672
27	Abu Serkama	1,200	643	39	197	571	57	570
28	Gimashe	753	404	24	124	359	36	358
	Total	76,483	40,977	2,462	12,567	36,415	3,629	36,351

In the woreda there are 28 kebeles and Koticha was the highest populated kebele with 5,504 people and also has high number of households which was 2,949. Gimashe was the lowest populated with 753 people and 404 households.(Woreda annual report).

4.3.5. Productivity and Income

The main source of income of the woreda is agricultur. The agricultural density of the woreda was 41,341 hectares of the total land in 2014/15. The major annual crops grown in the woreda are cereals like Teff, Wheat, Barley and cash crops like Onion, Cabbage and Green pepper. In 2014/15, the highest productive yields were Wheat and Teff.

4.3.6. Education

In 2015, there were 49 primary schools (21 1st cycle (1-4) and 28 2nd cycle (5-8)), 2 secondary schools (9-10) and one preparatory school in Akaki Woreda. As the information obtained from the woreda education office, number of female students showed increment when compared to previous years in primary schools. There were 291 primary, 25 secondary and 13 preparatory school teachers in the woreda.

The school age child (target) for the academic year was 2091 and the total enrolment was 3726. School dropout in 6 months of 2007 was 310. The reason of dropout was economic problem as the woreda education office mentioned.

4.3.6.1. School Health

In Akaki woreda, schools with water supply were only four (4). Schools with functional male and female separated latrine are 52. In addition, 28 schools have school anti AIDS and other health clubs.

0.2Table 4.2: Number of enrolled students and their teachers by sex in Akaki Woreda, FinfinneZuria Oromia Special Zone, Oromia Region, 2015

S. N	Types of School		Number of Students			Number of Teachers			Remark
			Male N (%)	Female N (%)	Total	Male	Female	Total	
1	Elementary School	1-4	5916	5083	10,999	93	79	172	
		5-8	2426	1847	4273	68	51	119	
2	Secondary School(9-10)		281	144	425	21	4	25	
3	Preparatory School(11-12)		36	15	51	13	0	13	

4.4. Facilities/Infrastructures

Akaki has 28 kebeles in the woreda, all 28 kebeles have road transportation access to woreda town in all seasons.

Telecommunication is one of the modes of communication. There was a mobile network, working in all kebeles of Akaki Woreda. In this woreda, all (rural) kebeles has no supplied with electricity power.

4.5. Woreda Health System

4.5.1. Organization of Woreda Health Office (Oregano gram)

The currently revised woreda health office structure after BPR was organized in to six technical teams and two supportive teams. These technical teams are plan and supervision, training and administration, health service delivery, communicable disease control, family health & health extension worker and health services quality regulation teams. The two supportive teams at woreda health office are secretary and recording and documentation.

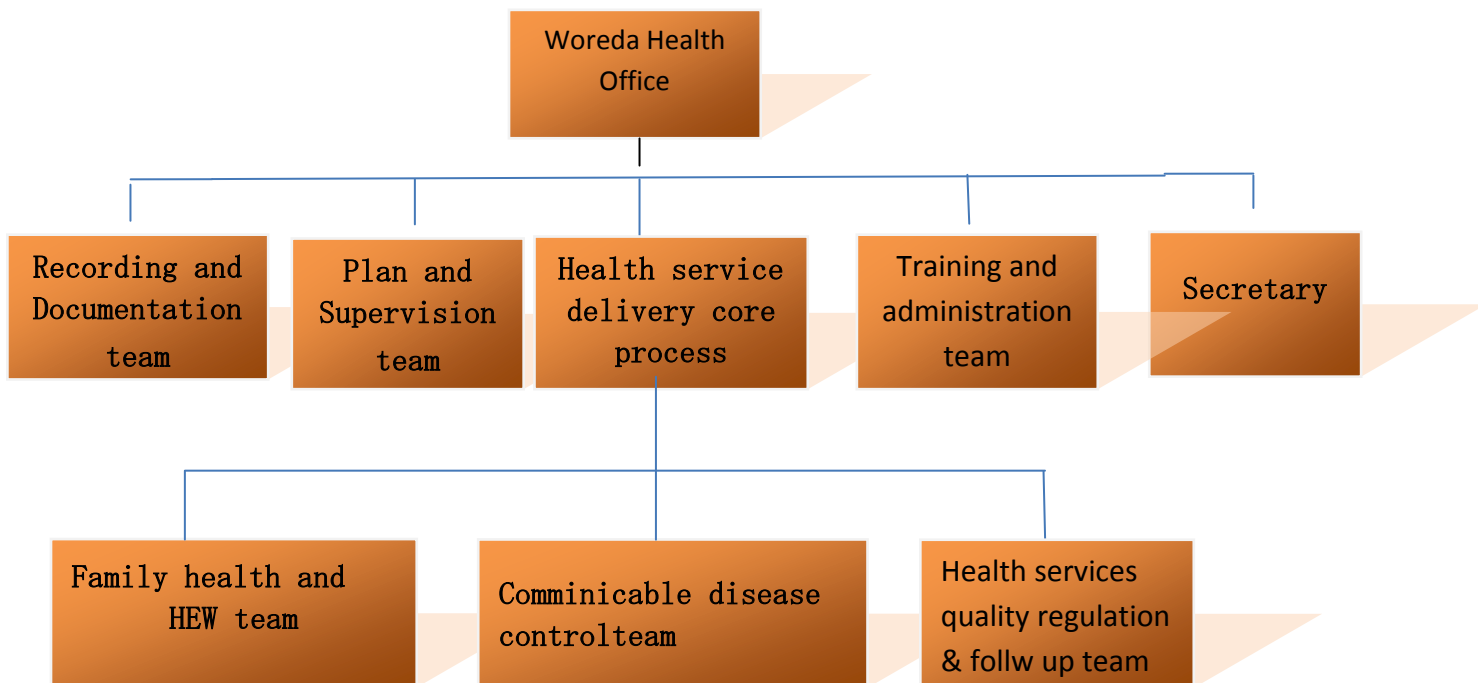


Fig.1. Organizational structure of Akaki woreda

4.5.2. Health facilities and their services

Regarding health facilities, there were three type “B” functional health centers namely Abu sera, Aba Samuel, Insilale and twenty eight (28) health posts in the woreda. All the health centers were giving both inpatient and outpatient services. All Health Centers have water, but they did not have

electric power supply and they run with solar power. The health service coverage of the woreda was 100%.(Woreda Health Office annual report).

Table 4.3 Infrastructures in health facilities, Akaki woreda 2014/15

S.N	Types of facilities	Health facility		
		Health Center (N=3)	Health Post (N= 28)	Total (N=31)
1	Water supply	3	0	3
2	Solar Power	3	3	3
3	Telecommunication service	3	28	31
4	Road transportation access to woreda HF	3	28	31 (all weather)

4.5.3. Cold chain system

Good cold chain management system is essential for vaccine efficacy and prevents the occurrence of outbreak. In AkakiWoreda, all Health Centers (three) have functional refrigerators. However, all Health Posts have no refrigerators.

4.5.4. Primary health care unit

Primary health care unit is a system designed by Ministry of Health to enhance the linkage between health center and health posts. In this system, all Health Center staffs expected to support technically the health posts under their catchment. According to the primary health care unit principle, at least five health posts should be included under one health center.

Table 4.4: List of Health Facilities with their respective catchment health posts in Akaki Woreda Finfine Zuria Oromia Special Zone, Oromia Region, 2015

S.N	Name of Health Facilities	Type	Number of Health Posts supported by the catchment	Remark
1	Abu sera Health Center	B	9	
2	Aba Samuel Health Center	B	7	
3	Insilale Health Center	B	6	
4	Akaki woreda Health Office	-----	6	These HPs were not included under HC, and were supported by the Woreda Health office.
	Total		28	

4.5.5. Health indicators and vital statistics

Health indicators and vital statistics are important to evaluate performances of health activities and to set policies. There is no mortality data of some vital statistics such as IMR, MMR, NMR, Under Five Mortality Rate, and Crude Death Rate.

Table 4. 5. Population and Vital statistics in Akaki Woreda, Oromia Region, 2015

S.No	Indicators	Number	%
1	Total population	76,846	100
2	Male	36,596	48
3	Female	39,008	52
4	Urban	1896	2.5
5	Rural	74,965	97.5
6	Total Live birth	2,654	3.47
7	Under one year old	2,463	3.22
8	Under 5 years old	12,567	16.43
9	Women (15-49 years old)	16,926	22.13
10	Pregnancy women	2654	3.47
11	IMR/1000	----- (No data)	-----
12	Neonatal Mortality Rate	----- (No data)	-----
13	Under 5 mortality Rate	----- (No data)	-----
14	Maternal Mortality Rate	----- (No data)	-----
15	Crude birth rate/1000	----- (No data)	-----
16	Crude death rate	----- (No data)	-----

4.5.6 Maternal and child immunization coverage

Immunization activity started in Ethiopia in 1970's E.C. This Expanded Program on Immunization is focused on vaccine preventable diseases, and now included and focused on 10 vaccine preventable diseases. In this Woreda, among 2,654 total live births, 2,309(87%) were vaccinated for BCG in 2014/15. In addition, of the 2,463 eligible infants, 2,094(85%) and 2,094(100%) of them were immunized for OPV3 and Penta-3 vaccines respectively. In this year, 2,463 (100%) under 1 year children were vaccinated for measles and 2364 (96%) were fully immunized. From total of 2463 under 1-year children, 47% of them were protected at birth;

Pregnant mother immunized two or more doses of TT vaccination during their pregnancy or three or more doses before she give birth was 1247(47%). From 14249 planned non-pregnant women, 5,557 (39%) were vaccinated for TT2 and more during 2014/15. (See Table 4.6)

Table 4.6. Maternal and child immunization coverage Akaki Woreda, Oromia Region, 2015

S.N	Antigen	Coverage (%)	Remark
1	Penta 1	100	
2	Penta 3	100	
3	OPV1	95	
4	OPV3	85	
5	Measles	100	
6	Fully Vaccinated	96	Fluctuated due to geographic situation, clients goes to the nearest HFs.
7	PAB	47	

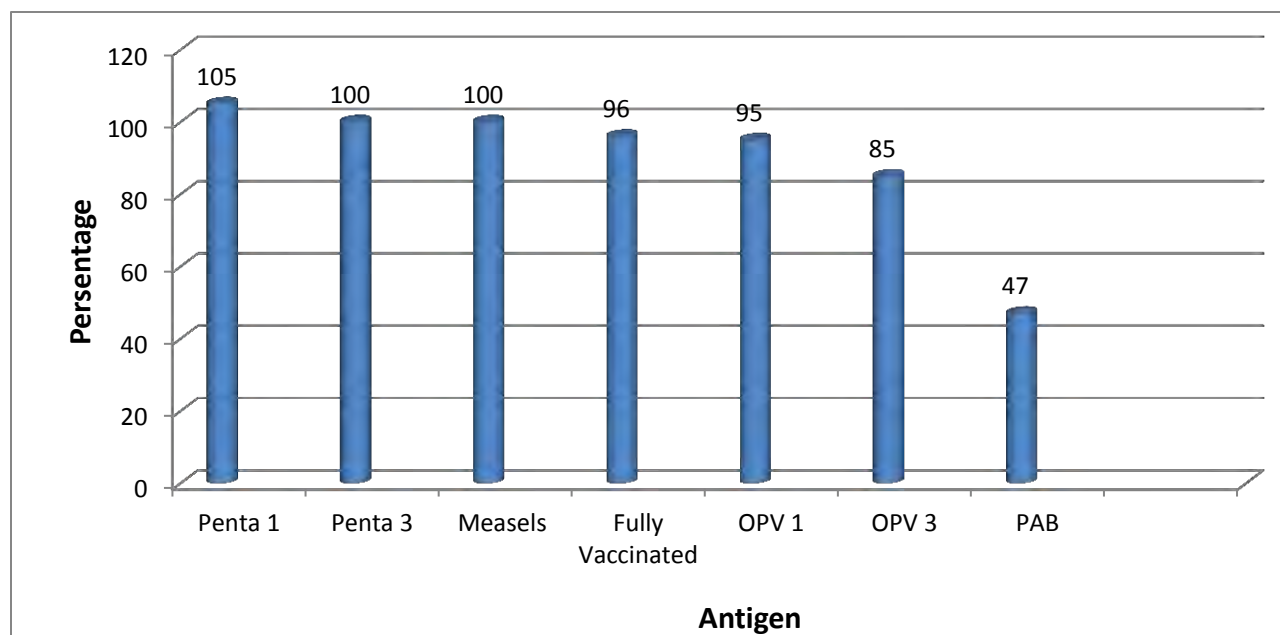


Fig.2. Vaccination Coverage of children in Akaki Woreda, Oromia , 2014/15

4.5.7. Water supply and sanitation

According to data obtained from Akaki Woreda Water Resource Office, of the total rural Population of the woreda, 50.8% was supplied with potable (safe water) supply. In this woreda, there were 9 protected springs, 82 protected wells, 24 standpipes of water sources in 2014/15. The average distance that each HH travel to fetch water was 1.5 KM in the same year.

Table 4.7: Types of water sources in Akaki Woreda, Oromia Region, 2015

S.N	Types of Water Resources	Number
1	Protected Spring	9
2	Un protected Spring	30
3	Protected Well	82(52=HDW,14=DW, 14=SHW)
4	Un protected Well	8
5	Stand Pipe	24

4.5.8. Latrine Coverage

From 15,935 households, 6,693 of them had standard latrine and the latrine coverage of the woreda was (42%) in 2014/15. There was no clear data on utilization of latrine in the woreda. No village of the woreda was free from open defecation.

4.5.9. Leading causes of outpatients visit (Morbidity)

Acute upper respiratory infection was a leading cause of outpatient morbidity in adults in the woreda, which was responsible for 1503(18.89%) and Diarrhea (non-bloody) in pediatric which comprised of 753 (30.01%) cases 2014/15. Acute febrile illness, Pneumonia, were among top ten diseases that caused outpatient morbidity in the woreda.

Table 4.8. Top ten leading causes of outpatient morbidity in adult (Akaki Woreda, Oromia Region, 2015)

Rank	Diseases	Number	%
1	Acute Upper respiratory infection	1503	18.89
2	Diarrhea (non- bloody)	1464	18.40
3	Acute Febrile illness(AFI)	1215	15.27
4	Pneumonia	1080	13.57
5	Trauma (injury, fracture, etc.)	757	9.51
6	Helminthiasis	672	8.45
7	Other or unspecified diseases of the eye and adnexa	344	4.33
8	Malaria (confirmed with Falciparum)	328	4.12
9	Diarrhea with bloody (dysentery)	299	3.76
10	Dyspepsia	294	3.70
	Total	7956	100

Acute Upper respiratory infection was the leading causes of outpatient morbidity in adults 1503 (18.89%) followed by Diarrhea (non- bloody) 1464(18.40%) and Acute Febrile illness (AFI) 1215(15.27%) respectively.

Table 4.9. Top ten leading causes of outpatient morbidity in pediatrics (Akaki Woreda, Oromia Region, 2015)

Rank	Diseases	Number	%
1	Diarrhea	753	30.01
2	Pneumonia	621	24.74
3	Acute Upper respiratory infection	371	14.79
4	Acute Febrile illness(AFI)	212	8.45
5	Diarrhea with bloody (dysentery)	146	5.82
6	Other or unspecified diseases of the eye and adnexa	104	4.15
7	Helminthiasis	96	3.83
8	Trauma (injury, fracture, etc.)	95	3.79
9	Diarrhea with dehydration	63	2.51
10	Infection of the skin and subcutaneous diseases	48	1.91
	Total	2,509	100

Diarrhea (non-bloody) was a leading cause of outpatient morbidity in pediatrics in the woreda, which was responsible for 753(30.01%) followed by pneumonia 621(24.74%).

4.5.10. Endemic Diseases

4.5.10.1 Malaria

In Akaki woreda, there were 18(64.3%)malarious kebeles with, 27,227 at risk population. In the year 2014/15, including current distribution from all households in the malarious kebeles (7,011) were supplied with ITNs.

However, there was no clear data on utilization coverage of ITNs among supplied households, Indoor residual spray was done for 7 kebeles in 2014/15 with Propoxer.

A total of 199 (0.73%) cases of malaria with no death were reported in 2014/15. From those malaria cases 43 cases were <5 children with no deaths. During the same year, there was no any shortage of malaria supplies such as Coartem and RDT.

4.5.10.2. Tuberculosis and Leprosy

A total of 40 tuberculosis cases (All forms of tuberculosis) were reported from health facilities to the woreda in 2014/15. From the total of TB cases 8 PTB negative, 15 PTB Positive and 17extra PTB. The Tb detection rate of the woreda was 20%, with 46.15% and 100% of TB cure rate and TB treatment success rate respectively which was far less than the regional one that is 65% detection rate and 85% cure rate in the year 2014/15(2007). There was no Tb defaulter and deaths on Tb treatment in the 2014/15.No leprosy cases were reported in Akaki woreda.

0.6Table 4.10.Number of clients tested for all forms of TB by sex and positive in Akaki Woreda, Oromia Region, 2014/15

S.N	Sex	Number of clients tested for TB and	Number of clients tested Positive for TB		
			PTB Negative	PTB Positive	EPTB
1	Male	27	5	12	10
2	Female	13	3	3	7
	Total	40	8	15	17

4.5.10.3. HIV/AIDS

In the woreda, 8,619 people were screened for HIV/AIDS in 2014/2015.From those screened, 17 (0.2%) of them were confirmed as positive. From positive 17 peoples 11(65%)of them were female. And 14(82.4%) of HIV positive people were at the age group of>25 years. There were 17 PLWHAs in the woreda. Among 17 new cases, 7 people have started ART service and 5 people were on Pre-ART service. Abu Sera health center was the only health center which started ART

service in the woreda. Community conversation (CC) is undertaking in some kebeles of the woreda to enhance the awareness of the community on prevention and control of HIV/AIDS. But it was not as planned. It was undertaken irregularly (interrupted) and not regularly conducted in all kebeles. Other HIV/AIDS prevention activity was under taken in the woreda like Income generating activity (IGA) for PLWHA and Orphans.

Table 4.11. Number of tested and positive clients for HIV in Akaki Woreda, Oromia Region, 2015

S.N	Types of Tests	Number of client tested for HIV	Number of clients tested Positive for HIV	%age
1	VCT	541	8	1.48
2	PIHCT	6,691	7	0.1
3	PMTCT	1,387	2	0.14
	Total	8,619	17	0.2

Table 4.12. No. of tested and positive clients for HIV by sex in Akaki Woreda, Oromia, 2014/15

S.N	Sex	Number of clients tested for HIV	Number of clients tested Positive for HIV	%age
1	Male	3,332	6	0.18
2	Female	5,287	11	0.2
	Total	8,619	17	0.2

Table 4.13. Number of tested and positive clients for HIV by age group in Akaki Woreda, Oromia Region, 2014/15

S.N	Age Group	Number of clients tested for HIV	Number of clients tested Positive for HIV	%age
1	<15 years	1,857	1	0.05
2	15-25 years	3,109	2	0.65
3	>25 years	3,653	14	0.38
	Total	8,619	17	0.2

4.5.10.4 Severe Acute Malnutrition (SAM)

There is no severe acute malnutrition in the woreda. All of the kebeles in the woreda were not hot spot areas for malnutrition. The woreda is highly productive and there was no food security problem in the last five consecutive years.(Woreda Agriculture Office annual report).

4.5.10.5 Outbreak and other disaster situations

In this woreda, there were no any outbreak or disaster situations that happened/occurred within the last five consecutive years.

4.5.11. Budget allocation for woreda health office

In the year 2014/15, the budget allocated for woreda Health office was 2,234,570.00. Of this total budget, 281,482 was allocated for different activities like maintenance and small projects. The woreda allocated 1,698,273.20(76 %) for salary and 254,814.80 (11.4%)for running different routine activities. During the same year, 391,992.81 ETB was secured from different donors and distributed to this woreda from the Regional Health Bureau for different activities such as prevention and control of HIV/AIDS, malaria, hygiene and sanitation promotion, supplemental immunization activities, nutrition programs and other different activities.

4.5.12 .Human Resources

In this woreda, 42 health professionals, 41 Health Extension professionals and 26 supportive Staff, totally 109 workers have been working in the woreda health office and different governmental health institutions. There were no physicians due to absence of hospitals and nucleus health centers in the woreda.

