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:

Gemechu Shume Bejiga

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

June 2014

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Advisors:

Dr. Wakgari Deressa

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Approval by Examining Board

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Chairman, School Graduate Committee

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Advisor

_____ _____

Examiner

_____ _____

Examiner

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List of Abbreviations

AAU	Addis Ababa University
Ach.	Achievement
AFP	Acute Flaccid Paralysis
AIDS	Acquire immunodeficiency syndrome
ANC	Antenatal Care
ART	Anti-Retroviral Therapy
Asp	Aspiration
AWD	Acute Watery Diarrhoea
BCG	Bacilli Calmette Guerin
BSc	Bachelor of Science
CBN	Community Base Nutrition
CDC	Center for Disease Control and Prevention
CFRs	Case Fatality Ratios
CHD	Community Health Day
CI	Confidence Interval
Cover.	Coverage
CTC	Cholera Treatment Center
D/M/Y	Day Month Year
DHO	District Health Office
DHS	Demographic Health Survey
Dip.	Diploma
DPT	Diphtheria Pertussis Tetanus
E.C	Ethiopian Calendar
EDHS	Ethiopian Demographic Health Survey
EFETP	Ethiopian Field Epidemiology Training Program
EFY	Ethiopian Fiscal Year
EHNRI	Ethiopian Health and Nutrition Research Institute
EOS	Enhanced Outreach Strategy
EPHA	Ethiopian Public Health Association
EPI	Expanded Program on Immunization
Epi.	Epidemiologic
ETH	Ethiopia
FAO	Food and Agriculture Organization
FETP	Field Epidemiology Training Program
G.P.	General Practitioner
Gov.	Government

H.C	Health Center
H.E.W	Health Extension Workers
H/G/Wollega	Horro Guduru Wollega
HC	Health Center
HIV	Human Immunodeficiency Virus
HMIS	Health Management and Information System
HNRI	Health and Nutrition Research Institute
HP	Health Post
HR	Human Resource
HSDP	Health Sector Development Program
IDSR	Integrated Diseases Surveillance and Response
IgM	Immune Globulin M
IM	Intra Muscular
Inj.	Injection
IRS	Indoor Residual Spray
IV	Intra Vein
IVI	International Vaccine Institute
LLITNs	Long Lasting Insecticide Treated Nets
LP	Lumbar Puncture
M &E	Monitoring and Evaluation
M^2	Meter Square
MCH	Maternal and Child Health
MCV	Measles Containing Vaccine
MMWR	Morbidity Mortality Weekly Report
MPH	Masters of Public Health
MUAC	Mid-Upper Arm Circumstance
N.B	Note Bene
NGO	Non-Governmental Organization
NNT	Neonatal Tetanus
OPV	Oral Polio Vaccine
OR	Odds Ratio
ORHB	Oromiya Regional Health Bureau
ORS	Oral Rehydration Salt
OTP	Out-Patient Therapeutic Program
P. Falciparum	Plasmodium Falciparum
P. Vivax	Plasmodium Vivax
PCV	Pneumococcal Conjugative Vaccine

Penta	Pentavalent
PF	Plasmodium Falciparum
PFSA	Pharmaceuticals Funds and Supply Agency
PHE	Public Health Emergency
PHEM	Public Health Emergency Management
PITC	Provider Initiated Test and counselling
PLWHA	People Living With HIV/ADS
PMTCT	Preventing Mather to Child Transmission
PO	Per Os
Pop.	Population
PR	Public Relations
PSNP	Productive Safety Net Program
PTB	Pulmonary tuberculosis
PV	Plasmodium Vivax
RDT	Rapid Diagnostic Test
Rx	Treatment
S.N	Serial Number
SAM	Severe Acute Malnutrition
SARS	Severe Acute Respiratory Syndrome
SC	Establishing Center
SIA	Supplementary Immunization Activity
SNNPR	South Nation and Nationalities People Region
SPH	School of Public Health
SRS	Simple Random Sampling
Tar.	Target
TB	Tuberculosis
TBA	Traditional Birth Attendant
TFP	Therapeutic Feeding Program
TI	Trans Isolate
TSF	Targeted Supplementary Food
TT	Tetanus Toxoid
TV	Television
TVET	Technical Vocational and Educational Training
UK	United Kingdom
UN	United Nations
UNICEF	United Nations children's Fund
VCT	Voluntary Counselling Test

VHF	Viral Haemorrhagic Fever
Vit. A	Vitamin A
WHO	World Health Organization
Wk	Week
Yr	Year
ZHD	Zonal Health Department
ZHO	Zonal Health Office

Executive Summary

Despite many intervention activities undertaking preventable communicable diseases are remain a public health problem globally. The Ethiopian government policy is more emphasis on prevention measures of communicable and non-communicable diseases. Also many strategies and programs were set to enhance disease prevention activities. Ethiopian Field Epidemiology Training Program that adapted from the United States Centers for Disease Control and Prevention (CDC) Epidemic Intelligence Service (EIS) is one of the program focusing on capacity building public health practitioners. The training enables trainers to conduct disease surveillance and implement prevention and control measures of prioritized diseases.

I stayed from October 2012 to May 2014 in Addis Ababa University School of Public Health-Field Epidemiology Training Program and at Oromiya Regional Health Bureau Field Base. During my stay, I carried out two outbreak investigations, one surveillance data analysis, one surveillance system evaluation, one district health profile description, submission of two abstracts, one scientific manuscript for peer reviewed journals, one belg assessment, one epidemiological research proposal, one training and one weekly epidemiologic bulletin for residency outputs. Even though I included only one weekly bulletin in this document, I totally produced 8 weekly bulletins during stay at field base.

We investigated two outbreaks (Malaria and Measles) during field base residency. Descriptive and analytical epidemiology methods were used to describe magnitude of the diseases and identify risk factors associated with diseases. A total of 6042 confirmed malaria cases were reported from Ilu woreda of South West Shewa zone, Oromiya region in 2013. We identified that low ITNs utilization, stagnant water, uncovered plastic household water container and broken glass bottles were contributed for malaria outbreak in the woreda. We recommended proper ITNs utilization, strong environmental management and regular indoor chemical spray for malaria prevention. Additionally, there was measles outbreak in Dawe Kachen Woreda, Bale zone, Oromiya region that we had investigate in January 2014. During this outbreak, a total of 172 measles cases and 5 deaths were reported from December 2013 to January 2014. Low measles vaccination, poor ventilation, malnutrition and weak community's awareness were attributed for measles in this woreda. We recommended, strengthen routine and supplemental immunization programs, good cold chain system and increase community awareness on measles prevention and control measures.

Surveillance data analysis of Severe Acute Malnutrition (SAM) for consecutive three years (2002 – 2004 E.C) was conducted in East Hararghe zone of Oromiya region. The cases are increasing throughout these years with decreasing deaths. We identified that strong screening and case management were contributed for increased number of cases and declining deaths.

I conducted surveillance system evaluation at Oromiya Regional Health Bureau (highlight) and in West Arsi zone of Oromiya region in 2013. During this evaluation, surveillance of selected diseases (malaria, measles and meningitis) was assessed. The system was satisfactory at regional level; whereas not satisfactory at West Arsi zone. Poor data management, infrequent supportive supervision, absence of well-organized feedback, poor utilization of manuals and guidelines were contributed for unsatisfactory of the system at the zone.

Health profile description was carried in Welmara district, Special Zone Surrounding Finfinne, Oromiya region from March to April 2013. Low community awareness and less number of health centers were made low coverage of institutional delivery in the district. Enrolment of female students was increased in primary school during 2011/12.

I prepared scientific manuscript for peer reviewed journals on measles outbreak investigation and response in Dawe Kachen woreda, Bale zone, Oromiya region.

Two abstracts were done for scientific conference submission; Malaria Outbreak Investigation and Intervention in Ilu Woreda of South-Western Oromiya and Measles Outbreak Investigation and Response in Dawe Kachen Woreda, Bale zone, Oromiya Region.

Belg assessment was conducted in selected woredas of Guji and Borena zones in Oromiya region during 2013 to identify humanitarian needs following emergency occurrence. Malnutrition is anticipated to be a major public health concern in Borena zone. There were measles and meningitis outbreaks in some districts of Guji zone. We identified shortage of drugs and medical equipment at both zonal level and many districts of these zones.

Epidemiological research project proposal on assessment of magnitude and factors associated with childhood vaccination status in Dawe Kachen woreda, Bale zone, Oromiya region was prepared. Descriptive cross-sectional study will be used for this study. A total of 720 mothers/caretakers with 12-23 months age child will be selected by systematic random sampling from randomly selected five kebeles of the woreda. Socio-demographic status of mothers/caretakers,

immunization status of mothers/caretakers and children, knowledge of mothers/caretakers on immunization service, place of delivery will be assessed using questionnaire adopted from EDHS and different similar studies. The overall activities of study will be expected to finish in three months (September-November 2014). The total estimated budget required for the study is **65,698 ETH Birr.**

Training was given to zonal and woreda PHEM focal persons from six zones and six towns of Oromiya region on PHEM overview, Early warning system, Public health emergency preparedness, Response, Recovery, Epidemiology and case-management of selected diseases. The training was success full in participation rate and increasing knowledge of participants as identified by post-test.

I prepared weekly bulletin on PHEM report of Oromiya Regional Health Bureau for WHO Epidemiologic week 5 of 2014. The health facilities report completeness for that week was 83% and above the expected national level (80%). Suspected measles cases and confirmed malaria cases were kept increasing during week 5 of 2014.

Chapter – I: Outbreak Investigations

1.1. Malaria Outbreak Investigation and Intervention in Ilu woreda, South-Western Oromiya, Ethiopia, 2013

Abstract

Background: Malaria is mosquito-borne parasitic disease and one of the most serious health problems of human beings. Despite intensive control measure like vector control and environmental management through community participation malaria remained a public health concern of the country. Unusual malaria cases increment was reported from Ilu district, Oromia, Ethiopia in October 2013. We investigated the outbreak to describe the magnitude of the disease and identify risk factors associated with the outbreak.

Method: Microscopic and RDT laboratory investigation conducted to confirm the disease. Magnitude of the disease was described by person, place and time. Previous years malaria data was reviewed to establish threshold level and understand trends of the disease. We conducted case-control study with randomly selected 109 cases and matched 109 community controls for age and sex. Epi Info 7.1 and Microsoft Excel were used to perform data entry and analysis. We also assessed environmental risk factors for the outbreak.

Result: A total of 6,042 confirmed malaria cases (Attack Rate: 80 per 1000) and zero death were reported from August to November 2013 with a peak in October. Slide positivity rate was 57.6%. Greater than four years old were more affected by malaria (Age specific attack rate per 1000 population was 84). Using bed net every night was found to be protective effect for the disease (Odds Ratio: 0.4, 95% CI: 0.2 - 0.8). Presence of stagnant water (Odds Ratio: 2.04, 95% CI: 1.2 - 3.5), uncovered plastic water container in or outside home (OR: 2.3, 95% CI: 1.1-4.5) and broken glass bottles (OR: 2.3, 95% CI: 1.9-5.8) were associated with the disease.

Conclusion and Recommendation: Low insecticide treated bed net utilization, presence of stagnant water, uncovered plastic water container and broken glass bottles in or outside home were attributed for the outbreak. We recommended proper ITNs utilization, indoor chemical spray per standard and strong environmental management through optimized community participation.

Keywords: Malaria, Outbreak, Case-Control, Ilu, Ethiopia

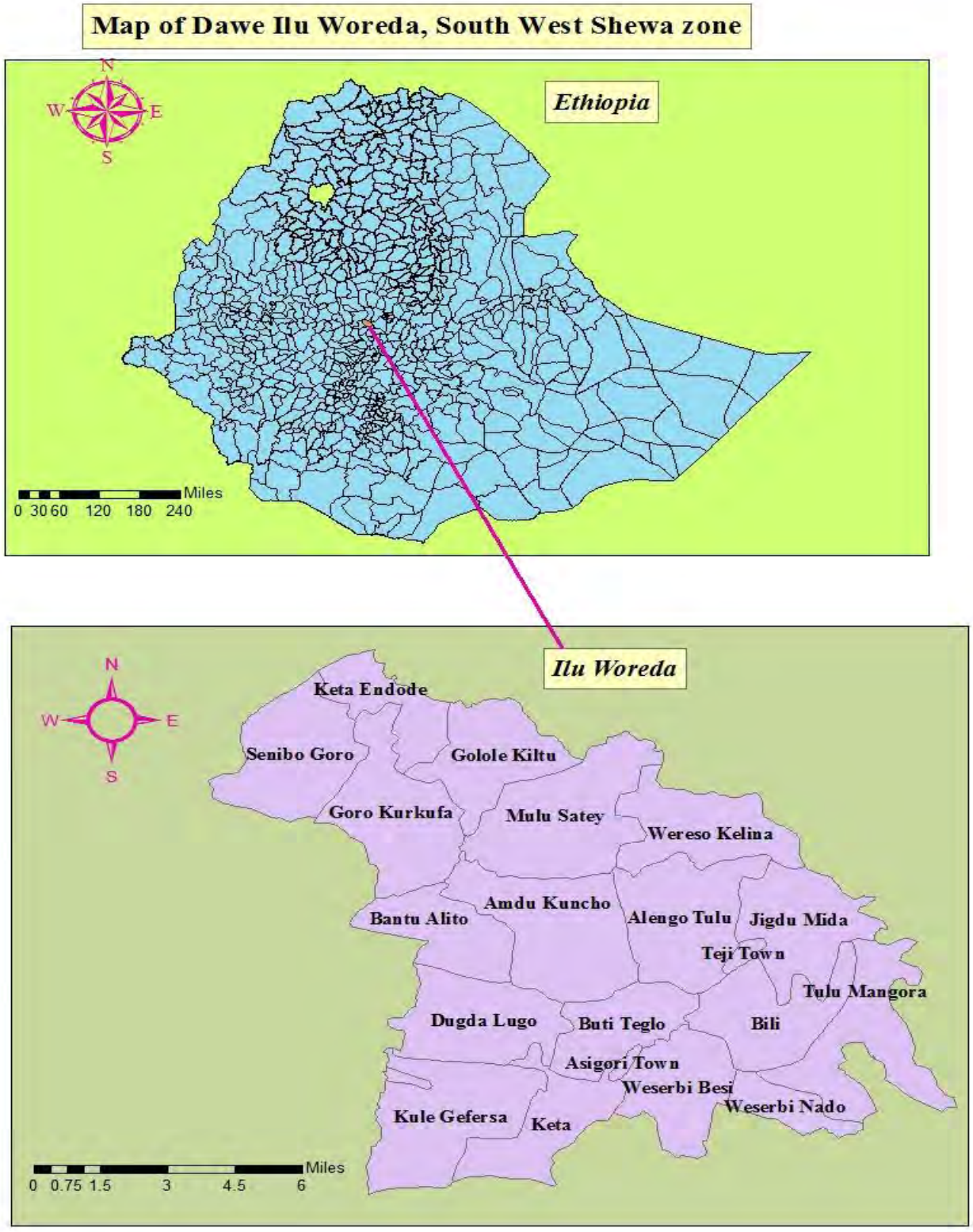

Figure 1.1.1: Map of Ilu woreda, South West Shewa Zone, Oromiya Region, Ethiopia, 2013.

1.1.1. 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 [2]. Malaria is affecting over 100 countries of tropical and subtropical regions of the world. It is among the leading cause of death in children under 5 years in Sub- Saharan Africa countries and accounts for 25% of all deaths [2].

Malaria is a major public health problem in Ethiopia. It has been consistently reported as one of the three leading causes of morbidity and mortality in the past years. Even though three-fourth of the country's land with altitude of below 2000 meters above sea level is known as malarias, the cases are also increasing in the areas with above 2000 meters. This increment of malaria in these areas is due to change of micro-climate and weather conditions that fevered mosquito breeding [3]. Four to five million people are affected by malaria every year in Ethiopia [4].

Hence Ethiopia is implementing different strategy towards malaria prevention and controls such as vector control (repellents, protective clothing, Insecticide treated mosquito nets, aerosols, house screening/house proofing), transmission control (Environmental management, Chemical insecticides, personal protective measures), site selection and zoo prophylaxis, significant cases are still kept reporting from some malarious area. Apart from being a major public health problem, the disease has also been identified as a potential impediment to the development of water harvesting, irrigation for agriculture and settlement in fertile underutilized low land areas with potential to enable the country achieve food security and improved household income [3]. Having exerted many efforts during the last five decades, significant achievements were made through malaria prevention and control [7].

Due to Ethiopia's complex topography and seasonal rainfall support largely seasonal short-term transmission, malaria is generally unstable that put the population non-immune [6]. Unlike many other Sub-Saharan African countries, asymptomatic parasitemia is not a common phenomenon in Ethiopia. Recurrent outbreaks and epidemics are associated with cyclical climatic variations that lead to increased vector survival in the country. Generally, malaria cases are peaked after two rainy season (March – May and July-September). The country has experienced the worst malaria epidemics in 1958 with three million cases and 150,000 deaths [5]. Plasmodium Falciparum and Plasmodium Vivax are the most dominant causes of malaria in Ethiopia.

Since 2005, Ethiopia has scaled up malaria control programs using key malaria interventions such as effective case management and vector control options (indoor residual spray and long-lasting insecticidal nets) in endemic areas [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 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 [9]. South West Shewa zone is among 18 zones of the Oromiya region and experienced malaria epidemic during the past decades. Of the 11 woredas of the zone, 4 of them namely; Ameya, Goro, Waliso Rural and Wanchi are classified as hot spot area for malaria. Like other places of the region, temperature and rainfall are associated with the occurrence of epidemic in the zone.

According to 2007 Population Census, Ilu Woreda of South West Shewa zone has a total population of 75,543 of which 37,349 are males and 38,149 females. There are 4 Health Centers and 20 Health Posts found in the woreda. There was normal trends of malaria cases in Ilu woreda during the last 15 years except unprecedented malaria outbreak in 1999 that caused high morbidity and mortality. In mid-October of 2013, unusual increment of malaria cases was reported from Ilu woreda, South West Shewa, Oromiya region. After having this, team was deployed to this woreda and investigated the outbreak.

1.1.2. Objectives

1.1.2.1. General Objectives

- To describe magnitude of malaria outbreak and identify factors associated with this outbreak in Ilu woreda.

1.1.2.2. Specific Objectives

- To verify existence of malaria outbreak in Ilu woreda.
- To summarize magnitude of the disease by person, place and time
- To identify factors and its sources associated with contracting malaria during the outbreak.
- To propose recommendations towards malaria control and prevention

1.1.3. Methods and Materials

1.1.3.1. Study Area

The study was conducted in Ilu woreda, South West Shewa zone, Oromiya region from October to November 2013.

1.1.3.2. Case Definitions

1.1.3.2.1. 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.

1.1.3.2.2. Standard Case Definition

Suspected Case: Any person with fever OR fever with headache, back pain, chills, rigor, sweating, muscle pain, nausea and vomiting diagnosed clinically as malaria

Confirmed Case: suspected case confirmed by microscopy or RDT.

1.1.3.3. Study Design

1.1.3.3.1. Descriptive Epidemiology

Malaria was defined and identified as acute febrile illness with blood smear positive for malaria in Ilu woreda during this outbreak. We reviewed the previous five years data of malaria from Ilu woreda health office and health facility level. However, due to absence of the previous complete five years data, previous year 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 in 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.

1.1.3.3.2. Analytical Epidemiology

Matched case-control study was conducted to identify risk factors associate the disease from October 27 to November 4, 2014. Community controls were selected for recently (not more than two weeks before interview) confirmed malaria case patients in 1:1 ratio basis. Selected cases were those confirmed at health centers or health posts; whereas controls were selected from kebeles where cases were selected. Controls were defined as having no malaria signs and symptoms for the last three months and matched for age and sex with malaria case-patients. During this investigation standard checklist was used to assess risk factors including sleeping area, use of

insecticide bed net, indoor residual spray, and presence of stagnant water. Selected case-patients and controls were interviewed about presence of mosquito breeding sites in their compound and near to home within 200 meters or less than it. These sites include unprotected surface water, open deep well, solid and liquid waste collection and disposal facility. Also, availability of uncovered plastic water container, old tires and broken glass bottles in the home or outside the home were critically assessed.

Microsoft Excel and Epi Info version 7.1 was used to describe the disease and analyze associated risk factors. The significance of risk factors for the outbreak was determined through bivariate analysis by calculating Odds Ratio and 95% Confidence Interval.

1.1.3.3.3. Laboratory Method

Laboratory technicians had conduct thick and thin smears with a 100× oil immersion microscopy at three health centers of this Woreda. Additionally, RDT were used at some health centers where a plenty of acute febrile illness were identified. Health extension workers identified confirmed malaria cases By RDT at health post and community level during outbreak investigation

1.1.3.3.4. Environmental Assessment

Data was collected on the presence of mosquito breeding sites from the woreda health office and health facilities. Similarly, observation of these potential mosquito breeding sites and presence of anopheles larvae in stagnant water was conducted.

1.1.4. Results

1.1.4.1. Laboratory

From July to November 2013, a total of 10,486 blood smear tests was done by Microscopy and RDT for suspected malaria cases at all health facilities of Ilu Woreda of which 6,042 were positive. Of the positive cases, 3,827 (63.3%) were positive for P. Falciparum, 1,753 (29%) were P. Vivax and 462 (7.7%) were mixed malaria.

1.1.4.2. Descriptive Epidemiology

A total of **6,042 (Attack Rate = 80 per 1000)** confirmed malaria cases were reported from Ilu Woreda of South West Shewa zone from July to November 2013 (Table 1.1.2). No deaths were reported from the woreda during this period. Slide positivity rate of the disease during this outbreak was 57.6 % and increased by 22.7% compared to same months of previous year (July to November). The outbreak was detected in mid-October of 2013. However, weekly reported malaria cases was crossed the epidemic threshold level in WHO Epidemiologic week 28 of July

2013 (74 cases were reported for a threshold of 30 cases). During this outbreak (July-November), the highest number of malaria cases (3804, 63%) was reported in October 2013. Of these cases in October, 1303 (34%) were reported at **WHO Epidemiologic Week of 43**. During the last four years (2010-2013), malaria cases were increased in October and November months. When the five year (2009 -2013) reported malaria cases in October were compared, 2013 October was exceeded the 2009, 2010, 2011 and 2012 by 3302, 3737, 3663 and 3469 cases respectively (table 1.1.1). Malaria cases were 335 in October 2012 and increased in October 2013 to 3804 cases. The incidence of both P. Falciparum and P. Vivax was increased from July to October 2013. In July 2013, the malaria attack rate was 5 per 1000 population and increased to 43 per 1000 in October.

Table 1.1.1: Confirmed malaria cases by months (July-November), In Ilu Woreda, South West Shewa, Oromiya, Ethiopia, from 2009 to 2013

Year	Months				
	July	**August**	**September**	**October**	**November**
2009	25	28	78	502	570
2010	73	62	66	67	65
2011	22	30	43	141	94
2012	116	67	144	335	227
2013	393	347	748	3804	750

Age five years and older were more affected with attack rate of 84 per 1000 population (table 1.1.3). Similarly, malaria attack rate was higher in male (87 per 1000 population) than female in Ilu woreda, 2013. Among a total of 6,042 malaria cases, 4135 (68.4%) were confirmed at Health Centers and 1907 (31.6%) were at Health Posts.

Table 1.1.2: Confirmed Malaria Cases, Ilu Woreda, South West Shewa, Oromiya, Ethiopia, 2010-2013

Year	Malaria Cases			
	Pf	Pv	Mixed	Total Confirmed Malaria
2010	370	649	0	1019
2011	1086	1058	0	2144
2012	433	820	11	1264
2013*	5160	2342	496	7998

* - 2013 is compiled for eleven months (December report did not included)

Table 1.1.3: Malaria Attack Rate per 1000 and Case Fatality Ratio by age and sex, Ilu Woreda, South West Shewa, Oromiya, Ethiopia, 2013

Variables		Population	# of Cases	# of Deaths	Attack Rate per 1000	Case Fatality Ratio (%)
Age	0-4	12,398	732	0	59	0
	> 4	63,145	5,310	0	84	0
Sex	Male	37,394	3,244	0	87	0
	Female	38,149	2,798	0	73	0
Total		**75,543**	**6,042**	**0**	**80**	**80**

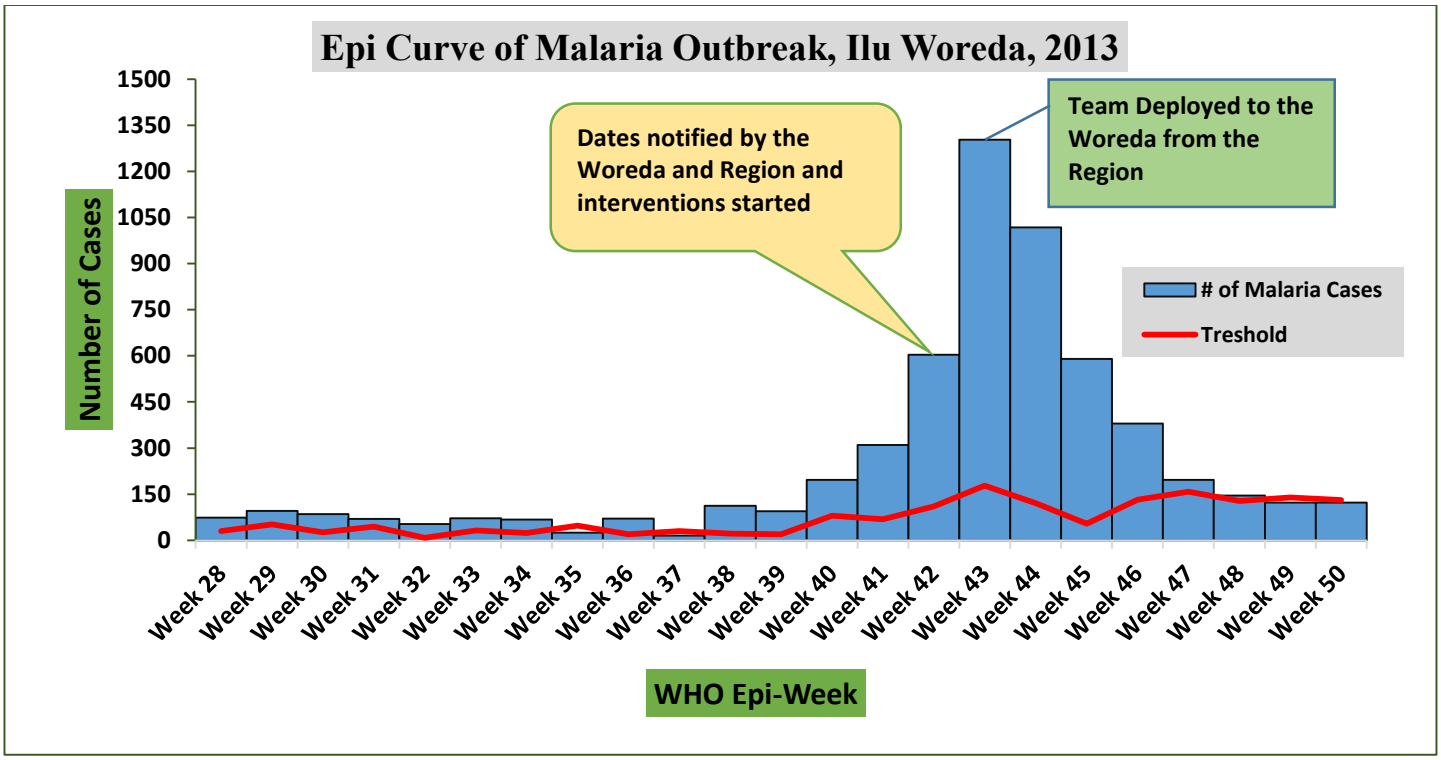

Figure 1.1.2: Number of malaria cases by WHO Epi Week, Ilu Woreda, South West Shewa zone, Oromiya, Ethiopia, Week 28 – 50, 2013

All 20 kebeles of the Woreda are malarious area with altitude of $\leq$ 2000 meters above sea level. Incidence rate was highest in Bantu Alito (61.8 per 1000) kebele and followed by Dugda Lugo (58 per 1000) and Weserbi Besi (54 per 1000) kebeles of the woreda (Table 1.1.4).

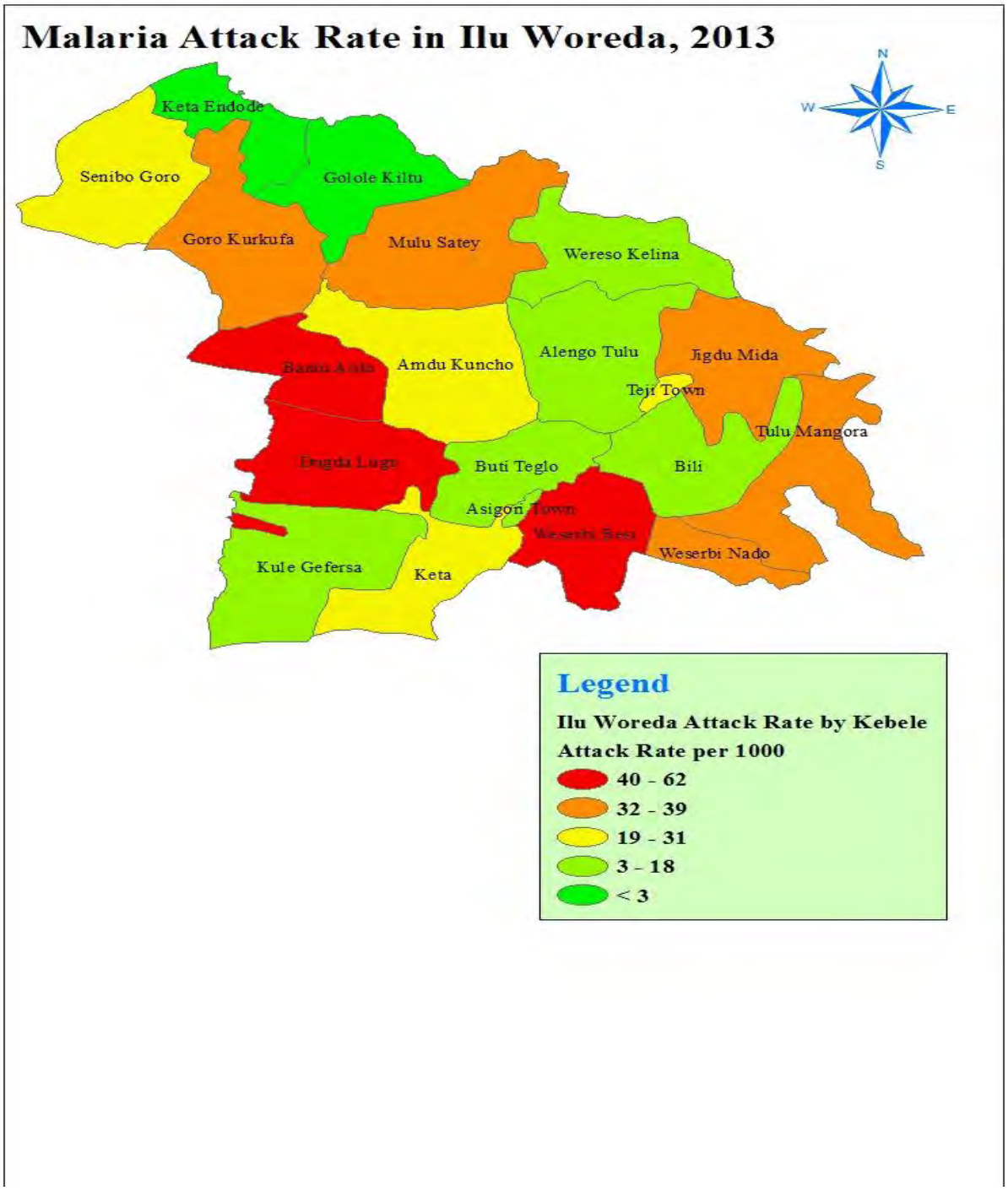

Figure 1.1.3: Malaria attack rate per 1000 population by kebele, Ilu Woreda, South West Shewa, Oromiya, Ethiopia, 2013

Table 1.1.4: Malaria attack rate by selected kebeles, Ameya Woreda, South West Shewa, Oromiya, Ethiopia, 2013

S.N	Kebele	Population	Male	Female	0-4	> 4	Total Cases	Attack Rate per 1000
1	**Bantu Alito**	3416	125	86	17	194	211	62
2	**Dugda Lugo**	4779	145	132	33	244	277	58
3	**Weserbi Besi**	2408	84	46	8	122	130	54
4	**Tullu Mangura**	3404	82	52	29	105	134	39
5	**Goro Kurkurfa**	3985	74	75	37	112	149	37
6	**Weserbi Neddo**	1606	35	25	6	54	60	37
7	**Jigdu Mida**	3050	79	33	16	96	112	37
8	**Mulu Satay**	4913	90	79	24	145	169	34
9	**Amdo Kuncho**	4582	79	64	16	127	143	31
10	**Simbo Goro**	4808	77	61	7	131	138	29

1.1.4.3. Analytical Epidemiology

During this case-control study, 109 malaria case-patients and 109 community controls were selected and interviewed from five kebeles of the woreda. Selected controls were matched by age and sex with case-patients. Of 109 case-patients, 56 (51.4%) were males and 53 (48.6%) were female. The mean and median age of cases were 21 and 14 years respectively and same for controls since matched with cases.

Presence of person with similar malaria signs and symptoms in the home before 2 weeks of onset was associated with the disease (Odds ratio: 2.6, 95% confidence interval: 1.4 - 4.4). Cases were less likely to use insecticide treated bed net compared to controls with low odds ratio of 0.4 and 95% confidence interval: 0.2 – 0.8.

Presence of stagnant water for mosquito breeding was associated with malaria outbreak (Odds Ratio: 2.04, 95% confidence interval: 1.2 - 3.5). Availability of plastic water container and broken glass bottles were associated for the illness with 2.3 and 3.3 odds ratio respectively (Table 1.1.5). Waste Collection practice did not associated with the disease (OR: 1.2, 95% confidence interval: 0.4 – 4.1)

Uses of repellent and protective clothes were uncommon, neither cases nor controls used them and thus not statistically significant for the disease. Last year chemical indoor residual spray was not

conducted for both cases and controls and not statistically significant for the occurrence of the outbreak.

Table 1.1.5: Demographic, personal and environmental protection factors among malaria cases and matched controls, Ilu Woreda, South West Shewa, Oromiya, Ethiopia, 2013

S.N	Characteristics		Cases (N= 109)	Controls (N= 109)	Estimated Odds Ratio	95% Confidence Interval
1	Educational status	Illiterate	46	47	**1**	**0.7-1.6**
		Literate	63	62		
2	Occupational status	Employed	34	30	**1.2**	**0.7-2.1**
		Unemployed	75	79		
3	Living close to stagnant water	Yes	70	55	**2.04**	**1.2 - 3.5**
		No	39	54		
4	Using bed net (every night)	Yes	20	37	**0.4**	**0.2 - 0.8**
		No	89	72		
5	Availability of uncovered plastic water container in or outside home	Yes	92	76	**2.3**	**1.1 - 4.5**
		No	17	33		
6	Presence of open deep well in their compound or near to home	Yes	9	10	**0.9**	**0.3 - 2.3**
		No	100	99		
7	Availability of broken glass bottles in the home	Yes	69	38	**3.3**	**1.9 - 5.8**
		No	40	71		
8	Presence of old tires in the compound	Yes	22	14	**1.7**	**0.8 - 3.7**
		No	87	95		
9	Presence of anybody with malaria sign and symptom in the home before 2-3 weeks	Yes	69	44	**2.6**	**1.5 - 4.4**
		No	40	65		
10	Presence of waste collection facility in the compound	Yes	6	5	**1.2**	**0.3 - 4.1**
		No	103	104		
11	Presence of gutter to collect rain water	Yes	8	5	**1.7**	**0.5 - 5.3**
		No	101	104		

1.1.4.4. Environmental Assessment

Observation was conducted for availability of stagnant water, uncovered plastic water containers, broken glass bottles and other potential mosquito breeding sites. In all assessed kebeles, it was identified that there was larvae of mosquitoes in observed stagnant water by naked eye.

1.1.5. Discussion

Several factors may have contributed to 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 [3, 7]. This outbreak was detected at the end of October 2013 even though weekly malaria report was crossed threshold level at WHO Epidemiologic Week 28 of July 2013. The outbreak was lasted for five months (July – November) due to delayed response. The rainy season in Ethiopia occurs from July to Sept annually could causes stagnant water accumulation that associated with an increase in malaria incidence. Similarly Heavy rain fall that occurred at the first week of September 2013 was significantly contributed and unconditional temperature in the woreda which may favoured mosquito breeding. Unusual heavy rainfall followed by high temperature is considered as the cause of malaria epidemics [8]. There were no deaths reported in this outbreak. One possible reason may be strong case detection and management however further study would be needed to determine this. According to woreda health office report, indoor residual spray did not conducted since mid-2012 until October 2013. So that no houses were sprayed before 12 months prior to the outbreak.

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 a lower risk of malaria infection.

Stagnant water found to be a major mosquito breeding site in this woreda. Following this it was believed that there were mosquito larvae in this water as observed by 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 during last year likely contributed for the outbreak.

Males were more affected by malaria than females. This may be due to males stay outside home during night than females for different reasons such as protecting domestic animals.

Our study documented that availability of uncovered plastic water containers and broken glass bottles were associated with the disease. This may be due to that these materials were remain a breeding and resting sites for mosquitoes.

1.1.6. Limitation

There was shortage of entomologist to confirm existence of anopheles mosquito larvae and measure their quantity in stagnant water. It was unable to get 2008 monthly malaria morbidity report of the woreda to set threshold level using previous five years data. Due to this reason, last year (2012) weekly malaria data was doubled and compared with the same time of this year report to establish threshold level. During investigation of the outbreak, some health extension workers were on training at kebele level that hindered some prevention activities like destruction of mosquito breeding sites.

