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:

Dagnachew Alemu Hurissa

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, 2015

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Advisors:
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Approval by Examining Board

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List of abbreviations and acronym

AAU	Addis Ababa University
AFP	Acute Flaccid Paralysis
AR	Attack Rate
AFRO	African Region Organization
AHI	Avian Human Influenza
ART	Anti Retro Viral Therapy
BPR	Business Process Reengineering
CDC	Communicable Disease Control
CFR	Case Fatality Rate
CHWs	Community Health Workers
CSA	Central Statistical Agency
CSF	Cerebral Spinal Fluid
DHO	Woreda Health Office
DHS	Demographic and Health Survey
DNA	Deoxyribo Nucleic Acid
EFETP	Ethiopian Field Epidemiology Training Program
E.C	Ethiopian Calendar
EFY	Ethiopian Fiscal Year
EPHI	Ethiopian Public Health Institute
EPI	Expanded Program on Immunization
EPR	Emergency Preparedness and Response
EWRR	Early Warning Rapid Response
FMOH	Federal Ministry of Health

HC	Health Center
HEP	Health Extension Program
HEWs	Health Extension Workers
HFs	Health Facilities
HMIS	Health Management Information System
IDSRI	Integrated Diseases Surveillance and Response
IHR	International Health Regulation
IR	Incidence Rate
IRS	Indoor Residual Spray
ITN's	Insecticide Treated Nets
LLIN	Long Lasting Insecticide Treated Nets
MCV	Measles Containing Vaccine
MOH	Ministry of Health
NGO	Non-Governmental Organization
NNT	Neonatal Tetanus
ORHB	Oromia Regional Health Bureau
OR	Odds Ratio
ONGO	Other Non-Governmental Organization
PHE	Public Health Emergency
PHEM	Public Health Emergency Management
P.f	Plasmodium falciparum
PMTCT	Prevention of HIV from Mother to Child Transmission
P.v	Plasmodium vivax
RDTs	Rapid Diagnostic Tests

RF	Relapsing Fever
RHB	Regional Health Bureau
RRT	Rapid Response Team
SRS	Simple Random Sampling
UNICEF	United Nations Children's Emergency Fund
WHO	World Health Organization
ZHD	Zonal Health Department

Executive Summary

Ethiopia has been giving special attention to the control of epidemic prone diseases, of international concern and diseases on eradication and elimination programs, through surveillance activities. The role of public health practitioners include ensuring effective health promotion, disease prevention and control activities, conducting surveillance on emerging public health threats and providing pertinent information to policy makers and public health officials.

From October, 2012 to end of May, 2014 I have stayed in Field Epidemiology Training Program, School of Public Health-AAU and at both EPHI and Oromia Regional Health Bureau field base. We carried out two outbreak investigations, one surveillance data analysis, one evaluation of surveillance system, one woreda health profile description, three abstracts for scientific conference, one Maher assessment, one research proposal and training as outputs.

Chapter I: We conducted epidemiological investigations of two outbreaks. We used descriptive and analytic epidemiology during investigations. We identified several factors that contributed to malaria outbreak in Saba Boru Woreda and found that poor ITN utilization and presence of stagnant water were attributed for the outbreak. We recommended proper utilization of ITN and environmental management through optimized community participation. We also confirmed measles outbreak in Didesa Woreda. Being unvaccinated and having poor awareness on the mode of transmission for measles infection were found to be risk factors for developing the disease. We recommended improved routine and campaign measles immunization targeting less than 15 years, and also health education on means of transmissions, treatment and prevention of measles infection has to be enhanced.

Chapter II: We did measles surveillance data analysis of five years (2009-2013 G.C) of Borena Zone to describe by person, place and time. Less than five children was the most affected age group followed by 5-14 years. Enhancing improved routine and campaign measles immunization targeting less than 15 years of age would prevent future risk.

Chapter III: We conducted evaluation of surveillance system in Ilu Aba Bora Zone from June 10-30, 2013. The overall surveillance system of the zone was weak. 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.

Chapter VI: We did health profile, health and health related data, of Arsi Negele Woreda during January 10-18, 2014. Acute Febrile Illness, Pneumonia and Acute Upper Respiratory Tract Infection were leading causes of adult morbidity in the woreda. While Pneumonia, Diarrhea and Acute Febrile Illness were the leading causes of morbidity in under-five children.

Chapter V: We did scientific manuscript for peer reviewed journals on malaria outbreak in Saba Boru, Guji Zone.

Chapter VI: We prepared three abstracts for submission to scientific conference during residency time. These are;

- ✓ Outbreak of malaria-Seba Boru, Guji Zone Oromia Region, Ethiopia, 2014.
- ✓ Measles Outbreak-Didesa Woreda, Ilu Aba Bora Zone, Oromia Region, Ethiopia, 2013.
- ✓ Five years (2009-2013G.C) measles surveillance data analysis-Borena Zone, Oromia Region, Ethiopia, 2013.

Chapter VII: We conducted Meher assessment (Narrative summary of disaster situation) in Oromia Region to identify humanitarian needs in drought affected areas from November 22 to December 19, 2014 in selected woredas of East and West Harerghe Zones. Measles outbreaks were occurred in both zones. Malaria and measles are the most anticipated risk in the zones. Malnutrition was a major problem in all visited woredas.

Chapter VIII: We prepared one proposal for research project. The objective of this study is to characterize the pattern of, and assess factors related to LLIN distribution and uses in gold mining kebeles of Seba Boru Woreda. We designed retrospective cross-sectional community and facility study. The sample size will be calculated using the standard formula for multistage cluster sampling, $\mathbf{n= DEFF*Z^2pq/D^{2.}}$

Chapter IX: We conducted training for Woredas and zonal Public health Emergency management focal persons of two regions. The training was given to them in order to achieve effective disease surveillance system, improve case management and strengthen the surveillance of maternal death (MDSR) and Ebola in addition to the 20 priory diseases in both regions.

A total of 65 trainees were participated in this training from the two regions. Of the total, 42(64.6%) males and 23 (35.5%) females were participated and majority of them 48 (73.8%) were from zones of Oromia Region and the rest from woredas of Addis Ababa Region.

The training was completed with good discipline, full attendance and active participation of the participant as well as effective in addressing the objective. Based on the daily evaluation from the trainee, we recommended the EPHI and regional health bureaus have to prepare and share the standard reporting formats for the improvement of the reporting system, allocate some budget for cascading the training for the other health professionals and also try to select convenient training venue for the future or prepare common transport service instead. In addition, we also did weekly PHEM bulletin and malaria trend analysis of Oromia Region from January to August 2014.

Chapter–I

Outbreak Investigations

1.1 Measles Outbreak Investigation in Didesa Woreda of Ilu Aba Bora Zone, Oromia, Ethiopia, March 2014

Executive summary

Introduction:

Measles is a leading vaccine preventable contagious disease caused by a virus genus Morbilli. According to the official report, an outbreak of measles is occurring throughout the regions of Ethiopia. Didesa was one of the measles outbreak affected woreda in Oromia Region in 2014. We conducted this study to determine the magnitude of morbidity and mortality due to measles infection and risk factors associated with outbreak.

Methods:

We used descriptive cross-sectional followed by unmatched case-control study, 50 cases with 100 controls. We collected the data using measles line lists, observation of cold chain, key informant interviews and using structured questionnaires.

Results:

A total of 84 measles cases with no death were reported during the outbreak. The outbreak was confirmed for measles IgM antibody. The index case was in Mede-Misoma Kebele. Age specific attack rate was higher in age groups of 5-14 year (9.9/1000person). The overall attack rate was 5.8/1000person. Seventy percent of the cases were unvaccinated. Being vaccinated and having awareness on the mode of transmission for measles infection were protective factor for developing the disease and statically significant with OR 0.13 [95% CI = 0.05-0.37] and OR 0.33 [95%= 0.12-0.89] respectively. Case management, active case searching and health education was conducted during the outbreak.

Recommendations:

Improved routine and campaign measles immunization targeting less than 15 years, and health education on means of transmissions, treatment and prevention of measles infection should be enhanced.

1.1.1 Introduction

Measles is an acute, highly contagious viral disease caused by measles virus. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva [1]. Measles is one of the most contagious diseases known to man and often occurs in explosive epidemics. It usually does not kill children directly; however, as a result of its associated immune suppression, measles can lead to lethal complications, such as pneumonia, croup, and diarrhea. Measles can also lead to lifelong disabilities, including blindness, brain damage, and deafness [2].

The risk factors for measles virus infection include; infants who lose passive antibody before the age of routine immunization, children with vitamin A deficiency and immunodeficiency due to HIV or AIDS, leukemia, alkylating agents, or corticosteroid therapy, regardless of immunization status and children who travel to areas where measles is endemic or contact with travelers to endemic areas. Malnourished and young children are at higher risk of developing complications and mortality from measles infection. Malnutrition (including vitamin A deficiency), underlying immunodeficiency and lack of access to medical care are all factors leading to the high case-fatality rates observed in many parts of the world [1]**.**

Measles infection presents with a two to four day prodrome of fever, malaise, cough, and runny nose (coryza) prior to rash onset. Conjunctivitis and bronchitis are commonly present. Although there is no rash at disease onset, the patient is shedding virus and is highly contagious.

In Ethiopia, the current routine immunization schedules recommend a dose of measles vaccination at nine months of age [1]. All immunization programs should have a standard of getting an access for all children with two doses of measles containing vaccine (MCV). The second dose may be delivered through routine immunization or periodically mass campaign upon the strategies able to achieve high coverage [3]**.**

In WHO Africa Regions, the only effective preventive measure is vaccination with two doses of measles-containing vaccine, usually administered as a measles-mumps-rubella (MMR) vaccine. National vaccine uptake of at least 95% with two doses of MMR vaccine is considered to be necessary to achieve region-wide [4]. However, a vaccination uptake of below 95% of the population in several EU Member States has resulted in an accumulation of susceptible

individuals. Thus measles has re-emerged in the region that resulted in an outbreak in sub-groups of populations with low vaccine uptake and then spread to the general population [5].

The sero-conversion rate of measles vaccine at nine month of age is 85%, accordingly, even in regions where routine immunization coverage is high; some children from each birth cohort remain susceptible to measles. When large numbers of susceptible children accumulate over time, periodic outbreaks may occur in well vaccinated woredas [1]. The critical question in evaluation of the vaccine program, an observational studies, direct (cohort) and indirect (case-control), have played a crucial role in determining whether persisting disease is the result of vaccine failure or failure to vaccinate. Observational designs are useful when comparing vaccines with very large differences in effectiveness [2].

Global progress in the past decade against measles has resulted in the reduction of cases by 71 percent from an estimated 548,000 in 2000 to 158,000 in 2011 [6]. However more than 40,000 laboratory confirmed cases of measles were reported globally in 2011 [3].

Even though the nationally coverage of MCV have increased from 57% in 2001 to 84% in 2012, these outbreaks occurred in the AFRO region challenges to the recent successes against measles-mortality and to the goal of measles elimination. Comparatively, SIA coverage has remained at high levels, around 90%, over the years 1996–2012.

A large outbreak of measles involving around 1,700 cases occurred in South Africa between 2003 and 2005 following its introduction from Mozambique. And also there were an outbreak of measles from 2009-2011, with the highest incidence among infants: 61 per 10,000 (95% CI: 59.3–62.4). But, the incidence in children aged 10 to 14 years and in those aged 15 to 19 years was higher than in those aged 5 to 9 [9].

Kenya has reported an MCV1 coverage of 107% (5,995,049) in children targeted 9-59 months. Gabon has achieved 68% (168,749) in children targeted 6-59 months during 2012.

The WHO-UNICEF coverage estimates for measles vaccination in Ethiopia indicate an increase from 37% in 2000 to 66% in 2012 [1]. However, measles outbreaks continue to occur throughout the regions of Ethiopia. Measles vaccine coverage of the Didesa Woreda also ranges 69% - 104% from midyear 2009-2013 [10].

After the report of the measles outbreak from Didesa Woreda, team was deployed for investigation. The main aim of this outbreak investigation was to assess the magnitude and risk factor of measles infection in Didesa Woreda, Oromia Region, from 12/2/-17/3/2014 and make recommendations of the future.

1.1.2 Objectives

1.1.2.1 General objective

To assess the magnitude and risk factor of measles infection in Didesa Woreda, Oromia Region, from 12/2/-17/3/2014

1.1.2.2 Specific objectives

- To confirm the existence of measles outbreak
- To describe the magnitude of measles infection
- To determine the risk factors for the measles infection

1.1.3 Methods

1.1.3.1 Study area and period

Didesa Woreda is one of the 24 woredas of Illu Aba Bora Zone, Oromia Regional state. Administratively the woreda is divided in to 31 rural kebels and one town. The woreda has a total population of 103,952 (97448 Rural and 6504 Urban). It is located at a distance of 280 K.m from the Zonal town (Metu) and 420 from regional town (Addis Ababa). The affected kebele (villages) are under Doyo Health Post and located 55 km away from the town of Didesa Woreda (Gembi). The woreda shares boundaries with Limu Woreda of Jimma Zone to the east, Satam Woreda of Jimma Zone to West, Gume Woreda of Jimma Zone to south and Gechi and Borecha Woreda of Illu Aba Bora Zone to the north. The ethnic compositions of the woreda are 95% Oromo, 5% Amhara and others. Concerning religious composition, 98% is Muslim followers & the rest 2% are followers of other religions. The woreda has 27 health posts with 53 health extension workers currently deployed, one temporal clinic and three health centres currently on service. The physical health service coverage of the woreda is 128.5% by health center and 75% by health post. The study was conducted from 12 February 2014 to 17 March 2014 in four villages of the woreda.

1.1.3.2 Case definition

A *case* was any person who resided in Didesa Woreda with fever and maculopapular (nonvascular) generalized rash and developed any of the following symptoms; cough, coryza or conjunctivitis (red eyes) between 12 February 2014 and 17 March 2014.

A *control* was any person who resided in the same community or village with cases in Didesa Woreda who did not have history of signs and symptoms of measles between 12 February 2014 and 17 March 2014.

1.1.3.3 Inclusion criteria

Cases: Any residents of Didesa Woreda who had symptoms of measles and agreed to participate from 12 February 2014 and 17 March 2014.

Controls: Any residents of Didesa Woreda during the study who was a neighbor to a case and who did not develop signs and symptoms of measles and agreed to participate was included.

1.1.3.4 Exclusion criteria

Cases: Those who refused to participate or were unconscious were excluded.

Controls: Those who refused to participate as well as family members from the same house hold.

1.1.3.5 Study design

We used descriptive cross-sectional and case-control study design to identify the risk factors for the occurrence of measles infection.

1.1.3.6 Sampling method

The cases and controls were recruited by convenient sampling method irrespective of the variables.

1.1.3.7 Sample size

We used unmatched case-control sample size determination with a ratio of 1:2 for cases and controls.

The assumption taken from previous study indicates that, proportion of controls exposed was 50% with an OR of 0.35 and conventionally alpha level of 0.05 and beta of 0.20 for a power of 80% were used to calculate the sample size using the following formula.

$$n_1 = \frac{\left(Z_{\alpha/2} + Z_{1-\beta}\right)^2 \bar{p}\bar{q}(r+1)}{r(p_1 - p_2)^2} \qquad n_2 = r\,n_1$$

$$p_1 = \frac{p_2(OR)}{1 + [p_2(OR - 1)]} \qquad p_1 = p_2(RR)$$

$$\bar{p} = \frac{p_1 + rp_2}{r+1} \qquad q = 1 - p$$

$$p_1 = \frac{0.5 \times 0.35}{1 + [0.5(0.35 - 1)]} = \frac{0.175}{0.675} = 0.26$$

p2 = 0.50

$Z_{1-\alpha/2} = 1.96$

$Z_{1-\beta} = 0.84$

$$\bar{p} = \frac{0.26 + (2 \times 0.50)}{2 + 1} = \frac{1.26}{3} = 0.42 \qquad \bar{q} = 1 - 0.42 = 0.58$$

$$n_1 = \frac{(1.96 + 0.84)^2 \text{x } 0.42\text{x}0.58\ (2 + 1)}{2(0.26\text{-}0.50)^2}$$

$n_1 = 49.7 \approx 50$ $n_2 = 2(50) = 100$

1.1.3.8 Data collection tools and Methods

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 measles infection. The national measles guide line; national PHEM guide line and camera were fully available. The data was collected through face to face interview with the respondents (community), by reviewing the line list data in the health facility and properly registering the geographical location of individual households.

1.1.3.9 Variable specification

Dependent variable	Independent variables
▪ Measles infection	▪ Measles vaccination status ▪ Over-crowding ▪ Travel history ▪ Contact history ▪ Awareness on mode of transmission of measles infection ▪ Awareness on prevention/control of measles infection ▪ Nutritional status

1.1.3.10 Ethical consideration

The woreda health office has accepted for the investigation of measles outbreak through the formal letter of ORHB. All the respondents as well as the parents were well informed about the objectives of study and we got oral consent from them. And also, some of the respondents were voluntary to get their photographs through our camera after they have been informed fully.

1.1.4 Results

1.1.4.1 Descriptive epidemiology

The index case was female with nine years of age who neither vaccinated nor previously measles infected. She visited the adjacent woreda (Borecha) of Illu Aba Bora Zone during a wedding ceremony where there was an outbreak of measles one month before her onset of rash. The epidemic curve was a multi-peak with sharp rise and gradual fall that indicated a propagative type of outbreak.

1.1.4.1.1 Description of measles cases by time

The duration of measles outbreak was one month and four days with intermittent interventions across the kebeles where the cases were occurred.

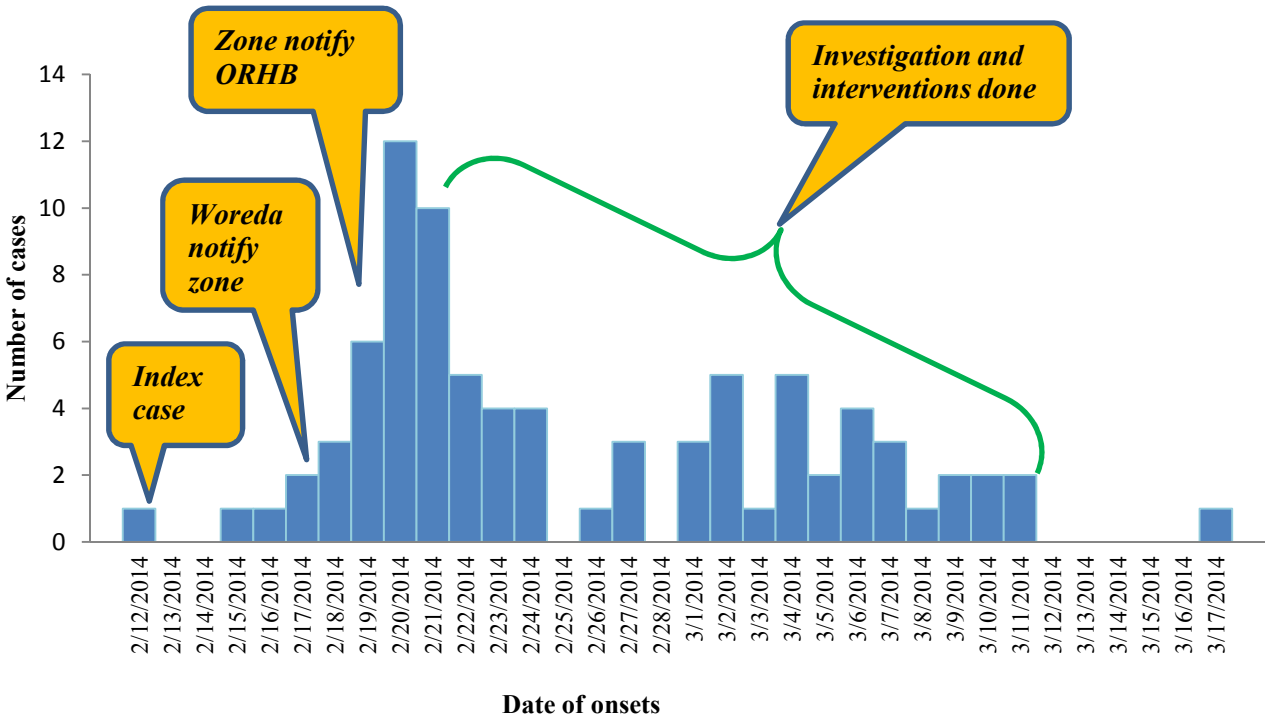

Figure 1.1.1: The date of onset of measles outbreak in Didesa Woreda, Oromia Region, Ethiopia from 12/2/-17/3/2014

1.1.4.1.2 Description of measles cases by place and person

Between 12 February 2014 and 17 March 2014, we detected a period prevalence of 5.8/1000(84) measles cases with 80% (4) laboratorically confirmed as positive through lab

confirmation. One was epidemiologically linked case in Dhidesa Woreda, Oromia Region. Majority of the cases were from Mede Misoma Kebele 58(69%) with the prevalence rate of 13.5 per 1000 population followed by Burka Jalela Kebele 16(19%), Degaga 5(6%), and Adis Alem Kebeles 5(6%) with the prevalence of 3.9, 1.8 and 1.6 per 1000 population respectively.

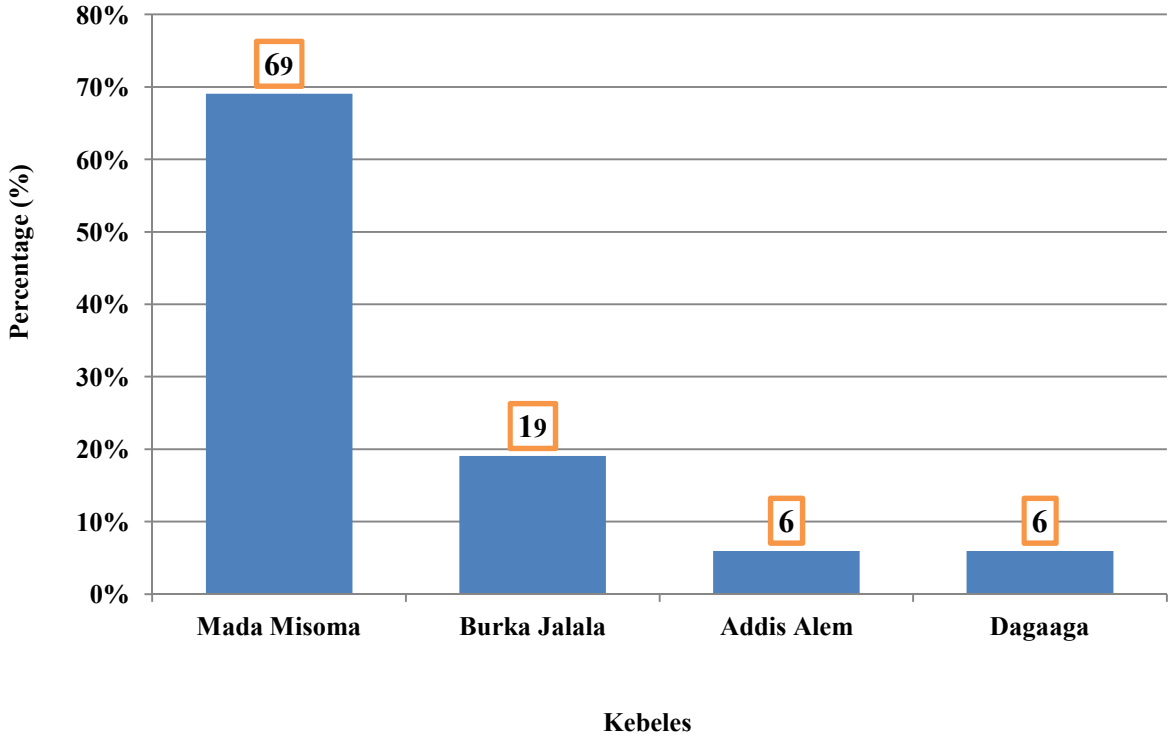

Figure 1.1.2: Distribution of measles cases by place in Didesa Woreda of Illu Aba Bora Zone, Oromia Region, Ethiopia from 12/2/-17/3/2014

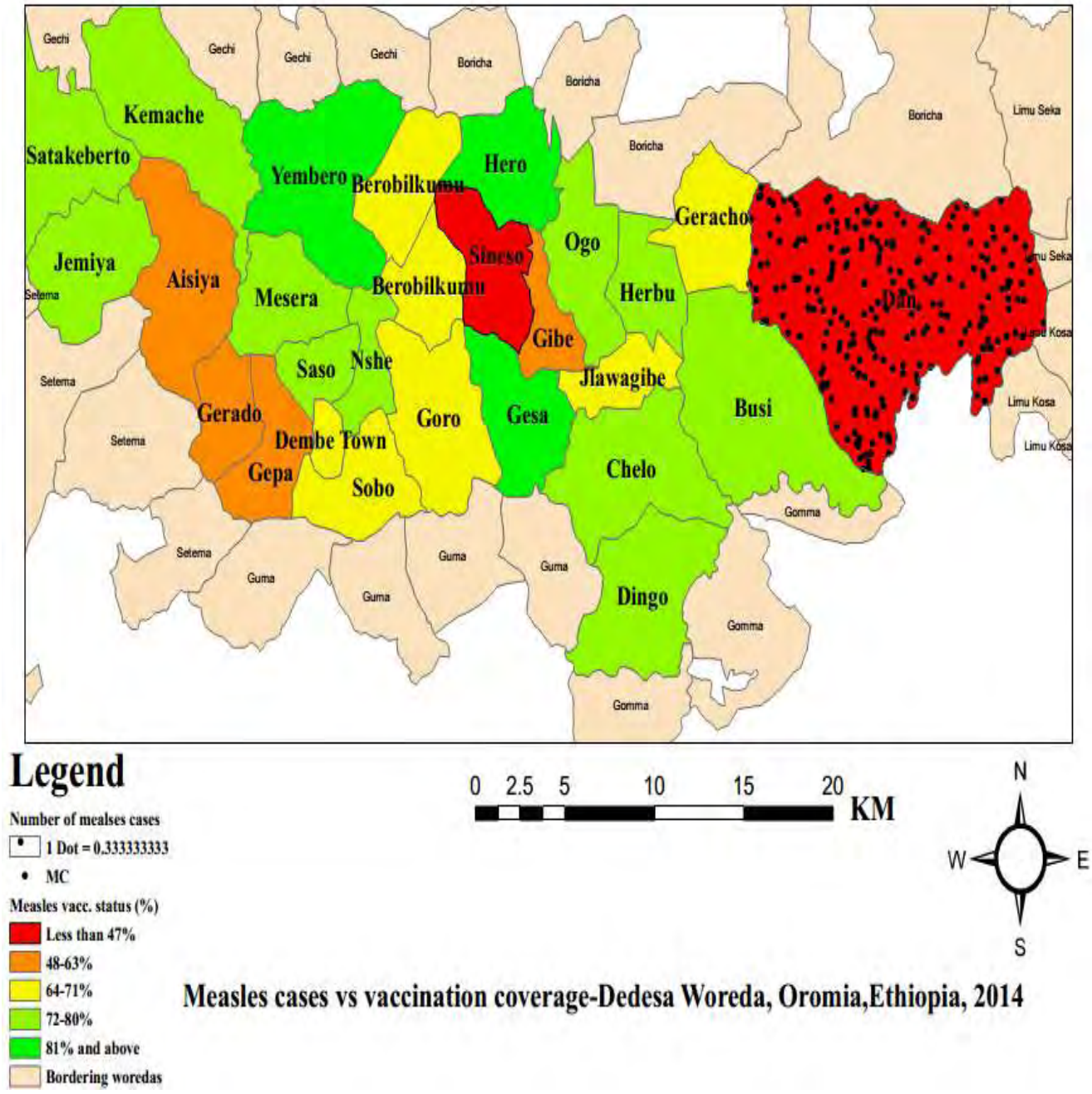

Figure 1.1.3: Measles cases vs vaccination coverage (three years)-Didesa Woreda, Oromia, Ethiopia, 2014

The proportion of cases was higher in males 64 (76.2%).

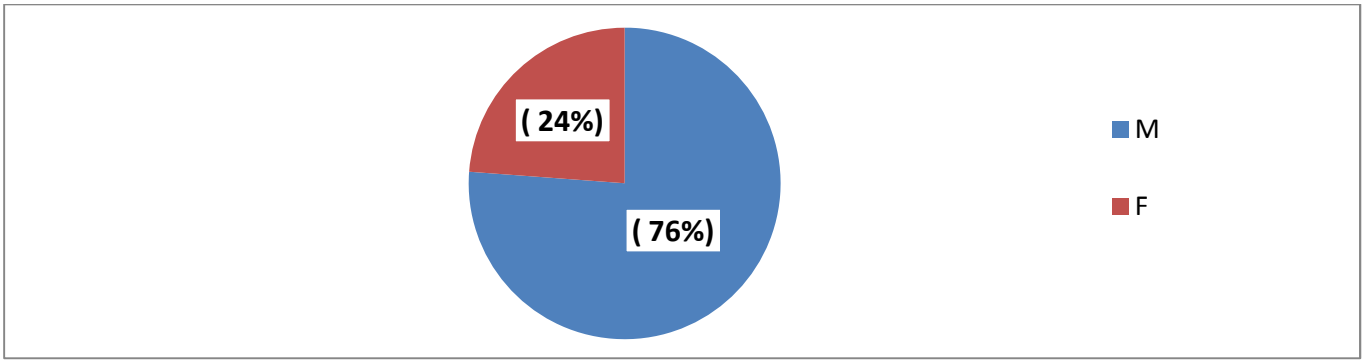

Figure 1.1.4: The proportions of cases by sex in Didesa Woreda, Ilu Aba Bora Zone of Oromia Region, Ethiopia from 12/2/-17/3/2014

The ASAR was higher in less than one year of age for Mede Misoma Kebele with 30/1000popn. However, there was no measles case in less than one year of age in the remaining three kebeles. From the total measles cases, ASAR was higher in age groups of 5-14 years in all kebeles that ranges from 1/1000 – 23.6/1000 populations.

Table.1: ASAR for measles infection among kebeles of Didesa Woreda, Oromia Region from 12/2/-17/3/2014

S. N	Name of kebeles	Total population	<1Yrs		1-4Yrs		5-14Yrs		>=15Yrs	
			No. cases	ASAR/ 1000	No. cases	ASAR/1 000	No. cases	ASAR/ 1000	No. cases	ASAR/ 1000
1	**Addis Alem**	2831	0	0	0	0	5	5.6	0	0
2	**Burka Jalela**	4142	0	0	1	1.8	13	9.9	2	0.9
3	**Degaga**	3142	0	0	0	0	1	1	4	2.4
4	**Mede misoma**	4297	4	30	7	12.2	32	23.6	15	6.7
Total		**14412**	**4**	**9**	**8**	**4.2**	**51**	**11.2**	**21**	**2.8**

Of the total measles cases included in the case control study, 35(70%) of the cases were unvaccinated against measles, 11 (22%) of the cases received only one dose and one (2%) of the cases received two or more doses. The vaccination status of three (6%) measles case was unknown.

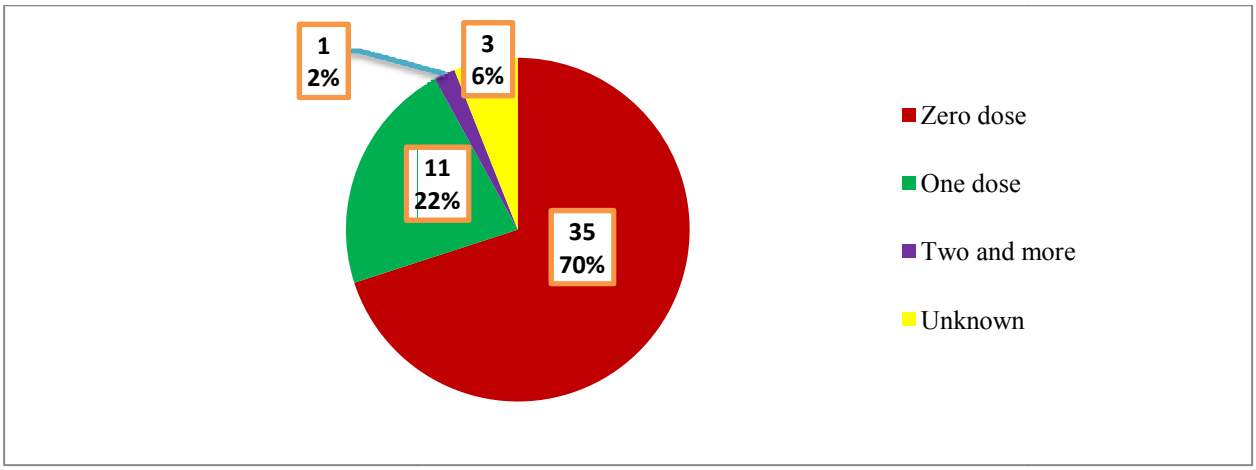

Figure 1.1.5: Vaccination status of measles cases in Ilu Aba Bora Zone, Oromia, 2014

It was reported that few households living in the woreda were settled population which were displaced from different regions and most of them were not willing to take vaccine due to poor health seeking behavior and cultural influence towards modern medicine.

1.1.4.2 Analytic epidemiology

A total of 50 cases and 100 controls were selected from the community to identify the risk factors for measles outbreak in affected kebeles of the Didesa Woredas, Ilu Aba Bora Zone. The median age of the participants was nine year. All measles cases had a history of rash and fever, 64 % had conjunctivitis, 96% had cough, 44% diarrhea, and 4% had lower respiratory infections (pneumonia). The socio- demographic characteristics of the study participants and risk factors for measles outbreak were described in table below.

Table 1.1.1: Demographic characteristics of measles case and controls in Didesa Woreda, Oromia Region, Ilu Aba Bora Zone, Ethiopia, from 12/2/-17/3/2014

S.N	Variables		Case No (%)	Control No (%)
1	Age	<1yrs	4(8)	2(2)
		1-4yrs	5(10)	22(22)
		5-14yrs and above	34(68)	65(65)
2	Family size	<5 persons/HH	5(10)	14(14)

S.N	Variables		Case No (%)	Control No (%)
		>5 persons/HH	45(90)	86(86)
		Married	1(2)	0(0)
3	Marital status of the patient	Not Applicable	36(72)	89(89)
		Single	13(26)	11(11)
		Muslim	49(98	89(89)
4	Religion	Orthodox	1(2)	11(11)
		Farmer	1(2)	8(8)
		House Wife	1(2)	0(0)
5	Occupation of the patient	Not Applicable	17(47)	47(47)
		Student	31(62)	42(42)
		Unemployed	0(0)	3(3)
6	Occupation of the families	Farmer	50(100)	100(100)

Table 1.1.2: Bivariate analysis of measles outbreaks in Didesa Woreda, Ilu Aba Bora Zone, Oromia Region, Ethiopia from 12/2/-17/3/2014

S.N	Variables		Cases No (%)	Control No (%)	Crude OR (95%CI)	P-Value
1	Being vaccinated	Yes	12(24)	56(56)	0.25(0.12-0.53)	0.0002
		No	38(76)	44(44)		
2	Knowledge on mode of transmission	yes	17(34)	58(58)	0.37(0.184-0.76)	0.009
		No	33(66)	42(42)		
3	Contact with a case	yes	42(84)	27(27)	14.19(5.91-34.07)	< 0.0001
		No	8(16)	73(73)		
4	History of travel prior to two weeks of onset	yes	13(26)	4(4)	8.43(2.58-27.53)	0.0001
		No	37(74)	96(96)		
5	Nutritional status	Normal	32(64)	85(85)	3.19(1.44-7.07)	0.003

		Moderate	18(36)	15(15)		
6	Over-crowding (average sleeping area/number of peoples sleep)	>5m2	1(2)	2(2)	1(0.09-11.30)	1.00
		<5m2	49(98)	99(98)		
7	Educational level of the patient	Literate	46(92)	79(79)	3.06(0.99-9.46)	0.04
		Illiterate	4(8)	21(21)		
8	Educational level of the family	Literate	3(6)	0(0)	Undefined	0.013
		Illiterate	47(94)	100(100)		
9	Sex	Male	32(64)	56(56)	1.40(0.69-2.81)	0.35
		Female	18(36)	44(44)		

By multivariate analysis, being vaccinated and awareness about the mode of transmission for measles infection were a protective factor for developing the disease and statistically significant with an odd ratio (OR) of 0.13[95% CI = 0.05-0.37, P= 0.0001] and 0.33[95%= 0.12-0.89, P= 0.029] respectively. In addition to this, contact with a measles cases and history of travelling prior to two weeks of onset were risk factor for developing the diseases and statistically significant with an OR of 15.39[95%CI= 5.46-43.39, P<0.0001] and 8.04[95%CI=1.79-35.94, P=0.064] respectively.

Table 1.1.3: Bivariate vs multivariate analysis of independent factor associated with measles outbreak among cases and controls of Didesa Woreda, Oromia Region, from 12/2/-17/3/2014

S.N	Risk factors	Crude OR(95%CI)	Adjusted OR(95%CI)	Adjusted P-Value
1	Being vaccinated	0.25(0.12-0.53)	0.13(0.05-0.37)	0.0001
2	Awareness on measles	0.373(0.184-0.76)	0.33(0.12-0.89)	0.029
3	Contact with a case	14.19(5.91-34.07)	15.39(5.46-43.39)	<0.0001
4	Travel history	8.43(2.58-27.53)	8.04(1.79-35.94)	0.0064

1.1.4.3 Laboratory result of the outbreak

Five blood samples were collected from patients in Didesa Woreda of Ilu Aba Bora Zone, in the period 12/2/-17/3/2014 and sent to the EHNRI for confirmation. Four specimens were tested positive for measles IgM and the fifth was an epidemiologically linked case during the specified outbreak period. Hence, based on the result of the laboratory test in the woreda, typical measles clinical manifestation and epidemiologically linked with laboratory confirmed cases, the outbreak was confirmed and cases were treated as measles.

1.1.5 Interventions taken

We (the investigation team) identified and characterized the measles outbreak. Technical assistance was given for health workers on case management, recording and reporting situation. Cases were treated to prevent further spread and reduce morbidity and mortality attributed to measles using medications (Anti biotic, ORS, TTC, Vitamin A) both at house hold and health facility level. Routine surveillance was enhanced and the situation was closely followed at each level on a daily bases. We gave health education for the community members and students in areas where the community are mostly assembled like, church, schools, holy water, local meetings as well as at house hold level while searching for active cases to prevent the transmission of the disease, motivate health seeking behavior and treatment if there is sign and symptoms of measles. The zone has started closely working with the affected and the entire neighboring woredas to prevent/control the outbreak from spreading to other areas, and alarming the community, health extension worker and community leader to strength the local surveillance system. In addition active surveillance has been conducted in neighboring kebeles of the woreda. The measles vaccination coverage within the specific kebeles was reviewed and bordering villages with low vaccination coverage were vaccinated.

1.1.6 Discussion

According to the national measles guide line, three or more laboratoty confirmed cases were needed to declare an outbreak of measles. Therefore, we confirmed the existence of measles outbreak with a prevalence of 5.8/1000(84) and 80% IgM positive among a total of five clinically measles suspected cases in Didesa Woreda from 12/2/-17/3/2014. As a woreda, the prevalence was higher as compared to the national health policy of Ethiopian Federal Ministry of Health (EFMoH) that targeted as one measles case per 1000persons. However, it was near the same as compared to the outbreak of measles occurred in South Africa with an incidence of 6.1/1000 for infants from 2009-2011, and the attack rate reported in Rural India, 6.2 per 1000persons. The ASAR was higher in the age groups 5-14 followed by under one years of age. This coincides with the measles outbreak investigated in South Africa that lied majority of the cases were infants and children aged 10-19 years.

When children are correctly administered 0.5 ml of potent live attenuated measles vaccine subcutaneously serologic, studies have demonstrated that measles vaccines induce seroconverion of 85% at 9 months and above 95% after 12 months of age [2, 5, 11]**.**

As multivariate analysis of this Didesa Woreda outbreak investigation shows, being vaccinated for measles infection were protective factor for developing the disease and statically significant with an odd ratio (OR) of 0.13[95% CI = 0.05-0.37, P= 0.0001], which is similar with the study done in Dhaka, Bangladesh and there was a significant difference between vaccinated and unvaccinated groups with OR 0.06 [95% CI=0.02-0.16] [12].

To prevent measles outbreaks or interrupt transmission and hence eliminate measles, 95 % population immunity is needed [1, 6]. In Didesa Woreda measles vaccine coverage was 80% at the end of 2013, which is not enough to develop herd immunity in the community and prevent an outbreak. In this outbreak 36 (72%) of measles case was unvaccinated against measles [10]. Therefore, the occurrence of this outbreak may be due to the presence of susceptible persons for measles infection in 2014.

The cold chain management of zonal health department was good (refrigerator monitored regularly as per standard) while that of the Didesa Woreda health offices for drug and vaccine storage was very poor (refrigerator was not monitored regularly and even might be off on weekends). Most of the time, the woreda health office used the cold box as vaccine storage for

more than three days due to electric problem. There was also a problem during vaccine transportation from DHO to different health facility. Current Federal Ministry of Health guidelines recommends measles vaccine to be stored at negative 20^0_C at the centre/national level and between 2-8^0_C at health facility and woreda level. Appropriate cold chain is necessary to maintain the efficacy of vaccines and immunization may not produce protection if the vaccine is stored in inappropriate cold chain. Therefore, this poor cold chain management of the woreda can resulted in loss of vaccine potency and might contribute for the occurrence of the outbreak.

In multivariate analysis, having awareness on modes of transmission and prevention of measles infection were a protective factor for developing the disease and statistically significant. Few households living in the woreda were settled population which was displaced from different regions. There were some households that think as a modern medicine aggravates the diseases and links its means of communication with some cultural beliefs so that not willing to take vaccine and have poor health seeking behavior as well as negative attitude towards modern medicine. This may be due to poor awareness on immunization, diseases characteristics and different cultural influences.

This all factors might contribute to the occurrence of measles outbreak in Didesa Woreda. As a response of an outbreak, cases were treated to prevent further spread; and reduce morbidity and mortality attributed to measles. Ongoing active febrile-rash illness surveillance was enhanced and continued in the community by HEWs and the situation was closely followed at each level on a daily bases. Health education was given for the community members of the affected and adjacent kebeles on the mode of transmission, treatment, prevention methods, to enhance their health seeking behavior.

1.1.7 Limitation

Absence or/and incompleteness of some data.

1.1.8 Conclusions and recommendations

Children aged 5-14 and under one years of age were the most affected segment of the population. Therefore, children less than 15 years should be targeted for the campaign by the woredas, zonal and regional organs to improve vaccination coverage with special attention to displaced population in affected villages. In addition the woreda health office has to improve routine

immunization in the population in collaboration with stakeholders to prevent spread of an outbreak and occurrence of further outbreak in the woreda as soon as possible.

The cold chain management of zonal health department was good while that of the Didesa Woreda health offices was very poor. The woreda health office used the cold box as vaccine storage for more than expected days or stores inappropriately. The DHO also didn't monitor and follow the temperature regularly. Therefore, regular training and refresher courses should be organized on EPI (cold chain management) and surveillance to improve health staff's knowledge of the cold chain management of vaccine and surveillance system (periodic and continuous reporting). Both ZHD and WHO has to conduct periodic supportive supervision and reviews of all surveillance and cold chain management in all health facilities. Woreda health office has to provide kerosene for refrigerator particularly for those health facilities far from woreda health offices. In addition zonal and regional organs have to discuss and give an immediate solution for illegal settlers in Didesa Woreda concerning health services, like EPI and other issues.

There were some households that think as a modern medicine aggravates the diseases and links its means of communication with some cultural beliefs so that not willing to take vaccine and have poor health seeking behavior as well as negative attitude towards modern medicine. Therefore, health extension workers has to improve health seeking behavior of the community through awareness creation toward modern treatment, characteristics of measles infection and the important of vaccine preventable disease in collaboration with traditional healers and religious leaders.

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1.2 Malaria Outbreak Investigation in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia, Ethiopia, September 2014

Abstract

Introduction: In Ethiopia, malaria is highly seasonal in many communities but may have nearly unstable in other areas with epidemic-prone transmission pattern. A malaria outbreak was reported in Seba Boru and Melka Soda Woredas of Guji and Borena Zones in Oromia, Ethiopia in September 2014. The aim of this study was to describe the magnitude of morbidity and mortality caused by the outbreak, investigate factors that contributed to the occurrence of the epidemics and to institute appropriate intervention measures to contain the epidemics in the woreda.

Method: We used microscopic and RDT laboratory investigation to confirm the disease. We reviewed the previous year's malaria data to establish a threshold level and to understand the trends of the disease. The magnitude of the disease was described by person, place and time. We conducted an unmatched case-control study with 100 randomly selected cases and 100 community controls.

Result: Among the total of 915 suspected cases, 549 (60%) confirmed malaria cases. The attack rate was 23.2 per 1000) and three malaria related deaths were reported during September 2014. Slide positivity rate was 65.4%. Person age 15 years and older were most affected with an attack rate of 28.4%. Using of Insecticide Treated Bed Net (ITN) were found to be protective factor and statistically significant with OR of 0.17[95% CI= 0.06-0.51]. Presence of stagnant water for mosquito breeding in less than 500-1000 was associated with malaria outbreak and statistically significant with an OR of 8.18[95% CI= 4.05-16.53].

Conclusion: Poor ITN utilization and presence of stagnant water were attributed for the outbreak. We recommended proper utilization of ITN and environmental management through optimized community participation.

1.2.1 Introduction

Malaria is mosquito-borne parasitic disease and one of the most serious health problems of human beings. It causes 300 million to 500 million episodes of acute illness and 1.2 million deaths per year globally[1]. Malaria is known to kill one child every 30 seconds, 3000 under five children per day and is affecting over 100 countries of tropical and subtropical regions of the world [2].

It is also a major public health problem in Ethiopia and has been consistently reported as one of the three leading causes of morbidity and mortality. *Plasmodium falciparum* and *P. vivax* are the two dominant parasite species causing malaria in Ethiopia, with relative frequencies of about 60% and 40%, respectively. This proportion varies from place to place and from season to season. *P. falciparum* is the dominant parasite species in malaria epidemic situations, and this species causes severe and complicated manifestations and almost all malaria deaths. *P. falciparum* has a remarkable biological diversity including an ability to develop resistance rapidly to a number of anti-malarial drugs, creating a major challenge in providing patients with this infection with effective malaria chemotherapy [3].

Since 1958, major epidemics of malaria have occurred at approximately five to eight year intervals, though recently there has been a trend towards smaller-scale, more frequent, sporadic epidemics and seasonal case build ups. In 1998, a widespread severe malaria epidemic occurred in most highland as well as lowland areas in Ethiopia. Many localized but severe outbreaks of malaria occurred in Amhara and SNNP Regional States, leading to widespread epidemic malaria in highland and highland fringe areas (up to 2,500 meters) in 2003 [3, 4].

Malaria epidemics can occur as a result of variability or changes in the rate of infection and population immunity. Generally epidemics occur in places where there is low and unstable malaria transmission, and where people have low or no immunity. However, there could be epidemics in high transmission areas if there is deterioration of health system, interruption of anti-malarial measures or migration of non-immune individuals, such as population movement in search of labor to these areas. Other triggering factors include: Unusual local weather phenomena and activities resulting in environmental modification that increase vector population; increased vulnerability of population from famine and malnutrition; Interruptions of anti-malarial measures which have kept malaria under control [3, 5].