Table 4.14. Distribution of human resources of all categories in the Akaki Woreda health office, 2014/15

S.N	Professions		Level of Education	Number		
				Male	Female	Total
2	Health Officers		Degree	4	1	5
3	Nurses	Dip	Level IV	5	9	14
		BSc	Degree	2	3	5
5	Environmental Health		BSc degree	3	0	3
6	Laboratory	Dip	Level IV	1	2	3
		BSc	Degree	1	0	1
7	Pharmacist		BSc degree	1	1	2
8	Druggist		Level IV	1	2	3
9	Midwifery	Dip	Level IV	1	5	6
10	HEWs		Level IV	0	6	6
			Certificate	0	35	35
11	Supportive staffs		D/t level of education	10	16	26
	Total			29	80	109

4.5.13. Discussion

Acute Upper respiratory infection is a woreda public health problem leading by 18.89% followed by Diarrhea (none- bloody) account for 18.40% and Acute Febrile illness (AFI) 15.27% of the total diseases reported at adult outpatient visit. Pneumonia and trauma (injury) are among ten top diseases in adult out patient in the woreda. From pediatric OPD Diarrhea (none-bloody) is the leading cause of morbidity by 30.01% followed by Pneumonia 24.74% and Acute Upper respiratory infection which accounts for 14.79%. There was no death reported due to those diseases in the past one year.

This may be because of expansion of health service to the community levels by HEP and increment of awareness of community through Health Development Army (HAD) in addition to health workers and improved clinical diagnosis (detection of any fever like symptoms with RDT at health post level and using of ITN).

Pneumonia (13.57%) was taking the fourth rank next to acute febrile illness in the adult Outpatient and second leading cause of morbidity (24.74%) in pediatrics followed by acute upper respiratory infection (14.79%) and acute febrile illness (8.45%) in pediatrics OPD which are placed in the third and fourth level respectively according to woreda prioritization setting.

However, diarrhea (non-bloody) was the leading cause of OPD visit; there was no death recorded due to these diseases in the woreda. Therefore, treatment of diarrhea (non-bloody) should be supported with specific laboratory diagnosis to rule out other diseases with these symptoms which sometimes mimic other diseases.

Tuberculosis detection rate of the woreda was 20% which is below 70% which is recommended by WHO. Generally in 2014/15, there were a total of 40 all forms of tuberculosis cases woreda.

Out of 8,619 clients screened (tested) for HIV 5,287 (61.34%) were female. This may reveal that there was poor awareness creation from the health professionals for male partners particularly during PMTCT services, or in other words male clients have negative attitude towards HIV testing services. Generally, HIV prevalence of woreda was 0.19%. Among the total clients registered at OPD level (8,619), 11.3% of them were screened for HIV particularly at PICT service which is below the expected 85% with regional plan. The explanation for this may be below initiation and commitment of health workers who worked at OPD rooms and/or the refusal of clients for HIV testing due to poor awareness or shortage of HIV test kits at health facility level as expected.

The woreda recorded sustainable immunization coverage in the year targeted to children less than one year old to prevent them from vaccine preventable diseases. The overall provision of safe (potable) water supply had 50.8% coverage in the year 2014/15. This revealed that water supply coverage of the woreda is still unsatisfactory and most people use unsafe water for their domestic purposes.

Severe acute malnutrition is not a major public health problem of the woreda. Most of the kebeles in the woreda were not hot spot areas for malnutrition.

Prevalence of HIV among PMTCT service was 0.1%, and the proportion of pregnant women counseled and tested for PMTCT was 16.1%.

4.5.14. Limitations

Lack or absence of mortality and some health related data at woreda level. Incompleteness and inconsistency of some data (latrine, EPI, maternal health, etc).

4.5.15. Conclusions

Acute Upper respiratory infection and diarrhea (none-bloody) was leading causes of outpatient morbidity in adults and pediatrics in the woreda respectively in 2014/15. Pneumonia, Acute Febrile illness (AFI), and Diarrhea with bloody (dysentery) were among top ten diseases that cause outpatient morbidity in the woreda.

Regarding tuberculosis, the case detection rate of the woreda was below the recommendation of WHO. There were no deaths reported, and no case was reported as failed the treatment.

ITN coverage was 26% and indoor residual spraying was conducted as an interventions activity and preventive measures in the last year, and malaria was still one of the cause of morbidity among the ten top diseases in adult OPD and from pediatric OPD 43 cases (22%) were children of <5 years, but it was not top leading causes of morbidity in the pediatric OPD in the woreda.

Male clients have lower number in HIV testing services than females. HIV screening at VCT site service was low and the overall prevalence of HIV infection 0.2% in the woreda among the general population.

Severe acute malnutrition was not a major public health problem of the woreda. All of the kebeles in the woreda were not hot spot areas for malnutrition and there were no reported SAM cases in the woreda during the year 2014/15. ART service was given only in one health center in the woreda.

4.5.16. Recommendations

Treatment of non-bloody diarrhea should be supported with specific laboratory diagnosis at health post level, and for acute febrile illness using RDT (in ICCM program) to rule out malaria, typhoid fevers or other diseases with fever like symptoms.

Some programs, like DOTs should have to be started in all health facilities and more efforts have to be done on the TB case detection rate and improve the follow up of the patient and the reporting system of all the health facilities in the woreda.

Even though ITN distribution and indoor residual spraying was conducted as an intervention activity and preventive measures, because of reluctant attention towards malaria in the woreda malaria is one of the causes of morbidity among the ten top diseases in the woreda. Therefore, special attention should be given to community practices on malaria prevention measures, ITN utilization and indoor residual spray.

Any OPD clients and pregnant mothers visiting the health facility should have to be counseled and tested or screened for HIV.

Even though the woreda was not under CBN program, OTP, TSF and CBN programs on nutritional activities should have to be strengthened in all health facilities because of decreased productivity in the year 2007 due to disturbed rain season by ELINO in the region.

Since the woreda has more HIV positive clients, ART services have to be started in other health centers in addition to Abusera health center.

Annex 4:

Data collection tool for health profile assessment Akaki Woreda health office, 2014/15

1. Historical Aspects of the area (Culture & Truism office).

- 1.1. Woreda at a glance: where it is _____
- 1.2. The name (how& why) _____
- 1.3. How the woreda was formed _____
- 1.4. Any other historical aspect _____

2. Geography and Climate (including map, altitudes, agro ecological zones etc...)

- 2.1. Woreda map _____
- 2.2. Location (distance and direction) _____
- 2.3. Altitude _____
- 2.4. Annual rain fall (average) _____ Max _____ Min _____
- 2.5. Annual temp(average) _____ High _____ Low _____
- 2.6. Climatic zones Highland _____ % Midland _____ % Lowland _____ %
- 2.7. Accessibility to main roads _____

3. Administrative setup

- 3.1. Total no. of kebeles: _____ Rural _____ Urban _____
- 3.2. Woreda boundaries North _____ South _____
East _____ West _____

4. Demographic information

- 4.1. Population: Total _____ urban _____ . rural _____
- 4.2. Male Popn _____ Female Popn _____ sex ratio _____
- 4.3. < 1yrs _____, < 5 yrs _____, < 15 years _____, >64 years _____,
Women 15-49 yrs of age _____.
- 4.4. Total population by kebele (each kebele pop) _____ Ethnic composition/language

5. Economy(mainstay of the economy, average income levels etc)

- 5.1. Main source of the economy _____
 - 5.1.1. Land density _____
 - 5.1.2. Cultivated _____
 - 5.1.3. Farming _____
 - 5.1.4. Grazing _____

5.1.5. Main crops _____, _____, _____, _____

5.1.6. Fertilizer utilization _____

5.2. House hold income source(average)

5.2.1. Agriculture _____ (No.)

5.2.2. Different business _____(No.)

5.2.3. Employee _____(No.)

5.2.4. Jobless _____(No.)

5.2.5. Average income per HH/year _____

6. Education and school Health

6.1. Distribution of Schools:

6.1.1. Primary (1-8) _____ 1st Cycle(1-4) _____ 2ndCycle (5-8) _____

6.1.2. Secondary (9-10) _____

6.1.3. Preparatory schools (11-12) _____,

6.1.4. TVET/colleges _____

6.1.5. K.G _____

6.2. Educational status of the community

6.2.1. Total School Age Children (target) _____

6.2.2. Total Enrolment _____(_____ %)

6.2.3. School dropout in 6 months or year 2007 _____

6.2.4. If there is school dropout ,why _____

6.2.5. Total Educated people as a whole, _____ Male _____ Female _____

6.3. School health activities:

6.3.1. Water supply: schools with water supply _____

6.3.2. Toilets: schools with functional latrines (Male& Female) _____

6.3.3. Schools with HIV/other Health clubs _____

7. Facilities (Transport, Telecommunication, Power supply, Water supply...)

7.1. How many of the health postshave access to transportation _____(_____ %),
Telecommunication _____(_____ %) ,Electric power _____(_____ %)
,Water supply _____(_____ %)

7.2. How many of the health centershave access to transportation _____(_____ %),
Telecommunication _____(_____ %) ,Electric power _____(_____ %)
,Watersupply _____(_____ %)

8. Health delivery system(woreda Health Structure/organogram)

8.1. Health Facility

S.N	Type	Number	Total No. of beds
1	Hospital		
2	Health center		
3	Private HFs(clinics/diag.lab/drugstores)		
4	Health posts		

8.2. Health institution to pop ratio:

8.3. Hospital: Pop _____ . HC: Pop _____ HP: Pop _____

8.4. Health service coverage _____

8.5. Human resource for health (all type)

Type	Number	Remark
Physicians		
Health Officers		
Nurses		
Lab.		
Pharmacy		
Environmental Health		
HEWs		
Others		

Doctor: pop ratio _____, Nurse: pop ratio _____ HEW: pop ratio _____

8.6. Top causes of morbidity and mortality

8.6.1. Top ten leading causes of OPD visit (morbidity):

Rank	Adults	Pediatrics
1		
2		
3		
4		
5		
6		
7		

8.6.2. Top ten causes of admissions

Rank	Adults	Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

8.6.3. Top ten causes of deaths (mortality).

Rank	Adults	Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		

8.7. Vital Statistics and Health Indicators

8.7.1. Infant Mortality Rate (IMR) _____ (total <1 yr deaths in 2007yr _____)

8.7.2. PMR _____ (The last year 2007yr)

8.7.3. Total live births _____

8.7.4. Total still births _____

8.7.5. Total neonatal deaths _____

8.7.6. Child Mortality Rate _____ (total <15 yr deaths in 2007yr _____)

8.7.7. Crude Birth Rate _____

8.7.8. Crude Death Rate _____ (total deaths 2007yr _____)

8.7.9. Maternal Mortality Rate _____ (total maternal deaths in 2007 _____)

8.7.10. Contraceptive Prevalence rate _____

8.7.11. Contraceptive acceptance rate _____

8.7.12. ANC rate (how many of the total expected pregnancies attended 1st ANC) _____

8.7.13. ANC rate (how many of the total expected pregnancies attended 4th ANC) _____

8.7.14. Percentage of deliveries attended by skilled birth attendants _____

8.7.15. Percentage of deliveries attended by HEWs _____

8.7.16. Percentage of deliveries attended by TBA _____

9. Immunization Coverage (for children);

- 9.1. BCG _____
- 9.2. OPV-0 _____ OPV -1 _____ OPV-3 _____
- 9.3. Penta-1 _____ Penta-3 _____
- 9.4. PCV10 -1 _____ PCV10 -3 _____
- 9.5. Measles _____
- 9.6. Fully immunized _____
- 9.7. PW TT2+ _____, NPW TT2+ _____

10. Health budget allocation:

10.1. Government

- 10.1.1. Total budget allocated for the woreda _____
- 10.1.2. Total budget allocated for health _____ (____ %)

10.2. Funds from NGO

- 10.2.1. Total _____ (purpose/programs) _____

11. Disaster situation in the woreda

- 11.1. Was there any disaster (natural or manmade) in the woreda in the last one year? _____
- 11.2. Any recent disease outbreak/other public health emergency _____
- 11.3. If yes, cases _____ and deaths _____

12. Community Health Services:

12.1. Status of services provided by community health workers namely

- 12.1.1. No. of TBAs/TTBA _____ and their responsibility _____
- 12.1.2. No. of CHWs/CHPs _____ and their responsibility _____
- 12.1.3. Responsibility of HEWs _____
- 12.1.4. Others _____

12.2. Status of Primary Health Care Components – with focus on the eight PHC elements

- 12.2.1. MCH (Delivery, ANC, PNC) _____
- 12.2.2. FP (Methods) _____
- 12.2.3. EPI (outreach service, cold chain, vaccine) _____

12.3. Environmental Health, Sanitation Hygiene. (WASH)

- 12.3.1. Latrine coverage _____ (____ %) & utilization rate _____ (____ %)
- 12.3.2. Total safe water supply coverage _____ (____ %)
- 12.3.3. Safe water supply coverage by kebele with its popn _____
- 12.3.4. Main source of water supply _____
- 12.3.5. Others _____

13. Endemic diseases; (in No & % for all questions)

13.1. Malaria:

- 13.1.1. Total malarious kebeles _____
- 13.1.2. Pop at risk _____
- 13.1.3. ITNs coverage (including current distn) _____
- 13.1.4. Is there IRS this year (No of kebeles) _____
- 13.1.5. If yes, No of kebeles undertaking IRS _____

- 13.1.6. Popn covered _____
- 13.1.7. HHs covered _____
- 13.1.8. Total malaria cases/yr _____ Deaths/yr _____,
- 13.1.9. <5yr cases _____ deaths _____
- 13.1.10. Malaria supplies (Coartem, RDT, etc) shortage _____ (month)
- 13.1.11. If, Other issues _____
- 13.2. TB/Leprosy**
- 13.2.1. Total TB cases _____
- 13.2.2. PTB negative _____
- 13.2.3. PTB positive _____
- 13.2.4. Extra PTB _____
- 13.2.5. TB detection rate _____
- 13.2.6. TB Rx completion rate _____
- 13.2.7. TB cure rate _____
- 13.2.8. TB Rx success rate _____
- 13.2.9. TB defaulter _____
- 13.2.10. Death on TB Rx _____
- 13.2.11. Total TB patients screened for HIV _____
- 13.2.12. Total Leprosy cases _____ on Rx _____
- 13.3. HIV/AIDS;**
- 13.3.1. Total people screened for HIV (last one year) _____
- 13.3.2. VCT _____
- 13.3.3. PITC _____
- 13.3.4. PMTCT _____
- 13.3.5. HIV prevalence _____
- 13.3.6. HIV Incidence (new cases/yr) _____
- 13.3.7. Total PLWHA _____
- 13.3.8. On ART _____
- 13.3.9. On Pre-ART _____
- 13.3.10. Other HIV prevention activities _____
- 13.4. Nutrition (malnutrition related OTPs, SC,TSF, CBN and PSNP activities)/HO &early warning**
- 13.5. Total OTP sites _____,
- 13.6. Total admissions to OTP/yr _____
- 13.7. Total SC sites, _____
- 13.8. Newly opened/yr _____
- 13.9. Total admissions to SC/yr _____
- 13.10. Is there TSF (Targeted Supplementary Feeding) program in the worda? _____
- 13.11. If yes children in the program, _____ (No & %)
- 13.12. CBN program _____
- 13.13. If yes children in the program, _____ (No & %)
- 13.14. If yes children in the program, _____ (No & %)

13.15. General food security
condition _____

13.16. Shortage of Essential drugs

_____.

13.17. What do you think the major Health problem/s of the
woreda? _____

14. Discussion of the highlights and the main findings of the health profile
Assessment and
description _____

15. Problem Identification and Priority Setting – set priority health problems based on the public
health importance, magnitude, seriousness, community concern, feasibility etc,

25. Reference

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CHAPTER- V

Scientific Manuscript for Peer Reviewed Journal

5.1. Investigation of Human Cutaneous Anthrax Outbreak

Authors: Getachew Demissie¹, Ahmed Ali² +251911684399, Gemechu Befu³

Address: EFETP, School of Public Health, Addis Ababa University

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: getachewdemissie4@gmail.com

Oromia Region +251913338945/+251921077928

Investigation of Human Cutaneous Anthrax Outbreak in Sire Woreda, Arsi Zone, Oromia Region,
2016

Abstract

Introduction: Anthrax is primarily a disease of herbivores and is a bacterial disease caused by the spore-forming *Bacillus anthracis*, Gram positive, rod-shaped bacterium. The objective was to confirm the existence of Cutaneous Anthrax Outbreak.

Method: A Descriptive study design was used to describe the outbreak from September 1-7/2016.

Results: Ten human Cutaneous Anthrax cases were identified with two community deaths reported from September 1-7, 2016. Five cattle died showing symptoms of anthrax. The onset of the outbreak was on September 1/2016 and 2 Kebeles of the Woreda has affected. Males (6) were more affected than females (4). Majority of the cases were age groups of 15 - 44 years, followed by 45-64 years old 3(30%) and one case was in the age group of 5-14 years. The mean age was 35 years. The overall attack rate in the District was 0.98 and the fatality rate was 0.2 per 10,000 populations. Koloba Shamela and Gesela Shashe Kebeles were affected.

Conclusion: The clinical presentation and epidemiological evidences indicated that cutaneous anthrax was a possible cause of illness and deaths among human beings and livestock of the area. Health sector and Livestock Development sector have to protect both human beings and livestock. And should implement awareness creation for the community and conducting routine immunization of animals.

Key word: Anthrax, Sire Woreda, Oromia,

5.2. Introduction

Anthrax is primarily a disease of herbivores although few, if any, warm blooded species are entirely immune to it. From earliest historical records until the development of an effective veterinary vaccine mid-way through the present century together with the subsequent advent of antibiotics, the disease was one of the foremost causes of uncontrolled mortality in cattle, sheep, goats, horses and pigs worldwide. Humans almost invariably contract anthrax directly or indirectly from animals (1).

Anthrax is a bacterial disease caused by the spore-forming *Bacillus anthracis*, a Gram positive, rod-shaped bacterium. When conditions are not conducive for growth and multiplication of the bacilli, they tend to form spores. The spore forms are markedly resistant to biological extremes of heat, cold, pH, desiccation, chemicals (and thus to disinfection), irradiation and other such adverse conditions [1]. Therefore, the spore forms are the predominant phases in the environment and it is very largely through the uptake of spores that anthrax is contracted [1].

Within the infected host the spores germinate to produce the vegetative forms which multiply, eventually killing the host. A proportion of the bacilli released by the dying or dead animal into the environment (usually soil under the carcass) sporulate, ready to be taken up by another animal. The major sources of human anthrax infection are direct or indirect contact with infected animals, or occupational exposure to infected or contaminated animal products [2].

Humans become infected in one of three ways- cutaneous, inhalation and gastrointestinal. In Cutaneous route, the organisms gain access through small abrasions or cuts and multiply locally with an inflammatory response [3]. Incubation period varies from few hours to even up to 60 days. For Cutaneous anthrax, Incubation period (IP) ranges from few hours to 3 weeks, but most often it is 2 to 6 days; for gastrointestinal anthrax, the average IP (incubation period) is 3-7 days. In inhalation anthrax, the median incubation period is 4 days, but may be up to 10 or 11 days [1, 3].

Anthrax infection in humans provides permanent immunity and second attacks are rare [3]. Though in general, the case fatality rate (CFR) due to anthrax has been reduced due to antibiotics, but all three forms are potentially fatal if untreated and CFR is substantial in situation of use anthrax as biological weapon[3].

Cutaneous anthrax accounts for more than 95% of human cases. It begins 2-5 days after infection as a small papule resemble an insect bite developing within a few days into a vesicle filled with dark bluish black fluid[3]. Rupture of the vesicle reveals a black Escher at the base with a very prominent inflammatory ring around the Escher. These were sometimes referred as malignant pustule. The lesion

was classically found on the hands, forearms or head and is painless. Rarely did it find on the trunk or lower extremity. Generally, cutaneous lesions are single, but sometimes two or more lesions are present. The Cutaneous form is more often self-limiting and with treatment, CFR is < 1percentage cases are fatal. There are approximately 10-100 thousand human incidences annually throughout the world with significant numbers of cases in Chad, Ethiopia, Zambia, Zimbabwe and India [4]. Anthrax is endemic throughout Africa, causing considerable livestock and wildlife losses and severe, sometimes fatal, infection in humans. Predicting the risk of infection is therefore, important for public health, wildlife conservation and livestock economies. However, because of the intermittent and variable nature of anthrax outbreaks, associated environmental and climatic conditions, and diversity of species affected, the ecology of this multi host pathogen is poorly understood [3,4].

Zambia has experienced an outbreak of Anthrax with a total of 233 suspected cases and 6 community deaths (CFR: 2.6%) reported from Chama District, Eastern Province between August and September 4, 2012 [5]. All patients had a history of contact (by ingestion or touch) with Hippo meat mysteriously dying in the upstream of the Luangwa River. The majority of cases presented with skin lesions compatible with Cutaneous Anthrax [5].

Animal anthrax is endemic disease in Ethiopia occurring usually in May and June every year (anthrax season) in several farming localities of the country, although suspected cases of livestock anthrax are reported from several districts, few of those are officially confirmed [6].

In Ethiopia, there was Anthrax outbreak in Afar Region in 9 August 2000 [7]. WHO has received reports of clusters of cases of suspected anthrax from the Region; no systematic epidemiological investigation has carried out (7).