1.1.7. Conclusion

There was malaria outbreak in Ilu woreda of South West Shewa zone. Age five years and older were more affected by the disease. Of 20 kebeles of the woreda Bantu Alito, Dugda Lugo and Weserbi Besi kebeles were more affected by malaria outbreak.

Presence of stagnant water, poor bed net utilization and household utensils like uncovered plastic water container and broken glass bottles were significantly associated with contracting malaria in this woreda.

Late notified of the outbreak 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 likely attributed for lasting long period of the outbreak. Existing plenty of stagnant water that has been a major mosquito breeding site was associated with the illness. Due

to normal trends of malaria cases during the previous 12 years, utilization of insecticide treated bed nets was neither monitored regularly and nor distributed since 2010 in the woreda.

1.1.8. Public Health Interventions

A total of 12,044 houses were sprayed with Bendiocarb chemical in selected 10 kebeles of the woreda. It was able to spray 974 meter square stagnant water with Abate anti-larval chemical and a total 130 volunteered people were participated on this activity. Communities were mobilized and taught on prevention and control measures of malaria disease. Active case search and early management were done at community and health facility level.

1.1.9. 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 per required standard should kept in place.
- Identification and removal of potential mosquito breeding sites should be conducted by maximizing community participation.
- 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, doubling 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 as per needed.
- Coverage and utilization of ITNs should be identified at woreda level at every Ethiopian fiscal year.

1.1.10. Acknowledgement

My heart felt thank is go Mr Girma Zeleke Ilu Woreda Malaria focal person and Mr. Gelana, the Woreda health office Environmental Health Protection and Sanitation Officer for their great contribution during field investigation and providing me different data needed for the investigation. Also I would like to thank Mr Kelbesa, Ilu Woreda Health Office Head for his support during this outbreak investigation. I would like to acknowledge deeply Mr Abushet Asnake for assisting me in investigation of this outbreak. Finally, EPHA and Oromiya Regional Health Bureau PHEM Core-Process should be thanked for their financial and technical support.

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Annex 1.1.1: Questionnaire for Malaria outbreak Investigation in Ilu District, South West Shewa zone, Oromiya, Ethiopia, 2013

I. Socio-demographic information:

1. ID number of respondent_____
2. Sex; M☐ F ☐
3. Age in years_____
4. Address; Region _____Zone_____ Woreda_____ kebele _____village_____ GPS Coordinates; E _____N_____
5. Occupation; Employed ☐ unemployed☐ Student☐ Pastoralist☐ farmer Other☐
6. Total family members _____
7. Ethnicity; Oromo ☐ Amhara ☐ Tigre☐ Guraghe ☐ Other ☐
8. Religion; Orthodox, ☐ Protestant, ☐ Muslim ☐ Catholic ☐ other ☐
9. Marital status; Married, ☐ single ☐ Widowed ☐ Divorced☐Not Applicable☐
10. Education status; Illiterate ☐ Primary, ☐ Secondary ☐ tertiary ☐, non-formal ☐
11. Case status;
    a) Case
    b) Control

II. Clinical presentations:

<u>*(For case only)</u>

1. What was the first symptom? _____
2. When was the 1st symptom started(date of onset of symptoms) DD/MM/YY_____
3. 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) sweating,: Yes ☐ No☐ d) Diarrhea : Yes ☐ No☐
    e) Anorexia: : Yes ☐ No☐

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

c) Altered consciousness Yes ☐ No☐,

d) Not able to drink or feed Yes ☐ No☐

e) Convulsion Yes ☐ No☐

f) Difficult breathing Yes ☐ No☐

g) Bleeding Yes ☐ No☐

h) Jaundice (yellowish coloration) Yes ☐ No☐

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

5. Was your blood samples taken? Yes-☐ No ☐

6. If yes **Q 5**, what was the result : Positive ☐ negative ☐

7. Did you get any treatment? 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☐,

8. Other treatment given _____

9. Did you recover completely after the treatment? Yes-☐ No ☐

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

III. Risk Factors:

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

1. Sleeping areas in side home _____outside home_____

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

3. Is there anybody in your home with similar malaria signs and symptoms? Yes-☐ No☐

4. Did you travel outside your village in the past 2-3 weeks? Yes-☐ No ☐

5. If Q **4** yes, indicate

(a) date of travel DD/MM/Y_____

(b) The place of travel _____

(c) Date when you returned back DDMMYY_____

(d) Were there sick patients (same symptoms) in the place where you have been? Yes-☐ No☐

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

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

8. Number of bed nets in your home _____

9. Was indoor chemical spray conducted last year prior to the outbreak? Yes-☐ No☐

10. If **Q 9** yes, how many times was sprayed? Once ☐ twice ☐ Three times and more☐

IV. Environmental investigation

11. Place of stay during night; Inside home ☐ Outside home ☐

12. Is there any artificial water -holding containers close to your home and inside your home those could be a potential for mosquito breeding sited? 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. Uncovered plastic container; Yes-☐ No☐

    h. Gutter to collect rainwater; Yes-☐ No☐

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

    j. Stagnant water Yes-☐ No☐

13. Presence of larvae in breeding sites around the home or vicinity; Yes-☐ No☐

14. Types of house; screened ☐ unscreened ☐

15. Do you use repellents? Yes-☐ No☐,

16. Do you use protective clothing? Yes ☐ No ☐

17. Availability of Solid and liquid waste collection; Yes-☐ No ☐

18. Presence of unprotected irrigation;; Yes ☐ No ☐

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

20. Presence of tick grass; Yes-☐ No☐

V. Awareness assessment

21. Do know sign and symptoms of malaria? ----------

22. How it transmitted?----------

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

1.2. Measles Outbreak Investigation and Response in Dawe Kachen woreda, Bale zone, Oromiya, Ethiopia, December 2013-January 2014

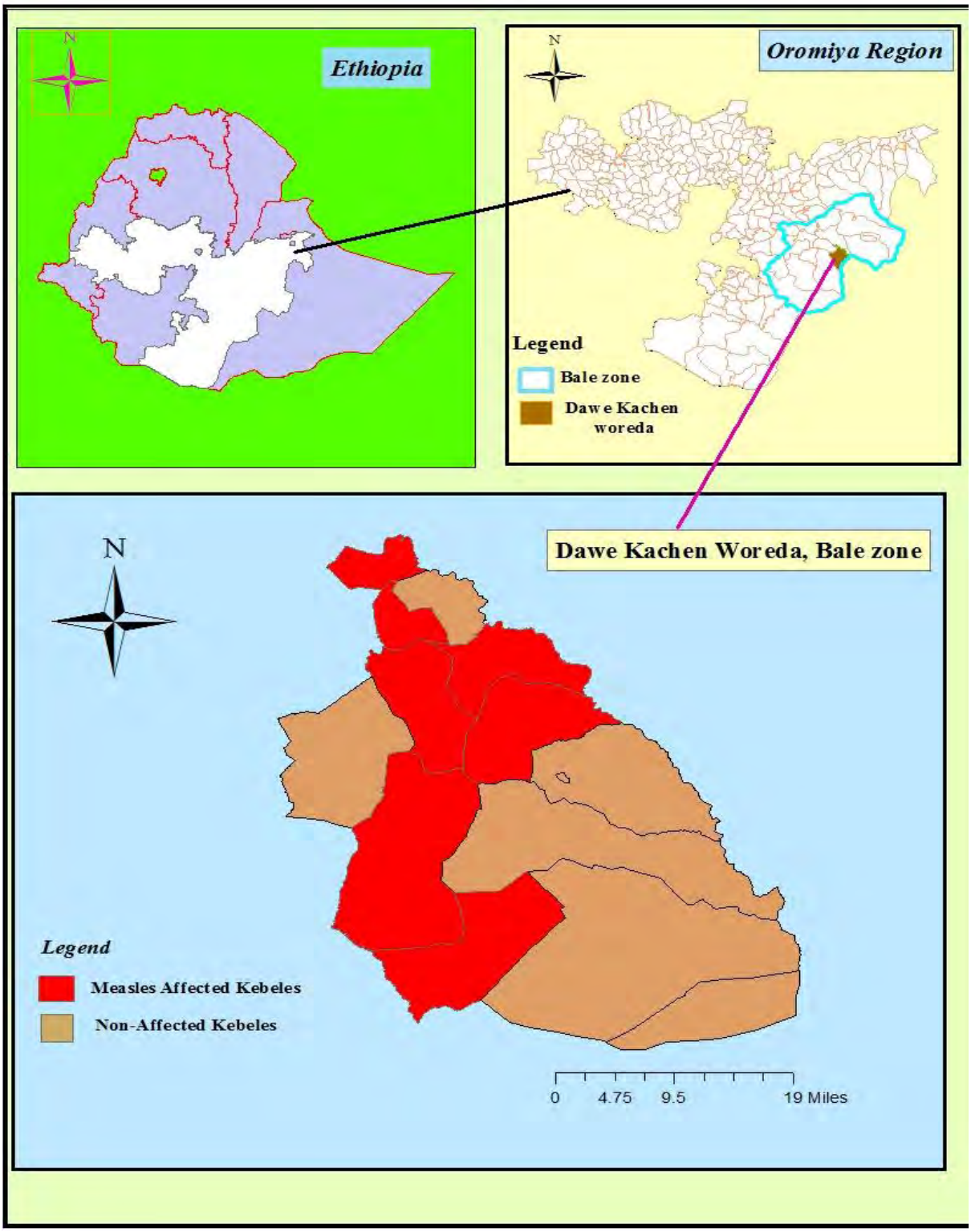
Abstract

Measles is a highly contagious respiratory tract infection caused by a morbillivirus. The disease causes high morbidity and mortality worldwide. In december 2013, Dawe Kachen District Health Office informed Bale zone health office that there were suspected measles cases identified in Dibe Kilofta kebele of the district. Hence EFETP residents were deployed to the epidemic site to cofirm the outbreak, describe magnitude of the outbreak and identify risk factors associated with disease.. Five samples were collected for measles IgM confirmatory test. Burden of measles was described by person, place and time. Matched 1:2 case-control study with randomly selected 62 measles case-patients and 124 neighbourhood controls was conducted from January 15- 29/2014. We interviewed study participants using structured questionnaire. Epi info 7 and Microsoft Excel were used to enter and analyze the data.

A total of 172 measles cases and 5 deaths were reported from Dawe Kachen district during epidemic period. The case fatality rate of measles was 2.8%. Of the total of 172 cases, 88 (51%) were females and 84 (49%) were males. One hundred thirty-one cases (76%) and all deaths were not vaccinated for measles. Under five years age were more ffected by the disease with age specific attack rate of 13 per 1000 population . All kebeles of the district did not have functional refrigerator for vaccine cold storage. Having vaccinated for measles had protective effect (Odds Ratio: 0.12, 95% CI: 0.06-0.31). Presence of measles case in the family (Odds Ratio: 13.5, 95% CI: 6.3-29.2), malnutrition (Odds Ratio: 26.5, 95% CI: 3.3-210.9) and Poor ventilation (Odds Ratio: 4.6, 95% CI: 1.8-11.6) were found to be significantly associated with measles outbreak.

Low measles vaccination coverage, having contact with a person suspected to have measles, poor housing condition and malnutrition were significant risk factors for contracting measles. We recommended enhance immunization programs, strong management of malnourished cases, good cold chain system and increase community awareness on measles prevention and controls measures.

Keywords: Measles, Outbreak, Case-Control, Dawe Kachen, Ethiopia, 2014.



Chapter 1 Figure 1.2.1: Map of Dawe Kachen woreda and measles affected kebeles, Bale zone, Oromiya, 2014

1.2.1. Introduction

Measles is a highly contagious respiratory tract infection caused by a morbillivirus and often occurs in explosive epidemics. The highest fatality rates are usually among children under five, and up to 20% in infants less than one year old. Measles usually does not kill children directly; however, as a result of its associated immune-suppression that lead to lethal complications, such as pneumonia, croup, and diarrhoea. Children affected by measles may suffer lifelong disabilities, including brain damage and blindness. Measles attributed for an estimated 10 million cases and 164,000 deaths worldwide each year [1]. Highly effective vaccine has been available since the 1960s. In 2001, countries in the World Health Organization (WHO) of African Region started implementation of the regional measles mortality reduction strategies with a goal to reduce the estimated number of measles deaths in 2005 to half of the estimate for 1999 [1]. This goal was achieved, and a new goal was established to reduce measles mortality in 2009 to 90% of the estimate for 2000. The measles mortality reduction strategy adopted by the African Region includes improving routine, measles vaccination coverage, providing a second opportunity for measles vaccination through supplementary immunization activities (SIAs), monitoring the impact of vaccination activities through case-based measles surveillance, and improving measles case management [2]. The implementation of measles vaccination policies worldwide has decreased the mortality rate attributed to measles by 78% between 2000 and 2008 [3]. Between 1999 and 2004 the most significant reduction in mortality has been observed in the Sub-Saharan African region (from 530,000 to 216,000 deaths per year) which results from increment in measles vaccination coverage [3]. Inequalities in access to vaccines within countries mean that death and disability from measles is concentrated primarily among the poorest, most marginalized and remote people.

The national Expanded Programme on Immunization was established in 1980 in Ethiopia and includes the first dose of measles-containing vaccine (MCV1) to be given at or shortly after the ninth month of age [4]. In Ethiopia, the implementation of the regional measles mortality reduction strategy started in 2002. Routine vaccination services are delivered through fixed health facilities, outreach sites, and since 2004, in some regions, during ‘‘Child Health Days’’ also referred to as Enhanced Outreach Services. In 2004, a system of nationwide measles case-based surveillance was established in Ethiopia [4]. Before the start of measles case-based surveillance in Ethiopia, measles incidence was monitored by a system of aggregated case counts of clinically diagnosed

measles reported monthly by clinicians. Failure to deliver at least one dose of measles vaccine to all infants remains the primary reason for high measles mortality. There are no known measles virus reservoirs outside of humans. Despite the widespread availability of measles vaccine for nearly 35 years in Ethiopia, measles remains a major cause of childhood morbidity and mortality. Measles outbreak was defined as the presence of 3 or more laboratory-confirmed measles cases reported from the same district or from the same catchment area of a health facility with onset of rash within a period of a month. After an outbreak was confirmed by the laboratory, the collection of blood specimens was interrupted and additional cases that conformed to the case definition were considered to be measles cases confirmed by epidemiologic linkage, as long as these cases occurred in the same woreda and had dates of onset within a month of the laboratory confirmed cases. A measles death was defined as a death of a confirmed measles case occurring within 30 days of the onset of rash [5, 6].

In Oromiya region measles outbreak is still a main public health concern. During the period of 2013/14, measles epidemics were reported from nine zones namely; Arsi, Bale, Borena, Guji, Horro Guduru Wollega, Illubabor, Kellam Wollega, West Hararghe and West Shewa of the region. Unpublished outbreak investigation report by Field Epidemiology Training Program Residents showed that the possible factors associated with the disease were low immunization coverage, malnutrition, poor cold chain management and community attitude toward measles control. About 1500 confirmed and epidemiologically linked measles cases with 20 deaths were reported from these epidemic areas in 2013/14. In the last five years there were huge measles epidemics in Dawe Sarar, Harena Bulluk and Gololcha districts of Bale zone. Similary, some districts of this zone have reported suspected measles cases in 2013.

In Dawe Kachen woreda of Bale zone measles outbreak was not observed during the last ten years. On December 29 of 2013, Dawe kachen woreda health office informed Bale zone health office that there were suspected measles cases identified in Dibe Kilofta kebele of this woreda. After having received this report from zonal health office, organized team that consists FETP residents was deployed to this woreda and investigated the outbreak.

1.2.2. Objectives

1.2.2.1. General Objective

- To describe magnitude of the measles outbreak and identify risk factors associated with contracting measles in Dawe Kachen woreda

1.2.2.2. Specific Objectives

- To confirm the existence of the outbreak in the woreda.
- To describe magnitude of the disease by person, place and time.
- To identify risk factors and its sources contributed for contracting measles in Dawe kachen woreda.
- To strength active case search and case management of measles during this outbreak.
- To propose recommendation on measles control and prevention measures

1.2.3. Methods and Materials

1.2.3.1. Coordination

As soon as suspected measles cases report was received from Bale zone PHEM focal person on 6/01/2014, we communicated with concerned bodies about the disease and how to investigate it. Measles linelists were received from the zone. FETP residents was mobilized to the area for investigation. The team discussed with zonal Health Department head, MCH officers and PHEM focal person on issues of the outbreak before the arrival to the outbreak site. At woreda level, there was discussion with woreda health office head, vice head, MCH officers and PHEM Focal person on possible causes of the outbreak, magnitude of the disease, number of affected kebeles, undertaking interventions and the way forward. The team was re-established that included one zonal health department officer, woreda health office staff and health center workers. Finally, the team departed to affected kebeles from January 16/01/2014 for investigation of the outbreak and implement control activities.

1.2.3.2. Laboratory Investigation

Five blood samples were collected from suspected measles cases and sent to Central Laboratory for IgM confirmatory test.

1.2.3.3. Case Definitions

1.2.3.3.1. Standard case definition: -

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

Confirmed: A suspected measles case that is investigated, including the collection of an adequate blood specimen (5ml), and has serological confirmation of recent measles virus infection (IgM positive).

1.2.3.3.2. Community case definition of measles: - Any person with fever and rash starts from face.

1.2.3.4. Study Area

Dawe Kachen is one of 20 woredas of Bale Zone Oromiya Region. According to population projection from 2007 census, the woreda has a total population of 37,188 of which 18,408 are males and 18,780 are females. One town and 13 rural kebeles are found in the woreda. There are two health centers in this woreda and the woreda town Mio is found 565 kilometres from Addis Ababa. The woreda has a surface area of 2,291 kilometres square. Among total land of the woreda, 78% is flat and the rest 22 is mountainous, valley and sloppy nature. Of the total population of the woreda, 31% are farmers and the rest 69 are agro-pastoralists. The woreda is bounded by Rayitu and Ginir woredas to the North, by Gura Dhamole woreda to the south, by Goro woreda to the west and by Dawe Serer woreda and Somali region to the east. Totally, the weather condition of the woreda is dry.

1.2.3.5. Study Period

We conducted case-control study from January 15 to 29, 2014 in Dawe Kachen woreda.

1.2.3.6. Study Source Population

Total population of Dawe Kachen woreda is study population of measles outbreak investigation.

1.2.3.7. Target Population

During this outbreak investigation, all confirmed and suspected to have measles cases, deaths and selected matched community controls were target population of this study.

1.2.3.8. Study Design

1.2.3.8.1. Descriptive Epidemiology

The previous five years data of EPI coverage was reviewed and collected from the woreda. Similarly, this data was collected from health facilities for data quality assurance. Also, data was gathered on current cold chain status and magnitude of malnutrition. Magnitude of the disease was described by sex, age, kebeles, date of onset, vaccination status and others variable from measles linelist.

1.2.3.8.2. Analytical Epidemiology

We conducted 1:2 ratio of case-control study in Dawe Kachen woreda. Case-patients were those who suspected to have measles by health facility workers before the study and active cases for

suspected measles identified by investigation team at the community level. Neighbourhood controls were selected and matched with measles case-patients by sex and age. Selected case-patients and controls were interviewed with standard and identical questionnaire. Different risk factors including vaccination status, contact history, housing condition, knowledge of the family, and nutritional status were assessed during this study.

1.2.3.9. Data Processing and Analysing

Data entered and summarized using Microsoft Excel. Analysis of different risk factors/exposures was done by using Epi info version 7.1 software. Epi-curve, magnitude and frequency of a disease was presented in figure and table forms. Measles attack rate and case fatality ratio were calculated among total cases and deaths. Additionally, estimated odds ratio and 95% confidence interval were determined through bivariate analysis.

1.2.3.10. Environmental Assessment

During this investigation, environmental factors that may contribute for the occurrence of measles outbreak and its magnitude were looked for. These factors include area of living house and ventilation status of the house for both selected case-patients and controls.

1.2.3.11. Ethical Consideration

Support letter was written from regional health bureau and Zonal health office. We obtained support and willingness to conduct the study from woreda health office. Objective of the investigation was told to study participants briefly. Then after, their oral consent and support was asked to participate in this study. Their confidentiality was assured.

1.2.3.12. Data Dessimination

Findings of this investigation in both soft and hard copy was communicated with Oromiya Regional Health Bureau, Bale zonal health office, Dawe Kachen woreda health office and Addis Ababa University. Additionally, soft copy of the document was sent to FETP Resident Advisors, Mentors, Co-ordinators and Field Supervisors.

1.2.4. Results

1.2.4.1. Laboratory

Five blood samples were collected and sent to Central Laboratory for IgM confirmatory test. Of these sent samples, four of them were confirmed positive for measles IgM test. The rest 173 cases were epidemiologically linked with confirmed measles cases.

1.2.4.2. Descriptive Epidemiology

A total of 172 measles cases and 5 deaths were reported from 27/12/2013 to 24/01/2014 from Dawe Kachen woreda. The overall attack rate of the disease per 1000 population was 5 and the CFR was 2.8% in this woreda. Among a total of five deaths reported from Dibe Kilofta kebele, four of them were community deaths. These deaths are ranges from 6 months to 3 years age. Of these deaths, 3 (60%) were females and 2 (40%) were males. Of the total 172 cases, 88 (51.2%) were females and 84 (48.8%) were males. Out of 172 cases, 17 (9.9%) of them were admitted with measles complications such as pnuemonia, diarrhea, otitis media, convulsion and feeding problem. Due to late detection of the outbreak by woreda and population movement/migration for water search it was to find the endex case. The cases reach its peak in fourth week of december 2013 and started to decline in the same month until january 2014 (figure 1.2.1).

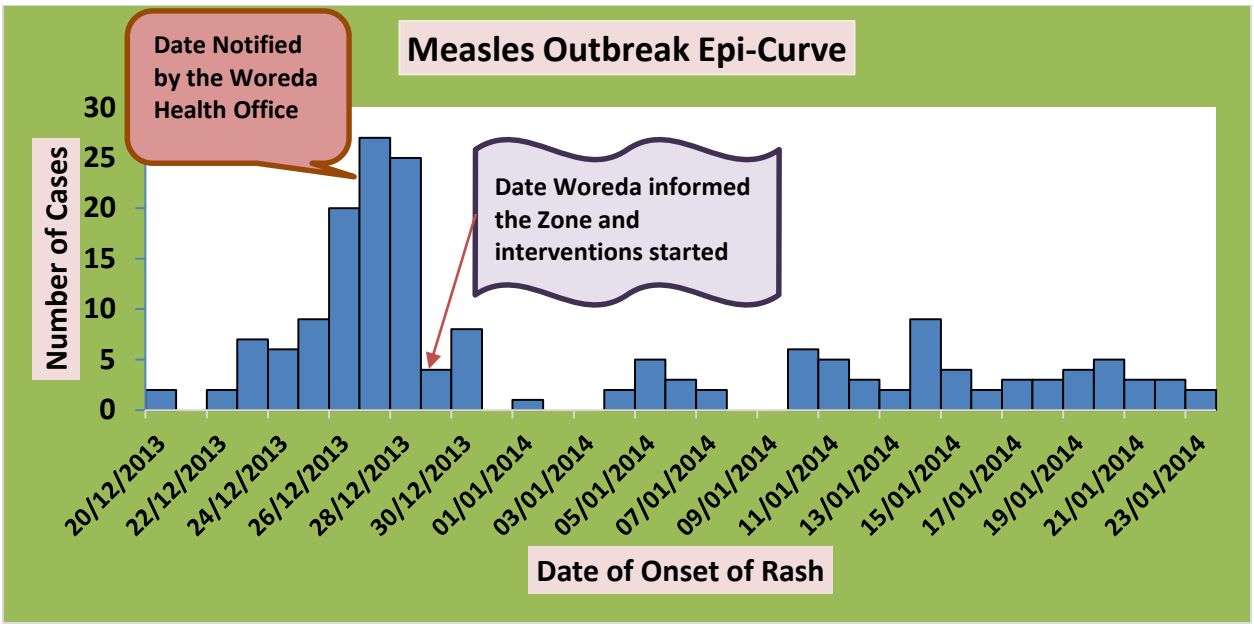


Figure 1.2.1: Number of measles cases by date of onset of rash, Dawe Kachen woreda, Bale, Oromiya from December 20/12/2013 to January 23/01/2014

Of the total 14 kebeles of the woreda, 7 (50%) kebeles were affected by this outbreak. Of these affected kebeles, the highest attack rate (32 per 1000 population) was reported from Dibe Kilofta kebele and followed by Dibe Mole (7 per 1000 pop.) and Beke Kora (5 per 1000 pop.) kebeles of the woreda (table 1.2.1). The least attack rate (1 per 1000 pop.) was reported from Kubi Weldaya kebele.

Table 1.2.1: Measles Attack Rate and Case Fatality Rate by Kebele, Dawe Kachen Woreda, Bale, Oromiya, December 2013 – January 2014.

S.N	Kebeles	Total Population	Number of Cases	Number of Deaths	Attack Rate (per 1000 population	Case Fatality Rate (%)
1	Dibe Kilofta	3684	114	5	32	4.2
2	Dibe Mole	3885	27	0	7	0
3	Bake Kora	2345	11	0	5	0
4	Oda Didibisa	2840	10	0	4	0
5	Didibisa Gale	2098	4	0	2	0
6	Megalo Serbo	2301	4	0	2	0
7	Kubi Weldaya	3174	2	0	1	0
	Woreda	**37188**	**172**	**5**	**5**	**2.8**

Under five years age were more affected by the disease with attack rate of 13 per 1000 population. One hundred and thirty one (76%) cases and all deaths were not vaccinated for measles; whereas only 3 (2%) of them were vaccinated twice and more.

Table 1.2.2: Measles cases by Age and Sex category, Dawe Kachen, Bale, Oromiya, December 2013 – January 2014.

Age Group	Sex		Total Number of Cases (%)
	Male (%)	Female (%)	
< 5	42 (24%)	40 (22%)	82 (46%)
5 – 9	11 (6%)	19 (11%)	30 (17%)
10 - 14	3 (2%)	4 (2%)	7 (4%)
15 - 19	17 (10%)	6 (4%)	23 (14%)
20 - 24	3 (2%)	7 (4%)	10 (6%)
25 - 29	6 (3%)	9 (5%)	15 (8%)
30 - 34	2 (1%)	4 (2%)	6 (3%)
≥ 35	2 (1%)	2 (1%)	4 (2%)
Total	**86 (49%)**	**91 (51%)**	**177 (100%)**

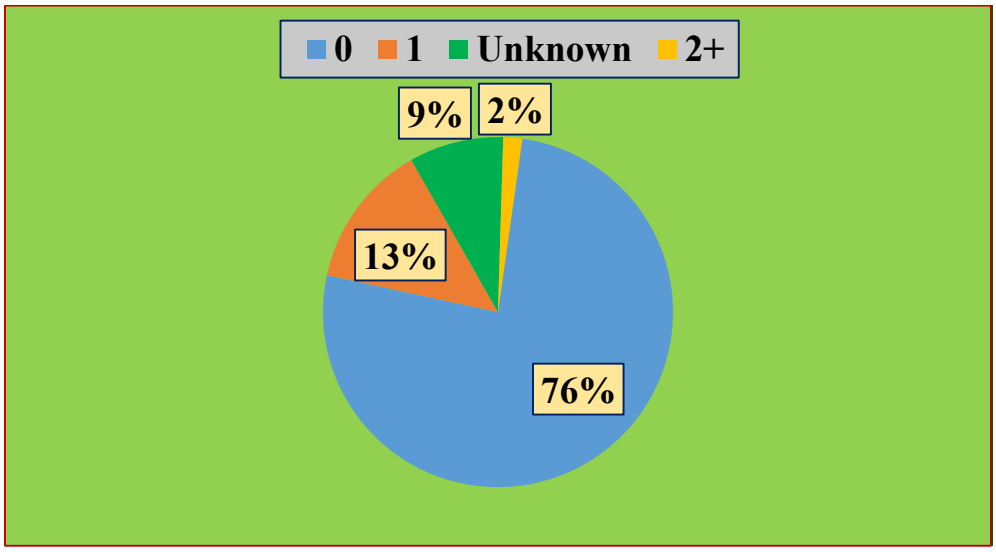


Figure 1.2.2: Measles vaccination doses of cases in Dawe Kachen woreda, Bale, Oromiya, December 2013 – January 2014.

1.2.4.3. Cold Chain

All kebeles of the woreda did not have functional refrigerator for protection of vaccine efficay. Due to this reason, these kebeles are performing routine EPI and supplemntal immunization activities by shipping the vaccines from two health centers found in their catchment area.

1.2.4.4. Vaccination Coverage

Measles vaccination coverage of the woreda was 80.2% for 2005 E.C. The woreda health office report showed that the coverage of measles vaccination campaign conducted in 2005 E.C was 110%. This high achievement may be due to error in the estimation of target group for measles vaccination.

Table 1.2.3: Measles, Pentavalent 1 and Pentavalent 3 vaccinations coverage of Dawe Kachen Woreda, Bale zone, Oromiya region from 2001 to 2005 E.C.

Year	Immunization Coverage			
	Tar/Ach/Cover.	**Measles**	**Penta 1**	**Penta 3**
2001	Target	1152	1152	1152
	Achievement	798	713	615
	%	***69.0***	***62.0***	***53.0***
2002	Target	1180	1180	1180
	Achievement	897	878	767
	%	***74.0***	***74.0***	***65.0***
2003	Target	1206	1206	1206
	Achievement	899	995	911
	%	***74.5***	***82.5***	***75.5***
2004	Target	1233	1233	1233
	Achievement	888	1092	972
	%	***72.0***	***88.6***	***78.8***
2005	Target	1271	1271	1271
	Achievement	1023	1227	1073
	%	***80.5***	***97.0***	***84.4***

Table 1.2.4: Measles Vaccination Coverage by Kebele, Dawe Kachen Woreda, Bale, Oromiya, 2003 – 2005 E.C.

S.N	Kebele	Measles Vaccination Coverage (%)		
		2003	2004	2005
1	Sof-umer	86.0	88.0	122.0
2	Oda Dibibisa	87.0	87.0	106.0
3	Megalo Serbo	53.0	75.0	63.0
4	Dibe Mole	63.0	63.0	61.0
5	Kubi Weldaya	83.0	99.0	94.0
6	Mentoke H/Watecha	79.0	81.7	103.0
7	A/Basaka	89.0	76.0	82.0
8	Dibe Kilofta	76.0	74.0	72.0
9	A/H/Aga	80.0	67.7	77.3
10	Didibisa Gale	71.6	71.0	94.0
11	Hargedeb	88.0	63.0	76.0
12	Bekeksa	63.0	50.0	47.0
13	Beke Kora	21.0	64.0	63.0
	Woreda	**74.5**	**72.0**	**80.5**

1.2.4.5. Analytical Epidemiology

In this investigation a total of 62 measles case-patients and 124 neighbourhood healthy controls were selected with a ratio of 1 case to 2 controls. Selected controls were matched with case-patients by age and sex. Among a total of 62 interviewed cases, 34 (54.8%) were females and 28 (45.2%) were males. The mean and median age of case-patients were 10.24 and 5 respectively. Vaccination status was significantly associated with measles cases (OR: 0.14, 95% CI: 0.06-0.31). Bivariate analysis showed that having contact history with a person suspected to have measles case during the last 2-3 weeks was significantly associated with the presence of the illness with odds ratio of 18.9 95% confidence interval of 8.8-40.9. Presence of measles case-patient in the family is attributed for the disease that scored 13.5 Odds Ratio. Malnutrition was one of the contributing factor for the occurrence of measles with Odds Ratio of 26.5 and 95% Confidence Interval of 3.3-

210. However, Educational status of the family and knowing measles modes of transmission were not associated with contracting measles.

Table 1.2.5: Selected characteristics of measles case-patients and controls with their significance, Dawe Kachen, Bale, Oromiya, Ethiopia, 2014

Variable		Case (#)	Control (#)	Odds Ratio	95% Confidence interval
Sex	Male	28	56	**0.93**	**0.5-1.7**
	Female	34	68		
Age group	< 5 years	30	60	**1**	**0.5-1.8**
	≥ 5 years	32	64		
Educational status of the Family	Illiterate	50	103	**1.2**	**0.5-2.8**
	Literate	12	21		
Did you ever vaccinated for measles?	Yes	9	68	**0.12**	**0.1-0.3**
	No	53	56		
Presence of sick person in the family	Yes	38	13	**13.52**	**6.3-29.2**
	No	24	111		
Contact history with measles case-patients	Yes	48	19	**18.94**	**8.8-40.9**
	No	14	105		
Travel history to the area with active measles	Yes	16	3	**1.5**	**0.6-3.6**
	No	42	121		
Do you know measles modes of transmission?	Yes	18	48	**0.65**	**0.3-1.2**
	No	44	76		
Housing Condition	Ventilated	6	41	**4.6**	**1.8-11.6**
	Not Ventilated	56	83		
Nutritional Status	Normal	51	123	**26.53**	**3.3-210.9**
	Moderate and Severe	11	1		

1.2.4.6. Environmental Assessment

Housing condition of households in their ventilation status was significantly associated with the disease (OR: 4.6, 95% CI 1.8-11.6). The family size and estimated area of the house for interviewed case-patients and controls were compared (table 1.2.6).

Table 1.2.6: Family size and estimated area of the house for interviewed measles case-patients and controls, Dawe Kachen woreda, Bale zone, Oromiya, Ethiopia, January 2014.

Case Status	Family Size			Estimated Area of the House (M^2)		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Case	2	10	7	9	32	15.12
Control	2	13	6	9	32	16.53

1.2.5. Public Health Interventions

Active measles case search and management were conducted in all affected kebeles of the woreda. Additionally, Antibiotics drugs and Vitamin A for measles treatment were mobilized from Zonal health Office and local working NGO (Merlin). Tracing of vaccination defaulters were conducted in all kebeles. Woreda health office and Health center professionals were sensitized on measles case detection and management. Communities were taught and mobilized on measles prevention and control measures. Screening and treatment of malnourished cases were done mainly in highly measles affected kebeles.

1.2.6. Discussion

Many factors may contribute for the occurrence of measles outbreak in this woreda. Measles outbreak is expected and could frequently occurred in area with low measles immunization coverage and poor cold chain management even with high vaccination coverage. From the woreda measles vaccination coverage of the last five years (2001 – 2005 E.C), we were able to observe that except the coverage in 2005 (80.5%) the rest were below 75%. Similarly, the average coverage of three years (2003 – 2005 E.C) in highly affected two kebeles namely Dibe Kilofta and Dibe Mole were 74% and 62.3% respectively. This shows that low vaccination coverage in the woreda resulted from poor community mobilization activity was attributed for the occurrence of the outbreak. Additionally, absence of functional refrigerator in all kebeles of the woreda may alter vaccine potency given at these kebeles level that contributed for measles since 24% of cases had history of one vaccination status. Similar case-control study done in Dawe Serer and Herena Buluk

woredas of Bale zone in Oromiya region showed that low vaccination coverage and non-functional cold storage were likely contributed for measles outbreak occurrence in this area [6].

Our study exhibited that poor ventilation of the case-patient's house was significantly contributed for the outbreak. Similarly, measles outbreak case-control study in china documented that basement of internet café which have comparatively poorer ventilation was a stronger risk factor for acquisition of measles [9]. Additionally, in this woreda area of the house may supported measles transmission in the family. This can be explained that WHO recommends 11 or more meter square floor space for 2 persons, 9-10 for 1.5 persons and 7-9 for 1 persons [10]. However, in studied area the mean of family size for cases was 7 and the mean of estimated area was 15.2 meter square. This indicated that area of the house and number of persons did not coincide with WHO recommendation which may create favourable condition for measles transmission with in the family.

The case fatality rate in this woreda was 2.8%. A retrospective, community-based study conducted in West Hararghe zone in Ethiopia following a measles outbreak in 2007 estimated that the case-fatality rate was 6.7%. Similarly, several studies in other countries documented that case fatality rates were ≥2.4% including a case fatality rate of 18.2% among cases aged < 5 years during an outbreak in Niger [11, 12]. Current estimates of CFR used by WHO in endemic countries range between 0.05% - 6%. Our findings of case-fatality rate also falls in this range (WHO). This may be due to strong case management in affected kebeles.

Most kebeles of the woreda are highly prone for malnutrition that usually contributed for the occurrence and extent of measles outbreak. Majority of the OTP admissions in 2005 (63%) and 2006 (69.1%) in the woreda were reported from measles affected kebeles. This exhibited that malnutrition was contributed for the outbreak in the woreda. On the other hand most measles inpatient admissions were developed pneumonia complication. Cross sectional retrospective study conducted in Philippines on risk factors associated with measles pneumonia identified that malnutrition was significantly contributed for measles pneumonia [10]. Our study also indicated that malnutrition may attributed for pneumonia complication in this area.

Low community awareness on measles treatment coupled with late detection of the outbreak by woreda may have contributed to severe cases and deaths from measles.

1.2.7. Limitation

- At the beginning of the outbreak investigation, there was a challenge of communities to bring measles case-patients to health facilities for modern treatment. However, this was gradually formed through intensive health education.
- Measles line-list was not properly filled by the woreda workers until the Regional team arrived there and made corrections on.
- Absence of child immunization card at household level was made difficult to get exact date of vaccination and other relevant information.

1.2.8. Conclusion

We confirmed the presence of measles outbreak in Dawe Kachen woreda of Bale zone. The results of this investigation documented that low measles vaccination coverage in the woreda was the main contributed factors for the size and severity of the outbreak. During this outbreak, age of 0-4 years children were more affected by measles compared with others age groups. Low community awareness on immunization service was also associated with the disease. Due to high magnitude of malnutrition in the woreda, this outbreak was aggravated mainly in two kebeles from where more admissions of malnutrition were reported. Additionally, inadequate cold storage of vaccines and their poor were significantly contributed for the outbreak.