Conventionally in areas of high-endemicity, prevalence of malaria infection is known to peak at an early age with an increase up to the age of 5 years; followed by a sharp fall in age groups 10-15 years and continuing on a slow decline with increasing age. This pattern of prevalence is a reflection of the age-related state of anti-malaria immunity that is developed as a result of repeated malaria infections under established malaria endemicity [6].

Oromiya is one of the region prone for malaria epidemic in the country. Among 304 woredas, 75 of them were identified as hot spot area for malaria disease. More than 23 million population of the region are living in risk area for malaria infection. In Oromiya region malaria occurs in epidemic forms from September to December and peaking in October and November [7].

Recently, the occurrence of malaria epidemics has become more common in Oromia Regional State due to environmental and climatological factors that include chloroquine-resistant falciparum malaria, high population movements and the expansion of agro-industrial developments and irrigation schemes in malarious areas [8].

Malaria is the most common disease in Guji Zone with frequent occurrence of epidemics both in the past and present. The transmission is seasonal and normally peaks during September to December after the summer rainy season. Although not well documented, malaria epidemics of varying degree had affected Seba Boru Woreda (formerly under Shakiso) during 1997-99 [8].

For 44% of the woredas in Guji Zone, the climatic condition for most places is temperate and low land. The ample annual rain fall in most places was above 2000m. Saba Boru Woreda is the first malaria reporting woredas in the zone, which is located between 1500-2000m above sea level and represents the most malaria epidemic-prone area of Guji Zone. All kebeles 100% (24 kebeles) of Seba Boru Woreda are malarious with 117,889 (100%) populations are at risk for malaria. In 2006 EFY, about 7,523 suspected cases were examined by RDT or microscopy for malaria. Of which, 2,364 (31.4%) of cases were positive and treated for malaria in the woreda.

There was a normal trend of malaria cases in Seba Boru and Melka Soda Woredas during the last 15 years [8]. In September of 2014, unusual increment of malaria cases was reported from Seba Bore and Melka Soda Woredas, Guji and Borena Zones, Oromia Region. After having this, team was deployed to this woredas and investigated the outbreak.

1.2.2 Objectives

1.2.2.1 General objective

To describe the magnitude of morbidity and mortality due to malaria epidemic and to investigate factors associated with the epidemics in Saba Boru Woreda, Guji Zone and Melka Soda Woreda, Borena Zone, Oromia, September 2014.

1.2.2.2 Specific objectives

- To verify existence of malaria epidemic in Seba Boru and Melka Soda Woredas
- To describe malaria cases by persons, place, and time
- To identify malaria species that causes epidemic in the woredas
- To determine risk factors that associated with malaria epidemic in woredas

1.2.3 Methods

1.2.3.1 Study area

We conducted the study in Saba Boru Woreda of Guji Zone and Melka Soda Woreda of Borena Zone in Oromia Regional state. Saba Boru and Melka Soda Woredas have an estimated area covering 396.43 and 287.26 km^2 respectively. The projected populations of Saba Boru and Melka Soda Woredas for the 2014 were 119,166 and 72,691 making the population density of 301 and 253 per km^2 respectively. Of the total population there were 19,543 under five children and 4,051 pregnant women in Saba Boru Woreda and 1,192 under five children and 15,144 pregnant women in Melka Soda Woreda. Saba Boru Woreda is further subdivided in to 22 rural and two urban kebeles where as Melka Soda has 12 rural kebeles and two towns. Both woredas have two geo climatic zones, Weinadega (Mid-land 2000-2500m altitude) which constitutes 45% and kola (low land <2000m) accounts for the remaining 55%. The Saba Boru's larger town is Derme which is located 207 kms away from zonal town (Negele Borena) and 600 kms to the south from Addis Ababa and that of Melka Soda Woreda is Melka Soda Town which is also located 165kms away from zonal town (Yabelo) and 532kms to the south away from Adiss Ababa. Saba Boru Woreda shares border with Goro Dola Woreda in North, Shakiso Woreda in East, Arero Woreda of Borena Zone in South and Melka Soda Woreda of Borena Zone and Shakiso Woreda in West where as Melka Soda Woreda shares with Kercha Woreda in North, Saba Boru Woreda in East, Arero Woreda in South and Dugde Dawa Woreda in West. Majority of the populations in both woredas were Oromo ethnic (79%), and Muslim (74%) was the predominant religion in Saba Boru and '*Wakefeta*' in Melka Soda (68%). About 86.5% of populations were engaged in agricultural activities in Saba Boru and 74% in Melka Soda. There are six health centers and 22 health posts in Saba Boru with potential health service coverage of 75% where as three health centers and 13 health posts with health service coverage of 80% in that of Melka Soda Woreda. All the populations of both woredas were living in malarious areas. Insecticide Treated Bed Nets (ITNs) were not distributed to households in the last three years as well as Indoor Residual Spray (IRS) was also not applied prior to the occurrence of the outbreak in all kebeles of both woredas. But both ITN distribution and IRS were held as intervention measures during the outbreak.

1.2.3.2 Study period:

The study was conducted from September 18 to October 2/2014.

1.2.3.3 Study design

1.2.3.3.1 Descriptive epidemiology

Malaria was defined and identified as acute febrile illness with blood smear positive for malaria in Seba Boru Woreda during this outbreak. We reviewed the previous five years data of malaria from Seba Boru Woreda health office and health facility. However, due to incompleteness of the previous five years data, last year's (2006 EFY) weekly malaria cases report was used to set epidemic threshold level by doubling weekly data and comparing with similar week of this year. During this outbreak investigation, the number of malaria cases and deaths were collected from health facilities on daily and weekly basis. Magnitude of this outbreak was described by age, sex, kebele/health facility, week, month and year. Similarly, slide positivity rate was calculated as those positive for malaria among total examined.

1.2.3.3.2 Analytical epidemiology

An un-matched case-control study was conducted to identify risk factors associated with the disease from September 18 to October 2/2014. Community controls were selected for recently (not more than two weeks before interview) confirmed malaria case patients in 1:1 ratio basis. Controls were defined as having no malaria signs and symptoms for the last three months. During this investigation a standard checklist was used to assess risk factors including sleeping and staying area during night, use of insecticide bed net, indoor residual spray, and presence of stagnant water or any other mosquito breeding area. Microsoft Excel and Epi Info version 7.3.1 was used to describe the disease and analyze associated risk factors. The significance of risk factors for the outbreak was determined through multivariate analysis by calculating Odds Ratio (OR) and 95% Confidence Interval (CI).

1.2.3.4 Laboratory method

Laboratory technicians had conducted thick and thin smears with a 100 × oil immersion microscopy at Dawa Health Center of Saba Bore Woreda. Additionally, RDT (Rapid Diagnostic Test) were also used in this health center whenever they faced shortage of some reagents and

during interruption electric power. Health extension workers also used RDT to identify confirmed malaria cases at health post and Community level during outbreak investigation.

1.2.3.5 Environmental assessment

Data was collected on the presence of mosquito breeding sites from the woreda health office and health facilities. Selected case-patients and controls were interviewed about presence of mosquito breeding sites in their compound and near to home within 500 meters or less than it. These sites include unprotected surface water, open deep well, solid and liquid waste collection and disposal facility. In addition, availability of uncovered plastic water container, old tires and broken glasses in the home or outside the home were also critically assessed. Similarly, observation of these potential mosquito breeding sites and presence of anopheles larvae in stagnant water was conducted.

1.2.3.6 Data collection

Data was collected by using strctured qustinnare, discussing with relevant bodies (task force), review of weekly IDSR at different level (zone health department, woreda health office and Health facilities), visit of the affected kebeles and interview the community members (patients) about knowledge of malaria transmission and control measure. Both RDT and Microscopic laboratory diagnosis were performed.

1.2.3.7 Data processing and analysis

We intered the data in to Excel spredsheet then inported to Epi-info statical soft ware version 7.3.1 and analysed for identifing association of some risk factors.

1.2.3.8 Data dissemination

We prepared written report of soft copies and shared to Addis Ababa University/School of Public Health, Oromia Regional Health Bureau, Guji Zone health department, Saba Boru Woreda health office, EPHI, EPHA and EFETP mentors, resident advisors and coordinator.

1.2.3.9 Data quality control

We used line list for describing malaria cases interms of time, place and person. However, all data completeness were checked before analysis.

1.2.3.10 Case definitions

1.2.3.10.1 Community case definition

Any person with fever OR fever with headache, back pain, chills, rigor, sweating, muscle pain, nausea and vomiting OR suspected case confirmed by RDT.

1.2.3.10.2 Standard case definition

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

Suspected: Patient with fever or history of fever in the last 48 hours and lives in malaria endemic areas or has history of travel within the past 30 days to malaria-endemic areas.

Probable: Any person with fever and one or more of major sign such as headache, rigor, back pain, chills, sweats, myalgia, nausea, and vomiting diagnosed clinically as malaria.

Confirmed: Any suspected case that confirmed by microscopy or RDT for plasmodium parasites.

1.2.4 Results

1.2.4.1 Description of malaria cases by person

Of the total 915 suspected malaria cases, 547 (59.8%) were males. Among the total suspected cases, 675 (73.8%) were from Saba Boru Woreda and 240 (26.2%) were from Melka Soda. The median age of suspected malaria cases were 19 years old (*range- One month to 80 year*). Proportion of suspected malaria cases was higher among males than females.

Table 1.2.1: Distribution of suspected malaria cases tested by RDT and microscopy by age and sex in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, September 1st to 26th, 2014

Characteristics	Frequency	Percent
Sex		
Male	547	59.8
Female	368	40.2
Total	**915**	**100.0**
Age group		
0-4	150	16.4
5-14	179	19.6
15-44	530	57.9
45+	56	6.1
Total	**915**	**100.0**

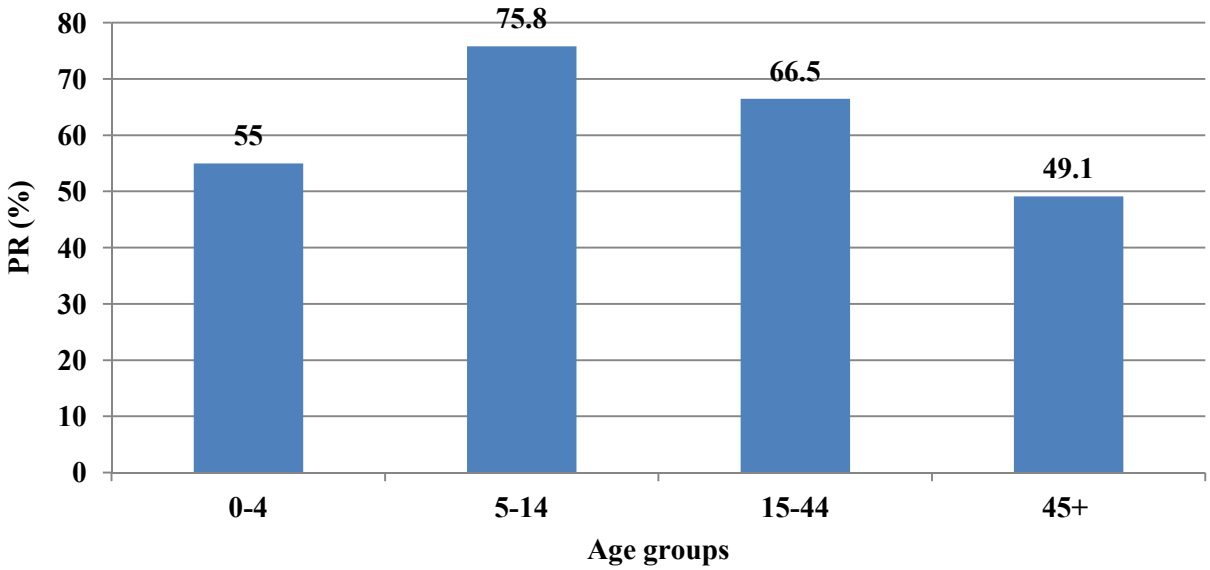

Figure 1.2.1: Positivity Rate (PR) of malaria cases by age group in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, September 1st to 26th, 2014

The over all positivity rate (PR) of this outbreak was 65.4%. The highest and lowest positivity rate was reported in the age 5-14 (75.8%) and above 45 years (49.1%) respectively (Fig-1.2.1).

Table 1.2.2: Distribution of malaria cases by age, sex and plasmodium species in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, September 1s^{t} to 26th, 2014

Characteristics	Total tested (RDT & Micro)	Total positive	PR (%)	Plasmodium species		
				P.f, n (%)	P.v, n (%)	Mixed, n (%)
Sex						
Male	546	376	68.9	182(61.5)	67(60.4)	127(67.9)
Female	362	218	60.2	114(38.5)	44(39.6)	60(32.1)
Age group						
0-4	149	82	55.0	39(13.2)	19(17.1)	24(12.8)
5-14	178	135	75.8	63(21.3)	28(25.2)	44(23.5)
15-44	526	350	66.5	176(59.5)	59(53.2)	115(61.5)
45+	55	27	49.1	18(6.1)	5(4.5)	4(2.1)
Total	**908**	**594**	**65.4**	**296**	**111**	**187**

Among the total malaria suspected cases (915), 908 (99.2%) of them were examined by RDT/Microscopy and 7(0.8%) were treated clinically. Of the total examined, 594 were positive for malaria with the overall positivity rate of 65.4%. Of the total positive cases, plasmodium falciparum accounts for 49.8% followed by mixed infection (31.5%).

Table 1.2.3: Malaria Attack Rate per 1000 and Case Fatality Ratio by age and sex, Seba Boru and Melka Soda Woredas, Guji and Borena Zones, September 1st to 26th, 2014

Variables	Population	Number of Cases	Number of deaths	Attack Rate per 1000	Case Fatality Ratio (%)
Age					
0-4	4,192	82	0	19.6	0
5-14	8,078	135	0	16.7	0
>15	13,294	377	0	28.4	0
Sex					
Male	12,654	376	0	29.7	0
Female	12,910	218	0	16.9	0
Total	**25,564**	**594**	**0**	**23.2**	**0**

1.2.4.2

The overall attack rate was 23.2 per 1000popn with a CFR of zero. Age group above 15 years was the most affected with an AR of 28.4 per 1000popn followed by under five years which accounts 19.6 per 1000popn. Males were more affected than females with an AR of 29.7 per 1000popon.

1.2.4.3 Description of malaria cases by place

Malaria epidemic was detected & reported to Guji Zone health department on August 25th, of 2014. Among the total cases, 675 (73.8%) were from Seba Boru Woreda of Guji Zone and 240 (26.2%) were from Melka Soda Woreda of Borena Zone in the period September 1st to 26th of 2014. Three malaria related deaths were also reported by the community from Seba Boru Woreda.

Table 1.2.4: Distribution of malaria cases by woreda and plasmodium species in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, September 1st to 26th, 2014

Name of woreda	Total tested (RDT or Micro)	Total positive (PR)	Plasmodium species		
			Pf, n(%)	Pv, n(%)	Mixed, n(%)
Melka Soda	238	181(76.1%)	79(43.7)	37(20.4)	65(35.9)
Saba Boru	670	413(61.6%)	217(52.5)	74(17.9)	122(29.6)
Total	**908**	**594(65.4%)**	**296(49.8)**	**111(18.7)**	**187(31.5)**

Most of the malaria cases (69.5%) were reported from Seba Boru Woreda. The most dominant species responsible for this outbreak was plasmodium falciparum in both woredas followed by mixed infection. Positivity rate was high in Melka Soda (76.1%) as compared to Saba Boru (61.6%) woreda.

Table 1.2.5: Distribution of malaria cases by kebele and plasmodium species in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, September 1st to 26th, 2014

Name of Woredas	Name of Kebeles	Total tested (RDT or Micro)	Total positive (PR)	**Plasmodium species**		
				Pf, n (%)	Pv, n (%)	Mixed, n (%)
S/Boru	Buri Ejersa	615	394 (64.1)	209 (53.1)	69 (17.5)	116 (29.4)
	Chekata Kojawa	55	19 (34.5)	8 (42.1)	5 (26.3)	6 (31.6)
M/Soda	Dada Oda Budu	238	181(76.1)	79 (43.7)	37 (20.4)	65 (35.9)
Total		**908**	**594(65.4)**	**296(49.8)**	**111(18.7)**	**187(31.5)**

Among the total positive malaria cases, most of them were reported from Buri Ejersa Kebele (66.3%) followed by Dado Oda Bedu kebele (30.5%) of Melka Soda Woreda. Positivity rate was

high in Dado Oda Bedu Kebele (76.1%) followed by Buri Ejersa Kebele (64.1%). Plasmodium falciparum accounts more for causing this outbreak in all kebeles.

Table 1.2.6: Malaria attack rate by kebeles, Seba Boru and Melka Soda Woredas, Guji and Borena Zone, September 1st to 26th, 2014

Name of woredas	Name of Kebele	Total Population	Sex		Age group			Total Cases	Attack Rate per 1000
			Male	Female	0-4 yrs	5-14 yrs	>15 yrs		
S/Boru	Buri Ejersa	10782	248	146	54	84	256	394	36.5
	Cheketa Kojowa	8174	11	8	2	9	8	19	2.3
M/Soda	Dada Oda Bedu	6608	117	64	26	42	113	181	27.4
Total		**25564**	**376**	**218**	**82**	**135**	**377**	**594**	**23.2**

The population in Buri Ejersa kebele were more affected by malaria followed by Dada Oda Bedu Kebele with attack rate of 36.5 and 27.4 per 1000popn respectively (Fig 1.2.6).

1.2.4.4 Description of malaria cases by time

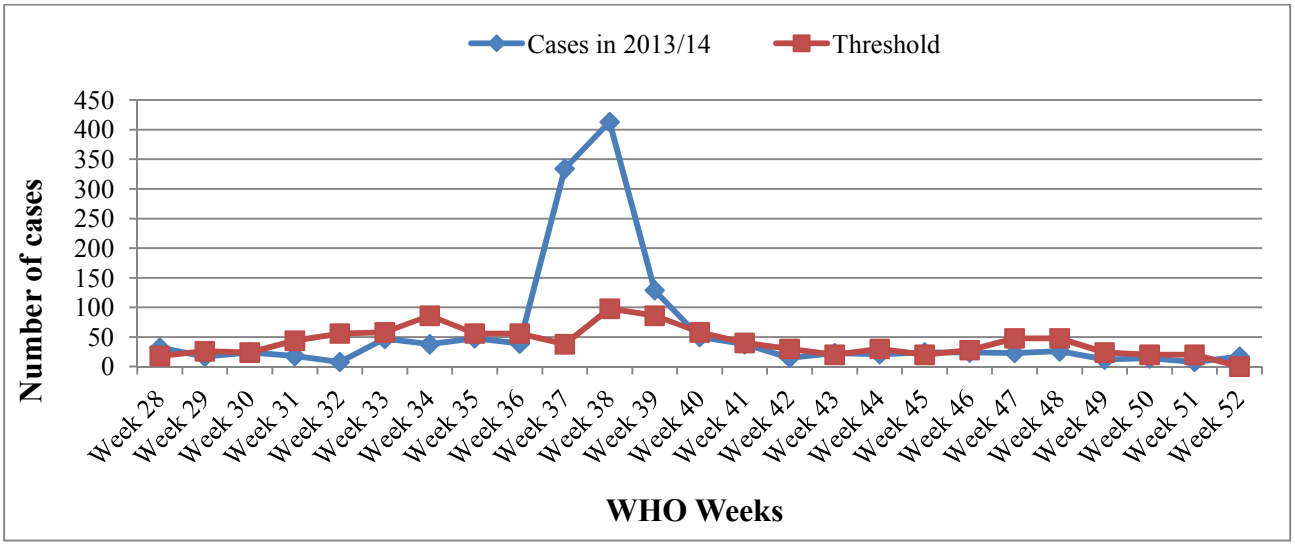

Figure 1.2.2: Trends of malaria cases crossing thresholds in Seba Boru and Melka Soda Woredas, Oromia, 2014

Reported number of malaria cases were exceeded the threshold level in first week, peaks in second week and starts to decline after third week of September 2014 (WHO week 36 to 39/2014).

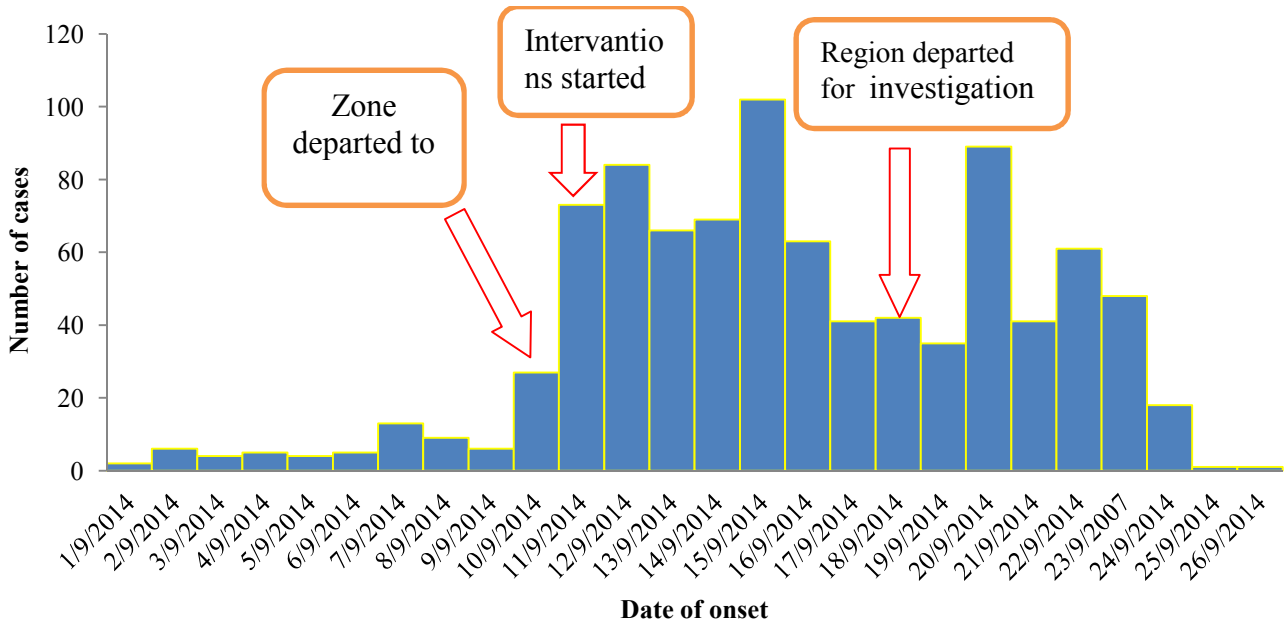

Figure 1.2.3: Epi curve showing date of onset of malaria outbreak in Seba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia Region, Ethiopia, 2014

As we see from the above Epic curve, zonal health department departed to the outbreak area lately, a week after the outbreak started, and interventions was started on September 9/2014. Regional health bureau and field epidemiology residents were also departed for investigation lately two weeks after the onset of the outbreak. This was due to late notification of outbreak by health facility to the next levels.

1.2.4.5 Laboratory

From September 1st to 26th, 2014, a total of 908 blood smear tests were done by microscopy and RDT for suspected malaria cases in Dawa Health Center, including his catchment health posts, of Seba Boru Woreda. Of the total tested cases, 594 (65.4%) were positive for malaria and Seven (0.8%) cases were treated clinically. Among the positive cases, 296 (49.8%) were P. Falciparum, 111 (18.7 %) P. Vivax and 178 (30%) were mixed malaria.

1.2.4.6 Risk factors analysis

During this un-matched case-control study, 100 malaria case-patients and 100 community controls were selected and interviewed from three kebeles (two from Seba Boru and one from Melka Soda) of the woredas. Of 100 case-patients and 100 controls, 61 (61%) and 69 (69%) were males for case-patients and controls respectively. The median age of cases and controls were 19.8 and 20 years respectively.

Table 1.2.7: Bi-variate analysis of independent factors related to malaria outbreak-Seba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia, Ethiopia, 2014

S. N	Characteristics		Cases (N= 100)	Controls (N= 100)	Estimated Odds Ratio	95% Confidence Interval	P-value
1	Educational status	Illiterate	82	55	3.73	1.96 - 7.1	<0.001
		Literate	18	45			
2	Occupational status	Employed	19	10	2.1	0.93 - 4.8	0.071
		Unemployed	81	90			
3	Using bed net (every night)	Yes	4	20	0.17	0.06 – 0.51	<0.001
		No	96	80			
4	Presence of stagnant water in less than 500-1000m	Yes	87	45	8.18	4.05 – 16.53	<0.001
		No	13	55			
5	Presence of any cans in their compound	Yes	36	13	3.76	1.85 - 7.67	0.00016
		No	64	87			
6	Availability of broken glass in the compound	Yes	45	8	9.41	4.13 - 21.42	<0.001
		No	55	92			
7	Presence of old tires in the compound	Yes	40	9	6.74	3.05 - 14.9	<0.001
		No	60	91			
8	Availability of waste plastic containers in the compound	Yes	50	13	6.69	3.32 - 13.51	<0.001
		No	50	87			
9	Not having awareness on prevention mechanisms	Yes	36	11	4.55	2.16 -9.61	<0.001
		No	64	89			

S. N	Characteristics		Cases (N= 100)	Controls (N= 100)	Estimated Odds Ratio	95% Confidence Interval	P-value
10	Not having awareness on transmission mechanisms	Yes	57	10	11.93	5.56 -25.6	<0.001
		No	43	90			
11	Staying outside of their home during night (before sleeping)	Yes	81	33	8.66	4.52 - 16.6	<0.001
		No	19	67			
14	Sleeping outside of their home during night	Yes	69	18	10.14	5.22 - 19.7	<0.001
		No	31	82			

Table 1.2.8: Multivariate vs bivariate analysis of risk factors for malaria outbreak-Seba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia, Ethiopia, 2014

S.N	Risk factors	Crude OR(95%CI)	Adjusted OR(95%CI)	Adjusted P-value
1	Using bed net (every night)	0.17 (0.06 - 0.51)	0.14 (0.03 - 0.42)	<0.0001
2	Presence of stagnant water in less than 500-1000m	8.18 (4.05 – 16.53)	1.93 (1.35 - 2.77)	0.003
3	Availability of broken glass in the compound	9.41 (4.13 - 21.42)	10.90 (3.32 - 35.77)	0.0001
4	Presence of old tires in the compound	6.74 (3.05 - 14.90)	4.63 (1.49 - 14.39)	0.008
5	Availability of waste plastic containers in the compound	6.69 (3.32 - 13.51)	4.35 (1.58 - 12.01)	0.0044
6	Not having awareness on transmission mechanisms	11.93 (5.56 -25.6)	7.17 (2.55 - 20.16)	0.0002
7	Sleeping outside of their home during night	10.14 (5.22 - 19.7)	5.48 (1.51 - 19.81)	0.0096

By multivariate analysis, using insecticide treated bed nets were protective factor for developing the diseases and statistically significant with an odd ratio (OR) of 0.14 [95% CI= 0.03 - 0.42, P< 0.001]. Using of repellent and protective clothes was uncommon and chemical indoor residual

spray was also not conducted in the last year (2014) in both cases and controls and thus has no any association with the occurrence of the outbreak.

Having poor awareness on means of transmission and sleeping outside of their home during night has also contributing risk factors for the occurrence of the outbreak and statistically significant with an OR of 7.17[95% CI= 2.55-20.16, P= 0.0002], 5.48[95% CI= 1.51–19.81, P=0.01] respectively.

Presence of stagnant water for mosquito breeding in less than 500-1000m was associated with malaria outbreak and statistically significant with an OR of 1.93[95% CI= 1.35-2.77, P= 0.003]. In all assessed kebeles, mosquito larvae were also observed in stagnant water by naked eye. Availability of waste plastic containers, broken glasses and old tires in the compound were also found to be contributing risk factors for the occurrence of the outbreak with an OR of 4.35 [95% CI= 1.58-12.01, P= 0.004], 10.90[95% CI= 3.32-35.77, P= 0.001], 4.63[95% CI= 1.49-14.39, P= 0.008] respectively.

1.2.5 Discussion

Several factors might be attributed for the occurrence of this outbreak. Multiple risk factors were assessed during the investigation beside intervention activities. Usually, poor personal practice towards malaria prevention, temperature, rainfall and population movement are contributed for the existence of malaria outbreak [7, 9]. This outbreak was detected at the end of August 2014 and crossed the threshold level at WHO Epidemiologic Week 36 of September 2014. The outbreak was lasted for one month (September1st to 26th 2014) due to daily new migration of non-immune individual movements to these areas for mining work as well as very poor preventive activities toward malaria in the woreda. Heavy rain fall that occurred in the mid August (WHO week 34) was significantly contributed for the availability of stagnant water, and unconditional temperature in the woreda might also favored mosquito breeding. More ever, Seba Boru Woreda is a place where gold mining is under way both by private organization and many unknown number of migrants come to work in the mines from different parts of the country, a lot of excavation was works holding water bodies suitable for mosquito breeding. Unusual heavy rainfall followed by high temperature is considered as the cause of malaria epidemics [8, 10]. Strong case detection and management were accounted for less malaria complications and zero case fatality rate during the period of this outbreak. According to woreda health office report, indoor residual spray was not conducted since August 2013, so that houses holds were not sprayed before 12 months prior to the occurrence of outbreak which is more than six months after spray and not protective.

Correct utilization of mosquito nets, anti-malarial spraying, and appropriate use of personal preventative measures such as use of repellent and protective cloth will reduce incidence of malaria [7]. A previous risk factor analysis by Deressa et al in Oromia Region showed that both spraying and household ownership of a mosquito net were associated with lower risk of febrile illness in children. Findings of our study also exhibited that using of bed net every night is associated with malaria infection.

Stagnant water in mined holes was found to be a major mosquito breeding site in this woreda. Following this, it was believed that there were mosquito larvae in this stagnant water as observed by investigation team including regional and zonal malaria expertise with naked eye. However, it was challenging to identify species of larvae and measure their quantity technically. Similar analytic approach in Sri Lanka and India indicated that people living closer to vector breeding

sites were at higher risk for malaria than those living farther away. Research conducted in Ghana also showed that abundance of water bodies have been associated with increased larval or mosquito abundance and thus increased risk for malaria transmission in human populations

In addition to weak vector control activities, absence of indoor residual spray and ITN distribution during last year was contributed for the outbreak.

Males were more affected by malaria than females in the woreda. This may be due to immigration of more males from different other places to mining area and also participate more on mining work than females.

1.2.6 Limitation

There was no weekly malaria morbidity report before 2012 in the woreda to set threshold level using previous five years data. Due to this reason, last year (2013) weekly malaria data was doubled and compared with the same time of this year report to establish threshold level. Even though three deaths were reported by the community during this outbreak, case fatality rate was not calculated due to absence of clear information that implies those deaths were due to malaria infection.

1.2.7 Conclusions

There was malaria outbreak in Seba Boru Woreda of Guji and Melka Soda of Borena Zones. Age five years and older were more affected by the disease. A household which has proxy to mining area was more affected. Presence of stagnant water, poor utilization of insecticide treated bed net and household utensils like waste plastic water container and broken glass were significantly contributed for the occurrence of the outbreak in this woreda. Sleeping outside of their home during night and having poor awareness on means of transmission has also contributing risk factors for the occurrence of the outbreak.

Late notified of the outbreak might showed that there was weak monitoring of malaria trends at all levels. Unable to detect the outbreak timely and delayed response such as environmental management and indoor residual spray might be attributed for the deaths and long lasting period of the outbreak. Presence of stagnant water in the mining hole has been a major mosquito breeding site which was associated with the illness. Insecticide treated bed was not distributed in last three years (2012-2014).

1.2.8 Public health interventions

A total of 19,037 (97%) households with 28,106 unit structures were sprayed with Propoxure and Bendiocarb chemical in 19 kebeles of the woreda. Abate chemical was also sprayed as anti-larval on stagnant water with an estimated area of 846 meter square. A total of 58 volunteered people were participated on this activity. Communities were mobilized and taught on prevention and control measures of malaria disease. Health professionals were mobilized and assigned to affected kebeles for active case search and early case management at the community and health facility level.

1.2.9 Recommendations

- ✓ Since all kebeles of the woreda are malarious area, insecticide treated bed net should be distributed for all households. Beside this, utilization of bed net should be monitored and optimized.
- ✓ Regular indoor residual spray should have to be planned as per required standard (twice per year) and applied before rainy season.
- ✓ ITN should be planned and distributed for all kebeles in the woreda.
- ✓ Identification and removal of potential mosquito breeding sites should be conducted by maximizing community participation, and also the mining owners have to give special emphasis to the mining hole and have to participate his workers.
- ✓ Trends of malaria cases should be monitored in weekly basis at all levels. This could help to detect malaria outbreak timely.
- ✓ Usually, malaria prevention and control will be effective by establishing community ownership. So that, increasing community effort in malaria prevention should be priority area of the woreda. Similarly, the woreda administration and different sectors should be participated in malaria control activities.
- ✓ Weekly and monthly malaria morbidity report should be appropriately documented for further review and use properly when ever needed.
- ✓ Coverage and Utilization of ITNs should be identified at woreda level at every Ethiopian fiscal year.

1.2.10 References

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Chapter–II

Surveillance data analysis

2.1 Measles Surveillance Data Analysis, Borena Zone, Oromia Region, Ethiopia, 2009 to 2013 G.C

2.1.1 Abstract

Measles remains a disease of public health importance and has been targeted for elimination in many areas of the world including Africa. We analyzed five years measles data to identify morbidity and mortality trends in Borena Zone, Oromia Region. We conducted descriptive cross-sectional study. We analyzed the data using Epi Info 7.3.5 and Microsoft Office Excel 2007. We defined suspected measles as any person with generalized maculopapular rash and fever plus cough or coryza or conjunctivitis. We checked completeness of data by excluding cases and deaths with incomplete information. We identified a total of 1782 measles cases and 16 deaths (CFR: 0.9%) with an average annual number of 356 cases (range: 8 to 575). Among the cases, 1492 (83.7%) were unvaccinated children. Of which, the age group of 1-4 and 5 to 14 years had 729 (41%) and 505 (28%) cases respectively and most affected age group of the population. Most of the children were susceptible or at risk of getting the diseases. Enhancing improved routine and campaign measles immunization targeting less than15 years of age would prevent future risk.

Key words: Measles, Measles case, Measles death, Vaccination, Borena

2.1.2 Introduction

Measles is an acute, highly contagious viral disease caused by paramyxovirus of the genus Morbilli virus. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva [1].

Measles remains an important cause of death among young children globally, despite the availability of a safe and effective vaccine [1]. Between 2000 and 2008, the number of worldwide measles cases reported to the World Health Organizatio (WHO) and the United Nations Children's Fund (UNICEF) declined by 67% (from 852,937 to 278,358). During the same eight year period global measles mortality in all ages was reduced by 78%, from an estimated 733,000 deaths in 2000 to an estimated 164,000 deaths in 2008. The largest percent reduction during this time period was in the Eastern Mediterranean where measles mortality decreased by 93%; followed by the Africa Region (92 % reduction), Western Pacific Region (92 % reduction) and the South East Asian Region (46% reduction) [2]. Measles mortality in Ethiopia is also believed to have decreased by 78% since initiation of the catch- up measles campaigns using modeling techniques **[1].**

Measles is reemerging as a public health threat. In Europe, outbreaks have been ongoing in 36 of the 53 World Health Organization (WHO) European member countries, resulting in almost 30,000 cases in 2011. In Africa, the number of cases increased from 36,000 in 2009 to 172,824 in 2010, and outbreaks were reported in countries with successful measles control programs. Even in countries with widespread vaccine availability and a well-established public health infrastructure, sustaining measles control has become a growing challenge [3].

Accelerated immunization activities have had a major impact on reducing measles deaths. Since 2000, more than one billion children in high risk countries globally were vaccinated against the disease through mass vaccination campaigns - about 225 million of them in 2011 [4]. From 2000 to 2008, approximately 4.3 million deaths were averted as a result of accelerated activities worldwide (both increases in routine coverage and implementation of measles campaigns). Indeed, more than 20 million people are affected by measles each year. The overwhelming majority (more than 95%) of measles deaths occur in countries with low per capita incomes and weak health infrastructures globally [2, 5]**.**

The average number of measles cases reported through the national aggregate reporting system in Ethiopia has been between 2000 and 5000 every year from 1990 to 2003. However, it is

believed that, only a small fraction of the disease burden is reported due to reasons related to health service access, the lack of active surveillance, socio cultural beliefs associated with measles, etc. The true burden during this period is estimated to be between 1 million and 1.4 million cases per year according to coverage-based estimates [6]**.**

Despite remarkable health service expansion as well as improved vaccination coverage, unexpected occurrences of measles outbreak are reported yearly in Ethiopias' Oromia Region. Therefore, an analysis of surveillance data was performed to describe measles epidemiology within the region, characterize the disease burden, and develop guidance to improve measles control efforts [1, 7]**.**

2.1.3 Rationale

Routinely analysis of surveillance data is a key function for describing measles epidemiology within the zone, characterize the disease burden, develop guidance to improve measles control efforts, monitoring disease trends, and evaluating the effectiveness of disease control programs and policies. Results from data analysis can trigger public health action.

2.1.4 Objectives

2.1.4.1 General Objective:

To assess the epidemiology of measles case in Borena Zone of Oromia Region from 2009 to 2013 G.C

2.1.4.2 Specific Objectives:

- To describe the distribution of measles cases in terms of time, place and person
- To assess socio-demographic characteristics and vaccination status of measles case in Boren Zone
- To analyze geographical and temporal trends of measles cases from 2009 to 2013

2.1.5 Methods

2.1.5.1 Case Definitions

2.1.5.1.1 Suspected measles case**:**

Any person with generalized maculo-papular rash and fever plus one of the following: cough or coryza (runny nose) or conjunctivitis (red eyes) [1].

2.1.5.1.2 A laboratory confirmed case:

A suspected case which has laboratory results indicating infection (IGM positive or isolated for a measles virus) [1].

2.1.5.1.3 Epidemiologically linked case:

A suspected case, which has contacts (possibly got the virus) with laboratory confirmed case or another epidemiologically confirmed case [1].

2.1.5.1.4 Measles-related death:

A death in an individual with confirmed (clinically, laboratory, or epidemiologically) measles in which death occurs within 30 days of rash onset and is not due to other unrelated causes e.g. a trauma or chronic disease [1].

2.1.5.2 Study Area

Borena is zone in the Oromia Region of Ethiopia. It is bordered on the south by Kenya, on the west by the Southern Nations, Nationalities, and Peoples Region, on the north by Guji and on the east by the Somali Region. Based on the 2007 census conducted by the Central Statistical Agency of Ethiopia (CSA), this zone has a total population of 962,489, of whom 487,024 are men and 475,465 are women. With an area of 45,434.97 square kilometers, Borena has a population density of 21.18. While 84,328 or 53.88% are urban inhabitants, 23,158 people, or 2.41% are pastoralists. A total of 182,258 households were counted in this zone, which results in an average of 5.28 persons to a household, and 174,474 housing units. The three largest ethnic groups reported were the Oromo (88.78%), the Gedeo (4.42%) and the Konso (3.17%); all other ethnic groups made up 3.63% of the population. Oromiffa is spoken as a first language by 90.94%, Gedeogna spoken by 4.06% and Konsogna by 2.72%; the remaining 2.28% spoke all other primary languages reported. The majority of the inhabitants are Protestant, with 47.25% of

the population having reported they practiced that belief, while 35.01% of the population practiced traditional beliefs, 9.62% were Muslim and 5.45% professed Ethiopian Orthodox Christianity. The CSA reported that 13,533 tons of coffee was produced in this zone in the year ending in 2005, based on inspection records from the Ethiopian Coffee and Tea authority. This represents 11.8% of the Region's output and 6.0% of Ethiopia's total output. Borena is also home to mines of Ethiopia which the Lega Dembi gold.

2.1.5.3 Study Period

We collected analyzed and interpreted secondary data on measles case for the past five years (2009-2013 G.C) from January 20, 2014 to March 30 /2014.

2.1.5.4 Study Design

Descriptive cross-sectional study was used to analyze the five year data of measles in Borena Zone pertaining person, time, and place.

2.1.5.5 Study subject

The study subjects were all suspected cases (all cases registered on line lists & case-based forms).

2.1.5.6 Data collection methods

Secondary data of measles for the last consecutive five years (2009-2013) were reviewed and collected from line lists of Borena Zone PHEM department by using structured checklist.

2.1.5.7 Data analysis

The five years of data were analyzed by using Epi Info 7.1.0.6 and Microsoft Office Excel 2007 to organize and analyze the data appropriately.

2.1.5.8 Inclusion criteria

Suspected measles cases and deaths with complete variables were included.

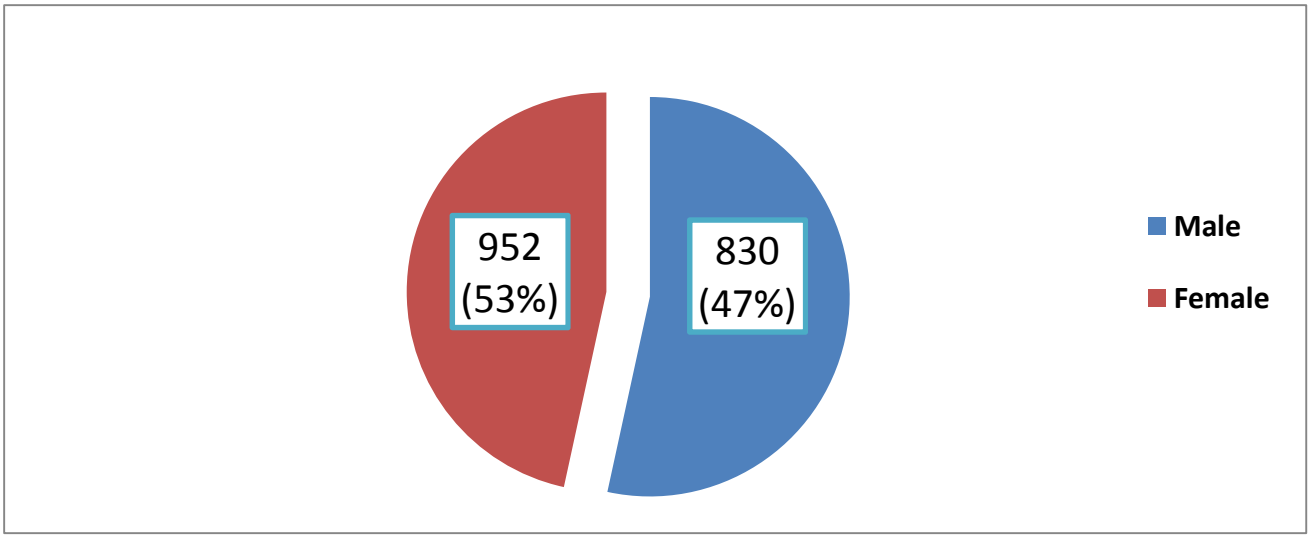
2.1.5.9 Exclusion criteria

Suspected measles cases and deaths with incomplete variables were excluded.

2.1.6 Results

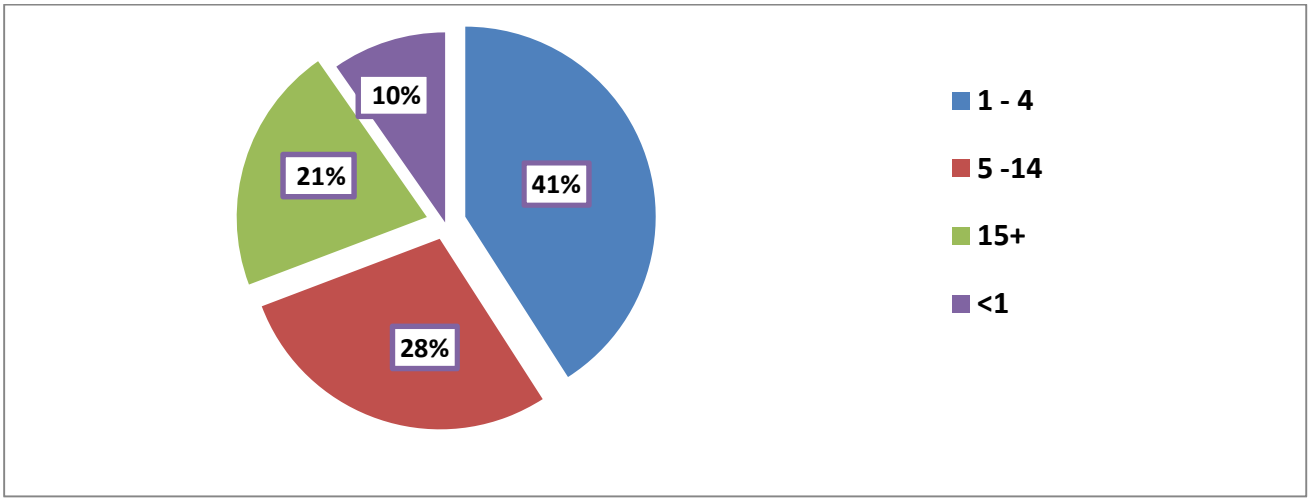
A total of 1782 cases were registered from 2009 to 2013. Among them, 952(53%) were male. The proportion of males and females among the cases reported for the period 2009 – 2013 was a male to female ratio of (952:830) of almost 1: 1.15.

Figure 2.1.1: Distribution of measles case by sex in Borena zone from 2009 to 2013



The median age of the cases was four years (range: 2 months to 77 years). A higher proportion of the cases was 1 to 4year-olds followed by 5 to 14 years old and above 15 years, with the proportions of 729 (41%), 505 (28%) and 375 (21%) respectively.

Figure 2.1.2: Distribution of measles case by age groups in Borena Zone,Oromia Region, 2009 to 2013



From the total reported cases (1782), 72(4%) of them were laboratory confirmed, 1605(90.1%) of cases were confirmed by epidemiological linkage, 58(3.3%) of cases were clinical compatible and 47(2.6%) of cases were discarded (Fig 2.1. 3).