The common use of traditional medicine for anthrax in Ethiopia indicates that the disease was well recognized by rural communities, but little are known about its prevalence, epidemiology and public health significance (8-10). According to the Federal Democratic Republic of Ethiopia Ministry of Health surveillance data, a total of 1,096 suspected human anthrax cases and 16 deaths (with a CFR of 1.5%) were reported from four regions (Tigray, Amhara, Oromia, and SNNP) during 2010/11 [11].

On Weekly PHEM Report from the Oromia Regional Health Bureau, ten-suspected anthrax cases and two deaths, report submitted in WHO epidemiological weeks 34 to the Regional level. The report included Sire Woreda of Arsi Zone. Under the Ethiopian Surveillance System, one case of anthrax is an outbreak and must be reported to Ministry of Health immediately[10]. We tried to communicate the Regional Health Bureau PHEM officers in ORHB regarding the existence of an outbreak in the above-mentioned Zone and Woreda and if so to send us the line lists of cases and

deaths. Accordingly, the Regional PHEM officers confirmed the existence of the outbreak, but line lists of cases from the Zone not yet received due to various reasons mentioned by the officer such as access for communication. We secured the Arsi Zone Health Department head, both PHEM officers land line, and cell phone numbers, because of late unsent report from all side, on September 7, 2016, a team of two residents went to the Zone and District to investigate the outbreak.

5.2.1 General Objective

The main objective of the study was to investigate cutaneous Anthrax outbreak and recommend control measures for affected Kebeles in Sire Woreda of Arsi Zone, Oromia, Ethiopia, September 01-07/2016.

5.2.1.1 Specific Objectives

- To investigate the existence of Cutaneous Anthrax outbreak in Sire Woreda
- To describe the magnitude of the Cutaneous Anthrax outbreak
- To support the local efforts already on the ground and take appropriate intervention measures.

5.2.2. Materials and Methods

5.2.2.1 Study area and population

Sire Woreda is one of the Woredas in the Arsi Zone, Oromia Region. It named after the landscape up lifted like bed and surrounded by gorge. As part of the Arsi Zone, Sire Woreda is bordered on the south by Diksis and Sude Woredas, on the west by Dodota and Lode Hetosa Woredas , on the north by Fantale Woreda of East Shoa Zone, on the east by the Jeju Woreda. The Keleta River separates it from Dodota and Fentale Woredas. The Administrative center is Sire town 72Km far from Assella, Capital Town of the Arsi Zone, with a total population of 102,449. Eighty-Seven percent of the population resides in rural Kebeles and the remaining in urban. The majority of the inhabitants practice Muslim,(61%), 30% practice Orthodox Christianity, and 9% were Protestants. It is situated on 1800 meter above sea level with an average temperature of 27°C. The Woreda has 22 Kebeles from which 20 are agro pastoralists and the rest two are town kebeles. There are three ethnic groups in the Woreda namely Oromo, Amhara and Gurage respectively in the order of their population size rank. The main food sources for households in this livelihood area are agriculture product (wheat, barley, bean and maize), livestock products (milk, butter, meat). Sleeping materials of the communities is mainly cattle hide and wooden bed.

5.2.2.2 Study Design

A Descriptive cross sectional study design with focused group discussion was employed to describe the Cutaneous Anthrax outbreak from September 1 –7/2016.

5.2.2.3 Case Definition;

Suspected Cutaneous Anthrax case: - any person living in the affected Kebeles with acute onset characterized by several clinical forms of Cutaneous: skin lesion evolving over 1 to 7 days from a papular through a vesicular stage, to a depressed black scar, invariably accompanied by edema that may be mild to extensive

Confirmed Cutaneous Anthrax Case; - any person with localized form of Cutaneous: skin lesion evolving over 1 to 7 days from a papular through a vesicular stage, to a depressed black scar, invariably accompanied by edema that may be mild to extensive and confirmed by laboratory.

5.2.2.4 Data Collection Method

We conducted focused group discussion with the community members and officials, discussion with Zonal Health Office, Public Health Emergency Management (PHEM) officer and Zonal and Woreda Livestock Resource Development Office Heads, reviewing the surveillance data, and reorienting the case definitions to the specific type of anthrax. We used Microsoft excel for entering and analysis of data.

5.2.2.5 Ethical Issues

Support letter obtained from the Oromia Regional Health Bureau (ORHB). A letter submitted to the Zonal and Woreda Health Offices in order to obtain their approval for data collection. Consents also secured from study participants. Confidentiality assured and Participants treated with respect and willingly participated in the study, with no payment or cohesion. Verbal consents to take photographs were obtained from parents and affected families.

5.2.3 Results

Regarding Cutaneous Anthrax Outbreak Situation in the Zone, Between September 1-7/2016, the Zonal Health Department received 10 suspected Cutaneous anthrax cases and two community deaths from the Sire Woreda two Kebeles, namely Gesela Shashe and Koloba Shamela.

However, after our team arrived and searched for more active cases, no additional new cases found. Totally, 10 suspected human Cutaneous anthrax cases were identified with two deaths between September 1-7, 2016. The onset of the outbreak was on 27 August 2016, but reported on 1 September 2016 as index case.

The causes of the reported anthrax, both from the index case medical records and observation of cases found during the investigation was having a meal and contact of slaughtered cattle meat being shared among their neighborhood and using its product like hide for sleeping purposes after four to six days. This practice was observed in all the interviewed cases of that community which they responded that even though they are seeing the cattle is dying by discharging blood from cattle orifice (nose and mouth), which killed five cattle (officially reported number from the Woreda Livestock Development Office) they used to eat the meat of slaughtered sick animal. The figure below indicates the epidemic curve and the pattern.

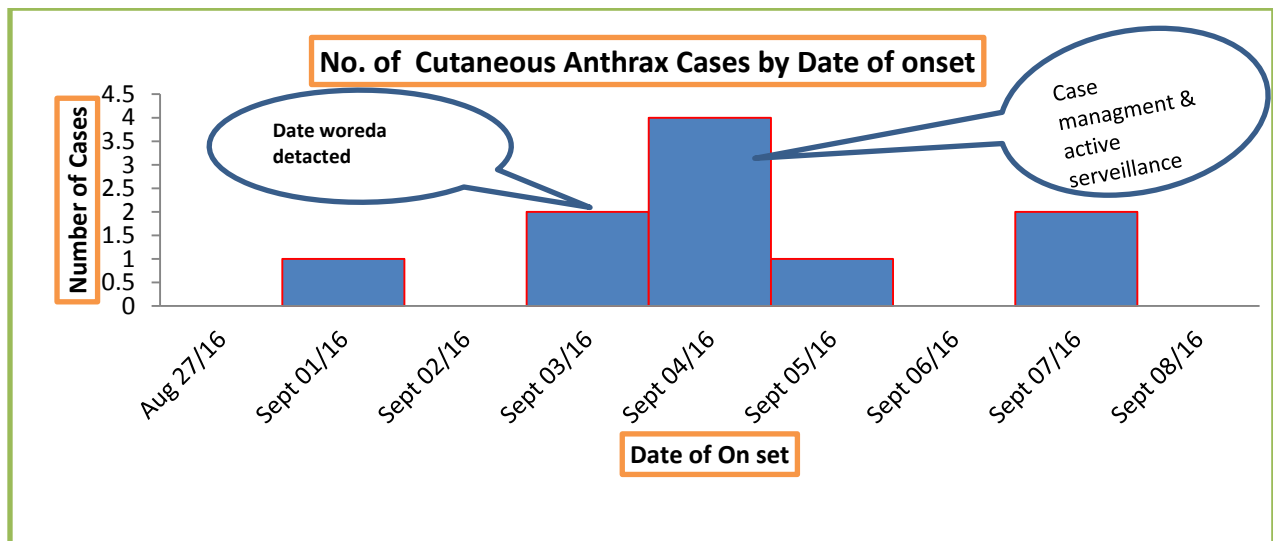


Figure 5.1: Number of Cutaneous Anthrax cases by date of onset, Sire Woreda of Arsi Zone, Oromia Region, 2016

Index case registered at the health facility on September 1/2016 and the highest number cases registered on September 4/2016. There were no cases on September 2 and 6/2016.

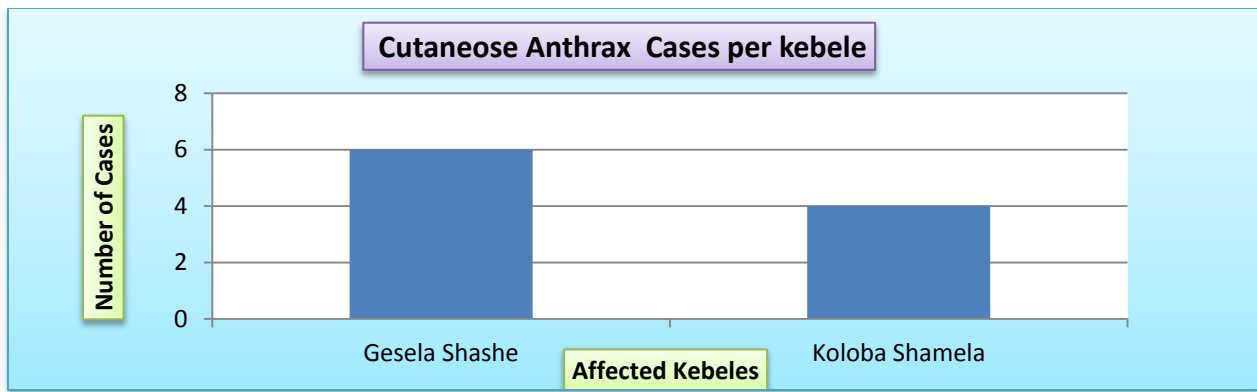


Figure 5.2: Distribution of Cutaneous Anthrax outbreak affected Kebeles in Sire Woreda of Arsi Zone, Oromia Region, 2016

Gesela Shashe is the first affected Kebele in the Woreda totally reporting 6 cases from September 1 up to September 7/2016 where as Koloba Shamela Kebele reported 4 cases from September 1-7/2016.

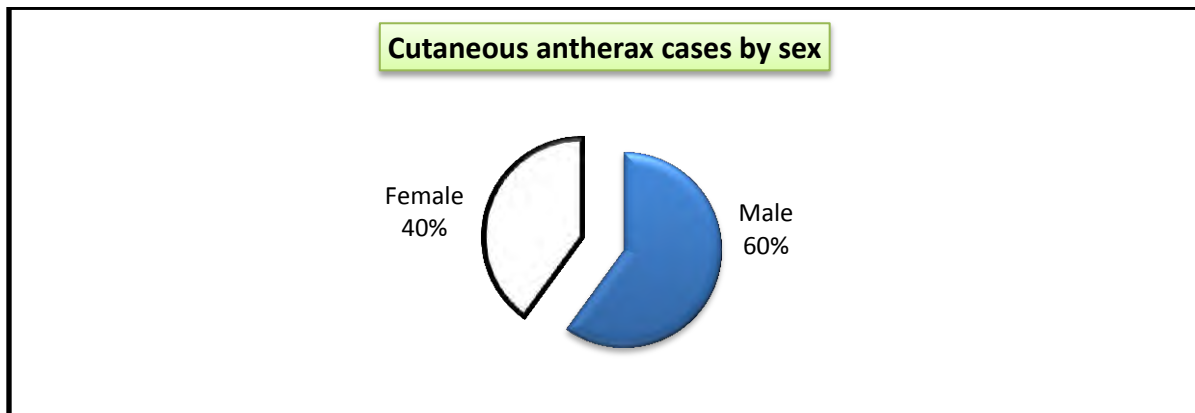


Figure 5.3: Proportion of cases by sex, Sire Woreda of Arsi Zone, Oromia Region, 2016

Six (60%) of the cases were males and males were more affected than females 4(40%).

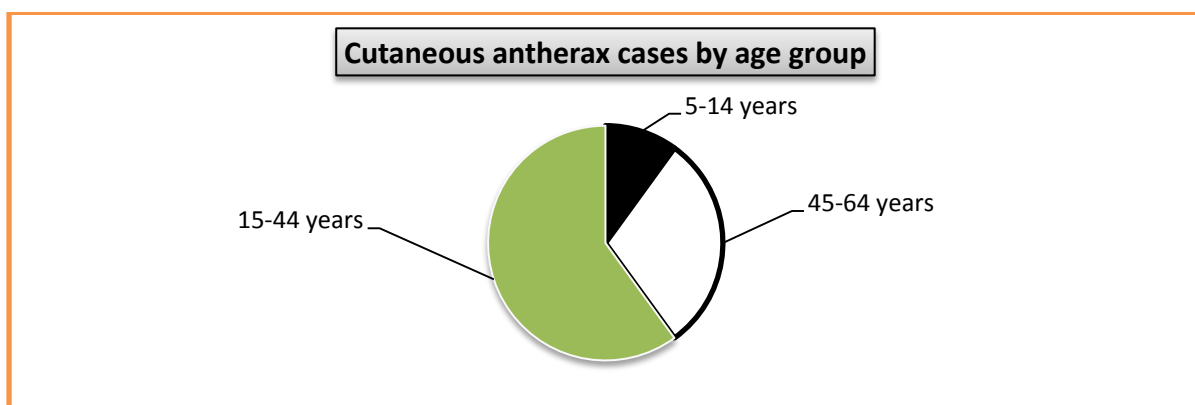


Figure 5.4: Proportion of cases by age group, Sire Woreda of Arsi Zone, Oromia Region, 2016

From total cases (six cases) were in the age groups of 15 - 44 years, followed by 45 – 64 years old three cases, and the remaining case was in the age group of 5-14 years; that was nine years old. The mean age was 35 years.

Table 5.1 Attack rate of Suspected Human Cutaneous Anthrax by sex in Sire Woreda of Arsi Zone, Oromia Region, 2016

Sex	Total Population of affected woreda	Cases	Attack rate per 10,000
Male	50,200	6	1.2
Female	52,249	4	0.8
Over all	102,449	10	0.98

The overall attack rate in the District was 0.98 and the fatality rate is 0.2 per 10,000 populations with males highly affected than females (Table 5.1).

Table 5.2: Attack rate of Suspected Human Cutaneous Anthrax by Kebele, Sire Woreda of Arsi Zone, Oromia Region, 2016

Kebele	Total Population	Number of Cases	AR/Attack rate per 10,000
Gesela Shashe	13,348	6	4.5
Koloba Shamela	10,247	4	3.9
Total	23,595	10	4.2

When we see the attack rate by affected Kebeles per 10,000 populations, Gesela Shashe Kebele recorded more attack rate than Koloba Shamela Kebele with the attack rate of 4.5 and 3.9 per 10,000 people respectively.

During our visit of the affected Kebeles, two active cases were found showing typical signs of cutaneous anthrax. Those active cases presented a typical anthrax skin lesion (Black Eschar), Ulcer and vesicle ring, oozing and edematous. The most affected area was the hand and legs.

All Suspected cases and the active cases have been given antibiotics. However, in our visit we found that two cases were not completely cured. There were no laboratory investigations done at the time of the investigations since all of the cases identified were already on treatment and recovering from the infection. Therefore, no samples were taken.

5.2.4 Public Health Intervention

5.2.4.1 Major activities during our visit at Arsi Zone Health Department

- To obtain relevant information regarding the outbreak (Cutaneous Anthrax outbreak) in the Zone, we conducted discussion with the Zonal Health Department officials (Zonal Head, PHEM Core Process Focal and workers).
- During discussion, we learned about the presence of suspected Anthrax in the Zone and they told us they reported to the Region about the situation.
- We obtained line-list of 10 cases with hard copy from the Zonal Health Office, which is not organized and compiled properly.
- We reviewed line-list to track areas affected by the outbreak in Sire Woreda where all of the cases were reported.
- We encourage the Zonal Health Officials to keep up good communication with the Regional Health Bureau for early responses and resources pooling, to ensure prompt cases management.

After we reviewed the available line-list and confirmed the occurrence of the suspected outbreak in Sire Woreda, we recommended the Zonal Health Department to alert all Woredas and initiate active surveillance for early case detection, with our active engagement.

5.2.4.2 At Sire Woreda Health Office

- Conducted discussion with Woreda Health Officials about the situation
- We obtained line-list of additional 10 cases from the Woreda which was sent to the zone
- The Zonal and Woreda health offices health workers, health extension workers, and livestock development health workers in the community have sensitized the community on prevention and control activities against eating dead animals and that they should notify the authorities, and bury all dead animals immediately.
- Antibiotic treatment have been given for all cases
- Conducted an active case search in collaboration with the community level women development army leaders.
- The veterinary (livestock development) office has carried out a mass vaccination for animals in all the affected areas.
- Awareness to avoid the herd animals from the known contaminated area by the fluids of dead or slaughtered sick cattle's.

5.2.5. Gaps Identified

- According to the National PHEM Guideline, timely reporting of outbreak at all levels is not functional.
- Early response not provided from the Arsi Zone Health Department.
- Surveillance data analysis for action was not done timely.
- Livestock resource development office
 - ✓ Were not conduct vaccination of livestock as per its schedule.
 - ✓ Has shortage of vaccine for Livestock.
 - ✓ Has shortage of refrigerator for vaccine storage and management at Woreda level.

5.2.6. Discussion

Totally, 10 suspected human Cutaneous anthrax cases were identified with two deaths during the investigation period and suspected Cutaneous anthrax cases were reported for the first time in the area where almost all of the community member's day-to-day life is with animal breeding and agriculture activity.

Even though there is vaccine for livestock to prevent the disease, shortage of diluents to conduct vaccination brought such consequences on human as well as livestock resource loss whose impact not only on the owners but also the country as well.

Taking into consideration the fact that exposure of cattle might be attributed to anthrax spores in the soil, while grazing, the outbreak of the human cases could be due to contact with cattle products. Anthrax cases had not been previously reported in the current outbreak area; however, it is possible that undiagnosed cases in livestock or wildlife might have occurred previously in those areas. It is also possible that known carcass sites further away could have been the source of the spores, which transported through waterways, natural drainage patterns to the locations of the outbreak.

In the outbreak, the majority of cases were in the age group of 15-44 and 5-9 years old, comprising six and three respectively in each age group. The remaining one case was at the ages of 5-14 years old. The mean age was 35 years. The overall attack rate in the district was 0.98 and the fatality rate was 0.2 per 10,000 populations. Koloba Shamela and Gesela Shashe Kebeles affected respectively.

In our investigation, six of the cases were males by gender, indicates that males were more affected than females. Surveillance data were not in place in timely and complete manner which contradict the national PHEM guideline standard.

5.2.7. Limitation of the study

The existence of the outbreak in the area was not reported immediately from Woreda to Zone and line list was not organized into Soft copy for analysis. The study was not supported with laboratory test due to late report to the Zone.

5.2.8. Conclusion

The clinical presentation and epidemiological evidences indicated that Cutaneous anthrax was a possible cause of illness and deaths among human beings and in livestock of the area even though there is no laboratory confirmed result. The outbreak has affected two Kebeles (Gesela Shashe and Koloba Shamela).

5.2.9. Recommendation

- ◆ Coordinated effort needed to indicate the community towards the mode of transmission of the disease and enhance prevention.
- ◆ There should be routine vaccination of livestock in the area to prevent animal to human transmission of disease.
- ◆ Both Health and livestock Development Offices at the Zone and Woreda should strength the surveillence system and conduct active surveillence regularly.
- ◆ The Regional Livestock Development Office should access the vaccines support with supplies to such vulnerable areas.

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CHAPTER- VI

Abstracts for Scientific Presentation

6.1 Investigation of Human Cutaneous Anthrax Outbreak

Authors: Getachew Demissie¹, Ahmed Ali², Gemechu Befu³

Address: EFETP, School of Public Health, Addis Ababa University

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: getachewdemissie4@gmail.com

Oromia Region +251913338945/+251921077928

Investigation of Human Cutaneous Anthrax Outbreak in Sire Woreda, Arsi Zone, Oromia, Ethiopia, 2016

Abstract

Introduction: Anthrax is primarily a disease of herbivores and is a bacterial disease caused by the spore-forming *Bacillus anthracis*, Gram positive, rod-shaped bacterium. From September 8-22/2016 an investigation of anthrax outbreak was conducted in Sire Woreda with the main objective to confirm the existence of an outbreak and recommend control measures.

Method: A Descriptive study design was used to describe the outbreak from September 1-7/2016.

Results: A total of 10 human cases were identified with 2 deaths reported from September 1-7, 2016. Five cattle died showing symptoms of anthrax. The onset of the outbreak was on 12 September 2016 and 2 Kebeles of the Woreda were affected. Males were more affected than females Majority of the cases 6 were age groups of 15-44yrs followed by 45-64yrs old 3 and 1 case was age group of 5-14 yrs. The mean age was 35 years. The overall attack rate in the district was 0.01 and the fatality rate is 0.2 per 10,000 populations. Koloba Shamela and Gesela Shashe Kebeles were affected respectively.

Conclusion: The clinical presentation and epidemiological evidences indicated that coetaneous anthrax was a possible cause of illness and deaths among human being and livestock of the area. The outbreak has affected two Kebeles (Koloba Shamela and Gesela Shashe Kebeles) than the other. Awareness creation and conducting routine immunization of animals should be implemented by government concerned bodies to protect both human beings and livestock.