Ventilation status and estimated area of the house were highly contributed for the transmission and magnitude of measles outbreak in Dawe Kachen woreda. The woreda disease surveillance was poor as they detected lately and unable to find the index case for measles outbreak. Except five deaths from measles, all treated cases at outpatient and inpatient services were recovered from their illness. This shows that the case management was relatively good. However, the activities performed by the woreda on community mobilization and providing the key massages for the community to prevent and control measles outbreak was weak.

1.2.9. Recommendation

- Mop-up mass vaccination campaign should be conducted throughout the woreda and its bounded woredas mainly in especially for those their routine vaccination coverage is low.
- Routine EPI service should be strengthened and pentavalent to measles dropout rate should be less than 10%.
- Cold chain management should be improved and one fridge should be established at least for three or four closer kebeles and should be functional throughout the month.
- Strong social mobilization should be conducted to increase the community awareness on uses of immunization, and measles prevention and control mechanisms. Mainly, community's awareness should be optimized on good housing condition and other environmental protection practices.
- Active surveillance activities of the woreda need to be revised and strengthen to enable early detection of the outbreak.
- In Oromiya region measles outbreak is occurring among one measles vaccination dose received children. This indicated that may be two dose and above strategy should be maintained and enhanced onwards.
- Screening and treatment of malnourished cases should be strengthened in the woreda.
- Assessment of factors that contributed for low immunization coverage mainly among communities should be conducted to enhance routine immunization activities of the woreda.

1.2.10. Acknowledgement

I would like to extend my genuine gratitude to Mr. Birhanu Gudeta, Bale zone PHEM focal person and Mr. Seyifedin Mohamed, Bale zone MCH expert for their great support before and during field investigation. Also, I would acknowledge Mr. Birhanu Areda, EFETP Cohort 4 Resident and my co-investigator for his huge role in outbreak investigation activities. Mr. Abdu Rauf and Mr. Abdulselam Dawe Kachen woreda health office head and vice head, should be appreciated for their kindly assistance through conducting the investigation. Additionally, I thank Mio and Sof-umer health centre's staffs and health extension worker of their catchment for their wonderful contribution for this study. Finally but not least, my heartfelt thank goes to AAU-SPH, EPHA, EHNRI and Oromia Regional Health Bureau for providing us financial and technical support for this field work.

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Annex 1.2.1: Questionnaire for Case - control study on Measles outbreak in Dawe Kachen Woreda, Bale Zone, Oromia Region, 2014

"Case status"

1. Case

2. 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 the patient/control	1. Farmer 2. House wife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.4	Family Occupation	1. Farmer 2. House wife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.5	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. Other (specify)_____
1.6	Ethnic group	1. Oromo 2. Tigre 3. Amhara 4. Other (specify)
1.7	Educational level of the patient/control	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary 6. Under school age

1.8	Educational level of the family	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.9	Marital status of the patient/control	1. Single 2. Married 3. Divorced 4. Widowed 5. Separated, 6 N/A
1.10	Family size	_____
1.11	Is there any sick person with rash, fever, running nose/conductivities (illness)? In the family?	1. Yes 2. No
1.12	If yes, number of sick person	_____

II**. Clinical History of Diseases:**

2.1	What was the symptom?	1.fever 2.Rash 3.cough, 4.coryza (runny nose), 5. conjunctivitis (red eyes) 7. Ear discharge 8. pneumonia 10. Vomiting 11. Others_____
2.2	**ONLY if complication**	i) Pneumonia:☐ yes no ☐ j) Cornea: ☐ yes no ☐ k) Blindness : ☐ yes no ☐ l) Convolution ☐ yes no ☐ m) Otitis media (ear discharge): ☐ yes no ☐ n) diarrhea : ☐ yes no ☐ o) Feeding problem☐ yes no ☐
2.3	Date of rash on set	__/__/____
2.4	Duration of rash_____	

2.5	Date seen at health facility	___/___/
2.6	Illness duration before visiting the health facility	_____ in days/hours
2.7	Did you (he/she) take treatment?	1.Yes 2.No
2.8	Location when rash started?	District_____Kebele_____
2.9	Did you recovered after the treatment?	1.cure 2. partially 3. deteriorated/disabled 4.death

III. Risk factor

3.1	Did you ever vaccinated for measles?	1.Yes 2.No 3. Unknow 4.Not applicable
3.2	If yes last vaccination date	1. Patient recall_____ dd/mm/yy 2. Vaccination card_____ dd/mm/yy 3. Don't remember
3.3	Number of vaccine doses received	1. One dose 4. Don't remember 2. Two dose 3. Three and above
3.4	Age of vaccination at first vaccinated.	_____
3.5	If not vaccinated why?	☐ lack of knowledge about vaccination campaign, ☐ absence during vaccination campaign, ☐ other, specify
3.6	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 _____
3.7	Did you contact with a person with measles symptoms within the last 2-3 weeks?	☐ yes ☐ no
3.8	Do you have any travel history four days before and after rash onset	1.Yes 2. No If yes where _____
3.9	Do you have any contact history with someone else four days before and after rash onset	1.yes 2.No If yes with whom_____
3.10	If Yes to question 3.5 place of travel	1.School 2.Neighbor 3.Market 4.Other_____
3.11	Do you know modes of transmission for measles?	1.Yes 2.No 3. If yes specify_____
3.12	Nutritional status of the cases	1.Normal 2.Moderate 3.Severely malnourished
3.13	What is the estimated area of the house?	_____
3.14	House condition?	☐ ventilated ☐ not-ventilated
3.15	Distance from house to HC?	☐ greater than 5 km ☐ equal or less than 5 km
3.16	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)_____
3.17	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)

3.18	Do you Know measles is vaccine preventable?	1. Yes 2. No 3. Don't Know
3.19	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):_____
3.20	How do you think measles can be cured?	1. Using modern medicine 2. Using traditional Medicine 3. Holly water 4. By feeding nutritious foods 5. Keeping the sick person indoor 6. Other(Specify)_____

Chapter – II: Surveillance Data Analysis Report

2.1. Surveillance Data Analysis of Severe Acute Malnutrition, East Hararghe Zone, Oromiya Region, Ethiopia, 2002-2004 E.C

Abstract

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

Methods: Cross-sectional descriptive study was conducted during collection of SAM data. Three years (2002 - 2004 E.C) report of SAM from the Zone and Regional database were reviewed. Different variables such as, SAM admissions, deaths, cured, total discharges in different age category with respect to time and place were included in the analysis of SAM report.

Results: In East Hararghe zone 78, 937 total admissions of SAM were reported at Outpatient Therapeutic Program (OTP) and Establishing Center (SC) in the last consecutive three years (2002 - 2004 E.C). Among these cases, 74,566 (94.46%) of them were new admission. Children 6-59 months of age constituted 74,075 (99.34%) of all new admissions. Admissions from severe acute malnutrition were increasing from 2002 to 2004, which were 19,194 and 30,415 in 2002 and 2004 respectively. From the past consecutive three-year's report of SAM in the Zone 401 deaths with a fatality rate of 0.54% were reported. The annual fatality rate declined from 1.4 % in 2002 to 0.16% in 2004.

Conclusion and Recommendation: Although the number of deaths has decreased, Therapeutic Feeding Program (TFP) admissions were increased from 2002 to 2004 E.C. This may be due to enhanced screening activity and improved cases management. The case management of SAM should be strengthened. The existing reporting format also need to revise to include sex category, pregnant, and lactating mothers.

Keywords: Severe Acute Malnutrition, Surveillance Data Analysis, East Hararghe, Ethiopia

2.1.1. Introduction

Malnutrition is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. This state being clinically manifested or detected only by biochemical, anthropometric or physiological tests. There are four forms of malnutrition: namely; under nutrition, specific deficiency, and imbalance and over nutrition. The number of possible underlying causes of malnutrition are seems endless and their interrelationships complex. However, one way of identifying these causes is to identify the three positive conditions necessary for adequate nutrition or, more precisely, necessary for adequate dietary intake and absence of disease. These are: - adequate access to food (household food security); adequate care of children and women: adequate access to health services & a healthy environment. In many Countries, nutrition policy and intervention is aimed at young child, pregnant and lactating women (2). Reducing malnutrition among children under the age of five remains a huge challenge in developing countries. An estimated 230 million under-five children are believed to be chronically malnourished in developing countries (Van de Poel et. al., 2008). Malnutrition contributes to over 50% of all child deaths worldwide each year (3). In Sub-Saharan Africa, 41% of under-five children are malnourished and deaths from malnutrition are increasing on daily basis in the region (FAO, 2008).

In Ethiopia severe acute malnutrition is among one of 20 notifiable and weekly reportable diseases in the Public Health Emergency Management system. Although the Ethiopian government has adopted a crosscutting approach to nutrition over the last decade, there is no specific nutrition policy (2). While the problem of malnutrition in Ethiopia is relatively well documented, its specific determinants are not well understood. Nationally, 44 percent of children under age five are stunted, and 21 percent of children are severely stunted (DHS, 2011). Regional variation in the prevalence of stunting in children is substantial. Stunting levels are somewhat above the national average in the Amhara (52 percent), Tigray (51 percent), Afar (50 percent), and Benishangul-Gumuz (49 percent) regions and are lowest in Addis Ababa and the Gambela region (22 and 27 percent), respectively (DHS, 2011).

In East Hararghe Zone, malnutrition has been a priority health issue repeatedly for several decades. Nutritional assessment which was carried out in this zone in 2004 EFY, identified that due to yield reduction and water shortage all rural Woredas of the zone are classified as hot spot area for SAM. Among these woredas, 11 of them categorized under priority 1 and the rests put as priority 2. At

the end of 2004 E.C., there were 503 Outpatient Therapeutic Programs (OTP) and 51 Established Centers (SC) in all Woredas of the Zone. The average annual new admission report of severe acute malnutrition during the past three years is 24,855.

Table 2.1.1: Hot spot Woredas, East Hararghe Zone, Oromiya, Ethiopia, 2004 E.C.

S.No.	Name of Woreda	Hot Spot Category	
		Priority 1	Priority 2
1	Bedeno	✓	
2	Chinaksen	✓	
3	Fedis	✓	
4	Golo Oda	✓	
5	Gursum	✓	
6	Kumbi	✓	
7	Meta	✓	
8	Meyu Muluke	✓	
9	Midega Tola	✓	
10	Kurfachele	✓	
11	Melka Belo	✓	
12	Babile		✓
13	Haromaya		✓
14	Deder		✓
15	Girawa		✓
16	Goro Gutu		✓
17	Jarso		✓
18	Kersa		✓
19	Kombolcha		✓

2.1.2. Study Rationale

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

2.1.3. Objectives

2.1.3.1. General Objective

- To analyze three years (2002 - 2004 EFY) data of severe acute malnutrition (SAM) and describe trends of morbidity and mortality of a disease, East Hararghe Zone, Oromiya, Ethiopia.

2.1.3.2. Specific Objectives

- To understand prevalence of a disease in districts of the zone.
- To identify morbidity and mortality of a disease by person, time, and place over the last consecutive three years.
- To propose recommendation.

2.1.4. Methods and Materials

2.1.4.1. Case Definitions

2.1.4.1.1. Suspected

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

2.1.4.1.2. Confirmed

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

2.1.4.2. Study Area

East Hararghe Zone of Oromiya Regional State was studied area for Severe Acute Malnutrition surveillance data analysis.

2.1.4.3. Study Period

Secondary data of Malnutrition for the past three years (2002-2004 E.C) was collected, analysed and interpreted from February 10 to March 30/2013.

2.1.4.4. Study Design

Descriptive cross-sectional study was conducted during collection of severe acute malnutrition data pertaining person, time, and place.

2.1.4.5. Study Population

All population of East Hararghe Zone, which is estimated to be 3,244,379 according to 2004 EFY projection, was included in the study.

2.1.4.6. Data Collection Procedure

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

2.1.4.7. Data Analysis Procedure

The collected data was analyzed by using Microsoft Excel in respect to important variables.

2.1.4.8. Data Variables

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

2.1.4.9. Data Dissemination

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

2.1.5. Results

During the last three years (2002-2004 E.C), 78,937 total admissions of severe acute malnutrition were identified at OTP and SC programs in East Hararghe zone, Oromiya region. Among these admissions, 74,566 of them were newly admitted. Among total new admissions, 82.8 % of them were screened with MUAC measurement (figure 2.1.5). SAM cases are high from May to August in all analyzed years. The prevalence of SAM in under five years children was 4.5 % in 2002, 5.6 % in 2003, and 7.43 % in 2004 E.C. OTP admission sites were increased from 428 in 2002 E.C to 524 in 2004 E.C.

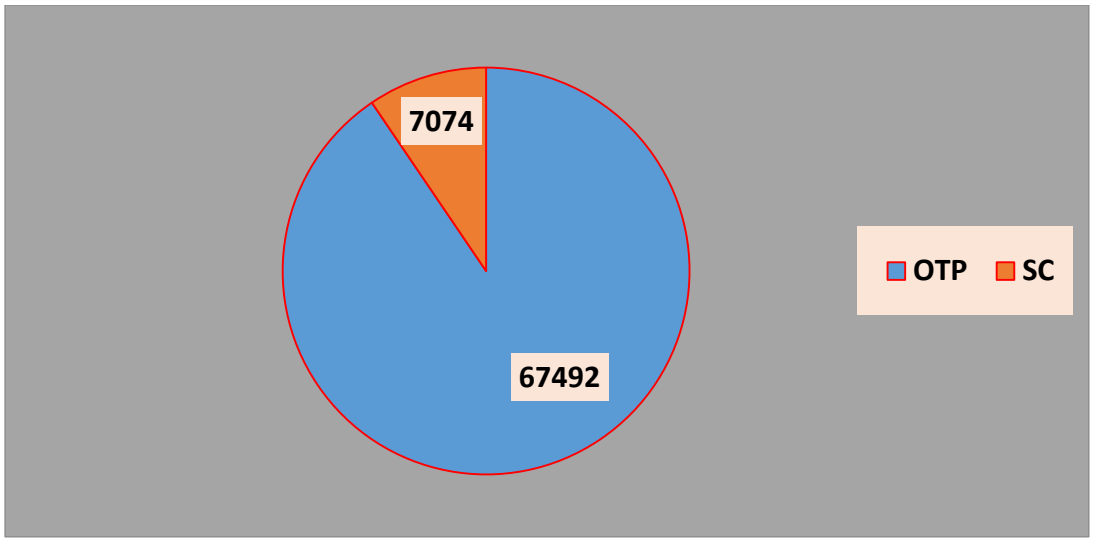

Figure 2.1.1: Total new admissions of SAM at OTP and SC programs in East Hararghe, Oromiya, 2002-2004 E.C

New admissions, which were 19,194 in 2002 E.C., increased to 30,415 (58%) in 2004 E.C. Ninety-nine percent of the total new admissions were children 6-59 months old (figure 2.1.3).

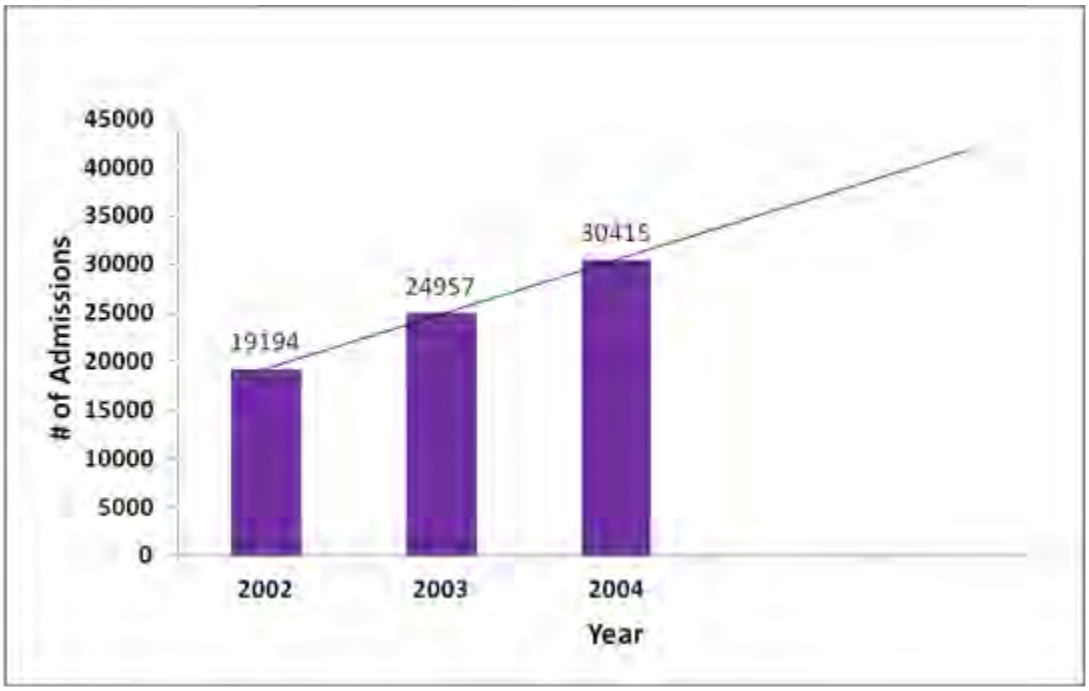

Figure 2.1.2: Total new admissions of Severe Acute Malnutrition, East Hararghe Zone, Oromiya, 2002 - 2004 E.C

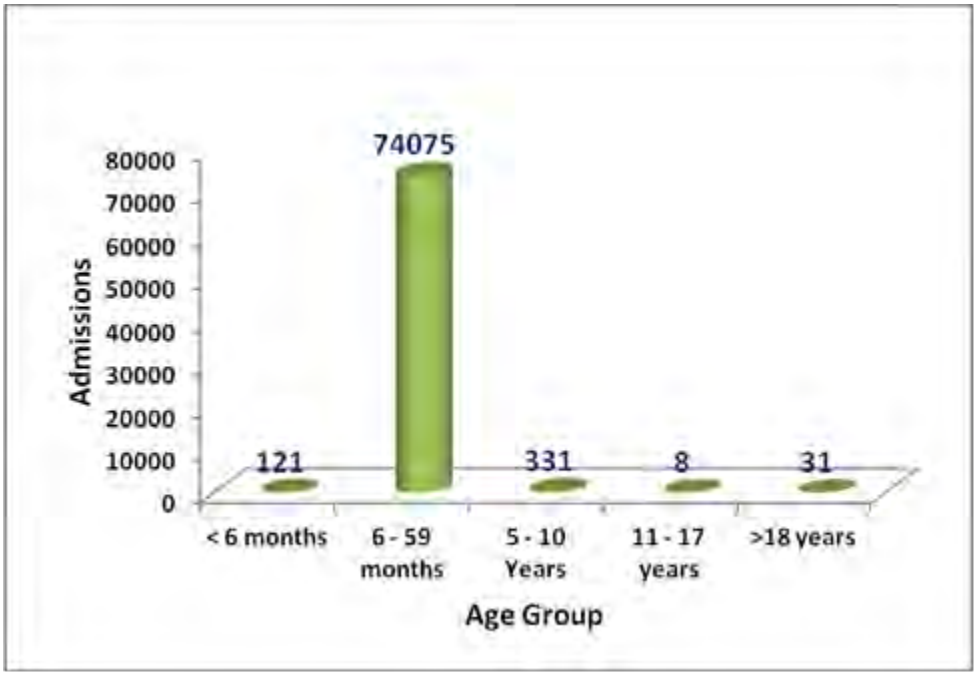

Figure 2.1.3: New admissions of SAM by age, East Hararghe, Oromiya, 2002 - 2004 E.C.

Figure 2.1.4: Number of OTP and SC sites, East Hararghe zone, Oromiya, Ethiopia, 2002 – 2004 E.C.

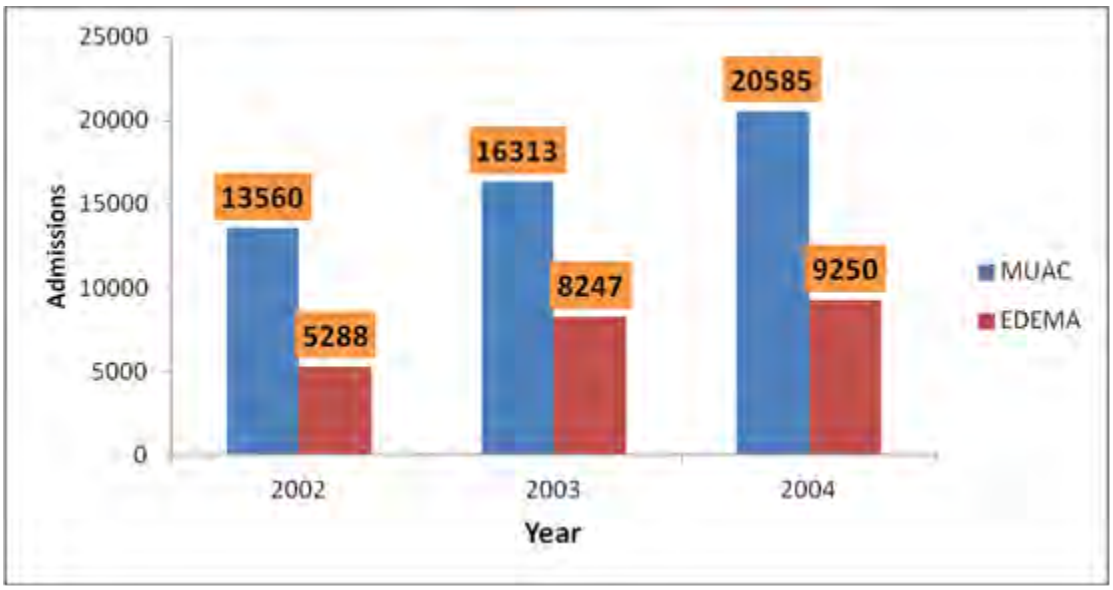

Figure 2.1.5: Admissions of SAM identified by MUAC and EDEMA in East Hararghe Zone, Oromiya Region from 2002- 2004 E.C.

Among hotspot priority 1 woredas of the zone, the prevalence rate of SAM admissions in children less than five years was highest in Fedis Woreda (15%) and followed by Meyu Muluke (14%) and Chinaksen (13%) woredas in 2004 E.C. The least (5.8%) prevalence rate was reported from Bedeno woreda of East Hararghe zone.

Table 2.1.2: Prevalence of SAM for Under five children per 100 population in hotspot priority 1 Woredas, East Hararghe zone, Oromiya region, Ethiopia, 2004 E.C.

S.N	Name of Woreda	Under five years Children	Total Admissions	Prevalence Rate per 100 popn.
1	**Fedis**	18372	2830	15.4
2	**Mayu Muluke**	7529	1060	14.1
3	**Chinaksen**	14414	1866	12.9
4	**Kurfa Chelle**	9479	1143	12.1
5	**Gola Oda**	12826	1539	12.0
6	**Kumbi**	4347	503	11.6
7	**Gursum**	24953	2092	8.4
8	**Midega Tola**	12218	973	8.0
9	**Meta**	40570	2761	6.8
10	**Melka Bello**	28424	1737	6.1
11	**Bedeno**	38427	2243	5.8

Figure 2.1.6: Trends of new admissions of SAM by month, East Hararghe zone, Oromiya, 2002-2004 E.C.

Of the total admissions in 2004 E.C., 90 % of them were confirmed as cured and exceeded the 2002 and 2003 by 8 % and 15% respectively. Among total admissions of 25,972 in 2003, 865 of them were reported to default before they have finished their therapeutic feeding program. Deaths are decreasing from 2002 to 2004 E.C. High number of deaths were reported from Fedis Woreda in 2004.

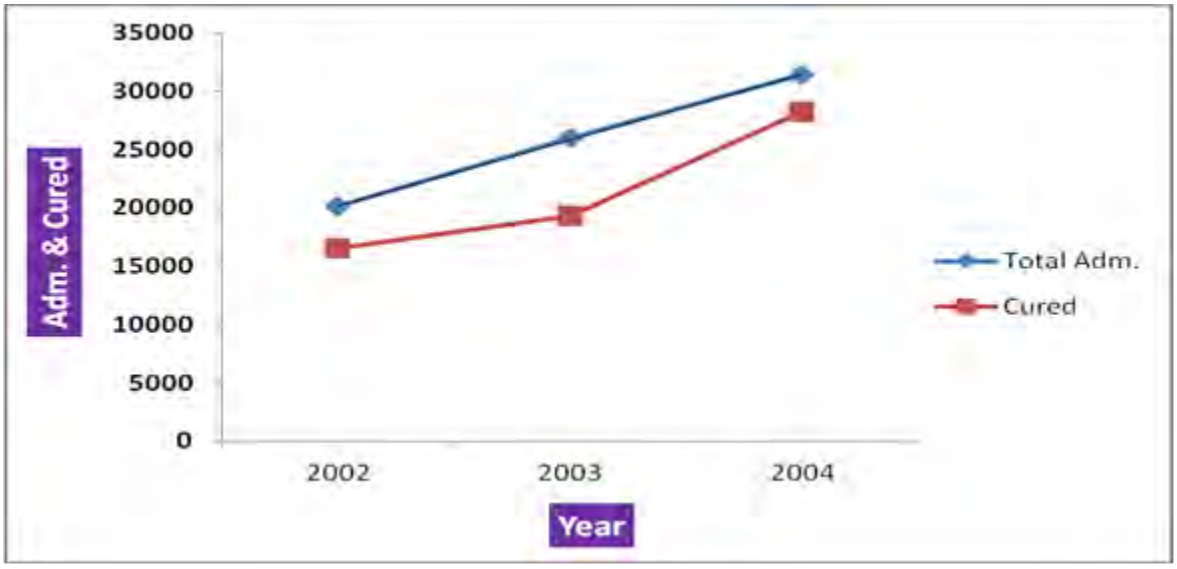

Figure 2.1.7: Total admissions and cured from SAM in East Hararghe zone, Oromiya, 2002-2004 E.C.

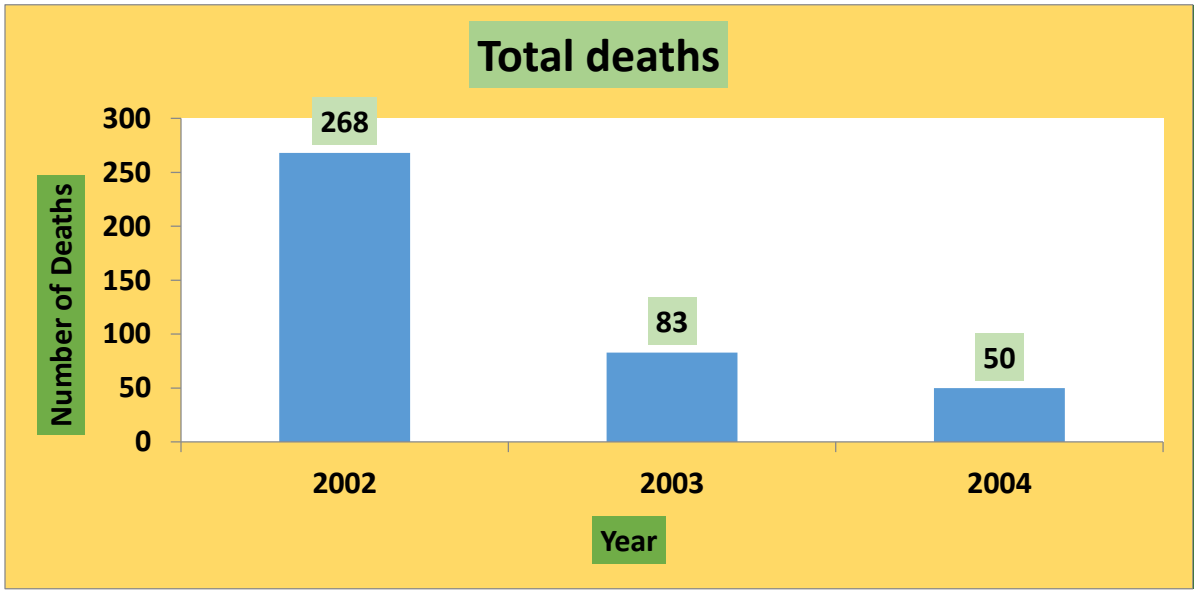

Figure 2.1.8: Total deaths of SAM, East Hararghe, Oromiya, 2002-2004 E.C

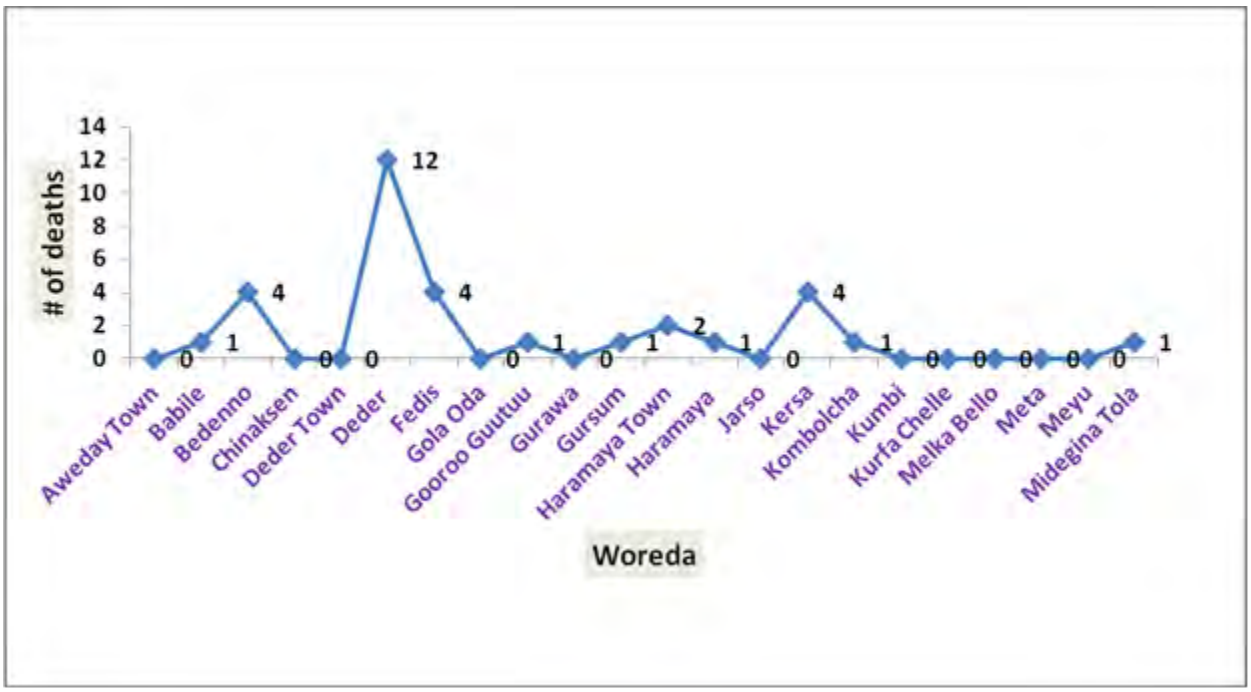

Figure 2.1.9: Number deaths of SAM by Woreda, East Hararghe, Oromiya, 2004 E.C

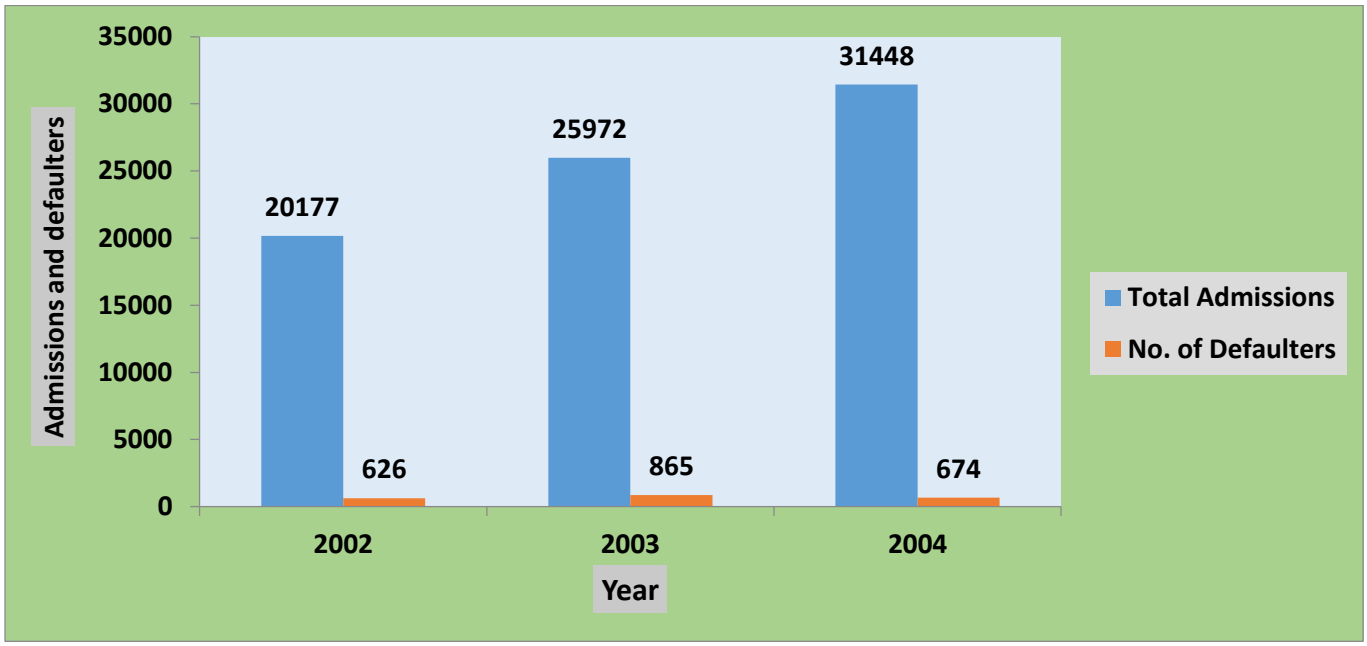

Figure 2.1.10: Total admissions and defaulters of SAM East Hararghe, Oromiya, 2002 - 2004 E.C.

2.1.6. Discussion

The proportion of malnutrition is highest in the age group of 24-35 months (34%) and lowest among those under six months (10%) children (EDHS, 2011). This may be explained by the fact that foods for weaning are typically introduced to children in the older age group, thus increasing their exposure to infections and susceptibility to illness (DHS, 2011). From this surveillance data analysis of SAM, it is possible to understand that children 6-59 months old highly suffered from severe acute malnutrition.

Increasing admissions of SAM may be associated with the deterioration of food security in the belg season and intensive EOS screening conducted at community level at different time. In the studied zone, number of deaths has decreased. This may be due to intervention programs were well conducted in the last three years. For example in 2004 E.C, 495,710 (109.1% from plan) children those age of 6-59 months were supplied with Vitamin A and 315,980 (104.5%) with age of 2-5 years were de-wormed. In addition, expansions of OTP and SC sites occurred at the same time as decreasing of severity and deaths from SAM in the zone. From previous consecutive three years data, it was understood that cases of malnutrition is high between May and August months of the year. This is may be due to shortage of yields become severe during these period of months.

2.1.7. Conclusion

Malnutrition is a major public problem of the country and increasing over the last three years in East Hararghe Zone. Cases were highest in 6-59 months and lowest among less than six months age of children. Of the hotspot priority 1 woredas of the the zone, the prevalence rate was highest in Fedis woreda. Documenting and compiling report for a long period was poor at regional and zonal level. The existing reporting format is lacked important variables such as sex category of SAM case-patients.

2.1.8. Limitations/Gaps

- Severe acute malnutrition activities did not included in HMIS report format.
- At regional level, complete SAM reports before 2003 E.C. were not well organized and documented.
- Regional PHEM unit did not compile and analyze SAM reports regularly.

- Before 2002 E.C Report formats were frequently changed, and make difficulty to get consistent report.
- It was unable to get enough recent literatures to discuss more about the burden and prevalence of severe acute malnutrition in Ethiopia.
- The existing report format of a region did not include sex category variable.
- Even though SAM reports for the past consecutive three years were well organized and complete, there is no report pertaining SAM before 2002 E.C. in both electronic software and hard copy at zonal level.

2.1.9. Recommendation

- Reports should be compiled and analyzed weekly, monthly, annually at all level to understand disease trends and take action.
- The intervention strategies of malnutrition mainly focus on children, pregnant and lactating women. Therefore, the existing reporting format should include number of screened pregnant and lactating women clearly.
- EDHS of 2011 reported that male children are slightly more likely to be malnourished than female. This shows that analyzing SAM data by sex is important to know trends between sexes and identify factors associated with a disease. So that, Regional SAM reporting format should have include sex category.
- Due to malnutrition is a major health problem of the country and region as well, it should be incorporated in HMIS report for regular monitoring and evaluation activities.
- It is better to collect and compile SAM reports by Woreda and health facility at Regional database. This helps to now the trends of a disease by woreda and health facility, so that problem prioritization and its implementation will be enhanced.
- Report formats should be consistent and revised as necessary depending on the current situations.
- Training should be given for nutrition experts of zonal and district level on report formats, how to compile report, analyze, and related issues of severe acute malnutrition.
- Screening of SAM cases and management should be enhanced at all levels.

- Communities should be aware of maintaining food security at all season and different partners those who are working on Nutrition Program should be mobilized to supply feeding nutrients with scarce areas.
- OTP and SC sites should be expand mainly in highly affected woredas.
- The weekly or monthly SAM report should be communicated with higher officials timely for decision making purposes.

2.1.10. Acknowledgment

I would like to thank East Hararghe zone's health office head Ato Ali Abdulahi for his facilitation to explore SAM reports at this level. My gratitude is also goes to East Hararghe zone Health Office's MCH and PHEM focal persons; mainly for Ato Mesfin Worku for his continuous support in feeding me SAM reports and others related materials. I take this opportunity to acknowledge Dr. Lucy Boulanger for her fruitful comments on this document. Finally, I want to thank Oromiya Regional Health Bureau, PHEM unit; Addis Ababa University School of Public Health Department of EFETP and EPHA for their technical and financial support to conduct this study.