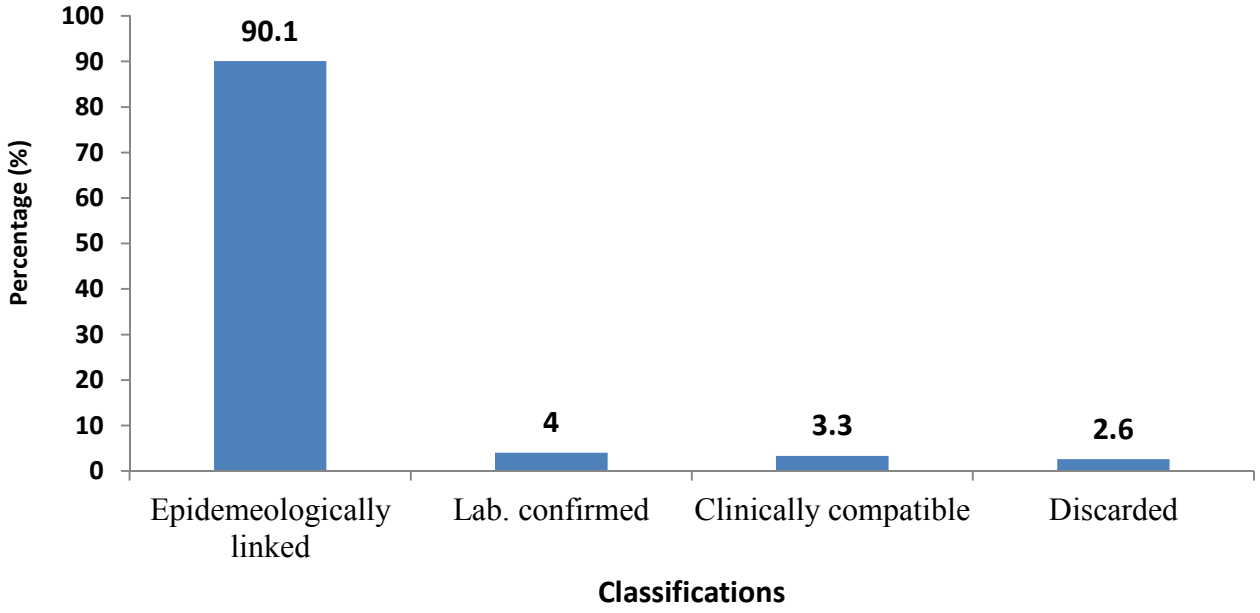


Figure 2.1.3: Final classification of measles cases in Borena Zone, Oromia Region, 2009-2013

Table 2.1.1: Age Specific Incidence and Case Fatality Rate of Measles in Borena Zone, Oromia Region, 2009-2013

Year	Age Group year	Population.	No cases	%	Incidence Rate/100,000	Death	CFR %
2009	<1	43824	2	25.0	4.6	0	**0.0**
	1-4	156417	3	37.5	1.9	0	**0.0**
	5-14	381076	2	25.0	0.5	0	**0.0**
	>15	639678	1	12.5	0.2	0	**0.0**
	Sub Total	**1220995**	**8**	**100.0**	**0.7**	**0**	**0.0**
2010	<1	36464	2	6.7	5.5	0	**0.0**
	1-4	130148	7	23.3	5.4	0	**0.0**

	5-14	285578	9	30.0	3.2	2	**22.2**
	>15	532247	12	40.0	2.3	0	**0.0**
	Sub Total	**1015935**	**30**	**100.0**	**3.0**	**2**	**6.7**
2011	<1	42763	129	11.5	301.7	0	**0.0**
	1-4	152631	431	38.3	282.4	4	**0.9**
	5-14	371849	296	26.3	79.6	1	**0.3**
	>15	624190	268	23.8	42.9	2	**0.7**
	Sub Total	**1191433**	**1124**	**100.0**	**94.3**	**7**	**0.6**
2012	<1	44096	3	6.7	6.8	0	**0.0**
	1-4	157389	20	44.4	12.7	0	**0.0**
	5-14	383442	8	17.8	2.1	0	**0.0**
	>15	643649	14	31.1	2.2	0	**0.0**
	Sub Total	**1228576**	**45**	**100.0**	**3.7**	**0**	**0.0**
2013	<1	45083	37	6.4	82.1	0	**0.0**
	1-4	160912	268	46.6	166.6	5	**1.9**
	5-14	392025	190	33.0	48.5	1	**0.5**
	>15	658056	80	13.9	12.2	1	**1.3**
	Sub Total	**1256075**	**575**	**100.0**	**45.8**	**7**	**1.2**
Total average	**<1**	**42446**	**173**	**9.7**	**407.6**	**0**	**0.0**
	1-4	**151499**	**729**	**40.9**	**481.2**	**9**	**1.2**
	5-14	**362,794**	**505**	**28.3**	**139.2**	**4**	**0.8**
	>15	**619,564**	**375**	**21.0**	**60.5**	**3**	**0.8**
	Total	**11,82603**	**1782**	**100**	**150.7**	**16**	**0.9**

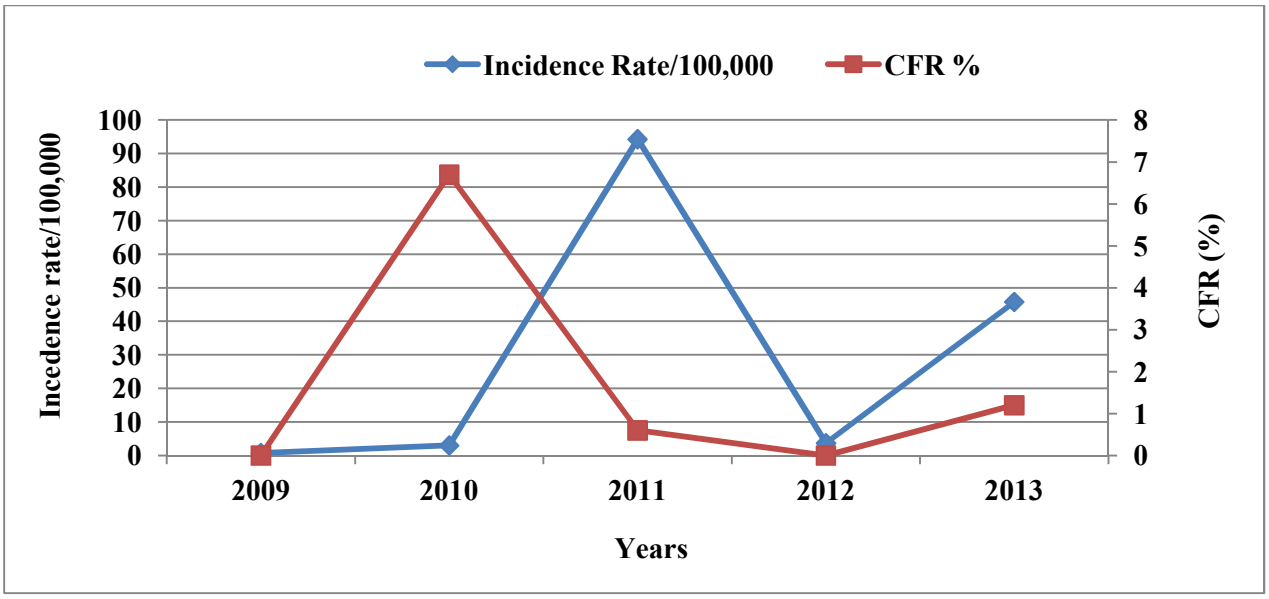


Figure 2.1.4: Trends of Incidence and Case Fatality Rate of Measles in Borena Zone, Oromia Region, 2009-2013

The highest average annual incidence was in the age group 1-4 years followed by less than one years of age with a rate of 93.8 per 100,000 and 80.1 per 100,000 populations respectively. This implies that children less than five years of age are at greatest risk of getting the diseases followed by 5 to 14 years.

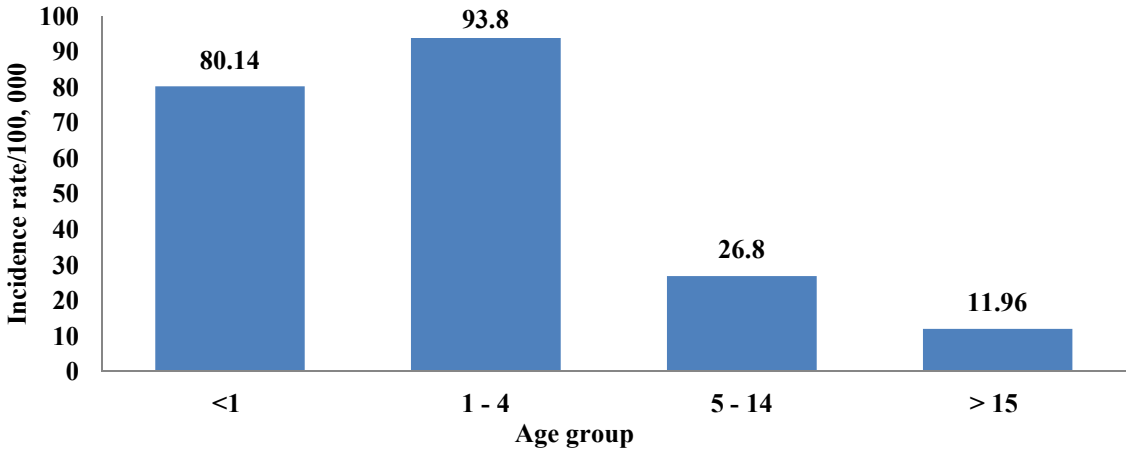


Figure 2.1.5: Age Specific Average Annual Incidence Rate of Measles in Borena Zone, Oromia Region, 2009-2013

Among the total Woredas of the zone, twelve out of fourteen woredas reported measles cases. Most of the cases were reported from two woredas namely 547(30%) Bule Hora and 460(25.8%) Abaya Districts. Areoro, Dire and Dillo Woredas reported the lowest case with incidence proportion of 10 (0.56%), 11(0.61%), and 7(0.4%) respectively.

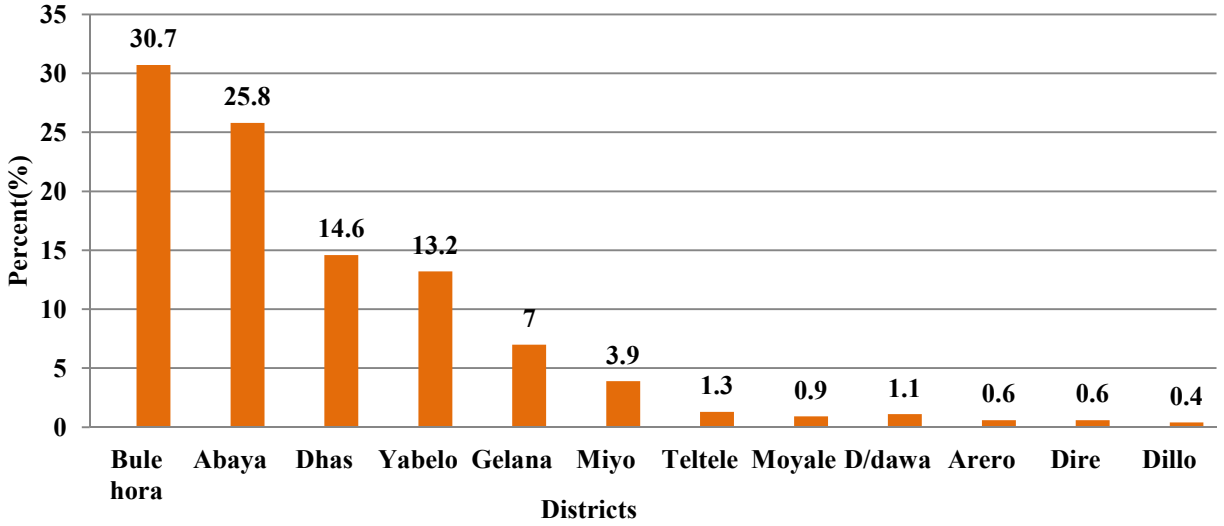


Figure 2.1.6: Distributions of Measles Cases by Woredas in Borena Zone, Oromia Region, 2009-2013

Measles Vaccination coverage in Borena Zone began increasing 2011. In 2009 and 2010 respectively, 61.2& and 71.4% of the children were vaccinated. After year 2011, all years are above 80% for most months. (Fig 2.1.7 and 2.1.8)

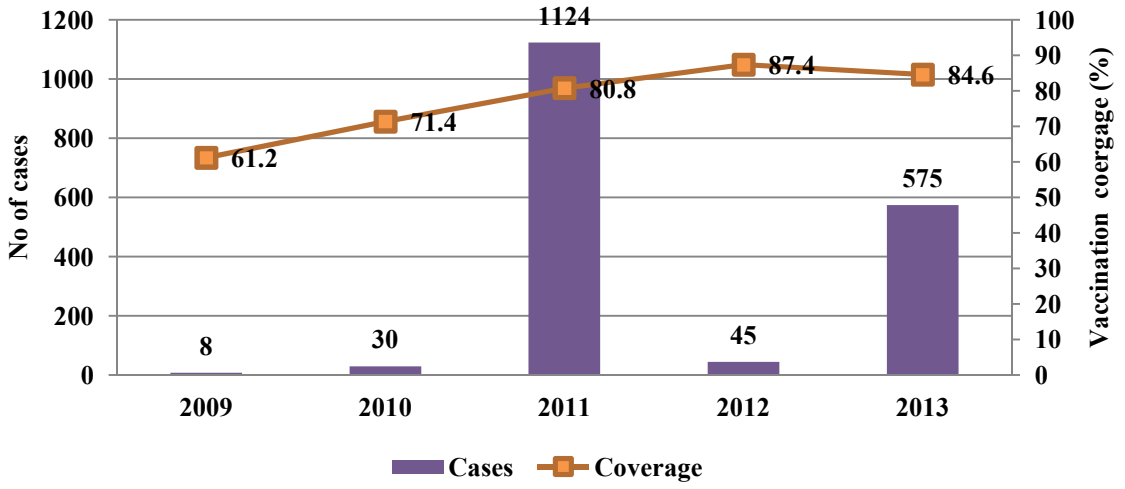


Figure 2.1.7: Measles cases and routine immunization measles coverage in Borena Zone of Oromia Region, 2009 to 2014

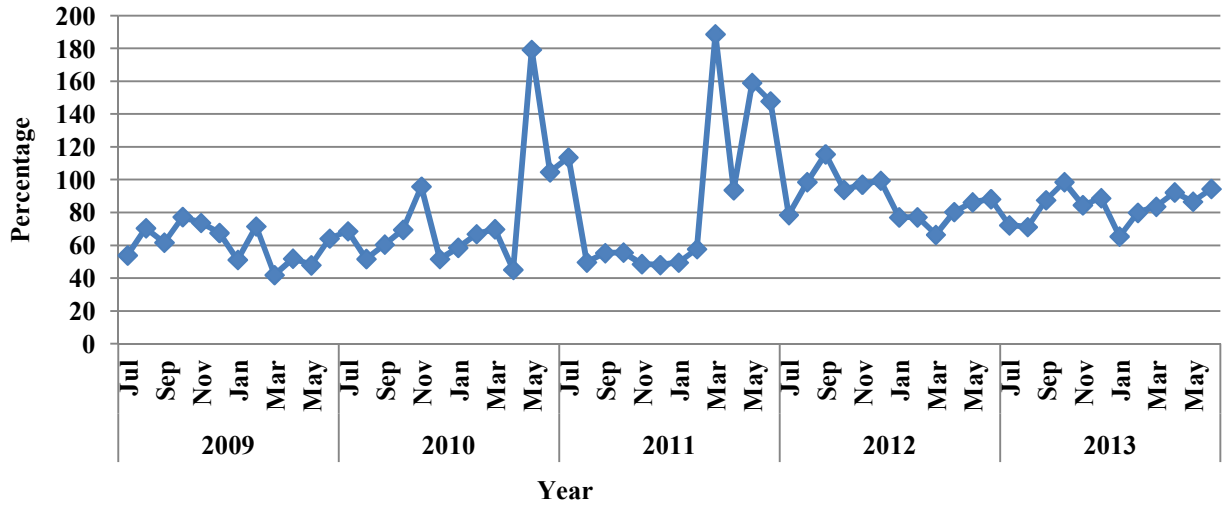
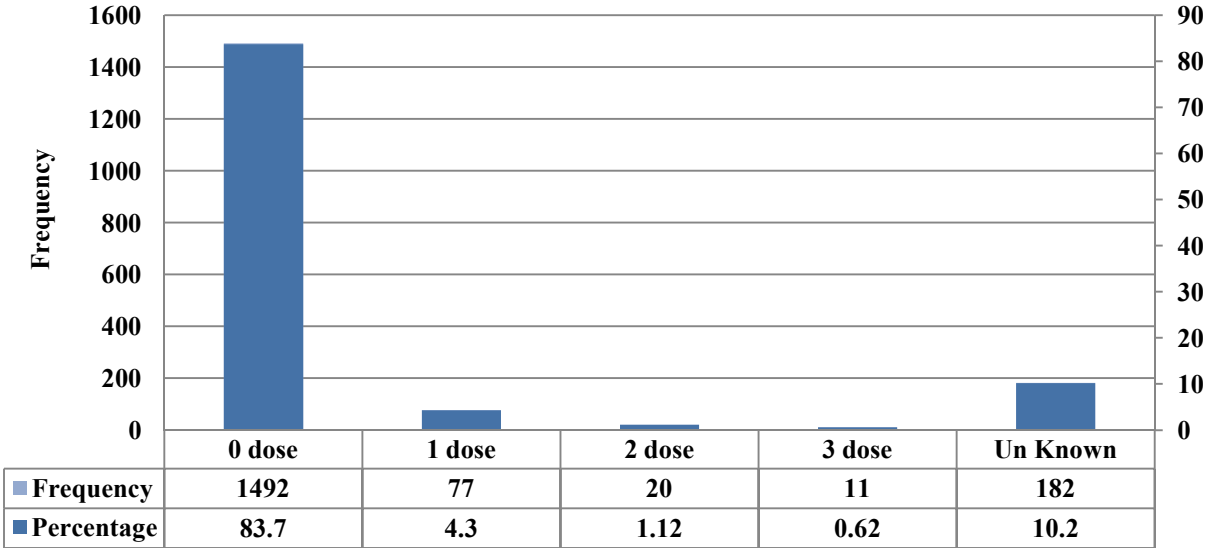


Figure 2.1.8: Trends of vaccination status of children by month-Borena Zone, Oromia Region from 2009 to 2013

From the total of 1782 cases, 6.1% (108) had received measles contain vaccine. Of whom, 77(4.32%), 20(1.12%) and 11(0.62%) had received measles contain vaccine with one, two and three doses respectively. Eighty three percent (1491/1782) of cases had not received the measles vaccine at all and 182(10.21%) of the cases did not know about their measles vaccination status (Fig. 2.1.9).



	0 dose	1 dose	2 dose	3 dose	Un Known
Frequency	1492	77	20	11	182
Percentage	83.7	4.3	1.12	0.62	10.2

Figure 2.1.9: Measles vaccine doses of the cases in Borena Zone, Oromia Region, 2009-2013

As the graph shows, the case occurred with the highest peak in between week 48 of 2010 through week 14 of 2011 and stayed throughout till week 10 of 2012.The case also started to reappear on week 52 of 2012 and started to increase in number in the late year of 2013.

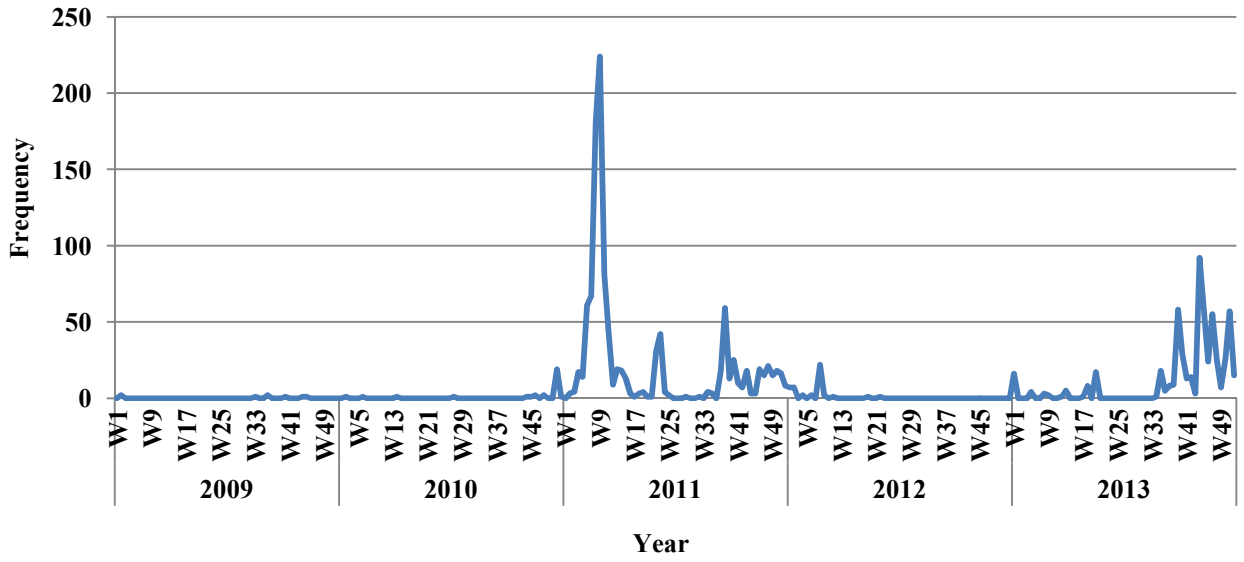


Figure 2.1.10: Trends of measles case in Boren Zone of Oromia Region from 2009 to 2013

Among the total 1784 cases, 16(0.89%) deaths were reported with the overall CFR of 0.9%. Highest deaths were reported in age group 5-14 years with the average annual CFR of 4.6 per 100. No death was reported in under one years of age. (Fig 2.1.11 & 2.1.12)

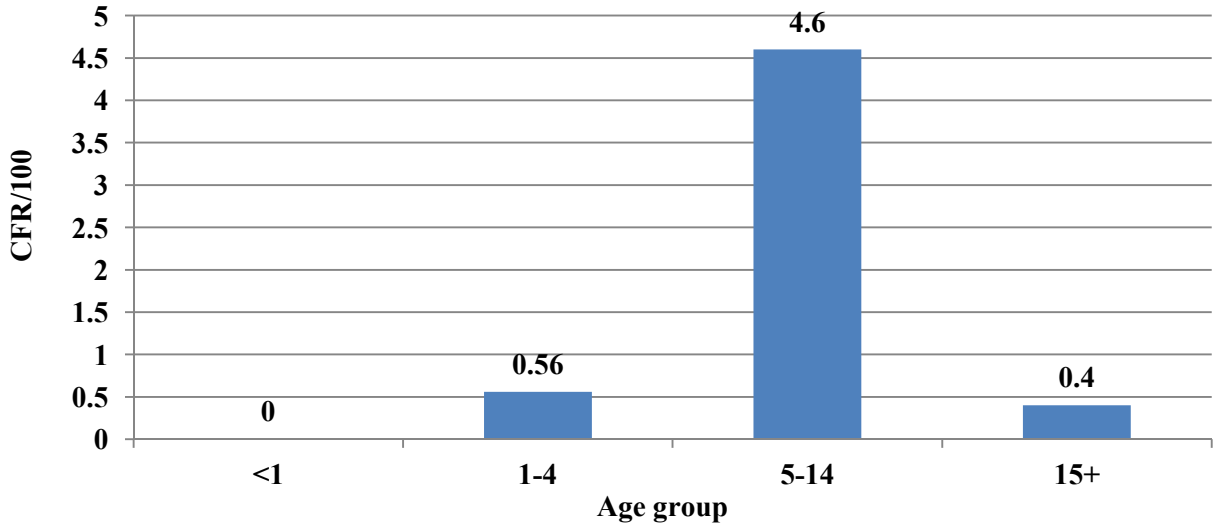


Figure 2.1.11: Age Specific Case Fatality Rate of Measles in Borena Zone, Oromia Region, 2009 – 2013

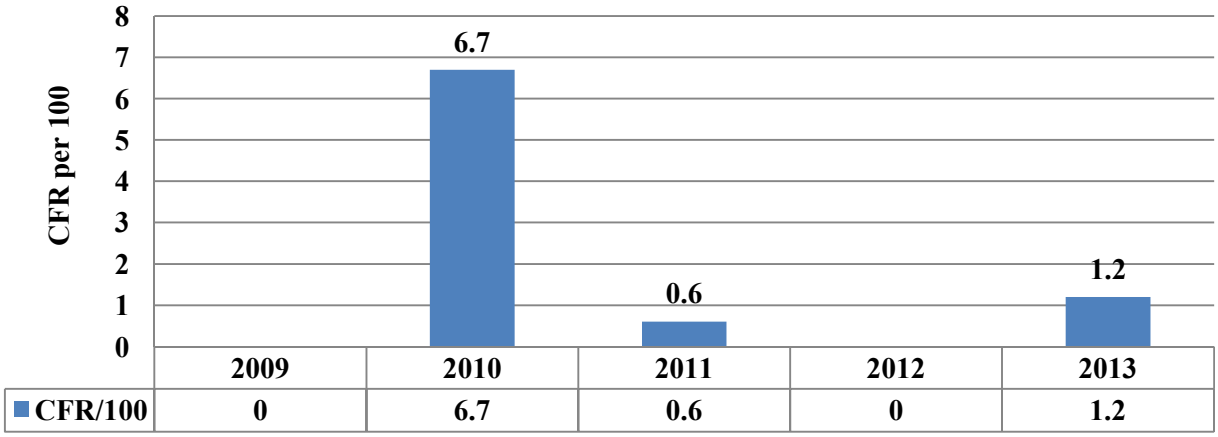


Figure 2.1.12: Case Fatality Rate of Measles by year of Borena Zone, Oromia Region, 2009 – 2013

2.1.7 Discussion

The most affected age groups were the under five years, with 41 % of them being children between the age of 1-4 years and 10% of them being children under one years, while the children between 5-14 year and 15 and above years old constituted 28% and 21% respectively. This study was similar to a study done in Zimbabwe in which the under five year age groups were the most affected accounting for 23.5% of the cases [8]**.**

In this study, 93.9% of the cases had not received the measles vaccine. This result was not similar to study done at National level in 2011 which is 43% (not received the measles vaccine)[1]. It indicates that outbreak was due to low vaccination coverage.

The highest average case fatality rate occurs in children aged 5 to 14 years years with the average CFR of 4.6 and per 100 populations. This is different from the study conducted in Ethiopia which shows the highest case-fatality rate occurs in infants 6 to 11 month of age, with malnourished infants at greatest risk. The case fatality rate is the same as compared with the global case fatality rate estimate for developing country including Ethiopia which is 3% to 6%. In Ethiopia the expected case fatality rate is between 3% and 6% [7]**.**

2.1.8 Limitation

The rate may underestimate the true lethality of measles due to under reporting of measles death. A small proportion of the surveillance data had missing information on important variables (i.e. demographics, final classification of the case and vaccination status) which made meaningful review of some of these records difficult.

2.1.9 Conclusion

Less than five children was the most affected age group followed by 5-14 years. Most of cases 1674 (94%) was unvaccinated children. Seasonal pattern of occurrence of measles has been observed with increased number of measles cases during the late-early part of the year (From Dec to Feb).

2.1.10 Recommendations

Children less than 15 years of age should have to be targeted for camping. Improved routine and campaign measles immunization with good and regular cold chain management have to be enhanced. Early preparedness and SIA should be held before the late-early part of the year (Dec to Feb) to overcome changes in seasonal patterns of measles cases. Regular refresher courses training has to be organized on EPI and surveillance to improve health staff's knowledge of the surveillance system and cold chain management should be strengthened. There is need to conduct periodic reviews of provincial surveillance data in order to strengthen weak woredas. More research to determine why some provinces/woredas are continually performing poorly concerning EPI activities should be facilitated.

2.1.11 Acknowledgements

I would like to acknowledge the Borena Zone Health Department, Ethiopia Public Health Association, Addis Ababa University, School of Public Health and Oromia regional Health Bureau Public Health Emergency Management staffs and all Ethiopia Field Epidemiology Training Program residents for their unlimited contribution during this surveillance data collection and analysis. Finally I would like to acknowledge Abigail Greenleaf and Mr.Tesfaye Deti for their unreserved comment though out the whole surveillance data analysis process.

2.1.12 References

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Chapter-III

Evaluation of Public Health Surveillance System

3.1 Evaluation of public health surveillance system in Ilu Aba Bora Zone, 2014

3.1.1 Introduction

3.1.1.1 Background

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 and 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, 3, and 4)**. 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 the, measure the burden of a disease (or other health-related event), including changes in related factors, the identification of populations at high risk, and the identification of new or emerging health concerns, monitor trends 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 are neither reported nor analyzed promptly. As a result, the opportunity to take action with an appropriate public health response and save lives is missed. However, in cases where adequate information is collected; it is often not available for use at the local level. Cognizant 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 member state endorsed this initiative and is using it and is 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. This new structure is extended down to the woreda level in their capacities. 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 (**3, 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 be evaluated 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 **(1).**

3.1.1.2 Rationale:

Malaria and measles are the major diseases of the Ilu Aba Bora 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 Didesa Woreda, Ilu Aba Zone in 2014 was reported two weeks after the investigation one and they didn't 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. Generally, use of the collected data at the local level as evidence for public health decision making is not well known and also evaluation of surveillance system is not done in the zone and little is known about the effectiveness and efficiency of the system.

3.1.2 Objectives

3.1.2.1 General objective

To evaluate the surveillance system of measles and malaria in Ilu Aba Bora Zone, and forward solutions for improvement

3.1.2.2 Specific objectives

- To assess core surveillance activities such as case detection, reporting, analysis and response in Ilu Aba Bora Zone
- To evaluate the attributes of the surveillance system of the selected diseases in Ilu Aba Bora 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

3.1.3 Methods

3.1.3.1 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 high performance of surveillance activities in 2013 report as well as repeated occurrence of outbreaks. It has 24 woredas with a total population estimated to be 1,545,820.

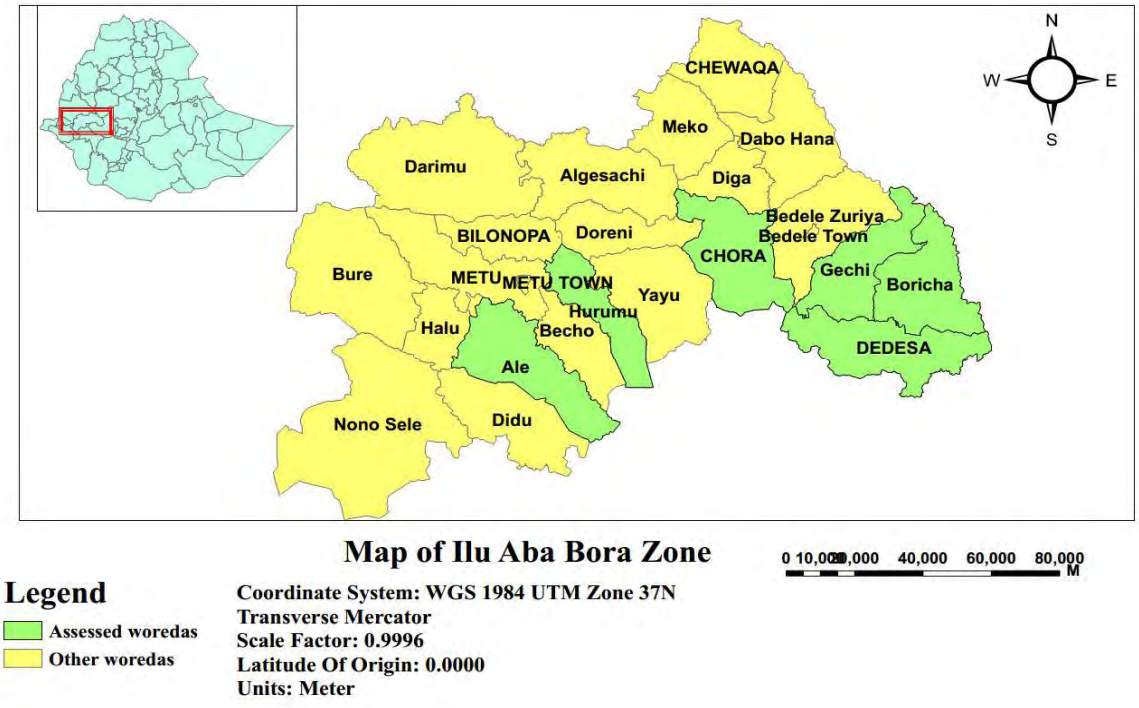

Figure 3.1.1: Administrative map of Ilu Aba Bora Zone showing the assessed woredas

3.1.3.2 Study design

We conducted a cross-sectional descriptive study from June 10-25, 2014 in Ilu Aba Bora Zone, Oromia Region.

3.1.3.3 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).

3.1.3.4 Sample Size and Sampling

Ilu Aba Bora Zone health department, six woreda health offices, one woreda hospital (Metu Hospital), six health centers and six health posts were included in the sample. We selected the woredas and health facilities as follows:

1. From the total woredas in the zone, we selected six woredas by Convenient Sampling Method (CSM).

2. From each selected woreda, we also selected one health center by CSM.

3. From the catchment health posts under each selected health center, we selected one health post (HP) by CSM. Finally a total of 20 sites were assessed during the study period.

3.1.3.5 Data collection technique

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

3.1.3.6 Data analysis

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

3.1.3.7 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.

3.1.3.8 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, Ilu Aba Bora Zone Health department and all visited woreda health offices, Ethiopia Public Health Association (EPHA) and Ethiopia Field Epidemiology Training Program mentor, resident advisors and coordinator.

3.1.4 Results

3.1.4.1 Meeting with stakeholders

The principal investigator 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. 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.

3.1.4.2 Importance of the surveillance system

Malaria: In Oromia region, around 75% of the land mass were malarious putting 22,423,868 (68%) of the population at risk of infection. During 2003 Ethiopian Fiscal Year (EFY), malaria cases per 1000 population were 46 persons indicating high malaria burden compared to the expected seven malaria cases per 1000 population. In 2004 EFY, 466,096 confirmed malaria cases were reported from the region which accounts 20-35% of outpatient visits and 16% of hospital admissions in the region. Annually, 18-30% of deaths were due to malaria (**6, 7**).

Oromia Region reported 354,991 suspected malaria cases were reported during July 2013 to June 2014. Among the total cases, 209,565 (59%) of them were plasmodium falciparum. In Ilu Aba Bora Zone, 24 woredas with a total 383 of 488 (78.5%) kebeles are reporting malaria. A total of 18,498 confirmed malaria cases were reported from the woredas to Ilu Aba Bora Zone health department from July, 2013 to June, 2014. Of these, 12,763 (69%) cases were positive for Plasmodium falciparum.

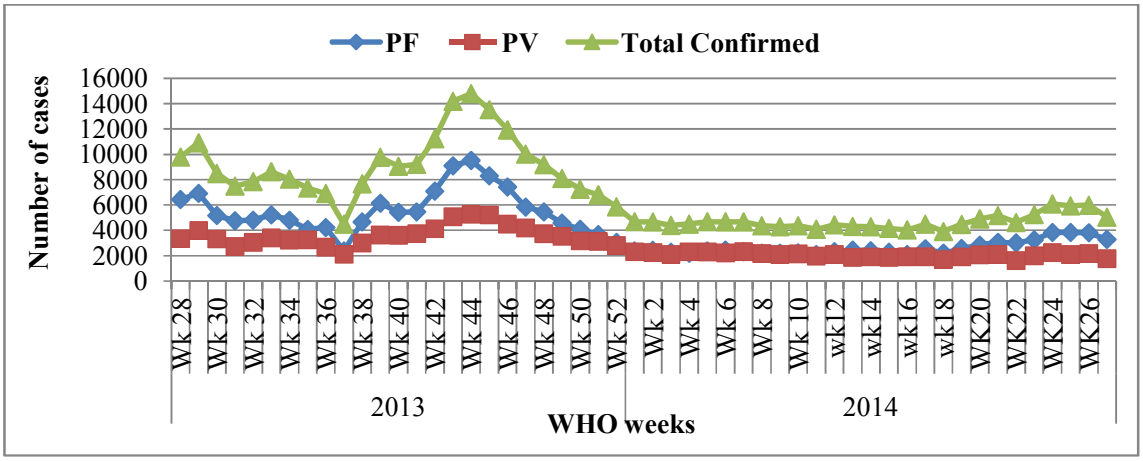

Figure 3.1.2: Trends of suspected malaria cases by species - Oromia Region, August 2013- June 2014

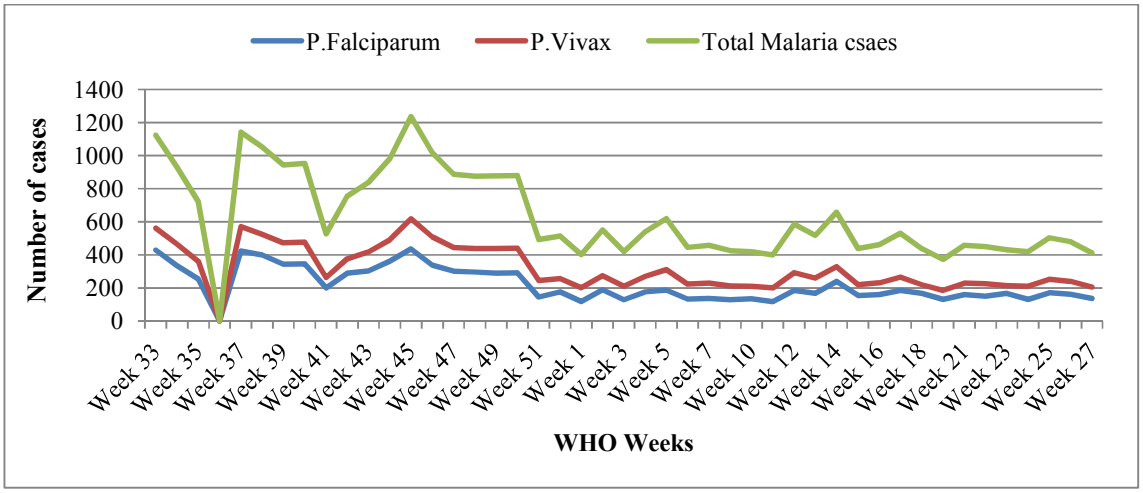

Figure 3.1.3: Trends of suspected malaria cases by species - Ilu Aba Bora Zone, Oromia Region, August 2013- June 2014

Measles: Three thousand nine hundred twenty three measles suspected cases and 30 deaths were reported from Oromia Region, August 2013 - June 2014.

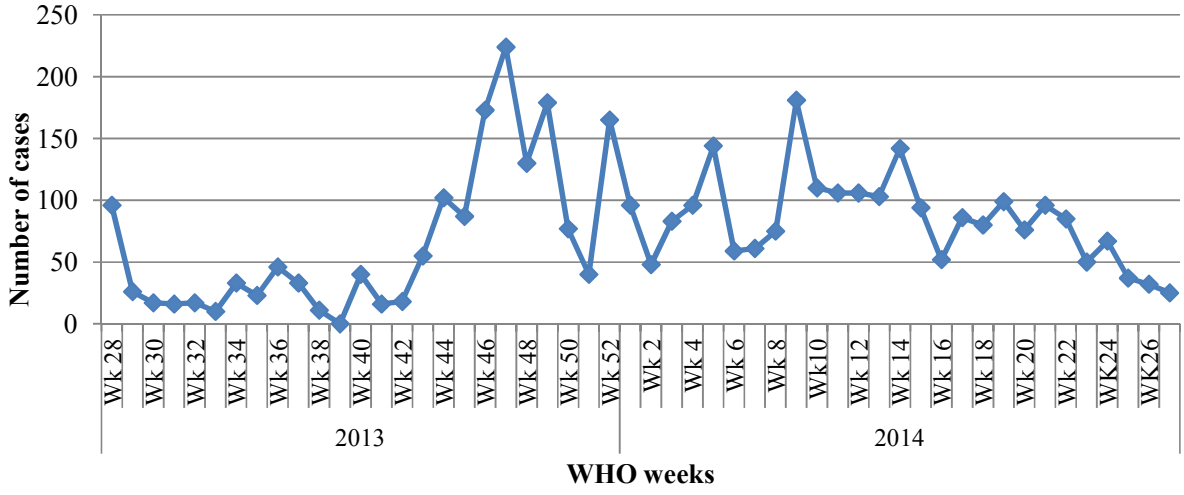

Figure 3.1.4: Trends of measles cases by WHO week of onset of symptoms in Oromia Region, August 2013 - June 2014

Two hundred thirty six measles cases were reported from Ilu Aba Bora Zone Health Department during September 2013 - June 2014.

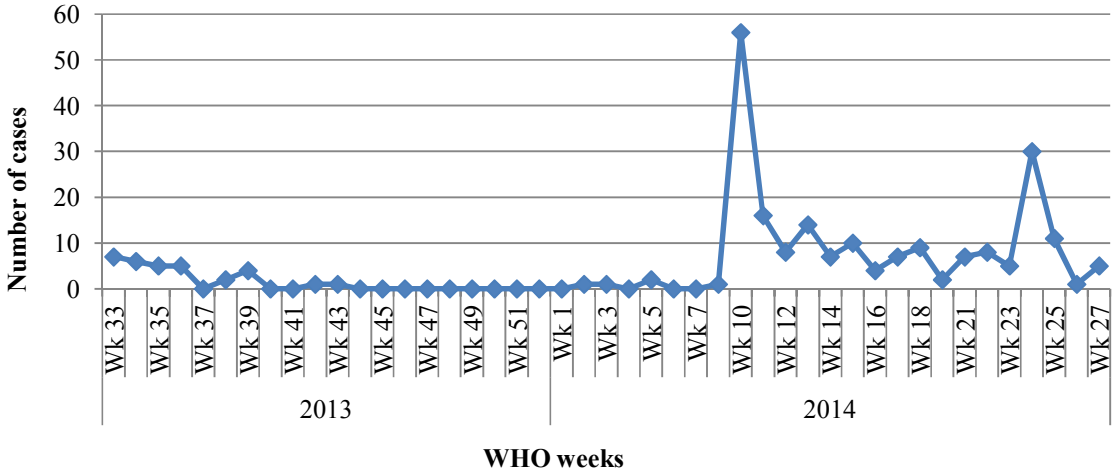

Figure 3.1.5: Trends of measles cases by WHO week in Ilu Aba Bora Zone, September 2013 to June 2014

3.1.4.3 Description of the surveillance system

3.1.4.3.1 Systems in place

In Ethiopia, the health information system for surveillance of communicable and non-communicable diseases is 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) is 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.

3.1.4.3.2 Targeted diseases under surveillance

The Public Health Emergency Management core process targets 21 selected diseases such as: AFP/Polio, Measles, AHI, Cholera, Guinea Worm, NNT, RVF, SARS, Small Pox, Yellow fever, Anthrax, VHF 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). In all visited health facilities and health offices, the surveillance of these diseases exist but poorly functioning.

3.1.4.4 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 (14).

3.1.4.5 Objectives surveillance system

- ✓ To establish strong and sustainable early warning system.
- ✓ To detect public health emergencies on a timely basis.
- ✓ To strengthen communication/information exchange capacity at all levels.
- ✓ To build capacity at all levels, especially at woreda level to prepare, prevent, detect, verify, respond and contain epidemics/other public health emergencies (PHEs) at local level and recover quickly from their impacts.
- ✓ To enhance community participation/involvement in Emergency Preparedness and Response (EPR) activities.
- ✓ To establish and maintain coordination and collaboration framework.
- ✓ To strengthen monitoring and evaluation capacity at all levels.

3.1.4.6 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

3.1.4.7 Case definitions

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

3.1.4.7.1 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.

3.1.4.7.2 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.

3.1.4.8 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 32,976,276 in 2014 (projected from the 2007 national census).

Table 3.1.1: The population under surveillance in the assessed zone and administrative areas by place of residence (Projected population for 2014).

S. N	Areas under assessment	Projected total population for 2014		
		Total	Urban	Rural
1	Alle Woreda	63,954	12,101	51854
2	Borecha Woreda	88,997	3,646	85,351
3	Chara Woreda	121,893	10,318	111,575
4	Didesa Woreda	102,884	7,555	95,329
5	Gechi Woreda	85,480	7,278	78,202
6	Hurumu Woreda	51,914	6,044	45,871
7	Illu Aba Bora Zone	1,545,820	166,407	1,379,413
8	Metu Hospital	185,370	163,866	21,504
9	Oromia Region	32,976,276	4,468,891	28,507,385

More than 86.4% of the population lives in the rural areas of the region. The health care service of the Oromia Region has 52 government hospitals, two public health research laboratories, 1,260 health centers, and 6,563 health posts. Ilu Aba Bora Zone has two woreda hospitals, 64 health center and 500 health posts at the peripheral level that gives service for the community. The overall health services coverage of the zone is 99.9%. In all assessed woredas, the respondents agree that the surveillance represent more rural community and they have satisfactory health seeking behavior**.**

Table 3.1.2: Number of health facilities in assessed woredas of Ilu Aba Bora Zone, Oromia Region, June 10-25/ 2014

Administrative area	Total Population	Number of Health Facilities						Health coverage	Potential representation	Health Seeking Behavior of community
		HPs	HCs	Hos.	NGO	Others	Total			
Alle Woreda	63,954	19	2	0	1	6	28	100	Rural	Good
Borecha Woreda	88,997	33	3	0	0	4	40	100	Rural	Good
Chora Woreda	121,893	32	5	0	0	9	46	100	Rural	Satisfactory

Administrative area	Total Population	Number of Health Facilities						Health coverage	Potential representation	Health Seeking Behavior of community
		HPs	HCs	Hos.	NGO	Others	Total			
Didesa Woreda	102,884	26	3	0	0	1	30	99.6	Rural	Satisfactory
Gechi Woreda	85,480	32	4	0	0	0	36	100	Rural	Good
Hurrumu Woreda	51,914	14	2	0	0	4	20	100	Rural	Satisfactory
Ilu Aba Bora Zone Zone	1,545,820	497	66	2	4	17	586	99.9	Rural	Good
Oromia Region	32,976,276	6563	1260	52	66	605	8,470	78	Rural	Satisfactory

3.1.4.9 Case detection and registration

Among the visited health facility, three (50%) of the Health Posts, five (83.3%) of Health Centers and visited hospital has posted cases definition for measles, but all of them have no standard case definition of malaria. 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 five (38.4%) of health facility, handling of these registers was poor (i.e. not registered cases properly and continuously). Concerning weekly PHEM reports, only four (30.8%) 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 (69.2%) of health facilities clinical register record were not consistent with their reports.

Table 3.1.3: Show presence of PHEM guideline, Standard case definitions and knowledge of respondents to use, in Ilu Aba Bora Zone, Aug, 2014

S.N	Types of visited health facility	Frequency	Variables /Parameters		
			Availability of IDSR manual (%)	Availability of standard or community case definition (%)	Knowledge of standard case definitions (%)
1	Zone	1	100	100	100
2	Woreda	6	100	66.7	100
3	Hospital	1	100	100	100

S.N	Types of visited health facility	Frequency	Variables /Parameters		
			Availability of IDSR manual (%)	Availability of standard or community case definition (%)	Knowledge of standard case definitions (%)
4	H. center	6	100	83.3	100
5	H. post	6	66.7	50	50
6	Total	20	93.34	80	90

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.

3.1.4.10 Reporting

Even though reporting format is prepared and distributed at central level, there was shortage of standard reporting form in all of visited health facilities in the past six months prior to visit. Due to this reasons all health facilities used different reporting format other than standard one for weekly reports. The average weekly reporting rates of the visited health facilities over the past 45 weeks (WHO week 33/2013 – 27/2014) prior to assessment was 90.7% (92% for HPs, 99% for HCs and 81.1% for Hosp). The overall reporting rates of the visited woredas to the zonal health department in 2006 EFY of the same weeks period prior to the assessment was 98.2% for Gechi Woreda, 97.8% Borecha, 91.9% Hurumu, 87.1% chora, 86.8% Alle and 82.8% for Didesa Woreda, where as the reporting rate of the zonal health department to the regional health bureau was 96%. Generally, in all assessed health facility and woredas, the report completeness and timeliness were more than expected except in WHO week 33/2013, which is 69% for completeness and 82% for timeliness.