Key word: Anthrax, Sire Woreda, Oromia,

6.2 Surveillance Data Analysis of Severe Acute Malnutrition

Authors: Getachew Demissie¹, Ahmed Ali², Gemechu Befu³

Address: EFETP, School of Public Health, Addis Ababa University

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: getachewdemissie4@gmail.com

Oromia Region +251913338945/+251921077928

Surveillance Data Analysis of Severe Acute Malnutrition, Arsi Zone, Oromiya Region, Ethiopia, 2005-2007 E.C

Abstract

Background: Malnutrition is one of the leading causes of child death in developing countries including Ethiopia. ArsiZone, Oromiya Region is highly prone to severe acute malnutrition since the past decades. This study is intended to analyze severe acute malnutrition (SAM) reports of this zone to understand its trends and propose recommendation.

Methods: Cross-sectional descriptive study was conducted during collection of SAM data. Three years (2005 - 2007 E.C) report of SAM from the Zone and Regional database were reviewed. Different variables such as, SAM admissions, deaths, cured, total discharges in different age category with respect to time and place were included in the analysis of SAM report.

Results: In Arsi zone 34,587 total admissions of SAM were reported at Outpatient Therapeutic Program (OTP) and Establishing Center (SC) in the last consecutive three years (2005 - 2007 E.C). Among these cases, 33,522 (94.46%) of them were new admission. Children 6-59 months of age constituted 33,064 (97%) of all new admissions. Admissions from severe acute malnutrition were decreasing from 2005 to 2006, which were 11,620 and 9,908 respectively and then increased to 13,059 at 2007. From the past consecutive three-year's report of SAM in the Zone 64 deaths with a fatality rate of 0.2 % were reported. The annual fatality rate inclined from 0.14 % in 2005 to 0.31% in 2006 and then declined to 0.11 in 2007.

Conclusion and Recommendation: Although the number of deaths has seems decreased, Therapeutic Feeding Program (TFP) admissions were increased from 2005 to 2007 E.C. This may be due to enhanced screening activity and improved cases management. The case management of SAM should be strengthened.

Keywords: Severe Acute Malnutrition, Surveillance Data Analysis, Arsi, Ethiopia

6.3 Investigation of Influenza Like illness (H1N1) Outbreak

Authors: Getachew Demissie¹, Ahmed Ali², Gemechu Befu³

Address: EFETP, School of Public Health, Addis Ababa University

Name of EFETP: Ethiopian Field Epidemiology Training Program

Email Address: getachewdemissie4@gmail.com

Oromia Region +251913338945/+251921077928

Investigation of Influenza Like illness (H1N1) Outbreak in Robe Town Arsi Zone, Oromia, Ethiopia-2016

Abstract

Background: Influenza is a highly infectious viral illness. The name “influenza” originated in 15th century Italy, from an epidemic attributed to “influence of the stars.” Influenza is a single-stranded, helically shaped, RNA virus of the orthomyxovirus family. Basic antigen types A, B, and the nuclear material determines C. In January 2011, CDC estimated that pandemic H1N1 influenza virus caused more than 60 million Americans to become ill, and led to more than 270,000 hospitalizations and 12,500 deaths. Influenza A viruses in Ethiopia reported nine confirmed cases and one pending as of August 2009. On 24 February 2016, a suspected H1N1 influenza like illness outbreak reported from Robe Woreda, Arsi Zone, to ORHB Public Health Emergency Management team. Investigated was made to confirm the outbreak, identify risk factors and implement control measures.

Methods: Matched case-control study conducted. Structured questioner used to collect data from 16 cases and 32 controls. Controls defined as any person in the prison without sign and symptom of the disease. Sixteen blood specimens collected for laboratory confirmation.

Results: Sixteen H1N1 cases identified and no death documented. Five of sixteen blood specimens tested positive for influenza sub type A H1N1pdm09. The overall attack rate was 31.25%. We observed overcrowding in their living room on average two prisoners were sleep together in one bed and up to 72 prisoners live in one class and all living rooms have only one small size window each for ventilation.

Conclusion: A confirmed influenza sub type A H1N1pdm09 outbreak occurred in the prison of Robe woreda, Arsi Zone, Oromia Region. The outbreak affected prisoners, staff and workers of the prison. Active surveillance should strengthen for the disease to reduce the risk of future outbreak in the prison.

Key words: H1N1, Outbreak, Prison, Ethiopia

CHAPTER – VII

Narrative Summery Of Disaster Situation

7.1 Narrative Summary Report on Meher Assessment in Arsi and Bale zones, Oromiya, Ethiopia, 2016

Executive summary

In order to identify humanitarian needs in drought affected areas of South Eastern Oromia Region, a team of two conducted a Meher assessment. The rapid assessment helped to explore immediate and future needs of the community in order to make prior identification of the needs. We conducted the assessment from November 20 to December 5 in the selected woredas of Arsi and Bale zones.

The main objective of the assessment was to develop emergency requirements and to contribute to ensuring appropriate and effective humanitarian planning that helps to reduce morbidity and mortality related to malnutrition and other communicable diseases outbreaks.

Data collection, conducted included review of documents, meetings and discussions with woreda and zonal preparedness and response task forces, officials and program managers. These complemented by field visits in selected woredas and kebeles to discuss with community to triangulate data and information collected from zone and woredas.

There were outbreaks of AWD in both assessment woredas of Arsi (Merti and Seru) and Bale (Ginir and Lege Hida). Arsi Zone officials reported 110 cases and no deaths reported. From June to October 2016, 6 cases reported from the woredas of Bale Zone. Among each zone total cases, from 116 cases 86 (73.3%) were from Merti Woreda and 18 (15.5%) were from Seru woreda of Arsi Zone and no community reported deaths occurred in both Zones in the period June to October 2016. Cases of Severe Acute Malnutrition (SAM) were mostly stable in all visited woredas of both Arsi and Bale zones, except that some increments observed in Dawe Kachen Woreda of Bale Zone, (through July to August 2016).

There were not enough public health emergency drugs and supplies in most of the assessed woredas of both zones. Generally, malnutrition was a major problem in all visited woredas. Public health emergency drugs and supplies should be available in all woredas, with special emphasis on woredas with high risk for nutrition problems.

7.1.1 Introduction

Humanitarian need assessment/community risk assessment is a participatory process for assessing hazards, vulnerabilities, risks, ability to cope, preparing coping strategies and finally preparing risk reduction options implementation plan by the local community. 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 [1].

Good assessment practice is about having enough relevant information in order to make sound analysis and judgment. The data then informs decision-making in relation to four main questions: whether to intervene; the nature and scale of the intervention; prioritization and allocation of resource; and program design and planning. Formal needs assessments may also aim to force a decision by others, to influence the nature of others' decisions, or to verify or justify decision already taken. Humanitarian need assessment is a way of achieving a more consistent and accurate picture of the scale and nature of the problems people actually face in humanitarian crises, and how to ensure that decisions about response are properly informed by that understanding [2].

The Government of Ethiopia has been conducting emergency health and nutrition assessment in the past years to address the emergency health and nutrition needs of the country. The assessment conducted twice a year, following harvesting seasons (Belg and Meher) and lead by the Federal Disaster Response Management and Food Security Coordination Office in collaboration with MoH, MoW, NMA, NGOS and UN Agencies (WHO, UNICEF and WFP).

Based on the projection of 2007 census conducted by the CSA, Arsi and Bale zones have a total population of 5,138,658. Among those, 2,517,942(49%) of them are male, 2,620,716 are female and 842,740 (16.4%) are under five children.

There are nine fully functional and three under construction hospitals, 182 health centers and 858 health posts functional within those zones.

Based on the consensus made among the Federal Mehar Assessment Team and zonal cabinets, 9 woredas, five from Bale and four from Arsi zones, were selected. Dawe Kechen, Rayitu, Seweyna, Ginir and Lege Hida Woredas selected from Bale Zone where as Gololcha, Merti, Seru and Zeway Dugda was from Arsi Zone. The selection of woredas made based on the pre- Meher Assessment report and information obtained from Arsi and bale zones.

7.1.2. Objectives

To assess the extent, type, magnitude, severity and likelihood of different risks in the most —vulnerable’ woredas;

To assess the existing capacity of the health system to address those risks;

To determine gaps in the capacity of the health system to address anticipated risks and existing threats. Based on the findings, to develop response plans

7.1.3 Methods

From selected zones, specifically selected and visited woredas, relevant data and information were collected using different methods. Due to time constraints, the team forced to divide itself into two sub-teams to achieve the objectives. Methods used during the assessment were:

We used semi-structured questionnaire to collect the required information.

We reviewed documents and reports from woredas and zonal health offices.

We held meetings and discussions with woredas, zonal preparedness and response task forces, officials and program managers.

We visited fields in selected woredas and kebeles to discuss with community and lower level governmental administrative bodies to triangulate data and information collected from zone and woredas.

7.1.4 Results

7.1.4.1 Coordination

There was a functional multi-sectoral PHEM coordination forum in all of avisited woredas, including zonal health departments. However, there were no public health emergency preparedness plan and budget in all assessed woredas except in Lege Hida, Merti and Gololcha.

Even though there was a contingency budget for emergencies at woreda level, there was no specific fund allocated for public health emergency response purpose in most woredas. To utilize that budget, the woreda cabinet had to discuss and agree on it. There was no agreed forum among all visited woredas, zonal health departments, NGOs and UN agencies to respond timely whenever emergency occurred.

7.1.4.2 Top five causes of morbidity

7 Table 7. 1:- Under five children causes of morbidity in visited woredas of Bale and Arsi Zones, Oromia, Ethiopia, 2016

* S o	Visited Woredas									
	Seweyna	Lega Hida	Ginir	Rayitu	Dawe Kechen	Gololcha	Merti	Seru	Zeway Dugda	
Top five cause of morbidity	1	Diarrhea (non bloody)	ARI	Diarrhea	AURTI	Diarrhea (non bloody)	Diarrhea (non bloody)	Diarrhea (non bloody)	Diarrhea (non bloody)	MAM
	2	Pneumonia	Pneumonia	Pneumonia	Dyspepsia	Pneumonia	Pneumonia	Malaria	Pneumonia	Diarrhea (non bloody)
	3	AURI	Diarrhea (non bloody)	AURI	Pneumonia	URTI	MAM	Pneumonia	AURTI	Pneumonia
	4	Intestinal parasites	Intestinal parasites	Infection of skin	UTI	Infection of skin(subcutaneous)	AURTI	AURTI	Diarrhea (with dehydration)	AURTI
	5	Infection of skin(subcutaneous)	Disease of musculo skeletal tissue	AFI	AFI	Intestinal Parasites	Diarrhea (with dehydration)	MAM	MAM	Helimenthiasis

From visited woredas of Arsi and Bale zones under five children causes of morbidity, Diarrhea (non-bloody) diseases was the leading followed by Pneumonia and URTI(Upper Respiratory Tract Infection).

8 Table 7.2: Above five children causes of morbidity in visited woredas of Bale and Arsi zones, Oromia, Ethiopia, 2016

*	S.no	Visited Woredas								
		Seweyna	Lega Hida	Ginir	Rayitu	Dawe Kechen	Gololcha	Merti	Seru	Zeway Dugda
Top five cause of morbidity	1	Diarrhea (non bloody)	ARI	AURI	MAM	AURI	Dyspepsia	AFI	Dyspepsia	Diarrhea (non bloody)
	2	Pneumonia	Diarrhea (non bloody)	AFI	Injury	Infection of skin (subcutaneous)	Pneumonia	AURTI	Pneumonia	Pneumonia
	3	AFI	Pneumonia	Disease of musculo skeletal tissue	Dyspepsia	Trauma	Acute febrile illness (AFI)	Diarrhea	Trauma	AFI
	4	Infection of skin (sub Cutaneous)	Dyspepsia	Dyspepsia	Intestinal parasite	AFI	AURI	Pneumonia	Intestinal parasite	Gastritis
	5	UTI	Disease of musculo skeletal tissue	Pneumonia	UTI	Gastritis	Trauma	Dyspepsia	AURI	MAM

According to the finding, above five children causes of morbidity diseases in visited woredas of Bale and Arsi zones, Pneumonia infection was the leading disease followed by URTI(Upper Respiratory Tract Infection) and Acute febrile illness (AFI).

9. Table 7.3: List of cases and deaths for major epidemic prone diseases in Arsi and Bale Zones, Oromia, Ethiopia, 2016

S N	Name of Woredas	Months	Epidemic prone diseases									
			AWD		Malaria		Measles		Meningitis		Rabies	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1	Gololcha	16-June	0	0	32	0	0	0	0	0	0	0
		16-July	0	0	62	0	0	0	0	0	0	0
		16-Aug	0	0	18	0	0	0	0	0	0	0
		16-Sept	0	0	36	0	0	0	0	0	0	0
		16-Oct	0	0	95	0	0	0	0	0	0	0
2	Merti	16-June	0	0	32	0	0	0	0	0	0	0
		16-July	30	0	21	0	0	0	0	0	0	0
		16-Aug	10	0	24	0	0	0	0	0	0	0
		16-Sept	46	0	32	0	0	0	0	0	0	0
		16-Oct	0	0	14	0	0	0	0	0	0	0
3	Seru	16-June	0	0	19	0	0	0	0	0	0	0
		16-July	0	0	14	0	0	0	0	0	0	0
		16-Aug	0	0	25	0	0	0	0	0	0	0
		16-Sept	18	0	41	0	0	0	0	0	0	0
		16-Oct	0	0	86	0	0	0	0	0	0	0
4	Zeway Dugda	16-June	0	0	62	0	0	0	0	0	0	0
		16-July	0	0	32	0	0	0	0	0	0	0
		16-Aug	0	0	49	0	0	0	0	0	0	0
		16-Sept	2	0	52	0	0	0	0	0	0	0
		16-Oct	0	0	46	0	0	0	0	0	0	0
5	Sewena	16-June	0	0	14	0	0	0	0	0	0	0
		16-July	0	0	38	0	0	0	0	0	0	0
		16-Aug	0	0	59	0	0	0	0	0	0	0
		16-Sept	0	0	56	0	0	0	0	0	0	0
		16-Oct	0	0	17	0	0	0	0	0	0	0
6	Lega Hida	16-June	0	0	0	0	0	0	0	0	0	0
		16-July	0	0	15	0	0	0	0	0	0	0
		16-Aug	0	0	29	0	0	0	0	0	0	0
		16-Sept	4	0	25	0	0	0	0	0	0	0
		16-Oct	0	0	15	0	0	0	0	0	0	0
7	Ginir	16-June	0	0	0	0	0	0	0	0	0	0
		16-July	0	0	0	0	0	0	0	0	0	0

		16-Aug	0	0	0	0	0	0	0	0	0	0
		16-Sept	2	0	0	0	0	0	0	0	0	0
		16-Oct	0	0	0	0	0	0	0	0	0	0
8	Raytu	16-June	0	0	15	0	0	0	0	0	0	0
		16-July	0	0	9	0	0	0	0	0	0	0
		16-Aug	0	0	29	0	0	0	0	0	0	0
		16-Sept	0	0	51	0	0	0	0	0	0	0
		16-Oct	0	0	20	0	0	0	0	0	0	0
9	Dawe Kachen	16-June	0	0	13	0	0	0	0	0	0	0
		16-July	0	0	24	0	0	0	0	0	0	0
		16-Aug	0	0	45	0	0	0	0	0	0	0
		16-Sept	0	0	12	0	0	0	0	0	0	0
		16-Oct	0	0	0	0	0	0	0	0	0	0

From epidemic prone diseases, AWD outbreak were reported from Merti, Seru, Zeway Dugda woredas of Arsi Zone and Lege Hida and Ginir woredas of Bale Zone. Malaria disease reported from all assessed woredas of both zones except Ginir woreda of Bale Zone during the assessment.

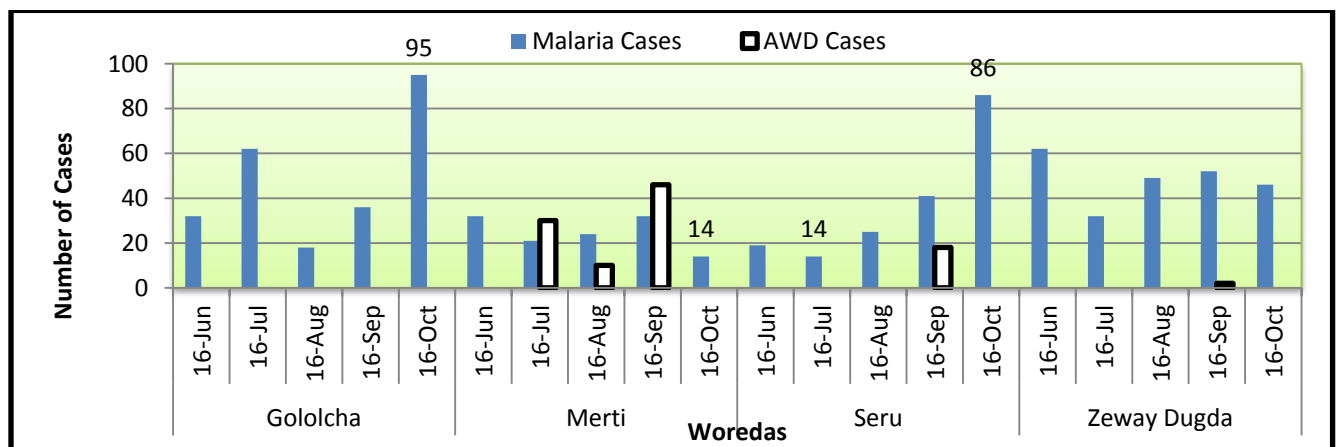


Figure 7.1: Malaria and AWD cases by woreda in Arsi Zone, Oromia, Ethiopia, 2016

Highest numbers of Malaria cases reported during October 2016 from Gololcha and Seru woredas of Arsi Zone 95 and 86 respectively and the lowest number of cases reported at October 2016 from Merti woreda(14) and at July 2016 from Seru woreda(14) of Arsi Zone, Oromia Region.

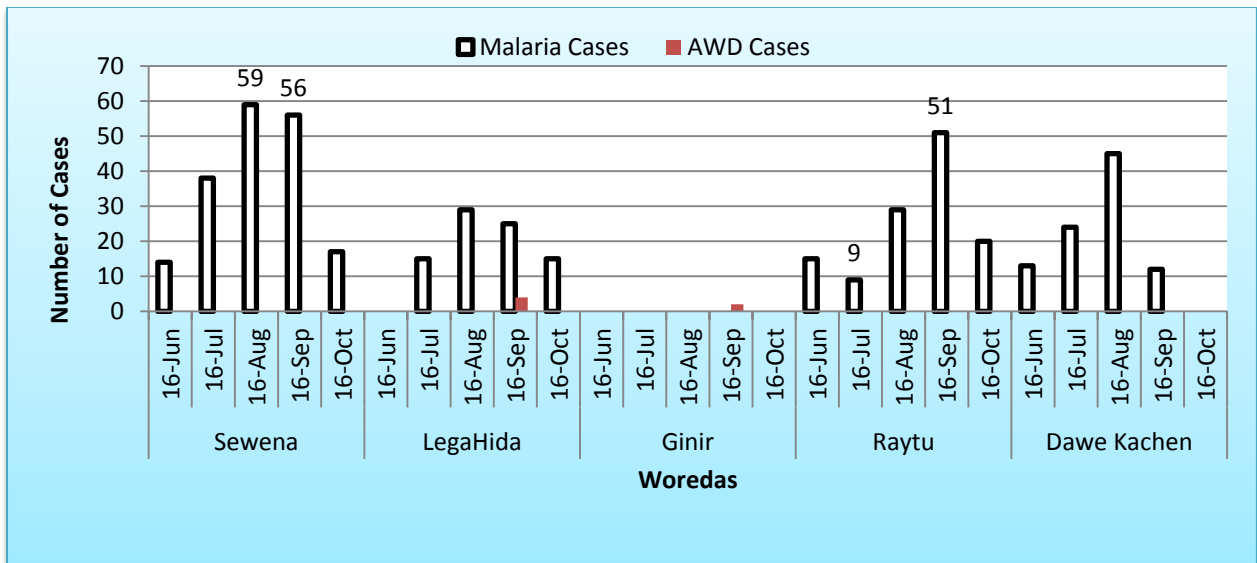


Figure 7.2: Malaria and AWD cases by woreda in Bale Zone, Oromia, Ethiopia, 2016

Highest numbers of Malaria cases reported during August and September 2016 from Seweyna and Raytu woredas of Bale Zone 59 and 56 respectively and the lowest number of cases reported at July 2016 from Raytu woreda(9) and at July 2016 Bale Zone, Oromia Region.