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Chapter – III: Evaluation of Surveillance System

3.1. Surveillance System Evaluation in West Arsi zone, Oromiya, Ethiopia, 2013.

Executive Summary

Public health surveillance is the ongoing systematic collection, analysis, and interpretation of health-related data timely dissemination of these data for action and program evaluation. Conducting surveillance system evaluation is crucial for monitoring efficacy and effectiveness of interventional programs in health care system. This study is intended to evaluate surveillance system in West Arsi zone mainly focusing on Malaria, Meningitis and Measles prevention and control activities.

Descriptive cross-sectional study was conducted in West Arsi zone, Oromiya region from May to June 2013. Zonal health office, 5 woredas, 9 health centers and 13 health posts were included in the study. West Arsi zone and 5 woredas of the zone were selected purposively and health facilities were selected by simple random sampling. Three diseases (Malaria, Measles and Meningitis) were selected purposively to be included in the system evaluation. WHO standard checklist for surveillance system evaluation was adopted for data collection.

National PHEM guideline and manuals for management of some prioritized diseases are available at zonal and all visited districts. Data analysis is performed for malaria, measles and meningitis regularly zonal level. However, analysis is only performing for malaria at visited districts and health facilities. Except at regional and zonal level, there was no written epidemic preparedness and response plan at all visited districts. The annual average weekly report timeliness and completeness for the zone are 69% and 71% respectively.

The current surveillance system of West Arsi zone is not satisfactory. Even though malaria and some epidemic prone diseases are decreased through intensive effort made by government and non-government bodies, strong tasks on enhancing proper feedback and supervisory activities have to be done effectively at all levels. Data management system is shown to be poor. Need based training should be facilitated and given to health professionals working at district and health facility level. Due to poor attention and lack of accessibility, utilization of different guidelines, manuals and protocols is low at health facility levels.

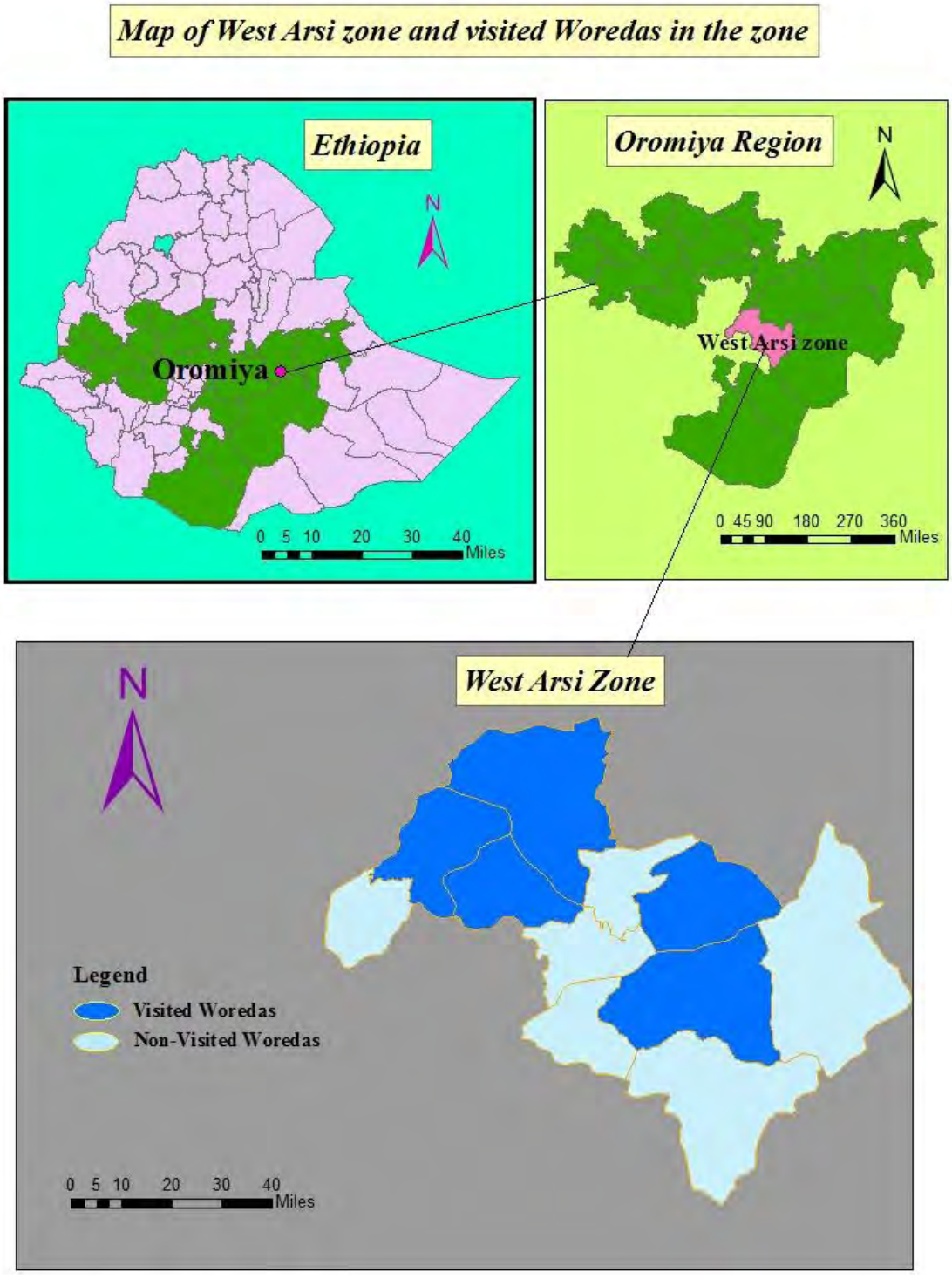

Figure 3.1.1: Map of visited zone and districts for Surveillance System Evaluation, West Arsi zone, Oromiya, Ethiopia, 2013.

3.1.1. Background

Public health surveillance is the ongoing systematic collection, analysis, and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice, closely integrated with a timely dissemination of these data to those responsible for prevention and control. Conducting surveillance system is crucial for monitoring efficacy and effectiveness of interventional programs in health care system. Effective communicable disease surveillance systems are one of the basic strategies of the national disease prevention and control program. A communicable disease surveillance system serves for two key functions; early warning of potential threats to public health and program monitoring functions which may be disease specific or multi-disease in nature [1]. Public health surveillance systems have been developed to address a range of public health needs. In addition, public health information systems have been defined to include a variety of data sources essential to public health action and are often used for surveillance [2]. The evaluation of surveillance systems should promote the best use of public health resources by ensuring that only important problems are under surveillance and that surveillance systems operate efficiently [3].

Federal Ministry of Health had prioritized 20 notifiable diseases which are prone for epidemic, had international concern and diseases on eradication and elimination programs in Integrated Disease Surveillance and Response activities. These diseases are categorized as immediate and weekly reportable diseases. Of selected diseases in this study, malaria and meningitis are classified under weekly reportable diseases whereas measles is categorized as immediately reportable disease. In Oromiya region, these diseases have been major public health problems. In 2004 E.C., there was intensive malaria outbreak in five zones of the region with 12 and 32 affected districts and kebeles respectively. During this year, a total 673549 confirmed and clinical malaria cases and 52 deaths were reported from the region. Similarly, there were 3143 suspected and confirmed measles cases and 26 deaths with case facility of 0.83 were reported regionally. In 2004 E.C., there were 643 meningitis cases and 16 deaths in the region. However, intensive outbreak was occurred in this year (2005 E.C).

In this study, purposes and attributes of surveillance system at West Arsi zone were described in detail. The purpose of evaluating surveillance of this disease is to monitor their trends and trigger public health action as they are shown increased. Enhancing surveillance system of these diseases is also crucial for reducing their magnitude.

The overall objectives of the surveillance system are; serve as an early warning system for impending public health emergencies, document the impact of an intervention, or track progress towards specified goals and monitor and clarify the epidemiology of health problems, to allow priorities to be set and to inform public health policy and strategies.

Data and information of surveillance flow is clearly stated in the system, which comprises from community level to international agencies. In the same manner, tasks in surveillance system is starts from reporting occurrence of health-related events and ends with feedback and dissemination of information for public health action (figure 1).

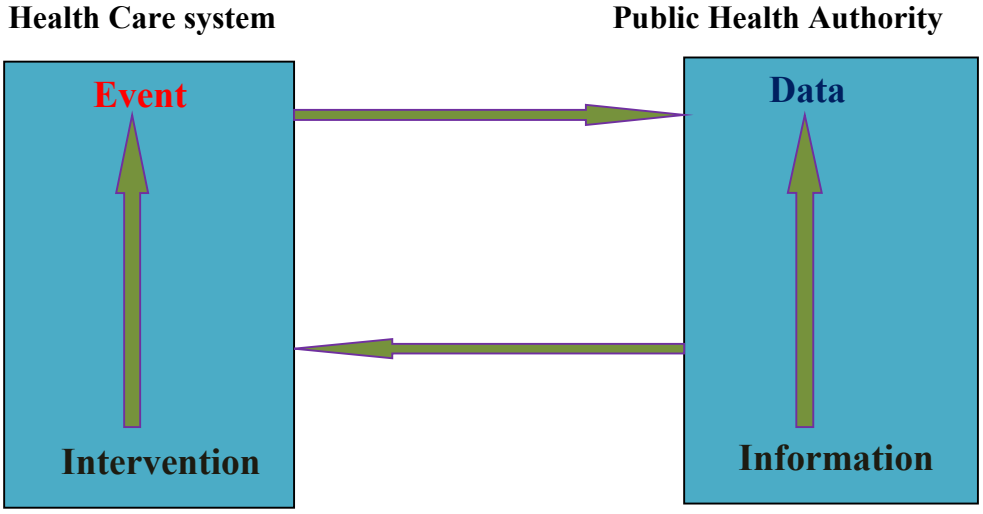

Figure 3.1.2: Simplified flow chart for a generic surveillance system

3.1.2. Study Rationale

Surveillance system evaluation is a tool for monitoring surveillance activities; disseminate feedbacks and inputs for improvement of intervention programs. Enhancing this evaluation is very important to control communicable diseases mainly those has public health importance. Malaria is one of communicable disease, which is under surveillance activities and poses major public health problem in the region. In West Arsi zone, Oromiya region selected diseases (Malaria, Meningitis and Measles) are remaining major public health problem. Recently, Meningitis epidemic that affects many districts was occurred in this zone. So that, this study is intended to evaluate surveillance system in West Arsi zone mainly focusing on Malaria, Meningitis and Measles prevention and control activities. Additionally, findings of this evaluation may lead decisions and use as an input for strengthening public health surveillance activities.

3.1.3. Objectives

3.1.3.1. General Objective

- To ensure that selected diseases (Malaria, Meningitis, and Measles) under surveillance and other major public health problems are being monitored efficiently and effectively at West Arsi zone of Oromiya Region.

3.1.3.2. Specific Objectives

- To assess and describe key attributes of the surveillance system mainly on prioritized diseases in West Arsi zone
- To know how well the intervention programs were met its intended purpose and objectives
- To identify strengths and challenges of the current surveillance system in this zone
- To understand effectiveness of the system in detecting and management of of an outbreak of selected diseases
- To assess the availability of the resources in a surveillance activities in the zone
- To propose appropriate recommendations

3.1.4. Methods and Materials

3.1.4.1. Study Area

West Arsi zone of Oromiya Region is one and known area in which different outbreaks were occurred repeatedly. Among these, Meningitis, Measles, Acute Watery Diarrhea and Anthrax outbreaks were occurred in the zone during the past 5 years. Meningitis is the most recent outbreak in the zone and brought social, economic and public health problems.

3.1.4.2. Study Design

Cross-sectional descriptive study was conducted during this evaluation in West Arsi zone, Oromiya region. Surveillance data flow from peripheral to national level was observed. In addition, tasks undertaken at different level were assessed. Data on attributes of the surveillance system (usefulness of the surveillance system, simplicity of the system, flexibility, quality of the data, acceptability, representativeness, timeliness, and stability of the surveillance system) at different level was collected during the assessment.

3.1.4.3. Sample Size and Technique

Among two Regional Research Laboratories, Adama center was selected purposively due to its proximity to selected zone. From this zone, five districts were selected by purposive sampling method. In addition, nine health centers and thirteen health posts were selected from these districts by Simple Random Sampling. During purposive selection of districts from this zone, their geographical location from Shashemenne city of the zone, weather condition, population density and previous surveillance performances were considered.

3.1.4.4. Study Unit

Regional Research Laboratory (Adama Center) were assessed for this study. Surveillance system at zonal level (West Arsi) was evaluated in detail. Purposively selected districts were constitute 38% of the total districts of the zone. Health centers and health posts were others study unit of this assessment.

Table 3.1.1: Name of visited districts and health facilities in West Arsi zone, Oromiya, 2013

S.No.	Name of district	Name of health center	Name of health post
1	**Adaba**	Wesha HC	Meskel Darkina
		Adaba HC	Adaba 02 HP
			Furuna Melka HP
2	**Arsi Negelle**	Kelo Duro HC	Mararo Hawilo
		Arsi Negelle HC	Danshe
			Kersa Meja
3	**Gedeb Hasasa**	Kubsa HC	Debera
			Tuse
4	**Shalla**	Awara Gama HC	Debula Bedena
		Senbete HC	Wali Ilalti
			Sondhi
5	**Shashemenne Rural**	Bishan Guracha HC	
		Toga HC	Toga health post
			Meja dema

3.1.4.5. Data Collection Tools and Procedures

Semi-structured questionnaire adopted from WHO and CDC standard questionnaire for surveillance system evaluation was used during data collection at all levels. Regional, Zonal, District and Health Facility PHEM focal persons and other responsible bodies were interviewed with this questionnaire. To confirm responses and ensure quality of the data, observation of documents was done at all levels. Similarly, data at different levels were compared for their consistency.

3.1.4.6. Data Analysis Tools

During entry and analysis of quantitative data, Microsoft Excel and Epi Info software were used.

3.1.4.7. Data Dissemination

The report is prepared in both hard and soft copies to submit for Addis Ababa University School of Public Health, Oromiya Regional Health Bureau-PHEM Core Process, West Arsi zone and

visited districts health offices. In addition, Ethiopian Field Epidemiology Training Program mentors, resident Advisors and Coordinators are the recipients of this document.

3.1.5. Results

3.1.5.1. Involvement of Stakeholders in Assessment

During selection of zone/area for this assessment, discussion was held with Regional PHEM Core Process head and staffs. Based on facts mentioned in Significance of the study, it was decided to conduct this assessment in West Arsi zone, Oromiya region. In this assessment, Regional Health Bureau and Zonal health office PHEM staff, selected district health offices and health facility focal persons were participated.

3.1.5.2. Overview of PHEM

Public health emergency is the process of anticipating, preventing, preparing for, detecting, responding to, controlling and recovering from consequences of public health threats in order that health and economic impacts are minimized. Regional PHEM unit is working with different stakeholders towards different needs and expectation. According to Business Processing and Re-Engineering reform that its implementation was started in 2008, Regional PHEM process has two sub-process namely; Early Warning, preparedness, Response and Recovery and Health research. During the past three years different weakness were identified in this process. These are:-

- Weak early warning system
- Lack of appropriate preparedness
- Late detection and delayed response
- No recovery activities in the consequences of public health emergencies

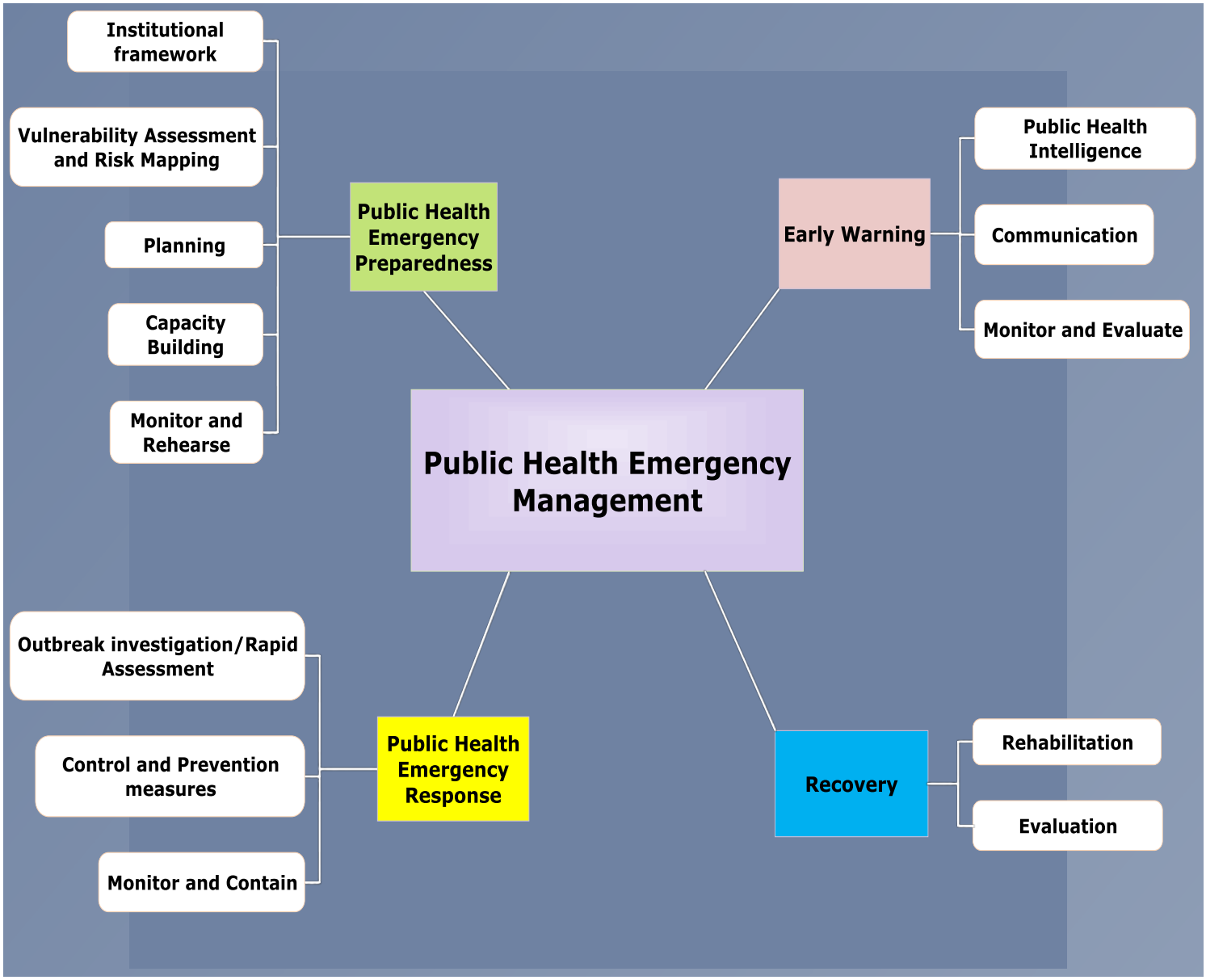

Figure 3.1.3: Major activities of Public Health Emergency Management at all levels, Oromiya Region

Figure 3.1.4: Linkage of Public Health Emergency Management with other processes in Oromiya region

At zonal level, the PHEM structure and task is the same as Regional level. Two health professionals are assigned on zonal structure for PHEM activities. At district level, there is one PHEM focal person. Similarly, at health center level there is one surveillance focal person working on PHEM activities.

3.1.5.3. Description of Selected Diseases (Malaria, Meningitis and Measles) in Surveillance System Evaluation

3.1.3.3.1. Malaria

Due to different efforts made by government and non-government agencies on malaria prevention and control, cases had decreased during the past 5 years. There are 75 hotspot districts for malaria in the region. About 20 million populations of the region are at risk for malaria infection. Regionally, 705,920 confirmed and clinical cases of malaria were reported during 2005 EFY. Of these cases, 408,377 (58%) were RDT/Microscopy confirmed malaria cases. Among the total confirmed malaria cases, 249,600 (61%) and 158,777 (39%) were positive for PF and PV respectively. In addition, 46 deaths from malaria were report in the region. In West Arsi zone,

there are 5 hot spots districts for malarial disease. A total of 18,962 confirmed malaria cases were reported from July 2012 to June 2013 in the zone. Of these cases, 9,839 (53%) were P.Falciparum and 8,790(47%) were Vivax. During this year, only one death of malaria case was reported from this zone.

Figure 3.1.5: Trends of P.F and P.V malaria cases by month, West Arsi, Oromiya from July 2012 - June 2013

3.1.3.3.2. Measles

Published and unpublished researches documented that poor cold chain system management, low vaccine potency and vaccination status are major contributors for the recurrence of measles outbreaks in the region. During 2005 EFY, 4,332 measles cases and 8 deaths were reported in Oromiya region. In West Arsi zone, 74 measles cases were reported for 2005 EFY.

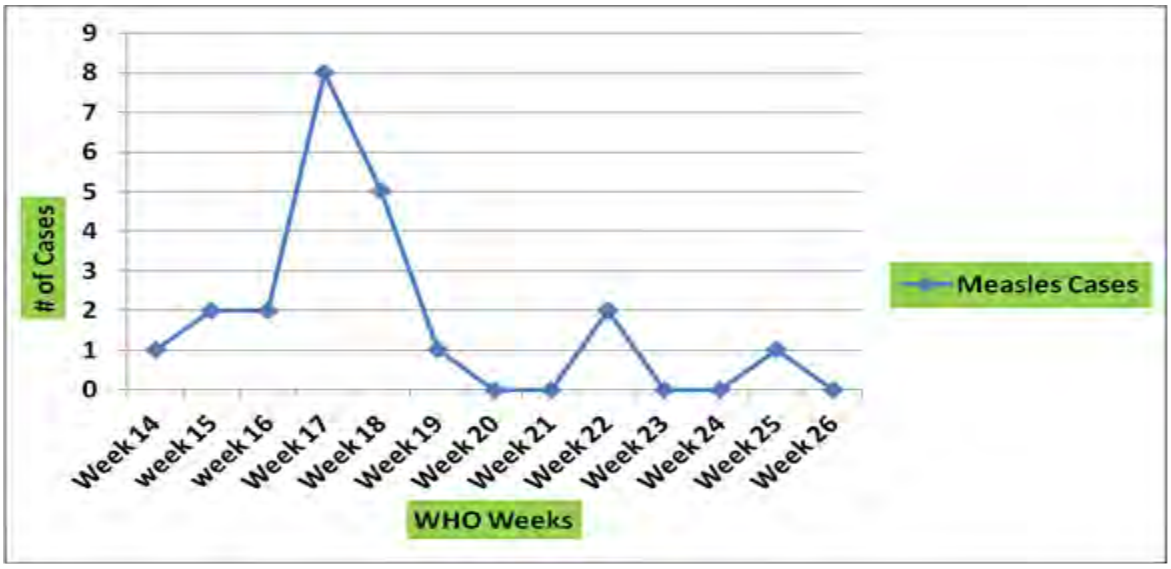

Figure 3.1.6: Number of measles cases by week in West Arsi zone, Oromiya from April 8/04/2013 - July 1/07/2013

3.1.3.3.3. Meningitis

In 2013, 548 meningitis cases were reported from H/G/Wollega, West Arsi, Guji and East Shewa zones, Shashemenne and Sebeta towns regionally. Of a total 548 cases, 254 (46%) were reported from H/G/Wollega and 205 (37%) were from West Arsi zones.

Table 3.1.2: Number of meningitis cases and deaths in Oromiya region, 2013

S.N	Zone/Town	Meningitis cases	Deaths
1	H/G/Wollega	254	2
2	West Arsi	205	15
3	Guji	41	1
4	Shashemenne town	27	0
5	East Shewa	17	1
6	Sebeta town	4	0
Total		**548**	**19**

In West Arsi zone, a total of 205 cases and 15 deaths with 7.3% case fatality rate were reported in the period of 16/05/2005 - 08/08/2005 E.C. Cases of meningitis were reported from districts of the zone. Of these cases 48 (23%) were reported from Shashemenne Rural district.

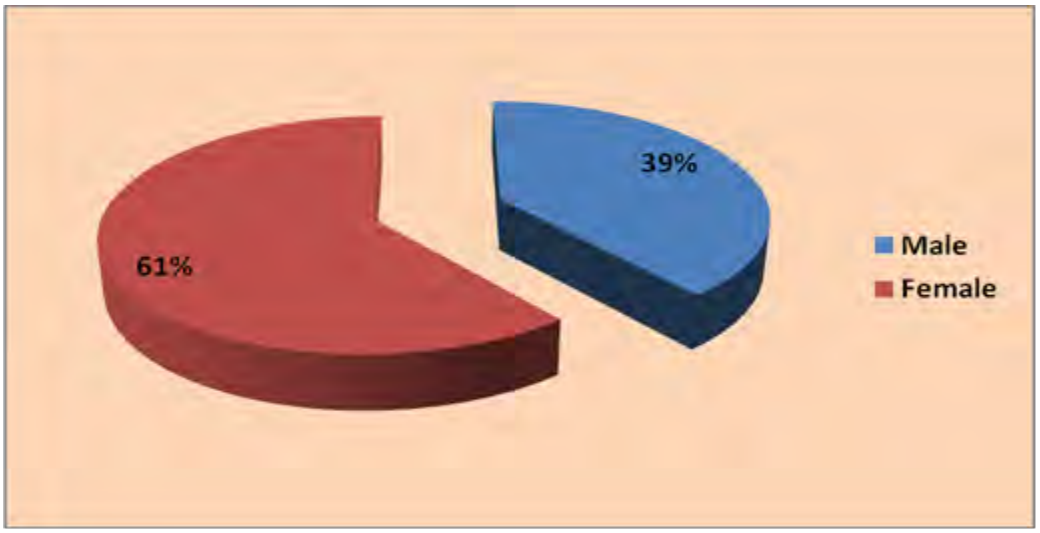

Figure 3.1.7: Meningitis cases by sex, West Arsi zone, Oromiya, 2013

3.1.5.4. Availability of National PHEM Guideline

New Public Health Emergency Management guideline is distributed for all zones of Oromiya region. In the same manner, all zones had distributed this guideline for their districts and we found in all visited districts of West Arsi zone. In addition, health centers were supplied with PHEM guidelines. However, some health centers did not have National PHEM guideline during this assessment. Among 9 visited health centers 2 (22%) of them did not have this guideline. Except in one health post in Gadab Hasasa district, the rests 12 health posts did not have National PHEM guideline.

3.1.5.5. Case Detection, Registration and Case definitions

Standard case definitions for all prioritized diseases are available at Zonal, visited districts and 7 (88%) health center in the zone. However, at visited two health centers and all health posts, case definitions are available for Measles, Malaria, AFP, NNT and Meningitis. In these health facilities, these case definitions were posted on the wall. At visited districts and health facilities, recent outbreak was detected within less than two days after date of onset of first case. At all visited health facilities, there is clinical registration. In addition, it was identified that diseases are correctly filled in clinical registration. Except in one health center for which respondent did not correctly told diagnosis of one selected disease (Meningitis) using standard case definition, in the

rests visited health centers respondents were observed to diagnosis the disease very well. At visited health post, health extension workers were responded correctly on standard case definitions of some diseases such as measles and meningitis.

3.1.5.5.1. 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 (nonvesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles.

Meningitis: - Any person with sudden onset of fever (>38.5^{0}C rectal or 38^{0}C axillary) and one of the following signs: neck stiffness, altered consciousness or other meningeal sign.

3.1.5.5.2. Community Case Definitions

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

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

Meningitis: - Any person with fever, severe headache and neck stiffness

3.1.5.6. Population under Surveillance

According to scope of National PHEM guideline, surveillance system is applicable in all population of country for prevention and control of diseases in PHEM. Following established regional PHEM since 2009, activities are implementing in all setting of the regional population.

Table 3.1.3: Population under surveillance of West Arsi zone and visited districts, 2013

S.N	Region/Zone/District	Total Population	Male	Female
1	West Arsi zone	2,255,235	1134383	1120852
2	Adaba district	163,874	82429	81445
3	Arsi Negelle district	310,537	156200	154337
4	Gedeb Hasasa district	221,292	111310	109982
5	Shalla district	176,368	88713	87655
6	Shashemenne Rural district	251,866	126689	125177

3.1.5.7. Data Reporting

Federal Ministry of Health and its stakeholders are responsible for designing and preparation of PHEM reporting formats. Zonal health office has provided these format through Regional Health Bureau and NGOs. During the last six months, shortage of weekly PHEM reporting formats was observed in 2 (40%) districts, 4 (44%) health centers and 6 (46%) health posts. However, these districts and health facilities solved their problem by copying and manually preparing the formats. West Arsi zone is using telephone to report weekly surveillance activities to next level. All visited districts are using both mail and telephone to report for zonal health office. Among thirteen observed health posts, 5 (36%) use mail and telephone, 9 (64%) use only mail to send report for the next level.

3.1.5.8. Data Analysis

At zonal level, measles and meningitis are analyzed weekly by person, time and place during the epidemic. However, malaria is analyzed weekly by person, place and time at these level. At zonal level (West Arsi), malaria and measles are analyzed by time and place. Place, time and person describe meningitis analysis. At visited districts, analysis is performed weekly only for malaria disease. For other diseases, it is performed once or twice per year. This may be due to lack of awareness, training, commitment and resources such as computer and printers. During this assessment, malaria is analyzed in four health centers (Toga, Bishan Guracha Arsi Negelle and Senbete) weekly and its line graph was observed too. The rest five health centers did not perform analysis of reportable diseases. Among 13 visited health posts, four of them are performing only trend analysis for malaria in weekly basis. In other health posts, analysis of diseases was not done totally. At all levels, PHEM and malaria focal persons are responsible for data analysis of selected diseases.

3.1.5.9. Existence of Action Threshold Levels

Action threshold level is available at Zonal and all visited district level on National PHEM Guideline. In addition, in 99% of health centers there are action threshold levels for all selected diseases. Even though there are thresholds of 20 prioritized diseases on National PHEM guideline, some health facility focal persons did not know/understand it properly. For example, among 27 health professionals who were asked for threshold levels for selected diseases, 21 (78%) of them

were respond correctly. This exhibited that utilization of surveillance manuals and guidelines is not good at district and health facility levels.

3.1.5.10. Outbreak Investigation

During 2012/13, measles, malaria and meningitis outbreaks were reported from different zones of Oromiya region. In West Arsi zone, meningitis and measles outbreaks were occurred in 2012/13. Zonal staff was participated in investigation of these outbreaks with regional and hospital professionals including EFETP residents. At this zone, risk factors of these diseases were looked for during investigations. Meningitis outbreak was occurred in all visited districts of the zone. These districts investigated the disease risk factors with zonal and hospitals professionals. However, it was identified that some districts have the capacity to investigate outbreak by their own staff.

Table 3.1.4: Outbreaks occurred in Oromiya region, 2012/13

Disease	Zone	No of affected districts	Is investigated?		Responsible bodies for investigation		
			Yes	No	ORHB	ZHO	DHO
Measles	West Arsi	2	✓			✓	✓
Meningitis	West Arsi	13	✓		✓	✓	✓

3.1.5.11. Epidemic Preparedness and Management

There is written epidemic preparedness and response plan at zonal level. However, shortage of emergency drugs and supplies were encountered in the past one year at this level. This problem was mainly observed during epidemic of meningitis in West Arsi zone. There was no written epidemic preparedness and response plan at all visited districts. They respond that there was a plan during meningitis outbreak but not in regular basis. In addition, there was a shortage of medical drugs and supplies for emergency management in some districts during the past one year.

Regarding existence and activities of epidemic management committee, there are established committee at zonal and visited districts. During this assessment, it was identified that established committee at these levels is not working regularly and not formulated with all necessary disciplines. The magnitude of this problem is high at district level and they had never met after termination of meningitis outbreak. However, they have been working regularly and evaluate their activities during meningitis epidemic. Visited districts were implemented prevention and control

measures based on local data. This can be explained that, many districts were mobilizing and sending communities to health facilities based on sign and symptoms of meningitis during massive meningitis epidemic. There is no budget line for epidemic response at zonal and district level. Nevertheless, they use from others budget sources and supported by regional health bureau during epidemic. In addition there is epidemic rapid response team at all visited sites. At all visited sites, cases of meningitis was detected with in less than 48 hours after date of onset of first case. So that, all districts were achieved acceptable case fatality rate of meningitis.

3.1.5.12. Availability of Budget and Resources for Surveillance Activities

There is budget allocated from government source for PHEM activities at regional level. Unlikely, there is no allocated budget from government source for public health emergency activities at zonal level. This problem is extended to the districts and they are depending on zonal or regional support. Due to this reason, district PHEM focal persons were become demotivated for surveillance activities. Even though all visited districts had computers and its accessories, they did not have for PHEM activities separately rather they use it for all activities. Stationery is not enough at some health posts. In addition shortage of hygiene and sanitation materials was observed at some health facilities.

Table 3.1.5: Availability of resources for surveillance activities at zone, district and health facility level, Oromiya, 2013

S.No	Resources	Zone			District			Health Centers			Health Posts		
		N	n	%	N	n	%	N	n	%	N	n	%
1	Electricity	1	1	100	5	5	100	9	8	89	13	1	8
2	Computer	1	1	100	5	5	100	9	4	44	13	0	0
3	Printer	1	1	100	5	5	100	9	3	33	13	0	0
4	Stationery	1	1	100	5	5	100	9	9	100	13	13	100
5	Vehicle	1	1	100	5	5	100	9	0	0	13	0	0
6	Motor Cycle	1	1	100	5	5	100	9	7	78	13	0	0
7	Fax	1	1	100	5	0	0	9	0	0	13	0	0
8	Telephone	1	1	100	5	5	100	9	3	33	13	0	0

3.1.5.13. Feedback

West Arsi zone health department has given written feedback for some districts in 2012/13. However this activity was not regularly done for all districts at this level. Many districts give written feedback for health facilities with integration of other activities that consists few indicators of surveillance activities quarterly. Nonetheless, Adaba district has prepared and disseminate written feedback for their health facilities on surveillance activities. In majority of observed districts, producing and dissemination of written feedback for health facilities is very poor. In other hand, PHEM focal persons at zonal and district level have been giving feedback for health facilities orally and writing on their registration book during their field visit.

3.1.5.14. Supportive Supervision

During the past six months, West Arsi zonal department conducted supportive supervision only once on surveillance activities for districts and health facilities. Shortage of vehicle, budget and logistics were attributed for incapability of conducting regular supportive supervision at zonal level. Among 9 visited health centers 3 (33%) had never supervised during the past 6 months by higher levels. Many districts have conducted integrated supportive supervision for health facilities with limited number of surveillance indicators. Of visited all health posts, 9 (69%) were not supervised in the past 6 months by higher levels. For all visited health centers and 4 health posts, integrated supportive supervision was conducted 1-2 and 1-6 times respectively. Reporting system, active case searches and other surveillance activities were reviewed in supervised districts and health facilities.

Table 3.1.6: Frequency of integrated supportive supervision conducted by district for health facilities, West Arsi, Oromiya, from October to March 2005 E.C.

S.No	District	Frequency in the past 6 months
1	Adaba	2 times
2	Arsi Negelle	6+ times
3	Gadab Hasasa	6 times
4	Shalla	2 times
5	Shashemenne Rural	3 times

3.1.5.15. Training of Surveillance Activities

This year, regional PHEM unit being with partners have conducted training for zonal and district's PHEM focal persons on New PHEM Guideline, Woreda Rapid Response Team and Community Integrated Disease Surveillance and Response for five days. In addition, regional PHEM and Malaria department conducted training for zonal PHEM focal person on malaria and how to send weekly report via email in regular basis. In each visited districts except in Gadab Hasasa, two PHEM focal persons were trained on disease surveillance and National PHEM Guideline. Additionally, there is at least one trained personnel at all visited health center. However, none health extension worker was trained on surveillance activity.

Table 3.1.7: Number of participants and topics trained at Zonal level, West Arsi Oromiya, 2012/13

S.N	Topics	Number of Participants from District	Number of Participants from Health Center	Total
1	AWD Management	13	20	33
2	PHEM New Guideline	13	22	35
3	Meningitis Management	26	0	26

Regional Health Bureau, WHO and IVI were support the training at zonal level. During this training professionals those are not working on PHEM were sent from some districts and it was one of a challenge for the training. Improvements on weekly reporting system, early detection and reporting of outbreaks and management of cases were observed after training.

3.1.5.16. Description of the Laboratory Capacity and Case Confirmation

3.1.5.16.1. Regional Laboratory (Adama Center)

Adama research laboratory is one of two regional laboratories found in Adama town. It has free standing building found in Adama hospital compound. There are 20 medical laboratory professionals of which 18 and 1 are BSc and MPH respectively. Most of these staffs were trained on laboratory investigation and management of malaria, meningitis and measles. The Laboratory is receiving reagents from Regional Health Bureau, HNRI, CDC, PFSA and ASM in purchasing and donation form. They have faced shortage of meningitis reagents during meningitis outbreak

in some zones of Oromiya region. At this laboratory level tests do not performed for Measles, Yellow fever, Hepatitis, VHF, and AFP diseases. However, tests for meningitis and cholera are performed at this level. Request forms of this laboratory are contain all needed information like patient information, specimen source, date and time of collection and type of test requested. There is a logbook and electronic record for all specimens sent for diagnostic testing to the laboratory. There is a system for internal quality assessment like control organisms at this laboratory. There is regular inventory and update of reagents and materials for stocks early warning.