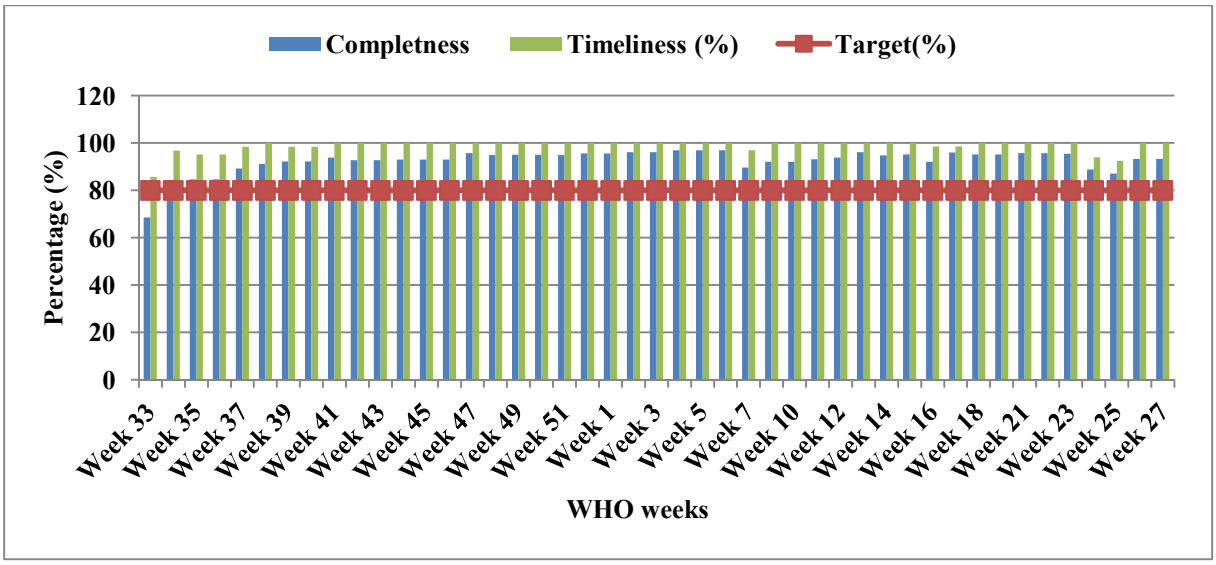

Figure 3.1.6: Average timeliness and completeness of weekly PHEM report by WHO weeks of visited health facilities in Ilu Aba Bora Zone, Oromia Region from WHO week 33/2013-27/2014

Reports were sent to the next level by telephone from most of health facilities and all woredas except for some health post which uses hard copy due to limited telephone service. Zonal health department uses an email for reporting to RHDs.

Table 3.1.4: The reporting rates of the health facilities in Ilu Aba Bora Zone in 11 months (WHO week 33/2013-27/2014) period time August 12/2013- June 6/2014

WHO weeks	Health Post			Health Centers			Hospitals			Total		
	E	R	C%	E	R	C%	E	R	C%	E	R	C%
Week 33	495	330	67	63	54	86	2	0	0	560	384	69
Week 34	495	411	83	63	61	97	2	0	0	560	472	84
Week 35	483	404	84	62	59	95	2	0	0	547	463	85
Week 36	483	404	84	62	59	95	2	0	0	547	463	85
Week 37	467	412	88	62	61	98	2	1	50	531	474	89
Week 38	495	446	90	62	62	100	2	1	50	559	509	91
Week 39	495	453	92	62	61	98	2	1	50	559	515	92
Week 40	495	452	91	62	61	98	2	2	100	559	515	92

WHO weeks	Health Post			Health Centers			Hospitals			Total		
	E	R	C%	E	R	C%	E	R	C%	E	R	C%
Week 41	495	460	93	62	62	100	2	2	100	559	524	94
Week 42	495	454	92	62	62	100	2	2	100	559	518	93
Week 43	495	454	92	62	62	100	2	2	100	559	518	93
Week 44	495	456	92	62	62	100	2	2	100	559	520	93
Week 45	495	456	92	62	62	100	2	2	100	559	520	93
Week 46	495	456	92	62	62	100	2	2	100	559	520	93
Week 47	495	471	95	62	62	100	2	2	100	559	535	96
Week 48	495	466	94	62	62	100	2	2	100	559	530	95
Week 49	495	467	94	63	63	100	2	2	100	560	532	95
Week 50	495	467	94	63	63	100	2	2	100	560	532	95
Week 51	495	466	94	63	63	100	2	2	100	560	531	95
Week 52	495	470	95	63	63	100	2	2	100	560	535	96
Week 1	495	470	95	63	63	100	2	2	100	560	535	96
Week 2	495	473	96	63	63	100	2	2	100	560	538	96
Week 3	495	473	96	63	63	100	2	2	100	560	538	96
Week 4	495	478	97	63	63	100	2	2	100	560	543	97
Week 5	495	478	97	63	63	100	2	2	100	560	543	97
Week 6	495	478	97	63	63	100	2	2	100	560	543	97
Week 7	500	445	89	64	62	97	2	0	0	566	507	90
Week 8	500	457	91	64	64	100	2	0	0	566	521	92
Week 10	500	457	91	64	64	100	2	0	0	566	521	92
Week 11	500	461	92	65	65	100	2	2	100	567	528	93
Week 12	497	462	93	65	65	100	2	2	100	564	529	94
Week 13	497	475	96	65	65	100	2	2	100	564	542	96
Week 14	497	467	94	65	65	100	2	2	100	564	534	95
Week 15	497	470	95	65	65	100	2	2	100	564	537	95
Week 16	498	454	91	65	64	98	2	2	100	565	520	92
Week 17	498	476	96	65	64	98	2	2	100	565	542	96
Week 18	497	470	95	65	65	100	2	2	100	564	537	95
Week 19	497	470	95	65	65	100	2	2	100	564	537	95

WHO weeks	Health Post			Health Centers			Hospitals			Total		
	E	R	C%	E	R	C%	E	R	C%	E	R	C%
Week 21	497	473	95	66	66	100	2	2	100	565	541	96
Week 22	497	473	95	66	66	100	2	2	100	565	541	96
Week 23	497	471	95	66	66	100	2	2	100	565	539	95
Week 24	497	438	88	66	62	94	2	2	100	565	502	89
Week 25	497	429	86	66	61	92	2	2	100	565	492	87
Week 26	497	459	92	66	66	100	2	2	100	565	527	93
Week 27	497	459	92	66	66	100	2	2	100	565	527	93

3.1.4.11 Data analysis

In all of the assessed health offices and health facilities, there was no responsible person placed for data analysis except for ZHD and RHD. Among the visited health facilities and woredas none of them were 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 ZHD and RHD analyze and follow the trends to compare the incidence rate for both malaria and measles appropriately. All the visited woredas established an action threshold for malaria.

3.1.4.12 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 Ilu Aba Bora Zone [Didesa and Borecha] in the last six months prior to the assessment and both outbreaks were investigated by the woredas, ZHD, RHD and EFETP residents.

3.1.4.13 Epidemic preparedness and response

Table.3.1.5: Regional, zonal and woreda preparedness for epidemic-Ilu Aba Bora Zone, Oromia Region, August, 2014

Variable	Region (N=1)	Zone (N=1)	Woreda (N=6)	Total (N=8)
Written emergency preparedness plan for an outbreak	1	1	0	2
Availability of emergency stocks of drugs and supplies	1	1	2	4
Experienced shortage of drugs during recent epidemic	0	0	0	0
Presence of budget line for epidemic response	1	1	0	2
Observed epidemic management meetings minutes	1	1	2	4
Presence of RRT	1	1	6	8

All the assessed woredas had no outbreaks investigation in the last one year except Didesa Woreda. Measles outbreak that reported to ZHD was responded within 48 hours. Of those visited woreda health offices none of them had epidemic preparedness and response plans for their priority diseases. However, all of them had established RRT and Tax Force Committee (Epidemic Management Committee) which is coordinated by woreda chief administrator, however epidemic management committee and RRT are activated only during the occurrence of the epidemic and also there is no experience of post epidemic evaluation by the team.

The region health bureau and zone health department have epidemic preparedness and response plans for priority diseases, and have epidemic management committee with rapid response team that involved in epidemic response on time and evaluate their performance regularly. None of the visited woredas and ZHD encountered shortage of emergency drugs and other supplies in the last two years including RHD. There is no specific budget for emergency purpose at all visited woreda health offices.

3.1.4.14 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, 66.7% of them were disseminated comprehensive (integrated) activities performance feedback to the health facilities on quarter bases. Ilu Aba Bora Zone health department distributed written monthly feedback to the woreda health offices. There is 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.

3.1.4.15 Supervision

Most of the assessed health office (RHB, ZHD and DHO) were not conducted regular supportive supervision according to guide line. However, zonal health department in collaboration with WHO surveillance focal person conducted supportive supervision in woredas health office and health facilities five times in the last six months prior to the assessment. The regional health bureau conducted integrated supportive supervision in zonal health department, woreda health offices and health facilities through health development army program. Among the visited health facility and woredas, none of them conducted supportive supervision for their respective health facility as per guideline, but five (83.3%) of the woredas and three (50%) health centers were conducted intermittently and at least once in the last 6 months prior to assessment with the integration of others program. More ever, ZHD as well as RHB didn't conduct any supportive supervision for the woredas and health facility within the same time period.

3.1.4.16 Training

All Regional Health Bureau technical staffs working in public health emergency management core process including Field Epidemiology Training Program residents had basic short term training for five days by national (EHNRI) in collaboration with partner on the surveillance system. At zone level all technical staffs working in PHEM unit and one EPI coordinator were trained on IDSR surveillance system.

All PHEM focal persons (representatives) as well as MCH coordinators of the assessed woredas health office had took short term training on surveillance for 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 WHO 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 formats.

3.1.4.17 Material resources available for surveillance

Table 3.1.6: Availability of resource for PHEM surveillance at different level in Ilu Aba Bora Zone, Aug, 2014

Sr.No	Number	Resource							
		Electricity	Motorcycle	Bicycle	Vehicle	Computers	Printers	Fax	Telephone
ZHD	1	100			100	100	100	100	100
DHO	6	100	100		50	100	100	0	100
HC	6	83.3	100		16.7	100	66.7	0	66.7
HP	6	33.3		16.7		0	0	0	0
Total	**19**	**79.15**	**100**	**16.7**	**55.6**	**75**	**66.675**	**25**	**66.675**

Resources for data management, communication, and logistics were all available at the region and zonal level. However, they all became scarce at the peripheral heath 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 budget constraints were observed at all the visited sites except at regional level. Fifthly percent of the assessed woreda health offices have no vehicle and they depend on the other sectors (other than health) for the transportation services. 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.

3.1.4.18 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 regional health research laboratory level. The region has two regional health research laboratories which are 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 Health and Nutrition Research Institute (EHNRI) 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 conformation 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). Among assessed health facility, none of them faced shortage of supply like gemisa reagents and RDT kit in the last six months.

3.1.4.19 Description of attributes of the surveillance system

3.1.4.19.1 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.

Detection of cases

The PHEM surveillance system was organized in community, health posts, and all other health facilities under the MOH will have active role in the detection of cases. However dissemination of case definitions of these priorities selected diseases were 83.3% among visited health facilities. Community cases definition was seen in 3(50%) of visited woredas.

All the visited health posts had good networking with the community and with respective health centers. On the others side; health posts working with volunteer community health workers, selected by the community that responsible for reporting all the health events, diseases to the health extension worker (HEW) immediately and weekly including zero reports.

The physical accessibility of the health care services was one health post at each kebele in all visited woredas with the commitment of HEW and community volunteers create a good health seeking behavior in the communities that increasing EPI coverage which help to prevent some vaccine preventable diseases in the communities within the zone. However, there is some limiting factors for early cases detection like delay of laboratory result particularly of measles for one to three months, and sometimes may not be even notified at all, work load of the health extension workers, lack of formal training for HEWs on surveillance, lack of resources and logistic for early case investigation at the community level and absence of budget for supportive supervision of the health facilities and early case investigation at community level.

Providing appropriate and rapid response to epidemics:

According to the respondents, even though the woreda epidemic committee is neither active nor evaluating their activities regularly in all the visited DHOs, RRT from will be deployed for cases investigation and management within one day whenever there is a suspected epidemic was reported from the community. The zonal health department and regional health bureau also responded with in 48hrs of report received from the lower level by different means. Generally, the surveillance users are satisfied with the current existing system as compared to the previous except for dalliance of sample results.

All the assessed woredas and facility focused only on case management rather than investigating the potential causes and risk factors responsible for the occurrence of the outbreak for guiding the response and also not relay on their findings as standard procedure for appropriate interventions. Moreover, there was no post epidemic evaluation report at all assessed health

woreda offices by the epidemic management committee concerning their preparedness and response activities but ZHD and RHB have the reports.

3.1.4.19.2 Simplicity

a. In the detection of cases

All of the respondents (100%) agreed that the case definitions of these priority diseases for identification of suspected cases are easy to understand and can be applied by all levels of health professionals, but it was difficult to confirm cases for some factors related to sample collection, shipment and delay in laboratory result.

b. Data follow

All (100%) of the visited sites agree that route of the data flow is clear and simple as it was set in the PHEM guideline and the reporting entities were also simple and understandable by all staffs except those who newly assigned HEWs at health post. About 83.3% of the health posts had shortage of standard weekly reporting formats, so that they reported only specific and few diseases which are commonly known and the next levels (health centers) considers the rest as zero reports. Most of the interviewed staffs (83.3%) also responded as a weekly report took an average of 10-15 min or more to fill a single report. The major problem mentioned by the respondents were lack of standard reporting formats and poor means of communication for reporting cases to the next higher bodies particularly from the health post to the health centers and health center to woreda health office. This might affected the timeliness of the report. In some visited woredas, HEW usually uses their personal mobile phones to send the report using simple SMS (text message) and complained for not refunding them in some places.

c. In the data management

Weekly or immediately PHEM data from the health posts were sent to respective health centers then to the woreda health office and to zonal and regional health bureau in telephone or a paper form and use of the data was also very limited at woreda and facility level since the collected data were not analyzed there. However, the weekly report that received from woreda health offices by phone entered in to standard format and sent to RHB mostly through email and also sometimes through call. Both ZHD and RHB analyze and interpret data by person, place and time in order to use for the future planning and monitoring.

3.1.4.19.3 Flexibility

A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds. Flexible system can accommodate new health related events, changes in case definition or technology and variations in funding or reporting sources (1). Unless efforts have been made to adapt the public health surveillance system to another disease (or other health-related event), a revised case definition, additional data sources, new information technology, or changes in funding, assessing the flexibility of that system might be difficult (1). All visited woreda health offices and zone health department responded as the Public Health Emergency Management (PHEM) system made the reporting format flexible to report other new events under immediately reportable case based conditions.

3.1.4.19.4 The quality of data

We tried to assess the data quality in all visited sites emphasizing completeness and timeliness of the report. We identified most of the HEWs (83.3% of HPs) reported only limited number of diseases and even they didn't have any documented weekly PHEM report for those reported. Only one out of six (16.7%) visited HPs reported all diseases under surveillance expected to be reported by HEWs at HP level. The DHOs also missed variables like date of report sent or received, name of person received or sent and the expected number of health facilities to report while reporting to ZHD using weekly reporting formats. At health facility level (HPs, HCs and Hosp) there are also commonly missed essential variables like vaccination status, date of onset, place residence etc. while reporting using line list during outbreak. Concerning case based reports, most of the health staffs didn't understand as they can use the blank variables to fill missed one like date of admission, vaccination history, address and the others variables of interest so that reported only limited variables stated only on the form. In some reporting formats, the variable age has the same column for different units (year and month). This has its own challenge during data analysis. 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.

3.1.4.19.5 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 satisfactory seems accepted by the health staffs with 95.5% reporting rate of the health facilities during 45 reporting WHO weeks (week 33/2013-27/2014). 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.

3.1.4.19.6 Representativeness

The representativeness of the surveillance system is 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 82.8% to 98.2%. The health seeking behavior of the communities was also changed from time to time due to awareness creation by HEWs rounding house to house in all of the rural households which account 86.4% of communities in Ilu Aba Bora Zone.

3.1.4.19.7 Timeliness and completeness

Timeliness of the public health surveillance is usually considered that time interval between the onset of health-related event and the reporting of the event to the public health agency responsible for immediate control effort, prevention of continued exposure or program planning.

The weekly reporting rate (completeness) of the health facilities in the zone was 90.7% with relatively low among hospitals (81.1%) and high among HCs (99%). The timeliness of visited woredas was 94.6% for Gechi Woreda, 92% Hurumu, 97% chora, 85.5% Didesa 80.7% Alle and 79.2% for Borecha Woreda. However, in some reports of visited sites, date of report sent to next level was not documented and was challenging during evaluation of report timeliness.

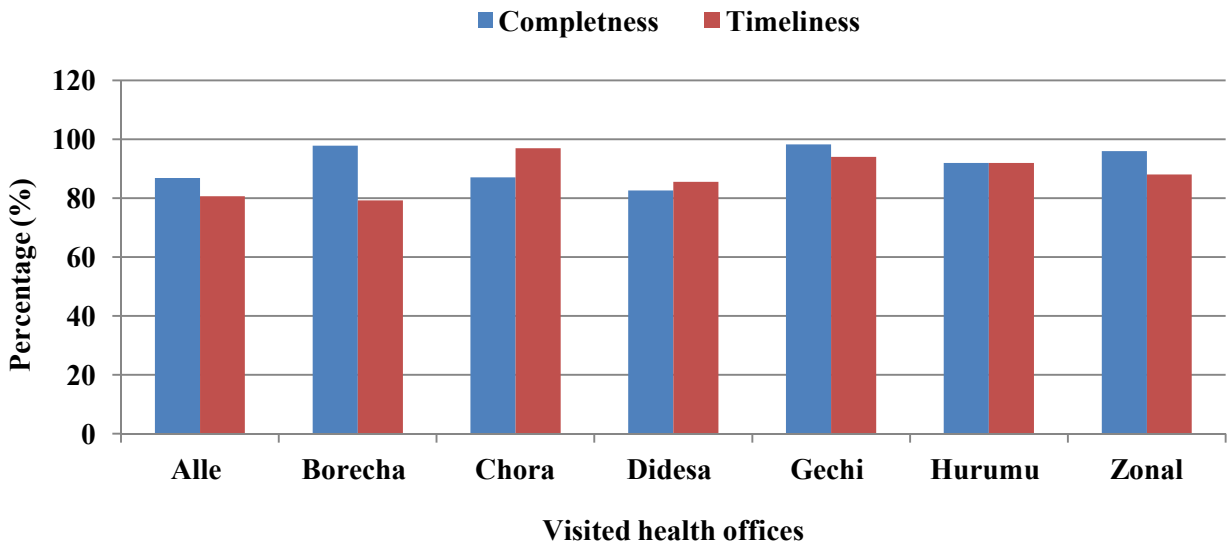

Figure 3.1.7: Zonal and woredas timeliness and completeness of PHEM weekly report of-Ilu Aba Bora Zone, Oromia Region, January 1 to June 30, 2014, Aug, 2014

3.1.4.19.8 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.

3.1.5 Discussion

The evaluation should assess how well the public health surveillance system is integrated with other surveillance and health information systems (e.g., data exchange and sharing in multiple formats, and transformation of data). Streamlining related systems into an integrated public health surveillance network enables individual systems to meet specific data collection needs while avoiding the duplication of effort and lack of standardization that can arise from independent systems. Integration encourages best use of scarce resources, and activities can be combined taking advantage of similar surveillance functions, skills, resources, and target population. For these purposes, each of priority diseases in the zone has case definition(s) and integrated diseases reporting formats defined by the ministry of health and the WHO; and reporting is institutionalized into the health facilities and health offices (**10)**.

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 didn't 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. Options for disseminating data and/or information from the system include electronic data interchange, public-use data files, the Internet, annual and other types of reports, publication in scientific, peer-reviewed journals, and poster and oral presentations, including those at individual, community and professional meetings.

In Ilu Aba Bora 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 90.1%

in the last 11 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 hided 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. A well-functioning system is frequently backed up by regular and purposeful supervisory support. In Ilu Aba Bora 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 Ilu Aba Bora 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 case definition of a health-related event can include clinical manifestations (i.e. symptoms), laboratory results, epidemiologic information (e.g., person, place, and time), and/or specified behaviors, as well as levels of certainty (e.g., confirmed/definite, probable/presumptive, or possible/suspected). The use of a standard case definition increases the specificity of reporting and improves the comparability of the health related event reported from different sources of data, including geographic areas. 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. An investigation for risk factors was also not common in all assesses sites. The response to an outbreak always focused on case management (put off fire) 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.

3.1.6 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 Ilu Aba Bora Zone was more than expected (>80%) in the last eleven month (WHO week 33/2013 – 27/2014) 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 feedback give from higher to their respective lower health facility were not continuous in the last eleven months.

Most of the visited sites have surveillance manual. Standard case definitions for measles were also seen in most of the health facilities but not for malaria. All of the PHEM focal persons were trained on the new PHEM guideline in all visited sites but not given to HEWs at the health post level. Weekly and monthly PHEM data (report) was nor 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 epidemic prone diseases.

3.1.7 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. Training should be provided to RRT of all the woredas and zone on basic standard procedures for outbreak investigation and response so that they can able to use their finding for action. 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.

3.1.8 References

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Chapter–IV

Health Profile Description

4.1 Health profile description of Arsi Negele Woreda, West Arsi Zone, Oromia Region, Ethiopia, 2014

Executive summary

Health profile is a system of collecting and summarizing health and other health related events, demographic, socio-economic, political and cultural aspect of a particular woreda. This summarized and prioritized health and health related information is useful for planning, implementing and evaluating health programs. Therefore, well described health profile can be useful for health program managers and stake holders. The objective of this study is to prepare health profile of Arsi Negele Woreda by identifying health problem and overall health status of the population in the catchment. Health and health related data was collected in Arsi Negele Woreda from January 10-18/2014. Interviews and standard questionnaires were used as tools for data collection. Sources of data were Arsi Negele Woreda health office, education office, water resource office, agricultural office, Finance and Economic Development office and administration office. Data was compiled and analyzed using micro soft excel. Acute Febrile Illness, Pneumonia and Acute Upper Respiratory Tract Infection, accounted for adult morbidity with 25.9%, 13.5% and 10.6% respectively from total OPD cases. While Pneumonia, Diarrhea and Acute febrile Illness were 40.3%, 21.2% and 21.2% respectively in under-five children. Eleven TB deaths and one defaulter were reported. ITN's distributions were 100% but malaria is among the ten top diseases. Severe acute malnutrition is a major public health problem of the woreda. Nine hundred eighteen new admissions were reported at OTP sites. Acute Febrile Illness, Pneumonia and Acute Upper Respiratory Tract Infection were leading causes of adult morbidity in the woreda. While Pneumonia, Diarrhea and Acute Febrile Illness were the leading causes of morbidity in under-five children. Presence of treatment failure and defaulter may facilitate Multi-Drug Resistant (MDR) TB which is dangerous and very difficult to treat in nearby health facilities and can results in death. IEC/BCC and strong follow up tracing mechanisms should be established.

4.1.1 Introduction

Health profile is a system of collecting, organizing and summarizing health and others health related events to describe health and others health related conditions, demographic, socio-economic, political, cultural and others aspect of a 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. It is also a process that 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 country 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 MDGs 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 Arsi Negele Woreda administration, Agriculture, Health, Educational, Water Resource, culture and tourism, and energy office and Finance office. The document covers almost the data and activities of the period 2012-2013, 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 and to identify problems for priority setting of Arsi Negele Woreda, 2013/14

4.1.2.2 Specific objectives

- To summarize health and health related data of Arsi Negele Woreda
- To identify health service status of the woreda in 2013/14
- To understand basic infrastructures of the woreda
- To identify major health problems of Arsi Negele Woreda

4.1.3 Methods

4.1.3.1 Study Area

Health profile description was conducted in Arsi Negele Woreda, West Arsi Zone, Oromia Region, 2013/14.

4.1.3.2 Study Period

All required data of last year (2013 G.C) were collected, analyzed and interpreted from Feb 20, 2014 to February 30/2014.

4.1.3.3 Study Design

Descriptive cross sectional study was conducted using standard questionnaire. Hard copy and softcopy were reviewed to generate different data. In addition, interviewing and discussion with concerned body will also be conducted.

4.1.3.4 Study period

Health and health related performance of 2013/14, socio-economic, administrative setup and cultural aspect data were collected from 10-18/01/2014.

4.1.3.5 Data collection methods

Health and others health related data of last year (2013/14 GC) were collected and reviewed from woreda health office, education office, water & energy office, woreda administrative office, Culture and tourism office and different literature and publications to incorporate other un available information.

4.1.3.6 Data analysis procedures

Data was compiled and analyzed using Microsoft Excel software.

4.1.4 Results

4.1.4.1 Historical Background

Arsi Negele is one of the woreda of West Arsi Zone in Oromia Region. Historically, name of the Woreda was come from two terms "**Arsi"** and" **Negele**". As the culture and tourism baeuro and other areas elders explained that the name Arsi came from the name of the areas nation. More ever, there was a conflict between Ethiopian and Italian in 1933(EC) .In 1936(EC), this woreda was established and given the name "**Negele**" which means Peace and finally said to be "**Arsi and Negele".** Arsi Negele is bordered on the south by Shashemene Zuria, on the south west by Lake Shala which separates it from Shala Woreda, on the west by the Southern Nations, Nationalities and Peoples Region, on the north by east Showa with which it shares the shores of Lakes Abijatta and Langano, and on the east by the Arsi Zone. **(Culture and Tourism Office)**

4.1.4.2 Geography and climate

Arsi Negele Woreda is found at 231 Kilometer away from Addis Ababa to the southern part of Oromia Region. The area of the woreda is 155,727 hectares. The Arsi Negele Woreda is surrounded by four other woredas and one town. In the East – munessa and Kore , in the West- Shalla Woreda, in the North- Adami tullu Woreda, and by Shashemene town in south. The altitude of the woreda is 1500-3500 Meters above the sea level. The climatic condition of a woreda is 19% Dega, 46.5% Woyina Dega and 34.5 Kola. Annual temperature is estimated to be between 10^0c and 25^0c. Annual range of rainfall is 825-1150 mm with an average of 123 rainy days.

4.1.4.3 Administrative and political structure

Administratively, the woreda has forty-five (45) rural kebeles and three towns. Also there are about 1,225 villages in the woreda. All woreda's administrative offices are found in Arsi Negele town. It has different recreation area. The National Park known to be "Abiyata Shalla Park", three known lakes (lake Langano,Lake Abiyat and lake Shalla) were found in this woreda, which are the source of income for the woreda as tourism purpose. It is also rich in forest known to be "Kuke forest" and the endemic animal of Ethiopia known as "Waliya" is living in this forest which is also using for tourism purpose. The Arsi Negele Woreda have also eight loges and resorts (Filwuha Resort or Wabe shebele, African Vacation, Savana Bittch, Borati Resort,

Langano Log, Kerkero Log, Bishan Gari Loge and Muler PLC) used for tourism purpose. All the Logs were found in the range of 17km to 35km distance away from the Arsi Negele Town.

4.1.4.4 Demographic Information

The total population of a woreda is estimated to be 310,236 of which 154187 is male and 156,049 were female in 2005 E.C. Among these total population 3% (7170) of them are residing in urban areas. Among the total population Under 1year, less than 5 and less than 15 years constitute 9,617, 50,879, and 148,913 respectively. The older age group (>65) consists (14,705) 4.74% of the total population. The productive age groups child bearing women (15-49 years of age) accounts for (68,562) 22.1% of a population. Oromo and Amhara are the dominant ethnics in the woreda. Regarding religion distribution, most woredas' populations are Islam, with 68.86% followed by Orthodox 20.2%, while 8.99% of the population was Protestant, and 1.04% were Catholic.

Table 4.1.1: Estimated population by kebeles and age category, Arsi Negele, Oromia, 2014

S.N	Name of kebeles	Total population	Total HH (4.8)	<1 years (3.1%)	< 5 years (16.4%)	<15 years (48%)	>65 years (4.74%)	Women (15-49) (22.1%)
1	A/Sade	6020	1254	187	987	2890	285	1330
2	A/Shaldo	8362	1742	259	1371	4014	396	1848
3	A/wayo	5978	1245	185	980	2869	283	1321
4	Arsi Negele 01	13253	2761	411	2173	6361	628	2929
5	Adaba Tita	6557	1366	203	1075	3147	311	1449
6	Aga	2872	598	89	471	1379	136	635
7	Alge	3454	720	107	566	1658	164	763
8	Ars Negele 03	17761	3700	551	2913	8525	842	3925
9	Arsi Negele 02	10603	2209	329	1739	5089	503	2343
10	Ashoka	7489	1560	232	1228	3595	355	1655
11	B/ilala	12825	2672	398	2103	6156	608	2834
12	B/reji	8521	1775	264	1397	4090	404	1883
13	B/Walda	8201	1709	254	1345	3936	389	1812
14	C/ilalu	6533	1361	203	1071	3136	310	1444

S.N	Name of kebeles	Total population	Total HH (4.8)	<1 years (3.1%)	< 5 years (16.4%)	<15 years (48%)	>65 years (4.74%)	Women (15-49) (22.1%)
15	D/D/H	2418	504	75	397	1161	115	534
16	D/H/Q	5258	1095	163	862	2524	249	1162
17	Dawe	4120	858	128	676	1978	195	911
18	Degaga	9264	1930	287	1519	4447	439	2047
19	Denshe	6026	1255	187	988	2892	286	1332
20	Galefi qeelloo	2402	500	74	394	1153	114	531
21	Gembelto	6985	1455	217	1146	3353	331	1544
22	Gode gena	9798	2041	304	1607	4703	464	2165
23	Goljota	5175	1078	160	849	2484	245	1144
24	Gonde gurate	7264	1513	225	1191	3487	344	1605
25	Gorbi Arba	6422	1338	199	1053	3083	304	1419
26	Gorbi derara	6012	1253	186	986	2886	285	1329
27	Gubat arjo	2445	509	76	401	1174	116	540
28	Hadha boso	4610	960	143	756	2213	219	1019
29	Iddoo jigeessa	3782	788	117	620	1815	179	836
30	Karsa gara	8204	1709	254	1345	3938	389	1813
31	Lephis	6156	1283	191	1010	2955	292	1360
32	Mararo hawilo	8896	1853	276	1459	4270	422	1966
33	Meti	1883	392	58	309	904	89	416
34	Mudhui arjo	6602	1375	205	1083	3169	313	1459
35	Muka oda	6264	1305	194	1027	3007	297	1384
36	Qararu	5183	1080	161	850	2488	246	1145
37	Qarsaa illalla	4845	1009	150	795	2326	230	1071
38	Qarsaa majaa	3984	830	124	653	1912	189	880
39	Rafu hargisa	5259	1096	163	862	2524	249	1162
40	Sayo maja	5157	1074	160	846	2475	244	1140
41	Shala bila	5168	1077	160	848	2481	245	1142
42	Shopha bultum	9928	2068	308	1628	4765	471	2194

S.N	Name of kebeles	Total population	Total HH (4.8)	<1 years (3.1%)	< 5 years (16.4%)	<15 years (48%)	>65 years (4.74%)	Women (15-49) (22.1%)
43	Sirba lenda	5247	1093	163	861	2519	249	1160
44	Snabaro rogicha	5550	1156	172	910	2664	263	1227
45	Tufa	4106	855	127	673	1971	195	907
46	Tulu kalo	5787	1206	179	949	2778	274	1279
47	Turge	6256	1303	194	1026	3003	297	1383
48	Watera	5351	1115	166	878	2568	254	1183
Total		**310236**	**64633**	**9617**	**50879**	**148913**	**14705**	**68562**

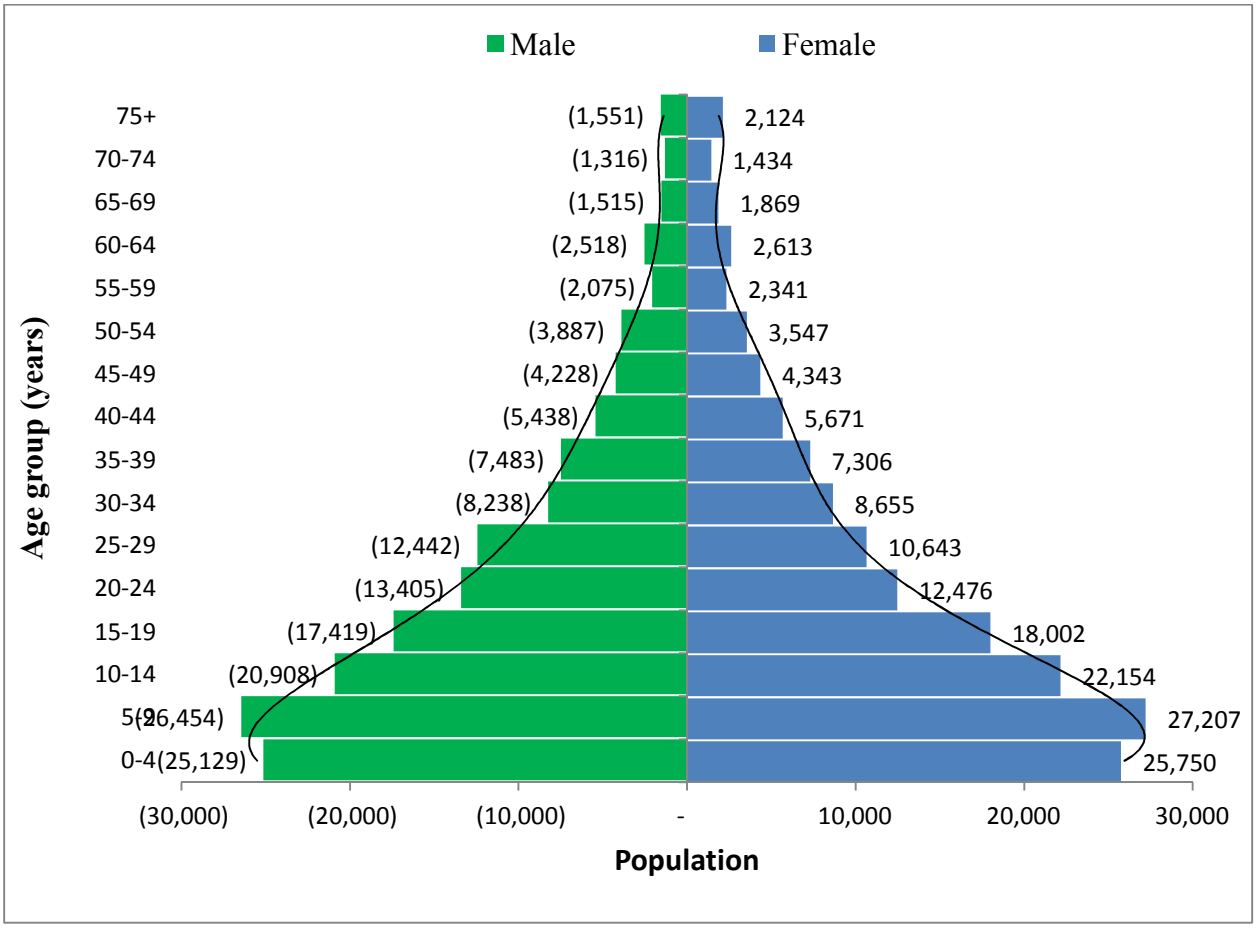

Figure 4.1.1: Population pyramid of Arsi Negele, West Arsi Zone, Oromia Region, 2014

4.1.4.5 Productivity and income

The main income of the woreda is agricultural. The agricultural density of the woreda was 50,505 (35.5%) hectares of the total land in 2013/14. In the Meher season of 2013/14, from 50,505 hectares of cultivated land, 1,876,074.4 quintals of yields were produced. The major annual crops grown in the woreda are cereals like Maize, Sorghum, Barley, Teff, and Wheat, and cash crops like Haricot been, Onion, and Green pepper are widely productive crops in the woredas. In 2013/14, the highest productive yields were Maize, Wheat and Teff with 901,156.86, 306,734 and 21,860 quintals respectively**.** The average monthly or yearly income of individual in the woreda is not known.

4.1.4.6 Education

In 2014, there are 12 governmental kindergartens, 99 primary schools (17 1st cycle (1-4) and 82 2nd cycle (5-8)), 4 secondary school (9-10) in Arsi Negele Woreda. However, there are no any governmental or non-governmental colleges. As information obtained from woreda education office, number of female students showed increment when compared to previous year in primary schools. There are 528 primary and 55 secondary schools teachers in the woreda.

Table 4.1.2: Number of enrolled students and their teachers by sex in Arsi Negele Woreda, Oromia, 2013/14

Types of School		Number of students			Number of teachers			Remark
		Male N (%)	Female N (%)	Total	Male N (%)	Female N (%)	Total	
Kindergarten		-	-	-	16	8	24	
Primary schools	1-4	-	-	-	104	110	214	
	5-8	-	-	-	242	72	314	
Secondary School (9&10)		-	-	-	42	13	55	

4.1.4.7 Facilities/Infrastructures

Arsi Negele has 48 kilometers of dry-weather and 85 all-weather road, for an average road density of 95 kilometers per 1000 square kilometers.

Among 43 kebeles and five towns of the woreda, all towns and 30 kebeles have road transportation access to woreda town in all weather and the rest 13 kebeles were only in dry season.

Telecommunication is one of effective mode of communication. Urban areas of the woreda have supplied with wave satellite type of telecommunication and rural didn't have any functional satellite or wireless telecommunication service. There is a mobile network working in all kebeles and towns of Arsi Negele Woreda.

In this woreda, tree rural kebeles and one town has supplied with electricity power. There is one Postal Office in Arsi Negele town serving the community of the woreda. There are five different Bank service in the Arsi Negele town one branch of Commercial Bank of Ethiopia is found in Goljota Kebele of the of the woreda; hence, all the community of the woreda where serving it properly.

4.1.4.8 Woreda Health System

4.1.4.8.1 Organization of woreda health office (Oregano gram)

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

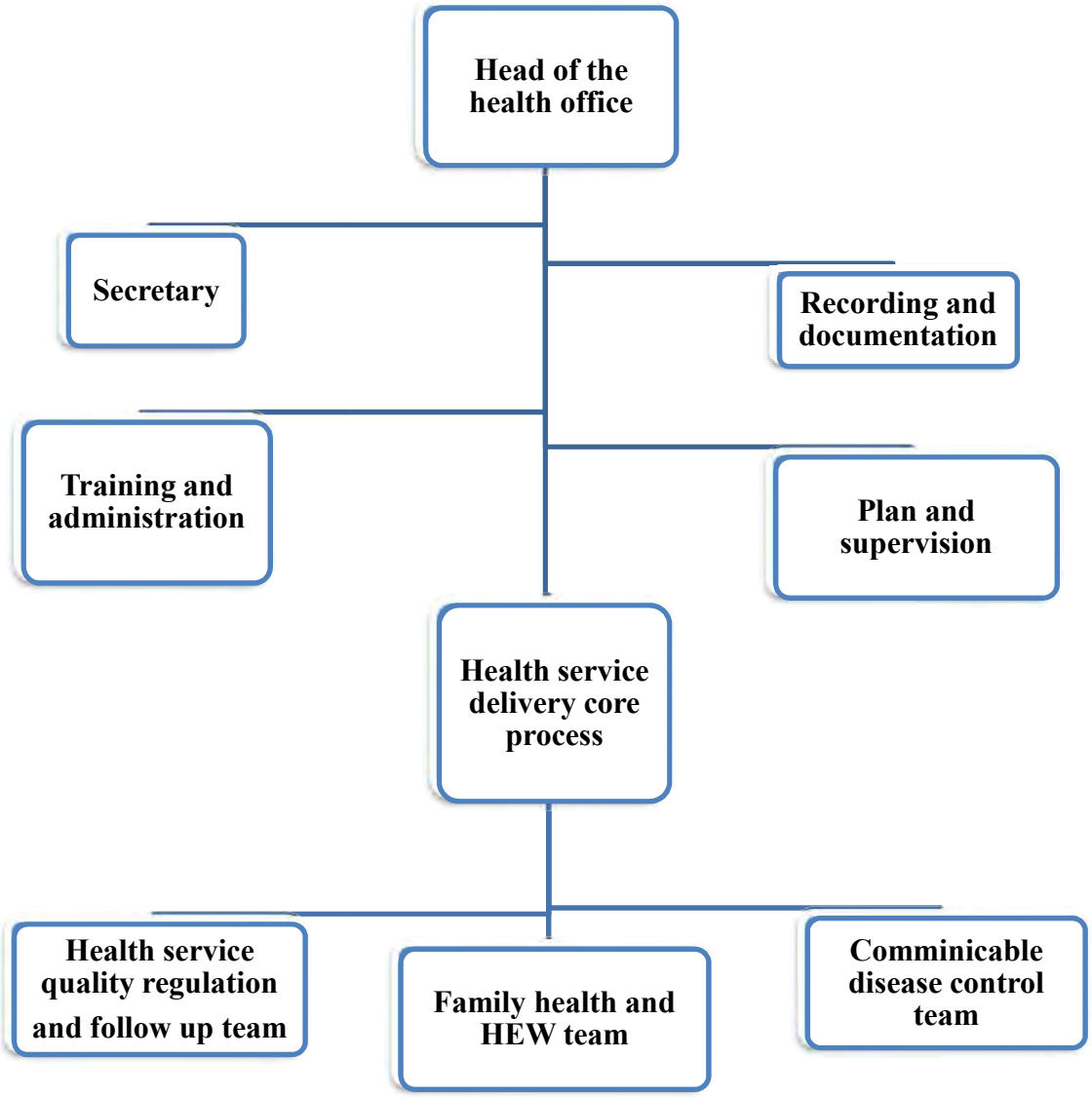

Figure 4.1.2: Organizational structure of Arsi Negele Woreda, Oromia, 2013/14

4.1.4.9 Health facilities and their services

Regarding health facilities, there are eight type "B" functional health centers namely Dole, Gorbi, Goljota, Meti, Besatu,Kelo,Godee, and Gembelto (newly constructed in 2013/14) and one type "C" health centers, and forty three health posts in the woreda. All the health centers were

giving both inpatient and outpatient services. The health service coverage of the woreda is 75% by health center and 100% by health post.

Table 4.1.3: Infrastructures in health facilities, Arsi Negele Woreda, West Arsi Zone, Oromia, 2013/14

S.N	Types of facilities	Health facility	
		Health Center (N=9)	Health Post (N= 43)
1	Water supply	6	0
2	Electricity Power	3	3
3	Telecommunication service	1	0
4	Road transportation access to woreda town	9	30 (all weather), 13 (only dry season)

4.1.4.9.1 Cold chain system

Good cold chain management system is essential for vaccine efficacy and prevents the occurrence of outbreak. In Arsi Negele Woreda all health centers (nine) and only two health posts have functional refrigerators. All these refrigerators are working with both kerosene and electricity power

4.1.4.9.2 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 staff is expected to support technically the health posts under their catchment. According to the principle of primary health care unit one health center should be included at least five satellite health posts under it based on the availability of health center in the woreda.

Table 4.1.4: List of health facilities with their respective catchment health posts

S.N	Name of health center(Catchment)	Type	Number of health posts supported by the catchment	Remark
1	Dole HC	B	5	
2	Gorbi H/C	B	5	
3	Goljota H/C	B	5	ART Service
4	Meti H/C	B	4	
5	Besatu H/C	B	3	
6	Kelo H/C	B	5	
7	Gode H/C	B	2	
8	Shala H/C	C	3	
9	Gembelto H/C	B	4	
10	Health office (Arsi Negele & Wayo cluster)	-	10	This HPs did not have HCs and then supported by the health office
Total			**46**	

4.1.4.9.3 Health indicators and vital statistics

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

Table 4.1.5: Population and Vital statistics in Arsi Negele Woreda, Oromia, March 2014.

S/N	Indicators	Number	%
1	Total population	310,236	100
2	Male	154,187	49.7
3	Female	156,049	50.3
4	Urban	9307	3
5	Rural	3009229	97
6	Total live births	10,548	3.4
7	Under 1 years old	9,617	3.1

S/N	Indicators	Number	%
8	Under 5 years old	50,879	16.4
9	Women 15- 49 years old	68,562	22.1
10	Pregnancy women	11,479	3.7
12	IMR/1000	No data	-
13	Neonatal Mortality Rate	No data	-
14	Under 5 Mortality Rate	No data	-
15	Maternal Mortality Rate	No data	-
16	Crude Birth Rate/1,000	No data.	-
17	Crude Death rate	No data	-

4.1.4.9.4 Maternal and child immunization coverage

Immunization activity was started in Ethiopia before three decades. This Expanded Program on Immunization is focused on vaccine preventable diseases, and now included about 10 diseases vaccine. In this woreda among 10,548 total live births, 11,056 (105%) were vaccinated for BCG in 2013/14. In addition, of the 9,617 eligible infants, 10858 (113%) and 10751(112%) of them were immunized for OPV3 and Penta-3 vaccines respectively. In this year 10497 (109%) under 1 year children were vaccinated for measles and 10,016 (104%) were fully immunized. Of a total 9617 under 1-year children, 58.5% of them were protected at birth; their mother was immunized two or more doses of TT vaccination during their pregnancy or three or more doses before she give birth. Of 55,842 planned non-pregnant women, 29,009 (52%) were vaccinated for TT2 and more during 2013/14. During the same year, out of 11,749 planned pregnant women, 11,046 (94%) were immunized for TT2 in Arsi Negele Woreda.

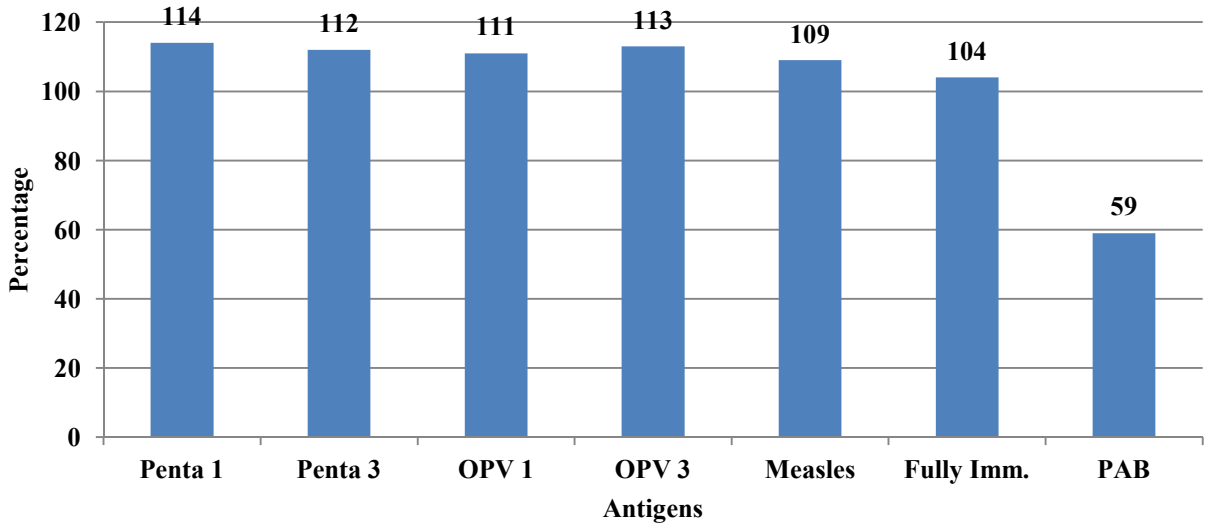

Figure 4.1.3: Vaccination coverage of children in Arsi Negele Woreda, Oromia Region, 2013/14

4.1.4.9.5 Maternal Health Service

Anti-natal care services were given for 11461 (99.8%) 11479 pregnant women in the woreda. Safe and clean delivery by HEWs is (1250)10.9% in 2013/14.