7.1.4.3. Outbreaks

There was an outbreak of AWD in Merti and Seru woredas of Arsi Zone and Ginir and Lege Hida of Bale Zone. The four woredas reported 110 cases with no deaths. Over seventy eight percent of the AWD cases (86) occurred in Merti Woreda in the period 16/11/2008-19/01/2009 EC. The rest of the cases, (24 or 22%) were from Seru woreda of Arsi Zone (18), Lege Hida (4) and Ginir (2) woredas of Bale Zone which occurred during July 2008 to September, 2009 E.C. No deaths were seen during epidemic periods in this woreda. Measles outbreaks were also reported from Harena Buluk Woreda of Bale Zone. A total of 85 cases were reported from the woreda in the last six months (July to December/2016). All of the measles cases 85 were from Harena Buluk woreda of Bale Zone.

The outbreak in Harena Buluk woreda occurred in the period 06/02/-23/04/2009. Among affected populations, 95% (81) were children under five years of age and 15 % (4) were above fifteen years of age in the Woreda.

According to Zonal Health Department of Bale Zone, malaria epidemic and Severe acute malnutrition (SAM) were anticipated in ten woredas (Dawe Kachen, Dawe Serar, DalloMenna, Gassera, Saweena, Gurra Damole, Rayitu, LegaHidha, MaddaWalabu, Gindhiir) with at risk population of 263,645, measles and meningitis in four woredas (Dawe kachen, Harena Buluk, Meda Welabu, Rayitu) with at risk population of 78,123 and boarder conflict in four woredas of Bale Zone with Ethiopian Somali Region.

Arsi Zone Zonal Health Department also anticipated malaria epidemic in eight woredas (Amigna, Dodota, Gololcha, Jeju, Merti, Seru, Shenen Kolu, and Zeway Dugda) with at risk population of 901,246 and measles in six woredas (Amigna, Gololcha, Seru, Shenen kolu, Sude, and Zeway Dugda) with at risk population of 269,034.

7.1.4.4 Preparedness

Public health emergency preparedness primarily, includes availability of sufficient drugs and supplies, accessibility of emergency fund and availability of trained human power to avert emergency situation.

7.1.4.5. Emergency drugs and supplies

10. Table 7.4: List of emergency drugs and supplies in Arsi and Bale Zone, Oromia, Ethiopia, 2016

S n	Drugs and supplies	Adequacy for one month (Yes/No)								
		Dawe Kechen	Ginir	Gololcha	Lege Hida	Merti	Rayitu	Seru	Seweyna	Zeway Dugda
1	Amoxicillin suspension (measles)	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
2	Ciprofloxacin	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
3	Coartem for malaria	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
4	Cotrimoxazole 400mg	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	Crystalline penicillin	Yes	No	Yes	No	Yes	No	Yes	No	Yes
6	CTC kit available	Yes	No	Yes	No	Yes	No	Yes	No	Yes
7	Doxycycline to treat AWD cases	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
8	Erythromycin 250mg for children	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
9	NG tube	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
10	ORS to treat AWD cases	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
11	RDT for AWD	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
12	RDT for malaria	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	RDT for Meningitis	Yes	Yes	No	No	Yes	No	Yes	No	Yes
14	Ringer Lactate to treat AWD cases	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
15	Syringe, Glove (for AWD Mgt)	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
16	Vitamin A(measles)	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
17	Tetracycline ointment (for measles)	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes

During Meher Assessment at Arsi and Bale zones, all assessed woredas have enough emergency drugs at their stock, except Lege-Hida, Rayitu and Seweyna woredas of Bale Zone, Oromia Region.

7.1.5. Risk factors

7.1.5.1. Malaria

Malaria is endemic in all assessed woredas. There are also different mosquitos breeding sites in all assessed woredas. Different types of ponds and harvested waters in the woredas was a suitable environment for mosquito breeding. Long lasting treated nets (LLTN) coverage is more than national target (80%) in all assessed woredas, except Lega Hida (78%) woreda of Bale Zone. Indoor Residual Spray (IRS) conducted in all woredas and the coverage is below minimum World Health Organization (WHO) recommendation (90%) in all woredas except Merti (94%) woreda of Arsi Zone.

The new malaria guideline distributed to all health facilities in assessed woredas. None of the woredas conducted formal training for health workers on new malaria guideline. But Merti, Ziway Dugda of Arsi Zone and Ginir Woreda of Bale Zone sensitized the health workers during review meetings.

7.1.5.2. Meningitis

There was no epidemic of meningitis in the last three years in Arsi and Bale Zones. Only both zonal health departments, Merti, Ginir and Raytu Woredas have meningitis outbreak guidelines. No trained manpower on outbreak management of meningitis in zonal health departments and all woreda health offices.

7.1.5.3. Acute Watery Diarrhea (AWD)

In the last three years (2014-2016 GC), especially in the year 2016 G.C epidemic of AWD occurred in both Arsi and Bale Zones. Those woredas affected by AWD were Berbere, Kachen, Dello Mana, Gasera Lege Hida, Goba, Sinana, Golocha, Goro, Harena Buluk, Meda Walabu, woredas of Bale zone and Bele Gesgar Merti, Munesa, Robe, Seru, Shirka woredas of Arsi zone.

11. Table 7.5: Latrine construction, utilization and safe water coverage, Arsi and Bale Zones, Oromia, Ethiopia, 2016

S.no	Name of Woredas	Latrine Coverage	Latrine Utilization	Water Supply Coverage
1	Gololcha	88	87	34
2	Merti	85	76	47
3	Ginir	85	65	39
4	Lege Hida	80	43	24.4
5	Zeway Dugda	65	Unknown	64
6	Sewena	64	Unknown	24
7	Raytu	64	Unknown	37
8	Dawe kechen	52	Unknown	7
9	Seru	29	Unknown	41
Average		68	30.1	35.3

Latrine coverage of visited woredas of Arsi and Bale zones were 68% on average. Gololcha, and Merti woredas of Arsi Zone has latrine coverage of 88% and 85%, and Ginir and Lege-Hida woredas of Bale Zone has 85% and 80% respectively. The least latrine coverage Woreda was Seru (29%) of Arsi Zone. Latrine utilization of both Arsi and Bale zones visited woredas were unknown except Gololcha(87%) and Merti(76%) of Arsi Zone and Ginir(65%) and Lege Hida(43%) woredas of Bale Zone.

Water coverage of all visited woredas of both Arsi and Bale zones were minimal. The highest water supply coverage was Zeway Dugda(64%) Woreda of Arsi Zone and the least coverage was Dawe kachen Woreda (7%) of Bale Zone.

7.1.5.4. Measles

Ongoing measles outbreaks were reported from Harena Buluk woreda (85 cases and zero death) of Bale Zone. Furthermore, sporadic cases of measles reported from Meda Walabu woreda (9 cases and 1 death). In addition, measles vaccination coverage was below 85% in Harena Buluk and Meda Walabu woredas of Bale zone respectively.

7.1.5.5. Nutrition

Lack of adequate nutrition is underlying cause for many major communicable diseases. The trend of Severe Acute Malnutrition (SAM) cases was stable in all visited woredas of both zones. Adequate therapeutic supplies of (F-100, F-75 and RUTF) available for one month in most assessed woredas, except Lege Hida woreda of Bale Zone. Relatively high number of SAM cases observed in Dawe kachen woreda of Bale Zone compared with other assessed Woreda.

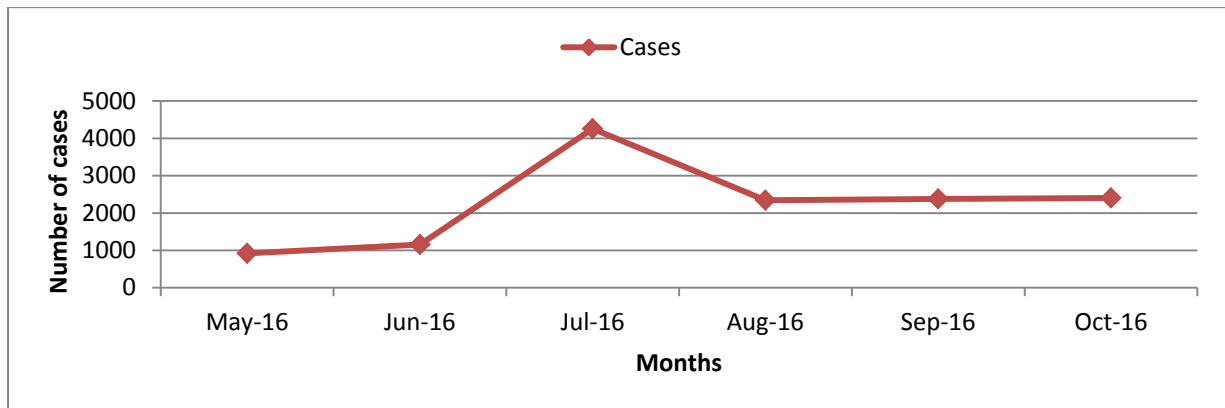


Figure 7.3: Trends of total SAM cases in Arsi Zone, Oromia, from May-Oct 2016

In Arsi Zone, the highest numbers of Sever Acute Malnutrition (SAM) cases recorded at July 2016, and the lowest numbers of cases were at May 2016.

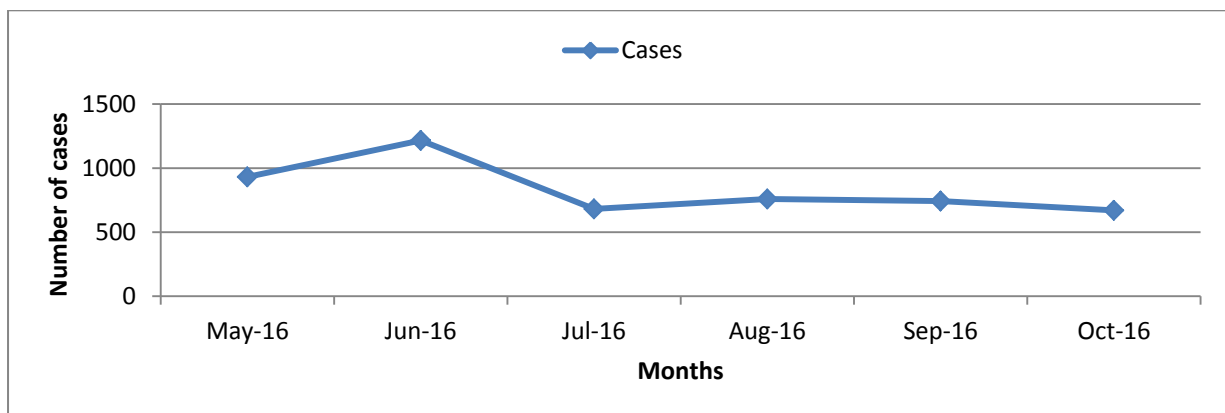


Figure7.5: Trends of total SAM cases in Bale Zone, Oromia, from May-Oct 2016

In Bale Zone, the highest numbers of Sever Acute Malnutrition (SAM) cases recorded at June 2016, and the lowest numbers of cases were at October 2016.

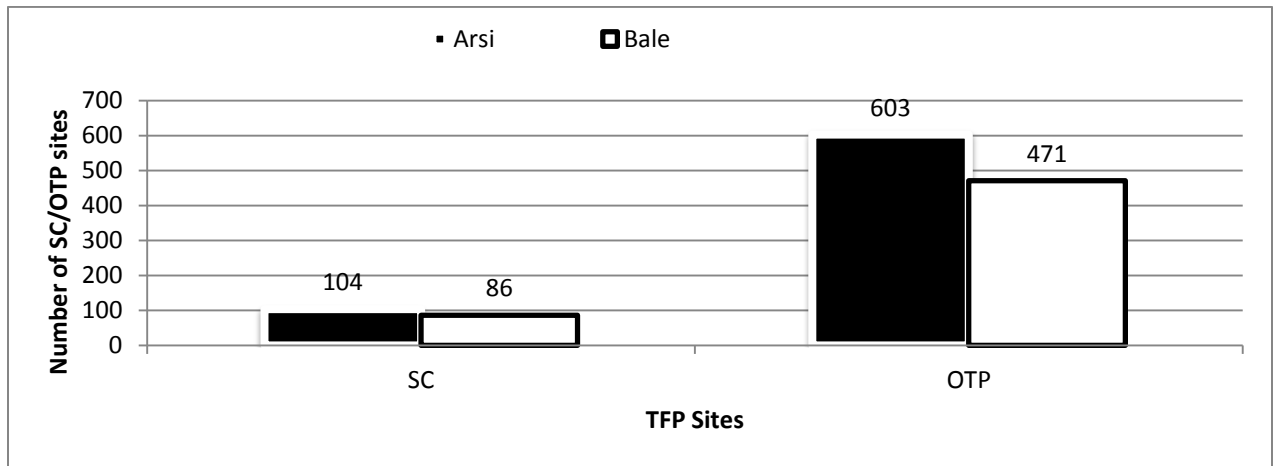


Figure 7.6: Number of Nutrition TFP Sites of both Arsi and Bale zones, Oromia, from May-Oct 2016

Numbers of Nutrition Therapeutic Feeding Program Sites of Arsi Zone (SC = 104 and OTP = 603) were higher than Bale Zone Therapeutic Feeding Program Sites which were (SC=86 and OTP = 471).

7.1.6. Conclusion

There was a functional multi-sectoral coordination forum in all assessed zones and woredas. However, they are not meeting regularly, except in Arsi zone. All assessed woredas have their own public health emergency preparedness and response plan, but not budget allocated, except Ginir Woreda of Bale Zone. Malaria, measles, AWD, SAM and meningitis were the main anticipated risk in the visited zones and woredas. However, measles outbreak reported in only Harena Buluk woreda of Bale Zone. On the other hand, many of assessed woredas and zones have enough emergency drug and supplies for 1 month except, Lege Hida, Raytu and sewena woredas of Bale Zone. Adequate therapeutic supplies RUTF, F100 and F75 were available in all assessed woreds, except in Lege Hida woreda of Bale Zone.

7.1.7 Recommendations

- Disease control and prevention activities for major epidemic prone disease (measles, malaria, AWD and meningitis) should be strengthened.
- Minimum emergency drugs and supplies should be available at zone and woreda level for preparation and timely response.
- Capacity building, such as training on PHEM is an appropriate response to cope with the high turnover of staff by the PHEM and WHOs and strength emergency preparedness before the emergency happen.
- All the woredas and zonal health departments should be required to have specific plan and budget for emergency response purpose.
- Measles Supplementary Immunization Activities (SIAs) should be targeted in woredas with nutritional problem since malnutrition can be predisposing factor for measles outbreak.

7.1.9. References

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3. Marc Debay, Epidemic preparedness and response in the African region. A review of the Program in the WHO/AFRO/EMC West Africa and Great Lakes Epidemiological Blocks. September 2000.
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CHAPTER- VIII

**Protocol/Proposal for
Epidemiologic Research
Project**

Summary

Background: Poor excreta disposal practices are responsible for a significant proportion of the world's infectious disease burden. There are many problems associated with traditional defecation practices. The most serious one is being health problems. More than 50 infectious diseases can be transferred from a diseased person to a healthy one by various direct or indirect routes involving excreta. In the World Health Organization (WHO) Africa Region, 44% of the 631 million people of the Region had no access to adequate sanitation in 1999. In Ethiopia, according to Ethiopian Demographic and Health Survey (DHS 2011), about 38 % of households have no access to latrine facilities.

Objective: To assess factors affecting utilization of latrine, in Berbere Woreda of Bale Zone, Oromia, Ethiopia.

Methods: Unmatched case control study will be employed. Cases will be those household, which have latrine but not using it yet, or households, which do not have latrine. Controls will be model households currently using latrine. One to two ratios of cases and controls will be selected. The study units will be identified by stratifying the Woreda population by kebele followed by random sampling technique (random table number will be used) to select household. Primarily, the source population will stratified in to 15 Rural and 2 suburban kebeles, with a population proportion of 95% and 5% respectively. Hence, 840-study subjects will be selected from rural kebeles, while the rest 44-study subjects will be selected from suburban kebeles. A structured questionnaire will be used for the purpose of data collection. Data will be entered, cleaned and analyzed using Epi-info7software.

Expected Out Comes: At the end of this study factors that affect Latrine use will be identified, documented and recommendations will be proposed to improve the rate of Latrine utilization. The total cost estimated for the study is 89,200.00 ETB.

8.1 Assessment of Factors Affecting Utilization of Latrine, Berbere Woreda, Bale Zone, Oromia, Ethiopia, 2017

8.1.1. Introduction

Poor excreta disposal practices are responsible for a significant proportion of the world's infectious disease burden. There are many problems associated with traditional defecation practices. The most serious one is being health problems. More than 50 infectious diseases can be transferred from a diseased person to a healthy one by various direct or indirect routes involving excreta [1]. There are many diseases associated with poor disposal of excreta. They include viral diseases like poliomyelitis, infectious hepatitis and gastroenteritis; Bacterial diseases like cholera, acute watery diarrhea (AWD), typhoid, bacillary dysentery; protozoal diseases like amoebic dysentery and giardiasis; and worm infections like ascariasis, trichuriasis and pinworm. The main route of infestations is oral-fecal [2]. Sanitation facilities interrupt the transmission of fecal-oral disease at its most important source by preventing human fecal contamination of water and soil [3]. The utilization of latrines is a relatively simple technology that may be used to control the spread of infectious diseases. Studies have shown that latrine coverage has to reach 90% of a population to have an impact on community health [4].

However, 2.4 billion people, 40% of the total world population, lack improved sanitation worldwide and 80% of those people live in rural areas [5]. In the World Health Organization (WHO) Africa Region, a total of 44% of the 631 million people of the Region had no access to adequate sanitation in 1999 [6]. In Ethiopia, according to Ethiopian Demographic and Health Survey (DHS) 2011, about 38% of households have no access to latrine facilities [7].

Health improvement comes from the proper use of sanitation facilities, not simply their physical presence [8]. This is best achieved through regular use of clean and well-maintained latrines. The proper use of latrines can reduce the risk of diarrhea to almost the same extent as improved water supplies [9].

8.1.2. Statement of the Problem

The latrine coverage and utilization in Berbere Woreda is low, 62% and 21% in Urban and Rural area respectively. Continuous field observation shows that some families in Berbere Woreda have latrines and yet not using them, while others have them but in poor hygienic conditions, and yet others do not have them at all [21]. Because of that, there is high incidence of diseases caused by poor sanitary conditions especially worm infestation and diarrheal diseases, including (AWD) acute watery diarrhea [21]. Poor use of latrines and excreta disposal might be contributing to morbidity caused by these sanitation related conditions. Such information related to poor use of latrines has never been documented. The factors affecting non-availability of latrines in homes have never been documented also. Therefore, it is

necessary to carry out this study to establish baseline information on the use of latrines in homes. The study is aiming at establishing use of latrines, availability of latrines, examining the quality of latrines and factors affecting their use in Berbere Woreda.

8.1.3. Rationale of the Study

Improved excreta disposal (especially in infant excreta) can reduce less than five years mortality by 60% and diarrheal diseases mortality by 66% [17]. Proper excreta disposal can reduce diarrheal morbidity by 36%, schistosomiasis by 77%, ascariasis by 29%, trachoma 27 - 50% and severe and moderate nutritional stunting by 38% and improved hygiene (notably hand washing) can reduce diarrhea morbidity by 33%[20].

Ethiopia, realizing the effectiveness of latrine for prevention of diarrheal diseases transmission, scaling up latrine ownership and utilization of latrine to cover 100% of household is undergoing [7]. The coverage of latrine is increasing in both urban and rural parts of Ethiopia since the start of health extension program. According to 2010/2011 Ethiopian health and health related indicators household latrine coverage reached 74% [13]. However, the utilization of latrine is low comparing with its coverage [10]. This study, therefore, will help to find out factors affecting household latrine utilization so that the policy makers and concerned bodies can respond appropriately [19].

8.1.4 Literature Review

The hygienic disposal of excreta is important because the infective organisms for many diseases leave through feces and some through urine [11]. One gram of feces may contain 10million viruses, 1 million bacteria, a 1000 parasite cysts and a 100 worm eggs [12]. The etiological factors associated with diarrhea disease in children, include microbial agents which are usually transmitted through food and water contaminated with human feces (13). The promotion of sanitation facilities and behaviors can dramatically affect the number of deaths from diarrheal disease in children under five [14]. Various studies conducted in Bangladesh, Burma, Philippines, and Papa New Guinea was consistent with an association between a particular hygiene behavior and an increased risk of diarrhea [20]. Such behaviors include hand washing before food preparation, open defecation of children, inattention to proper disposal of feces, the method used by mothers to clean children after defecation, the manner of disposing of the feces of children and compound hygiene [15]. Young children frequently infected with enteric pathogens and their stools are actually an important source of infection for others [5].

Therefore, hygienic disposal of the feces of all young children is an important aspect of diarrhea prevention [16].The report in Kenya showed that children begin to use the latrine as early as 2 years but most of them start at the age of five [5]. Reported usage of latrine in Lesotho by adults was 99%

[12]. However, the use of latrines for the disposal of children's feces was only 50 %; and only 39% disposed children's feces in the latrine in Philippines [17]. Studies have shown that hygienic disposal of children's feces is associated with 30-40% less risk of diarrhea [14, 15, and 20]. Maintenance and use of latrines at household level are related each other, the better they are maintained, the better they are used [18].