3.1.5.16.2. Case Confirmation and Laboratory Capacity of Districts and Health Facilities

All visited districts have the capacity to transport specimens to higher levels for confirmatory test. This can be explained by that there are trained personnel on this and enough cold chain equipment at this level. Also these districts have guidelines of specimen collection, handling and transportation. Laboratory of all visited health centers has ability to collect and diagnose sputum, stool, urine and blood specimen. In addition there are trained staffs and good cold chain system in 8 (89%) of health centers to transport specimen of suspected measles and acute flaccid paralysis cases. In Senbete Shalla health center, Shalla district there is no trained professional on sample collection, handling and transportation of prioritized diseases and poor cold chain system. Collection and diagnosis of suspected meningitis case specimen do not performed at health center level.

3.1.5.17. Attributes of the Surveillance System

3.1.5.17.1. Usefulness

At zonal level, visited all districts and health facilities, it was identified that the current surveillance system is helpful for early detection of outbreaks. This was confirmed during recent outbreak of meningitis in this zone that the system was well enough in disease detection and control activities were led by data generated by surveillance system. Government and non-government organizations have used surveillance data to make decisions and take actions. However, surveillance guidelines did not distributed uniformly in all health facilities and there was poor utilization of guidelines at this level. Respondents at zonal, all visited districts and health facilities believe that the system is good enough to estimate magnitude of morbidity and mortality of selected diseases, identify factors associated with these diseases and able to evaluate of prevention and control programs. However, late or no feedback from central laboratory on sent specimen for confirmatory test has being a challenge in early detection and management of outbreaks.

3.1.5.17.2. Simplicity

All respondents at zonal, district and health facility agreed that case definitions of selected diseases (measles, malaria and meningitis) are easy and applicable for case detection by all level professionals. In addition, they believe that community case definitions are easy to understand at community level since good case detection activities were done during meningitis outbreak in this zone. In all health facilities, 99% of asked professionals were respond correctly for case definitions of selected diseases; meningitis, malaria and measles. All respondents at each level were familiar with when and for whom report will send. PHEM focal persons at zonal and district level thought that additional data collection on cases are not time consuming rather it is important to deal with. Respondents at all level told that it takes 10 - 15 minutes to fill weekly reporting format on morbidity and mortality of priority disease. Similarly, respondents at zonal and district levels agreed that it takes about 10 minutes to disseminate weekly reports through phone.

3.1.5.17.3. Flexibility

As the current reporting format contains additional spaces at the end for both weekly and immediately reportable diseases with namely; others, it can accommodate newly occurring health events/disease to fill on without any difficulty. Also, weekly reporting format can be modified based on current situation and different concerns. Existing reporting format was updated in 2009 to include newly emerged diseases such as Avian Influenza, Pandemic Influenza and SARS. Zonal and district level respondents agreed that implementation of National PHEM guideline did not difficult with changes in existing procedure of case detection, case definition and report forms. However, respondents at zonal and most districts and health facilities believe that changes in allocating funds will affect implementation of surveillance system.

3.1.5.17.4. Data Quality

Reporting formats of weekly and immediately reportable diseases are well understood at zonal, district and health center levels. But, due to lack of training some health extension workers were observed to be confused with this format. Even though training has been conducted at regional and zonal level for PHEM officers on data quality management, some problems occurred pertaining reporting system that resulted from lack of attention. Additionally, reporting sites and data collectors did not supervised regularly. At health post level, due to many health extension workers are not good in English they did not understand some variables and phrases on reporting formats. Major problems identified at different levels on filling reporting format are stated as follow:

- Date of sent and received, reporter and receiver information did not written on reporting formats
- Blank spaces that should be filled with zero (0) number but not were observed at district and health facility level. This problem is insignificant at regional and zonal level
- Duration of activity report(week at which activities were performed) is missed during report compiling mainly at health post level
- Documenting copies of report in sequential manner is poor at district and health facility levels

3.1.5.17.5. Acceptability

Active participation of agents in reporting system of surveillance activities in regular pattern is a major attribute for system's acceptability. In 2005 EFY, PHEM weekly reporting rate was **71%** for West Arsi zone health department. Of all facilities, NGO and privates are less likely to send weekly PHEM report. This can be due to lack of understanding the relevance of data by these facilities and poor monitoring system of governmental organizations. Also, some governmental institutions did not send a report timely and completely. This may arise from weak communication system, lack of reporting formats, poor working motivation and considering surveillance activities as additional work by some district's PHEM focal persons. Different stakeholders like WHO, UNICEF, CDC and others are participating in strengthening surveillance system in collaboration with Regional and Zonal health offices.

3.1.5.17.6. Representativeness

Representativeness can be evaluated by access to health services and health seeking behavior of the populations. Following implementation of health extension program, majority of the population are accessed to basic health services. Many health posts were constructed since implementation of this program. Regionally, there are more than 1000 functional health centers with 2-8 in one district.

Table 3.1.8: Health service coverage of the Region, West Arsi zone, and visited districts, Oromiya, 2013

S.N	Region/Zone/District	Health service coverage (%)
1	Oromiya	86.7
2	West Arsi zone	74.4
3	Adaba district	100
4	Arsi Negelle district	50
5	Gedeb Hasasa district	75
6	Shalla district	100
7	Shashemenne Rural district	60

Health seeking behavior of the population is improved after intensive efforts have been made from regional to household levels. Women developmental army is a crucial strategy that established and implementing to optimize utilization of health service through entire community. As National PHEM guideline, surveillance system is to be implemented nationwide with full involvement of all stakeholders. However, activities should be done more at urban set up since gaps were identified at this level.

Factors contribute for poor implementation of surveillance activities at urban level are:-

- Government attention for rural health development
- Late implementation of urban health extension program
- Lack of manpower at this level

3.1.5.17.7. Timeliness and Completeness

Timely report of surveillance data is important for early public health interventions. Timeliness is a speed between steps in a public health surveillance system. As per standard of National PHEM the expected level of report timeliness is 80% and above. Early case detection is another key attribute of timeliness assessment. Case detection and response towards recent outbreaks were discussed under case detection section. The first case during meningitis outbreak in West Arsi zone was reported from Kokosa district which admitted at SPNNR, Hawasa city, Adare Hospital after two days of the disease onset. Similarly, Zonal health office was reported to Regional PHEM within a day. During investigation of this outbreak, different associated risk factors were identified for intervention activities.

It was unable to describe weekly PHEM report timeliness for districts since date of sent and received were not filled properly at zonal level.

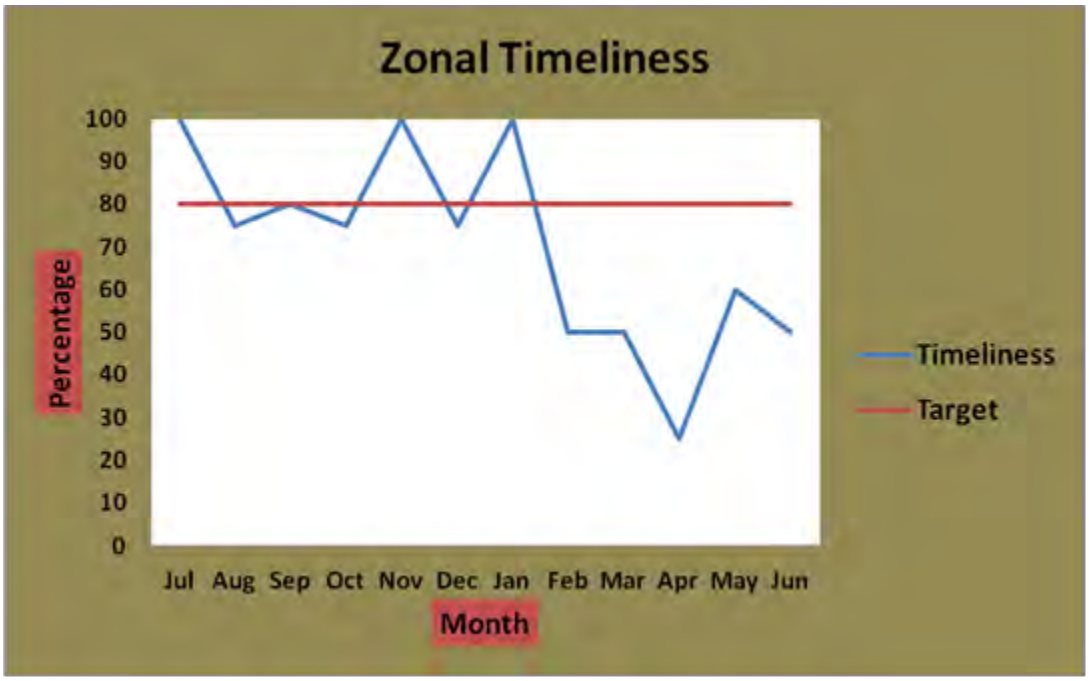

Figure 3.1.8: The Average percentage of weekly PHEM report Timeliness by month, West Arsi zone, from July 2012 to June 2013

In West Arsi zone, annual average report completeness was **71%** which is below National minimum expected level **(80%)** in 2012/13**.** During the past one year (2012/13), the highest (100%) zonal completeness was reported in July, November and January months and lowest (22%) was in April month (Figure 3.1.9).

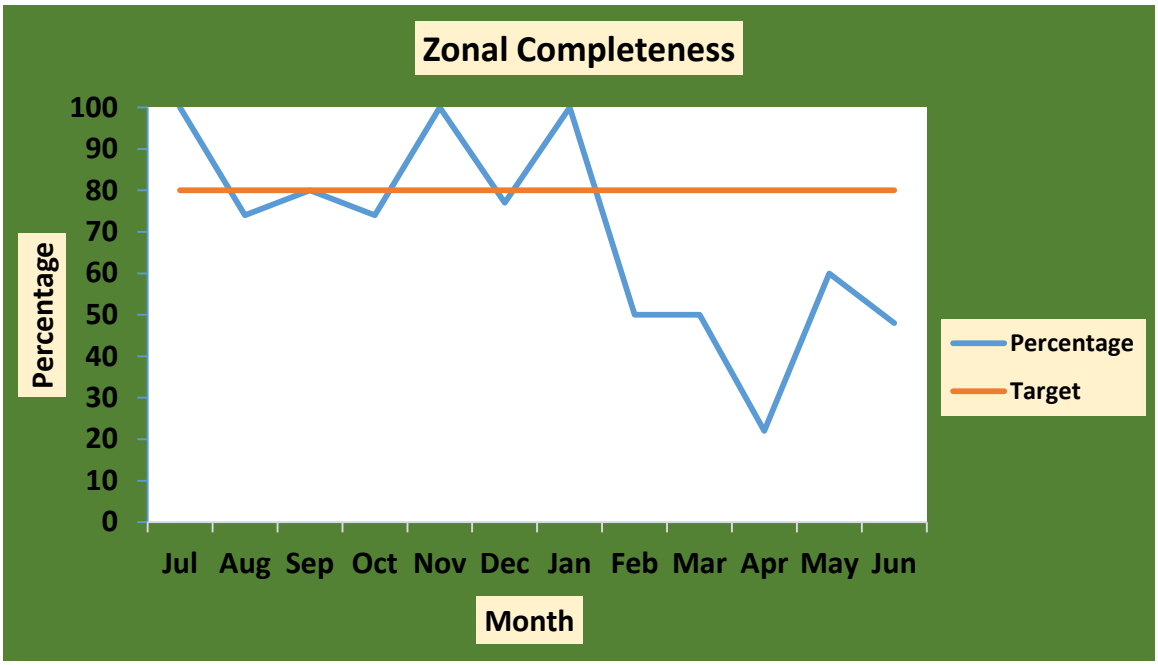

Figure 3.1.9: The Average percentage of weekly PHEM report completeness by month, West Arsi, Oromiya, February - April 2013

At some visited health centers, it was difficult to get some copies of weekly PHEM report to assess their completeness. Of thirteen visited health posts, ten of them sent all (12) weekly report in the last three months (February to April), one sent 11 reports and two of them were sent 10 weekly reports.

Table 3.1.9: Weekly completeness of Visited districts and Health centers, West Arsi zone, Oromiya, from February to April 2013.

District/Health Center	Week											
	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12
Adaba district	71	83	81	83	79	81	74	71	76	64	74	71
Arsi Negelle district	89	88	88	88	89	98	95	97	99	82	97	92
Gedeb Hasasa district	77	87	75	77	64	62	75	68	72	75	66	68
Shalla district	75	84	83	93	0	77	81	68	60	61	54	56
Shashemenne R. district	80	88	61	93	79	79	75	86	95	91	86	95
Wesha HC	75	50	50	50	50	75	75	75	75	50	75	25
Adaba HC	100	100	100	100	100	100	100	100	100	100	100	100
Kelo Duro HC	100	83	83	83	83	83	83	83	83	83	83	83
Arsi Negelle HC	100	75	75	100	100	75	NA	100	NA	75	100	75
Kubsa HC	83	50	83	100	83	83	100	67	83	100	100	100
Awara Gama HC	56	56	56	0	56	56	56	56	56	56	56	56
Senbete Shalla HC	0	NA	78	56	0	67	NA	NA	56	NA	78	56
Bishan Guracha HC	100	75	100	100	100	75	75	100	NA	NA	75	NA
Toga HC	100	100	100	100	100	100	NA	NA	NA	NA	NA	NA

3.1.5.17.8. Sensitivity/Predictive Value of Positive

Sensitivity is the proportion of cases of a disease (or other health-related event) detected by the surveillance system. It was difficult to evaluate sensitivity of the system without knowing false negatives and positives that identified by the system. Even though there are false positives those are confirmed as negative by Gold Test/Microscope/, there are no false negatives identified by system and later confirmed by Gold test as true negative. Due to this reason, it was difficult to measure sensitivity of the system at each level. However, it is possible to assess predictive value positive or proportion of reported cases by case definition that actually have the diseases. Based on this, among 41,076 suspected malaria cases in West Arsi zone, 32,748 (PVP 79.7%) of them were confirmed as positive for malaria in 2012/13.

Table 3.1.10: Predictive value positive for malaria cases in malaria hotspot districts, West Arsi, Oromiya, 2005 EFY

S.No	District	Suspected Malaria cases	Confirmed Malaria cases	PVP (%)
1	Arsi Negelle	8895	4310	**48.5**
2	Shalla	5937	2222	**37.4**
3	Shashemenne Rural	7963	2527	**31.7**
4	Siraro	6569	3023	**46.0**
5	Wondo	6894	3386	**49.1**

3.1.5.17.9. Stability

Stability is reliability and availability of the public health surveillance system without interruption. Some lines of budget are available at regional level from donors which enhance PHEM activities. Availability of PHEM focal persons at Zonal, district and Health facility level is a good opportunity for running surveillance system even with limited resources. Except a few budget distributed for specific activities for zone and some districts, there is no specific budget line/source for surveillance activities at zonal and district level. Shortage of budget and logistics is hindering supervision and capacity building activity at zonal and district level. However, supportive supervision is conducting with integration of other programs. Even though PHEM unit of many districts did not have some data management resources such as computer and printer, they are using other department's resource for data entry, compilation, analysis and dissemination.

3.1.6. Discussion

Surveillance system evaluation is a periodic assessment of effectiveness and efficiency program toward its purposes and objectives. Collaborative and integrated assessment of public health surveillance system is important for resource minimization, comprehensive skill, anticipatory and organizes feedback. It is possible to conduct repeated evaluations with similar objectives, or implement a series of evaluations with differing objectives and assessing different components of the surveillance system [2]. Since established of PHEM as core process at Federal and Regional level through Business Re-engineering significant achievements were recorded on surveillance activities. In Oromiya region surveillance system evaluations were done by EFETP residents during the past three years in different zones. Findings of these assessments were being inputs in strengthening surveillance activities. Even though there are some resource limitation and lack of commitment at some districts, PHEM focal persons are working well on surveillance interventions.

Epidemic preparedness refers to the existing level of preparedness for potential epidemics and includes availability of preparedness plans, stockpiling, designation of isolation facilities, setting aside of resources for outbreak response [2]. At all levels, there is no well-organized epidemic preparedness and response plan. There is no written epidemic and preparedness and response plan at all visited districts. This may cause weak case detection and response during epidemics. The aim of preparedness is to strengthen capacity in recognizing and responding to public health emergencies through conducting regular risk identification and analysis, establishing partnership and collaboration, enhancing community participation and implementing community-based interventions and strategic communication during the pre-emergency phase and ensuring their monitoring and evaluation [3]. It was identified that rapid response team is functional only during outbreak. However, during recent outbreak of meningitis in West Arsi zone the first case was detected within two days after date of onset. Feedback is a key function of public health surveillance system. At all visited level there is no strong written feedback. As region is essential role player in preparing and disseminating feedback of surveillance activities for zones and districts in different method, it was not done well mainly in written forms. Current practice of the region on preparation and dissemination weekly bulletin is a good starting point to strength feedback system. Due to shortage of budget, vehicle and logistics supportive supervision did not conducted in 2005 EFY as per needed at zonal and visited districts on surveillance activities independently (in addition to integrated supportive supervision). Absence of budget line either from government or non-governmental organizations for surveillance activities at zonal and district level is remain a major bottleneck to run tasks under PHEM towards their objectives. Additionally shortage of resources for data management is being a challenge to generate and disseminate PHEM reports timely through maintaining their quality. Visited districts and health centers have a capacity to collect, handle and transport specimen of measles and AFP to central laboratory which is an opportunity for early case detection and management. Adama Regional Research Laboratory is being assessed by external quality assessors and striving well to be one of the country's and African best research laboratory.

There is no problems on the simplicity of the system regarding case definitions of selected diseases, reporting system and additional data collected on cases at all visited levels. It was agreed by all respondents that the surveillance system is flexible for newly occurring health and health related events. Even though reporting formats of priority diseases are easy and clear to fill for data

collectors at zonal level, some gaps were observed on quality of reporting system at district and health facility levels. This problem is high at health post level since health extension workers did not get any training on surveillance activities. Timeliness and completeness of report is important for timely public health interventions. Except in some districts and health facilities, the average annual completeness of weekly report at zonal level is below expected national level (80%). Due to poor handling and management of data, it was unable to get timeliness of districts at zonal levels. Timeliness of West Arsi zone is decreased from January to June.

The ability of the system to capture true cases regarding malaria disease was assessed in this evaluation. On this basis, predictive value positive for malaria by case definition was low in malarious districts of West Arsi zone as majority of them were less than 50% for the year of 2012/13.

3.1.7. Conclusion

Periodic assessment of public health surveillance system is a key activity to identify strengths and weakness of the existing system. This will be more effective if it was done in collaboration with key stakeholders. At West Arsi zone the surveillance system was not satisfactory and efforts should be exerted to improve the system mainly on supervisory activities, proper and timely feedback, data management and analysis of prioritized diseases.

It was identified that training of surveillance is mandatory for health extension workers since none of them did not get at all visited health posts. Following this, poor data management was observed at this level during the assessment. Regular monitoring and follow up of health extension workers from districts and zonal PHEM unit is very weak.

Networking of surveillance reporting system and other communication is believed to be a solution for identified problems on late detection of outbreaks and poor reporting system. Also, this system may enhance strong feedback system for zones and districts. At district and health facility levels, there was poor utilization of different surveillance manuals and guidelines with magnificent of the problem at health facility level where core surveillance activities such as active case search, early case detection and management are performed. As identified in this evaluation, timeliness and completeness of weekly PHEM report the Zone and some districts were low compared to expected national level. Additionally, timeliness of reports did not performed regularly at all levels which was unable to evaluate districts and health facilities whether they are communicating surveillance data timely or not. The proportion of malaria cases those actually having disease and identified by

case definition was very low in malarias districts of West Arsi zone. This may results from poor utilization of malaria case definition and low quality of test kits. Even though some problems were faced in implementation of the system, the existing surveillance system at all visited level is likely addressing some important public health problems and meeting its objectives.

3.1.8. Limitations

- During the period of assessment, there was National Immunization Campaign of Measles that made difficult to get PHEM focal persons of some districts and health facilities at the time of visit.
- Due to poor handling and management of data, it was unable to get some important data such as report timeliness from some districts and health facilities.
- There was weak willingness of some district's PHEM focal persons to collaborate for this assessment.
- Some focal persons and other responsible bodies were not present at their working site during this assessment.
- Sometimes there was electric power interruption at zonal and some districts to collect and generate requested data.

3.1.9. Recommendations

- Since measles cases and outbreaks are increasing from time to time, intensive and systematic strategy should put in place in prevention of the disease.
- Training should be given for health extension workers on surveillance activities to improve active case search and reporting system.
- Data quality assessment should be conducted at all levels as many problems were identified on reporting system during this evaluation.
- Even though enough weekly reporting formats are available at zonal and some district levels, it was not timely distributed for health facilities. So that timely and adequately distribution of these formats for facilities will help to expedite and improve quality of the report.

- Networking PHEM reporting system from region to district is very important for timely data utilization which lead to strengthened response activities.
- During this assessment, some district's PHEM focal persons are working on surveillance activity as additional rather than routine works. For this reason, PHEM activities should be considered as core task and work on it with full responsibility and accountability at all districts.
- Data analysis for prioritized diseases at district and health facility level should be performed regularly.
- Utilization of National PHEM guideline and different manuals for management of prioritized diseases should be optimized at all levels; mainly at health facilities.
- Using available resources and exploring external funds for surveillance activities such as for early warning system and responses should be done intensively.
- Strong supportive supervision and feedback should be maintained in regular basis at all levels.
- Results of laboratory confirmation of some diseases should be disseminated timely for intervention activities as delay of some confirmatory tests were occurred before.

3.1.10. Acknowledgement

I would like to acknowledge West Arsi zone health department heads for their support to undertake this evaluation at zonal and selected districts. Additionally, my heartfelt thanks goes to Mr. Haji Kediro for his impressive and great support in assessment of surveillance system even being with us from starting date to final at all visited areas. Visited districts and health centre's heads and PHEM focal persons have to be appreciated for their big efforts in this study.

My profuse thank is for Mr. Tesfaye Deti Oromiya Regional Health Bureau-PHEM Core Process Manager and Dr. Getahun Aynalem for their constructive and valuable comments on this study report. Finally, my gratitude is goes to Addis Ababa University School of Public Health, CDC and EPHA for their facilitation of technical and administrative arrangements to conduct this assessment.

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Annex 3.1.1: Zonal Level Questionnaire for Surveillance System Evaluation

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Identifiers

Date __/___/_____ Region _____

Respondent Name _____ Zone _____

Interviewer _____

_____

General

I. **Availability of a National Surveillance Manual;**

1. Is there a national manual for surveillance?

a. Yes b. No c. Unknown

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

_____

_____

_____

_____

II. **Case Detection and Registration;**

2. Do you have standard case definitions for Malaria, Meningitis, and Measles?

a. Yes b. No c. Unknown d. Not applicable

If yes, observe the standard case definition for those diseases _____

_____

III. **Data reporting:**

3. Who is responsible for providing you reporting formats of surveillance?

a. Federal Ministry of Health PHEM unit.

b. NGOs

c. Others _____

4. Have you encountered shortage of appropriate surveillance forms at any time during the last 6 months? a. Yes b. No c. Unknown
5. What are the reporting entities for the surveillance system?
    a. Public health facilities
    b. NGO health facilities
    c. Military health facilities
    d. Private health facilities
    e. Others_____

6. Number of districts has reported weekly and immediately report in the last 3 months compared to expected number? _____
7. Number of Health post, Health centers, Hospitals, NGO health facility, Others (private) sent weekly report in the last three months? _____

Weekly: _____

Immediately: _____

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

Number of districts has sent weekly reports on time in the last 3 months:

_____

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

    a. Yes b. No

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
    f. Other_____

10. How do you report to the next level?
    a. Mail
    b. Fax
    c. Telephone

d. Radio

e. Electronic

f. Other

IV. **Data analysis**

11. Do you describe data by person (case based, outbreaks, and sentinel)?

a. yes b. no c. don't know

If yes, observe analyzed data by person: _____

12. Do you describe data by place?

a. yes b. no c. don't know

If yes, Observe description of data by district (tables, maps)

_____

13. Do you describe data by time?

a. yes b. no c. don't know

If yes, observe description of data by time:

_____

14. Do you perform trend analysis?

a. yes b. no c. don't know

If yes, observe line graph of cases by time

_____

List disease(s) for which line graph is observed

_____

_____

V. **Availability of defined threshold;**

15. Do you have defined threshold level for Malaria, Meningitis, and Measles?

a. yes b. no c. don't know

If yes, observe for some diseases _____

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

17. How often do you analyze the collected data?

a. Daily

b. Weekly

c. Every 2 weeks

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

18. Have you an appropriate denominators?

a. Yes b. No c. don't know

If yes, observe presence of demographic data (E.g. population by district and hard to reach groups)

_____

VI. Outbreak Investigation

19. Number of outbreaks suspected in the past year:_____

20. List the diseases: _____

21. Of those suspected/detected, how many of them were investigated? _____

(Observe reports and take copies if possible) _____

22. Number and percentage of outbreaks in which risk factors were looked for:_____

23. Number and percentage of outbreaks in which findings were used for action:_____

[Observe report]

24. Number of districts that looked for risk factors [observe in reports]

_____

25. Number of districts that used the data for action [observe in final report]

_____

VII. Epidemic preparedness(relevant for epidemic prone diseases)

26. Is there Zonal plan for epidemic preparedness and response?

a. Yes B. No c. Unknown

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

_____

27. Has the zone had emergency stocks of drugs, vaccines, and supplies at all times in past 1 year?

a. Yes b. No c. Unknown

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

a. Yes b. No c. Unknown

29. Are there standard case management protocols for Measles, Malaria, and Meningitis?

a. Yes b. No c. Unknown

If yes, list the exists protocols, _____

Observe the existence of a written case management protocol for at least 1 priority disease

_____

VIII. **Presence of a budget line for epidemic response;**

30. Is there a budget line for epidemic response?

a. Yes b. No c. Unknown

If yes, describe total budget allocated and utilized in the past last year _____

IX. **Existence of zonal epidemic management committee;**

31. Is there established zonal epidemic management committee?

a. Yes b. No c. Unknown

If yes, observe minutes (or report) of meetings of epidemic management committee

_____

32. Has epidemic management committee evaluated its preparedness and response activities during the past year?

a. yes b. no c. don't know

If yes, observe written report to confirm _____

_____

X. **Zonal rapid response team for epidemics;**

33. Does the zone have a rapid response team for epidemic?

a. Yes b. No c. Unknown

34. Is there any notification of recently reported outbreak to which you had response within 48 hrs?

a. Yes b. No c. Unknown

If yes, observe that the zone responded within 48 hours of notification of most recently reported outbreak (from written reports with trend and intervention)

a. Yes b. No c. Unknown

XI. **Feedback;**

35. How many feedback bulletin or reports has the regional level produced in the last year?

_____

Observe the presence of a report or bulletin that is regularly produced to disseminate surveillance data _____

_____

XII. **Supervision;**

36. How many supervisory visits have you made in the last 6 months compared to expect?

_____(%)

37. If no supervision was not made during the past 6 months, please mention the reasons,

_____

_____

_____

XIII. **Training on surveillance activities;**

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

_____

39. On what topics have you gave training in the last 6 months?

_____

_____

_____

40. What are your stakeholders those supporting you in giving training? _____

_____

41. Major challenges during and after training activities _____

_____

_____

42. Strengths during and after training _____

_____

_____

XIV. **Resources**

Do you have;

43. **Data management equipment**

Computer_____

Printer _____

Photocopier _____

Data manager _____

Statistical package _____

Stationary _____

44. **Communications:**

Telephone service _____

Fax _____

Radio call _____

Mobile phone _____

Computers that have modems _____

45. **Budget line (from donors) _____**

XV. **Surveillance Networking**

46. Do you have functional computerized surveillance network at this level?

a. Yes b. No c. Unknown

XVI. **Budget for surveillance**

47. Is there a budget allocated for surveillance activities from the Regional Health Bureau budget (governmental source)?

a. Yes b. No c. Unknown

If yes, what is the proportion of this budget from total allocated budget for other activities?

_____(%)

48. How could surveillance be improved?

_____

_____

_____

XVII. **Surveillance Co-ordination**

49. Is there a focal unit for surveillance at the this level?

a. Yes b. No c. Unknown

If yes, observe organogram of the zone to confirm

_____

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

_____

_____

_____

Questionnaire for Attributes and level of Usefulness:

a. Total population under surveillance_____

b. In 2012/13, what is the incidence / Prevalence of:

- Malaria incidence _____ prevalence _____Deaths _____
- Meningitis incidence _____ prevalence _____Deaths _____
- Measles incidence _____ prevalence _____Deaths_____

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

Does the surveillance system help;

c. To detect outbreaks of these selected priority diseases early? Yes/ No

d. To estimate the magnitude of morbidity and mortality of these diseases, including identification of factors associated with these diseases? Yes/ No

e. Permit assessment of the effect of prevention and control programs? Yes/ No

Observe (confirmation):

- interventions and diseases trends analyzed _____

_____

II. Description of Each System Attributes:

i. Simplicity:

1. Is the case definition of Malaria, Meningitis and Measles easy for case detection by all level health professionals? a. Yes b. No c. Unknown
2. What are the organizations which need to receive reports of the surveillance data?

_____

_____

3. Do you feel that additional data collected on cases are time consuming?

a. Yes b. No c. Don't know

4. How long it takes to fill the reporting format?

a. <5 minutes b. 10-15 minutes c. >15 minutes

Overall comments of on the above points _____

_____

_____

_____

ii. Flexibility:

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? a. Yes b. No c. Don't know
2. Do you think that any change in the existing procedure of case detection, case definition, allocating funds, report forms, and formats will make difficult to implement? a. Yes b. No c. Don't know

Overall comments on the above points

:_____

_____

_____

_____

_____

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

1. Are the data collection formats for these priority diseases clear and easy to fill for all the data collectors/ reporting sites? a. Yes b. No
2. Have you ever gave training for data collectors on data quality management?

a. yes b. no. c. don't know

3. Are the reporting site and data collectors supervised regularly? a. Yes b. No
4. **Observe:** Review the last month report of selected diseases

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

_____

_____

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

_____

_____

iv. Acceptability:

1. Do you think all the reporting agents accept and well engaged to the surveillance activities? a. Yes b. No

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

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. Cost of data reporting
F. Other:

_____

_____

2. Are all stakeholders are fully participate in surveillance system strengthening?

a. yes b. no c. don't know

If no, what are the reasons make them discomfort?_____

_____

_____

v. Representativeness:

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

   a. the urban b. the rural c. equal

vi. Timeliness:

1. Do you think that the existing surveillance system is timely detecting the outbreak? a. yes b. no c. don't know

Comment _____

_____

_____

2. During the most recent outbreak of malaria, meningitis and measles within how many days these outbreaks were reported to the region after the first case/index case/

   _____

3. Is enough information is available for control of selected diseases during outbreak? a. yes b. no c. don't know

Comment_____

_____

_____

4. How long does it take to have laboratory confirmation of
   A. Malaria_____
   B. Meningitis _____
   C. Measles _____

vii. Stability:

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

Annex 3.1.2: District Level Questionnaire for Surveillance System Evaluation

---

Identifiers

Date ___/___/____ Region _____

Interviewer _____ Zone _____

Respondent_____ District _____

Availability of national surveillance manual

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

a. Yes b. No c. Unknown

If yes, observe national surveillance manual _____

I. Case confirmation

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

a. Yes b. No c. Unknown d. Not applicable

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

a. Yes b. No c. Unknown c. Not applicable

II. Data reporting

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

a. Yes b. No c. Unknown

5. Number of health facilities (Health posts, Health centers, Private/NGO) sent weekly reports in the last 3 months compared to expected number

Weekly: _____ /12 times the number of health facilities

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

On time (use national deadlines)

6. Number of weekly reports submitted on time: ____/12 times the number of health facilities
7. Number of immediately reports submitted on time: _____/3 times the number of health facilities
8. How do you report to the next level:
    a. Mail
    b. Fax
    c. Telephone
    d. Radio
    e. Electronic
    f. Other

Strengthening reporting

9. How can reporting be improved?

_____

_____

_____

III. ***Data analysis for Malaria, Meningitis, Measles and others***

10. Have you appropriate denominators (<5 years children, total population, population by kebeles, and so on)

a. yes b. no c. Don't know

If yes, Observe for each denominators _____

_____

11. Do you describe data by person (case based, outbreaks, sentinel)?

a. Yes b. No c. Unknown

Observe description of data by age and sex_____

_____

_____

12. Do you describe data by place (locality, village, work site etc)?

a. Yes b. No c. Unknown

Observe description of data by place _____

_____

_____

13. Do you describe of data by time?

a. Yes b. No c. Unknown

If yes, observe the description _____

_____

_____

14. Do you perform trend analysis (line graph of cases by time) for malaria, meningitis and measles?

a. Yes b. No c. Unknown

If yes, Observe and list diseases _____

_____

_____

IV. Availability of threshold level for selected diseases

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

a. Yes b. No c. Unknown

If yes, for which diseases and mention what are their threshold levels _____

_____

_____

16. Who is responsible for data analysis? _____

17. How often do you analyze the collected data?

a. Daily
b. Weekly
c. Every 2 weeks

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

*V. **Outbreak investigation***

18. Number of outbreaks suspected in the past 6 months: _____

Observe the investigations (Observe reports and take copies if possible): _____

_____

19. Has your district ever investigated an outbreak?

a. yes b. No c. Unknown

*VI. **Epidemic preparedness***

20. Is your district has a plan of epidemic preparedness and response?

a. yes b. no c. Unknown

*If yes, o*bserve a written plan of epidemic preparedness and response _____

_____

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

a. yes b. no c. unknown

If yes, observe the stocks of drugs and supplies at time of assessment _____

_____

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

a. Yes b. No c. Unknown

If yes, how did you solve the problem at that time? _____

_____

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

a. Yes b. No c. Unknown

VII. Epidemic management committee

24. Is established epidemic management committee at district level?

a. yes b. no c. unknown

If yes, observe minutes (or report) of meetings of epidemic management committee

_____

_____

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

a. Yes b. No c. Unknown

VIII. Responses

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

a. Yes b. No c. Unknown

27. Is your district responded with 48 hours of notification of most recently reported outbreak?

a. yes b. no c. don't know

If yes, observe that the district responded within 48 hours of notification of most recently reported outbreak (from written reports) _____

_____

28. What were the case fatality rates during most recent outbreak mainly for meningitis, malaria, and measles? _____

_____

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

29. Has epidemic management committee evaluated their preparedness and response activities during the past year?

a. Yes b. No c. Unknown

If yes, observe written report to confirm _____

_____

IX. Feedback

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

_____

Observe the presence of a written report that is regularly produced to disseminate surveillance data for health facilities, _____

_____

31. How many feedback bulletin or reports has the district received in the last year from zone/region? _____

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

X. Supervision

32. How many times had you supervise health facilities in the last 6 months?

_____

Observe supervision report or any evidence of supervision in last 6 months _____

_____

33. Is appropriate review of surveillance practices were done during supervision?

a. yes b. no don't know

If yes, observe supervision report or any evidence for appropriate review of surveillance practices _____

_____

34. If not all the required supervisory visits were conducted, mention the reasons.

Reason 1_____

Reason 2_____

Reason 3_____

XI. Training

35. Number of health personnel trained in disease surveillance

_____

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

XII. Resources

37. Is your district has enough logistics for surveillance activities?
    a. Electricity
    b. Bicycles
    c. Motor cycles
    d. Vehicles
38. Data management
    a. Stationery
    b. Calculator
    c. Computer
    d. Printer
    e. Statistical package
39. Communication
    a. Telephone service
    b. Fax
    c. Computers that have modems
40. **Information education and communication materials**
    a. Posters
    b. Megaphone
    c. Flipcharts or Image box

d. VCR and TV set
e. Generator
f. Screen
g. Projector (Movie)
h. Other:

41. **Hygiene and sanitation materials**
    a. Spray pump
    b. Disinfectant

XIII. Surveillance co-ordination:

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

a. yes b. no c. don't know

If yes, observe some documents _____

XIV. Satisfaction with surveillance system

43. Are you satisfied with the surveillance system?

Yes No Unknown Not applicable

44. ***If no***, how can the surveillance systems is improved?

_____

_____

_____

XV. Opportunities for integration

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

_____

_____

_____

Annex 3.1.3: Health Center Level Questionnaire for Surveillance System Evaluation

Identifiers

Date ___/___/_____ Region _____

Interviewer _____ Zone _____

Respondent_____

District _____

Name of health facility _____

I. Availability of national surveillance manual

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

a. yes b. no don't know

If yes, observe national surveillance manual _____

II. Case detection and registration

2. Within what time interval (between date of onset and reach health facility) have you detected the most recent outbreak (e.g meningitis, malaria, measles and so on)? _____
3. Is there clinical register at this facility?

a. yes b. no c. Unknown

If yes, observed the existence of a clinical register _____

4. Is clinical register is filling correctly?

a. yes b. no c. unknown

Observe the last month filled clinical register if correctly done _____

_____

5. Do you have a standard case definition for country's priority diseases such as Malaria, Meningitis, and Measles?

a. Yes b. No c. Unknown

Observe the standard case definition for each priority diseases _____

_____

6. Are you using standardized case definitions for the country's priority diseases?

a. yes b. no c. don't know

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

_____

(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)

III. Case confirmation

7. Are you able to collect sputum Y N U N/A

Stool Y N U N/A

Blood Y N U N/A

CSF Y N U N/A

Observed the presence of materials required to collect

Stool Y N U N/A

blood/serum Y N U N/A

CSF Y N U N/A

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

a. Yes b. No c. Unknown d. Not applicable

If yes, observe presence of functional cold chain at health facility _____

_____

9. Observe presence of packing materials for shipment of specimens at health facility

_____

_____

IV. Data reporting

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

a. Yes b. No c. Unknown

11. Can you report accurately cases from the registry into the summary report to send to higher level?

a. yes b. no c. don't know

Observe that the last monthly report agreed with the register for 3 diseases;

a. Malaria Y N U N/A

b. Meningitis Y N U N/A

c. Measles Y N U N/A

12. How many times have you sent surveillance report in the last three months?

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

Weekly: ____ /12 times the number of sites

Immediately: /-- times the number of sites

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

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

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

14. How do you report?

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

15. **Strengthening reporting**

How can reporting be improved?