4.1.4.9.6 Water supply and sanitation

According to data obtained from Arsi Negele Woreda Water Resource Office, of the total rural population of the woreda, 83% was supplied with potable water. In this woreda, there are 19 protected springs, 12 protected well, 81 stand pipes of water sources in 2013/14.

Table 4.1.6: Types of water sources in Arsi Negele Woreda, West Arsi Zone, Oromia, 2013/14

	Types of water sources	Number
1	Protected spring	19
2	Un protected spring	8

	Types of water sources	Number
3	Protected well	12
4	un protected well	110
5	Stand pipe	81
Total		**230**

4.1.4.9.7 Latrine Coverage and Utilization

Among 64,633 households, 55,142 (85%) of them has standard latrine in 2013/14. There is no clear data on utilization of latrine in the woreda. One villages of the woreda is free from open defecation in Meraro Hawulo kebele and other eight villages of the woreda are on progress to become open defecation free. All households in these open defecation free village are using their latrine properly.

4.1.4.9.8 Top leading causes of outpatients visit (Morbidity)

Acute febrile illness and pneumonia is a top leading cause of outpatient morbidity in adults and pediatrics in the woreda, which is responsible for 5492(10.9%) and 4312(9.19) cases respectively in 2013/14. Diarrhea, upper respiratory tract infection, and all types of malaria are among top ten diseases that cause outpatient morbidity in the woreda.

Table 4.1.7: Adult Top ten leading causes of outpatient morbidity in Arsi Negele Woreda, 2013/14

Rank	Disease	Number of cases	%
1	Acute Febrile Illness	5492	25.9
2	Pneumonia	2856	13.5
3	Acute upper respiratory infection	2246	10.6
4	Unspecified infection and parasitic diseases	2126	10
5	Infection of skin and sub coetaneous tissue	1666	7.9
6	Trauma(injury)	1566	7.4
7	Urinary truck infection	1500	7.1
8	Malaria	1396	6.6

Rank	Disease	Number of cases	%
9	Unspecified cause of external cause	1366	6.4
10	Unspecified obstetric condition	976	4.6
Total		**3396**	**100**

Table 8: Five top leading causes of outpatient morbidity in pediatrics in Arsi Negele Woreda, West Arsi Zone, Oromia, 2013/14

Rank	Disease	Number of cases	%
1	Pneumonia	4312	40.3
2	Diarrhea	2264	21.2
3	Acute febrile illness	2264	21.2
4	Unspecified infection and parasitic diseases	1046	9.8
5	Acute upper respiratory infection	810	7.6
Total		**10696**	**100**

4.1.4.10

4.1.4.11 Endemic Diseases

4.1.4.11.1 Malaria

In this woreda, there are 32 malarious kebeles with 161,276 at risk population. During 2013/14, all households in the malarious kebeles (33,599) were supplied with ITNs (i.e. 100% coverage). However, there is no clear data on utilization coverage of ITNs among supplied households. Indoor residual spray was done for 28 kebeles with 40938 houses in 2013/14 with deltamethrin. A total of 4757 cases of malaria with no death were reported. During the same year there was no any shortage of malaria supplies such as Coartem and RDT in the woreda.

4.1.4.11.2 Tuberculosis and Leprosy

A total of 545 tuberculosis cases (All form of tuberculosis) were reported from health facilities to the woreda in 2005 EFY. From the total all forms of TB cases 248 PTB negative, 158 PTB positive and 121 extra PTB. The Tb detection rate of the woreda was 48% with 95% and 96% of TB cure rate and TB treatment success rate respectively. There was one Tb defaulter and eleven (11) deaths on Tb treatment in the 2013/14. A total of 35 Tb patients were screened for HIV in

the same year. In 2013/14, 279 TB patients were screened for HIV/AIDS. There were three leprosy cases and all of them were on treatment in the same year in Arsi Negele Woreda.

4.1.4.11.3 HIV/AIDS

In this woreda, 26,877 people were screened for HIV/AIDS in 2005 EFY. Among these clients, 99 (0.37%) of them were confirmed as positive result. The prevalence of HIV/AIDS is 0.25%. There are 788 PLWHAs in the woreda. Among 99 new cases, 98 people have started ART service. Goljota health center is the only health center on which ART service is given in the woreda. Community conversation is undertaking in all kebeles of the woreda to enhance awareness of the community on prevention and control of HIV/AIDS.

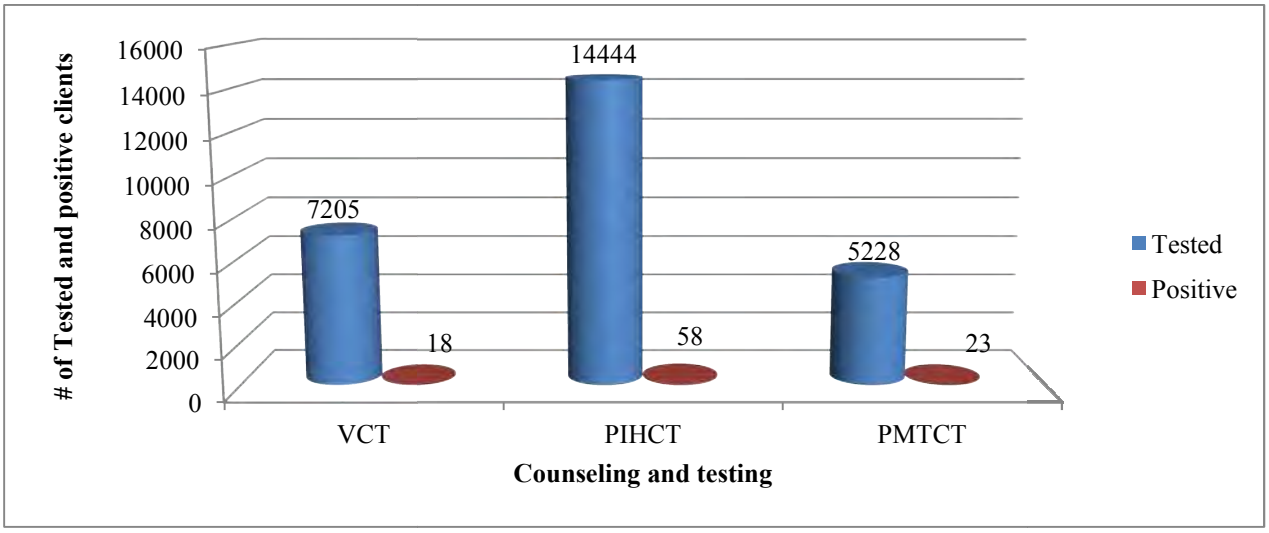

Figure 4.1.4: Number of tested and positive clients for HIV in Arsi Negele Woreda, Oromia, 2213/14

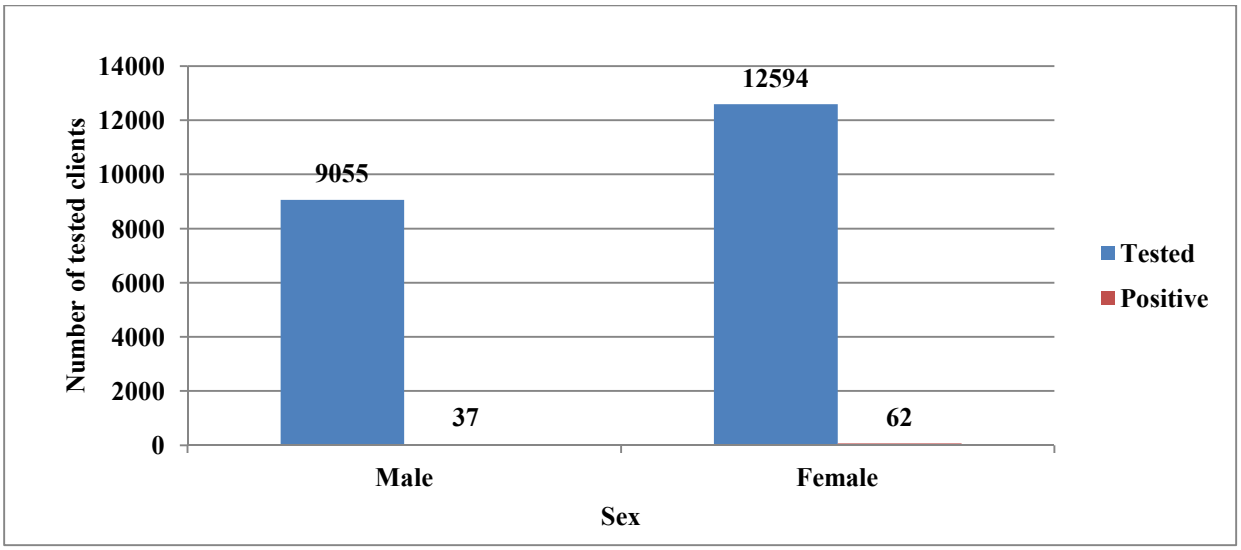

Figure 4.1.5: Number of screened and positive clients by sex in Arsi Negele Woreda, Oromia, 2013/14

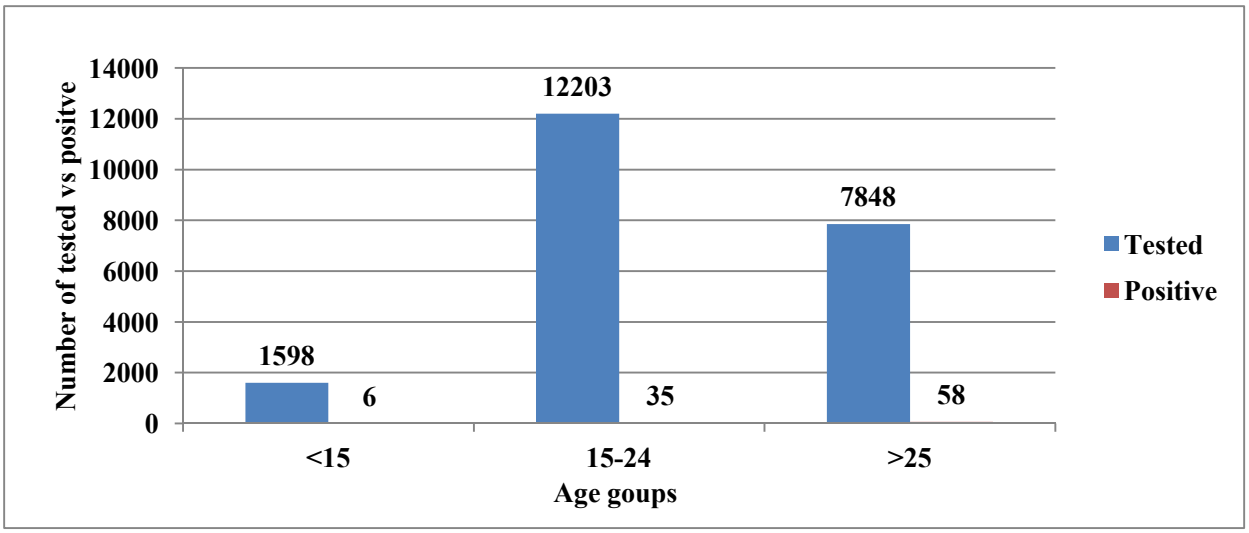

Figure 4.1.6: Number of tested and positive clients for HIV in VCT and PICT by age group in Arsi Negele Woreda, Oromia in 2013/14

4.1.5 Severe Acute Malnutrition (SAM)

Severe acute malnutrition is a major public health problem of the woreda. Almost all of the kebeles in the woreda were hot spot areas for malnutrition. Forty six OTP and one SC sites were established in 2013/14. Nine hundred eighteen new admissions were reported at OTP and no

admission at SC in the woreda. There were also TSF and CBN programs working on nutritional activities in 43 kebeles which enrolled 783 children in the program in 2013/14.

4.1.5.1.1 Outbreak and other disaster situations

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

4.1.5.2 Budget allocation for woreda health office

In 2013/14, 5,940,916 ETB was allocated for the woreda health office. Of this total budget, 93,477 had allocated for different activities. The woreda had allocated 82% for salary and 18% for running different routine activities. During the same year, 584,549.70 ETB sourced from different donors were distributed to this woreda from 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 others.

4.1.5.3 Human Resources

In this woreda, 111 health professionals, 87 Health Extension Workers and and 66 supportive staff 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 4.1.8: Distribution of human resources of all categories in the Arsi Negele Woreda health office, 2013/14

S.N	Profession	Level of education	Number		
			Male	Female	Total
1	Physicians/GP	Dig	0	0	0
2	Health officers	Dig	6	1	7
3	Nurses	BSC	4	2	6
		Dip	47	12	59
	Health education & promotion	BSC	0	1	1
4	Environmental health	BSC	1	0	1
5	Laboratory	BSC	3	0	3
		Dip	7	1	8

S.N	Profession	Level of education	Number		
			Male	Female	Total
6	Pharmacist	BSC	1	0	1
7	Druggist	Dip	9	2	11
8	Mid-Wifery	Dip	2	11	13
9	HEWs	Cert.	0	87	87
10	Supportive staff	Dip & cert.	48	19	67
Total			**128**	**136**	**264**

4.1.6 Discussion

Acute febrile illness is a woreda public health problem leading by 25.9% of the total diseases reported at outpatient visited. Even though malaria, pneumonia and diarrhea are among ten top diseases in the woreda, 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 in addition to health workers and improved clinical diagnosis (detection of any fever like symptoms with RDT at health post level.

Pneumonia (13.5%) was taking the second rank next to acute febrile illness in the adult outpatient and leading causes of morbidity in (40.3%) in pediatrics followed by acute upper respiratory (10.6%) disease in adult OPD and diarrhea (21.2%) in pediatrics OPD which are placed in the third and second level respectively according to woreda prioritization setting. However, no matter how acute febrile illness is being the leading causes of OPD visited; this might be due to endemicity of malaria in the woreda. Therefore, treatment of acute febrile illness should be supported with specific laboratory diagnosis to rule out malaria, typhoid fevers or other diseases with fever like symptoms which sometimes mimic one over the others.

Tuberculosis detection rate of the woreda was 48% which higher than the regional case detection rate of 2011 which was 39%, but below 70% which is recommended by WHO. Generally in 2011, there were a total of 545 all forms of tuberculosis 228/100,000 population cases were diagnosed and reported in the woreda which is above 163/100,000 population.

Out of 26,877 clients screened (tested) for HIV 17,822 (66.3%) of them were female. This may revealed 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 incidence of woreda is 0.04%. Among the total clients registered at OPD level (26,877), 45.3% 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 low 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 kites 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 increased from 51% to 83% coverage in the year 2014. This is because of new additional stand pumps constructed in 9 kebeles and repaired broken hand pumps in the rest of rural kebeles.

Severe acute malnutrition is a major public health problem of the woreda. Most of the kebeles in the woreda were hot spot areas for malnutrition. Forty six OTP and one SC sites were established in 2013/14. Nine hundred eighteen new admissions were reported at OTP and no admission at SC in the woreda. This may be due to availability and functionality of OTP program in all heath posts. There were also TSF and CBN programs working on nutritional activities in 43 kebeles which enrolled 783 children in 2013/14.

Prevalence of HIV among PMTCT service was 0.26%, which is low as compared to 4% of the national prevalence of 2007 ANC HIV sentinel surveillance (4). The proportion of pregnant women counseled and tested for PMTCT was 45.5.4%.

4.1.6.1 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).

4.1.6.2 Conclusions

Acute febrile illness and pneumonia is a top leading cause of outpatient morbidity in adults and pediatrics in the woreda cases respectively in 2013/14. Diarrhea, upper respiratory tract infection, and all types of malaria are 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. In addition eleven deaths were reported, and one case was reported as failed the treatment due to weak attention given to it.

Even though ITN coverage was 100% and indoor residual spraying was conducted as an interventions activity and preventive measures in the last year, malaria was still one of the causes of morbidity among the ten top diseases in the woreda.

Male clients have lower awareness and negative attitude towards HIV testing services than females.HIV Screening at PICT site service was low and the overall incidence of HIV infection 0.32% in the woreda among the general population.

Severe acute malnutrition is a major public health problem of the woreda. Most of the kebeles in the woreda were hot spot areas for malnutrition. ART service was given only in one health center in the woreda.

4.1.6.3 Recommendations

- Treatment of acute febrile illness should be supported with specific laboratory diagnosis at health post level using RDT (in ICCM program) to rule out malaria, typhoid fevers or other diseases with fever like symptoms which sometimes mimic one over the others.
- DOTs program should have to be started in all health facilities and more efforts have to be done on the TB case detection rate and will improve the follow up of the patient and the reporting system of all the health facilities in the woreda.
- Even though ITN coverage was 100% and indoor residual spraying was conducted as an interventions activity and preventive measures, malaria was still one of the causes of morbidity among the ten top diseases in the woreda. Therefore, special attention should have to be given to communities practices on ITN utilization and measures taken to sprayed houses by health extension workers.
- Awareness creation by health extension workers to improved indicating lower awareness among men population in the woreda.
- Any OPD clients and pregnant mothers visiting the health facility should have to be counseled and tested or screened for HIV.
- OTP, TSF and CBN programs working on nutritional activities should have to be strengthened in all heath facilities.
- Since the woreda has more HIV positive clients, ART services have to be started in other health centers in addition to golgota health center.

4.1.6.4 Acknowledgment

I would like to thank Arsi Negele Woreda health office for their cooperation to get all available data. Mainly, my gratitude is big for Mr. Kedir Tahir and Miss Fossia, woreda health office MCH and Regulatory unit's expert for their continuous support. In addition, I would like to thank woreda's finance and economic development, Education, Culture and Tourism, Land and Environmental Protection offices for their volunteer and gave me regarded data.

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4.1.7 Reference

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Chapter–V

Scientific manuscript for peer reviewed journals

5.1 Malaria Outbreak Investigation-Saba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia Region, Ethiopia, September 2014

Abstract

Introduction: In Ethiopia, malaria is both seasonal and unstable. A malaria outbreak was reported in Seba Boru and Melka Soda Woredas of Guji and Borena Zones in Oromia, Ethiopia in September 2014. The aim of this study was to describe the magnitude of morbidity and mortality caused by the outbreak, investigate factors that contributed to the occurrence of the epidemics and to institute appropriate intervention measures to contain the epidemics in the woreda.

Method: We used microscopic and rapid diagnostic tests to confirm the disease. We reviewed the previous year's malaria data to establish a threshold level and to understand the trends of the disease. The magnitude of the disease was described by person, place and time. We conducted an unmatched case-control study with 100 randomly selected cases and 100 community controls.

Result: Among the total of 915 suspected cases, 549 (60%) were confirmed malaria cases. The attack rate was 23.2 per 1000popn and three malaria related deaths were reported in September 2014. Slide positivity rate was 65.4%. Person age 15 years and older were most affected with an attack rate of 28.4%. Use of insecticide treated bed net was protective factor and statistically significant with OR of 0.17[95% CI= 0.06-0.51]. Presence of stagnant water for mosquito breeding in less than 500-1000m from households was associated with malaria outbreak and statistically significant with an OR of 8.18[95% CI= 4.05-16.53].

Conclusion: Poor insecticide treated bed net utilization and presence of stagnant water were attributed for the outbreak. We recommended proper utilization of insecticide treated bed net and environmental management through optimized community participation.

Keywords: Malaria, Outbreak, Case-Control, Seba Boru, Melka Soda, Ethiopia

Words: 262

5.1.1 Introduction

Malaria is mosquito-borne parasitic disease that causes 300 million to 500 million episodes of acute illness and 1.2 million deaths per year globally [1]. Malaria is known to kill one child every 30 seconds, 3000 under five children per day and affects over 100 countries of tropical and subtropical regions of the world [2].

It is also a major public health problem in Ethiopia and has been consistently reported as one of the three leading causes of morbidity and mortality. *Plasmodium falciparum* and *P. vivax* are the two dominant parasite species causing malaria in Ethiopia, with relative frequencies of about 60% and 40%, respectively. The proportion varies by location and season. *Plasmodium falciparum* is the dominant parasite species in malaria epidemics and is species that causes severe and complicated manifestations and almost all malaria deaths. *P. falciparum* has a remarkable biological diversity including an ability to develop resistance rapidly to a number of anti-malarial drugs, creating a major challenge in providing patients with this infection with effective malaria chemotherapy [3].

Since 1958 in Ethiopia, major epidemics of malaria have occurred at approximately five to eight year intervals, though recently there has been a trend towards smaller-scale, more frequent, sporadic epidemics and seasonal case build ups. In 1998, a widespread severe malaria epidemic occurred in most highland as well as lowland areas in Ethiopia. Many localized but severe outbreaks of malaria occurred in Amhara and SNNP Regional States, leading to widespread epidemic malaria in highland and highland fringe areas (up to 2,500 meters) in 2003 [3,4].

Malaria epidemics can occur as a result of variability or changes in the rate of infection and population immunity. Generally epidemics occur in places where there is low and unstable malaria transmission, and where people have low or no immunity. However, there can be epidemics in high transmission areas if there is a poor health system, interruption of anti-malarial measures or migration of non-immune individuals, such as population searching for labor. Other triggering factors include: Unusual local weather phenomena and activities resulting in environmental modification that increase vector population; increased vulnerability of population from famine and malnutrition; Interruptions of anti-malarial measures which have kept malaria under control [3, 6].

Conventionally in areas of high-endemicity, prevalence of malaria infection is known to peak at an early age with an increase up to the age of 5 years; followed by a sharp fall in age groups 10-15 years and slowly declining with increasing age. This pattern of prevalence is a reflection of the age-related state of anti-malaria immunity that is developed as a result of repeated malaria infections under established malaria endemicity [8].

Oromiya is one of the region prone for malaria epidemic in the country. Among 304 woredas, 75 of them were identified as hot spot area for malaria disease. More than 23 million people in Oromia are living in risk area for malaria infection. In Oromiya Region malaria occurs in epidemic forms from September to December and peaks in October and November [11].

Recently, the occurrence of malaria epidemics has become more common in Oromia Region due to environmental and climatological factors that include chloroquine-resistant falciparum malaria, high population movements and the expansion of agro-industrial developments and irrigation schemes in malarious areas.

Malaria is the most common disease in Guji Zone with frequent epidemics. The transmission is seasonal and normally peaks during September to December after the summer rainy season. Although not well documented, malaria epidemics of variable degree had affected Seba Boru Woreda (formerly under Shakiso) from 1997-99 [13].

For 44% of the woredas in Guji Zone, the climatic condition for most places is temperate and low-land. The annual rainfall in most places was above 2000m. Saba Boru Woreda is the highest malaria reporting woredas in the zone, which is located between 1500-2000m above sea level and represents the most malaria epidemic-prone area of Guji Zone. All kebeles 100% (24 kebeles) of Seba Boru Woreda are malarious with 117,889 (100%) populations are at risk for malaria. In 2013/14, about 7,523 suspected cases were examined by RDT or microscopy for malaria. Of which, 2,364 (31.4%) cases were positive and treated for malaria in the woreda.

There was a normal trend of malaria cases in Seba Boru Woreda during the last 15 years. In September of 2014, unusual increment of malaria cases was reported from Seba Boru Woreda, Guji Zone, Oromiya Region. After having this, team was deployed to this woreda and investigated the outbreak.

5.1.2 Methods

5.1.2.1 Descriptive epidemiology

Malaria was defined and identified as acute febrile illness with blood smear positive for malaria in Seba Boru Woreda during this outbreak. We reviewed the previous five years data of malaria from Seba Boru Woreda health office and health facility. However, due to incompleteness of the previous five years data, last year (2013/14) weekly malaria cases report was used to set epidemic threshold level by doubling weekly data and comparing with similar week of this year. During this outbreak investigation, number of malaria cases and deaths were collected from health facilities on daily and weekly basis. Magnitude of this outbreak was described by age, sex, kebele/health facility, week, month and year. Similarly, slide positivity rate was calculated as those positive for malaria among total examined.

5.1.2.2 Analytical epidemiology

We conducted an un-matched case-control study to identify risk factors associated with the disease from September 18 to October 2, 2014. Community controls were selected for recently (not more than two weeks before interview) confirmed malaria case patients in 1:1 ratio. Controls were defined as having no malaria signs and symptoms for the last three months. During this investigation standard checklist was used to assess risk factors including sleeping and staying area during night, use of insecticide bed net, indoor residual spray, and presence of stagnant water or any other mosquito breeding area. Microsoft Excel and Epi Info version 7.1 were used to describe the disease and analyze associated risk factors. The risk factors for the outbreak were determined through Multivariate analysis by calculating Odds Ratio (OR) and 95% Confidence Interval (CI).

5.1.2.3 Laboratory method

Laboratory technicians conduct thick and thin smears with a 100 × oil immersion microscopy at one health center (Dawa) of this woreda. Additionally, RDT (Rapid Diagnostic Test) were also used in this health center whenever they faced shortage of reagents and during electric power interruption. Health extension workers also used RDT to identify confirmed malaria cases at health post and community level during outbreak investigation.

5.1.2.4 Environmental assessment

We collected data on the presence of mosquito breeding sites from the woreda health office and health facilities. Selected case-patients and controls were interviewed about presence of mosquito breeding sites in their compound and near to home within 500 meters or less than it. These sites include unprotected surface water, open deep well, solid and liquid waste collection and disposal facility. In addition, availability of uncovered plastic water container, old tires and broken glasses in the home or outside the home were also assessed. Similarly, observation of these potential mosquito breeding sites and presence of anopheles larvae in stagnant water was conducted.

5.1.3 Result:

5.1.3.1 Description of malaria cases by person

Of the total 915 suspected malaria cases, 547 (59.8%) were males. Majority of the suspected cases were Oromo ethnic (77%), and were Muslim (78%). About 86.5% of suspected cases were engaged in agricultural activities. The median age of suspected malaria cases were 19 years old (range - one month to 80 year). People ages above 15 year were more affected with an AR of 28.4/1000popn.

Table 5.1.1: Distribution of malaria cases by age, sex and plasmodium species in Seba Boru and Melka Soda Woreda, Guji and Borena Zone, September 1s^{t} to 26th, 2014.

Characteristics	Total tested (RDT + Micro)	Total positive	PR (%)	Plasmodium species		
				P.f, n (%)	P.v, n (%)	Mixed, n (%)
Sex						
Male	546	376	68.9	182(61.5)	67(60.4)	127(67.9)
Female	362	218	60.2	114(38.5)	44(39.6)	60(32.1)
Age group						
0-4	149	82	55.0	39(13.2)	19(17.1)	24(12.8)
5-14	178	135	75.8	63(21.3)	28(25.2)	44(23.5)
15-44	526	350	66.5	176(59.5)	59(53.2)	115(61.5)
45+	55	27	49.1	18(6.1)	5(4.5)	4(2.1)
Total	**908**	**594**	**65.4**	**296**	**111**	**187**

Table 5.1.2: Malaria Attack Rate per 1000 and Case Fatality Ratio by age and sex, Seba Boru Woreda, Giji Zone, Oromia Region, Ethiopia, 2014

Variables	Population	Number of cases	Number of Deaths	Attack Rate per 1000	Case Fatality Ratio (%)
Age group					
0-4	4,192	82	0	19.6	0
5-14	8,078	135	0	16.7	0
>15	13,294	377	0	28.4	0
Sex					
Male	12,654	376	0	29.7	0
Female	12,910	218	0	16.9	0
Total	**25,564**	**594**	**0**	**23.2**	**0**

5.1.3.2 Description of malaria cases by place

A malaria epidemic was detected and reported to Guji Zone health department on August 25th, of 2014. Among the total cases, 675 (73.8%) were from Seba Boru Woreda of Guji Zone and 240 (26.2%) were from Melka Soda Woreda of Borena Zone in the period September 1st to 26th of 2014. Three malaria related deaths were also reported by the community from Seba Boru Woreda.

Table 5.1.3: Distribution of malaria cases by kebele and plasmodium species in Seba Boru and Melka Soda Woreda, Guji and Borena Zone, September 1st to 26th, 2014

Name of Woredas	Name of Kebeles	Total tested (RDT or Micro)	Total positive (PR)	Plasmodium species		
				Pf, n (%)	Pv, n (%)	Mixed, n (%)
S/Boru	Buri Ejersa	615	394 (64.1)	209 (53.1)	69 (17.5)	116 (29.4)
	Chekata Kojawa	55	19 (34.5)	8 (42.1)	5 (26.3)	6 (31.6)
M/Soda	Dada Oda Budu	238	181(76.1)	79 (43.7)	37 (20.4)	65 (35.9)
Total		**908**	**594(65.4)**	**296(49.8)**	**111(18.7)**	**187(31.5)**

Table 5.1.4: Malaria attack rate by kebeles, Saba Boru Woreda, Guji Zone, Oromia, Ethiopia, 2014

Name of woredas	Name of Kebele	Total Population	Sex		Age group			Total Cases	Attack Rate per 1000
			Male	Female	0-4 yrs	5-14 yrs	>15 yrs		
S/Boru	Buri Ejersa	10782	248	146	54	84	256	394	36.5
	Cheketa Kojowa	8174	11	8	2	9	8	19	2.3
M/Soda	Dada Oda Bedu	6608	117	64	26	42	113	181	27.4
Total		**25564**	**376**	**218**	**82**	**135**	**377**	**594**	**23.2**

The overall AR and SPR was 23.2 per 1000popon and 65.4% respectively. The population in Buri Ejersa Kebele was more affected by malaria followed by Dada Oda Bedu with an AR of 36.5 and 27.4 per 1000popn respectively, where as Dado Oda Bedu Kebele high SPR (76.1%).

5.1.3.3 Description of malaria cases by time

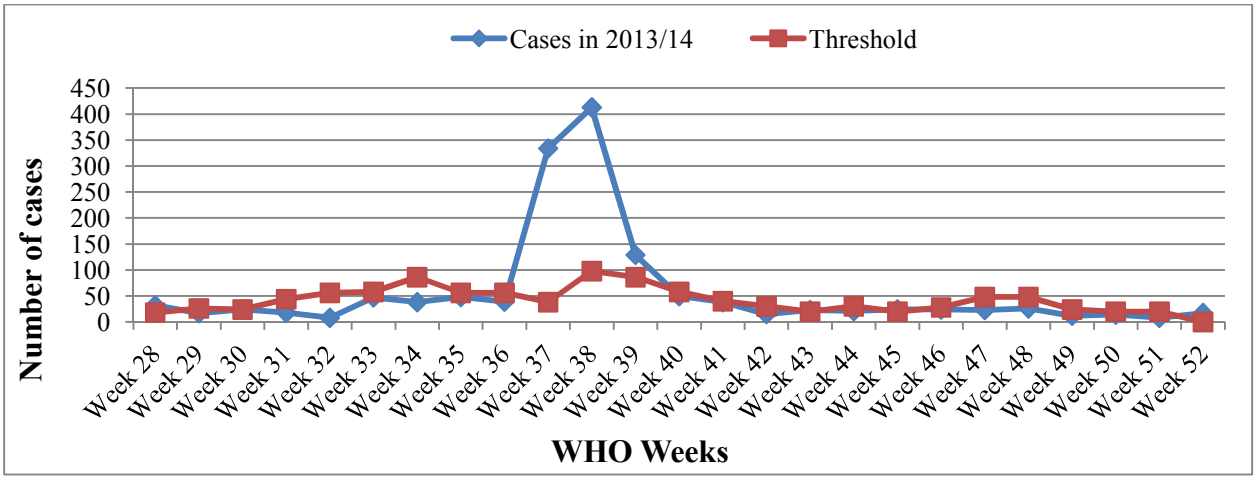

Figure 5.1.1: Shows new cases crossing thresholds at WHO week 36, 2014

5.1.3.4 Laboratory

From September 1st to 26th, 2014, a total of 908 blood smear tests were complete by microscopy and RDT for suspected malaria cases in Dawa Health Center, including the catchment health posts, of Seba Boru Woreda. Of the total tested cases, 594 (65.4%) were positive for malaria and eleven (1.2%) cases were treated clinically. Among the positive cases, 296 (49.8%) were P. Falciparum, 111 (18.7 %) P. Vivax and 178 (30%) were mixed malaria.

5.1.4 Risk factors analysis

During this un-matched case-control study, 100 malaria case-patients and 100 community controls were selected and interviewed from three kebeles (two from Seba Boru and one from Melka Soda) of the woredas. Of 100 case-patients and 100 controls, 61 (61%) and 69 (69%) were males for case-patients and controls respectively. The median age of both cases and controls were 20 yea

Table 5.1.5: Multivariate vs bivariate analysis of risk factors for malaria outbreak-Seba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia, Ethiopia, 2014

S.N	Risk factors	Crude OR(95%CI)	Adjusted OR(95%CI)	Adjusted P-value
1	Using bed net (every night)	0.17 (0.06 - 0.51)	0.14 (0.03 - 0.42)	<0.0001
2	Presence of stagnant water in less than 500-1000m	8.18 (4.05 – 16.53)	1.93 (1.35 - 2.77)	0.003
3	Availability of broken glass in the compound	9.41 (4.13 - 21.42)	10.90 (3.32 - 35.77)	0.0001
4	Presence of old tires in the compound	6.74 (3.05 - 14.90)	4.63 (1.49 - 14.39)	0.008
5	Availability of waste plastic containers in the compound	6.69 (3.32 - 13.51)	4.35 (1.58 - 12.01)	0.0044
6	Not having awareness on transmission mechanisms	11.93 (5.56 -25.6)	7.17 (2.55 - 20.16)	0.0002
7	Sleeping outside of their home during night	10.14 (5.22 - 19.7)	5.48 (1.51 - 19.81)	0.0096

5.1.5 Discussion

Multiple risk factors were assessed during the investigation beside intervention activities, and based on the results several factors could be attributed to the ccurrence of this outbreak. Usually, poor personal practice towards malaria prevention, temperature, and rainfall and population movement are contributed for the existence of malaria outbreak [5, 11].

This outbreak was detected at the end of August 2014 and crossed the threshold level at WHO Epidemiologic Week 36 of September 2014. The outbreak was lasted for one month (September1st to 26th 2014) due to daily new migration of non-immune individual movements to these areas for mining work as well as very poor preventive activities toward malaria in the woreda. Heavy rain fall that occurred in the mid August (WHO week 34) was significantly contributed for the availability of stagnant water, and unconditional temperature in the woreda might also favored mosquito breeding. Moreover, Seba Boru Woreda is a place where gold mining is under way both by private organization and many unknown number of migrants come to work in the mines from different parts of the country. Therefore, excavation brings about holes filled with water suitable for mosquito breeding. Unusual heavy rainfall followed by high temperature is considered as the cause of malaria epidemics [12-13]. Strong case detection and management were resulted in fewer malaria complications and zero case fatality rate during this outbreak. According to woreda health office report, indoor residual spray was not conducted since August 2013. Houses holds were not sprayed before 12 months prior to the occurrence of outbreak which is more than six months after spray and not protective. Correct utilization of mosquito nets, anti-malarial spraying, and appropriate use of personal preventative measures such as use of repellent and protective cloth will reduce incidence of malaria [11]. A previous risk factor analysis by Deressa et al in Oromia Region showed that both spraying and household ownership of a mosquito net were associated with lower risk of febrile illness in children. Findings of our study also exhibited that using of bed net every night is associated with malaria infection.

Stagnant water in mined holes was found to be a major mosquito breeding site in this woreda. Following this, it was believed that there were mosquito larvae in this stagnant water as observed by investigation

team including regional and zonal malaria expertise with naked eye. However, it was challenging to identify species of larvae and measure their quantity technically. Similar analytic approach in Sri Lanka and India indicated that people living closer to vector breeding sites were at higher risk for malaria than those living farther away. Research conducted in Ghana also showed that abundance of water bodies have been associated with increased larval or mosquito abundance and thus increased risk for malaria transmission in human populations. In addition to weak vector control activities, absence of indoor residual spray and ITN distribution during last year was contributed for the outbreak.

Males were more affected by malaria than females in the woreda. This may be due to immigration of more males from different other places to mining area and also participate more on mining work than females.

5.1.6 Limitation

There was no weekly malaria morbidity report before 2012 in the woreda to set threshold level using previous five years data. Due to this reason, last year (2013) weekly malaria data was doubled and compared with the same time of this year report to establish threshold level.

5.1.7 Conclusion

There was malaria outbreak in Seba Boru Woreda of Guji and Melka Soda of Borena Zones. Age five years and older were more affected by the disease. Kebeles which has proxy to mining area are highly affected. Presence of stagnant water, poor utilization of insecticide treated bed net and household utensils like waste plastic water container and broken glass were significantly contributed for the occurrence of the outbreak in this woreda. Sleeping outside of their home during night and having poor awareness on means of transmission has also contributing risk factors for the occurrence of the outbreak.

Late notified of the outbreak might showed that there was weak monitoring of malaria trends at all levels. Unable to detect the outbreak timely and delayed response such as environmental management and indoor residual spray might be attributed for the deaths and long lasting period of the outbreak. Presence of stagnant water in the mining hole has been a major mosquito breeding site which was associated with the illness. Insecticide treated bed was not distributed in last three years (2012-2014).

5.1.8 Public health interventions

A total of 19,037 (97%) households with 28,106 unit structures were sprayed with

Propoxure and Bendiocarb chemical in 19 kebeles of the woreda. Abate chemical was also sprayed as anti-larval on stagnant water with an estimated area of 846 meter square. A total of 58 volunteered people were participated on this activity. Communities were mobilized and taught on prevention and control measures of malaria disease. Health professionals were mobilized and assigned to affected kebeles for active case search and early case management at the community and health facility level.

5.1.9 Recommendation

Since all kebeles of the woreda are malarious area insecticide treated bed net should be distributed for all households. Beside this, utilization of bed net should be monitored and optimized. Regular indoor residual spray should have to be planned as per required standard (twice per year) and applied before rainy season. ITN should be planned and distributed for all kebeles in the woreda. Identification and removal of potential mosquito breeding sites should be conducted by maximizing community participation, and also the mining owners have to give special emphasis to the mining hole and have to participate his workers. Trends of malaria cases should be monitored in weekly basis at all levels. This could help to detect malaria outbreak timely. Usually, malaria prevention and control will be effective by establishing community ownership. So that, increasing community effort in malaria prevention should be priority area of the woreda. Similarly, the woreda administration and different sectors should be participated in malaria control activities. Weekly and monthly malaria morbidity report should be appropriately documented for further review and use properly when ever needed.

Coverage and Utilization of ITNs should be identified at woreda level at every Ethiopian fiscal year.

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Chapter–VI

Abstracts for Scientific Presentation

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6.1 Measles Outbreak Investigation-Didesa Woreda, Ilu Aba Bora Zone, Oromia, Ethiopia, March 2014

6.1.1 Abstract

Introduction: Didesa was one of the measles outbreak affected woreda in Oromia Region in 2014. Mede-Misoma, Burka-Jalele, Degaga and Adis-Alem were among the measles affected kebeles in Ilu Aba Bora Zone. Measles is a leading vaccine preventable contagious disease caused by a virus genus Morbilli. According to the official report, an outbreak of measles is occurring throughout the regions of Ethiopia. We conducted this study to determine the magnitude of morbidity and mortality due to measles infection and risk factors associated with outbreak.

Methods: We used unmatched case-control study, 50 cases with 100 controls. We collected the data using measles line lists, observation of cold chain, key informant interviews and using structured questionnaires. We entered and analyzed the data using Epi-Info version 7.3.1 and Microsoft Excel.

Results: A total of 84 measles cases with no death were reported during the outbreak. The outbreak was confirmed for measles IgM antibody. The index case was seen in Mede-Misoma Kebele. ASAR was higher in age groups of 5-14 year (9.9/1000person). The overall attack rate was 5.8/1000person. Seventy percent of the cases were unvaccinated. Being vaccinated and having awareness on the mode of transmission for measles infection were protective factor for developing the disease and statically significant with OR 0.13 [95% CI = 0.46-0.37] and OR 0.33 [95%= 0.12-0.89] respectively. Case management, active case searching and health education was conducted during the outbreak.

Conclusion: Most of the cases were unvaccinated children. Males and children aged 5-14 years was the most affected segment of the population. Improved routine and campaign measles immunization targeting less than 15 years, and health education on means of transmissions, treatment and prevention of measles infection have to be enhanced.

Keywords: Measles, Outbreak, Case-Control, Didesa, Ethiopia

Words: 275

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6.2 Malaria Outbreak Investigation-Saba Boru and Melka Soda Woredas, Guji and Borena Zones, Oromia Region, Ethiopia, September 2014

Abstract

Introduction: In Ethiopia, malaria is highly seasonal in many communities but may have nearly unstable in other areas with epidemic-prone transmission pattern. A malaria outbreak was reported in Seba Boru and Melka Soda Woredas of Guji and Borena Zones in Oromia, Ethiopia in September 2014. The aim of this study was to describe the magnitude of morbidity and mortality caused by the outbreak, investigate factors that contributed to the occurrence of the epidemics and to institute appropriate intervention measures to contain the epidemics in the woreda.

Method: We used microscopic and RDT laboratory investigation to confirm the disease. We reviewed the previous year's malaria data to establish a threshold level and to understand the trends of the disease. The magnitude of the disease was described by person, place and time. We conducted an unmatched case-control study with 100 randomly selected cases and 100 community controls.

Result: Among the total of 915 suspected cases, 549 (60%) confirmed malaria cases. The attack rate was 23.2 per 1000) and three malaria related deaths were reported during September 2014. Slide positivity rate was 65.4%. Person age 15 years and older were most affected with an attack rate of 28.4%. Using of Insecticide Treated Bed Net (ITN) were found to be protective factor and statistically significant with OR of 0.17[95% CI= 0.06-0.51]. Presence of stagnant water for mosquito breeding in less than 500-1000 was associated with malaria outbreak and statistically significant with an OR of 8.18[95% CI= 4.05-16.53].

Conclusion: Poor ITN utilization and presence of stagnant water were attributed for the outbreak. We recommended proper utilization of ITN and environmental management through optimized community participation.

Keywords: Malaria, Outbreak, Case-Control, Seba Boru, Melka Soda, Ethiopia

Words: 266

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6.3 Measles Surveillance Data Analysis, Borena Zone, Oromia Region, Ethiopia, 2009 to 2013

Abstract

Introduction

Measles remains a disease of public health importance and has been targeted for elimination in many areas of the world including Africa. It is the commonest in occurrence and the number of deaths in Ethiopia which contributes substantially to the worldwide mortality burden. We analyzed five years measles data to identify morbidity and mortality trends in Borena Zone, Oromia Region.

Methods:

We conducted descriptive cross-sectional study. We analyzed the data using Epi Info 7.3.1 and Microsoft Office Excel 2007. We defined suspected measles as any person with generalized maculopapular rash and fever plus cough or coryza or conjunctivitis. We checked completeness of data by excluding cases and deaths with incomplete information.

Results:

We identified a total of 1782 measles cases and 16 deaths (CFR: 0.9%). The median age of the cases was four years (range: 2 months to 77 years). The highest average annual incidence rate was in the age group 1-4 years (93.8 per 100,000) followed by less than one years of age (80.1/100,000) with the overall incidence rate of 29.5/100,000popon. The highest average CFR (4.6%) was reported in age group 5-14 years. Among the cases, 1492(83.7%) were unvaccinated children.

Conclusions:

Most of the children were susceptible or at risk of getting the diseases. Less than five children was the most affected age group followed by 5-14 years. Enhancing improved routine and campaign measles immunization targeting less than 15 years of age would prevent future risk.

Key words: Measles, Measles case, Measles death, Vaccination, Borena

Words: 234

Chapter–VII

Narrative Summary of Disaster Situation

7.1 Emergency Need Assessment Report of Health and Nutrition in Eastern Oromia Region, Ethiopia, 2014

Executive summary

In order to identify humanitarian needs in drought affected areas of 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 conducted from November 22 to December 19 in the selected woredas of East and West Harerghe Zones.

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

Data collection included review of documents, meetings and discussions with woreda and zonal preparedness and response task forces, officials and program managers. This was 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 in both assessesment woredas of East (Chinaksen and Meyu Muluke) and West Hareghe Zones (Daro Lebu, Guba Koricha, Mieso and Hawi Gudina). East Haraghe Zone officials reported 33 cases and three communities reported deaths. From June to October 2014, 249 cases were reported from the woredas of West Harerghe Zone. Among each zone total cases, 213 (85.5%) were from Guba Koricha Woreda of West Harerghe Zone and 19 (57.6%) and three community reported deaths were occurred in Chinaksen Woredas of East Harerghe Zone in the period 20/8/-21/9/2006 EC. Cases of Severe Acute Malnutrition (SAM) cases were mostly stable in all visited woredas of both zones except some increment is observed in Girawa Woreda (*July to October*) of East Harerghe Zone, and Daro Lebu Woreda (*through July to August 2014*), Guba Koricha and Hawi Gudina Woredas (*August to October 2014*) of West Harerghe Zones. There was 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 a 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 need of the country. The assessment is conducted twice in a year followingharvesting seasons (Belg and Meher) and lead by 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, these zones have a total population of 5,460,044. Among those, 2,822,909 (50%) of them are male and 926,692 (16.4%) are under five children. There are six hospitals, 186 health centers and 933 health posts functional within these zones.

Based on the consensus made among the federal mehar assessment team and zonal cabinets, 13 woredas, seven from East and six from West Harerghe Zones, were selected from these zones. Chinakson, Deder, Girawa, Gola Oda, Gursum, Meyu Muluke and Midega Tola Woredas were

selected from East Harerghe Zone where as Bedu Dimtu, Daro Lebu, Doba, Guba Koricha, Hawi Gudina, Mieso were from West Harerghe Zone.

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/impending risks and existing threats.
- ✓ Based on the findings, to develop response plans

7.1.3 Methods

From selected zones, specifically selected and visited woredas, pertinent data and information were collected using different methods. Due to time constraints, the team was 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 is a functional multi-sectoral PHEM coordination forum in all of addressed woredas including zonal health departments. But there is no public health emergency preparedness plan and budget in all assessed woredas except in Meyu Muluke, Gursum, Mieso and Hawi Gudina. Even though there is a contingency budget for emergencies at the woreda level, there is no specific fund allocated for public health emergency response purpose in most woredas. To utilize this budget, the woreda cabinet should discuss and agree on it. There is no agreed forum among all addressed woredas, zonal health department, NGOs and UN agencies to respond timely whenever emergency occurs.