Children especially the under five may not use latrines [5]. This is because in some areas people regard a child's stool as harmless [19]. In a study in India, 85% of the children were defecating in the open [20]. In another study in Bangladesh, whereas 23% of the homes had latrines, 12% of the children were using them [19]. Studies carried out by the WHO show that culture plays a big role in the location of a pit latrine. Latrines may be located behind a house so that people are not seen doing to defecate or in front of the house for prestige [2].

In addition, some communities in Africa and Asia, a daughter in law and a father in-law cannot share the same latrine, while in South America there is a belief that women become pregnant by using the same latrine with men [2]. Also fears for safety of the elderly and young children, myths about safety like being poisoned, getting other diseases like STDs, being bitten by snakes, taboos about use e.g. not sharing latrine with in-laws, fear of causing infertility or miscarriage in women. Desirability of spreading feces: human feces should spread to fertilize the soil [2].

8.1.5. Objectives

8.1.5.1 General Objective:

- ✓ To assess factors affecting utilization of latrine, in Berbere Woreda of Bale Zone, Oromia, Ethiopia, 2017

8.1.5.2. Specific objectives:

- ✓ To assess factors that affect latrine utilization.
- ✓ To study latrine utilization

8.1.6 Research Methodology

8.1.6.1 Study Area and population

Berbere Woreda is one of the 18 Woredas in Bale Zone of Oromia Regional State, 450 km southeast of Addis Ababa. The Woreda has 17 kebeles, (15 rural and 2 Suburban). It has 119,033 total population of which 60,469 (50.8%) were male and 58,564 (49.2%) were female [21]. For the Woreda, the number of family members per households was 4.8, which make the total house hold approximately 24,799. Ninety-five percent of the population inhabiting in the rural kebeles, where as

the rest in suburban accounting 5%. Concerning the health care services, there are three governmental health centers, 16 health posts and four lower private health clinics [21]. The Woreda latrine coverage was 62% where as the utilization coverage is 21% [21]. There were two (2) Health Extension workers (HEWs) in eleven Kebele Health Posts each and one (1) HEW in five kebele Health Posts of the Woreda assigned in the Health Post [21].

8.1.6.2. Study Design: Unmatched case control study will employed. Cases will be those household, which have latrine but not using it yet or households, which do not have latrine. Controls will be model households currently using latrine. One to two ratios of cases and controls will be selected.

8.1.6.3. Study Population:

The source population shall be all households, which found in rural and suburban kebeles of Berbere Woreda.

8.1.6.4. Study Subjects

The study subjects shall be heads or spouse of households those do not have latrine at all, those have latrine but not using it, and those have latrine and currently using it in Berbere Woreda will be chosen randomly from all kebeles. It will assumed that one latrine will serve only for one house hold, but if more than one house hold utilizes one latrine together, one head of house hold or spouse will be selected from each by lottery methods for interview. If more latrine existed in the household that are currently under utilization, one latrine will selected again by lottery method for observation.

8.1.6.5. Sample size determination:

The study sample size will be determined by statistical calculation using Epi-info statistical tool. The samples will be determined based on 2:1 ratios of case and control. Two subject from those who have latrine, but do not use it, and or from those who have no latrine at all, and one subjects from households those are currently utilizing latrine (Model House hold) and. Assuming 10% of households those are currently utilizing latrine have exposed to any estimated exposure against utilization of latrine and 1.32 odds ratio, 95% confidence interval with 80% power of significance a total of 884 (295 cases and 589 controls) study subjects will be obtained.

8.1.6.6. Sampling Procedure:

The study units will be identified by stratifying the Woreda population by kebele followed by random sampling technique (random table number will be used) to select household. Primarily, the source population will stratified in to 15 Rural and two suburban kebeles, with a population proportion of 95% and 5% respectively. Hence, 840-study subjects will be selected from rural kebeles, while the rest 44-study subjects will be selected from suburban kebeles. This will believed to increase

representatives of the subjects, as there might be differences by type of residence, information, culture, access to safe water, economic status and efforts from external bodies that causes variations. The population proportion of respective kebeles will determine the number of households. Furthermore, the study units (households) those are not currently using latrine will be selected by simple random sampling, using the recent registration list which was prepared for 1to5 strategic implementation by kebele administrative offices. If the household selected by random sampling method is using latrine currently or refused to participate in the study the next nearest house hold will be visited. For those currently using latrine the house hold will be selected from model family graduated list using random sampling method.

8.1.6.7. Data collection:

A structured questionnaire will be used for the purpose of data collection. Twenty-six health extension workers for data collection and five supervisors for supervision will recruited before data collection. Training will be given for data collectors and supervisors prior to study period for three days. Data collectors will be classified to 13 groups. They will be expected to visit 12 household and fill the forms per day for six days. Interviews using structured questionnaires will be conducted with household heads or spouses from the selected households in the study villages. The questions will be focused on various sub-themes like, socio demographic characteristics of the respondent, latrine condition, culture barriers against utilization of latrine and issues concerning the role of utilization of latrine in acute watery diarrhea transmission. Other issues focused will perceive benefits of latrine use, reasons for having latrine. Pre-test will be conducted in a non-study village to identify the potential problems encountering during data collection and interview. Questionnaires will administered after explaining the purpose of the study and criteria used to select each respondent. Informed verbal and written consents will obtained from each household heads or respondents.

8.1.6.8. Operational definitions:

Latrine utilization: households with functional latrines and at least if the family disposes the feces of their under five years children in the latrine, no observable feces in the compound, observable fresh feces through the squat hole and the foot-path to the latrine is uncovered with grasses.

Functional latrine: latrine provides services at the time of data collection even if the latrine requires maintenance.

Good latrine: latrine that has super structure with a door, the floor of the latrine is smeared smooth with a slab with storm water diversion, feces content below 3 feet.

Fair latrine: Latrine that has Super structure, with or without door, leaking roof, sagging walls, logs of the floor visible and fecal content below 3 feet.

Bad latrine: No structure at all, logs of the floor visible, fecal contents above 3 feet (Visible)

Clean Latrine: No fecal matter in and around the pit latrine, properly swept.

8.1.6.9. Study variables:

8.1.6.9.1. Dependent variable – Utilization of latrine

8.1.6.9.2. Independent variables:-

- Socio-economic
- Environmental
- Knowledge

8.1.6.10. Data Quality:

The questionnaire will be prepared originally in English and then will be translated in to Afan Oromo and back to English to ensure reliable information. Data collection guideline will be prepared and given for data collectors and supervisors. Pre-test of questionnaire and training of data collectors and supervisors will be conducted to ensure the quality of data. Data collectors and supervisors will review every questionnaire for completeness and for logical consistency, and counter checked by the principal investigator at the end of each day in the field. Data cleaning will be conducted at the end of data entry.

8.1.6.11. Ethical Consideration:

The ethical approval and clearance will be obtained from Medical Faculty of Addis Ababa University ethical committee. Permission also will obtain from Oromia Regional Health Bureau, Bale Zonal Health Department and Berbere Woreda Health Office. The data collectors will be oriented during the training so that they would provide proper advice for the respondents regarding any malpractice they have come across. Interview will be carried out only with full consent of the person being interviewed. Before each interview, clear explanation will be given about the aim of the study will not neither to evaluate the performance of the individual nor to blame anyone for weakness, but to gather information and opinions that may lead to eventual improvement in the utilization of latrine. Each respondent will assured that the information provided by them would be confidential and used only for the purpose of research. Confidentiality of information will maintained during the whole study.

8.1.6.12 Data Analysis

Data will be entered, cleaned and analyzed using Epi-info7 software. Frequency distribution, percentages, and odds ratio with 95% confidence interval will be calculated to ascertain the association between dependent and independent variables as appropriate and displayed using tables and figures. Qualitative data will be coded and analyzed.

8.1.6.13. Dissemination of findings:

Results will be submitted to AAU Department of Community Health and presented orally. To help in future interventions the result will be communicated to governmental and non-governmental bodies. These include the Berbere Woreda Health Office, Bale Zonal Health Department, Oromia Regional Health Bureau, Federal Ministry of Health (FMoH), and other partners.

8.1.6.14. Expected outcomes:

The factors that may influence people against using latrines will be clearly identified and documented.

8.1.7. Budget and Implementations Time

A total of 89,200.00 birr will be needed to conduct the study as table showed below. The project will take about one month including preparation of final report. Study will be started within two weeks after grant released.

8.1.7.1. Budget Break Down

Descriptions	Activities	Cost in ETH. Birr
Training cost	Training for data collectors	23,932.00
Perdium cost	Perdium payment for data collectors and supervisors	35,898.00
Vehicle cost	Vehicle rent	14,400.00
Fuel costs	Fuel for vehicle	12,800.00
Stationary costs	Stationary materials for Questionnaire and data collection	2,170.00
Total		89,200.00

8.1.7.2 Tentative implementation time of the project

S/ no.	Area	Activities	Time period		
			June	July	August
1	Adopting and finalizing the tools	Translation of data collection tool to local language	✓		
2	Training of data collectors	Invite data collectors, preparation for training, conduct training	✓		
3	Pretest	Check for the validity of data collection Tools	✓		
4	Field visit	Data collection	✓		
5	Data analysis	Enter data and analysis		✓	
6	Report writing	Writing report		✓	
7	Submission of report	Submission of report			✓

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Annexes

Annex 1; structured questionnaires

Introduction:

Hello, my name is..... . I am Addis Ababa University EFETP Research Team member. Thank you for taking the time to speak with us today. We are conducting an assessment on Factors Affecting Utilization of Latrine in Berbere Woreda and wanted to speak with heads of house hold and or spouse. Our goal is to figure out factors affecting the utilization of latrine in the community. We are very interested in your experiences and your point of view.

We will start by asking your willingness to participate in the study and clearly explain you the objective, benefit and risks of the study to get your consent. Then we will ask you all a multiple of questions for discussion. Questions are simple and what you clearly known in your daily activities. Please feel free to speak your mind; your name, position, and anything that could identify you personally will not be used in any official reports or presentations.

No	Question	Answer	Options for (Go to)
1. Demography			
1.1	Region	Oromia	
1.2	Zone	Bale	
1.3	Woreda	Berbere	
1.4	Kebele		
1.5	House number		
1.6	What is your Ethnicity?	1. Oromo 2. Amhara 3. Gurage 88. Other (Specify) _____	
1.7	What is your religion?	1. Muslim 2. Christian 3. Others	
1.8	Age		
1.9	Sex		
1.10	What is your occupation	1. Farmer 2. House wife 3. Government Employee 5. Merchant 6. Student 7. Daily Labourer 8. Other _____	
1.11	What is your level of Education	1. Illiterate 2. Able read and write 3. primary (grade 1-8) 4. Secondary & above	
1.12	What is your children level of	1. Illiterate _____	

	education? (write the numbers of children in the space provided)	2.Able to read and write____ 3.primary(grade1-8)____ 4.Secondary & above	
1.13	What is your father/mother in law level of education?	1.Illiterate 2.Able read and write 3.primary(grade1-8) 4.Secondary & above	
1.14	How many years are you residing in this village?	_____ years	
1.15	How many family member residing with you?	_____ 1-5 years _____ over 5 years	
2. Latrine Situation			
2.1	Do you have latrine?	1. Yes 2. No	If No skip to Q.3.11
2.2	If yes how long you own the latrine?	_____ years	
2.3	Is hand washing facility beside the latrine?	1.Yes 2.No	
2.4	Is hand washing facility beside the latrine?	1.Yes 2.No	
2.5	How many meter the latrine far from the house?	_____ in meter	
3. Factors of latrine utilization			
3.1	Are you using the toilet?	1.Yes 2.No	If No skip to Q3.10
3.2	Show me your toilet	1.Good 2.Fair 3.Bad 4.Functional 5.Clean 6.Dry	
3.3	Why you are using the latrine?	1.To protected from diseases 2.To protect children from diseases 3. I was told to use it by government 4. To keep my environment clean 5. I do not know	
3.4	Does all your family use it?	1.Yes 2. No	If No skip to Q3.7
3.5	At what age do children start using a latrine by themselves? i.e. not being assisted.	_____ years	
3.6	Before the child starts going to the pit latrine where do you dispose of the excreta	1.Put it in the latrine 2.Discard it on the compound 3. Burying in the ground 4.Other _____	
3.7	If no to Q3.4 who do not use the latrine	1.Mother in law 2.Father in law 3.Children less than five years 4.Females 5.Other _____	
3.8	If Answer for Q3.7 is children	1.Faeses of child is not harmful	

	less than 5 Why?	2.Other	
3.9	If Answer for Q3.7 is Females why?	1.Fear of pregnancy 2.Other	
3.10	Why you are not using the latrine?	1.Personality issue(near to house) 2. Feces used for fertilizer 3.wife and husband do not use the same latrine 4.Fear of diseases transmission 5. Fear of snake/insect bite 6. Bad smell 7.Fear of causing infertility or miscarriage in women	
		8. Not comfortable 9. Other	
3.11	Why you did not have latrine?	1.I do not know its importance 2.Feces are used for latrine 3.Resource(construction materials) 4.Work force 5.Cultural barriers 6. I have no place 7. Forest is near to my home 8. Latrine is not comfortable 9. Other	
3.12	Where are you using?	1.Open field, 2.Neighboring, 3.Public latrine 4.Other(specify)	
3.13	If answer for question 3.12 is —open field”, why you choose it?	1.For fertilizer 2.For other purpose	
3.14	Do you know advantage of latrine?	1.Yes 2.No	
3.15	If yes from whom did you heard of it?	1.Yes 2.No	
3.16	Do you have access to save water?	1.Yes 2.No	
3.17	If yes within how many km or you get it?	_____ km _____ m	
3.18	How many litters do you fetch per day?	_____ lit	

Thank you for your cooperation!

Annex 2: Consent Form

Title: Assessment of Factors Affecting Utilization of Latrine in Berbere Woreda of Bale Zone, Oromia, Ethiopia, 2017

Objective: To carry out assessment of factors affecting utilization of latrine in Berbere Woreda of Bale zone in order to produce information to point public health intervention.

Procedure: This project will take about 25 minutes of your time. There are two parts. First, we will clearly explain you the purpose, benefits and risks of the study. We will give you a chance to ask questions and get answers about the study. Second, we will ask you about latrine utilization among your family. All information collected during this study will be kept private and will only be known by the investigators.

Benefits: This project will help the government of Ethiopia and all level government health sectors to enhance the utilization of latrine and maximize the benefits of latrine.

Risks: There is no risk to you from answering the questions or being participated in this study. We will give you a copy of this consent.

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 study 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 25 minutes. There will be no involvement past today.

Participant Agreement: The project has been explained for me. 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.

The purpose of the study and confidentiality procedures has been explained to me and me on my own consent: a) Agree _____ b) Disagree _____

Signature of Interviewer _____

Date of interview _____ Time started _____ Time completed _____

Checked by supervisor: Name _____ Signature _____ Date _____

CHAPTER – IX

Other Additional Output Reports

9.1. Narrative Summary Report of AWD Prevention and Control Activities done at Berbere Woreda of Bale Zone, Oromia Region, From September 2016- February

9.1.1. Introduction

Acute watery diarrhea can be caused by many different infections and may also occur following ingestion of chemicals or food contaminated with pre-formed bacterial toxins.[3]

It is a disease caused by infection of the intestine with the gram-negative bacteria *Vibrio cholera*, either type O1 or O139. Both children and adults can be infected. 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. [1,3]

There are over 100 vibrio species known but only the “cholera” species are responsible for cholera epidemics¹. *Vibrio cholera* species are divided into 2 sero groups: [1,3]

- *Vibrio cholerae*O1, subdivided into Classical and El Tor biotypes,
- *Vibrio cholerae*O139 sero group was first identified in 1992 in India. It has since been isolated in other Asian countries between 1993 and 1998. [1, 2, 3]

9.1.2 Epidemiology of Acute Watery Diarrhea

Both El Tor and Classic biotypes are divided into 3 serotypes: Ogawa, Inaba and Hikojima. The three serotypes can co-exist during an epidemic because the bacteria can mutate between serotypes. [1] This does not affect the epidemic pattern: [1,2]

- ✓ clinical features are similar, whatever the strain
- ✓ Regardless of the strain, the response is the same.

About 20% of those who are infected develop acute, watery diarrhea – 10–20% of these individuals develop severe, watery diarrhea with vomiting. If these patients are not promptly and adequately treated, the loss of such large amounts of fluid and salts (more than 10-20 liters/day in severe forms) can lead to severe dehydration and death within hours.

The case-fatality rate in untreated cases may reach 30–50%. Treatment is straightforward (basically rehydration) and, if applied appropriately, should keep the case-fatality rate below 1%. Cholera/AWD/ is usually transmitted through fecal contamination of water or food and remains an ever-present risk in many countries.

New outbreaks can occur sporadically in any part of the world where water supply, sanitation, food safety, and hygiene are inadequate. The greatest risk occurs in over-populated communities and refugee settings characterized by poor sanitation, unsafe drinking-water, and increased person-to-

person transmission. As the incubation period of cholera is very short (2 hours to 5 days), the number of cases can rise extremely quickly.[1]

Vibrios grow easily in saline water and alkaline media. They survive at low temperatures but do not survive in acid media; they are destroyed by gastric acid in the stomach, by chlorine disinfectant solutions or by boiling during at least one minute.[1]

9.1.3 Mode of Transmission

Cholera is transmitted by the fecal-oral route. A dose of more than one million organisms is usually needed to cause illness. Cholera is transmitted almost exclusively by contaminated water or food. Transmission by contact, such as touching patients, is rare.

Water may be contaminated at its source. Surface water and water from shallow wells are common sources of infection. In addition, *Vibrio cholera* can live for years in certain aquatic environments. Water is also frequently contaminated at home when inadequately washed hands come in contact with stored water. Bathing or washing cooking utensils in contaminated water can also transmit cholera. [1,2]

Moist grains, such as rice, millet, or sorghum, when served at room temperature or lightly warmed, are common vehicles for cholera transmission. Moist foods lightly contaminated after cooking and allowed to remain at room temperature for several hours, provide an excellent environment for the growth of *Vibrio cholera*. Other foods which can transmit cholera include raw or undercooked seafood, particularly shellfish, and raw fruits and vegetables. [1,2]

Corpses of cholera patients are highly infectious through their excreta. Physical contact during funerals is also a major medium. Cholera treatment centers can become main sources of contamination if hygiene and isolation measures are insufficient. [1,2,3]

Acidifying foods with lemons, tomatoes, yogurt, or fermented milk helps to inhibit *Vibrio cholera* growth. [1]

Humans are the main reservoir of *Vibrio cholerae*. Asymptomatic (healthy) carriers and patients carry huge quantities of vibrio in feces and in vomit; up to 100,000,000 bacteria can be found in 1 ml of cholera liquid. Other potential reservoirs are water, some molluscs, fish, and aquatic plants. The infective dose depends upon individual susceptibility, but in general a 1,000,000 dose is needed to cause the illness.[1]

9.1.4 Risk Factors

❖ **Poor social and economic environment, precarious living conditions associated with:** [1]

- Insufficient water supply (quantity and quality)
- Inappropriate and poor sanitation and hygiene practices
- Inadequate food safety - this includes cultural influences on food preparation and storage at home, poor food safety during preparation and storage, inadequate/lack of food safety in markets and restaurants and by street vendors. During outbreak peel it, cook it or leave it.
- High population density: camps and slum populations are highly vulnerable.
- Underlying diseases such as malnutrition, chronic diseases and AIDS are thought to increase susceptibility to cholera, but this has not been proven. [1]

❖ **Environmental and seasonal factors.**

AWD/Cholera/ epidemics often start at the end of the dry season or at the beginning of the rainy season, when water sources are limited. This pushes people to accumulate at the fewer water sources available and increasing risks of contamination and transmission. Furthermore, the salinity can increase during the dry season and favors the growth of vibrio. Heavy rains can also provoke the emergence of cholera: flooding of contaminated water from sewage systems, latrines or septic tanks may contaminate wells or other water sources and thereby increase the concentration of organic nutrients in the water.[1]

9.1.5 Magnitude of Acute Watery Diarrhea & Current situation in Ethiopia

Diarrhoea is a major health problem [2]. Diarrhoea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of causative agents. These causative agents include viruses, bacteria and parasites [1,2,3]. Diarrhoeal infection spreads through contaminated food or drinking-water, or from person-to-person as a result of poor hygiene.

There are three clinical types of diarrhoea: acute watery diarrhoea – lasts several hours or days, and includes cholera; acute bloody diarrhoea – also called dysentery; and persistent diarrhoea that – lasts 14 days or longer [1, 2].

Nearly 90% of diarrhoea is attributed to unsafe drinking water, inadequate sanitation and poor hygiene [1]. It is widely recognized that exposure to diarrhea pathogens in developing countries is associated with such factors as quality and quantity of water, availability of toilet facilities, housing conditions, level of education, household economic status, place of residence, feeding practices, and the general sanitary conditions (personal or domestic hygiene) around the house [2,3].