_____

_____

_____

V. Data analysis

16. Do you describe data by person (outbreaks, sentinel)?

a. yes b. no c. Don't know

If yes, Observe description of data by age and sex _____

17. Do you describe data by place (locality, village, work site etc)?

a. yes b. no c. don't know

If yes, Observe description of data by place _____

18. Do you describe data by time?

a. yes b. no c. don't know

If yes, Observe description of data by time _____

19. Do you perform trend analysis?

a. yes b. no c. don't know

If yes, Observe line graph of cases by time _____

20. Who is responsible for data analysis? _____

21. How often do you analyze the collected data?

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

22. Have you appropriate denominators?

a. yes b. no c. don't know

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

_____

VI. Availability of threshold levels for each priority disease

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

a. Yes b. No c. Unknown

If yes, what is the threshold level for Meningitis and measles? _____

_____

_____

VII. Epidemic preparedness

24. Is your health facility has a standard case management protocol for epidemic prone diseases?

a. yes b. no c. don't know

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

VIII. Epidemic response

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

a. Yes b. No c. Unknown

26. Did your facility achieve acceptable case fatality rates (e.g. 10% for Meningococcal CSM 1% for Cholera) during the most recent outbreak?

a. Yes b. No c. Unknown d. Not applicable

Observe case facility rate for most recent outbreaks _____

_____

IX. Feedback

27. Have you received a report or bulletin from a higher level during the past year on the data they have provided?

a. yes b. no c. Don't known

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

_____

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

29. Have you conducted at least semi-annual meetings with community members to discuss results of surveillance or investigation data?

a. yes b. no c. don't know

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

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

X. Supervision:

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

Observe supervision report or any evidence of supervision in last 6 months _____

_____

31. Is appropriate review of surveillance practices were done during the past supervision activities?

a. yes b. no c. don't know

Observe supervision report or any evidence for appropriate review of surveillance practices

_____

_____

XI. Training

32. Number of health personnel trained in disease surveillance and epidemic management

_____

33. On what topics of surveillance they trained? _____

_____

34. Are they any training, which is relevant to your job that facility's personnel did not get yet?

_____

_____

XII. Resources

Have you:

35. **Logistics**
    a. Electricity
    b. Bicycles
    c. Motor cycles
    d. Vehicles
36. **Data management**
    a. Stationery
    b. Calculator
    c. Computer
    d. Software
    e. Printer
    f. Statistical package
37. **Communications**
    a. Telephone service
    b. Fax
    c. Radio call

d. Computers that have modems

38. **Information education and communication materials**

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

39. **Hygiene and sanitation materials**

a. Spray pump
b. Disinfectant

40. **Protection materials (list)** _____ _____ _____

_____

_____

XIII. Satisfaction with surveillance system

41. Are you satisfied with the surveillance system?

a. Yes b. No c. Unknown d. Not applicable

42. If no, how can the surveillance system is improved? _____

_____

_____

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

_____

_____

_____

Annex 3.1.4: Health Post Level Questionnaire for Surveillance System Evaluation

Identifiers

Date ___/___/_____ Region _____t

Interviewer _____ Zone _____

Respondent_____

District _____

Name of health facility _____

I. Availability of national surveillance manual

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

a. Yes b. No c. Unknown d. Not applicable

If yes, observe national surveillance manual _____

II. Case detection and registration

2. Have you clinical clinical register?

If yes, observe the existence of a clinical register

a. Yes c. No c. Unknown d. Not applicable

3. Do you correctly register cases?

a. Yes b. No c. Unknown d. Not applicable

If yes, observed the correct filling of the clinical register during the previous 30 days_____

_____

III. Presence of standardized case definitions for the country's priority diseases

4. Do you have a standard case definition for Malaria, Meningitis, and Measles ?

a. Yes b. No c. Unknown d. Not applicable

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

a. Yes b. No c. Unknown d. Not applicable

IV. Using standardised case definitions for the country's priority diseases

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

_____

(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

V. <u>Data reporting</u>

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

a. Yes b. No c. Unknown d. Not applicable

6. Have you reported accurately cases from the registry into the summary report to go to higher level?

a. yes b. no c. don't know d. Not applicable

Observe 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. Malaria Y N U N/A
b. Meningitis Y N U N/A
c. Measles Y N U N/A

7. Number of reports sent to the next higher level during the past 3 months;

Weekly: ____ /12 times the number of sites

Immediately: /-- times the number of sites

8. On time (use national deadlines)

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

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

9. How do you report?
    a. Mail
    b. Fax
    c. Telephone
    d. Radio
    e. Electronic

f. Other

10. Strengthening reporting

How can reporting be improved?

_____

_____

_____

VI. Data analysis

11. Describe data by person (outbreaks, sentinel)

a. Yes b. No c. Unknown d. Not applicable

If yes, Observed description of data by age and sex _____

_____

12. Describe data by place

a. Yes b. No c. Unknown d. Not applicable

If yes, observed description of data by place (locality, village, work site etc) _____

_____

13. **Describe data by time**

a. Yes b. No c. Unknown d. Not applicable

If yes, observe description of data by time _____

_____

14. Did you perform trend analysis?

a. Yes b. No c. Unknown d. Not applicable

If yes, Observe line graph of cases by time _____

_____

VII. Epidemic response

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

a. Yes b. No c. Unknown d. Not applicable

VIII. Feedback

16. have you received a report or bulletin from a higher level during the past year on the data they have provided?

a. Yes b. No c. Unknown d. Not applicable

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

17. Have you conducted meetings with the community members in the past six months on surveillance activities?

a. Yes b. No c. Unknown d. Not applicable

If, Observe the minutes or report of at least 1 meeting between the health facility team and the community members within the six months

IX. Supervision:

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

Observe supervision report or any evidence of supervision in last 6 months _____

_____

19. Is appropriate surveillance practices were reviewed by higher level during supervision?

a. yes b. no c. Don't know d. Not applicable

If yes, observe supervision report or any evidence for appropriate review of surveillance practices _____

_____

X. Training

20. Number of personnel trained in disease surveillance and epidemic management

_____

Topics on which training were given _____

_____

By whom you you were trained? _____

_____

XI. Resources

Have you:

21. Logistics

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

22. Data management

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

23. Communications

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

24. **Information education and communication materials**

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

25. Hygiene and sanitation materials

a. Spray pump
b. Disinfectant

26. Protection materials (list) _____ _____ _____

_____

_____

XII. Satisfaction with surveillance system

27. Are you satisfied with the surveillance system?

a. Yes b. No c. Unknown d. Not applicable

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

_____

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

_____

_____

_____

_____

Annex 3.1.5: Regional Laboratory Level Questionnaire for Surveillance System Evaluation

General information	**Responses**		**Remark**
Name of the laboratory	_____		
Address of the laboratory:	Telephone_____ Fax_____ e-mail_____		
Level of the Laboratory :	Community Health Facility District Regional National		
Affiliation of the Laboratory :	**Public**/Private /Academic /Religious Institution / NGO		
Name of head of Laboratory			
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	Yes	/ No	

(e.g. emergency generator)?					
If yes, what systems are protected?	Refrigerators/freezers		Yes	No	
	Computers		Yes	No	
	Other(specify)		Yes	No	
			Yes	No	
			Yes	No	
What types of communications systems are available?	Post		Yes	No	
	Telephone		Yes	No	
	Fax		Yes	No	
	Satellite phone		Yes	No	
	E-mail		Yes	No	
Number of Laboratory staff	Medical Laboratory Professional	MSc			
		BSc			
		Diploma			
	1. Assistants (not doing tests)				
	2. Data clerks Cleaner				
	3. Cleaner, Guards and Drivers				
Has training been conducted for your staff on laboratory	Malaria		Yes	no	
	Meningitis		Yes	no	
	Measles		Yes	no	

investigation and management of;	Other epidemic prone diseases (briefly describe)		
If yes when was the last training been conducted for your laboratory staff?			

Reagents

Where you are getting your reagents?	From a commercial supplier
	From another laboratory
	Supplied by Regional/Zonal/District/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 Under purchasing others(specify)
What type of water is used for preparation of media and reagents?	
Deionized Distilled Distilled Tap water	Yes No Yes No Yes 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, conjunctival swab	IgM by EIA Other serological test Virus isolation			
Yellow fever	Blood, postmortem liver	IgM Virus isolation			
Suspect typhoid or	Blood, faeces	Culture Identification tests			

brucellosis	serum	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 Identification of unknown organism Test not performed on site	Yes No Yes No Yes No
Number of sample referred in the last six month?	
Types of transport media used (□□all that apply)	
Trans-isolate Cary and Blair Viral transport medium	Yes No Yes No 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 notifiable diseases to any of the following Ministry of Health offices/institutions?	
District Health Office	Yes / No / NA

Regional Health Bureau	Yes / No/ NA
National / MOH level	Yes / No/ NA Yes / No /NA
If reports are submitted, how frequently?	
Weekly Monthly Quarterly Other	Yes No Yes No Yes No 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 many times do you visited by higher levels 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

Chapter – IV: Health Profile Description

4.1. Health Profile Description of Welmara Woreda, Oromiya Special Zone Surrounding Finfinne, Oromiya, Ethiopia, 2011/12

Executive Summary

Health profile is a system of collecting and summarizing health and health related events, demographic, socio-economic, political and cultural aspect of a particular district. Summarizing and analysing health and health related data of a district is important to prioritize public health data and determine diseases burden. Health profile description was conducted in Welmara district of Oromiya region to understand overall health and health related events, mainly performed in 2004 E.C.

Standard questionnaire was used during data collection, which was undertaken from March 10 to 16/03/2013. Beyond district health office, different sectors like, education, water, agriculture, finance and economic development were interviewed using designed questionnaire. Microsoft Excel software was used during data compile and analyse.

Welmara district has divided into 24 kebeles of which 23 are Peasant Associations/rural kebeles and one is urban kebele. The total population of a district is estimated to be 93,317 of which 50.23% is male and 49.77% female in 2004 E.C. Among these total population 4,804 (5.15%) of them are residing in urban areas. Acute febrile illness was the top leading cause of outpatient morbidity in 2004 E.C. In this district, there were 2 functional type B health centers and 22 health posts in 2004 E.C. From a total of 2,958 eligible infants, 87% vaccinated for pentavalent 3, 88% for measles and 82% were fully immunized. In this district, 1364 (48%) pregnant women were immunized. 70% (2,175) pregnant women have ANC service in 2004 E.C. Among a total of pregnant women in the district, only 20% of them got delivery service by skilled attendants. The latrine coverage of the district was 67% in 2004 E.C. A total 132 all forms of TB cases were identified. The prevalence of HIV/AIDS in the district was 0.05.

Even though some activities were under taken by district to improve health status of the community, much efforts is expected to exert mainly on institutional delivery and TT vaccination of pregnant women and AFI surveillance. Since there were no essential vital statistics those uses for program evaluation and trend analysis in the district, it is better to collect and compile these indicators at each level.

2.1.1. Introduction

Health profile is a system of collecting and summarizing health and health related events, demographic, socio-economic, political and cultural aspect of a particular district. Summarizing and analysing health and health related data of a district is important to prioritize problems and plan on identified gaps. Having done this description in annual basis is crucial in understanding current performance and to identify underperformed activities.

Our Country had set five years Growth and Transformation Plan since 2003 E.C. This strategic plan will lead the country to the achievement of Millennium Developmental Goals. Different cross cutting approaches are in place to enhance this plan. Of these activities, Demographic Health Survey that is carried out nationally and health profile description at each administrative level are a tool for updating status and input for planning.

Communicable diseases and maternal deaths are kept major public health problems of the country. The Federal Ministry of Health (FMOH) has applied multi-pronged approaches to reducing maternal and new-born morbidity and mortality.. In 2011, Maternal Mortality Rate is declined to 590/100,000. Even though maternal mortality rate are shown decreased in the last few years, efforts have to accomplished to achieve Millennium Developmental Goals. Malaria, HIV/AIDS, diarrhoea and respiratory diseases are among leading causes of morbidity and mortality in the country. Similarly, these diseases have been challenge to health sector of in the Oromiya region. Coverage of institutional delivery is low in the region. According to 2004 E.C. performance report of the region, institutional delivery is 34%. Additionally, malaria cases were increased significantly in 2004 E.C.

2.1.2. Objectives

2.1.2.1. General Objective

To assess and describe health and health related data to identify problems for priority setting of Welmara district in Special Zone Surrounding Finfinne.

2.1.2.2. Specific objective

- To identify health service status of the district in 2004 E.C
- To understand basic infrastructures of the district.
- To identify major health problems of Welmara district.
- To summarize health and health related data of Welmara woreda.
- To set recommendations based on identified problems.

4.1.3.Methods and Materials

4.1.3.1. Study Design

Descriptive cross sectional study was conducted using standard questionnaire. Hard copy and softcopy for different health and health related data were reviewed.

4.1.3.2. Study period

Health and health related performance of 2004 E.C., socio-economic, administrative setup and cultural aspect data were collected from March 10 to 16, 2013.

4.1.3.3. Study area

Health profile description was conducted in Welmara district, Oromiya Special Zone Surrounding Finfinne, Oromiya region.

4.1.3.4. Data Collection Tools and Procedures

During data collection, semi-structured questionnaire was used at district level. Interview was conducted with selected district offices focal persons using the questionnaire.

4.1.3.5. Data analysis procedure

Data was compiled and analyzed by Microsoft Excel software.

3.1.4. Results

3.1.4.1. Historical Background

Welmara district is one of eight districts of Special Zone Surrounding Finfinne in Oromiya region. Historically, name of the district came from "**Welmara Choke**" kebele in the district. The elders living in this area explained that there was a descent place in this kebele, which had been found on the bottom of "**Foyeta Mountain**", where people around were getting together and exchange their ideas, views, and play some cultural games. Likewise, the youth found in that area were coming to the place for playing and eating the seed of the local tree found in that area known as "Harbu". On the basis of this, one area's residing elder said that **"Ijoolleen kun asumaa walmaraa oolu!"** which is to mean "**These youth are encircling to this area!**". After this saying, people start to call this area as "Welmara" (Welmara District Culture and Tourism Office).

3.1.4.2. Geography and climate

Welmara district is found at 32 Kilometres to the west of Finfinne City, where the official city of the zone and region. The district is located between $8^0$50'-$9^0$15' N Latitude and $38^0$25'-$38^0$45' Longitude. The area of the district is 755 km^2 or 80927 hectares. The Welmara district surrounded by three districts and one town: in the East - Burayyu town, in the West- Ejere district, in the North- Sululta district, and by Sebeta Hawas district in the South. The altitude of the district is 2060-3380 Meters above the sea level. The climatic condition of a district is 61% Dega and 39% Woyina Dega. Annual temperature is estimated to be between 0.1^0c and 27^0c. Annual range of rainfall is 634-1300 mm with an average of 150 rainy days.

3.1.4.3. Administrative and political structure

The district has twenty-three (23) rural kebeles and one town administration. Also there are about 463 villages in the district. All district's administrative offices are found in Holeta town. However, administratively Holeta town is not under Welmara district: it is one of towns in the Special Zone Surrounding Finfinne.

Even though the district has a high accumulation of some mineral resources such as Black and white stones which could serve for different purposes, it doesn't properly utilized till now. There are 12 small-scale industries in the district.

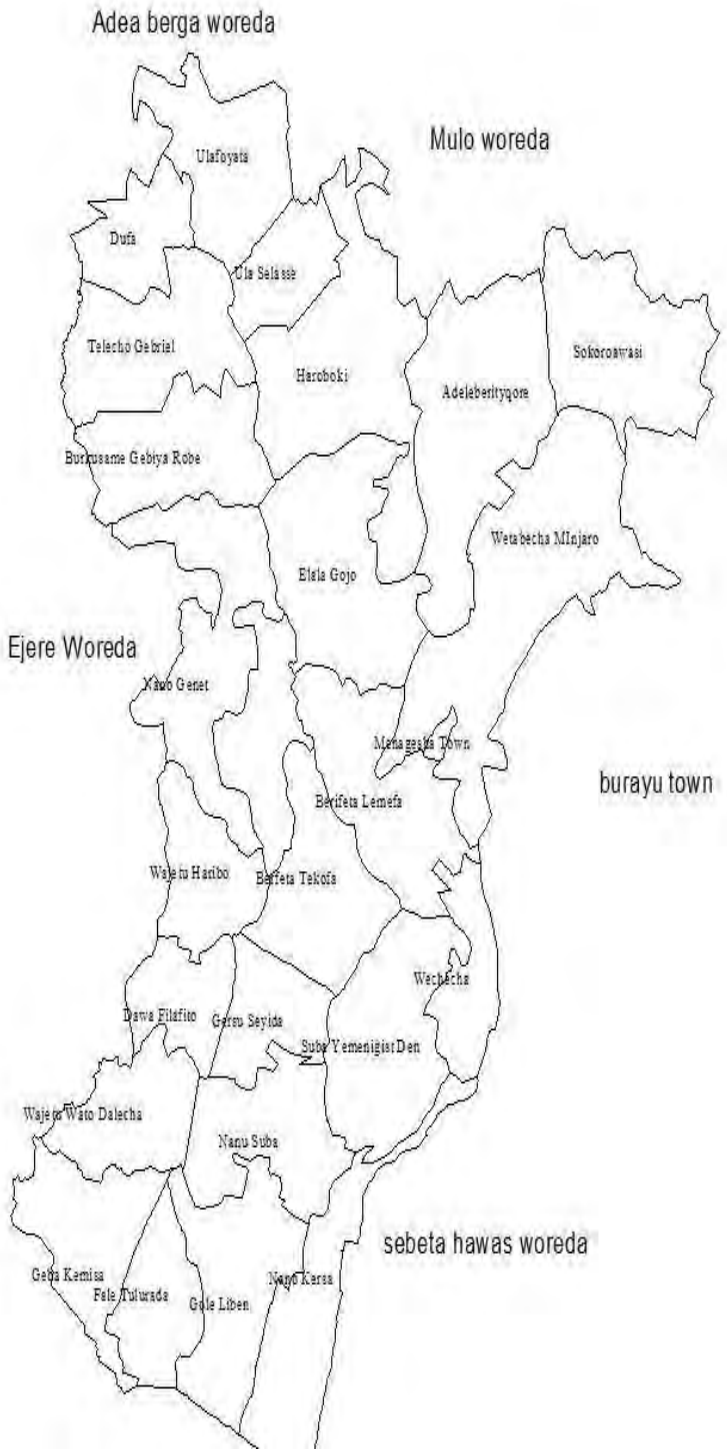

Figure 4.1.1: Administrative map of Welmara district, Oromiya

3.1.4.4. Demographic Information

From the projection of 2007 Census, the total population of a district is estimated to be 93,317 of which 46,873 is male and 46,444 female in 2004 E.C. Among these total population 5.15% (4,804) of them are residing in urban areas. Under 1-year children are 2,958; less than 5 years are 15,304 and less than 15 years constitute 44,428 of the total population. The older age group (>65 years) consists 4.74% of the total population. Childbearing women (15-49 years of age) are accounted for 22.13% (20,651) of a population. Oromo, Amhara, and Guraghe are the dominant ethnics in the district. Regarding religion distribution, most district's populations are followers of Orthodox and Protestant.

Table 4.1.1: Estimated population by kebeles and age category, Welmara district, Oromiya, 2004 E.C.

S.No	Kebele	Total Population	< 1 year (3.17%)	< 5 years (16.4%)	< 15 years (47.61%)	> 65 years (4.74%)
1	Ade Simbirit Kotu	5777	183	947	2750	274
2	Barfata 1st	4017	127	659	1912	190
3	Barfata 2nd	4789	152	785	2280	227
4	Burkusami Gaba Robi	4654	148	763	2216	221
5	Bakaka and Kore Oddo	2725	86	447	1297	129
6	Dawa Lafto	2637	84	432	1255	125
7	Dufa	2546	81	418	1212	121
8	Fale Tulu Rada	3862	122	633	1839	183
9	Gaba Kemisa	4745	150	778	2259	225
10	Garasu Sida	3442	109	564	1639	163
11	Gole Liban	5341	169	876	2543	253
12	Haro Boki	4761	151	781	2267	226
13	Menagesha	2089	66	343	995	99
14	Nano Suba	5196	165	852	2474	246
15	Nano Kersa	5234	166	858	2492	248
16	Sokoru Hawaso	4350	138	713	2071	206
17	Telecho	3415	108	560	1626	162
18	Tulu Wato Dalecha	3964	126	650	1887	188
19	Ula Foyeta	3595	114	590	1712	170
20	Ula Silase	2315	73	380	1102	110
21	Wajitu Harbu	2424	77	398	1154	115
22	Wechecha	2296	73	377	1093	109
23	Welmara Coke	3833	122	629	1825	182
24	Watabecha Minjaro	5310	168	871	2528	252

3.1.4.5. Productivity and Income

Agricultural activity is the main income of the district. Agricultural land density of the district was 115.6 p/km^2 in 2004. From 33,057 hectares of cultivated land in the Meher season of 2004 E.C, 670,651 quintals yields were produced. The major annual crops produced in the district are cereals, pulses and oil seeds. Barley, teff, wheat and maize are widely produced cereal crops. In addition, some cash crops such as tomato, onion, and oilseeds are produced in the district. In 2004 E.C, the highest productive yields were Wheat and Barley with 309,583 and 175,759 quintals respectively**.** The average monthly or yearly income of individual in the district is not known.

3.1.4.6. Education

In 2004 E.C, there were 4 non-governmental kindergartens, 37 primary schools and 1 secondary school (9-10) in Welmara district. However, there are no any governmental or non-governmental colleges. As information obtained from district education office, number of female students showed increment compared to previous year in primary schools. There are 312 primary and 19 secondary schools teachers in the district. The teacher to student ratio is 1:50 and 1:32 in primary and secondary schools respectively. Educational coverage of the district is 73.3% in 2004 E.C.

Table 4.1.2: Number of enrolled students by sex in Welmara district, Oromiya, 2004 E.C.

Types of School	Number of students			Remark
	Male N (%)	Female N (%)	Total	
Kindergarten	324 (61.7%)	201 (38.3%)	525	all are non-governmental
Primary schools	8,507 (54.9%)	6,977 (45.1%)	15484	1-8 grades
Secondary School	359 (59.3%)	246 (40.7%)	605	From grade 9 to 10

3.1.4.7. Facilities/Infrastructures

The district has 55 km of gravel road (all weather), 52 km of dry season and 62 km of Asphalt road, which is under construction. Among 24 kebeles of the district, 12 kebeles have road

transportation access to district town in all weather, 10 of them only in dry season, and 2 of them have no road access neither dry or rainy season.

Telecommunication is one of effective mode of communication in the district. Urban areas of the district have supplied with wave satellite type of telecommunication and rural areas have wireless phone working by solar energy. Mobile network is working in all 24 kebeles of Welmara district.

In this district, two rural kebeles and one town have supplied with electricity power. In these areas, 302 rural and 826 urban households were benefited from electricity power.

There is one Postal office in Menagesha town of Welmara district. There is no any Bank service in the all kebeles of the district; hence, it is available in Holeta found in the district.

3.1.4.8. Health facilities and their services

Regarding health facilities, there are two type B functional health centers namely Asgori and Menagesha health centers, and twenty-two health posts in the district. One type B health center is also under construction in Telecho kebele. Due to proximity of the district to Addis Ababa and nucleus health center found in the Holeta town, these two health centers are giving only outpatient services. The health service coverage of the district is 53.5% by health center and 96% by health post.

Table 4.1.3: Infrastructures in health facilities, Welmara Woreda, Special Zone Surrounding Finfinne, Oromiya, 2004 E.C.

Health facility type	Number of health facilities with				
	Water supply	Electricity Power	Telecommunication Service	Incinerator	Road transportation access to district town
Health Center	1	2	1	0	2
Health Post	0	3	0	0	12 (all weather), 9 only dry season

3.1.4.9. Cold chain system

Good cold chain system management is essential for vaccine efficacy and to prevent occurrence of an outbreak. In Welmara district, 11 (50%) health posts have functional refrigerators. All these refrigerators are working by both kerosene and electricity power. In addition, there are 7 non-functional refrigerators in seven health posts of the district.

3.1.4.10. Primary health care unit

Primary health care unit is a system designed by Federal 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 found in their catchment area. According to the principle of primary health care unit one health center should support at least five satellite health posts under it based on the availability of health center in the district. In this district, Asgori health center support 10 health posts, Menagesha health center 8, and the rest 6 health posts are supported and monitored by district health office staffs.

3.1.4.11. Health indicators and vital statistics

Health indicators and vital statistics are important to estimate/evaluate performances of health activities and to set strategies as per needed. There is no data of some vital statistics such as Infant Mortality Rate, Maternal Mortality Rate, Under Five Mortality Rate, and Crude Death Rate.

Table 4.1.4: Population and Vital statistics in Welmara district, Oromiya, 2004 E.C.

S/N	INDICATORS	Number (%)
1	Total population	93,317 (100)
2	Male	46,873 (50.23)
3	Female	46,444 49.77)
4	Urban	4,804 (5.15)
5	Rural	88,513 (94.85)
6	Total live births	3,145 (3.37)
7	Under 1 years old	2,958 (3.17)
8	Under 5 years old	15,304 (16.4)
9	Women 15- 49 years old	20651 (22.13)
10	Pregnant women	No Data
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	34 per 1,000 popn.
17	Crude Death rate	No Data

3.1.4.12. 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 reached on 10 vaccines. In this district, 2,614 (83% of the total births) of them were vaccinated for BCG in 2004 E.C. In addition, of the 2,958 eligible infants, 2,497 (84.4%) of them were immunized for OPV1 and Penta 1 vaccines. In this year 2,612 (88.3%) under 1 year were vaccinated for measles and 2,440 (82.5%) fully immunized. Of a total 2,958 under 1-year children, 51.6% of them were protected at birth; since their mothers were immunized two or more doses of TT vaccination during their pregnancy or three or more doses before they give birth. Of 13,735 planned non-pregnant women to vaccinate with TT2 an above, 7,158 (66%) of them were vaccinated during 2004 E.C. During the same year, of 2,844 planned pregnant women to vaccinate for TT2 and above, 1,364 (48%) were immunized in Welmara district.

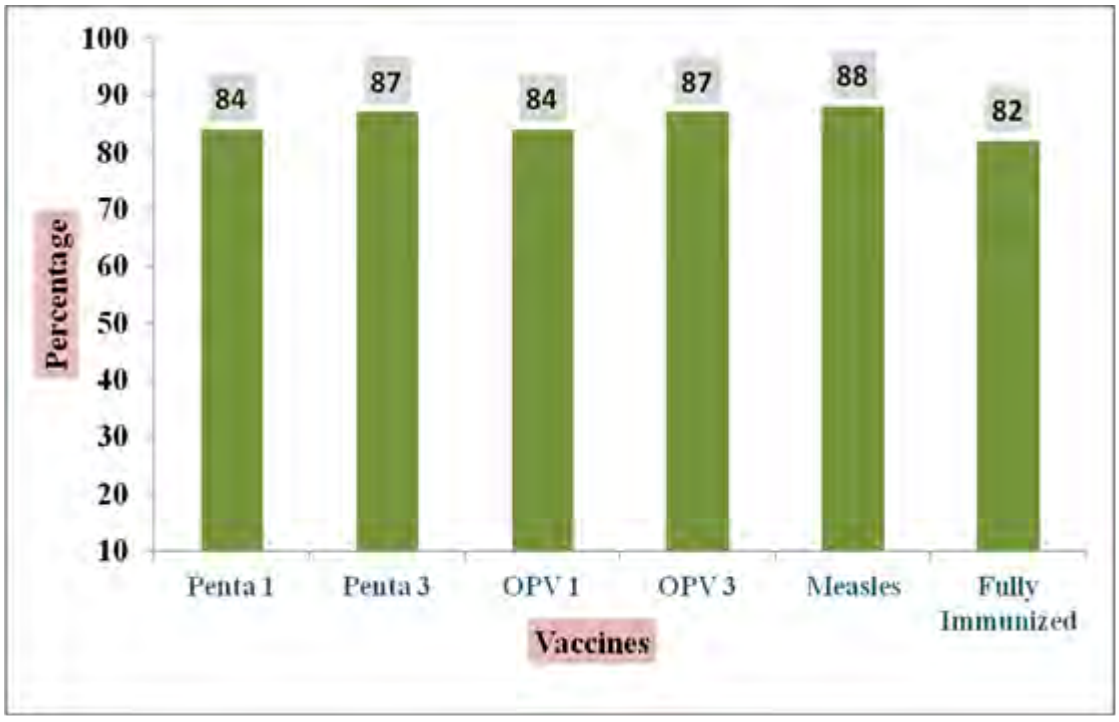

Figure 4.1.2: Coverage of Pentavalent, OPV, Measles and Fully Immunized for under 1 year children in Welmara district, Oromiya, 2004 E.C

In the district, highest performances of measles and pentavalent 3 from the plan were reported from Burkusami Gaba Robi (100%, 100%), Sokotu Hawaso (100%, 100%) and Ule Silase (100%, 100%) kebeles in 2004 E.C (figure 3).

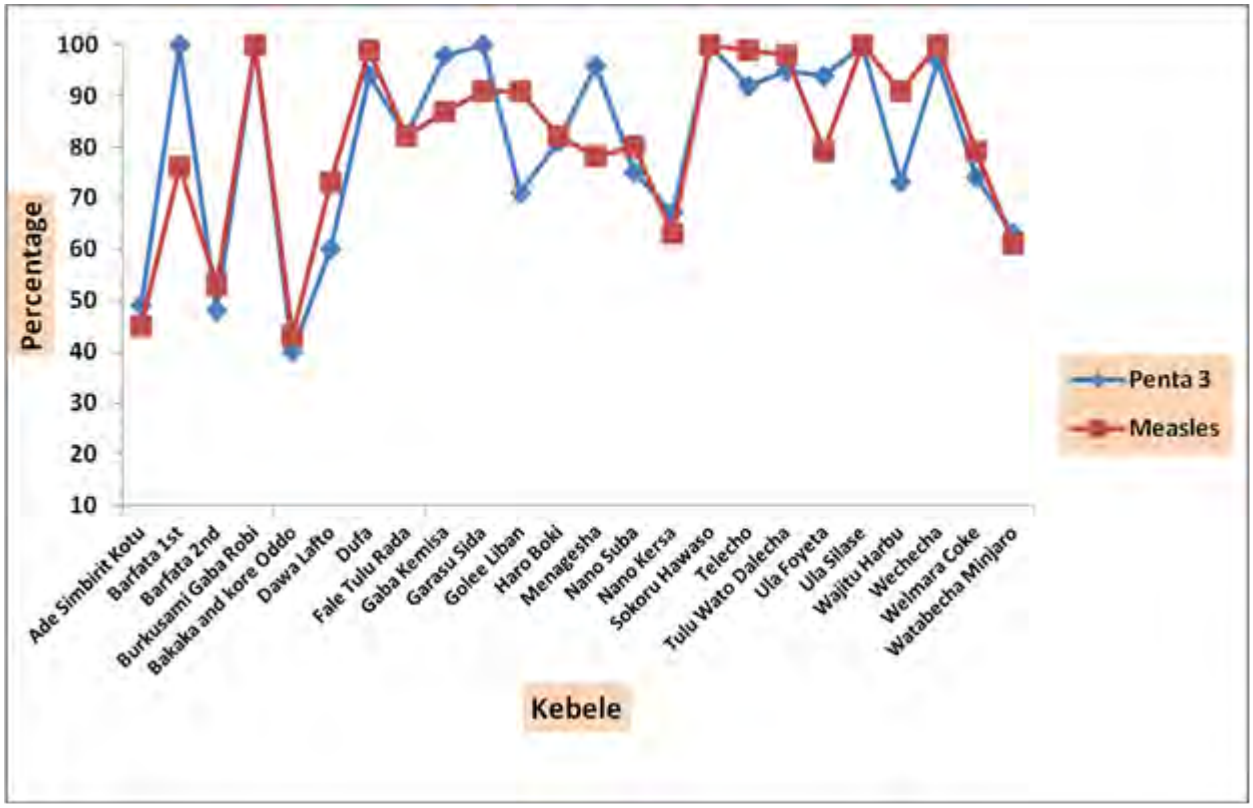

Figure 4.1.3: Coverage of Pentavalent 3 and Measles vaccinations by kebeles in Welmara district, Oromiya, 2004 E.C.

3.1.4.13. Maternal Health Service

Anti-natal care service was given for 2,175 (70%) pregnant women in the district. Skilled attendants served 20 % of pregnant women during delivery. Safe and clean delivery by HEWs is 58% in 2004 E.C. Contraceptive prevalence rate of the district was 66 %.

Safe and clean delivery was well achieved in Sokoru Hawaso (97%), Garasu Sida (94%), and Wajitu Harbu (83%) kebeles in 2004 E.C. However, the least number of safe and clean delivery were from Ade Simbirit Kotu (12%), Haro Boki (14%), and Menagesha (14%) kebeles of the district in 2004 E.C. (figure 4).

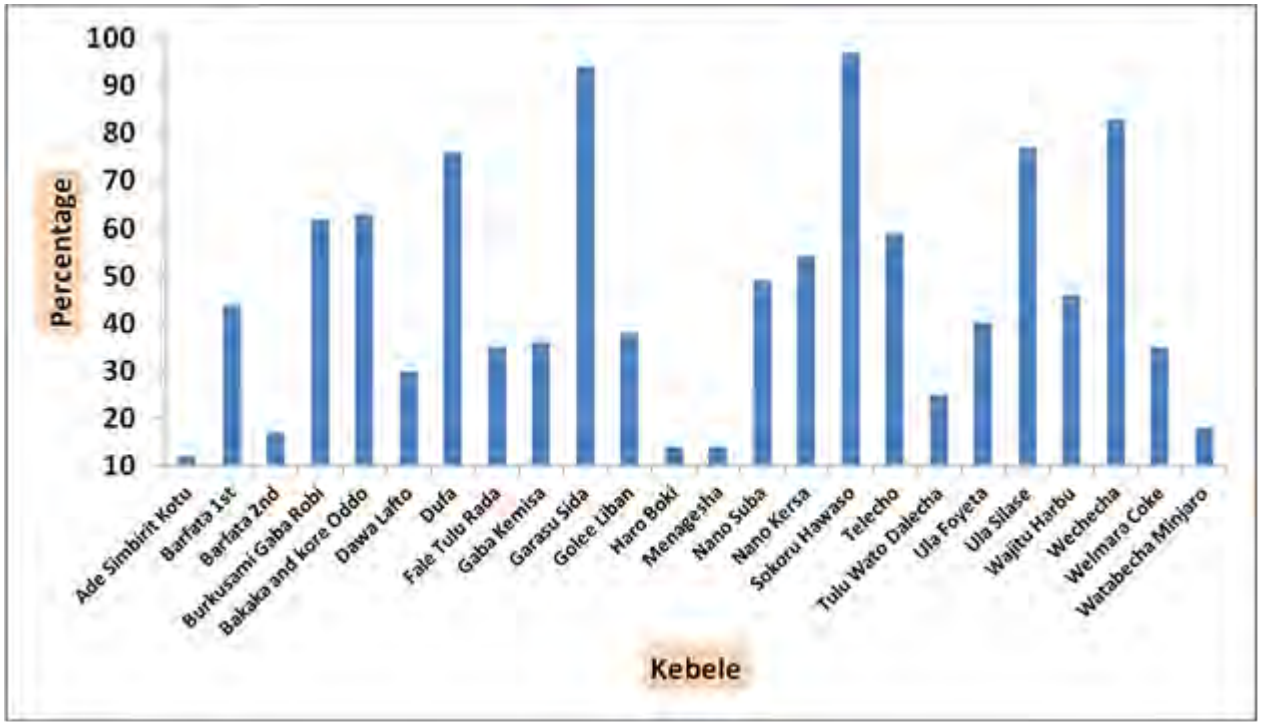

Figure 4.1.4: Coverage of safe and clean delivery by kebeles, Welmara district, Oromiya, 2004 E.C.

3.1.4.14. Water Supply and Sanitation

According to data obtained from Welmara district Water Resource Office, 60.23% of the rural populations were supplied with potable water. In this district, there are 110 hand-dug wells, 50 shallow wells and 15 spring water sources in 2004 E.C.

3.1.4.15. Latrine Coverage and Utilization

Among 20,545 households of the district, 13,765 (67%) of them had standard latrine in 2004 E.C. There is no clear data on utilization of latrine in the district. Eight villages of the district are free from open defecation and all households in these villages are using their latrine properly.

3.1.4.16. Top Leading Causes of Outpatients Visit (Morbidity)

Acute febrile illness is a top leading cause of outpatient morbidity in the district that constitute 604 (18%) of top ten diseases in 2004 E.C. Diarrhoea, intestinal parasite, and all types of malaria are among top ten diseases that cause outpatient morbidity in the district (table 5).

Table 4.1.5: Top ten leading causes of outpatient morbidity in Welmara district, 2004 E.C.

Rank	Disease	Number of cases	%
1	Acute Febrile Illness	604	18
2	Diarrhoea	566	17
3	Intestinal Parasite	484	14
4	Malaria	349	10
5	Pneumonia	305	9
6	STI	299	9
7	Arthritis	287	8
8	Wound	245	7
9	Gastritis	163	5
10	Ear Problem	94	3
	Total	**3396**	**100**

3.1.4.17. Endemic Diseases

3.1.4.17.1. Malaria

In this district, there are five malarious kebeles with 23,146 population at risk. During 2004 E.C., all households (4,957) in these kebeles were supplied with LLITs. Indoor residual spray was done for 3333 houses in 2004 E.C. with deltamethrin chemical. A total 349 cases of malaria with no deaths were reported during this year. During the same year there was no shortage of malaria supplies such as Coartem, RDT in the district.