7.1.4.2 Top five causes of morbidity

Table 7.1.1: Under five children causes of morbidity in visited woredas of East and West Harerghe Zones, Oromia, Ethiopia, 2014

*	S. N	Visited woredas											
		B/Dimtu	Daro Lebu	Doba	Guba Koricha	Hawi Gudina	Mieso	Gursum	Chinakson	Meyu Muluke	Gola Oda	Giraw a	Deder
Top five cause of morbidity	1	Diarrhoea	Gastro interitis	Diarrhoea with no dehydration	Diarrhoea (non bloody)	Diarrhoea (non bloody)	Diarrhoea (non bloody)	Pneumonia	Pneumonia	ARI	Pneumonia	Pneumonia	Pneumonia
	2	Pneumonia	SAM	MAM	Pneumonia	Pneumonia	Pneumonia	Diarrhoea (non bloody)	Diarrhoea (non bloody)	Diarrhoea	Diarrhoea	AURTI	Diarrhoea
	3	URTI	Pneumonia	Diarrhoea with some dehydration	SAM	AURTI	AURTI	Diarrhoea with dehydration	AURTI	Eye and ear infection	Injury	Injury	Dysentary(bloody)
	4	Skin infection	AURT	Pneumonia	Diarrhoea with dehydration	Intestinal parasite	AFI	AURTI	Dysentary(bloody)	Skin infection	Eye and ear infection	Gastritus	Helmenthiasis
	5	Intestinal parasite	Helmenthiasis	SAM	AURTI	Diarrhoea with dehydration	Helmenthiasis	Helmenthiasis	Helmenthiasis	Intestinal parasite	Skin infection	UTI	AURTI

Table 7.1.2: Above five children causes of morbidity in visited woredas of East and West Harerghe Zones, Oromia, Ethiopia, 2014

	Visited woreda												
	S.N	Gursum	China kson	Meyu Muluke	Gola Oda	Girawa	Deder	B/Dimtu	Daro Lebu	Doba	G/ Korich a	H/ Gudin a	Mieso
Top five cause of morbidity	1	Pneumonia	Pneu monia	Pneumon ia	Injury(fig hting)	Pneumon ia	Pneu monia	Trauma	AUR T	Trauma	Traum a	AUR TI	Pneumonia
	2	UTI	UTI	Injury	UTI	Injury (fighting)	Traum a	Dyspeps ian	Traum a	Diarrhoea (non bloody)	Pnemin ia	UTI	Diarrhoea (non bloody)
	3	AURTI	AUR TI	Gastritus	Intestinal parasite	Gastritus	Diarrh oea	URTI	Pneu monia	Pneumonia	Dyspep sia	Dyspe psia	Trauma
	4	Injury	Dysps ia	Animia	Pneumon ia	Animia	UTI	Pneumo nia	UTI	AURTI	AFI	Pneu monia	Animia
	5	diarrhoea(No n bloody)	Traum a	Intestinal parasite	Gastritus	Intestinal parasite	URTI	Itestinal parasite	AFI	AFI	UTI	Traum a	AFI

Table 7.1.3: List of cases and deaths for major epidemic prone diseases in East and West Harerghe Zones, Oromia, Ethiopia, 2014

S. N	Name of woreda	Month	Epidemic Prone diseases									
			AWD		Malaria		Measles		Meningitis		Rabies	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1	**Chinaksen**	14-Jun	0	0	6	0	0	0	0	0	0	0
		14-Jul	0	0	7	0	0	0	0	0	0	0
		14-Aug	0	0	4	0	0	0	0	0	0	0
		14-Sep	0	0	3	0	0	0	0	0	0	0
		14-Oct	0	0	8	0	19	0	0	0	0	0
2	**Deder**	14-Jun	0	0	20	0	0	0	0	0	0	0
		14-Jul	0	0	10	0	5	0	0	0	0	0
		14-Aug	0	0	11	0	0	0	0	0	0	0
		14-Sep	0	0	9	0	0	0	0	0	0	0
		14-Oct	0	0	16	0	0	0	0	0	0	0
3	**Girawa**	14-Jun	0	0	49	0	0	0	0	0	0	0
		14-Jul	0	0	43	0	0	0	0	0	0	0
		14-Aug	0	0	132	0	0	0	0	0	0	0
		14-Sep	0	0	97	0	0	0	0	0	0	0
		14-Oct	0	0	120	0	0	0	0	0	0	0
4	**Gola Oda**	14-Jun	0	0	6	0	0	0	0	0	0	0
		14-Jul	0	0	32	0	0	0	0	0	0	0
		14-Aug	0	0	6	0	0	0	0	0	0	0
		14-Sep	0	0	16	0	0	0	0	0	0	0
		14-Oct	0	0	0	0	0	0	0	0	0	0
5	**Gursum**	14-Jun	0	0	25	0	0	0	0	0	0	0
		14-Jul	0	0	131	0	0	0	0	0	0	0
		14-Aug	0	0	13	0	0	0	0	0	0	0
		14-Sep	0	0	20	0	0	0	0	0	0	0
		14-Oct	0	0	23	0	0	0	0	0	0	0
6	**Meyu Muluke**	14-Jun	0	0	1	0	0	0	0	0	0	0
		14-Jul	0	0	17	0	0	0	0	0	0	0

S. N	Name of woreda	Month	Epidemic Prone diseases									
			AWD		Malaria		Measles		Meningitis		Rabies	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
		14-Aug	0	0	57	0	0	0	0	0	0	0
		14-Sep	0	0	147	0	0	0	0	0	0	0
		14-Oct	0	0	0	0	14	0	0	0	0	0
7	B/Dintu	14-Jun	0	0	18	0	0	0	0	0	0	0
		14-Jul	0	0	15	0	0	0	0	0	0	0
		14-Aug	0	0	11	0	0	0	0	0	0	0
		14-Sep	0	0	11	0	0	0	0	0	0	0
		14-Oct	0	0	27	0	0	0	0	0	0	0
8	Daro Lebu	14-Jun	0	0	50	0	0	0	0	0	0	0
		14-Jul	0	0	15	0	0	0	0	0	0	0
		14-Aug	0	0	14	0	0	0	0	0	0	0
		14-Sep	0	0	14	0	0	0	0	0	0	0
		14-Oct	0	0	17	0	3	0	0	0	0	0
9	Doba	14-Jun	0	0	37	0	0	0	0	0	0	0
		14-Jul	0	0	17	0	0	0	0	0	0	0
		14-Aug	0	0	32	0	0	0	0	0	0	0
		14-Sep	0	0	35	0	0	0	0	0	0	0
		14-Oct	0	0	70	0	0	0	0	0	0	0
10	Guba Koricha	14-Jun	0	0	-	0	0	0	0	0	0	0
		14-Jul	0	0	-	0	71	0	0	0	0	0
		14-Aug	0	0	-	0	7	0	0	0	0	0
		14-Sep	0	0	-	0	41	0	0	0	0	0
		14-Oct	0	0	-	0	88	0	0	0	0	0
11	Hawi Gudina	14-Jun	0	0	0	0	15	0	0	0	0	0
		14-Jul	0	0	6	0	0	0	0	0	0	0
		14-Aug	0	0	5	0	0	0	0	0	0	0
		14-Sep	0	0	20	0	0	0	0	0	0	0
		14-Oct	0	0	34	0	12	0	0	0	4	0
12	Mieso	14-Jun	0	0	43	0	0	0	0	0	0	0

S. N	Name of woreda	Month	Epidemic Prone diseases									
			AWD		Malaria		Measles		Meningitis		Rabies	
			Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
		14-Jul	0	0	31	0	0	0	0	0	0	0
		14-Aug	0	0	66	0	6	0	0	0	0	0
		14-Sep	0	0	78	0	0	0	0	0	0	0
		14-Oct	0	0	150	0	0	0	0	0	0	0

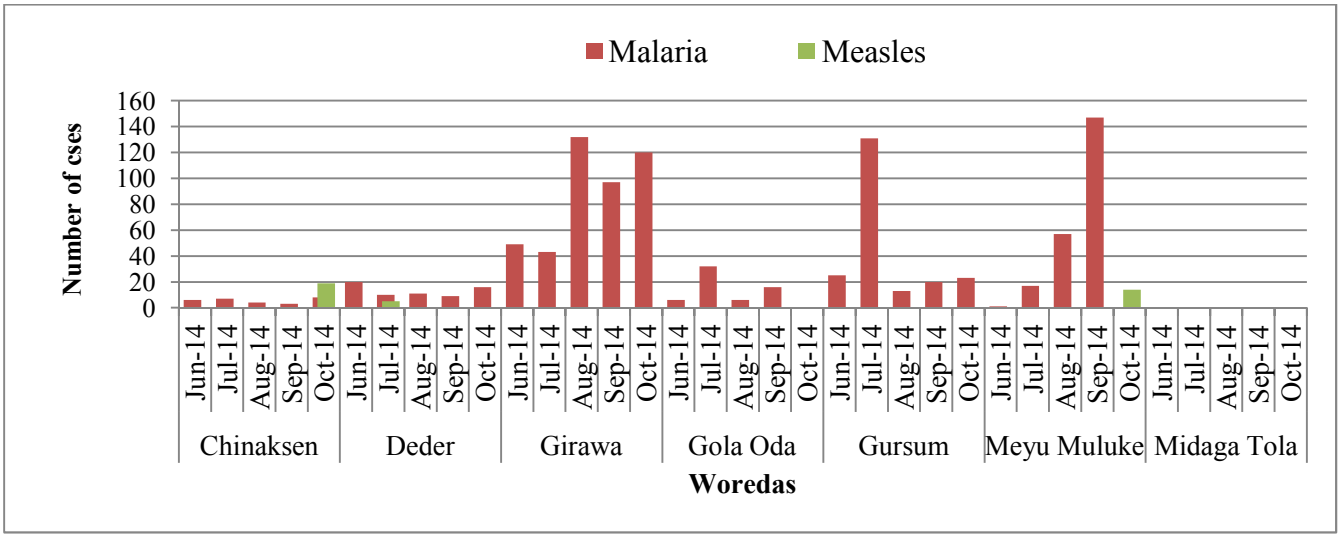

Figure 7.1.1: Malaria and measles cases by woreda in East Harerghe Zone, Oromia, Ethiopia, 2014

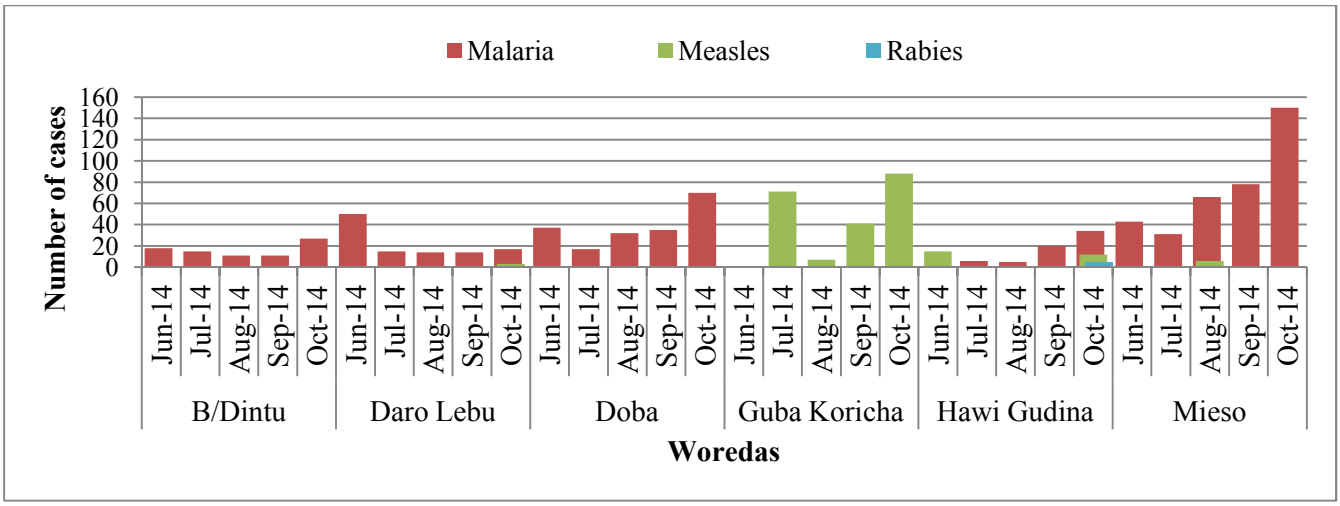

Figure 7.1.2: Malaria, measles and rabies cases by woreda in West Harerghe Zone, Oromia, Ethiopia, 2014

7.1.4.3 Outbreak

In East Harerghe Zone, there was a measles outbreak in Chinaksen and Meyu Muluke Woredas. The two woredas reported 33 cases and three non-confirmed measles deaths. Over fifty percent of the measles cases (19) and three deaths occurred in Chinaksen Woredas in the period 20/8/-21/9/2006 EC. The rest of the cases, (14 or 42.4%) were from Meyu Muluke which occurred during October, 2006 E.C. No deaths were seen during epidemic periods in this woreda. There were no outbreaks of measles in Deder, Girawa, Gola Oda, Gursum and Midaga Tola Woredas of East Harerghe Zone. Measles outbreaks were also reported from Daro Lebu, Guba Koricha, Mieso and Hawi Gudina Woredas of West Harerghe Zone. A total of 249 cases were reported from these woredas in the last five months (*June to October/2014*). Most of the measles cases 213 (85.5%) were from Guba Koricha followed by Hawi Gudina, Mieso and Daro Lebu Woredas of West Harerghe Zone with magnitude of 27(10.8%), 6 (2.4%), and 3 (1.2%) cases respectively. Among the outbreak in Guba Koricha, 129 (60.6%) of them were occurred in the period 16/1/-19/3/2007 EC and the rest 84 (39.4%) were occurred before three months. All affected populations were children under five in Guba Koricha Woreda.

According to zonal health department of East Harerghe Zone, malaria epidemic is anticipated in eleven woredas, measles in twelve woredas, Sever acute malnutrition (SAM) in 22 woredas, meningitis in four woredas, Acute Watery Diarrhea (AWD) in seven woredas and conflict in four woredas with at risk population of 1,075,307; 947,105; 1,630,117; 707,602; 767,5570; 228,640;

respectively. West Harerghe Zonal Health Department also anticipated malaria epidemic in five woredas (Anchor, Burka Dimtu, Dari Lebu, Hawi Gudina and Mieso) with at risk population of 549,387 and measles in eight woredas (Anchar, Burka Dimtu, Chiro City, Daro Lebu, Gemechis, Guba Koricha, Hawi Gudina and Mieso) with at risk population of 238,568.

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

Table 7.1.4: List of emergency drugs and supplies in East and West Harerghe Zone, Oromia, Ethiopia, 2014

S. N	Drugs and supplies	Adequacy for one month (Yes/No)												
		Chinaksen	Deder	Girawa	Gola Oda	Gursum	Meyu Muluke	Midaga Tola	B/Dintu	Daro Lebu	Doba	G/Koricha	Hawi Gudina	Mieso
1	Ringer Lactate to treat AWD cases	No	Yes	No	No	No	No	No	Yes	No	Yes	Yes	No	No
2	ORS to treat AWD cases	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
3	Doxycycline to treat AWD cases	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
4	Syringes and gloves for AWD mgt	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
5	Amoxicillin suspension (measles)	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
6	Tetracycline ointment (measles)	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No
7	Vitamin A(measles)	No	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
8	Coartem for malaria	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes

S. N	Drugs and supplies	Adequacy for one month (Yes/No)												
		Chinaksen	Deder	Girawa	Gola Oda	Gursum	Meyu Muluke	Midaga Tola	B/Dintu	Daro Lebu	Doba	G/Koricha	Hawi Gudina	Mieso
9	Artesunate(rectal) for malaria	Yes	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	No	Yes
10	Artesunate(injection) for malaria	No	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes	No	Yes
11	Artemether IM for malaria	No	No	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes
12	Quinine (PO) for malaria	Yes	Yes	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes
13	Quinine (IV) for malaria	No	No	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes
14	Chloroquine for malaria	Yes	Yes	Yes	No	Yes	No	No	Yes	No	Yes	Yes	No	No
15	Ceftraxione(Meningitis)	Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No
16	RDT for malaria	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
17	RDT (Pastorex) for Meningitis	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
18	LP set	No	No	No	No	No	No	No	Yes	No	Yes	No	No	No
19	Number of CTC kit available	No	No	No	No	Yes	No	No	Yes	No	No	Yes	No	No
20	Clinical Delivery Assistance kit Part A: Reusable equipment	No	No	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	No	No
21	Clinical Delivery Assistance kit Part Drugs and Disposable equipment	No	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes	No	No
22	Mgt of complications of Abortion kit (Manual Vacuum	No	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No

S. N	Drugs and supplies	Adequacy for one month (Yes/No)												
		Chinaksen	Deder	Girawa	Gola Oda	Gursum	Meyu Muluke	Midaga Tola	B/Dintu	Daro Lebu	Doba	G/Koricha	Hawi Gudina	Mieso
	Aspiration Set)													

7.1.4.6 Risk factors

7.1.4.6.1 Malaria

Malaria is endemic in all assessed woredas except Chinaksen and Gursum. There is also different mosquito breeding sites in all assessed woredas. Unprotected irrigation in Meyu Muluke Woreda and different types of ponds and harvested waters in the rest of the woredas was a suitable environment for mosquito breeding. Long lasting treated nets (LLTN) coverage is less than national target (80%) in all assessed woredas except Hawi Gudina (100%) and Daro Lebu (89%) woredas of West Harerghe Zone. Indoor Residual Spray (IRS) was conducted in all woredas and the coverage is below minimum World Health Organization (WHO) recommendation (90%) in all woredas except Deder (96%) woreda of East Harerghe Zone. The new malaria guideline is distributed in all health facilities in assessed woredas. None of the woredas conducted formal training for health workers on new malaria guideline. But Girawa, Deder and Chinaksen Woredas sensitized the health workers during review meeting.

7.1.4.6.2 Meningitis

There was no epidemic of meningitis in the last three years in East and West Hererghe Zones. Only zonal health departments, Meyu Muluke and Deder Woredas have meningitis outbreak control guideline. No trained human power on outbreak management in zonal health departments and all woreda health offices.

7.1.4.6.3 Acute Watery Diarrhea (AWD)

In the last three years (2012-2014 GC), epidemic of AWD was not occurred in both East and West Harerghe Zones.

Table 7.1.5: Latrine construction, utilization and safe water coverage, East and West Harerghe Zones, Oromia, Ethiopia, 2014

S.N	Woredas	Latrine coverage	Latterine ultilization	Safe water coverage
1	Chinakson	62	51	68
2	Deder	64	64	48
3	Girawa	80	71	69
4	Gola Oda	36	31	61
5	Gursum	78	71	75
6	Meyu Muluke	46	29	31
7	Midaga Tola	52.2	Unknown	29
8	B/Dintu	47	35	Unknown
9	Daro Lebu	38	Unknown	Unknown
10	Doba	69	68	Unknown
11	Guba Koricha	49	49	Unknown
12	Hawi Gudina	65	61	37
13	Mieso	41	30	Unknown
Average		**55.9**	**43.1**	**32.2**

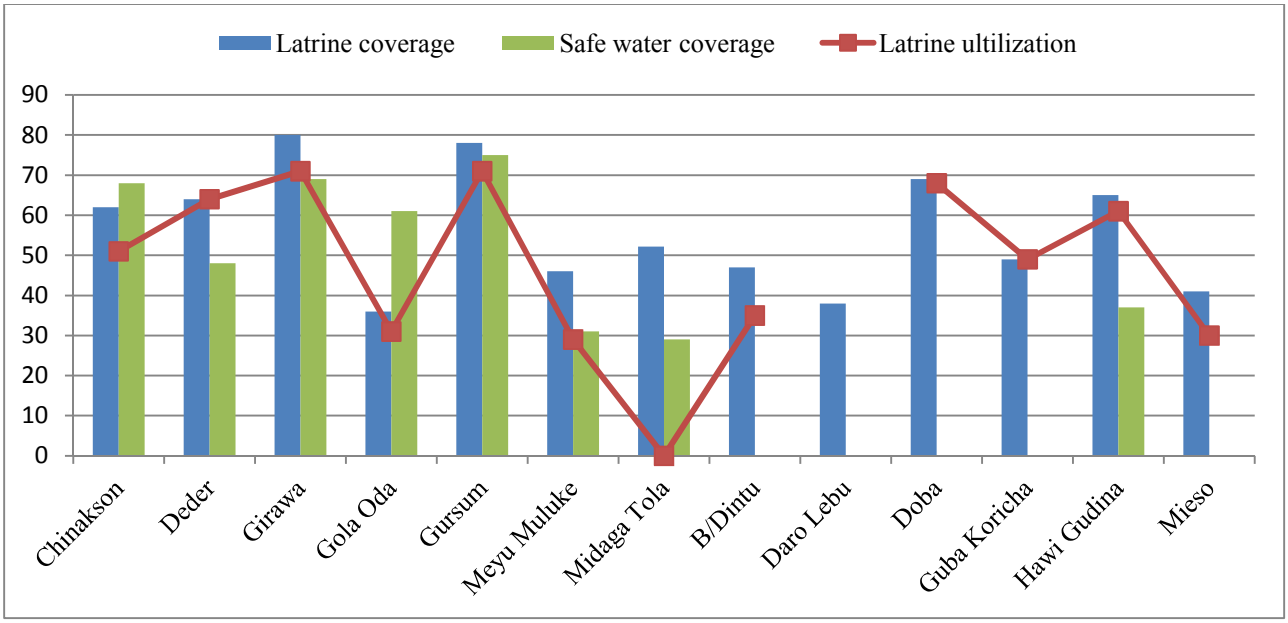

Figure 7.1.3: Latrine construction, utilization and safe water coverage by woreda in East and West Harerghe Zones, Oromia, Ethiopia, 2014

7.1.4.6.4 Measles

There is an ongoing measles outbreak in Meyu Muluke and Gursum Woreda of East Harerghe Zone, and also in Hawi Gudina and Daro Lebu Woredas of West Harerghe Zone. Average measles vaccination coverage of those woredas was 86.2% (*range 72% for Hawi Gudina - 99% for Gursum*). Measles supplemental immunization activities (SIA) were not conducted in assessed woredas in 2006 E.F.Y, except in Midaga Tola Woreda of West Harerghe Zone in which 17,447 (80%) children aged from 6 to 59 months were vaccinated. Measles guideline was distributed to all health facilities in all woredas of both zones.

7.1.4.6.5 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 except minimal increases were observed in Girawa Woreda (*July to October*) of East Harerghe Zone, and Daro Lebu Woreda (*through July to August 2014*), Guba Koricha and Hawi Gudina Woredas (*August to October 2014*) of West Harerghe Zones.

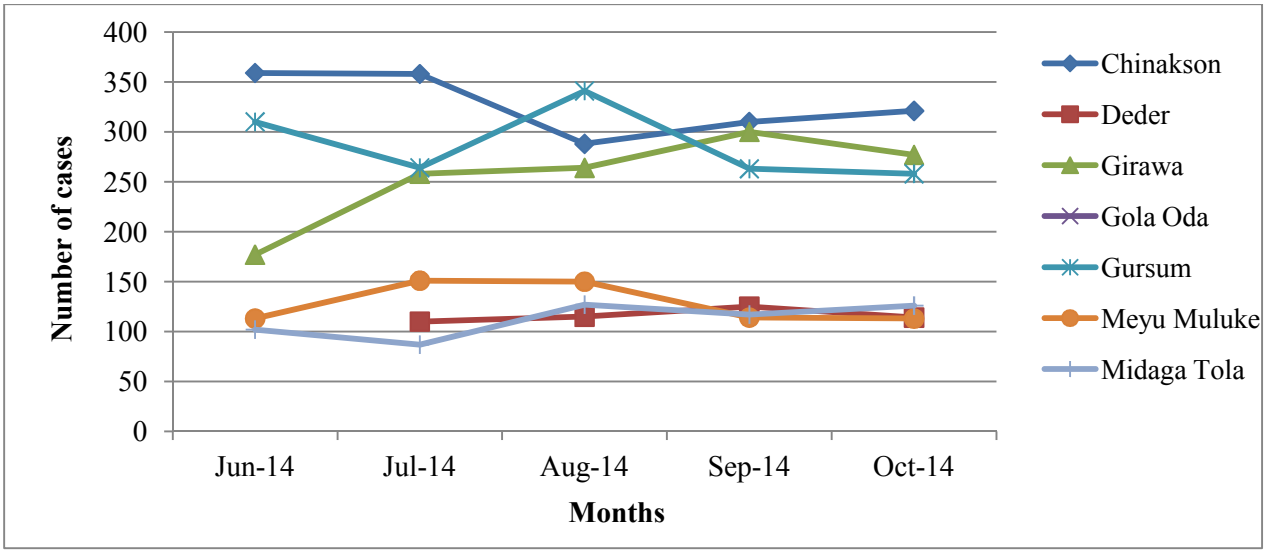

Figure 7.1.4: Trends of total SAM cases by woreda in East Harerghe Zone, Oromia, from Jun-Oct 2014

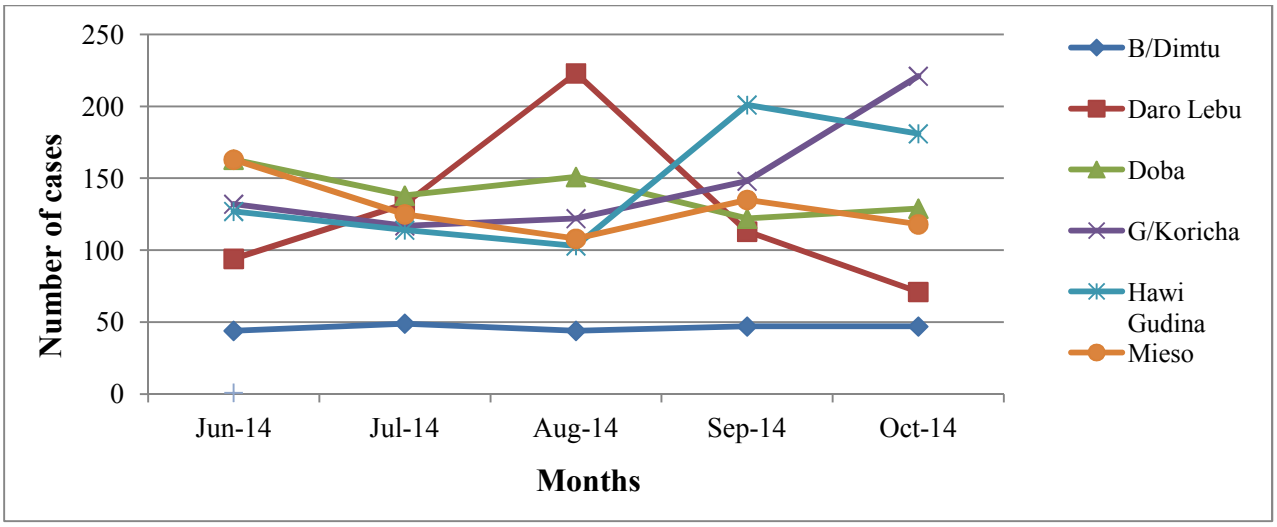

Figure 7.1.5: Trends of new admission SAM cases by woreda in West Harerghe Zone, Oromia, from Jun-Oct 2014

Table 7.1.6: Therapeutic feeding program by woreda in East and West Harerghe Zones, Oromia, Ethiopia, 2014

Name of assessed woredas	Month	**Woreda**	Total number of TFP (OTP/SC) in the woreda	Number of SC sites	Number of OTP sites	Total number of OTP/SC reported	Therapeutic supplies enough (Y/N) (for next one month)			Children discharged from TFP and referred to SFP(Y/N)
							RUFT	**F100**	**F75**	
Chinaksen	Jun-14	359	44	7	37	44	Y	Y	Y	N
	Jul-14	358	44	7	37	40	Y	Y	Y	N
	Aug-14	288	44	7	37	43	Y	Y	Y	N
	Sep-14	310	44	7	37	44	Y	Y	Y	N
	Oct-14	321	44	7	37	43	Y	Y	Y	N
Deder	Jun-14	0	54	8	46	54	Y	Y	Y	Y
	Jul-14	110	54	7	45	52	Y	Y	Y	N
	Aug-14	115	54	7	46	52	Y	Y	Y	N
	Sep-14	125	54	7	46	53	Y	Y	Y	N
	Oct-14	114	54	8	46	54	Y	Y	Y	N
Girawa	Jun-14	177	60	7	53	60	Y	Y	Y	N

Name of assessed woredas	Month	Woreda	Total number of TFP (OTP/SC) in the woreda	Number of SC sites	Number of OTP sites	Total number of OTP/SC reported	Therapeutic supplies enough (Y/N) (for next one month)			Children discharged from TFP and referred to SFP(Y/N)
							RUFT	F100	F75	
	Jul-14	258	60	7	53	60	Y	Y	Y	N
	Aug-14	264	60	7	53	60	Y	Y	Y	N
	Sep-14	300	60	7	53	60	Y	Y	Y	N
	Oct-14	277	60	7	53	60	Y	Y	Y	N
Gola Oda	Jun-14	-	22	4	18	22	Y	Y	Y	N
	Jul-14	-	22	4	17	22	Y	Y	Y	N
	Aug-14	-	22	3	18	21	Y	Y	Y	N
	Sep-14	-	22	4	18	21	Y	Y	Y	N
	Oct-14	-	22	4	17	22	Y	Y	Y	N
Gursum	Jun-14	310	41	4	37	41	Y	Y	Y	N
	Jul-14	264	44	5	39	44	Y	Y	Y	N
	Aug-14	341	53	7	46	53	Y	Y	Y	N
	Sep-14	263	53	7	46	53	Y	Y	Y	N
	Oct-14	258	53	7	46	53	Y	Y	Y	N
Meyu Muluke	Jun-14	113	17	3	14	17	N	Y	Y	N
	Jul-14	151	17	3	14	17	N	Y	Y	N
	Aug-14	150	17	3	14	17	N	Y	Y	N
	Sep-14	114	17	3	14	17	N	Y	Y	N
	Oct-14	113	17	3	14	17	N	Y	Y	N
Midaga Tola	Jun-14	102	23	3	20	23	Y	Y	Y	N
	Jul-14	87	23	3	20	23	Y	Y	Y	N
	Aug-14	127	23	3	20	23	Y	Y	Y	N
	Sep-14	117	23	3	20	23	Y	Y	Y	N
	Oct-14	126	23	3	20	23	Y	Y	Y	N

Almost all of the assessed woredas didn't face any shortage of therapeutic supplies like RUFT, F100 and F75, and woredas health office stock was enough for the next one month except for

Meyu Muluke Woreda of East Harerghe Zone, which has a Plumpy nut (RUFT) shortage and Hawi Gudina Woreda of West Harerghe Zone which has F100 and F75 shortage. However, overall, zonal health department of East harerghe Zone had no stock balance of those therapeutic supplies for the next one month where as West Harerghe Zone has enough stock of those therapeutic supplies.

7.1.5 Conclusion

- There is functional multi-sectoral PHEM coordination forum in all of the addressed woredas in East Harerghe Zones including zonal health department.
- There is no public health emergency preparedness plan and budget in all assessed woredas except in Meyu Muluke, Gursum, Mieso and Hawi Gudina.
- Diarrhea and pneumonia is the leading cause of morbidity in under five children in both West and East Harerghe Zones.
- Measles outbreaks occurred in woredas with high number of malnutrition cases (Daro Lebu, Guba Koricha, Mieso and Hawi Gudina, Chinaksen and Meyu Muluke Woredas) within last three months.
- Outbreaks of malaria and measles are the most anticipated risk in the zones.
- There is poor preparedness on all emergency drugs and supplies for malaria, measles, AWD and meningitis for the next one month.

7.1.6 Recommendations

- ✓ 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 hazard came
- ✓ All the woredas and zonal health departments should be required to have specific plan and budget for emergency response purpose.*(→ Good preparedness)*
- ✓ Public health emergency drugs and supplies should be available in all woredas with special emphasis to woredas with nutritional problem.
- ✓ Measles Supplementary Immunization Activities (SIAs) should be targeted in woredas with nutritional problem because malnutrition can be predisposing factor for measles outbreak.

7.1.7 Acknowledgements

I would like to acknowledge Ethiopian Public Health Institute (EPHI) for facilitating us to assess this important humanitarian need. Secondly, many thanks go to CDC-Ethiopia and Ethiopian Public Health Association (EPHA) for their valuable financial support. Lastly, my appreciation also goes to zonal health departments Public Health Emergency Management (PHEM) focal persons for their commitments and active engagement during meher assessment period. Finally, I would like to expand my gratitude to Abigail Greenleaf for constructive comments.

7.1.8 References

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Chapter-VIII

Protocol/Proposal for Epidemiologic Research Project

8.1 Assessment of factors associated with ITN distribution and utilization in gold mining area, Seba Boru Woreda, Giji Zone, Oromia, Ethiopia, 2015

Executive summary

Background: Ethiopia is one of the most malaria epidemic-prone countries in Africa. Rates of morbidity and mortality increase dramatically during epidemics. Insecticide treated net (ITN) is an effective tool for preventing the transmission of malaria. The recent national strategic plan targets that at least 80% of people at risk of malaria shall use ITNs properly. Oromia region reported the lowest use of nets in children under five (55%) and pregnant women (27.5%) in malaria-endemic areas (<2,000m). Comparison among regional states also revealed that households in Oromia have the lowest percentage of net ownership (44.3%). But recently, the occurrence of malaria epidemics has become more common in Oromia. Saba Boru is the first malaria reporting woreda in Guji Zone one among the hot spot woredas of the region that has many gold mining sites and supported by partners targeting malaria for elimination. However, there had been malaria outbreak during September 2014. In order to meet the MDG's and the Roll Back Malaria targets, it is must to determine the actual levels of ITN distribution and use in these gold mining areas and to take timely corrective actions. The main purpose of this study is to characterize the pattern of, and assess factors related to ITN distribution and use in kebeles that have gold mining sites in Seba Boru Woreda.

Methodology: Retrospective cross-sectional community and facility study is designed. Sample size required for this study is 1,162 HHs using single proportion estimation $n=Z^2pq/D^2$. The assumptions taken are: an expected proportion (ITN utilization) of 55%. The sampling will be accomplished in two stages. Initially all kebeles that has gold mining sites will be listed (12), and then six kebeles will be selected randomly using the lottery method. Next, by spanning a pen from approximate center of cluster, the households towards which the ball point of the pen will indicate will be serially included into the study by making study households proportional to total number of households in the selected clusters in a kebele. Data will be entered and analyzed using Epi Info 7.3.1 and Micro soft Excel.

Work plan: Data collection will be started on July1, 2015 and ends on July 25, 2015. The study will be completed in November 10, 2015.

Budget: The required cost for the study was estimated to be **4,999.93USD.**

8.1.1 Introduction

Malaria is a parasitic infectious disease caused by protozoan parasites of the genus Plasmodium and is transmitted by mosquito species Anopheles arabiensis, An. pharoensis, An. funestus and An. nili[1].

It is also a major public health problem in Ethiopia and has been consistently reported as one of the three leading causes of morbidity and mortality. Since 1958, major epidemics of malaria have occurred at approximately five to eight year intervals, though recently there has been a trend towards smaller-scale, more frequent, sporadic epidemics and seasonal case build ups. In 1998, a widespread severe malaria epidemic occurred in most highland as well as lowland areas in Ethiopia. Many localized but severe outbreaks of malaria occurred in Amhara and SNNP Regional States, leading to widespread epidemic malaria in highland and highland fringe areas (up to 2,500 meters) in 2003 [3,4].

Malaria epidemics can occur as a result of variability or changes in the rate of infection and population immunity. Generally epidemics occur in places where there is low and unstable malaria transmission, and where people have low or no immunity. However, there could be epidemics in high transmission areas if there is deterioration of health system, interruption of anti-malarial measures or migration of non-immune individuals, such as population movement in search of labor to these areas. Other triggering factors include: Unusual local weather phenomena and activities resulting in environmental modification that increase vector population; increased vulnerability of population from famine and malnutrition; Interruptions of anti-malarial measures which have kept malaria under control [3, 6].

Oromia is one of the region prone for malaria epidemic in the country. Among 304 woredas, 75 of them were identified as hot spot area for malaria disease. More than 23 million population of the region are living in risk area for malaria infection. In Oromia region malaria occurs in epidemic forms from September to December and peaking in October and November [11].

Recently, the occurrence of malaria epidemics has become more common in Oromia Regional State due to environmental and climatological factors that include chloroquine-resistant falciparum malaria, high population movements and the expansion of agro-industrial developments and irrigation schemes in malarious areas.

Malaria is the most common disease in Guji Zone with frequent occurrence of epidemics both in the past and present. The transmission is seasonal and normally peaks during September to December after the summer rainy season. Although not well documented, malaria epidemics of variable degree had affected Seba Boru Woreda (formarly under Shakiso) during 1997-99 [13].

Saba Boru Woreda is one of hot spot woreda from the region, which is located between 1500-2000m above sea level and represents the most malaria epidemic-prone area of Guji Zone. All kebeles 100% (24 kebeles) of Seba Boru Woreda are malarious with 119,166 (100%) populations are at risk for malaria.

8.1.2 Literature review

Insecticide treated net (ITN) is an effective tool for preventing the transmission of malaria [18]. This is particularly the case since regular re-treatment of nets with insecticide has become unnecessary with the introduction of long-lasting insecticidal nets (LLIN) [21]. Recent efforts promoting the use of LLIN have shifted their emphasis from a focus on vulnerable populations to a broader objective of universal coverage, defined at the household level as the use of insecticide-treated nets by all household members regardless of age or gender [23]. There is an emerging consensus that a ratio of at least one LLIN for every two household members is typically sufficient to achieve universal coverage in a population [25].

“On the basis of five community-randomized trials, when full coverage is achieved, ITNs reduce all-cause child mortality by an average 18% (range 14–29%) in sub-Saharan Africa with implication of 5.5 lives could be saved per year for every 1000 children under 5 years of age protected.”

The recent national strategic plan targets that at least 80% of people at risk of malaria shall use ITNs properly and consistently and 100% of households in malaria-endemic areas should own one ITN per sleeping space by the year 2015. The country aims at malaria elimination in areas with historically low malaria transmission, while achieving near zero malaria transmission in the remaining malarious areas [27]. To achieve such a goal, better understanding of the distribution and utilization of ITNs, is essential.

A huge discrepancy was reported between ownership versus use of ITNs [2]. Studies quantified this difference as 95% vs 59% (Kenya) [30], 70% vs 53.1% (Nigeria), and 90% vs 77% (Tanzania) [32]. Malaria Indicator Survey revealed that net ownership differed by wealth status,

with 66.4% of the richest households owning at least one net, compared to 44.6% of the poorest households [31]. Comparison among regional states revealed that households in Oromia have the lowest percentage of net ownership (44.3%). While all individuals benefit from sleeping under a LLIN, young children and pregnant women are particularly vulnerable to malaria and hence are an important target for LLIN use. Oromia reported the lowest use of nets in children under five (55%) and pregnant women (27.5%) in malaria-endemic areas (<2,000m).

8.1.3 Statement of the problem

Insecticide treated net (ITN) is an effective tool for preventing the transmission of malaria [18]. The distribution and use of insecticide-treated bed nets (ITNs) is one of the central interventions for preventing malaria infection [2]. National policy aims to provide one ITN for every sleeping space (approximately one net per 1.8 persons in malaria-endemic areas <2,000m) [27]. In Ethiopia, the Ministry of Health (MOH) conducted continuously mass distribution of LLINs between 2005 and 2007, targeting to distribute two LLINs per household in malaria endemic areas [31]. Forty two million insecticide-treated nets (ITNs) and LLINs were procured and distributed to malaria-endemic areas of the country including Oromia Region [17]. Comparison among regional states also revealed that households in Oromia have the lowest percentage of net ownership (44.3%). Oromia reported the lowest use of nets in children under five (55%) and pregnant women (27.5%) in malaria-endemic areas (<2,000m). Recently, the occurrence of malaria epidemics has become more common in Oromia Region. Malaria is the most common disease in Guji Zone with frequent occurrence of epidemics both in the past and present. Seba Boru is first malaria reporting woreda from Guji Zone and among hot spot woredas of the region. Although not well documented, malaria epidemics of variable degree had affected Seba Boru Woreda (formerly under Shakiso) during 1997-99 [13].

There had also been an outbreak during September 2014 in this woreda. In order to meet the Millennium Development Goals (MDG's) and the Roll Back Malaria targets, it is indispensable to determine the actual levels of distribution and use of ITN of Seba Boru Woreda that contributed for the lower ownership and ITN use of Oromia Region as well as its associated factors, and to take timely corrective actions.

8.1.4 Justification

Saba Boru is one hot spot malarious woredas in Guji Zone of Oromia Regional State that was supported by United Nation Children's Emergency Fund (UNICEF) based on consensus made between Regional Health Bureau and UNICEF targeting malaria for elimination. However, there had been malaria outbreak in gold mining areas of this woreda during September 2014. This initiates for the need to study and characterize the pattern of ITN distribution, utilization and determine associated factors in malaria-endemic kebeles that has gold mining sites in Seba Boru Woreda.

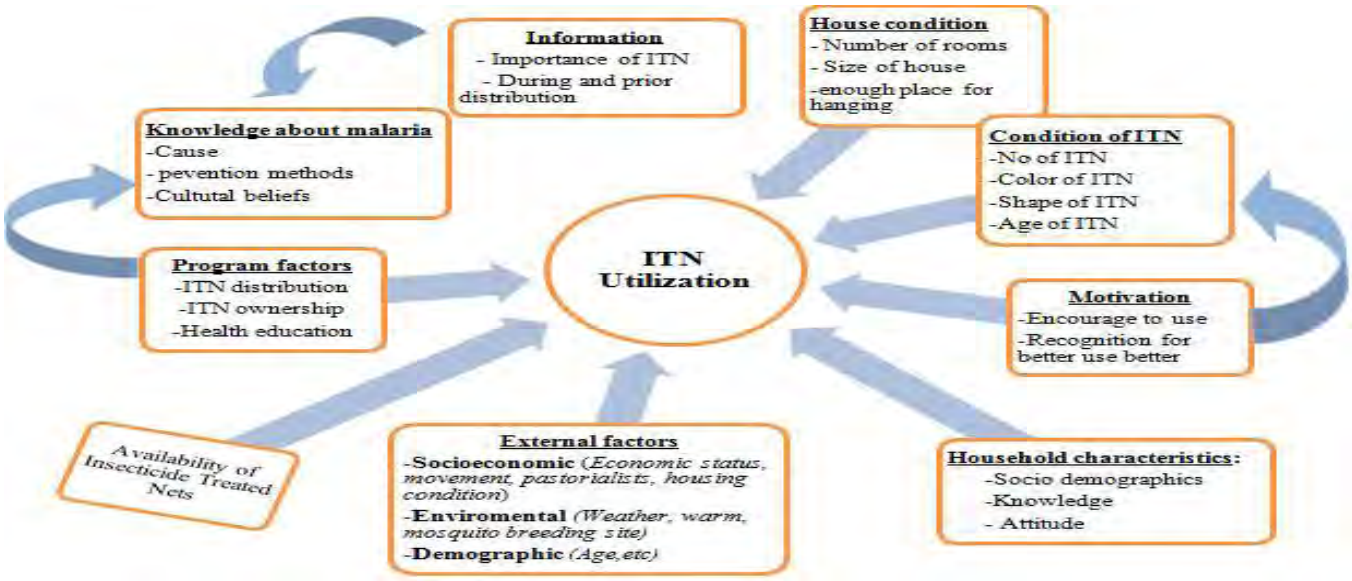

Figure 8.1.1: Conceptual framework for factors affecting Insecticide Treated Nets utilization

8.1.5 Objectives

8.1.5.1 General objective

The objective of this study is to characterize the pattern of, and assess factors related to LLIN distribution and uses in gold mining kebeles of Seba Boru Woreda.

8.1.5.2 Specific objectives

- Characterize the pattern of ITN distribution and utilization in kebele of Saba Boru Woreda; and
- Determine associated factors on distribution and utilization of ITN's in kebeles of Saba Boru Woreda.

8.1.6 Materials and Methods

8.1.7 Study area

Seba Boru Woreda is one of the 16 woredas of Guji Zone in Oromia Regional State with an estimated area covering 396.43 km^2. The projected population of the woreda for the 2014 was 119,166 making the population density of 301 per km^2. Of the total population 19,543 and 4,051 are under five children and pregnant women respectively. The woreda is further subdivided into 22 rural and two urban kebeles and has two geo climatic zones, Weinadega (Mid-land 2000-2500m altitude) which constitutes 45% and kola (low land <2000m) accounts for the remaining 55%. The woreda's capital town is Derme which is located 207 kms away from zonal town (Negele Borena) and 600kms to the south from Addis Ababa. It shares border with Goro Dola Woreda in North, Shakiso Woreda in East, Arero Woreda of Borena Zone in South and Melka Soda Woreda of Borena Zone and Shakiso Woreda in west. There are six health centers and 22 health posts with potential health service coverage of 75%. All the populations of the woredas were living in malarious areas, i.e all kebeles were malarious. This woreda has gold mining sites in different places of 12 kebeles. So that, many people came to this woreda from different directions of the country for the search of labor.

8.1.7.1 Study design

Cross-sectional community and facility study is designed.

8.1.7.2 Study period

Data collection will be started on July1, 2015 and ends on July 25, 2015. The study will be completed in November 10, 2015.

8.1.7.3 Study population

The study subjects will be all households in selected kebeles of Seba Boru Woreda.

8.1.7.4 Sampling procedure

The sample size will be calculated using the standard formula for multistage cluster sampling, $\mathbf{n= DEFF * Z^2pq/D^2}$. The assumptions taken are: an expected proportion (ITN utilization) of 55% (from the Ethiopia Malaria Indicator Survey (MIS) 2011), 95% confidence level and a 5% tolerable error. Accordingly, the sample size required for this study is 761 households. Adding 10% for non-response, the grand total sample size required will be 837 households. The

sampling will be accomplished in two stages. Initially kebeles which have gold mining sites will be listed out (12) and six kebeles will be selected using lottery method. Then the selected kebeles will be divided in to three equal villages, which have already divided politically. Next, data collectors will go to the approximate centre of each selected villages and span a pen. Then the households towards which the ball point of the pen will indicate will be serially included into the study (proximity sampling). The numbers of households which will be included into the study in each kebeles and villages will be proportional to the total number of households in the selected villages in a kebele. Selected households will be interviewed based on questionnaire. ITN distributions and use data will be collected considering vulnerable groups, including non immune immigrants coming there for search of labor (gold mining purpose), children under five years and pregnant women. Two data collectors will be recruited for each selected kebeles having minimum of college level diploma and health background. Kebeles or villages with no gold mining sites will not be included in the study.

8.1.7.5 Data collection instrument

Semi-structured household questionnaire will be administered to individuals in households. This tool is taken from Ministry of Health/Ethiopian Public Health Institute prepared by Malaria Indicator Survey Technical Working Group team members. The questionnaire will be composed of variables for socio-demographic (sex, age, occupation, educational status), environmental, knowledge, attitude and predictors of LLIN possession and utilization.

8.1.7.6 Data collection procedure

The study team will consists of two field supervisors based on qualification that have BSc in health, one data clerk and twelve data collectors who have good experience of data collection with similar study experiences will be recruited. Experienced data collectors preferably who have health background will be recruited, trained for two days (theoretical and field training) and deployed at the site. The major sources of data will be health facilities, household heads/house wives/persons whose age is above fourteen.

8.1.7.7 Operational definitions

An insecticide-treated net is a mosquito net that repels disables and/or kills mosquitoes coming into contact with insecticide on the netting material. There are two categories of ITNs: conventionally treated nets and long-lasting insecticidal nets:

- A conventionally treated net is a mosquito net that has been treated by dipping in a World Health Organization (WHO) recommended insecticide. To ensure its continued insecticidal effect, the net should be re-treated after three washes, or at least once a year.
- A long-lasting insecticidal net is a factory-treated mosquito net made with netting material that has insecticide incorporated within or bound around the fibers. The net must retain its effective biological activity without re-treatment for at least 20 washes under laboratory conditions and three years of recommended use under field conditions (WHO standard).
- Net utilization is defined as having slept under a net during the night preceding the survey.