Socioeconomic factors may affect, directly and indirectly, environmental, behavioral, nutritional, and demographic risk factors, with the exception of age and sex [1, 2, 3].

Cholera, an acute intestinal infection, causes watery diarrhoea that can quickly lead to severe dehydration and death if treatment is not promptly given, according to the United Nations agency.

—Overall, 8.8 million people are at risk of malaria and 5 million of cholera (in Ethiopia),” WHO spokesman TarikJasarevic said in a note sent to journalists.

Ethiopian health officials have confirmed cases of acute watery diarrhoea in the Somali, Afar and Oromiya regions of Ethiopia, told Reuters. —It is not confined to the refugees.”

Drought across the Horn of Africa, now affecting more than 11 million people in Ethiopia, Djibouti, Kenya and Somalia, has increased the risk of the spread of infectious diseases, especially polio, cholera and measles, the WHO says.

9.2. Berbere Woreda AWD Outbreak Prevention and Control Preparedness Rapid Assessment Report, February 2017 G. C.

AWD outbreak occurred in different parts of Oromia Region since 2015 G.C. In addition, as a field resident, I deployed to different areas of the Region to participate on the prevention and control of the outbreak. From those parts of the Region AWD outbreak affected Zones, at different time I deployed to different Zones of Oromia Region; Arsi, Bale and East Wollega Zones. From these Zones, I stayed at Bale Zone for long period. Therefore, some activities have done at Bale Zone AWD affected Woredas with a team, and I tried to illustrate Berbere Woreda AWD situation and prevention and control activities.

9.2.1 Back Ground

Berbere Woreda is one of the 18 Woredas in Bale Zone of Oromia Regional State, 450 km southeast of Addis Ababa. The Woreda has 17 kebeles, (15 rural and 2 Suburban). It has 119,033 total population of which 60,469 (50.8%) were male and 58,564 (49.2%) were female [4]. For the Woreda, the number of family members per households was 4.8, which make the total house hold approximately 24,799. Ninety-five percent of the population inhabiting in the rural kebeles, where as the rest in suburban accounting 5%. Concerning the health care services, there are three governmental health centers, 16 health posts and four lower private health clinics [4]. The Woreda latrine coverage was 62% where as the utilization coverage is 21% [4]. There were two (2) Health Extension workers (HEWs) in eleven Kebele Health Posts each and one (1) HEW in five kebele Health Posts of the Woreda assigned in the Health Post [4].

9.2.2 Methods

A. Activities done before deployment to the field

1. Team containing three members is formed
2. Team came together and prepared action plan and discussed on checklist for clarification and to have common understanding
3. Team collect official letter and checklist then deployed to field.

B. Team discussed with Bale Zone Health Office on the following topic

1. Level of preparedness for emergency
2. Availability of different organizational structure doing with surveillance team.
3. Available both government and non- government health facilities and other infrastructures.
4. Whether they identify and map risk area and some precipitating factors that make difficulty to hand the case
5. Resource available:

- trained manpower,
 - AWD guideline,
 - emergency preparedness plan,
 - emergency budget
 - Emergency drug and medical supply
6. Coordination and Communication channel of health office with administrative bodies and other sectors
 7. Major challenges and gaps that need assistance

C. Findings

Emergency preparedness situation

- No document show emergency preparedness plan
- There is RRT but no TOR and no minute showing their functionality
- Task force committee not established yet
- No budget for emergency response
- They identified 5 kebeles that are border to Somali Region,
- There are Mini media, Monterbo and Mega phone for announcement and community awareness creation but no plan with communication office to use media communication

D. Early warning and surveillance

- There is copy of IDSR report but no trend analysis
- No document showing analysis of report completeness, timeliness
- No document showing feedback given to health facilities that give health service and report to the Office

E. Environmental Health and Hygiene

- ✓ No document that show their action plan
- ✓ Latrine coverage is about 62%, but no data showing utilization coverage
- ✓ Safe water supply is 31%
- ✓ There are no community latrine but no data showing water carriage latrine
- ✓ No data showing Food and Drink establishment and their water supply and waste disposal mechanisms

F. Strength considered by our team

- ❖ They get information start activities
- ❖ They conduct risk area mapping Special those five kebeles border to Somali Region
- ❖ They discussed with these administrative and sensitize the team for active search
- ❖ They establish technical committee at Health Office and Woreda level
- ❖ Planning for sanitation campaign for fast transmission of information about ADW

G. Gaps identified by the assessment team

- Risk area mapping is not well done
- Need assessment is not done
- No Emergency preparedness plan and action plan supported by document
- No established Task force committee by integrating other sectors
- Lack of information to establish other sub-committee like WASH and Regulatory, Logistic and Inspection committee containing pharmacy professionals
- Active case search not started yet
- Coordination of other sectors and preparing common action plan not yet started

H. Ways forward/ Recommendation

- ✓ Immediate establishment of Task Force and Other sub-committee
- ✓ Further risk areas and other aggravating factors identification
- ✓ Detailed and categorized need assessment(short and long term need)
- ✓ Preparing comprehensive and joint action plan (short and long term)
- ✓ Develop/ set Turn of Reference (TOR) for all formed committee
- ✓ Setting means/way of active case searching and means of report communication
- ✓ Plan to conduct Town sanitation campaign and keep its continuity
- ✓ Sensitizing Health Development Army and other command posts in administrative structures
- ✓ Prepare clear and organized need assessment arising lower level community

9.2.3 Results

Currently Berbere Woreda was affected by AWD outbreak since Meskerem 1/2009 E.C.

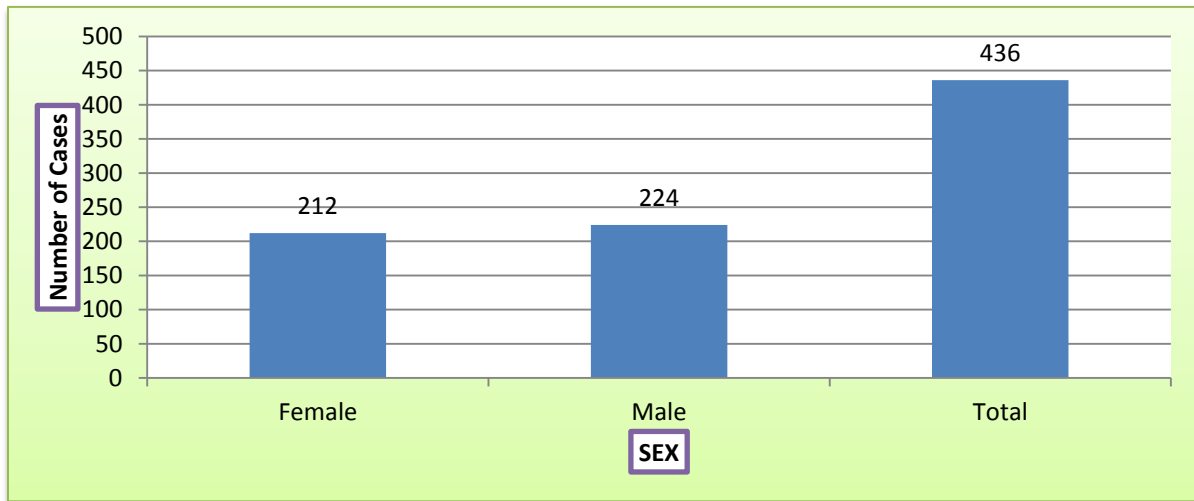


Figure 9.1: Distribution of AWD cases by sex

The numbers of AWD by sex were Male 224(51.4%) and Females 212(48.6%) respectively. Male cases were higher than Female cases in the Woreda.

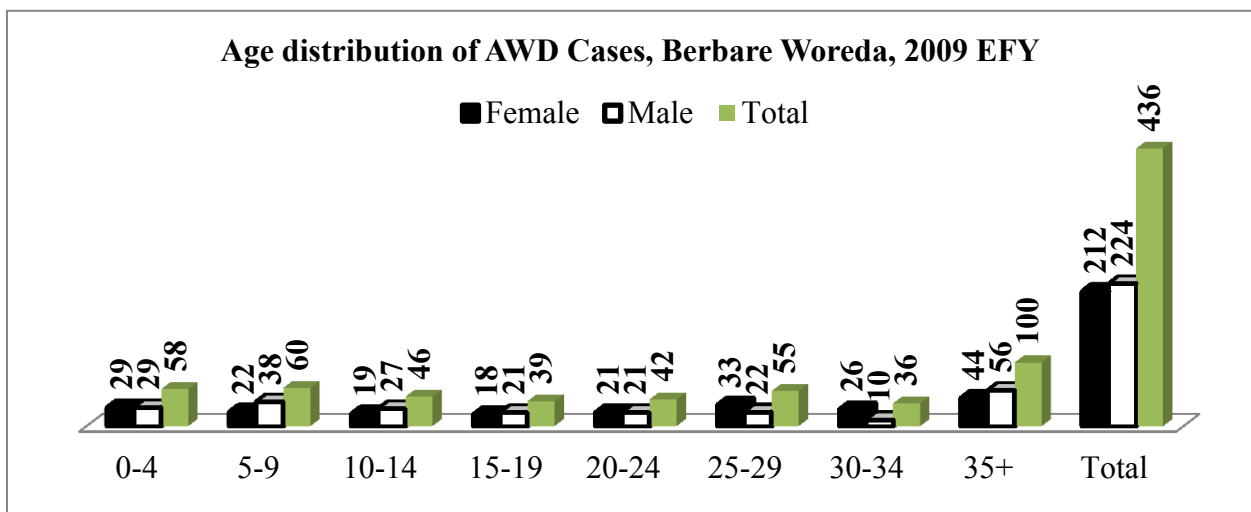


Figure 9.2: Distribution of AWD cases by age category

The majority of cases were children of age under 15 years and adults of age above 35 years.

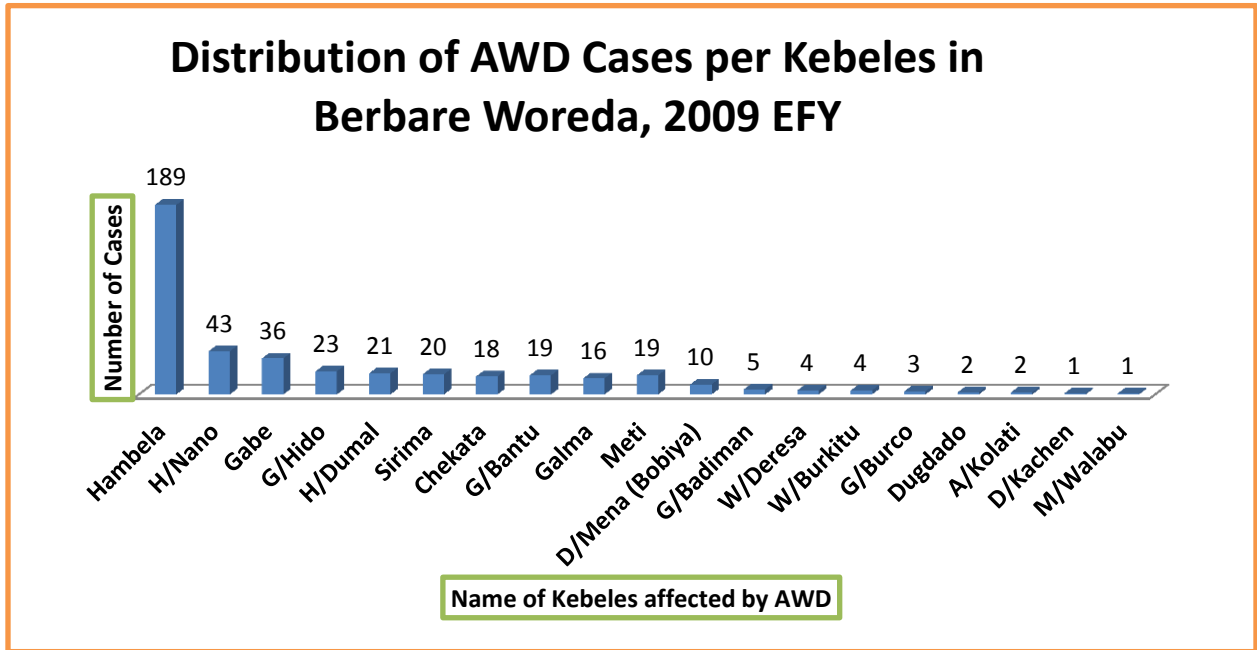


Figure 9.3: Distribution of cases by Kebele and neighbors Woredas of Berbare Woreda

In Berbare Woreda of Bale Zone, 16 kebeles were affected by AWD. High number of cases were admitted from Hambela kebele of Berbare Woreda which accounts 189(43.3%), followed by Haro Nanno 43(10%), and Gebe 36(8.3%) kebeles.

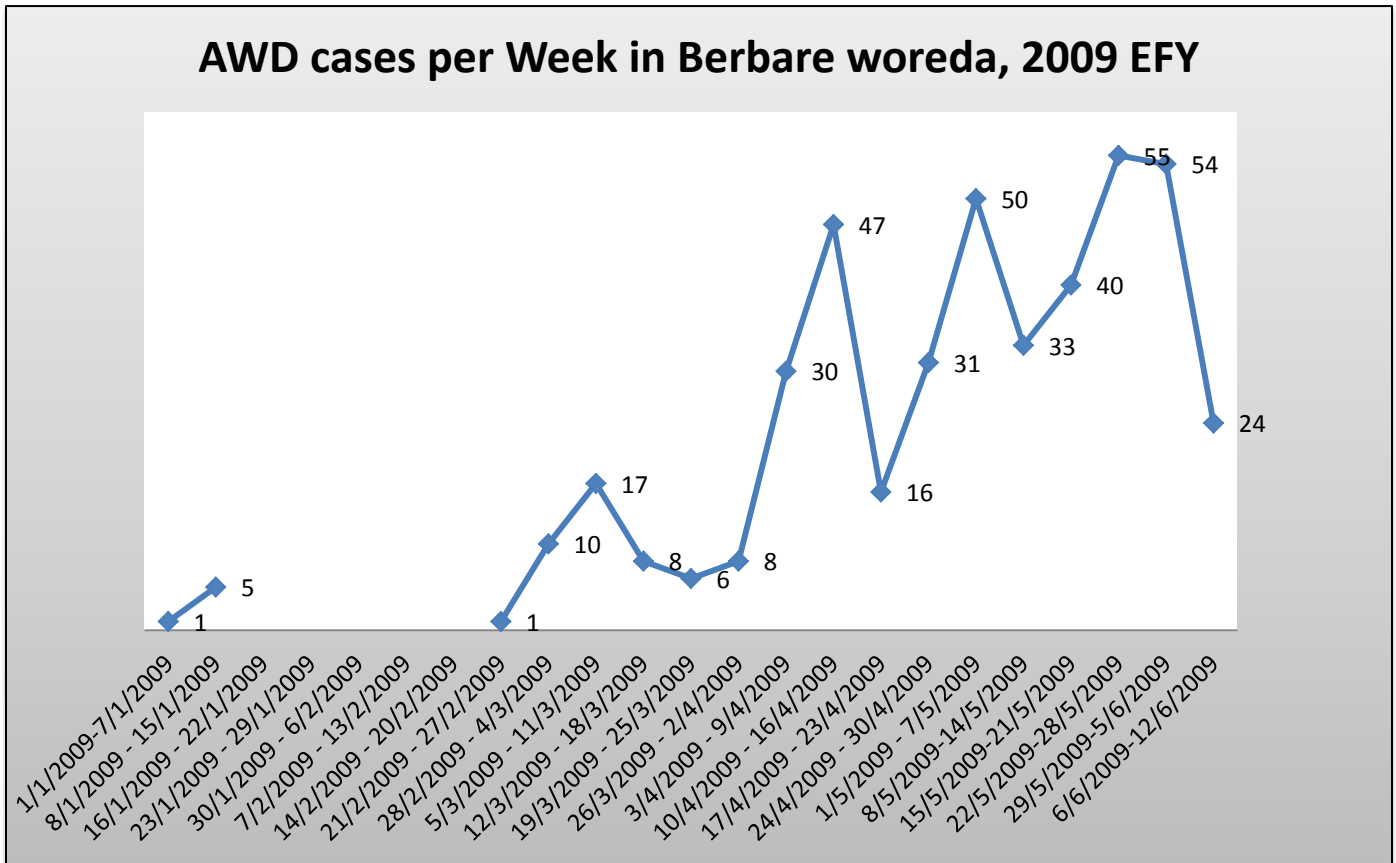


Figure9.4: Number of Cases by Week (in Ethiopian Week)

AWD cases were increased rapidly, continued increasing up to December 10-16 /2009, and decreased between December 17 to 23/2009. Again, cases were increased up to January 28/2009. From Jan.29/2009 it shows decreasing trend.

9.2.4. AWD Prevention and Control activities Done during field stay at Bale Zone



Figure 9.5; Discussion with Bale Zone officials and stakeholders



Figure 9.6: Some activities that expose people to AWD



Figure 9.7: Awareness creation activities and discussion done with different types of communities at Berbere and Goro Woredas of Bale Zone



Figure 9.8: Awareness creation activities and discussion done with Students and School members



Figure 9.9 : Awareness creation activities and discussion done with Religious leaders and community elders.



Figure 9.10: AWD Treatment Centers (CTC) established at different sites



Figure 9.11: Latrines constructed by community participation




Figure 9.12: Water purifiers was distributed to the community

References

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2. Science journal of public health, published on line June 20, 2013.
3. Global Disease Detection (GDD) Manual —Rapid Diagnostic Tests for Epidemic Diseases”
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4. Berbere Woreda Health Office Annual report Bulletin, (2016)

9.3. Weekly Bulletin of PHEM Report for WHO Epidemiologic Week 25/2016, and Week 3/2017 Oromia Regional Health Bureau.



Oromia Regional Health Bureau, PHEM core process

WEEKLY PHEM BULLETIN

HIGH LIGHTS OF THE WEEK

Malaria, TB and Measles case load is trending to increase in some zones while reporting completeness has waned.

I. Introduction

This bulletin serves to summarize weekly surveillance data and performance of UHRII-ITRII on epidemic prone diseases and other public health emergencies. It comprises completeness, timeliness and reporting trends of priority diseases and present response activities. It also provides feedback on surveillance activities for week 25, 2016 GC.

II. Weekly Surveillance Report

Report completeness and timeliness of government health facilities were 92% and 92% respectively. All zones and towns reported timely, except Bursyu Town. Completeness of all zones and towns were also above the target except Bursyu Town (50%) (Fig 1).

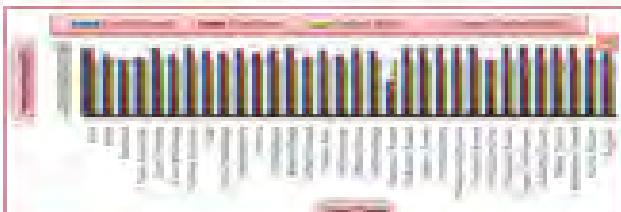


Figure 1: Report completeness and timeliness for consecutive 24 weeks, Oromia, June 2016

Regional report completeness and timeliness of the past twenty four consecutive weeks were above the target except for timeliness of week 2, 5, 7, 8, 13 & 23 (Fig 1).

WEEK 25, 2016




Figure 2: Trends of regional surveillance report completeness and timeliness by week, Oromia, June 2016

III. Diseases condition

1. Malaria

In this week, a total of 5,505 clinical and confirmed malaria cases were reported. Among the total clinical and confirmed malaria cases 5,371 (97.6%) of them were confirmed cases. Of the total confirmed cases 3433(64.3%) of them were plasmodium falciparum. Confirmed malaria cases were increased by 625(1.4%), as compared to week 24. A total of 28,154 cases were laboratory tested, yielding a positivity rate of 19.07%. The highest number of confirmed malaria cases was reported from East Shoa Zone 1497 (27.2%) followed by Borena 584 (10.6%), Agri 452 (8.2%), East Wollega 359 (6.5%), Kelem Wollega 254 (4.6%), West Wollega 254 (4.6%), South West Shoa 250 (4.5), East Harerge 240 (4.4%), Ilu Abba Bona 225 (4.1%), and West Shoa 227 (4.1%). Boset (21.8%), Adama (18.1%), and Fantale (14.6%) were woredas from East Shoa Zone; Gelana (41.1%), Abaya (28.6%), and Tefale (10.1%) from Borena Zone; and Mari (31.4%), Dodota (17.9%), and Jaju (12.4%) from Agri Zone were woredas that contributed for highest number of case loads that need attention. Trends of confirmed malaria cases of the twelve consecutive weeks for some selected zones are indicated below:

PUBLIC HEALTH EMERGENCY

Weekly PHEM Bulletin, Oromia, 2016



Figure 3: Trends of confirmed malaria cases (Pv + Pf) of selected zones by Week, Oromia, June 2018.