3.1.4.17.2. Tuberculosis and Leprosy

All forms of TB cases were 132 in 2004 E.C. Among 38-suspected cases to have tuberculosis, 11 PTB were confirmed with case detection rate of 62%. During this year, the TB cure rate and treatment success rate were 83% and 68% respectively. In this district, there was no any defaulter and 2% of death rate on TB treatment. In 2004 E.C., 35 TB patients were screened for HIV/AIDS. There was no case of leprosy identified during 2004 E.C. in Welmara district.

3.1.4.17.3. HIV/AIDS

In this district, 4,390 people were screened for HIV/AIDS in 2004 E.C. Among these clients, 47 (1.07%) of them were confirmed positive for HIV test. The prevalence of HIV/AIDS is 0.05 per 100 population. There are 50 People Living With AIDS (PLWA) in the district. Thirty-five people have started ART service. ART service is started only in Menagesha health center. Community conversation is undertaking in all kebeles of the district to enhance awareness of the community on prevention and control of HIV/AIDS.

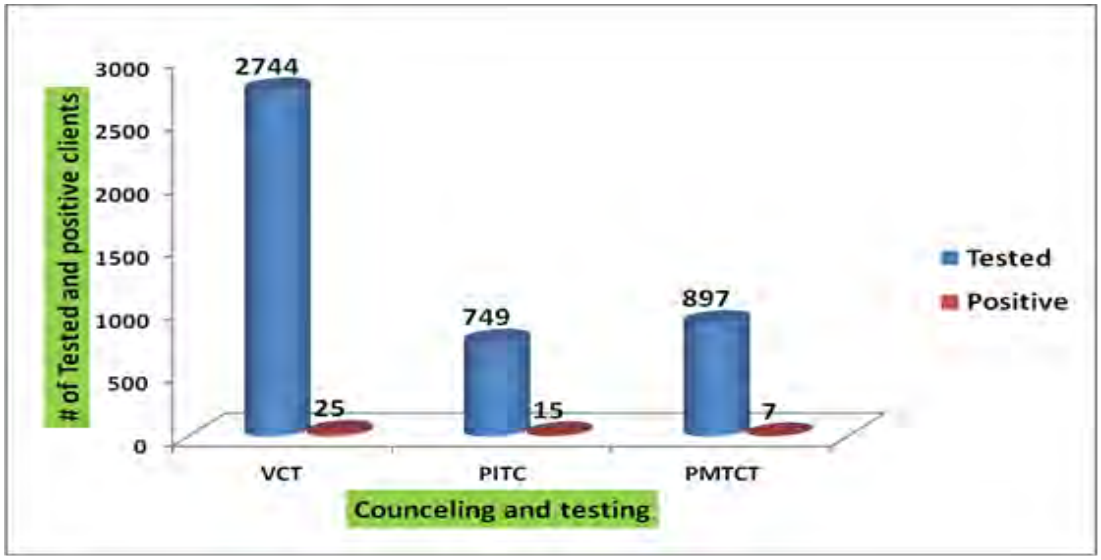

Figure 4.1.5: Number of tested and positive clients in Welmara district, Oromiya, 2004 E.C.

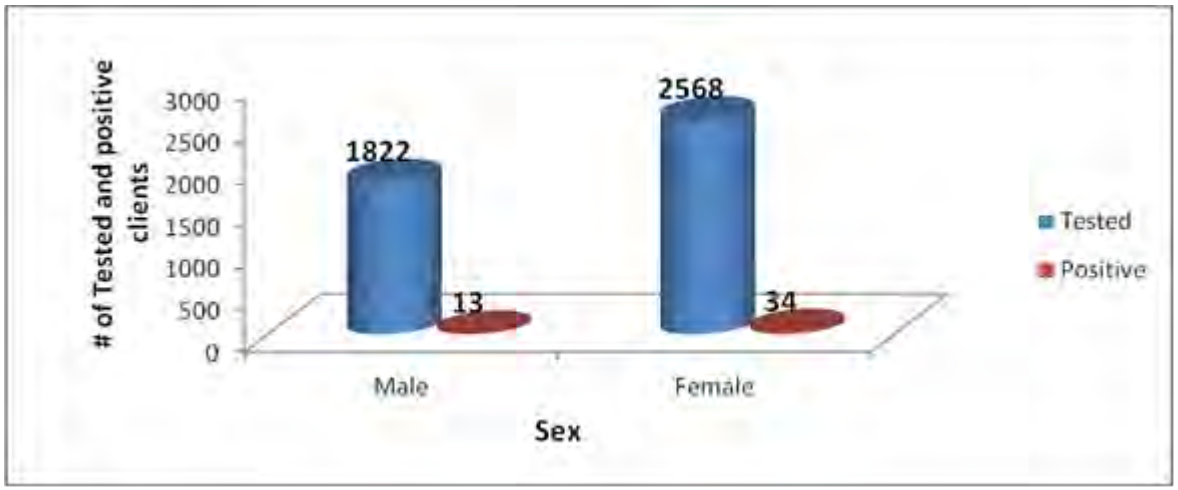

Figure 4.1.6: Number of screened and positive clients by sex in Welmara district, Oromiya, 2004 E.C.

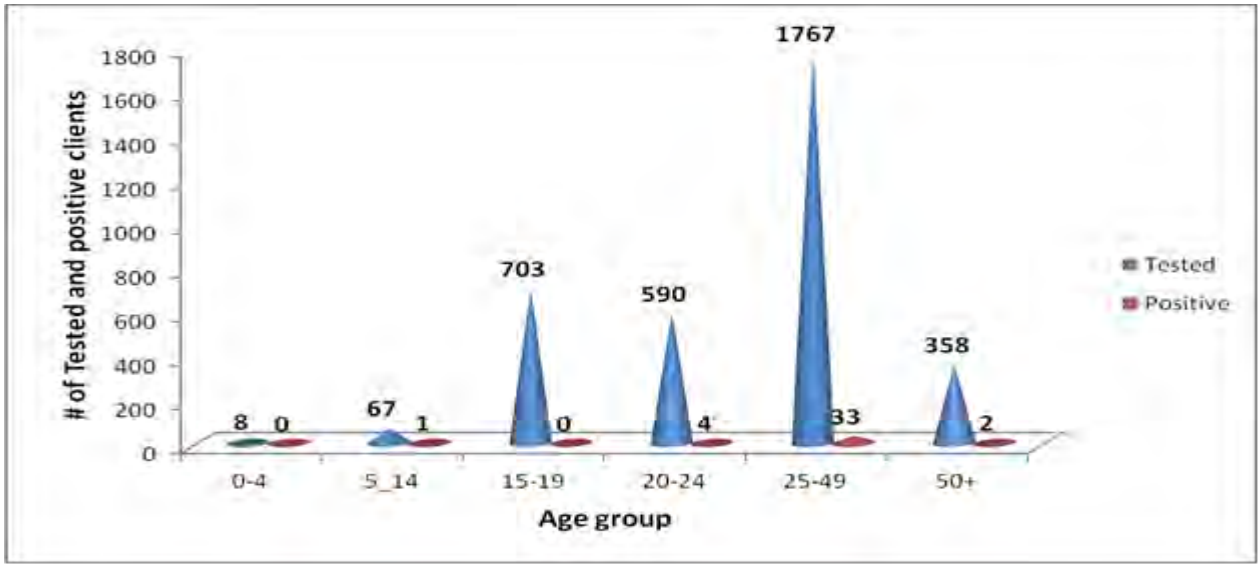

Figure 4.1.7: Number of tested and positive for HIV at VCT and PICT by age group in Welmara district, Oromiya in 2004 E.C.

3.1.4.17.4. Severe Acute Malnutrition (SAM)

Severe acute malnutrition is not a major public health problem of the district. There are no any hot spot kebeles/areas for malnutrition. Five Outpatient Therapeutic Program (OTP) sites were established in 2004 E.C. There is no Establishing Center (SC) site in this district. Fifty-four new admissions were reported from OTP in 2004 E.C. There were no TSF, CBN, PSNP and other programs working on nutritional activities in the district.

3.1.4.17.5. Outbreak and other disaster situations

In this district, there were no outbreak or disaster situations that happened/occurred during the last three years.

3.1.4.18. Budget allocation for district health office

In 2004 EFY, 2,112,485.77 ETB was allocated for the district health office. Of this total budget, the district had allocated 84% for salary and 16% for running different routine activities. During the same year, 288,789.80 ETB sourced from different donors were distributed to this district from Regional Health Bureau for different activities such as prevention and control of HIV/AIDS, Sanitation, Supplemental immunization activities and others.

3.1.4.19. Human Resources

In this district, 100 health professionals and supportive staff have been working in the district health office and different governmental health institutions. Because of no hospitals in the district, there were no physicians.

Table 4.1.6: Distribution of human resources of all categories in the Welmara district health office, 2004 E.C.

S. no	Profession category	Quantity	Ratio of profession to population
1	Physicians/GP	0	-
2	Health officers	2	1:46659
3	Nurses (Bsc+Dip.)	19	1:10369
4	Environmental health	2	1:46659
5	Laboratory (Bsc+Dip.)	3	1:31106
6	Pharmacist (Bsc+Dip.)	3	1:31106
7	Mid-Wifery	3	1:31106
8	HEWs	46	1:2047
9	Supportive staff	22	-
	Total	**100**	

3.1.5. Discussion

Low skilled, safe and clean delivery coverage is a major problem of the district. This is due to low community awareness on institutional delivery that many mothers give birth at home by traditional attendants. Poor awareness creation by health extension workers and less number of health centers in the district were contributed for underperformed institutional delivery. As the population of district is 93,317, they have to have four health centers as per standard of World Health Organization (WHO). By this standard, one health center serves 25,000 populations; that is why 93,317 populations should have to four health centers. However, there are only two functional health centers in the district right now. There was no death report of malaria in 2004

E.C. in this district. This could be due to effective early case management and less endemicity of the district for malaria.

Number of females who got counselling and testing service of HIV/AIDS were higher than male in 2004 E.C. This may be due to establishment of 1 to 5 women network system at all kebeles and increased participation of female students, which helps to maximize behaviour and practice of women towards health care system. In addition, number of positive clients of HIV is higher in women. This can be explained due to higher number of screened women and biological risk factors for getting of HIV infection.

Immunization coverage of the children was good as some vaccination performances were more than 80 percent in 2004 E.C. This revealed that community awareness and outreach activities were done well. Other reason for increment of vaccination coverage is routine immunization activities were done integrated with national EOS campaign. During this campaign children who did not receive pentavalent 2 and 3 in the previous year were traced and vaccinated for these doses.

According to National objective on prevention and control of Tuberculosis, efforts are invested to reduce the prevalence of TB to 156 per 100,000 populations in 2015. In this district, the prevalence of TB should be less than 146 per the population of the district (93,317). During 2004 E.C, all forms of TB were 132 that are below expected level. This exhibited that, activities were undertaken well to prevent TB cases. However, more efforts need to enhanced to increase the treatment success rate as it performed less than 70% (national level), which is 68% in the district.

Low awareness of community on construction and utilization of latrine is responsible for poor environmental sanitation activities.

3.1.6. Conclusion

The district is working on some activities to improve skilled, safe and clean delivery coverage. Mainly through established 1 to 5 women networks, awareness on institutional delivery is being created massively. As number of existing functional health centers is constraint for institutional delivery, one health center is under construction to increase health service coverage of the district. Vital statistics should be collected and compiled at district and all health institution levels. The district is expected to maintain non-functional refrigerators at kebeles to strengthen cold chain system and keep vaccine potency. However, some performances of TB prevention

and control are showed to be good, still efforts have to be doubled to increase treatment success and cure rate. Due to low number of males who got HIV counselling and test service, the district has to conduct strong mobilization to maximize their awareness.

3.1.7. Limitations

- Vital statistics such as Infant mortality rate, neonatal mortality rate, under five mortality, pregnant women, and maternal mortality rate were not available either at district health office or health institutions level.
- At district level, top leading diseases that cause outpatient morbidity were not identified by age category and sex.
- The district did not conduct data quality assessment at kebele levels to verify some performances.
- Monthly or annual average income of individual was not known at this district.
- Due to district could not conduct inventory on utilization of LLITNs and latrine, it was unable to get data on these coverage.

3.1.8. Recommendations

- Important health indicators and vital statistics should be organized at all levels.
- At health facilities, top leading causes of outpatient morbidity should be complied with important variables such as age and sex category.
- Conduct AFI surveillance
- The district health office has to conduct data quality assessment, to ensure data quality and evaluate trends of performances.
- Inventory of latrine and ITNs utilization should be conducted based on National/Regional standards.
- Non-functional refrigerators on some kebeles should be maintained to improve cold chain management.
- Community awareness should be upraised on institutional delivery.
- In practice, the number of fully immunized children must be equal or less than measles. However, in some kebeles of the district such as Barfata 1st, Dawa Lafto, and Gaba Kemisa number of fully immunized children is greater than measles. Therefore, the district should have to revise and verify this data.

3.1.9. Acknowledgment

I would like to thank Welmara district health office for their cooperation to get all available data. Mainly, my gratitude is big for Mr. Deresa Adugna, district health office plan and monitoring expert for his continuous support. In addition, I would like to thank district's finance and economic development, Education, Culture and Tourism, Land and Environmental Protection offices for their volunteer and gave me regarded data.

Finally, I would like to acknowledge Oromiya Regional Health Bureau - PHEM process, AAU school of Public Health Department of EFETP, EPHA for technical and financial support to conduct this health profile description.

3.1.10. References

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2. FMOH, Guidelines for Clinical and Programmatic management of TB, Leprosy and TB/HIV in Ethiopia, April, 2012, Addis Ababa, Ethiopia
3. Central Statistical Agency, ICF International Calverton; Ethiopia Demographic and Health Survey 2011; Maryland, USA, March 2012.
4. FMOH, Policy Planning Directorate, 2011, Addis Ababa, Ethiopia
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Annex 4.1.1: Data collection tools for District Health Profile Description

I. Historical Aspects of the area (only if relevant)

1. Why the District named that? Date of establishment of woreda.

_____

_____

_____

_____

_____

II. Geography and Climate

1. Latitude _____
2. Longitude _____
3. Altitude _____
4. Annual rain fall_____
5. Annual Temperature _____
6. Climatic zones_____ _____ _____ _____
7. Area of District (Square KM)_____

III. Infrastructures

1. Gov. Hospital (Functional) _____
2. Gov. Health Centers (Functional) _____
3. Health Posts (Functional) _____
4. Private/NGOs Health Facilities _____
5. College/TVET _____
6. Preparatory Schools _____
7. Secondary Schools _____
8. Primary Schools _____
9. Kindergartens _____
10. Telecommunication service in the District_____
11. Electricity _____
12. **Water Accessibility:-**

Pipe water Water _____ Hand dug well _____

Borehole water _____ Deep well _____

Spring Water _____ Others _____

13. Post Office _____
14. Banks _____
15. Main Roads _____
16. Number of kebeles has road access to District town in winter and summer _____
17. Number of kebeles has road access to District town only in winter _____
18. Number of kebeles with Electricity _____
19. Number of kebeles with telecommunication services _____

IV. Administrative setup

1. Total no of kebeles _____ ;urban ____ rural _____
2. Total number of villages _____
3. District boundaries by;

East _____

West _____

North _____

South _____

V. Demographic Information

1. Total Population _____; Urban _____ Rural _____
2. Male _____ Female _____ Sex ratio _____
3. Under 1 yr _____. Under 5 yrs_____.< 15 years_____.>64 years_____
4. Childbearing women (15-49 years of age) _____
5. Total population by kebele _____
6. Under 1 yr _____ under 5 yrs _____< 15 years _____ (By kebele)
7. Ethnicity

Oromo____(__%) , Amhara_____(__%), Tigre_____(__%), Gurage____(__%), Others _____ (___%)

VI. Economy

1. Main income of District_____
2. Average monthly/Annual income of population _____

VII. Infrastructures accessibility in Health and School facility

1. No. of Health Centers with: Water supply _____ Electricity _____ Telecommunication _____ Incinerator _____Access to transportation _____
2. No. of Health Posts with: Water supply _____ Electricity _____ Telecommunication_____ Access to transportation _____
3. No. of all secondary schools with: Water supply _____ Electricity _____ Latrine _____ Hand washing facility _____

VIII. Cold chain

1. Number of health posts with Refrigerator _____
2. Number of Refrigerators work with: Only Electricity power _____
   Kerosene _____
   Both _____

IX. Primary Health Care unit (linkage between health center and health post)

S.No.	Name of HC	No. of health posts under this HC	Remark
1			
2			
3			
4			
5			
6			

X. Health service coverage of District_____

XI. Man power (health professionals)

Profession category	**No.**	**Remark**
Physicians/GP		
Health officers		

Nurses (Bsc+Dip.)		
Env. Health		
Laboratory (Bsc+Dip.)		
Pharmacist (Bsc + Dip.)		
Mid-wifery		
HEWs		
Others		

XII. Top ten causes of morbidity and mortality in 2004 E.C

1. Top ten leading causes of morbidity:

Rank	Disease	No. of cases/patients	
		Adult	Under 5 yrs
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

2. **Top ten causes of admissions**

Rank	Disease	No. of cases/patients	
		Adult	Under 5 yrs
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

3. **Top ten causes of mortality**

Rank	Disease	No. of deaths	
		Adult	Under 5 yrs
1			
2			
3			
4			
5			
6			
7			

8			
9			
10			

XIII. Vital Statistics and Health Indicators (2004 E.C)

1. Total Live Births _____
2. Infant Mortality Rate _____
3. Neonatal Mortality Rate _____
4. Prenatal Mortality Rate _____
5. Under Five Mortality Rate _____
6. Crude Birth Rate_____
7. Crude Death Rate_____
8. Maternal Mortality Rate _____
9. Contraceptive Prevalence rate_____
10. ANC rate (how many of the total expected pregnancies attended ANC) _____
11. Delivery services by skill attendants (%) _____
12. Delivery Services by HEWs (%) _____

XIV. Immunization Activities: (% from Eligible)

1. Under 1 year children immunization;

   BCG___ OPV1____, OPV2____, OPV3____Penta 1____, Penta 2___, Penta 3___PCV 1___,

   PCV 2____, PCV 3____, Measles, Fully Immunized _____, PAB____
2. Tetanus Toxoid vaccination for NPW:

   TT2+ _____
3. Tetanus Toxoid vaccination for PW:

   TT2+ _____

XV. Malaria

1. Total no. of malarious kebeles_____ , Population at risk _____
2. Number of HHs with ITNS _____ (___%)
3. ITNS utilization coverage _____ (%)

4. Is IRS done this year? Yes/No _____If yes, how many times? _____No. of houses sprayed?_____
5. Total cases/yr_____ deaths/yr_____,<5yr cases_____ <5yr deaths_____
6. Malaria supplies (Coartem, RDT, etc) shortage_____
7. Other issues on malaria _____
   _____
   _____

XVI. TB/Leprosy;

1. Total TB cases_____ PTB negative_____ PTB positive____ Extra PTB _____
2. TB case detection rate _____
3. TB Rx completion rate _____ TB cure rate _____
4. TB Rx success rate _____
5. TB defaulter rate_____
6. TB Cure Rate _____
7. Death on TB Rx_____
8. Total TB patients screened for HIV_____
9. Total Leprosy cases_____ on Rx_____

XVII. HIV/AIDS;

1. Total people screened for HIV (last one year)_____
2. VCT_____ PITC_____PMTCT_____
3. HIV prevalence_____
4. HIV Incidence (new cases/yr)_____
5. Total PLWHA_____
6. ART _____

7. Other HIV prevention activities_____

_____

XVIII. Malnutrition data (2004 E.C)

1. Number of hot spot kebeles for SAM _____
2. No. OTP sites_____, No. of SC sites_____
3. Total admissions at OTP____, Total admissions at SC____
4. Total deaths at OTP and SC _____
5. Is there TSF program in the woreda_____
6. CBN program_____ PSNP_____other_____
7. General food security condition_____

_____

XIX. Environmental Health Activities

1. Latrine coverage,_____ (___%)
2. Utilization coverage _____ (_____%)
3. Public Latrine _____
4. No. of ODF Villages_____
5. No. of ODF Kebeles _____

XX. Outbreak and others disasters situations

1. Is there any outbreak occurred in the past three years? Yes/No_____, If yes, mention type of outbreaks_____
2. Explain their burden (No. of cases and deaths)_____
3. What actions were taken during outbreaks_____

   _____

   _____

   _____
4. Is there any disaster situation in the last five years?Yes/No _____, If yes, mention them_____

_____

_____

5. Explain life and economic loss of a disasters_____

_____

XXI. Budget Allocation (for health) in 2004 E.C

1. Total Governmental budget of District health office _____
2. Breakdown of budget for each activities

_____

_____

_____

_____

3. Total budget from NGOs _____

XXII. What are major health problems of the woreda?_____

_____

XXIII. Any comments, suggestions and questions regarding to this health profile description_____

_____

_____

_____

_____

Chapter – V: Scientific Manuscripts for Peer reviewed Journals

5.1. Measles Outbreak Investigation and Response in Dawe Kachen Woreda, Bale zone, Oromiya, Ethiopia, December 2013 – January 2014

Abstract

Measles is a highly contagious respiratory tract infection caused by a morbillivirus. The disease causes high morbidity and mortality worldwide. In december 2013, Dawe kachen district health office informed Bale zone health office that there were suspected measles cases identified in Dibe Kilofta kebele of the district. Hence EFETP residents were deployed to the epidemic site to describe magnitude of the disease and identify risk factors associated with the outbreak.

Five samples were collected for measles IgM confirmatory test. Burden of measles was described by person, place and time. Matched 1:2 case-control study with randomly selected 62 measles case-patients and 124 neighbourhood controls was conducted from January 15-29/2014. We interviewed study participants using structured questionnaire. Epi info 7 and Microsoft Excel were used to enter and analyse the data.

A total of 172 measles cases and 5 deaths were reported from Dawe Kachen district during epidemic period. The case fatality rate of measles was 2.8%. Of the total of 172 cases, 88 (51%) were females and 84 (49%) were males. One hundred thirty-one cases (76%) and all deaths were not vaccinated for measles. Under five years age were more ffected by the disease with age specific attack rate of 13 per 1000 population. All kebeles of the district did not have functional refrigerator for vaccine cold storage. Having vaccinated for measles had protective effect (Odds Ratio: 0.12, 95% CI: 0.06-0.31). Presence of measles case in the family (Odds Ratio: 13.5, 95% CI: 6.3-29.2), Malnutrition (Odds Ratio: 26.5, 95% CI: 3.3-210.9) and Poor ventilation (Odds Ratio: 4.6, 95% CI: 1.8-11.6) were found to be significant associated with measles outbreak.

Low measles vaccination coverage, having contact with a person suspected to have measles, poor housing condition and nutritional status were attributed for the outbreak. We recommended enhance Immunization programs, good cold chain system and increase community awareness on measles prevention and control measures.

Keywords: Measles, Outbreak, Case Control, Dawe Kachen, Ethiopia, 2014.

5.1.1. Introduction

Measles is a highly contagious respiratory tract infection caused by a morbillivirus and often occurs in explosive epidemics. The highest fatality rates are usually among children under five, and up to 20% in infants less than one year old. Measles usually does not kill children directly; however, as a result of its associated immune-suppression that lead to lethal complications, such as pneumonia, croup, and diarrhoea. Children affected by measles may suffer lifelong disabilities, including brain damage and blindness. Measles attributed for an estimated 10 million cases and 164,000 deaths worldwide each year. Highly effective vaccine has been available since the 1960s. In 2001, countries in the World Health Organization (WHO) of African Region started implementation of the regional measles mortality reduction strategies with a goal to reduce the estimated number of measles deaths in 2005 to half of the estimate for 1999 [1]. This goal was achieved, and a new goal was established to reduce measles mortality in 2009 to 90% of the estimate for 2000. The measles mortality reduction strategy adopted by the African Region includes improving routine, measles vaccination coverage, providing a second opportunity for measles vaccination through supplementary immunization activities (SIAs), monitoring the impact of vaccination activities through case-based measles surveillance, and improving measles case management [2]. The implementation of measles vaccination policies worldwide has decreased the mortality rate attributed to measles by 78% between 2000 and 2008 [3]. Between 1999 and 2004 the most significant reduction in mortality has been observed in the Sub-Saharan African region (from 530,000 to 216,000 deaths per year) which results from increment in measles vaccination coverage [3]. The national Expanded Programme on Immunization was established in 1980 in Ethiopia and includes the first dose of measles-containing vaccine (MCV1) to be given at or shortly after the ninth month of age [4].

In Ethiopia, the implementation of the regional measles mortality reduction strategy started in 2002. In 2004, a system of nationwide measles case-based surveillance was established in Ethiopia [4]. Failure to deliver at least one dose of measles vaccine to all infants remains the primary reason for high measles mortality. There are no known measles virus reservoirs outside of humans. Despite the widespread availability of measles vaccine for nearly 35 years in, measles remains a major cause of childhood morbidity and mortality. Measles outbreak was defined as

the presence of 3 or more laboratory-confirmed measles cases reported from the same district or from the same catchment area of a health facility with onset of rash within a period of a month. A measles death was defined as a death of a confirmed measles case occurring within 30 days of the onset of rash [5].

In Oromiya region measles outbreak is still a main public health concern. During the period of 2013/14, measles epidemics were reported from eight zones namely; Arsi, Bale, Borena, Guji, Horro Guduru Wollega, Illubabor, Kellam Wollega, West Hararghe and West Shewa of the region. Unpublished outbreak investigation report by Field Epidemiology Training Program Residents showed that the possible factors associated with the disease were low immunization coverage, malnutrition, poor cold chain management and community attitude toward measles control. About 1500 confirmed and epidemiologically linked measles cases with 20 deaths were reported from these epidemic areas.

In the last five years there were huge measles epidemics in Dawe Sarar, Harena Bulluk and Gololcha districts of Bale zone. Dawe Kachen is one of 20 woredas of Bale zone Oromiya region. According to population projection from 2007 census, the woreda has a total population of 42,862 of which 18,408 are males and 18,780 are females. One town and 13 rural kebeles are found in the woreda. There are two health centers in this woreda and the woreda town Mio is found 565 kilometres from Addis Ababa. The woreda has a surface area of 2,291 kilometres square. Among total land of the woreda, 78% is flat and the rest 22 is mountainous, valley and sloppy nature. Of the total population of the woreda, 31% are farmers and the rest 69 are agro-pastoralists. The woreda is bounded by Rayitu and Ginir woredas to the North, by Gura Dhamole woreda to the south, by Goro woreda to the west and by Dawe Serer woreda and Somali region to the east. Totally, the weather condition of the woreda is dry. In Dawe Kachen woreda of Bale zone measles outbreak was not observed during the last ten years. After received report of suspected measles cases from the woreda, we investigated the outbreak to describe magnitude of the measlse and identify factors associated with occurrence of the disease and implement control measures of measles.

5.1.2. Methods and Materials

5.1.2.1. Laboratory Investigation

Five blood samples were collected from suspected measles cases and sent to Central Laboratory for IgM confirmatory test.

5.1.2.2. Case Definitions

Standard case definition of measles: - Suspected: Any person with fever and maculopapular (nonvesicular) generalized rash, and cough, coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles.

Confirmed: A suspected measles case that is investigated, including the collection of an adequate blood specimen (5ml), and has serological confirmation of recent measles virus infection (IgM positive).

Community case definition of measles: - Any person with fever and rash starts from face.

5.1.2.3. Descriptive Epidemiology

The previous five years data of EPI coverage was reviewed and collected from the woreda. Similarly, this data was collected from health facilities for data quality assurance. Also, data was gathered on current cold chain status and magnitude of malnutrition. Magnitude of the disease was described by sex, age, kebeles, date of onset, vaccination status and other variables from measles linelist.

5.1.2.4. Analytical Epidemiology

We conducted 1:2 ratio of case-control study in Dawe Kachen woreda. Case-patients were those who suspected to have measles by health facility workers before the study and active cases for suspected measles cases by investigation team at the community level. Neighbourhood controls were selected and matched with measles case-patients Selected case-patients and controls were interviewed with standard and identical questionnaire. Different risk factors including vaccination status, contact history, housing condition, knowledge of the family, and nutritional status were assessed during this study, condition, knowledge of the family, and nutritional status were assessed during this study.

5.1.2.5. Environmental Assessment

During this investigation, environmental factors that may contribute for the occurrence of measles outbreak and its magnitude were looked for. These factors include area of living house and ventilation status of the house for both selected case-patients and controls.

5.1.2.6. Data Processing and Analysing

Data entered and summarized using Microsoft Excel. Analysis of different risk factors/exposures was done by using Epi info version 7.1 software. Epi-curve, magnitude and frequency of a disease was presented in figure and table forms. Measles attack rate and case fatality ratio were calculated among total cases and deaths. Additionally, estimated odds ratio

and 95% confidence interval were determined through bivariate analysis.

5.1.3. Results

5.1.3.1. Laboratory

Five blood samples were collected and sent to Central Laboratory for IgM confirmatory test. Of these sent samples, four of them were confirmed positive for measles IgM test. The rest 173 cases were epidemiologically linked with confirmed measles cases.

5.1.3.2. Descriptive Epidemiology

A total of 172 measles cases and 5 deaths were reported from 27/12/2013 to 24/01/2014 from Dawe Kachen woreda. The attack rate of the disease per 1000 population was 4.8 and CFR was 2.8% in this woreda. Among a total of five deaths reported from Dibe Kilofta kebele, four of them were community death. Of the total 172 cases, 88 (51.2%) were females and 84 (48.8%) were males. Of a total of 172 cases, 17 (9.9%) of them were admitted with measles complications such as pnuemonia, diarrhea, otitis media, convulsion and feeding problem. Due to late detection of the outbreak by woreda and population movement/migration for water search it was found to be difficult to find the endex case. The cases reach its peak in fourth week of december 2013 and started to decline in the same month until january 2014 (figure 5.1.1).

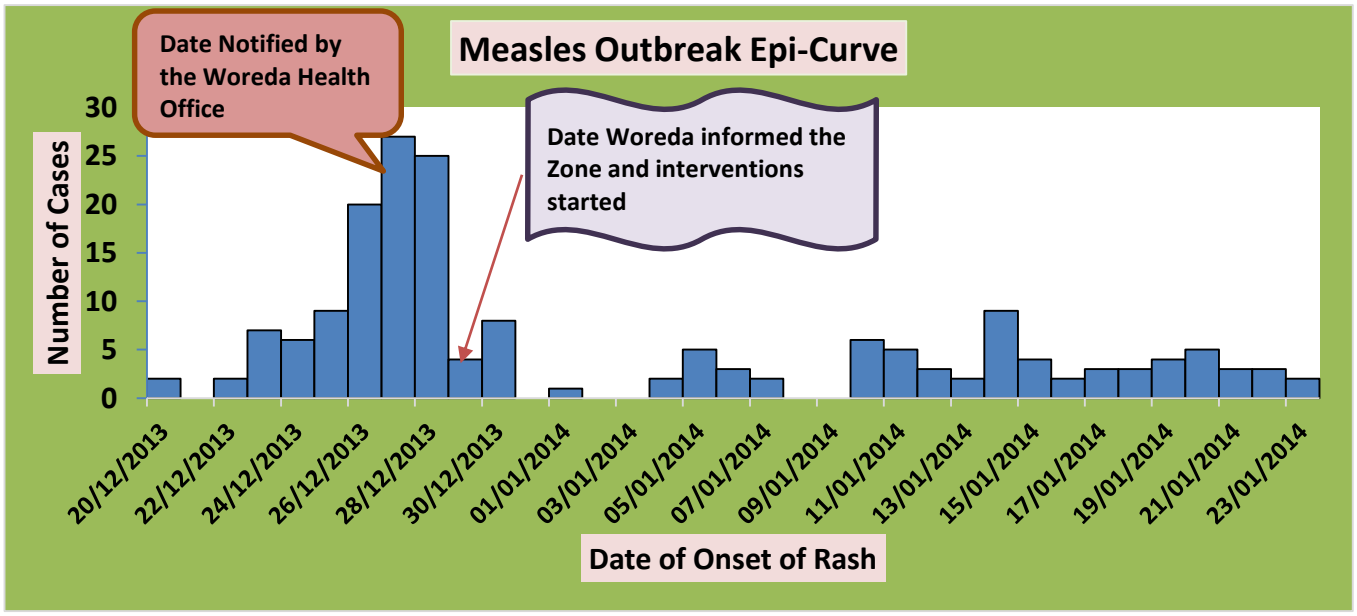

Figure 5.1.1: Number of measles cases by date of onset of rash, Dawe Kachen woreda, Bale, Oromiya from December 20/12/2013 to January 23/01/2014

Of the total 14 kebeles of the woreda, 7 (50%) were affected by this outbreak with the highest cases reported from Dibe Kilofta (32 per 1000 pop.) kebele.

Table 5.1.1: Measles Attack Rate and Case Fatality Rate by Kebele, Dawe Kachen Woreda, Bale, Oromiya, December 2013 – January 2014.

S.N	Kebeles	Total Population	Number of Cases	Number of Deaths	Attack Rate (per 1000 population	Case Fatality Rate (%)
1	Dibe Kilofta	3684	114	5	32.3	4.2
2	Dibe Mole	3885	27	0	6.9	0
3	Bake Kora	2345	11	0	4.7	0
4	Oda Didibisa	2840	10	0	3.5	0
5	Didibisa Gale	2098	4	0	1.9	0
6	Megalo Serbo	2301	4	0	1.7	0
7	Kubi Weldaya	3174	2	0	0.6	0
	Woreda	**37188**	**172**	**5**	**4.8**	**2.8**

Under five years age were more affected by the disease with attack rate of 13 per 1000 population. One hundred and thirty one (76%) cases and all deaths were not vaccinated for measles; whereas only 3 (2%) of them were vaccinated twice and more.

Table 5.1.2: Measles cases by Age and Sex category, Dawe Kachen, Bale, Oromiya, December 2013 – January 2014.

Age Group	Sex		Total Number of Cases
	Male	Female	
< 5	40	37	77
5 – 9	11	19	30
10 – 14	3	4	7
15 – 19	17	6	23
20 – 24	3	7	10
25 – 29	6	9	15
30 – 34	2	4	6
≥ 35	2	2	4
Total	**84**	**88**	**172**

All kebeles of the woreda did not have functional refrigerator for protection of vaccine efficay. Due to this reason, these kebeles are performing routine EPI and supplemntal immunization activities by shipping the vaccines from two health centers found in their catchment area. Measles vaccination coverage of the woreda was 80% for 2005 E.C.

5.1.3.3. Analytical Epidemiology

In this investigation a total of 62 measles case-patients and 124 neighbourhood healthy controls were selected with a ratio of 1 case to 2 controls. Selected controls were matched with case-patients by age and sex. Among a total of 62 interviewed cases, 34 (55%) were females and 28 (45.2%) were males. The mean and median age of case-patients was 10.2 and 5 respectively. Having vaccinated for measles was found to be protective factor for measles cases (OR: 0.14, 95% CI: 0.06-0.31). Having contact history with a person suspected to have measles case during the last 2-3 weeks (OR: 18.9, 95% CI: 8.8-40.9), presence of measles case-patient in the family (OR: 13.5, 95% CI: 6.3-29.2) and malnutrition (OR: 26.5, 95% CI: 3.3-210.9) were associated with the disease. However, educational status of the family and knowing measles modes of transmission were not associated with the outbreak of measles.

5.1.3.4. Environmental Assessment

Housing condition of households in their ventilation status was significantly associated with the disease (OR: 4.6, 95% CI 1.8-11.6). The minimum family size for both case and control was 2; minimum estimated house area was 9 m^2 for both cases and controls. The mean of family size for cases and controls were 7 and 6 respectively. Additionally, mean of estimated house area for cases and controls were 15 and 17 m^2 respectively.

5.1.4. Discussion

Measles outbreak is expected and could frequently occurred in area with low measles immunization coverage and poor cold chain management even with high vaccination coverage. The woreda health office measles vaccination coverage report indicated the last five years (2001 – 2005 E.C) were below 75% except for 2005 (80%). This shows that low vaccination coverage in the woreda resulted from poor community mobilization activity was attributed for the occurrence of the outbreak. Absence of vaccine cold storage at all kebeles may contributed for the disease mainly for cases who vaccinated for measles before. Similar case-control study done in Dawe Serer and Herena Buluk woredas of Bale zone in Oromiya region showed that low vaccination coverage and non-functional cold storage were likely contributed for measles outbreak occurrence in these area [6]. Our study exhibited that poor ventilation of the case-patient's house was significantly contributed for the outbreak. Similarly, measles outbreak case-control study in china documented that basement of internet café which have comparatively poorer ventilation was a stronger risk factor for acquisition of measles [9]. In this epidemic sites of Dawe Kachen woreda, area of the house may supported measles transmission within the family. This is due to WHO recommends 11 or more meter square floor space for 2 persons, 9-10 for 1.5 persons and 7-9 for 1 persons which is not coincide with our findings [10]. A retrospective community-based study conducted in West Hararghe zone in Ethiopia following a measles outbreak in 2007 estimated that the case- fatality ratio was 6.7%. Similarly, several studies in other countries documented that case fatality ratios were $\geq$2.4% including a case fatality ratio of 18.2% among cases aged < 5 years during an outbreak in Niger [11, 12]. Current

estimates of CFRs used by WHO in endemic countries range between 0.05% - 6%. The measles case fatality ratio in this woreda was 2.8% that fall between WHO estimates. This may be due to strong case management in affected kebeles.

Most kebeles of the woreda are highly prone for malnutrition that usually contributed for the occurrence and extent of measles outbreak. Majority of the OTP admissions in 2005 (63%) and 2006 (69%) as woreda were reported from measles affected kebeles. Following this, we identified that malnutrition was one of contribution factors for the outbreak. Also malnutrition was contributed for measles complications in this area which is same with cross sectional retrospective study conducted in Philippines on risk factors associated with measles pneumonia [10].