8.1.7.8 Variables of the study

Dependent variable: Distribution of ITN, Utilization of LLIN

Independent variables:

- Socio-demographic variables such as sex, age, occupation, educational status and wealth quintiles
- Environmental variables such as distance of vector breeding site from living house, type of housing structure and indoor residual spray
- Knowledge variables such as effectiveness of LLIN against mosquito if washed or not
- Attitude variables such as if there are not enough LLIN's for everyone in a household who should be given priority

8.1.7.9 Data entry and analysis

Data entry template will be designed in EPI-Info version 7.3.1. Data entry and cleaning will be done by principal investigator. Then, the data analysis will be done using Epic Info 7.3.1 and Microsoft Excel and presented using descriptive statistical methods; with frequency distribution tables, percentages and graphs. Furthermore inferential statistics will be done to look into factors

that influence the major outcome variables of LLIN's distribution, usage and other issues related to household knowledge and reasons for not distributed and use. For this computation 95% confidence intervals will be used.

8.1.7.10 Data quality assurance measures

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.

Apart from extensive training of data collectors, strict supervision of data collection process using field supervisors by using the following methods will be employed to assure the data quality.

- All questionnaires will be checked by the field supervisors to ensure all questionnaires are completed every week.
- 10% random check and validation of household questionnaires will be done in every cluster on week basis.

8.1.8 Ethical clearance

The ethical approval and clearance will be obtained from School of Public Health-Addis Ababa University ethical committee. Permission will be also obtained from the concerned bodies of Oromia Regional Health Bureau, Guji Zonal Health Department and Saba Boru 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 might 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 that it 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 LLIN. Each respondent will

be assured that the information provided by them would be confidential and used only for the purpose of research.

8.1.9 Dissemination of findings

Results will be submitted to Ethiopia Field Epidemiology Training Program. To help in future interventions the result will be communicated to governmental and non-governmental bodies. These include the Saba Boru Woreda Health Office, Guji Zonal Health Department, Oromia Regional Health Bureau, Ethiopia Public Health Institute (EPHI), partners and others. One day conference will be arranged at woreda level to present the study results. In addition efforts will be done to publish the paper and disseminate it via presentation on different national and international conferences.

8.1.10 Expected outcomes

The factors that may influence people against use of LLIN's will be clearly identified and documented.

8.1.11 Budget and implementation time

A total of **4,999.93 USD** will be needed to conduct the study. The project will take about six months including data collection and preparation of final report. Guji Zonal health department and Seba Boru Woreda will be asked for help like car, etc as alternative source whenever we faced budget shortage. Details of budget break down and implementation time is annexed below (Annex: 8.1.1 and 8.1.2).

8.1.12 References

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Chapter – IX

Other Additional Outputs

9.1 Narrative summary of training given to woredas, zones and region of Addis Ababa and Oromia Regions

9.1.1 Introduction

The burden of disease in our country is mainly due to preventable communicable diseases which are the common causes of morbidity, mortality and disability. The National Health Policy gives due attention to the control and prevention of preventable communicable and epidemic prone diseases as well.

The best strategy for strengthening of prevention and control of communicable diseases is surveillance as it provides evidences on which to base decisions on public health interventions. The importance of disease surveillance in guiding health planning and intervention was recognized long ago; nevertheless, current routine surveillance system is constrained by many factors such as shortage of trained personnel, poor data collection, non recording, failure to report diseases of epidemic potential in time, incomplete and late reporting of notify able diseases and inadequate data analysis especially at peripheral level. As a result of these constraints Public Health Emergency Management (PHEM) surveillance system (reporting) and case management remains weak.

As to the frequent supervisory visits carried out by the health bureau personnel the reports received from zonal health offices are incomplete and observation at health facilities shows that the case management, of priority diseases was very poor. In addition there is also a disease of public health importance known as Ebola which affected West African countries, mostly of Serra lion, Guinea and Liberia. Ethiopia is also one of the bordering countries of those affected that needs awareness of this disease for all of health professionals for the surveillance of this new disease as well.

Therefore, there is a need from EPHI, Oromia Regional Health Bueuruo (ORHB) as well as Addis Ababa Regional Health Bueuruo (AARHB) to train all PHEM focal persons in order to achieve effective disease surveillance system, improve case management and strengthen the surveillance of maternal death (MDSR) and Ebola in addition to the 20 priory diseases in both regions.

9.1.2 Objectives

9.1.2.1 General objective

To strengthen PHEM focal persons on general surveillance system of PHEM, maternal death and Ebola for zone focal persons so that they will cascade to all health professionals.

9.1.2.2 Specific objectives

- To strength surveillance systems of PHEM, MDSR and Ebola.
- To improve the health workers' ability on case management of selected epidemic prone diseases, maternal death and Ebola.

9.1.3 Methods

9.1.3.1 Training component

- Power point presentation
- Discussion and experience sharing
- Question and answering (oral)

9.1.3.2 Participant selection criteria

All PHEM focal persons were selected from all zones of Oromia and woredas of AA Regions.

- Oromia Region---------- 48
- AA Region ---------- 17
- Total ---------- 65

9.1.3.3 Training period

Training was conducted from January3-4/2014.

9.1.3.4 Venue

Kereyu Hotel, Adama Town

9.1.4 Results

9.1.4.1 Trainee profiles

A total of 65 trainees were participated in this training from these two regions. A total of 48 males and 17 females were participated and majority of them 48(73.8%) were from zones of Oromia Region and the rest from woredas of AA. Among the total participants seven (10.7%) of them were from the RHB (five from Oromia and two from AA)

9.1.4.2 Training topics covered

- Objectives and Methods of the training
- Weekly Reporting format (Format for HEW and Health Workers)
- Outbreak Investigation and Response
- Public Health Emergency Early Warning System
- Epidemiology of Ebola
- Ebola Surveillance and Outbreaks investigation
- Brief summary of international context: Why mothers die?
- Introduction to National MDSR system
- MD identification and reporting system with practical exercise
- MDSR Data flow within the PHEM system
- Extracting data from the system with practical exercise
- Maternal death review at facility with practical exercise
- Current status of MDSR

9.1.4.3 Trainers

A total of six trainers and facilitators, five from EPHI (two EPHI staffs and three EFETP residents) and two of them were WHO surveillance officers.

Table 9.1.1: MDSR and Ebola Training for Public Health Emergency Management Officers, Adama, 03-04 January 2014 (Addis Ababa and Oromia Regions)

Date	Time	Topics	Presenter	Moderator
3/1/2015	8:00am-8:30am	Registration	Organizer	Abyot Bekele
	8:30am-8:45am	Participant Introduction	Participants	

Date	Time	Topics	Presenter	Moderator
	8:45am-9:00am	Objectives and Methods of the training	Mr. Daniel Kaba	
	9:00am-9:40am	Public Health Emergency Early Warning System	Dagnachew Alemu	
	9:40am-10:15am	Discussion	Participants	
	10:15am-10:35am	Tea Break	Organizer	
	10:35am-11:00am	Weekly Reporting format (Format for HEW and Health Workers)	Mr. Amanu Shifara	
	11:00am-11:15am	Discussion	Participants	
	11:15am-12:00pm	Outbreak Investigation and Response	Wake Abebe	
	12:00am-12:30pm	Discussion	Participants	
	12:30pm-2:00pm	Lunch	Private	
	2:00pm-3:00pm	Epidemiology of Ebola	Mr. Abyot Bekele	
	3:00pm-3:30pm	Discussion	Participants	
	3:30pm-4:00pm	Tea Break	Organizer	
	4:00pm-5:00pm	Ebola Surveillance and Oubreak Investigation	Mr. Abyot Bekele	Dagnachew Alemu
	5:00pm-5:30pm	Discussion	Participants	
4/1/2015	8:30am-8:45am	Brief Summary of International Context: Why Mothers die?	Vedio Presentation	
	8:45am-9:45am	Introduction to National MDSR system	Dr.Ekram(FMOH)	
	9:45am-10:15am	Discussion	Participants	
	10:15am-10:30am	Tea Break	Organizer	
	10:30am-12:00pm	MD identification and reporting system with practical exercise	Mr.Birhanu(E4A)	
	12:00pm-12:30pm	Discussion	Participants	
	12:30pm-2:00pm	Lunch	Private	Tefera Tadele
	2:00pm-2:30pm	MDSR Data flow within the phem system	Gemechu Gudina	
	2:30pm-2:45pm	Discussion	Participants	
	2:45pm-4:00pm	Extracting data from the system with	Mr.Birhanu (E4A)	

Date	Time	Topics	Presenter	Moderator
		practical exercise		
	4:00pm-4:20pm	Tea Break	Organizer	
	4:20pm-5:00pm	Maternal death review at facility with practical exercise	Mr.Abdu	
	5:00pm-5:30pm	Current status of MDSR	Dr.Sahlie(E4A)	
	5:30pm-6:00pm	Wayforward and Clossinjg remarks	Mr.Abyot	

9.1.5 Discussion

All of trainees were attended the whole training days. At the end of specific topic presentation most trainees were actively participated on discussion either by asking question or answering, sharing their experience and doing some practical exercises as well as oral feed back at the end of the training. The training was aimed to build the capacity of Public Health Emergency Management (PHEM) focal persons based on the need of EPHI and regions so that will be cascaded accordingly to all health professionals. Participants were from all zones of Oromia Region as well as woredas of AA Region including regional PHEM staffs. This participation from different places of the regions facilitated for more discussions and experience sharing to have common understanding within the zones and regions. The trainees were also evaluated qualitatively through the discussion, question and answering as well as some practical exercises so that they completed the training with good performances. However, the training was conducted within two days for all topics which is not adequate time and limed some of our discussions.

9.1.6 Challenges

- Inadequate training day (needs at least 4-5 days)
- Absence of logistics for pre and post test
- Long distance of the training hall from town (inconvenient during lunch)

9.1.7 Conclusion and recommendations

The training was completed with good discipline, full attendance and active participation of the participant as well as effective in addressing the objective. The trainers were also very concerned and prepared well on the topics accordingly to share their experiences for the trainees. Based on the daily evaluation from the trainee we recommended the EHPI and regional health bureaus have to prepare and share the standard reporting formats for the improvement of the reporting system, allocate some budget for cascading the training for the other health professionals and also try to select convenient training venue for the future or prepare common transport service instead.

9.2 Oromia Region weekly PHEM bulletin and malaria trend analysis

We did weekly PHEM bulletin and malarial trend analysis from January to August 2014 of Oromia Region.

Oromia Regional Health Bureau, PHEM core process

WEEKLY PHEM BULLETIN

EPid. Week 12, 2014 (14_21/07/2006 E.C)

HIGH LIGHTS OF THE WEEK

- *Suspected measles cases report were Neither increased nor decreased*
- *Confirmed malaria cases have been slightly increased.*

I. Introduction

In our Region malaria and measles have been still the main public health concern as compared to others. This bulletin was prepared for WHO Epid. Week 12, 2014. The bulletin consists of completeness of weekly report, trend of malaria and measles cases, surveillance and responses.

II. Weekly surveillance Report

In this week report completeness of government health facility for Oromia Region was 88%. It was above the target and decreased by 1% as compared to the previous week. All Zones and towns sent the weekly report except North shoa zone,Sebeta and Dukem town. All zones and towns report completeness was 80% and above for this week except Gelana town (40%). The report completeness of zones and towns is indicated below (fig.1).

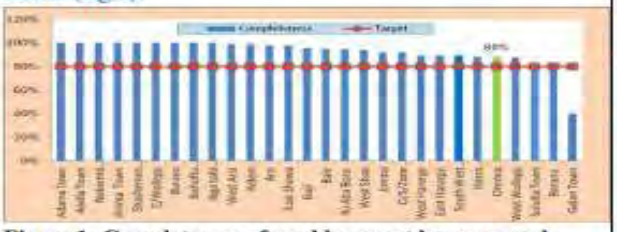

Figure 1: Completeness of weekly report by zones and towns, week 12, 2014,Oromia.

From the past eleven consecutive weeks (Week 01/2014_11/2014), the lowest 78% report completeness was in WHO week 01/2014 and the highest (89%) in WHO week 11/2014 (fig. 2).

Figure 2: Regional surveillnace report completeness by WHO week , from week 1-12, 2014, Oromia.

III. Diseases condition

1. Malaria

In week 12/2014, totally 4,432 confirmed malaria cases were reported. Among confirmed and clinical cases, 24 (0.4%) cases were admitted. From total confirmed cases, 2332(52.6%) were P.falciparum. In this week confirmed malaria cases were increased by 348(8.5%) as compared to week 11/2014. The weekly magnitude of confirmed malaria cases is indicated in figure 3, which consists the last twelve consecutive WHO weeks report.

Figure 3: Regional confirmed malaria trends including P.f and P.v species from week 01-12/2014,Oromia.

Among the total confirmed cases, the highest number of cases were reported from West Shewa zone, 693(15.6%) which is followed by East shoa zone, 636(14.4%). The other zones with high number of confirmed malaria

** = PUBLIC HEALTH EMERGENCY*

Weekly PHEM Bulletin, Oromiya_ 2014

Oromia Regional Health Bureau, PHEM core process

WEEKLY PHEM BULLETIN

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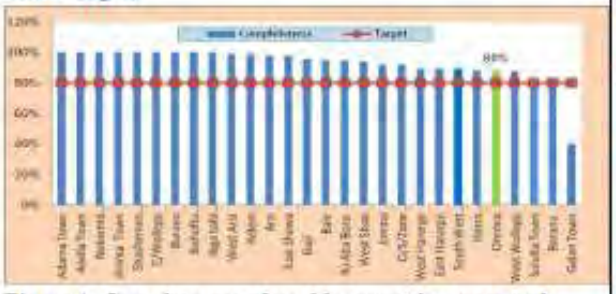

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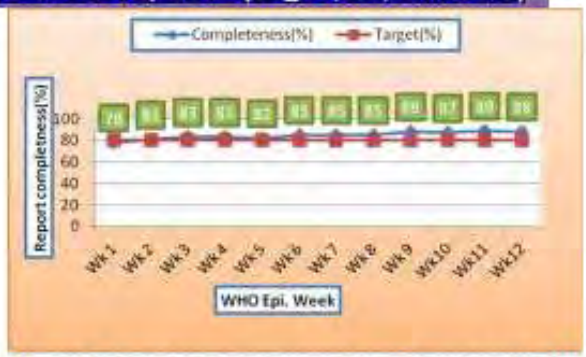

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III. Diseases condition

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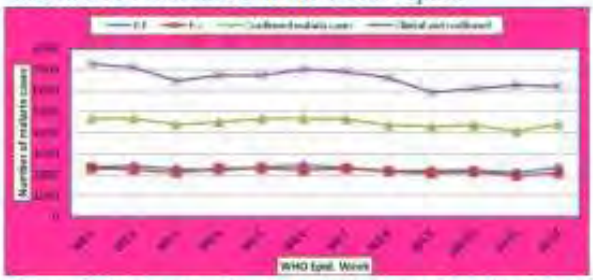

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9.2.1 Acknowledgements

I would like to thanks to Ethiopian Public Health Association (EPHA), Addis Ababa University College of Health Sciences and School of Public Health for their finical and technical support.

My thanks also goes to the training participants, trainers and facilitators from EPHI and WHO surveillance staffs.

9.3 Surveillance of Ebola Viral Disease (EVD)

9.3.1 Introduction

Ebola Viral Disease (EVD) is one of numerous viral hemorrhagic fevers. It is a severe, often fatal disease in humans and non-human primates (such as monkeys, gorillas, and chimpanzees).

Ebola virus disease is caused by infection with a virus of the family *Filoviridae*, genus *Ebolavirus*. When infection occurs, symptoms usually begin abruptly. There are five identified subspecies of Ebola virus. Four of the five have caused disease in humans, Ebola virus (*Zaire Ebola virus*); Sudan virus (*Sudan Ebola virus*); Taï Forest virus (*Taï Forest Ebola virus*, formerly *Côte d'Ivoire Ebola virus*); and Bundibugyo virus (*Bundibugyo Ebola virus*). The fifth, Reston virus (*Reston* E*bola virus*), has caused disease in non-human primates, but not in humans.

The natural reservoir host of Ebola viruses remains unknown. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the virus is zoonotic (animal-borne) with bats being the most likely reservoir[1].

The most widespread epidemic of Ebola virus disease in history is currently ongoing in two West African countries. It has caused significant mortality, with reported case fatality rates of up to 70% and specifically 57–59% among hospitalized patients. Ebola virus disease was first described in 1976 in two simultaneous outbreaks in sub-Saharan Africa; this is the 26th outbreak and the first to occur in West Africa. The outbreak began in Guinea in December 2013 and then spread to Liberia and Sierra Leone. A small outbreak of twenty cases occurred in Nigeria and one case occurred in Senegal. Several cases were reported in Mali, and an isolated case occurred in the United Kingdom. Imported cases in the United States and Spain led to secondary infections of medical workers but did not spread further. Liberia was officially declared Ebola-free on 9 May after 42 days without any further cases being recorded, but remains on high alert for new outbreaks. As of 24 May 2015, the World Health Organization (WHO) and respective governments have reported a total of 27,049 suspected cases and 11,149 deaths, though the WHO believes that this substantially understates the magnitude of the outbreak.

This is the first Ebola outbreak to reach epidemic proportions; past outbreaks were brought under control within a few weeks. Extreme poverty, a dysfunctional healthcare system, a mistrust of government officials after years of armed conflict, and the delay in responding to the outbreak

for several months have all contributed to the failure to control the epidemic. Other factors include local burial customs that include washing of the body after death and the spread to densely populated cities[2].

9.3.2 Purpose of Ebola Surveillance

Considering the infectivity and high case fatality rate of EVD, early detection, timely specimen collection and processing, immediate isolation of new cases and meticulous contact tracing will limit new chains of transmission and have a significant impact on control of the epidemic.

Due to the EVD outbreak in West Africa countries, its surveillance was initiated at ports of entry (airports and land crossing areas) and in the general health system and at community level. The purpose of this surveillance is:

- For early and timely detection of suspected cases and/or outbreaks,
- Rapid investigation and early laboratory verification of the etiology,
- Contact tracing and follow up of contacts.

9.3.3 Case Definition of Ebola Virus Disease

- **Suspected case** A person who has both consistent symptoms and risk factors as follows: Clinical criteria, a person having fever of greater than 38.6^0C , and additional symptoms such as severe headache, muscle pain, vomiting, diarrhoea, abdominal pain, or unexplained haemorrhage; and/or Epidemiologic risk factors within the past 21 days before the onset of symptoms, such as contact with blood or other body fluids or human remains of a patient known to have or suspected to have EVD; residence in or travel to an area where EVD transmission is active; or direct handling of bats or non-human primates from disease-endemic areas.

- **Probable Case** is defined as illness in any person suspected to have EVD who was evaluated by a clinician or any person who died from suspected Ebola and had an epidemiological link to a person with a confirmed case but was not tested and did not have laboratory confirmation of the disease.

- **Confirmed Case** must be confirmed via laboratory testing and a probable or suspected case is classified as confirmed when a sample from the person was positive for Ebola virus in laboratory testing[1].

9.3.4 Major activities done during residency period

9.3.4.1 Screening of Passengers at Ports of Entries

With the evidence of EVD in West Africa, and the declaration of Public Health Emergency of International Concern, traveller screening of passengers coming from affected countries is an important activity and contribute to early detection of cases and prevent the importation of a the disease.

We did the following major activities on passengers screening;

- Raised awareness of EVD and disseminate information among all relevant stakeholders at Humera (ports of entry)
- We sensitized public health authorities at ports of entry
- Provided a training on EVD to health workers
- Gave onsite orientation on the Case definition of EVD and infection prevention for all health workers of Humera hospital and health center
- Supervised health workers on screening of passengers at Humera land ports

9.3.4.2 Responding to hotline

We participated in responding to hotline (8335) from 29 August to 11 November, 2014. As result we tried to analyze the most frequently asked questions from the community, frequency of call and proportion of participants by their regions.

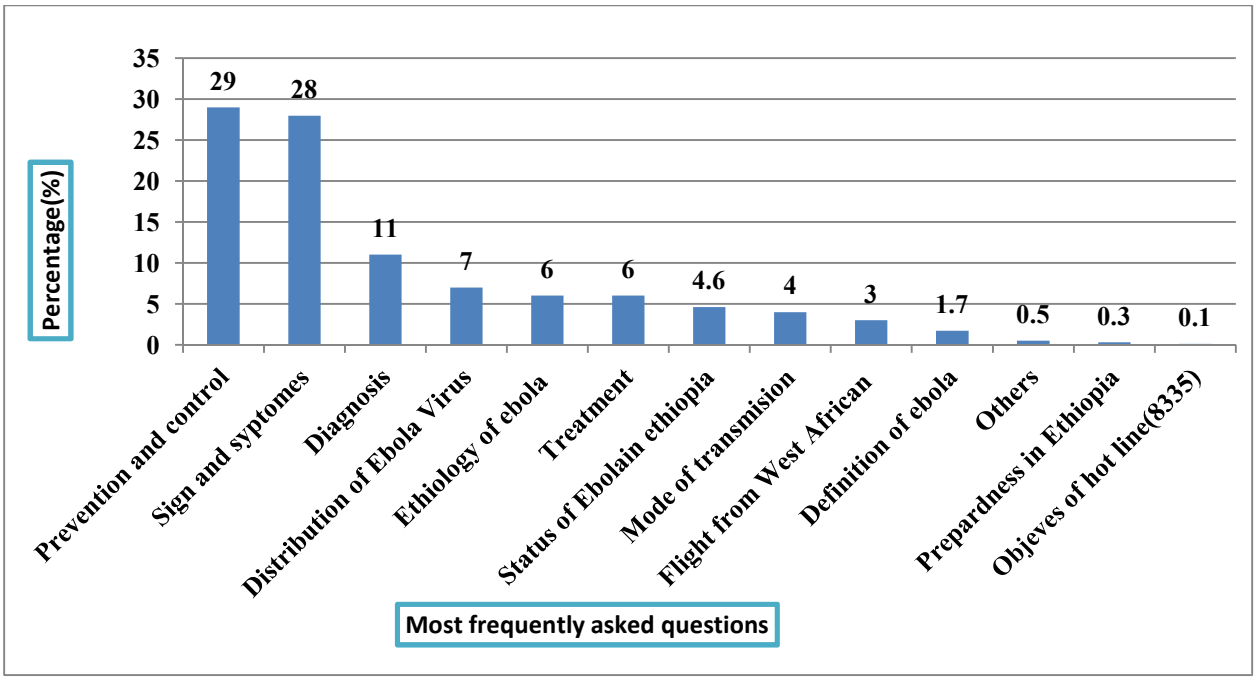


Figure 9.3.1: Frequency of Call per day, from 29 August to 11 November, 2014, Ethiopia

The most frequently asked question by the community was control and prevention of EVD (29%), followed by sign and symptoms (28%) of Ebola viral diseases.

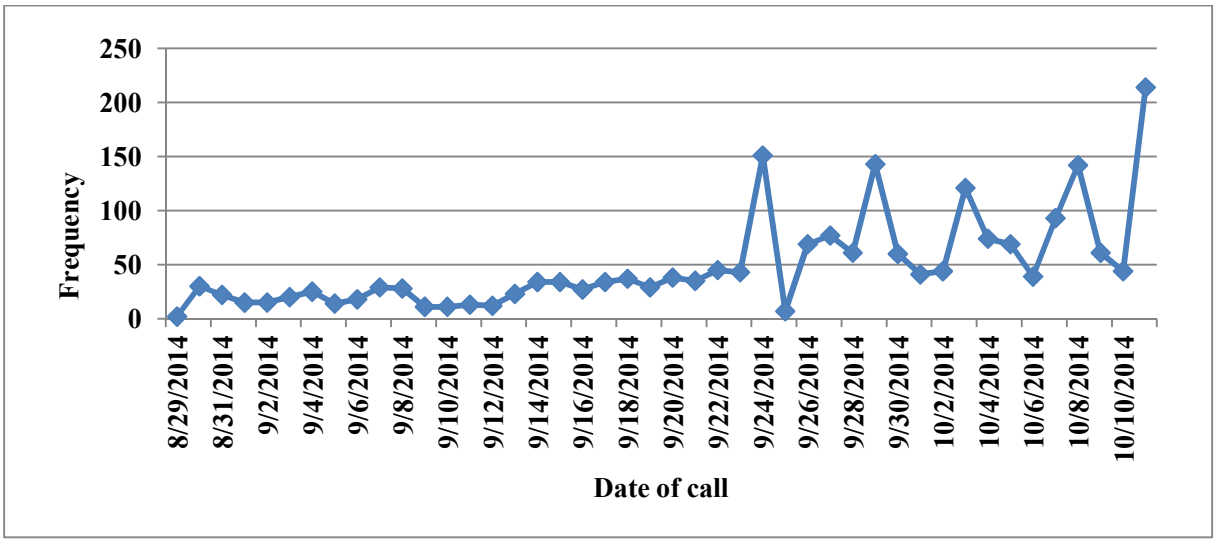


Figure 9.3.2: Trends of Call per day, from 29 August to 11 November, 2014, Ethiopia

As the above graph shows the number of people called to hotline were increased from day to day from 29 August to 11 November, 2014 due to awareness creation and notification of the hotline for the community at each ports of entry (POE) by the residents.

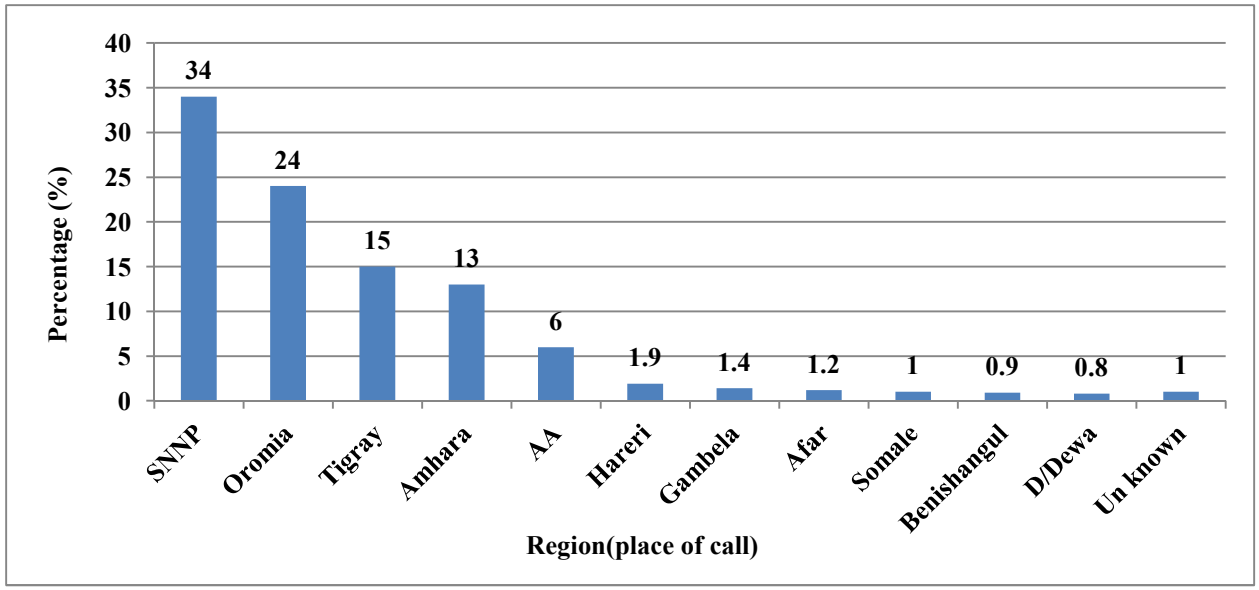


Figure 9.3.3: Distributions of frequency of call by place from 29 August to 11 November, 2014, Ethiopia

The most frequent call was from SNNP (34%) followed by Oromia (24%), Tigray (15%) and Amhara (13%) Regions from 29 August to 11 November, 2014.

9.3.4.3 Follow up of passengers from EVD affected country

We followed passengers from those EVD affected countries to Ethiopian on daily basis. The passenger form those Ebola affected county were followed both in hotels and their residency place (home) for 21 days by measuring body temperature twice a day using infrared thermometer from September 2014 to may 2015.

Table 9.3.1: Some list of passengers followed from 29 August to 11 November, 2014.

Contacted face to face through phone not contacted

No	Passengers' full name	Sex	Depart from	Residence	Phone number	Duration of stay in Ethiopia	Departure date	Follow up days												
								Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13
1	Kalokos M.S	M	Seira Leon, Guinea, Liberia	AU	911201639	AU staff		10/15/2014	10/16/2014	10/17/2014	10/18/2014	10/19/2014	10/20/2014	10/21/2014	10/22/2014	10/23/2014	10/24/2014	10/25/2014	10/26/2014	10/27/2014
2	Djoulbaye	M	Seira Leon, Guinea, Liberia	AU	929033109	AU staff		10/15/2014	10/16/2014	10/17/2014	10/18/2014	10/19/2014	10/20/2014	10/21/2014	10/22/2014	10/23/2014	10/24/2014	10/25/2014	10/26/2014	10/27/2014
3	Lamba Juana	M	Seira Leon, Guinea, Liberia	AU	911201636	AU staff		10/15/2014	10/16/2014	10/17/2014	10/18/2014	10/19/2014	10/20/2014	10/21/2014	10/22/2014	10/23/2014	10/24/2014	10/25/2014	10/26/2014	10/27/2014
4	Wurei Bah	M	Seira Leon, Guinea, Liberia	AU	912621689	AU staff		10/15/2014	10/16/2014	10/17/2014	10/18/2014	10/19/2014	10/20/2014	10/21/2014	10/22/2014	10/23/2014	10/24/2014	10/25/2014	10/26/2014	10/27/2014
5	Kalokos M.S	M	Seira Leon, Guinea, Liberia	AU	9.1E+08	AU staff		10/15/2014	10/16/2014	10/17/2014	10/18/2014	10/19/2014	10/20/2014	10/21/2014	10/22/2014	10/23/2014	10/24/2014	10/25/2014	10/26/2014	10/27/2014
6	Djoulbaye	M	Seira Leon, Guinea, Liberia	AU	9.3E+08	AU staff		10/15/2014	10/16/2014	10/17/2014	10/18/2014	10/19/2014	10/20/2014	10/21/2014	10/22/2014	10/23/2014	10/24/2014	10/25/2014	10/26/2014	10/27/2014

9.3.5 Limitation of this report

The analysis of the EVD surveillance data was given to only specific residents so that can't discussed in details.

9.3.6 Strength of EVD surveillance

- ✓ Screening of all passengers from Ebola affected country at Airport and ports f entry
- ✓ Daily follow up of the travelers and residents from those affected country foe 21 days
- ✓ Preparation of Ebola treatment units and isolation centers in Addis Ababa and most regions
- ✓ Awareness creation for the community through hotline (8335) and training for health workers at deferent levels

9.3.7 Weakness EVD surveillance

- Passengers out of Addis were not followed well
- No system in place for passengers of invalid address
- Follow up system was not cascaded to the regions; done only at federal level

9.3.8 Recommendations

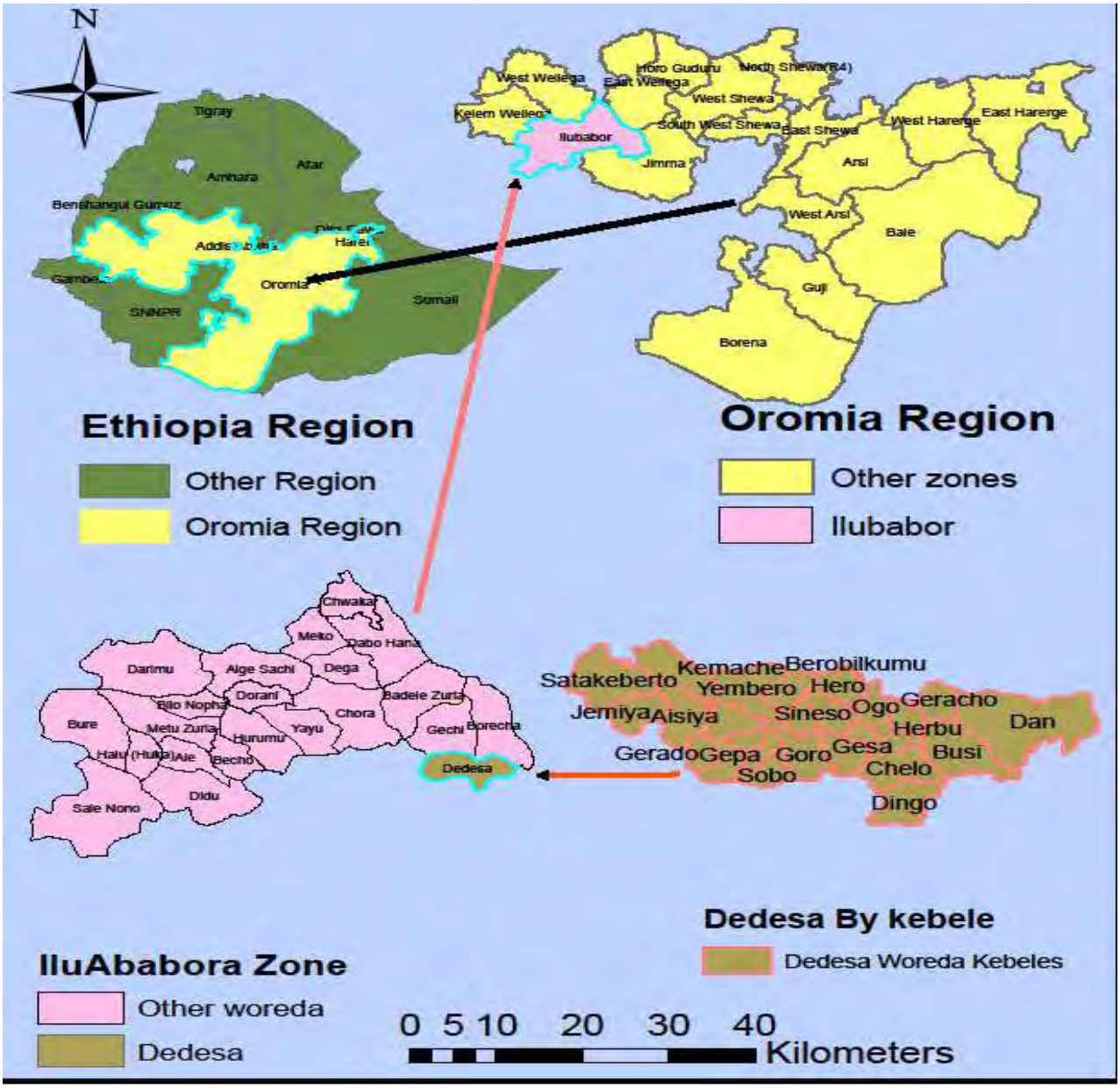
- ➢ The Federal Ministry of Health or EPHI should cascade the follow up system to all the regions including Addis Ababa so that passengers out of Addis Ababa were also not missed
- ➢ Some passengers were reported with invalid address or purposely changed their address not to be followed. Therefore, EPHI has to do in collaboration with police for addressing those who refused.

9.3.9 References

1. Ethiopian Public Health Inistitute, Ebola viral disease enterim gudeline, 2014.

2. CDC, Ebola virus epidemic in West Africa. 2015.

Annex 9.3.1: Administrative map of the Didesa Woreda, Illu Aba Bora Zone, Oromia Region, Ethiopia.



Annex 9.3.2: Questionnaires for Case - control study on measles outbreak in Didesa Woreda of Ilu Aba Bora Zone.

Case status = Case _____Control_____

Patient Name_____ date of Data collection_____

Region_____ Zone_____ Woreda_____ Kebele _____ Got _____ Phone_____

Location: Longitude:_____ Latitude:_____

I. Socio-demographic Characteristics

S. No	Questions	Alternatives
1.1	Sex	1.Male 2.Female
1.2	Age	years_____ Months_____
1.3	Occupation of parents/care givers	1. Farmer 2. House wife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.4	Occupation of patient	1. Farmer 2. House wife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Not applicable 9. Other (specify)_____
1.5	Educational level of mother or care giver	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.6	Educational level of the patient	Illiterate Read and write Elementary Secondary

		Above secondary
1.7	Marital status	1. Single 2. Married 3. Divorced 4. Widowed 5. Separated
1.8	Family size	_____
1.9	Is there any sick person with rash, fever, running nose/conductivities (illness)?	1. Yes 2. No
1.10	If yes, number of sick person	_____

II. Clinical History of Diseases

2.1	What was the symptom?	1.fever *2.*Rash 3.cough, 4.coryza (runny nose), 5. conjunctivitis (red eyes) *6.*Diarrhea 7.Ear discharge 8. pneumonia 9.Blidness 10. Laringo tracheal infection 11.Vomitting Others_____
2.2	Date of rash on set	__/__/____
2.3	Date seen at health facility	__/__/_____
2.4	Did you (he/she) take treatment?	1.Yes 2.No

2.5	If yes, treatment taken	1.ORS 2.Antibiotics 3.Vitamin A 4.Supplementary food 5. TTC ointment 6.Anti pyretics 7.Others given_____
2.6	Did you recovered after the treatment?	1.cure 2. partially 3. deteriorated/disabled 4.death

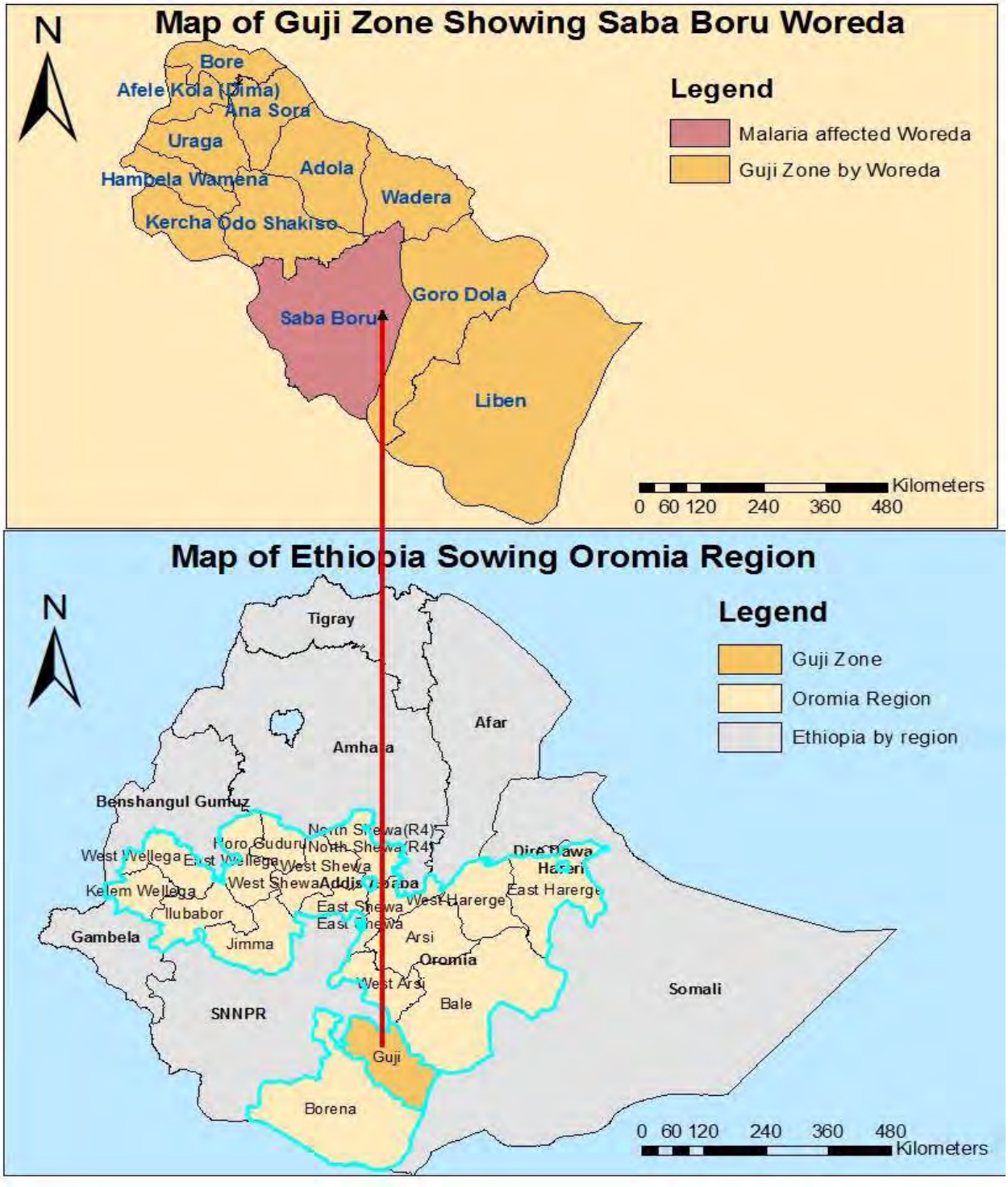
III. Risk factor and Knowledge question

3.1	Did you ever vaccinated for measles?	1.Yes 2.No 3.Unknow 4.Not applicable
	If yes last vaccination date	1.patient recall_____ dd/mm/yy 2. vaccination card_____ dd/mm/yy
3.2	Number of vaccine doses received	1.one dose 2. two dose 3.three and above
3.3	Did you have any travel history 7-18 days to areas with active measles cases before onset of symptoms?	1.Yes 2.No If Yes where _____
3.4	Do you have any travel history four days before and after rash onset	1.Yes 2. No If yes where _____
3.5	Do you have any contact history with someone else four days before and after rash onset	1.yes 2.No If yes with whom_____

3.6	If Yes to question 3.5 place of travel	1.School 2.Neighbor 3.Market 4.Other_____
3.7	Do you know modes of transmission for measles?	1.Yes 2.No 3. If yes specify_____
3.8	Did you ever have measles infection?	1.Yes 2.No 3. Don't know
3.9	Nutritional status of the cases	1.Normal 2.Moderate 3.Severely malnourished
3.10	How many people are living together in one house with you:	_____
3.11	What is the estimated area of the house?	_____
3.12	Where did you go first when you get ill?	1. Health Facility 2. Traditional Healers 3. Holy Water 4. Stayed at home 5. Other :(Specify)_____
3.13	How do you think people get measles?	1. Contact with a virus from ill person 2. From God 3. Bad attitude of other people 4. Other(Specify)
3.14	Do you Know measles is vaccine preventable?	1. Yes 2. No 3. Don't Know
3.15	Who do you think can be affected by measles?	1. Children of aged less than 5 years 2. Children of aged less than 18 years 3. Women of any ages 4. Any age groups of both male and women 5. Other (specify):_____

3.16	How do you think measles can be cured?	1. Using modern medicine 2. Using traditional Medicine 3. Holy water 4. By feeding nutritious foods 5. Keeping the sick person indoor 6. Other(Specify)_____

Annex 9.3.3: Administrative map of Guji Zone Showing Seba Boru Woreda



Annex 9.3.4: Data Collection form for malaria outbreak investigation, Saba Bore Woreda, Gugi Zone 2014

I. Socio-demographic information:

1. ID number of respondent_____

2. Age in years_____

3. Sex: M☐ F ☐

4. Address: Region _____Zone_____ Woreda_____ kebele _____village_____

5. Occupation: Employed ☐ unemployed ☐ Student☐ Pastoralist ☐ farmer

6. Total family members _____

7. Ethnicity: _____

8. Religious: Orthodox, ☐ Protestant, ☐ Muslim ☐ other ☐

9. Marital status : Married, ☐ single ☐ Widowed ☐ Divorced☐

10. Education status: Illiterate ☐ Primary, ☐ Secondary ☐ tertiary ☐, non-formal ☐

11. Case status

a) Case Yes ☐ ,

b) Control yes☐

II. Clinical presentations:

***(For case only)**

12. What was the first symptom? _____

13. When was the 1st symptom started(date of onset of symptoms) DD/MM/YY_____

14. What were others symptoms?

a) Fever: Yes ☐ No☐, if yes duration of fever____ Was it constant fever?: Yes ☐ No☐ or every other days fever? Yes ☐ No☐

b) Vomiting : Yes ☐ No☐

c) Diarrhea : Yes ☐ No☐,

d) Anorexia (appetite loss): : Yes ☐ No☐,

e) Headache: Yes ☐ No☐

f) sweating,: Yes ☐ No☐,

g) Chilling and shivering : Yes ☐ No☐,

h) Weakness : Yes ☐ No☐,

i) Caught: : Yes ☐ No☐,

j) back pain : Yes ☐ No☐,

k) muscle pain : Yes ☐ No☐,

l) rigor: Yes ☐ No☐,

➧ ***Ask the following signs (M to Y) for complicated malaria only***

m) Altered consciousness (e.g. confusion, sleepy, drowsy, comma) Yes ☐ No☐,

n) Not able to drink or feed Yes ☐ No☐,

o) Severe dehydration, Yes ☐ No☐,

p) Persistent fever, Yes ☐ No☐,

q) Frequent vomiting Yes ☐ No☐,

r) Convulsion or recent history of convulsion Yes ☐ No☐,

s) Unable to sit or stand up Yes ☐ No☐,

t) pallor (Anemia) Yes ☐ No☐,

u) No urine output in the last 24 hours Yes ☐ No☐,

v) Bleeding Yes ☐ No☐,

w) Jaundice (yellowish coloration) Yes ☐ No☐,

x) Difficult breathing Yes ☐ No☐,

y) Other conditions that cannot be managed at this leve_____

15. Did you visit health facilities? Yes☐ No☐, if yes, when did you visit health facilities? DD/MM/YY_____

16. Did you get any treatment 1.Yes ☐ No☐, If yes, what treatment did you get?

(a) Coartem Yes ☐ No☐, was it for PF Yes ☐ No☐,

(b) Chloroquine? Yes ☐ No☐, was it for PV Yes ☐ No☐,

(c) Quinine tablets Yes ☐ No☐, was it for pregnant and <5 Kg? Yes ☐ No☐,

(d) Quinine injection Yes ☐ No☐, was it for sever malaria Yes ☐ No☐,

(e) Other treatment given

_____

_____

17. Did you recover completely after the treatment: Yes-☐ No ☐

18. Place of residence during 2 weeks before onset of illness;_____

19. Blood samples taken: Yes-☐ No ☐

20. If yes Q18, what was the result : Positive ☐ negative ☐

III. Risk Factors:

***(For both cases and controls)**

21. Specific living areas _____

22. Sleeping areas in side home _____outside home_____

23. Do you stay outside over night? Yes-☐ No☐

24. Is there anybody in your home with similar sign and symptoms? Yes-☐ No☐

25. Did you travel outside your village in the past 2-3 wks Yes-☐ No ☐

26. If yes Q 24, indicate

(a) date of travel DD/MM/Y_____

(b) the place of travel

(c) date when you returned back DDMMYY_____

27. If Q 24 is yes, Is there sick patients (same symptoms) in the place where you have been Yes-☐ No☐

28. is there a similar sick patient in your house hold Yes-☐ No☐

29. Do you have bed net in your household Yes-☐ No☐, If is yes, how often do you use Always☐ Sometimes ☐Never ☐

30. Do mothers and children given priority of using bed nets? Yes-☐ No☐

31. If yes Q 28 the number of bed nets _____

32. Was deltamethrine sprayed this year? Yes-☐ No☐

33. If yes Q31 when?_____

34. If yesQ31 how many? Once ☐ twice ☐

IV. Environmental investigation

35. Place of stay during night? _____

36. Is there any artificial water -holding containers close to your home? such as :

a. old tires: Yes-☐ No☐,

b. Plant in the containers /flower –pots Yes-☐ No☐,

c. plant with temporary water pools Yes-☐ No☐,

d. Open deep well: Yes-☐ No☐,

e. Broken glass bottles Yes-☐ No ☐,

f. Cans Yes-☐ No☐,

g. Plastic container Yes-☐ No☐,

h. Gutter to collect rainwater: Yes-☐ No☐,

i. Uncovered water storage/ septic tank Yes-☐ No☐,

j. Stagnant water Yes-☐ No☐,

37. Presence of mosquito vectors/ mosquitoes breeding sites around the home or vicinity? Yes-☐ No☐,

38. If Q36 yes, presence of larvae in breeding sites Yes-☐ No☐,

39. Types of house screened Yes-☐ No ☐, unscreened Yes-☐ No ☐,

40. Do you use repellents Yes-☐ No☐,

41. Protective clothing Yes-☐ No☐,

42. Waste collection: Yes-☐ No☐,

43. Unprotected irrigation Yes-☐ No☐,

44. Presence of Intermittent rivers cloths to the community Yes-☐ No☐,

45. Presence of tick grass Yes-☐ No☐,

V. Awareness assessment

46. Do know malaria? Sign and symptoms ----------

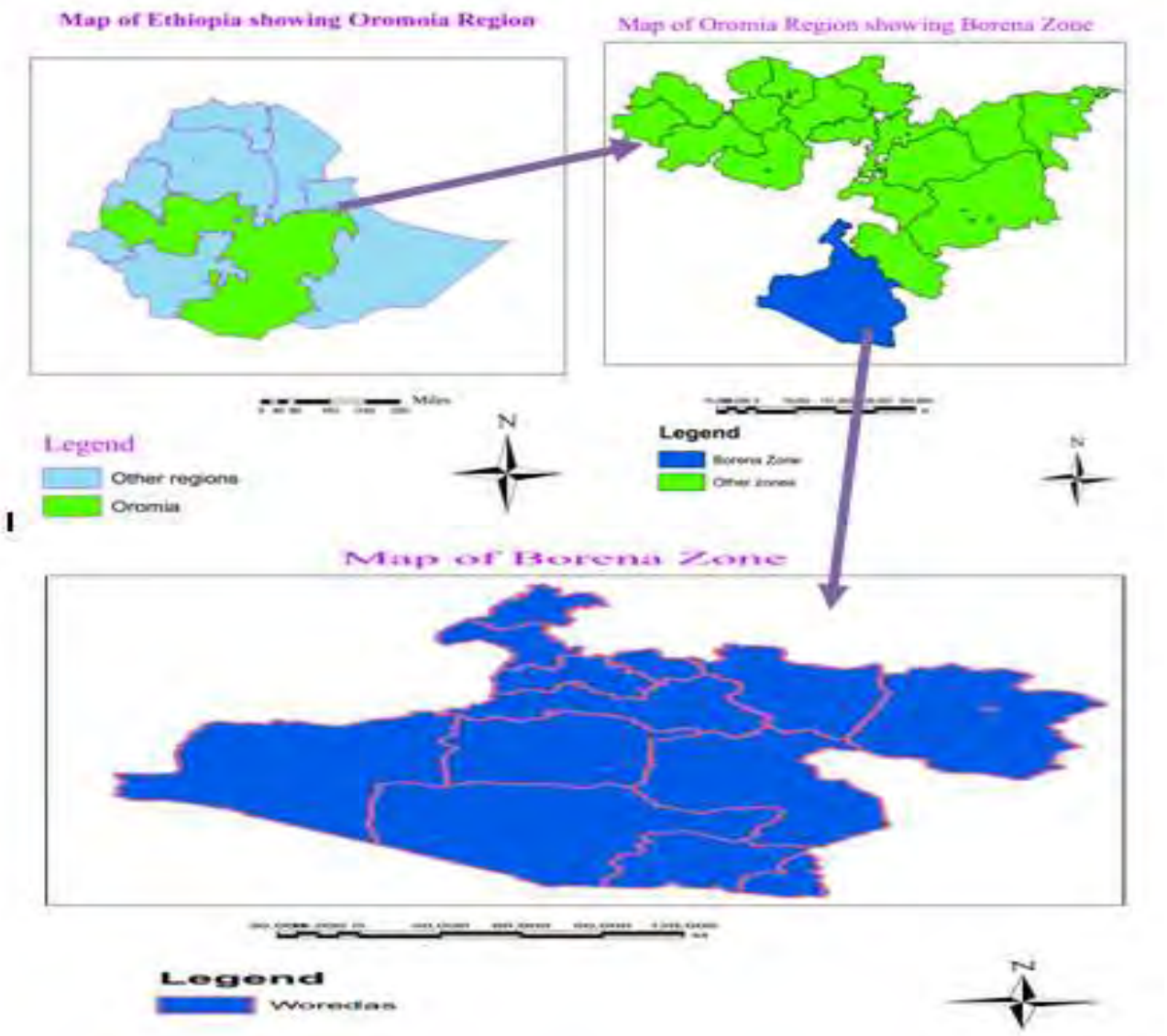
---

47. How it transmitted?----------

---

48. How it can be prevented?----------

Annex 9.3.5: Administrative map of the Borena Zone (study area)



Annex 9.3.6: Questionnaire for evaluation of surveillance system-Ilu Aba Bora Zone, Oromia, Ethiopia 2014

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, **Obs** [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, (Obs) 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, Obs , 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, Obs** presence of demographic data (E.g. population by woreda 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, Obs, a written plan of epidemic preparedness and response

30. Has the zone had emergency stocks of drugs, vaccines, and supplies at all imes 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, Obs (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 Obs: the presence of a report of **s**urveillance 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 is 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 in 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, **Obv:** 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 affect 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, **Obs** national PHEM /IDSR Guide line/manual:_____

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

   If No, Reason _____

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

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

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

   Weekly: _____ /12 times the number of health facilities

   Immediately: _____/ times the number of health facilities

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

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

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

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

9. How can reporting system be improved?

_____

_____.

10. Did you analysis IDSR data? Yes/No

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

If yes, Obs description of data by age and sex

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, **Obs** observed description of data by time?