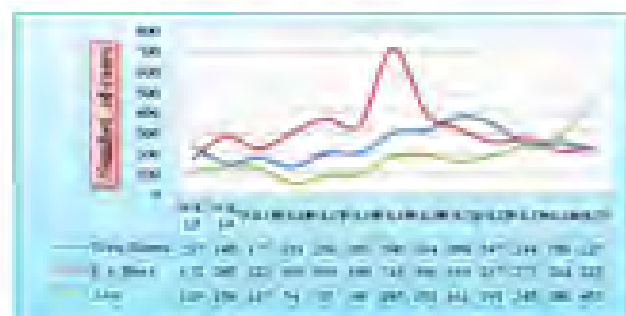


Figure 4: Trends of confirmed malaria cases (Pv + Pf) of selected zones by week, Oromia, June 2018.



Figure 2: Trends of confirmed malaria cases (Pv + Pf) of selected zones by Week, Oromia, June 2018.

2. Dysentery (Diarrhea with blood)

In this week, a total of 1964 dysentery cases were reported. Cases were decreased by 35 (3%) as compared to week 24. The highest number of cases was reported from East Showa 208 (10.6%), North Showa 143 (7.30%), West Showa 137 (7%), and Argi zone 130 (6.62%). Modjo (31.25%), Adama (13.94%) and Lugga (9.61%), were woredas from East Showa Zone, Fiche Town (13%), Wuchale (12%) and Kuyu (11.2%) from

North Showa zone and Gedo Hospital (18%), and Ambo town (12%) from West Showa Zone were woredas that contributed for high number of cases. Trends of dysentery cases in the twenty one consecutive weeks are shown below (Fig. 6).



Figure 6: Trends of dysentery cases by week, Oromia, June 2018.

J. Measles

In this week, a total of 85 suspected measles cases were reported to the region. The cases were increased by 9 (12%) as compared to week 24. Majority of the cases were reported from South West Showa Zone 41 (48.23%), Jimma zone 13 (15.3%), Argi zone 12 (14.11%), West Showa 11 (12.94%), Bahoftu town 2 (2.35%), Bale 1 (1.17%), East Showa 1 (1.17%), Illu Abba bore 1 (1.17%), Kelem Wollega 1 (1.17%), Sebetsa town 1 (1.17%), and West Argi 1 (1.17%) cases. St. Luke Hospital (66%), Ameya (27%), Tulu bula Hospital (5%), and Woliso Fura (2.43%) from South west Showa Zone, and Limu Seka (77%), Agaro town (15%), Somo (8%) from Jimma Zone, Meri (34%), Jera (8%) from Argi Zone, Gindeberet Hospital (63.63%), Guder Hospital (27.27%) and Gedo Hospital (9.09%) from West Showa Zone were woredas that contributed for high number of suspected cases compared to their respective woredas. Trends of the past twelve consecutive weeks of suspected measles cases are shown below (Fig. 7).



Figure 7: Trends of suspected measles cases by week (12-23), Oromia, June, 2016.

4. AFP/Polio

In this week, no suspected AFP cases were reported to the region.

5. Malnutrition

In this week, a total of 2,353 new SAM cases were reported to the region. SAM cases were increased by 413 (16.9%) as compared to week 24 (fig: 8). Of the total cases, 326 (11.5%) of them were treated at stabilization center. Majority of the cases were reported from East Harerge Zone 603(21.14%) followed by West Harerge 585 (20.5%), Bale 424(15%), West Aji 295(10.34%), Aji 218(7.64), Guji 206(7.22%), Bale 216 (9.3%), and East Showa 103(3.7%) are high number of SAM cases contributor Zones. Gossa (16.25%), Fedda (14.42%), and Chinkenen (9.6%) were Woredas from East Harerge Zone, Gemedha (19.14%), Misso (16.66%), Uda Bulum (6.89%), were Woredas from West Harerge Zone; Harera buluk (25.23), Mada Welebu (21.93%), Gini (9.43%), Dolo Mens(5.66%), Shashamane (44.74%), Shala (20.67%) Aji Negele (6.13%) were Woreda from West Aji Zone that contributed for high number of SAM cases that need attention. Trends of the past Seventeen consecutive weeks of SAM cases as of regional and zonal level respectively were indicated below (Fig: 8).

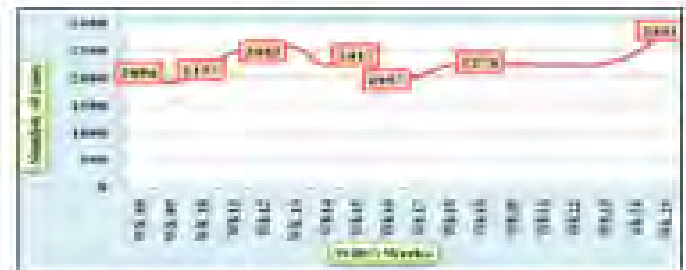


Fig. 8: Trends of SAM cases by weeks, Oromia, June,2016.

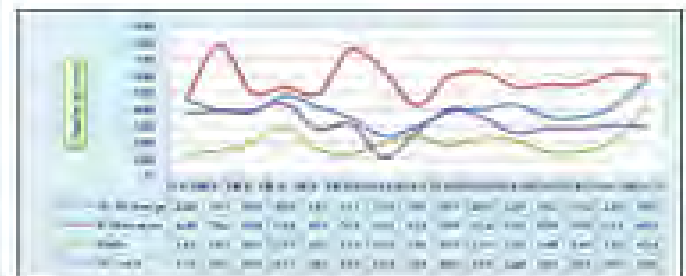


Fig. 9: Trends of SAM cases by selected zones, Oromia, June,2016.



Fig. 10: Trends of SAM cases by selected zones, Oromia, June,2016.

6. Meningococcal Meningitis

In this week a total of nine suspected meningococcal meningitis cases were reported to the region. Cases were reported from Buje Hora Hospital (4) and Yabelo Hospital (1) of Borena zone; Hambela (1) and Negelle Hospital (1) of Guji zone. Goba Towne of Bale(1), Bedessa town of west Harerge Zone (1).

7. Rabies

In this week, a total of seven suspected rabies cases were reported to the region. Cases were reported from Shechemene town (4), Amigna(1) and Chole(2) woredas of Agji Zone.

8. Anthrax

In this week no anthrax case was reported to the region.

9. Relapsing Fever

In this week, a total of three Relapsing Fever cases were reported to the Region. Case was reported from East shoa Mojo(1), Gamba Hospital (1) and Shechemene(1) of West Agji zone.

10. Maternal deaths

In this week, a total of five maternal deaths were reported to the region. Cases were reported from Adama town(1), Deder(1) and Fedja(1) of East Harerge zone, Goma Woreda(1) of Jimma zone, Chiro Hospital(1) of West Harerge.

11. Response Activities

- o Based on weekly surveillance report, feedback was given to all zones and towns timely.
- o Daily follow-up of rumors of epidemic prone diseases and other public health emergencies are followed regularly.
- o Necessary efforts have been carried out at all levels, so as to minimize the current nutrition emergency problem and unusual increment of malaria cases in some local areas.
- o AND outbreak investigation and response is under way
- o Health and nutrition task force meeting is conducted, issues discussed and action points shared with partners every two week
- o Guinea-Worm disease control, prevention and eradication program will be strengthened so as to make Ethiopia GNU free country and get certified

I



Biree Egeensa Fayyaa Oromiyaatti Adesma Hailu Ise
Hoggansa Balaa Tasea Fayyaa Hawaasaa, Qalannee F
Qorannoo Fayyaa

Oromia Regional Health Bureau
PHEM Core Process

WHO WEEK 3, 2017

Highlights of the Week

- Weekly severe acute malnutrition (SAM) and Diarrhoea cases were reported by 5.5% and 1% respectively, while confirmed malaria and measles cases were decreased by 38% and 51% as compared to week 2.
- Acute Watery Diarrhoea (AWD) cases were reported as compared to week 2.

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 3, 2017.

II. Weekly Surveillance Report

Report completeness and timeliness of government health facilities were 90% & 79% respectively. Report completeness of all zones and towns were above the target except for the Bale (76%), Borena Zone (74%), Bata Town (76%) and Robe Town (40%). Report completeness was increased by 13% where as timeliness remained equal as compared to week 2. Report was **NOT** received from Sekela Town where as West Arsi West Guji and North Slog reported late where as Nekemte Town government health facilities were not reported.



Fig. 1: Report completeness and timeliness by zones and towns, Oromia Region, week 3, January, 2017.

Regional report completeness of the past sixteen consecutive weeks were above the target except for the completeness of weeks 39 (54%), 42 (72%) and week 2 (79%) of 2017 (Fig.2).

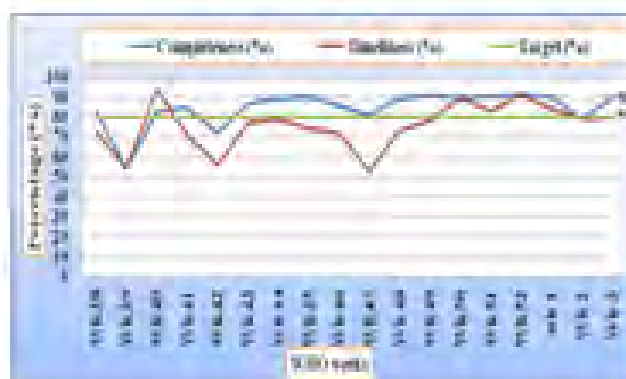


Fig. 2: Trends of regional surveillance report completeness and timeliness by week, Oromia, week 3, January 2017

III. Diseases or conditions

1. Malaria

In this week, a total of 1,855 clinical and confirmed malaria cases were reported. Among the total clinical and confirmed malaria cases 1791 (96.5%) of them were confirmed cases. Of the total confirmed cases, 979 (54.6%) of them were *plasmodium falciparum*. Of total confirmed cases eleven of them were managed in patiently. Confirmed malaria cases were decreased by 72 (3.8%) as compared to week 2. A total of 21,626 cases were laboratory tested, yielding a positivity rate of 8.3%.

The highest number of confirmed malaria cases were reported from East **Shoa** 238 (13%) followed by **Kebem Wollega** 215 (12%), **West Wollega** 145 (8%) and **South West Shoa** 103 (6%) Zones.

Table-1: Distribution of malaria case had reported by selected zones and woredas of Oromia region, week 2, January, 2017

Zone Name	Suspected Fever cases Examined by RDT or Microscopy	P.F + P.V	Positivity rate	Case proportion from region
District name				Zones
E/ Shoa	2593	238	9.2	13
Fantale	346	63	18.2	26
Danda	509	37	7.3	16
Wollo				
Wollega	973	215	22.1	12
Dale				
Wakera	231	109	47.2	50.7
Gama Keba	123	24	19.5	11.2
West				
Wollega	1891	145	7.7	8.1
Baba				
Gambel	228	23	10.1	15.9
Mendi Town	130	20	15.4	19.8
SWS	1475	103	7.0	5.8
Wakera				
Rural	97	27	27.8	26

2

Wakera Town	485	21	4.3	20
Jima Zone	941	84	8.9	5.2
Shabe	113	27	23.9	29
Yana Bona	57	16	28.1	17
Chora Bona	101	10	9.9	11
Regional	21626	1791	8.3	

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

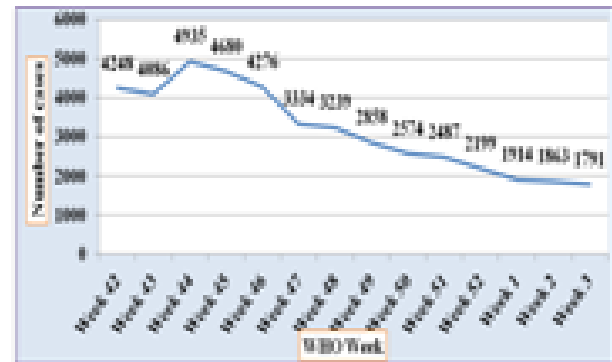


Figure 3: Trends of confirmed malaria cases by week, Oromia Region, week 42/2016 to week 2, January, 2017

2. Dysentery

In this week, a total of 1,475 dysentery cases were reported. Cases were increased by 15 (1%) as compared to week 2. The highest number of cases was reported from **Borena** 120 (8%) followed by **Jima** 103 (7%) and **East Shoa** 94 (6%) zones. Trends of dysentery cases for the last eleven consecutive weeks are shown below (fig: 4).

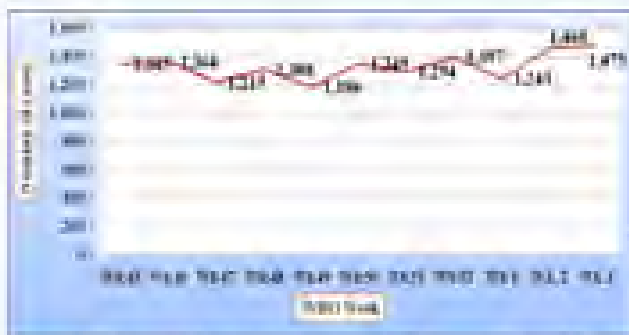


Figure 4: Trends of dysentery cases by WHO weeks, Oromia Region, week 48/2016 to week 2, January, 2017

3. Measles

In this week, a total of 20 suspected measles cases were reported to the region and cases were decreased by 21 (51%) as compared to week 2. Most of the cases were reported from Guji 5 (25%) followed by Bale 3 (15%) and West Guji 3 (15%) zones. Wadera Woreda and Adola Hospital of Guji zone each 2 (30%) from Guji Zone and Hassa Bork Woredas 3 (100%) of Bale Zone were woredas contributed for high number of cases.

Trends of the past ten consecutive weeks of suspected measles cases were shown below (Fig. 5).

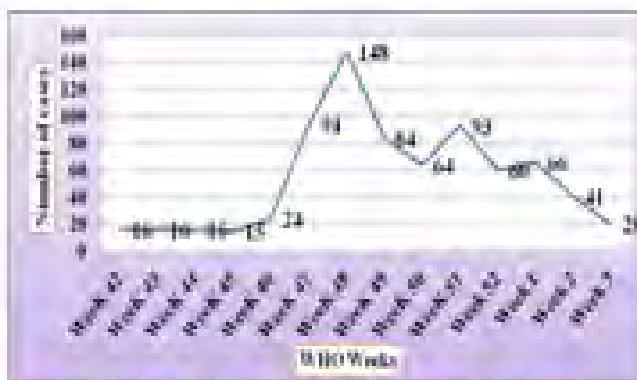


Figure 5: Trends of suspected measles cases by time, Oromia Region, week 48/2016 to week 2, January, 2017



Figure 6: Spot Map showing distribution of measles cases in affected zones and woredas, January 2017

4. Acute Flaccid Paralysis (AFP)

In this week, two suspected AFP cases were reported to the region from Mata Town of Ilu Aba Bora Zone (1) and Waga Tuka Woreda of East Wolloga Zone (1).

5. Malnutrition

In this week, a total of 1,472 new severely acute malnutrition (SAM) cases were reported to the region. Of the total cases, 115 (8%) of them were treated at stabilization center. SAM cases were increased by 77 (5.3%) as compared to week 2 (fig. 6), which might be due to report rate (completeness of week 2 (79%) and week 3 (90%)). Most of the cases were reported from East Hararge 271 (18.4%) followed by West Hararge 146 (10%), Bale 131 (8.9%), Guji 129 (8.7%), Jimma 123 (8%), West Shoa 119 (8%) and West Arsi 114 (7.7%) zones. Giraya 37 (21%), Bedeso 28 (10.3%) and Gola Oda 27 (10%) from East Hararge; Boba 21 (27%), Chico Balar 19 (24%) and Gemechie 18 (23%) Woredas from West Hararge Zone; Saraya 47 (36%) and Goro 27 (20.6%) from Bale Zone and Uruga 17 (13%) and Haro Walaba 16 (11.4%) from Guji zone were woredas that reported high case load.

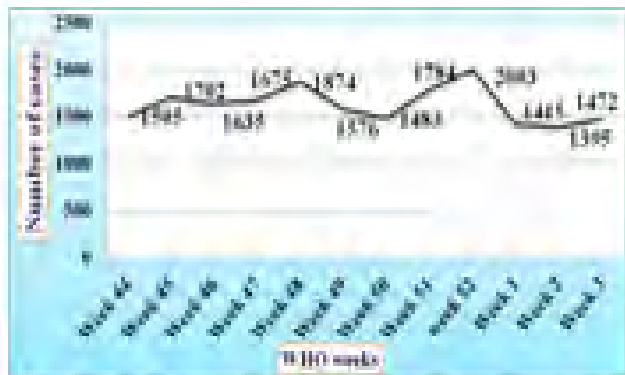


Fig 8: Trends of regional SAM cases by time, Oromia Region, week 49/2016 to week 3, January, 2017

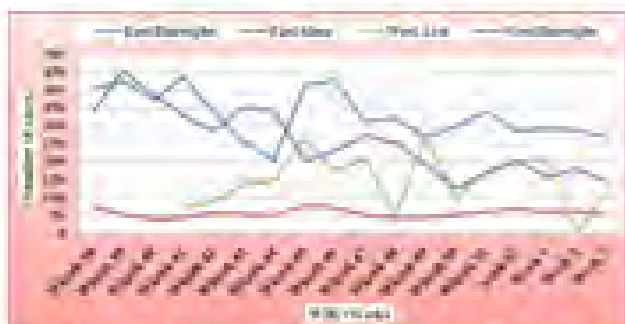


Fig 7: Trends of SAM cases of some selected zones, by WHO week, Oromia Region, January, 2017

6. Meningococcal Meningitis

In this week, a total of five suspected meningococcal meningitis cases were reported to the region from **Hop**, **Guji**, **Wollega** (2), **Jinna** Town (1) and **East Wollega** (1) Zone.

7. Anthrax

In this week, no suspected anthrax case was reported to the region.

8. Relapsing Fever

In this week, a total of nine relapsing fever cases were reported to the region. The cases were reported from **Ambo** Town (6), **Nedjo** Hospital (1) of **West Wollega** and **Saba Bora** Woredas of **Guji** Zone (2).

9. Maternal deaths

In this week, a total of ~~one~~ suspected maternal deaths were notified. **Darimu** of **Ibbahor** Zone; **St Jike** Hospital and **Tulu Bolo** Hospital of **South West Shoa** Zone; **Adaba**, **Dodola** Town and **Dodola** Rural of **West Arsi** Zone; **Ibat** and **Gudjer** Hospital of **West Shoa** Zone; **Chiro** Hospital of **West Hararge** Zone; **Jima** Town and **Robe** Town notified one suspected maternal death each.

10. Acute Watery Diarrhea (AWD) Cases

Regionally, since the occurrence of AWD outbreak, a total of 5,515 suspected cases were reported up to WHO week 3/2017; where 14 zones, 13 administrative towns and 114 districts have been affected, while 93 of them were declared as free from AWD outbreak and twelve districts report sporadically.

In this week, a total of 60 new AWD admissions were reported. Cases were reported from; **Berbera** (49), **D/Mena** (6) and **Goro** (3) Woredas of **Bale** Zone.

Map of Oromia Region showing AWD affected Zones, Woredas and towns.



Figure-8: Map of Oromia Region showing AWD affected Zones, Woredas and Towns, January 2017

11. Guinea Worm (GW)

In this week, no Guinea Worm case was reported.

12. West Nile Virus (WNV)

In this week, no suspected WNV case was reported.

13. Typhoid fever

In this week, a total of 1,765 suspected typhoid fever cases were reported to the region. The cases were decreased by 124 (2%) when compared to last week report. Most cases were reported from East Shoa, 476 (3.4%) and Kelem Wollega 392(6.9%) zones and Nekemte 428 (7.6%), and Jimma 382 (6.7%) towns.

14. Other cases

In this week, a total of 72 scabies, 3 dog bites and 7 animal bite cases were reported to region (table 2).

Table 2: Distribution other cases by reporting districts/ facilities in Oromia region, week 3, 2017

S.N	Zone	Woreda/Town	Other name	Other case
1	East Hararge	Bahik Town	Scabies	1
		Bodena	Scabies	2
		Chinkam	Scabies	7
		Midega	Scabies	62
2	H/G/W	Abe Dassen	Dog Bite	7
3	Jimma	Lima Hospital	Animal bite	2
		Gerna	Animal bite	1
Regional		Total Scabies cases		72
		Total Cases on Anti rabies prophylaxis		10

- AWD situation is being monitored by taking daily report from affected zones with active cases.
- AWD & Rota Virus outbreaks prevention and control activities have been underway in all active woredas by regional, zonal and woreda expertise.
- Health and nutrition taskforce meeting is conducted monthly with partners.
- Any rumors have been received, verified and risks have been communicated

IV. Response Activities

- Based on weekly surveillance report, feed-back is often given to all zones and towns timely.

I, the undersigned, declare that this is my original work and has never been presented by another person in this or any other University and that all the source materials and references used for this thesis have been duly acknowledged.

Name: **Getachew Demissie**

Signature: _____

Place: _____

Date of Submission: **June 7, 2017**

The thesis has been submitted for examination with my approval as a University advisor.

Name of advisor: **Prof. Ahmed Ali**

Signature: _____

Date: _____