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

a) Malaria Yes/ No

b) Measles Yes/No

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

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

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

(Obs for 2 priority diseases)_____

13. Did you have appropriate denominators? Yes/ No

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

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

15. How often do you analyze the IDSR data?

a. Daily b. Weekly c. Every 2 weeks

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

<u>Outbreak investigation</u>

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

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

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

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

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

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

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

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

If yes, (observe written report to confirm)

Responses

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

24. 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?_____

Obs 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?_____

(Obs supervision report)

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

(Text)

Reason 1_____

Reason 2_____

Reason 3_____

Training

28. Have you 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, **Obe:** 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 nknown 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, Obs; for the existence **PHEM/IDSR** national guide line or manual

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

If yes, **Obs** the existence of a clinical register

3. Is there the health facilities correctly register cases during the previous 30 days?

Yes/No

If yes, **Obs**; the clinical register

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

a) Measles Yes/No

b) Malaria Yes/No

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

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

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

5. 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, Obs the presence of materials required to collect

a) Stool Yes No N/A

b) blood/serum Yes No N/A

c) CSF Yes No N/A

7. Do you have the capacity to handle sputum, stool, blood/serum and CSF until shipment at this facility? Yes No N/A

If yes, Obs 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, Obs presence of transport media for stool at health facility.

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

Yes No N/A

If yes, what the reason? _____

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

a. **Obs** Measles Yes No N/A

b. **Obs** Malaria Yes No N/A

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

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

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

12. **On time (use national deadlines)**

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

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

13. How do you report?

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

14. How can reporting be improved? Your suggestion

_____

_____

_____

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

If yes, Obs data

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

If yes, Obs line graph of cases by time

17. Do you have an action threshold for any of the priority diseases? Yes No N/A

If yes, what is it (Ask for 2 priority diseases)?

Malaria cases ____ % increase

Measles cases____ % increase

18. Who is responsible for data analysis? _____

19. How often do you analyze the collected data?

a) Daily b) Weekly c) Every 2 weeks d) Monthly e) Quarterly

f) As needed……..

20. Presence of demographic data at site (E.g. population <5 yr., population by village, total Population) Yes / No

Epidemic preparedness

21. Is there standard case management protocol for epidemic prone diseases at health facilities? Yes No N/A

If yes, Obs the existence of a written case management protocol for 1 epidemic prone disease

Epidemic response

22. Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No N/A

Feedback

23. Have you received feedback report in the last year from higher level? Yes/No

If yes, how many feedback reports has the health facility received in the last year? ___

Obs; at least 1 report received

24. Have you conduct meeting with community in the last 6 month? Yes No N/A

If yes, how often? a) Weekly b) every two weeks c) monthly d) quarterly e) as needed

Supervision

25. Did you supervise health posts in the last 6months? Yes No N/A

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

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

27. Did you get any supportive supervision from higher level in the last 6 months? Yes No N/A

If yes, Obs; supervision report or any evidence for appropriate review of surveillance

Training

28. Have you 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

49. Total population of the woreda under surveillance_____

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

a) Malaria cases _____Deaths _____

b) Measles cases _____Deaths _____

51. 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

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

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

c) Flexibility

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

55. 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

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

If, **Obe:** Review the last months report of these diseases

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

54. 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)? _____

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

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

g) No feedback / or recognition given by the higher bodies.

h) Reporting formats are difficult to understand

i) Report formats are time consuming

j) 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

58. 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 Post Level Questionnaire

Identifiers

Woreda_____

Name of health Post_____

Respondent_____

Date _____

Interviewer _____

General Information

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

   If yes, Obs PHEM/IDSR national guide line or manual:

2. Is the health post has a clinical register? Yes No N/A
3. Are cases correctly registered in the health post? Yes No N/A

   If No, state the reason; _____

   If yes, Obs; the correct filling of the clinical register during the previous 30 days

4. Do you have a standard case definition for: (each priority disease)
   a) Measles, Yes No N/A
   b) Malaria? Yes No N/A

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

5. Do you use standardized case definitions for the priority diseases? Yes/No

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

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

   Yes/ No

7. 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) **Obs** Measles Y N N/A
   b) **Obs** Malaria Y N N/A

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

   Obs Weekly: _____/12 times the number of sites

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

9. On time (use national deadlines)

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

   Obs ; Number of immediately reports submitted on time: ___/-- times from health post .

10. How do you report?

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

11. How can reporting be improved?

Suggest

_____

_____

_____

12. Describe data by person, place & time (outbreaks, sentinel) Yes/ No Not applicable

Epidemic response

13. Has the health post implemented prevention and control measures based on local data for at least one epidemic prone disease? Yes No N/A

Feedback

14. Have you received feedback in the last 6month? Yes No N/A

15. How many feedback reports has the health post received in the last year? ___

If yes Obs; Observed at least 1 report at the health post from a higher level during the past year on the data they have provided

16. Have you conduct meeting with community members in the 6month? Yes No N/A

17. If yes, how many meetings has this health post conducted with the community members in the past six months? _____

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

18. If No, list the reason _____

_____.

Supervision

19. Have you supervised by higher level in the last 6 months?

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

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

Training

21. Have you trained in disease surveillance and epidemic management? Yes No N/A

22. Number of staffs trained_____

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

_____.

Resources

23. Logistics

a) Electricity yes No N/A

b) Bicycles yes No N/A

c) Motor cycles yes No N/A

24. Data management

a) Stationery yes No N/A

b) Calculator yes No N/A

c) Computer Software &Printer Yes No N/A

25. Communications

a) Telephone service yes No N/A

b) Fax yes No N/A

c) Radio call yes No N/A

d) Computers that have modems Yes No N/A

26. Information education and communication materials

a) Posters yes No N/A

b) Megaphone yes No N/A

c) Flipcharts Image box yes No N/A

d) Other: yes No N/A

27. **Hygiene and sanitation materials**

a) Spray pump yes No N/A

b) Disinfectant Yes No N/A

28. **List of Personal Protection Equipment (PPE)**

_____

_____

Satisfaction with surveillance system

29. Are you satisfied with the surveillance system? Yes No N/A

If no, how can the surveillance systems will be improved? Suggest_____

_____.

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

_____

_____

_____

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, **Obe:** 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?_____.

Laboratory Assessment Tool

General information

Name of the laboratory		
Address of the laboratory:	Telephone_____ Fax_____ e-mail_____	
Level of the Laboratory :	Community Health Facility Woreda Regional National	
Affiliation of the Laboratory :	**Public**/Private/Academic /Religious Institution / NGO	
Building Facilities and utility services		
Is the laboratory in a free-standing building or part of larger structure?		
How many rooms with bench space are there in the laboratory Do the Laboratory have the following services available? Electricity/Running water		
Is there a back-up power source in case of power failure (e.g. emergency generator)?	Yes No	
If yes, what systems are protected?		
Refrigerators/freezers	Yes No	
Computers	Yes No	
Other(specify)	Yes No	
What types of communications systems are available?		
Post	Yes No	
Telephone	Yes No	
Fax	Yes No	
Satellite phone	Yes No	

E-mail (no. computers)	Yes No	
Internet (no.computer)	Yes No	
Laboratory staff		
1. Medical Laboratory Professionals Number a. MSc/MPH b. Bsc c. Dipoma		
2. Assistants (not doing tests)		
3. Clerical/Cleaner		
Has training been conducted for the laboratory staff on		
Malaria		
Other epidemic prone diseases (briefly describe)		
If yes when was the last training been conducted for your laboratory staff ?		

Reagents & kits

Where you are getting your reagents?	From a commercial supplier	
	From another laboratory	
	Supplied by Regional/Zonal/Woreda/health office	
Was there shortage of reagents in the last six month which are used for identifying diseases	Yes	No
If Yes, What Are the most important reasons?	Lack of funds Lack of information Un prioritizing others(specify)	
What type of water is used for preparation of media and reagents?		
Deionized Distilled Distilled Tap water	Yes Yes Yes	No No No

Tests performed at the laboratory

Disease	**Specimen type**	**Assay Performed**	**Yes**	**No**	**Number/ Month**
Meningitis	CSF	a. Cell count b.Latex agglutination c. Gram stain d. Culture e.Identification tests f.A-M susceptibility			
Watery diarrhea (cholera)	Faeces	Microscopy of wet preparation Culture-TCBS Culture-Alk. Peptone Serotyping			
Malaria	Blood	Thick/Thin film microscopy			
Measles	Serum Throat swab, conjunctivas swab	IgM by EIA Other serological test Virus isolation			
Yellow fever	Blood, postmortem liver	IgM Virus isolation			
suspect typhoid or brucellosis	Blood, faeces serum	Culture Identification tests A-M susceptibility Serological tests (Widal, brucella agglutinins)			
Hepatitis	Serum	Anti-HAV IgM Anti-HbsAg Anti-HCV IgM			
Viral haemorrhagic fevers (any)	Serum Serum, other tissue specimens	IgM Virus detection			
Acute flaccid paralysis	Faeces	Virus isolation Virus typing			

Specimen collection, labeling and handling

Do request forms contain **ALL** of the following patient information: specimen source, date and time of collection, type of test requested?	Yes	No
Are specimens that are received labeled with the patient's name and unique identifiers?	Yes	No
Does the laboratory have a logbook/electronic record of all specimens sent for diagnostic testing?	Yes	No
Are specimens discarded after testing, or are they stored?	Discarded	Stored
Does you laboratory refer bacteriology isolates or serum samples to a reference laboratory?	Yes	No
If yes, reason for referral (□ □all)		
Confirmation	Yes	No
Identification of unknown organism	Yes	No
Test not performed on site	Yes	No
Number of sample referred in the last six month?		
Types of transport media used (□ □all that apply)		
Trans-isolate	Yes	No
Cary and Blair	Yes	No
Viral transport medium	Yes	No
Other (describe):		

Reporting procedures

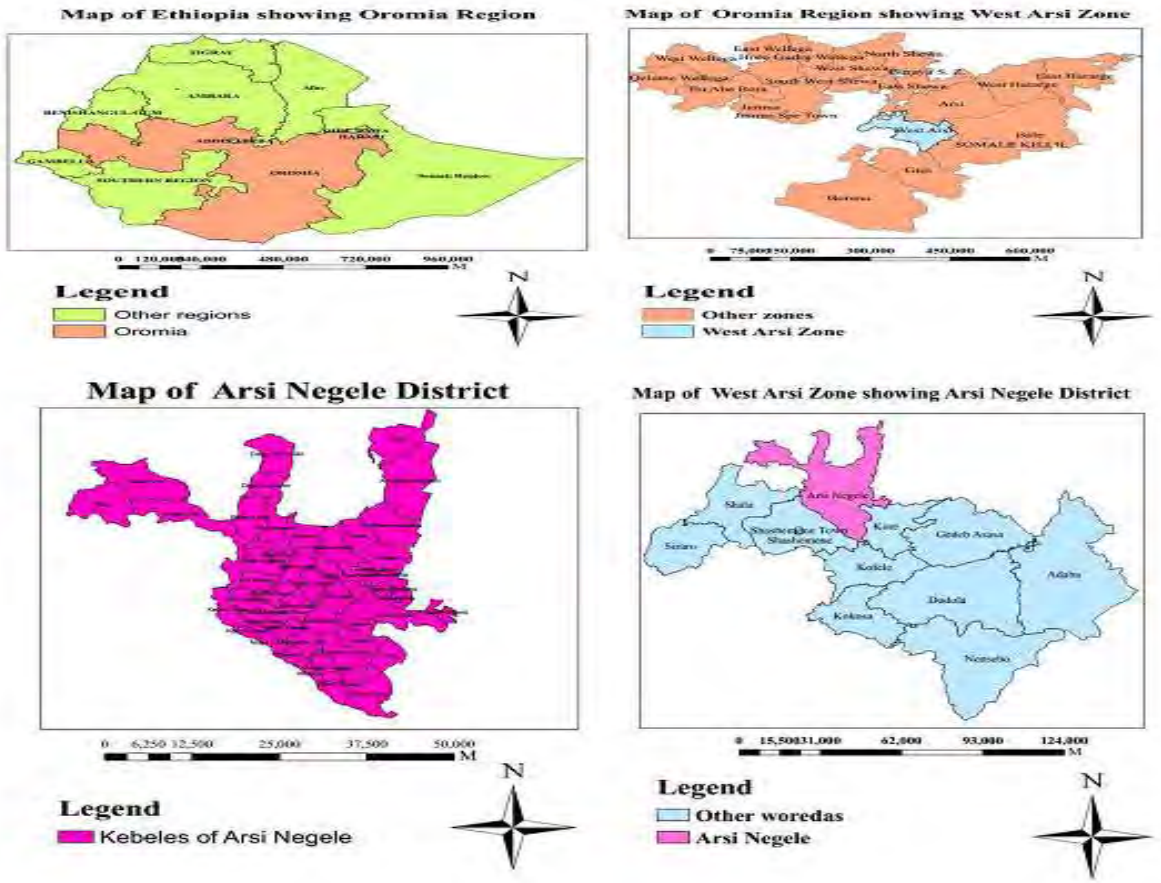
Are records kept of the number and type of tests performed and results?	Yes	No
Does the laboratory have a list of diseases that are supposed to be reported to the Ministry of Health?	Yes	No
Does the lab staff know what diseases should be reported?	Yes	No
Does the lab provide regular reports of patients with reportable diseases to any of the following Ministry of Health offices/institutions?		
Woreda Health Office	Yes	No
State Health Office	Yes	No
National / MOH level	Yes	No
If reports are submitted, how frequently?		
Weekly	Yes	No
Monthly	Yes	No
Quarterly	Yes	No
Other	Yes	No

Quality control procedures and programs

Does the laboratory use any system for internal quality control?	Yes	No

Does the laboratory participate in any external quality assurance or proficiency schemes?	Yes No
Was there any general laboratory supervision conducted to this laboratory?	Yes No
If yes, how often in for the last one year?	one times/two times/ three and more
Does your laboratory have a system for regularly monitoring of quantities of reagents and materials so that there is warning if stocks become low?	Yes No

Annex 1.1.1: Administrative map of Arsi Negele Woreda, West Arsi Zone, Oromia Region, 2013



Annex 1.1.2: Data collection tool for health profile assessment in Arsi Negele, Oromia, Ethiopia, 2013/14

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 2004 _____

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 posts** have access to transportation_____(_____%) , Telecommunication_____(_____%) ,Electric power_____(_____%) ,Water supply _____(_____%)

7.2. How many of the **health centers** have access to transportation_____(_____%) , Telecommunication_____(_____%) ,Electric power_____(_____%) ,Water supply _____(_____%)

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

8.1. Health Facility

Type	Number	Total No. of beds
Hospital		
Health center		
Private HFs(clinics/diag.lab/drug stores)		
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	No.	Remark
Physicians		
Health officers		

Nurses		
Lab.		
Pharmacy		
Env. 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):**

Adult		Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

8.6.2. **Top ten causes of admissions**

Adult		Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

8.6.3. **Top ten causes of deaths (mortality).**

Adult		Pediatrics
1		
2		
3		
4		
5		
6		
7		
8		
9		

10		

8.7. **Vital Statistics and Health Indicators**

8.7.1. Infant Mortality Rate (IMR) _____(total <1 yr deaths in 2005 yr_____)

8.7.2. PMR_____ (The last year 2005 yr)

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 2005 yr_____)

8.7.7. Crude Birth Rate_____

8.7.8. Crude Death Rate_____ (total deaths 2005 yr____)

8.7.9. Maternal Mortality Rate_____(total maternal deaths in 2005_____)

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. PCV_{10} -1 _____PCV_{10} -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_____

12.4. **Health education**_____

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 woreda? ____

13.11. If yes children in the program, _____ (No & %)

13.12. CBN program_____

13.13. If yes children in the program, _____ (No & %)

13.14. PSNP_____ other_____

13.15. If yes children in the program, _____ (No & %)

13.16. General food security condition_____

_____

_____

_____

_____

_____.

13.17. Shortage of Essential drugs

_____

_____

_____

_____

_____

_____.

13.18. 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,

_____

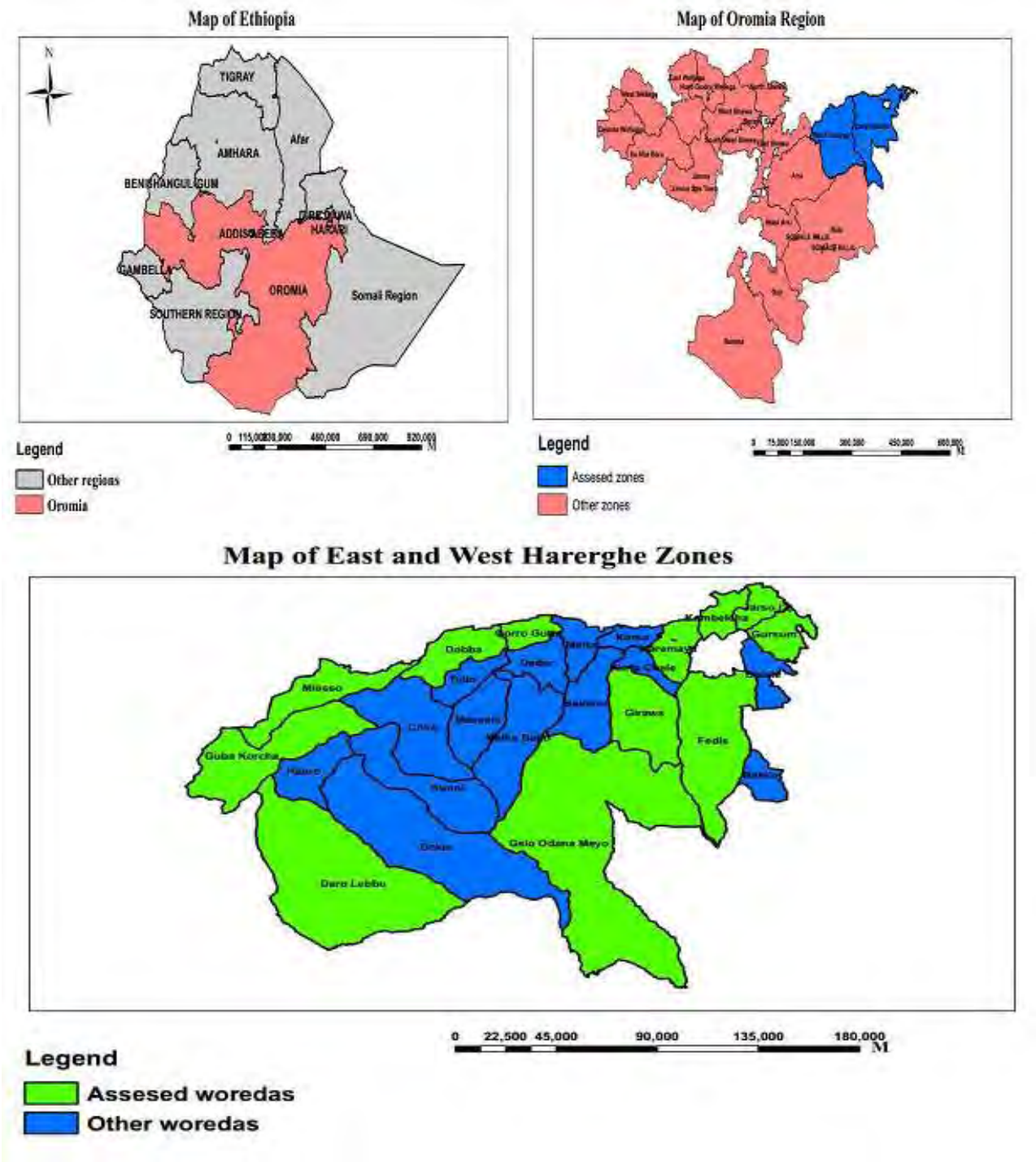
_____

_____

_____

_____

Annex 1.1.3: Administrative map of East and West harerghe Zones showing the study area (assessed woredas), 2014



Annex 1.1.4: Questionnaire for rapid meher assessment of health sector at woreda level 2014

Interviewer name _____ Institution:_____

Region:_____

Interview Date: _____ Zone_____

Woreda_____

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

SECTION I: SOCIO- DEMOGRAPHIC PROFILE				
1.1. Woreda total population:	M:_____F:_____		Under 5_____	Total:_ ___
1.2. Special Population *(if any):*	Pastorals____	Refugees____	IDPs____	Migrant Workers___

SECTION II: HEALTH PROFILE	
2.1. Coordination	
Is there a multi sectoral PHEM coordination forum?	Yes□ No□
Is there a PHE preparedness and response plan?	Yes□ No□
Is there accessible emergency response fund	Yes□ No□
2.2. Morbidity (List top 5 causes of Morbidity) in the year 2006 EC (2013-2014 GC)	

a. Morbidity below 5	b. Morbidity above 5	
1.	1.	
2.	2.	
3.	3.	
4.	4.	
5.	5.	

2.3. List number of cases/deaths from Sene 2006 EC to Tikimt 2007 EC (June–Oct 2014)

Month	AWD		Malaria		Measles		Meningitis		Other (specify)
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Death	
June 2014									
July 2014									
Aug 2014									
Sept 2014									
Oct 2014									

2.4. Outbreak?

Was there any outbreak in the last 3 months? YES_____

NO_____

If yes, specify the type of disease

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Is there any ongoing outbreak of any disease? YES_____

NO_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

Type of outbreak _____Number of cases _____Deaths _____(specify the time period)_____

2.5. Preparedness: Is there emergency drugs and supplies enough for 1 month? Or easily accessible on need?

Ringer Lactate (to treat AWD cases)	Yes□ No□	
ORS (to treat AWD cases):	Yes□ No□	
Doxycycline *(to treat AWD cases)*:	Yes□ No□	
Consumables : Syringes, Gloves *(for AWD management):*	Yes□ No□	
Amoxil susp (measles)	Yes□ No□	
Tetracycline ointment (measl es	Yes□ No□	
Vit A (measles)	Yes□ No□	
Coartem for Malaria	Yes□ No□	
Lab supply: RDT for Malaria	Yes□ No□	
Lab supply: RDT (pastorex) for M eningitis LP set	Yes□ No□ Yes□ No□	
Number of CTC kit available: (for A WD)	Yes□ No□	
Main shortage (if any): Specify		
Is budget allocated for emergency Rapid response by the woreda?		

SECTION III: RISK FACTORS			
Diseases	**Risk factors for epidemics to occur**	**Yes**	**No**
Malaria	Malaria endemic area		
	Presence of malaria breeding site		
	Interrupted or potentially interrupting rivers		
	Unprotected irrigation in the area		
	LLINs coverage <80%		
	Indicate the coverage of IRS 2006		
	Depleted prevention and control activities		
	Number of malarious kebeles and total population in these Kebeles	Keb _____	

		_ pop _____ __	
Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify date)		
	Has vaccination been conducted in the past 3 years		
	If yes : Indicate the date and number of people vaccinated	date	No
AWD	Was there AWD epidemic in the last three years (If yes specify date)		
	Latrine coverage		
	Latrine utilization		
	Safe water coverage		
Measles	Is there ongoing measles outbreak		
	What is the measles vaccination coverage of 2006 EC, less than one year		
	Has SIA been conducted in 2006 EFY		
	If yes, Indicate the month and number of children vaccinated including the age group	Month_____	
		No. Vaccinated	
		Age group	

Any other observations you made or any risks of epidemics?

_____

_____

_____

_____

_____

What were the major challenges in your Epidemic response experience?

_____

_____

Section IV: Nutrition - TFP admissions at woreda level May to October 2014

Month	Total SAM Cases	Total Number of TFP (OTP/SC) in the woreda	Number of SC.	Number of OTP.	Total Number of OTP/SC reported.	Therapeutic Supplies enough Y/N (for the next -- mo)			Children Discharged from TFP referred to SFP Y/N
						RUTF	F100	F75	
June									
July									
Aug									
Sept									
Oct									

Any comment

Annex 1.1.5: Budget break down of the project in gold mining kebeles of Saba Boru Woreda, Guji Zone, July to November, 2015

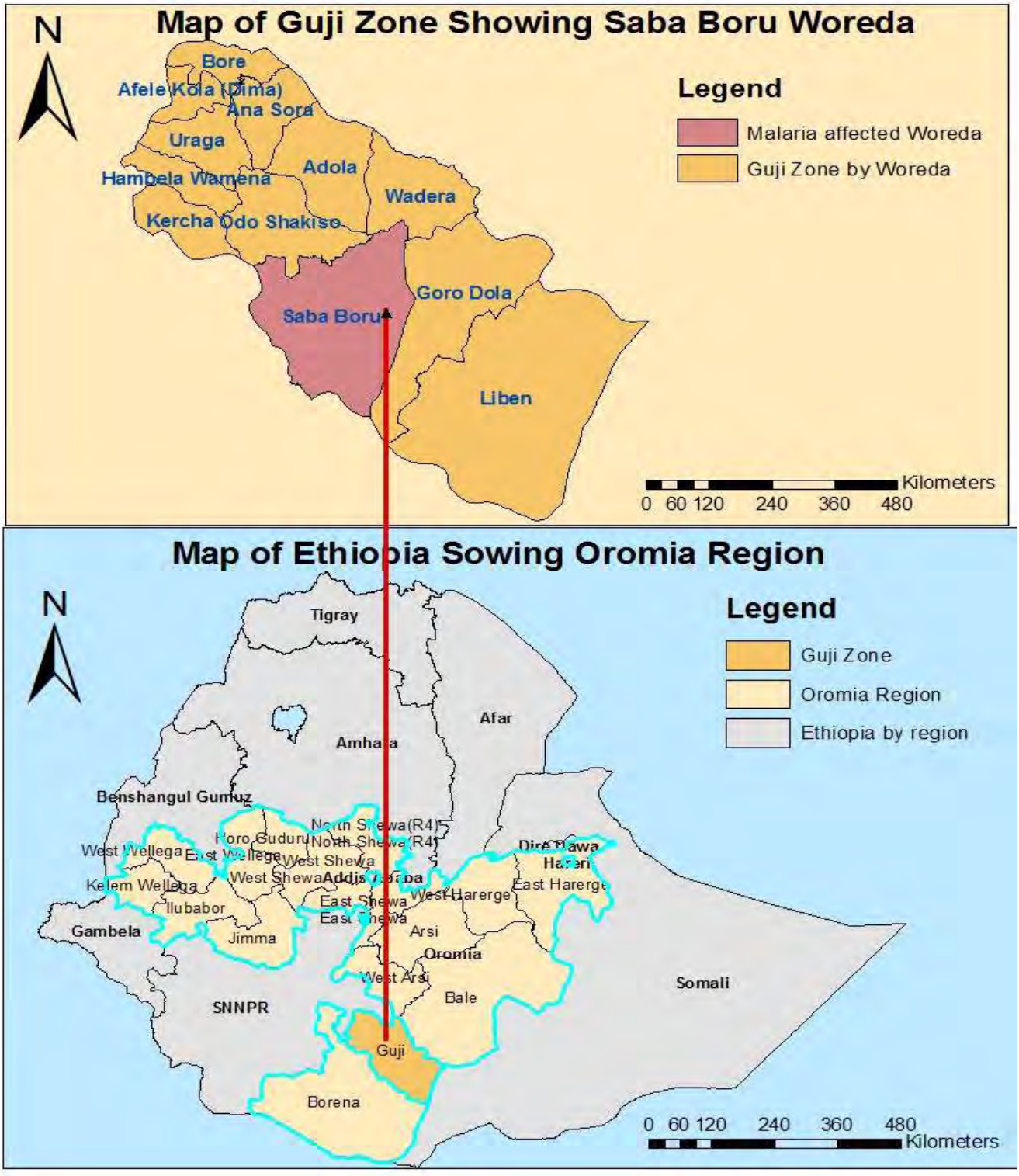
S.N	***Budget category***	***Unit Cost***	***Multiplying factor***	
1	***personnel***	***Daily Wage (including per Diem)in USD***	***Number of staff days (Number of staff x Number of working days)***	***Total Cost(ETB)***
	Principal investigator (EFETP resident)	20.00	1x20	400.00
	Supervisors‘ per diem	15.00	2x15	450.00
	Data collectors	10.00	12x15	1,800.00
	Data entry clerk	5.00	1x20	100.00
	Sub total	**Personal total**		**2,750.00**
2	***Transport***	***Km/day and liters/day***	***No. days x Liters/day x cost/liter***	
	Fuel cost	400km/day with 5km/liter => 80lit/day	20x80x0.935	1,497.54
	Sub total	**Transport total**		**1,497.54**
3	***Supplies***	***Cost per Item (USD)***	***Number***	
	Questionnaire duplication	0.30	1,162.00	348.60
	Pen	0.30	20.00	6.00
	Marker (pack)	2.50	4.00	10.00
	Printing paper(pack)	4.70	1.00	4.70
	Photocopying (pack)	0.05	1,000.00	50.00
	Printing and Binding	1.00	10.00	10.00
	Sub total	**Supplies total**		**429.30**

4	***Training***	***Cost per item (USD)***	***Number of days***	
	Hall rent	20.00	2 days	40.00
	Tea/coffee	1.5 USD/ participant/day (1.5x15)= 22.5 USD/day	2 days	45.00
	Sub total	***Training total***		***85.00***
5	***Total***		***(1+2+3+4)***	***4,761.84***
6	***Contingency***		***5% x Total***	***238.09***
7	***Grand total***		***Total (5) +Contingency (6)***	***4,999.93***

Annex 1.1.6: Annex-2: Tentative implementation time of the project in gold mining kebeles of Saba Bore Woreda, Guji Zone, July to November, 2015

S. N	**Area**	**Activities**	Time period					
			June	**July**	**August**	**September**		**November**
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	Data collection	Field visit						
5	Data analysis	Enter data and analysis						
6	Report writing	Writing report						
7	Submission of report	Submission of report						

Annex 1.1.7: Administrative map of Guji Zone Showing Seba Boru Woreda (project site)



Annex 1.1.8: Semi-structured questionnaires on ITN's distribution and utilization-Seba Boru, Oromia, Ethiopia, 2015

Introduction:

Hello, my name is..... . I am Field Epidemiology Training research team member. Thank you for taking the time to speak with me today. We are conducting study on ITN distribution and use among residents of this kebele and wanted to speak with you. Our goal is to figure out factors affecting the distribution and utilization of ITN 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. And then we will ask you all a multiple of questions for discussion. Questions are simple and what you are clearly known in your daily activities. Please feel free to speak; your name, position, and anything that could identify you personally will not be used in any official reports or presentations. (Feel consent Form).

No.	QUESTION	CATEGORIES
1.1	Region	1. Oromia
1.2	Woreda	2.Sebaboru
1.3	Kebele	_____
1.4	House Number	_____
1.5	What is your Ethnicity?	1. Oromo 2.Amhara 3.Gurage 88.Other(Specify)_____
1.6	What is your religion?	1. Orthodox 2. Protestant 3. Islam

No.	QUESTION	CATEGORIES
		4. Wakefata 5. Other (specify)
1.7	Age	_____ Year
1.8	Sex	1.Male 2.Female
1.9	What is your occupation	1.Farmer 2.House wife 3.Government Employee 5.Merchant 6.Student 7.Daily Labourer 8.Other_____
1.10	What is your level of education	1.Illiterate 2.Primary(grade1-8) 4.Secondary 5. Tertiary (College diploma and above)
1.11	How many years are you residing in this village?	_____
1.12	How many family members residing with you?	____ 1-5years ____ 5-14 years ____15-24 _____25 and above
1.13	Family monthly income in birr	----------
1.14	What is your socio-economic class in the community?	1. Poor 2. Middle 3. Rich

No.	QUESTION	CATEGORIES
2.1	Main material of the floor RECORD OBSERVATION	NATURAL FLOOR 1. Earth/Sand 2. Dung RUDIMENTARY FLOOR 1. Wood planks 2. Palm/Bamboo FINISHED FLOOR 1. Parquet/Polished wood 2. Vinyl or asphalt strips 3. Ceramic tiles 4. Cement 5. Carpet 6. Other (specify)
2.2	Main material of the wall RECORD OBSERVATION	NATURAL WALL 1. No walls 2. Cane/trucks/bamboo/reed RUDIMENTARY WALL 1. Bamboo/wood with mud 2. Stone with mud 3. Uncovered abode 4. Plywood 5. Carton FINISHED WALL 1. Cement 2. Stone with lime/cement 3. Bricks

No.	QUESTION	CATEGORIES
		4. Cement blocks 5. Covered Adobe 6. Wood planks/shingles 7. Other (Specify)
2.3	Main material of the Roof RECORD OBSERVATION	NATURAL ROOF 1. Thatch/Leaf 2. Sticks and mud RUDIMENTARY ROOF 1. Rustic mat/plastic sheet 2. Reed/bamboo 3. Wood planks FINISHED WALL 1. Corrugated iron 2. Wood 3. Calamine/cement fiber 4. Cement/concrete 5. Roofing shingles 6. Other (Specify)
2.4	Windows RECORD OBSERVATION	Yes, Total # of windows---- No
2.5	Type of windows RECORD OBSERVATION.	Any window Windows with glass Windows with screens Windows with curtains/shutters
3	How many separate rooms are in this household? INCLUDE ALL ROOMS, INCLUDING KITCHEN, TOILET, SLEEPING ROOMS, SALON, etc.	Number of rooms------

No.	QUESTION	CATEGORIES
3.1	How many rooms in this household are used for sleeping? INCLUDE ONLY ROOMS WHICH ARE USUALLY USED FOR SLEEPING.	Number of sleeping rooms ----------
3.2	How many separate sleeping spaces are there in your household? INCLUDE ALL SLEEPING SPACES, INCLUDING IF THERE IS MORE THAN ONE SLEEPING SPACE IN EACH ROOM USED FOR SLEEPING	Number of sleeping spaces ----------
4	How many of the following animals / birds does your household own? Cattle? Goats? Sheep? Pigs? Chickens? Dogs? Cats?	Cattle------- Goats-------- Sheep-------- Pigs---------- Chickens--------- Dogs---------- Cats----------
4.1	Does any member of your household own: A bicycle? A motorcycle or motor scooter? A car or truck?	YES NO Bicycle ---------- Motor cycle/Scooter ---------- Car/Truck ----------
5	At any time in the past 12 months, has anyone sprayed the interior walls of your dwelling against mosquitoes?	Yes No Don't know
5.1	How many months ago was the house sprayed against mosquitoes? IF LESS THAN ONE MONTH, RECORD # MONTHS AGO.	Months ago.....

No.	QUESTION	CATEGORIES		
5.2	Who sprayed the house against mosquitoes?	Government worker/Program Private company House hold member Other (specify) Don't know		
5.3	At any time in the past 12 months, have the walls in your dwelling been plastered or painted?	Yes No Don't know		
ASK RESPONDENT TO SHOW YOU THE NET(S) IN THE HOUSEHOLD. *IF MORE THAN THREE NETS, USE ADDITIONAL QUESTIONNAIRE*		NET #1	NET #2	NET #3
		OBSERVED NOT OBSERVED	OBSERVED NOT OBSERVED	OBSERVED NOT OBSERVED
6.1	How long ago did your household obtain the mosquito net?	Months ago More than 3 years ago Other----------	Months ago More than 3 years ago Other ----------	Months ago > 3 yrs ago 95 Other ----------
6.2	Observe or ask the brand of mosquito net *IF BRAND IS UNKNOWN, AND YOU CANNOT OBSERVE THE NET, SHOW PICTURES OF TYPICAL NET TYPES/BRANDS TO RESPONDENT*	PERMANENT' NET1 Permanet Olyset Safenite Interceptor Other/Don't Know PRETREATED' NET2 Salam Enkilfe KO Nets Other	PERMANENT' NET1 Permanet Olyset Safenite Interceptor Other Don't Know PRETREATED' NET2 Salam Enkilfe KO Nets Other	PERMANENT' NET1 Permanet Olyset Safenite Interceptor Other Don't Know PRETREATED' NET2 Salam Enkilfe KO Nets Don't know

No.	QUESTION	CATEGORIES		
		(specify)---- Don‘t Know	Don‘t Know	
6.3	Where did you obtain the net?	Government -----1 Clinic/Hospital-----2 Neighbor hood------3 Health committee-----4 Health Extension Worker--5 Community Health Worker/ Agent ----6 Retail Shop-----7 Pharmacy------8 Workplace-----9 Other (specify)	Government -----1 Clinic/Hospital----2 Neighbor hood----3 Health committee-4 Health Extension Worker---5 Community Health Worker/Agent ----6 Retail Shop----7 Pharmacy-----8 Workplace-----9 Other (specify)	Government -----1 Clinic/Hospital-----2 Neighbor hood----3 Health committee--4 Health Extension Worker--5 Community Health Worker/ Agent ----6 Retail Shop----7 Pharmacy-----8 Workplace-----9 Other (specify)
6.4	Did you purchase the net?	Yes..... .....1 No(skip to 21)..... 2 Not sure..... 3	Yes..... ....1 No (skip to .....2 Not sure.....3	Yes..... ....1 No (skip to.....2 Not sure.....3

No.	QUESTION	CATEGORIES		
6.5	How much did you pay for the net when it was purchased?	< 50 Birr ....1 50 – 100 Birr.......... 2 > 100 Birr----------- 3 Not sure........... 4	< 50 Birr.............1 50 – 100 Birr....... 2 > 100 Birr----- 3 Not sure.......... 4	< 50 Birr ....1 50 – 100 Birr......... 2 > 100 Birr---------- 3 Not sure............ 4
6.6	PLEASE RECORD OR ASK THE GENERAL CONDITION OF THE NET	Good (no holes)……. 1 Fair (no holes that fit a torch battery)………… 2 Poor (1-4 holes that fit a torch battery)………… 3 Unsafe (>5 holes that fit a torch battery……… 4 Unused (still in package……. 5 Unknown……… 6	Good (no holes)……. 1 Fair (no holes that fit a torch battery)………… 2 Poor (1-4 holes that fit a torch battery)………… 3 Unsafe (>5 holes that fit a torch battery……… 4 Unused (still in package……. 5 Unknown……… 6	Good (no holes)……. 1 Fair (no holes that fit a torch battery)………… 2 Poor (1-4 holes that fit a torch battery)………… 3 Unsafe (>5 holes that fit a torch battery……… 4 Unused (still in package……. 5 Unknown……… 6
6.7	Did anyone sleep under this mosquito net last night?	Yes........... 1(skip to 6.9) No............ 2 Not sure........ 8	Yes... 1(skip to 6.9) No............ 2 Not sure........ 8	Yes..... 1(skip to 6.9) No............ 2 Not sure........ 8
6.8	Why did no-one sleep under this mosquito net last night?	No malaria……	No malaria……1 No	No malaria……1 No

No.	QUESTION	CATEGORIES		
		1 No nuisance/insects…..2 No space for net….3 Irritation….4 Suffocation/too hot….5 Difficult hanging net…6 Shape….7 Absence from home….8 Other_____ _____ 9 Don't know……10	nuisance/insects…..2 No space for net….3 Irritation….4 Suffocation/too hot….5 Difficult hanging net…6 Shape….7 Absence from home….8 Other_____ _ 9 Don't know……10	nuisance/insects…..2 No space for net….3 Irritation….4 Suffocation/too hot….5 Difficult hanging net…6 Shape….7 Absence from home….8 Other_____ 9 Don't know……10
6.9	When your bed net is torn or gets a hole, how likely are you to mend it out to have a tailor mend it? READ THE RESPONSE OPTIONS TO THE PARTICIPANT AND ASK HIM OR HERTO CHOOSE THE BEST RESPONSE	VERY LIKLEY, I mend all holes in my net…….1 SOMEWHAT LIKELY, I sometimes mend holes in my net…….. 2 SOMEWHAT UNLIKELY, I rarely mend on holes in my net…….. 3 VERY UNLIKLEY, I never mend holes in my net ……..4		
6.10	How often do you wash your net(s)? DO NOT READ THE RESPONSE OPTIONS	When it gets dirty……. 1 1 time a year……. 2 2 – 3 times a year……3 4 – 5 times a year…… 4		
6.11	Will insecticide treated nets still be effective against mosquitoes if you wash them	Yes..... 1 No..... 2 Don't know..... 8		

No.	QUESTION	CATEGORIES
6.12	If there are not enough nets for everyone in a household, who should be given priority when deciding who can sleep under a net? DO NOT PROVIDE ANSWERS MULTIPLE RESPONSES POSSIBLE PROBE ONCE (Anything else?)	Elderly people……. 1 Head of house hold……. 2 Young children……... 3 Pregnant women……. 4 People who contribute the most money to the household…… 5 Person who obtained/bought the net……6 Other(specify)_____ 7 Don't know……. 8

1. What is the distance of nearest mosquito breeding site from living house in meters? -------

---

2. What type of breeding place was common in near your living area? ----------

For health facility

1. Did you ever distributed ITNs for the community?----------
2. If **yes**, number of ITN distributed per house hold? ----------
3. Coverage of ITN perkebeles?----------
4. If **No** to Q.1, why? ----------

Declaration

I, the undersigned, declare that, this my original work and never been presented by another person in this or any other university and that all the source material and reference materials used for this thesis have been acknowledged.

Name: Dagnachew Alemu Hurissa

Signature: ----------

Date: ----------

Date of submission: ----------

The thesis has been submitted for examination with my approval as a university advisor.

Name of Advisor[1]: Dr. Wakgari Deressa

Signature: ----------

Date: ----------

Name of Advisor[2]: Ms. Abigail Greenleaf

Signature: ----------

Date: ----------