5.1.5. Limitation

At the beginning of the outbreak investigation, there was a challenge of communities to bring measles case-patients to health facilities for modern treatment. However, this was gradually formed through intensive health education. Measles line-list was not properly filled by the woreda workers until the Regional team arrived there and made corrections on. Absence of child immunization card at household level was made difficult to get exact date of vaccination and other relevant information.

5.1.6. Conclusion

We confirmed the presence of measles outbreak in Dawe Kachen woreda of Bale zone. The results of this investigation documented that low measles vaccination coverage in the woreda was the main contributed factors for the size and severity of the outbreak. During this outbreak, age of 0-4 years children were more affected by measles compared with others age groups. Due to high magnitude of malnutrition in the woreda, this outbreak was aggravated mainly in two kebeles from where more admissions of malnutrition were reported. Ventilation status and estimated area of the house were highly contributed for the transmission and magnitude of measles outbreak in Dawe Kachen woreda. The woreda surveillance capacity of outbreak was poor as they detected lately and unable to find the index case for measles outbreak.

5.1.7. Recommendation

Mop-up mass vaccination campaign should be conducted throughout the woreda and its bounded woredas mainly in especially for those their routine vaccination coverage is low. Routine EPI service should be strengthened and pentavalent to measles dropout rate should be less than 10%. Cold chain management should be improved and one fridge should be established at least for three or four closer kebeles and should be functional throughout the month. Strong social mobilization should be conducted to increase the community awareness on uses of immunization, and measles prevention and control mechanisms. Mainly, community's awareness should be optimized on good housing condition and other environmental protection practices. Active surveillance activities of the woreda need to be revised and strengthen to enable early detection of the outbreak. In Oromiya region measles outbreak is occurring among one measles vaccination dose received children. This indicated that may be two dose and above strategy should be maintained and enhanced onwards. Screening and treatment of malnourished cases should strengthened in the woreda.

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Chapter – VI: Abstracts for Scientific Presentation

Authors: Gemechu Sh. Bejiga, L. Boulanger, T. Deti

Name of FETP: Ethiopia

Email: milkigeme@gmail.com

6.1. Malaria Outbreak Investigation and Intervention, Ilu woreda, South-Western Oromiya, Ethiopia, 2013

Background: Malaria is mosquito-borne parasitic disease and one of the most serious health problems of human beings. Despite intensive control measure like vector control and environmental management malaria remained a public health concern of the country. Unusual malaria cases increment was reported from Ilu district, Oromia, Ethiopia in October 2013. We investigated the outbreak to describe the magnitude of the disease and identify risk factors associated with the outbreak.

Method: Microscopic and RDT laboratory investigation conducted to confirm the disease. Magnitude of the disease was described by person, place and time. Previous years malaria data was reviewed to establish threshold level and understand trends of the disease. We conducted case-control study with randomly selected 109 cases and matched 109 community controls for age and sex. Epi Info 7.1 and Microsoft Excel were used to perform data entry and analysis. We also assessed environmental risk factors for the outbreak.

Result: A total of 6,042 confirmed malaria cases (Attack Rate: 80 per 1000) and zero death were reported from August to November 2013 with a peak in October. Slide positivity rate was 57.6%. Greater than four years old were more affected by malaria (Attack Rate 84 per 1000). Using bed net every night was found to be protective effect for the disease (Odds Ratio: 0.4, 95% CI: 0.2 - 0.8). Presence of stagnant water (Odds Ratio: 2.04, 95% CI: 1.2 - 3.5), uncovered plastic water container in or outside home (OR: 2.3, 95% CI: 1.1-4.5) and broken glass (OR: 2.3, 95% CI: 1.9-5.8) were associated with the disease.

Conclusion and Recommendation: Low insecticide treated bed net utilization, presence of stagnant water, uncovered plastic water container and broken glass in or outside home were attributed for the outbreak. We recommended proper ITNs utilization, regular indoor chemical and strong environmental management.

Keywords: Malaria, Outbreak, Case-Control, Ilu, Ethiopia

Word count: 287

Authors: [1] Gemechu Sh. Bejiga, [2] Birhanu Areda, [3] Lucy Boulanger, [4] Wagari Deresa

Address: [1 2] Addis Ababa University School of Public Health Ethiopian Field Epidemiology Training Program Cohort Four Residents, [3] Ethiopian Field Epidemiology Training Program Resident Advisor, [4] Addis Ababa University School of Public Health Dean.

6.2. Measles Outbreak Investigation and Response in Dawe Kachen Woreda of Bale zone, Oromiya Region, Ethiopia, 2014

Measles is a highly contagious respiratory tract infection caused by a morbillivirus. The disease causes high morbidity and mortality worldwide. In december 2013, Dawe kachen district health office informed Bale zone health office that there were suspected measles cases identified in Dibe Kilofta kebele of the district. Hence EFETP residents were deployed to the epidemic site to describe magnitude of the disease and identify risk factors associated with the outbreak. Five samples were collected for measles IgM confirmatory test. Burden of measles was described by person, place and time. Matched 1:2 case-control study with randomly selected 62 measles case-patients and 124 neighbourhood controls was conducted from January 15- 29/2014. We interviewed study participants using structured questionnaire. Epi info 7 and Microsoft Excel were used to enter and analyse the data. A total of 172 measles cases and 5 deaths were reported from Dawe Kachen district during epidemic period. The case fatality rate of measles was 2.8%. Of the total of 172 cases, 88 (51%) were females and 84 (49%) were males. One hundred thirty-one cases (76%) and all deaths were not vaccinated for measles. Under five years age were more affected by the disease with attack rate of 13 per 1000 population. All kebeles of the district did not have functional refrigerator for vaccine cold storage. Vaccination status had protective effect (Odds Ratio: 0.12, 95% CI: 0.06-0.31). Presence of measles case in the family (Odds Ratio: 13.5, 95% CI: 6.3-29.2), Nutritional status (Odds Ratio: 26.5, 95% CI: 3.3-210.9) and Poor ventilation status (Odds Ratio: 4.6, 95% CI: 1.8-11.6) were found to be significant associated with measles outbreak. Low measles vaccination coverage, having contact with a person suspected to have measles, poor housing condition and nutritional status were attributed for the outbreak. We recommended enhance Immunization programs, good cold chain system and increase community awareness on measles prevention and controls measures.

Keywords: Measles, Outbreak, Matched Case-Control, Dawe Kachen, Ethiopia.

Characters (with spaces): 2040

Chapter – VII: Narrative Summary of Disaster Situation

7.1. Narrative Summary Report on Belg Assessment in Borena and Guji zones, Oromiya, Ethiopia, 2013

Executive Summary

Among 18 teams established at Federal level for belg assessment, four of them were assigned in Oromiya region in selected nine zones. Our team (team 6) was assigned in Borena and Guji zone. These zones are among 18 zones of Oromiya region and found in western part of the country. This assessment is intended to investigate the extent, types, magnitude, severity and likelihood of different risks in the most "vulnerable" Woredas and develop response plan based on identified findings.

Visited districts were selected by discussing with zonal Epidemic Preparedness Task Force and considering districts those were selected by Regional. The same procedures were done at district level to select visited kebeles, health facilities and villages. Following this, three districts (Dillo, Yabello Rural and Bule Hora) from Borena and two districts (Goro Dola and Liban) from Guji were assessed from June 15 to 30, 2013. At each level interview and discussion were conducted with concerned bodies including community members by using prepared checklists. Additionally, review of documents was done at zonal and district level.

Even though they did not have regular meeting there are functional multi-sectorial coordination forum at both zonal level. In Guji zone, there were measles cases in three districts with a total of 116 cases and 4 deaths from March to June 2013. Additionally, there was Meningitis outbreak before three months in Guji zone. However, there was no outbreak in Borena zone during the past three months. There were a shortage of emergency drugs and supplies at all visited districts of both zones. Mortality of major communicable diseases was significantly decreased in both zones. There was poor latrine coverage and utilization at visited districts. Similarly, there was poor coverage of drinking water in all visited districts of both zones. Due to lack of drinking water in the coming six months, AWD is anticipated to increase in some districts of both zones. Poor cold chain management and low vaccination coverage were contributed for measles outbreak in Guji zone.

Multi-sectorial coordination forum should be strengthened at all levels in Borena and Guji zones. Medical supplies for emergency management should be adequately maintained at zonal, district and health facility level.

7.1.1. Introduction

Need is not a precisely definable or measurable quantity. Needs Assessments are simply systematic processes for collect information and making justifiable decisions. Experience has shown that coordinating needs assessments is an important element in saving lives and restoring people's livelihoods. Along with emergency preparedness, the timeliness and quality of assessments help determine an effective humanitarian response.

A coordinated assessment is an assessment planned and carried out in partnership by humanitarian actors, in order to document the impact of a particular crisis and to identify the needs of affected populations.

In Borena zone, there are 13 rural districts and 1 town administration. Among these districts, 10 of them are pastorals and 3 are agro-pastorals. Similarly, in Guji zone there are 13 rural districts and 3 town administrations of which five districts are pastorals and the rests are agro-pastorals. From 2007 Population census projection, total population of Borena and Guji zones is 1,168,712 and 1,721,530 respectively. In both zones there are 572 rural and 48 urban kebeles. There are 3 governmental hospitals, 53 health centers and 192 health posts in the Borena zone. In Guji zone there are 2 governmental hospitals, 56 health centers and 302 health posts. Borena zone is bounded by SNNP region to the north, Kenya to South, Guji zone and Somale region to East and SNNP to the West. Guji zone is bounded by Bale zone to the east, Somale region to southeast, Borena zone to south-west, SNNPR to north and north-west. The health service coverage of Borena zone is 92%; whereas 84% in Guji zone. This belg assessment is conducted from June 16 to 30, 2013 by formulated team from Ministry of Agriculture, Regional Health Bureau, Regional Water, Mineral and Energy Bureau, Regional DPPC and Pastorals, NGOs and UN agencies. This assessment is aimed to identify health and health related events/hazards, to determine actual capacity of zonal problem solving and propose recommendations on identified problems.

Table 7.1.1: Socio-demographic status of visited districts in both zones, 2013.

Vital Statistics		Districts				
		Yabello Rural	**Dillo**	**Bule Hora**	**Goro Dola**	**Liben**
Total Population	Male	51,540	13,545	160,550	40,324	41,069
	Female	47,767	13,545	156,796	40,324	41,069
	Total	**99,307**	**27,090**	**317,346**	**80,648**	**82,138**
Number of Reproductive age group Women		22,840	6,231	72,990	18,549	18,892
Number of Pregnant Women		3,674	1,002	11,742	2,984	3,039
Number of Lactating Women		No Data	No Data	10,694	No Data	No Data
Under 5 Children		16,286	6,068	52,044	13,227	13,471
Live Births		3,606	984	11,460	2,926	2,945

7.1.2. Objectives

- To assess the extent, types, magnitude, severity and likelihood of different risks
- 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

7.1.3. Methods

1. Visited woredas were selected based on regional need and discussion with zonal task force
2. Checklists were used during data collection at zonal and woreda level
3. Discussion was done with woredas task force
4. Observation was conducted during interviewing for confirmation
5. Communities were interviewed on some issues such as health service delivery, feeding behaviour and availability of drinking water
6. Debriefing was given for Zonal and district task forces on assessment findings

7.1.4. Results

7.1.4.1. Coordination

There is functional multi-sectorial coordination forum at both zonal level. In this forum all relevant government, NGOs and UN agencies were represented. However, they did not meet regularly. Similarly, there is functional multi-sectorial PHEM coordination forum in all visited districts of both zones. However, there is a shortage of funds for PHE preparedness and response activities in these districts.

7.1.4.2. Top five Morbidity

In all visited three districts of Borena zone, pneumonia is a leading cause of morbidity in below five years of age. Similarly, pneumonia is leading cause of morbidity for above five years two districts of Borena zone (Dillo and Bule Hora). Additionally, pneumonia is is a leading cause of morbidity for both under and above age categories in Goro Dola district of Guji zone.

Table 7.1.2: Top five causes of morbidity in under five years children in visited districts of Borena and Guji zone, from September to March 2005 E.C.

Zone	Districts	Top Five causes of morbidity in under five years children				
		1	2	3	4	5
Borena	Yabello Rural	Pneumonia	Malaria	Intestinal Parasite	Diarrheal Disease	Acute Febrile Illness
	Dillo	Pneumonia	Diarrheal Disease	Respiratory Tract Infection	Malaria	Intestinal Parasite
	Bule Hora	Pneumonia	Intestinal Parasite	Diarrheal Disease	Skin diseases	Malaria
Guji	Goro Dola	Pneumonia	diarrheal Disease	Intestinal Parasite	Skin Infection	URTI
	Liben	Pneumonia	Diarrheal Disease	Malaria	Respiratory Tract Infection	Skin Infection

Table 7.1.3: Top five causes of morbidity in above five years in visited districts of Borena and Guji zone, from September to March 2005 E.C.

Zone	Districts	Top Five causes of morbidity in above five years				
		1	2	3	4	5
Borena	Yabello Rural	Malaria	Pneumonia	Diarrheal Disease	URTI	Acute Febrile Illness
	Dillo	Pneumonia	Diarrheal Disease	Malaria	Urinary Tract Infection	Gastritis
	Bule Hora	Pneumonia	Typhoid Fever	Respiratory Tract Infection	Diarrheal Disease	Malaria
Guji	Goro Dola	Pneumonia	Malaria	Diarrheal Disease	Acute Respiratory Infection	Acute Febrile Illness
	Liben	Diarrheal Disease	Pneumonia	Acute Respiratory Infection	STI	Typhoid Fever

7.1.4.3. Cases and Deaths of major Epidemic prone diseases

During the past five months (Jan - May 2013), there were no confirmed cases and deaths of AWD and Meningitis in all visited districts of Borena zone. However, one suspected Measles case was reported from Bule Hora district in May 2013. In the contrast, there were confirmed measles and meningitis cases in Guji zone. In the last five months (Jan-May 2013), a total of 116 measles and 42 meningitis cases were reported from Guji zone. Of the total of measles cases, 64 (55%) of them were reported from Goro Dola district. Four measles deaths were reported from Guji zone between January to May 2013.

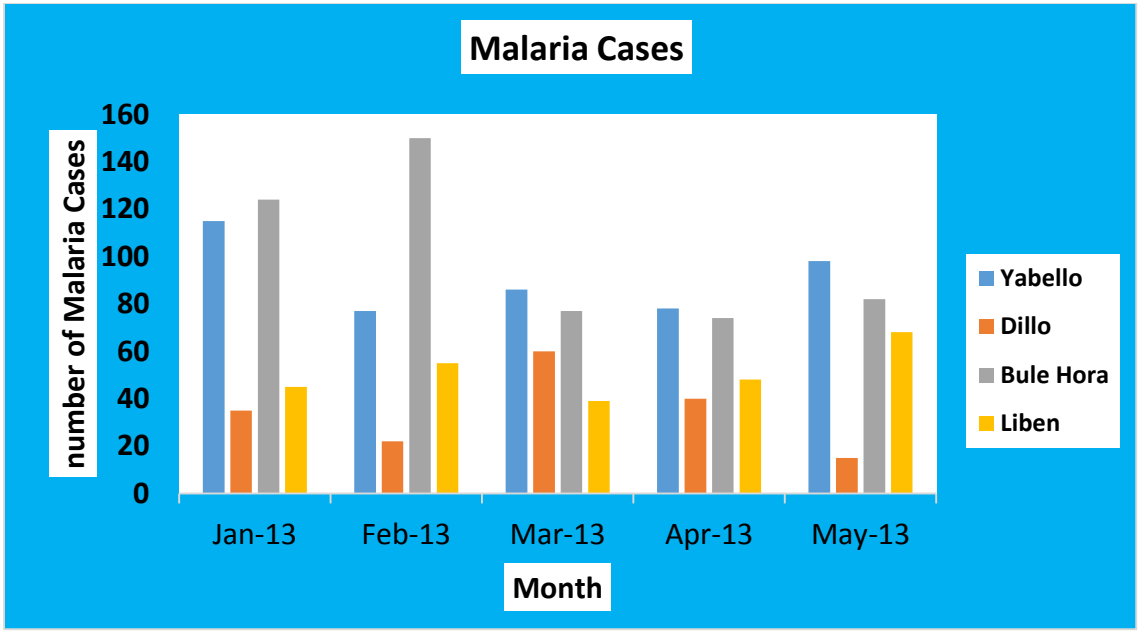
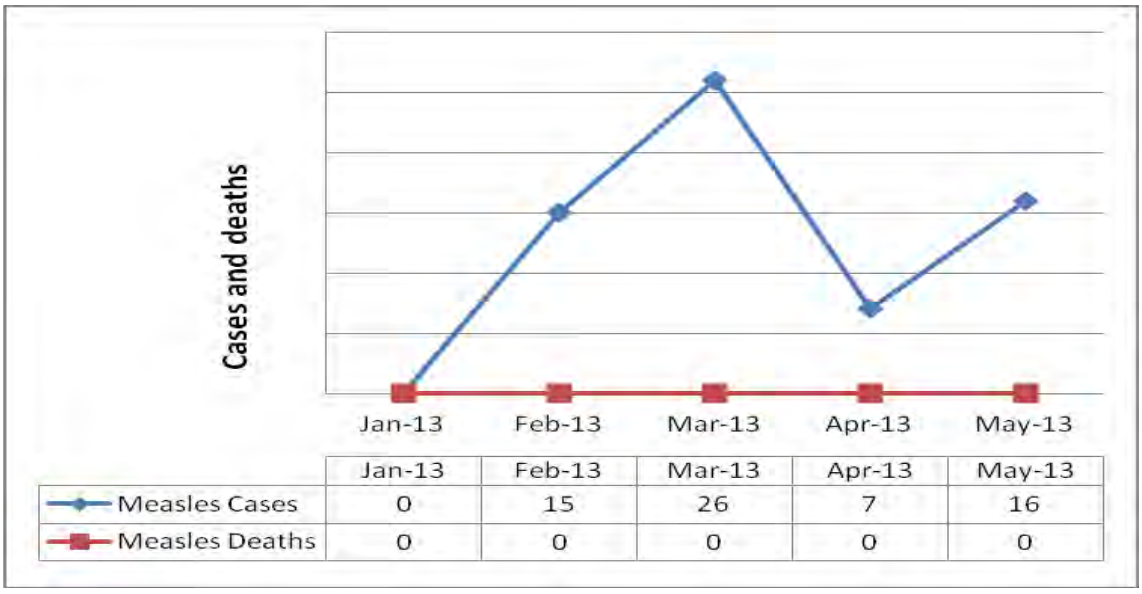


Figure 7.1.1: Number of Malaria Cases in Yabello Rural, Dillo districts (Borena) and Liben district (Guji), Oromiya, from Jan-May, 2013



	Jan-13	Feb-13	Mar-13	Apr-13	May-13
Measles Cases	0	15	26	7	16
Measles Deaths	0	0	0	0	0

Figure 7.1.2: Number of Measles cases and deaths in Goro Dola district, Guji zone, Oromiya, from Jan-May 2013

The PHEM report completeness of most visited districts in both zones was good mainly for Yabello woreda of Borena zone. In this district, the PHEM report completeness was 100% for most weeks (11/12) from August to September 2012.

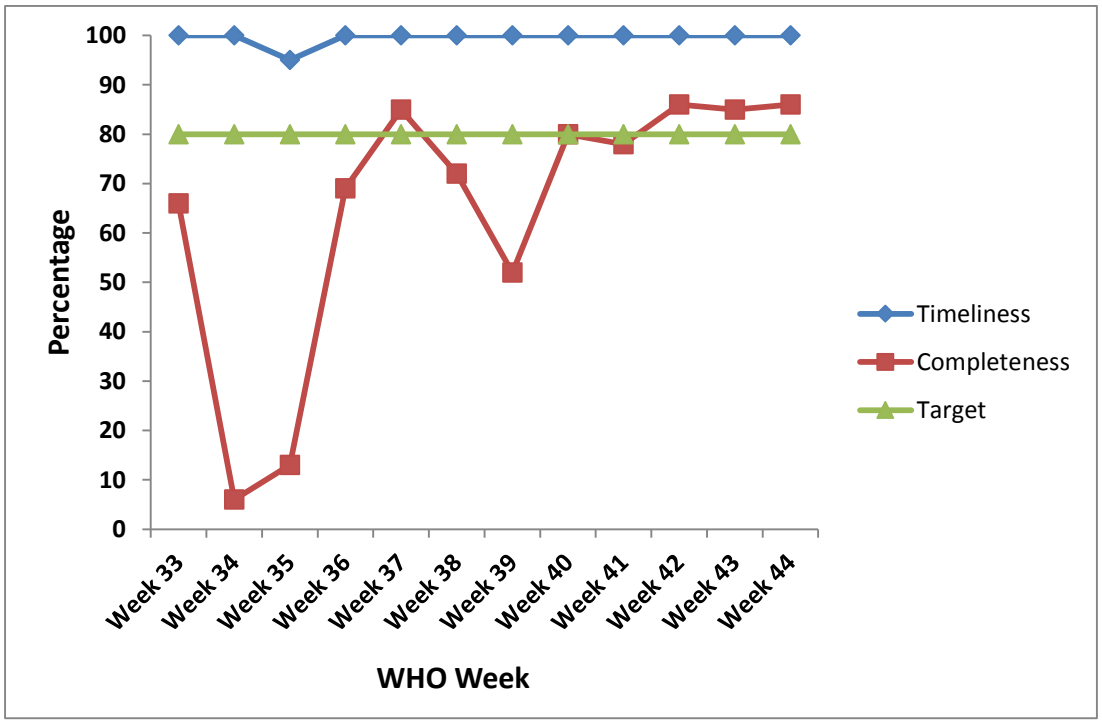


Figure 7.1.3: Weekly timeliness and completeness of Yabello district, Borena zone, Oromiya from July to September 2012

In Goro Dola district of Guji zone, both timeliness and completeness were 80% and above during the week of August to September 2012 except for WHO Epi. Week 38.

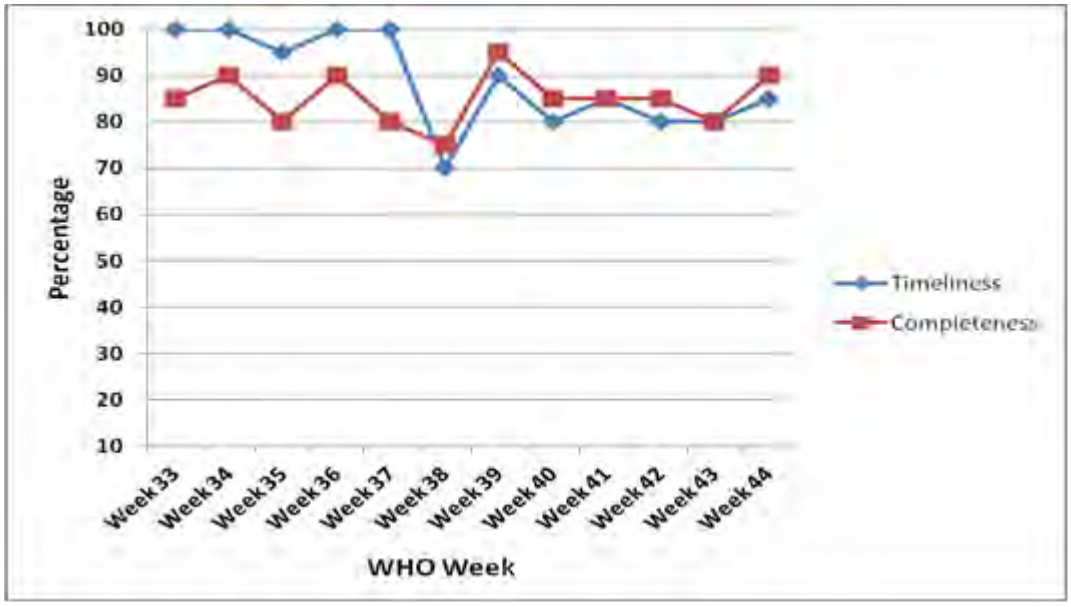


Figure 7.1.4: Weekly timeliness and completeness of Goro Dola district, Guji zone, Oromiya from July to September 2012

7.1.4.4. Existence of Outbreaks

There were no unusual outbreaks in Borena zone during the past three months. Malaria is shown increasing in Teltele, Abaya, Gelana and Bule Hora districts of Borena zone. So that, epidemic of malaria anticipated to occur in these districts. In the last three months, there were measles outbreak in Goro Dola, Shakiso and Uraga districts of Guji zone. From these districts, 116 cases and 4 deaths of measles were reported. In addition, some cases were reported from Goro Dola district in this month (June). Distance of households from health facilities and poor attitude on measles treatment were contributed for the ongoing occurrence of measles cases in Goro Dola district

7.1.4.5. Preparedness and Availability of Drugs and Medical Supplies

Shortage of emergency drugs and supplies was a major problem at both zonal and some district levels. According to both Zonal stock balance, Anti-Malaria drugs, AWD Kits, Oily CAF, ORS, Clinical Delivery Assistance kit PART A and B were observed as a big shortage and not available totally. Mainly in Yabello district of Borena zone, this problem was identified as very critical. In many districts of Guji zone, drug and other medical supplies those were supplied by Pharmaceuticals Fund and Supply Agency did not coincide with districts need. Many districts

of both zones did not allocate budget for Rapid Emergency Response. There were trained staffs on Minimum Initial Service Package for Reproductive Health at both Zonal level.

Table 7.1.4: Requirement, availability and gaps of drugs and medical supplies in Borena zone, Oromiya, 2013

Drugs and Medical Supplies		Unit	Total requirement	Available	Gaps
Drugs	Coartem	Box	2,237	60	2,177
	Artesunate (rectal)	Pack	210	75	135
	Artesunate (Inj)	Vial	2460	20	2,440
	Artemether IM	ND	ND	0	ND
	Quinine (PO)	Box	25	0	25
	Quinine (IV)	Box	260	0	260
	Chloroquine	Tin	60	0	60
	Ceftriaxione	Vial	17,359	0	17,359
	Oily CAF	Bottle	1550	0	1,550
	Doxcycline	Box	190	30	160
	Ringer lactate	Carton	290	60	230
	ORS	Box	240	50	190
	Vit A.	Tin	296	5	291
Lab Supplies	RDT (Malaria)	No.	23,649	10,000	13,649
	Pastorex (Meningitis)	No.	ND	0	ND
	LP set	No.	123	0	123
	TI bottle	No.	10	0	10
CTC Kit (AWD)		No.	31	0	31
Medical Supplies	Gloves	Box	380	160	160
	Syringes	Pieces	64,477	0	64,477
	PPE	Kit	280	0	280
Clinical Delivery Assistance kit PART A: Reusable Equipment		Kit	50	0	50
Clinical Delivery Assistance kit PART B: Drugs & Disposable Equip.		Kit	50	0	50

Mgt. of Complications of Abortion kit (Manual Vacuum Asp. Set)	Kit	50	10	40

N.B. ND in above table stands for No Data.

Table 7.1.5: Requirement, availability and gaps of drugs and medical supplies in Guji zone, Oromiya in 2013

Drugs and Medical Supplies		Unit	Total requirement	Available	Gaps
Drugs	Meningitis Vaccines	Vial of 10 doses	43400	0	43400
	Coartem	Box of 6x4x30tab	200	0	200
	Artesunate (rectal)	Strip	2000	0	2000
	Artesunate (Inj)	Vial	4200	0	4200
	Artemether IM	Ampule	2000	0	2000
	Quinine (PO)	Blister	2500	0	2500
	Quinine (IV)	Ampule	2800	0	2800
	Chloroquine	Strip	4000	1000	3000
	Ceftriaxione	Vial	2973	0	2973
	Oily CAF	Vial	2500	0	2500
	Doxcycline	Strip	300	0	300
	Ringer lactate	Bag	6500	0	6500
	ORS	Sachet	4500	0	4500
	Vit A.	Tin	50	10	40
Lab Supplies	RDT (Malaria)	Test	50000	30000	20000
	Pastorex (Meningitis)	Set	30	0	30
	LP set	Set	30	0	30
	TI bottle	Bottle	15	0	15
CTC Kit (AWD)		Kit	15	0	15
Medical Supplies	Gloves	Pair	26000	0	26000
	Syringes	Pieces	30000	0	30000
	PPE	Kit	150	0	150

Clinical Delivery Assistance kit PART A: Reusable Equipment	Kit	45	0	45
Clinical Delivery Assistance kit PART B: Drugs & Disposable Equip.	Kit	95	0	95
Mgt. of Complications of Abortion kit (Manual Vacuum Asp. Set)	Kit	20	0	20

Table 7.1.6: Availability of enough emergency drugs and supplies for one month in visited districts of Borena and Guji zones, Oromiya Region, 2013

Drugs and Supplies	**Availability of drugs and supplies for one month (yes/no)**				
	Borena			**Guji**	
	Yabello Rural	Dillo	Bule Hora	Goro Dola	Liban
Ringer Lactate (to treat AWD cases)	**No**	**Yes**	**No**	**Yes**	**Yes**
ORS (to treat AWD cases):	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Doxycycline *(to treat AWD cases)*:	**No**	**No**	**No**	**Yes**	**Yes**
Consumables : Syringes, Gloves *(for AWD management):*	**No**	**Yes**	**No**	**Yes**	**Yes**
Amoxil susp (measles)	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Tetracycline ointment (measles)	**No**	**Yes**	**No**	**Yes**	**Yes**
Vit A (measles)	**No**	**Yes**	**No**	**Yes**	**Yes**
Coartem for Malaria	**No**	**No**	**No**	**Yes**	**No**
Artesunate (rectal) for Malaria	**No**	**No**	**No**	**Yes**	**No**
Artesunate (Injection) for Malaria	**No**	**No**	**No**	**Yes**	**No**
Artemether IM for Malaria	**No**	**No**	**No**	**Yes**	**No**
Quinine (PO) for Malaria	**No**	**No**	**Yes**	**Yes**	**No**
Quinine (IV) for Malaria	**No**	**No**	**No**	**Yes**	**No**
Chloroquine for Malaria	**No**	**No**	**Yes**	**Yes**	**No**
Ceftriaxione (Meningitis)	**No**	**No**	**No**	**Yes**	**No**
RDT for Malaria	**Yes**	**No**	**Yes**	**Yes**	**No**

RDT (pastorex) for M eningitis	**No**	**No**	**No**	**No**	**No**
LP set	**No**	**No**	**No**	**No**	**No**
Number of CTC kit available: (for AWD)	**No**	**No**	**No**	**Yes**	**No**
Clinical Delivery Assistance kit PART A: Reusable Equipment	**No**	**Yes**	**Yes**	**Yes**	**No**
Clinical Delivery Assistance kit PART B: Drugs & Disposable	**No**	**Yes**	**No**	**Yes**	**No**
Mgt. of Complications of Abortion kit (Manual Vacuum Asp. Set)	**No**	**No**	**No**	**Yes**	**No**

7.1.4.6. Risk Factors

7.1.4.6.1. Malaria

Malaria cases were increasing in Teltele, Abaya, Gelana and Bule Hora districts of Bale zone. Similarly, In Liben district of Guji zone malaria cases were increased compared with previous year. In addition, some breeding sites of mosquito and interrupted rivers those are potential for occurrence of malaria cases were identified in Bule Hora (Borena), Liben (Guji) and Goro Dola (Guji) districts. More than 90% kebeles of visited districts in both zones were malarious areas. Due to shortage of budget and medical supplies there were depleted prevention and control activities of in many districts of both zones. Even though there was poor utilization of LLITs its distribution coverage was more than 80% in all visited districts of both zones. Indoor Residual Spray (IRS) did not conducted in all visited districts during 2005 E.C. Following these, malaria is expected to increase in the coming six months in Teltele, Gelana and Bule Hora districts of Borena zone and Shakiso, Adola Rede, Wadera districts of Guji zone.

7.1.4.6.2. Meningitis

During the last three years, there was no Meningitis epidemic in Borena zone. In addition, it is not expected to be occurred in the coming months in Borena zone. However, there was meningitis outbreak before three months in Guji zone. During this period in Guji zone, ten districts were affected with a total of 44 cases and one death. Meningitis outbreak control guideline was observed in both districts of this zone (Guji). Because of high population movement from different parts of the country for mineral mining activities, meningitis cases were were anticipated to occur in Shakiso, Girja, Saba Boru, Adola Rede and Wadera districts.

7.1.4.6.3. AWD

There were no AWD outbreak in all visited districts of both zones. In many districts of Borena zone, ponds were drying due to early withdrawal of rain. Also, many water schemes are not functional in Borena zone. For example in Dillo district of Borena zone only few motorized and mechanized schemes are working. Similarly, there were a lot of non-functional water schemes in many districts of Guji zone. Latrine coverage and utilization of many districts in both zones were very low. In addition, the coverage of potable water is very low in many districts of both zones. In some visited kebeles/villages of both zones, communities are drinking pond water without making any treatment for this water. So that, AWD is expected to be a public health problem in the coming months in these zones.

Table 7.1.7: Latrine coverage, utilization and save water coverage of visited districts in Borena and Guji zones, Oromiya, From August 2012 to June 2013

Zone	District	Latrine Coverage (%)	Latrine Utilization (%)	Safe Water Coverage (%)
Borena	Yabello	41	26	18
	Dillo	10.8	5	36
	Bule Hora	79	48	48
Guji	Goro Dola	32	32	No data
	Liben	69	No data	53

7.1.4.6.4. Measles

There is no ongoing measles outbreak in Borena zone. However, there is still report of measles cases in Goro Dola district of Guji zone. In all visited districts of both zones, measles guideline is distributed for all health facilities and there were trained health workers on measles management. Last year SIA was conducted in both zones. Due to poor cold chain system management and less availability of functional refrigerators at health post level, Borena zone has fear of measles outbreak in some districts. Similarly, because of poor cold chain system

management and ongoing report of measles cases from some districts, there is anticipation of measles outbreak in Borena zone.

Table 7.1.8: Measles vaccination Coverage of Visited districts, Borena and Guji zones, Oromiya, From August 2012 to June 2013

Zone	District	Measles Vaccination Coverage (%)
Borena	Dillo	76
	Bule Hora	85
	Yabello Rural	82
Guji	Goro Dola	92
	Liben	92

7.1.4.7. Challenges in Responding Epidemics

During epidemic management, shortage of transportation and emergency drugs are main challenges that faced many districts of both zones. Lack of budget, logistics and trained manpower were others challenges of district in epidemic control activities.

7.1.4.8. Nutrition

Reportedly, there were no abnormal cases of malnutrition in both zones. However, OTP and third round CHD screening data indicate that there are still cases of malnutrition in most of Borena districts. This year, SAM cases were increased in some districts of Borena zone Compared to last year; whereas decreased in many districts of Guji zone. Poor dietary habit of the community and low income sources were contributed for SAM increment in Borena zone. Similarly, improper feeding habit was observed in some districts of Guji zone and significant number of SAM cases were reported from these districts. In the coming months, cases of malnutrition are expected to be increased in many districts of Borena zone due to milk reduction and significant loss of crop production. In many districts of both zones, there are adequate therapeutic supplies for this year.

Table 7.1.9: Monthly new TFP admissions, OTP and SC sites of Dillo and Bule Hora districts, Borena zone from January to May 2013.

District	Month	Total new SAM cases	Total number of Sites	
			OTP	SC
Dillo	January	7	11	2
	February	5	11	2
	March	3	11	2
	April	0	11	2
	May	1	11	2
Bule Hora	January	99	48	2
	February	118	48	2
	March	119	48	3
	April	121	48	3
	May	227	48	3

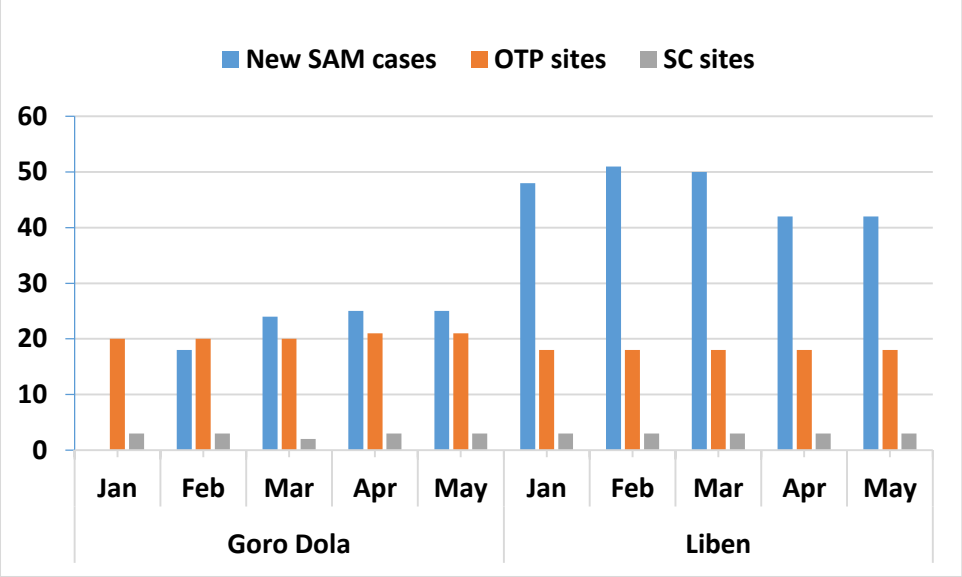


Figure 7.1.5: Monthly new TFP admissions, OTP and SC sites of Goro Dola and Liben districts, Guji zone, Oromiya, from January to May 2013

7.1.5. Summary of health and health related risks and population at risk

Table 7.1.10: Number of at risk Districts and type of health and health related risks in Borena and Guji zones, Oromiya, 2013

Zone	Type of Risk	Number of at Risk Districts	Total at risk Population
Borena	Malnutrition	All Districts	221,266
	Malaria	All Districts	257,057
	AWD	7 Districts	313,465
	Measles	4 Districts	149,413
	Meningitis	5 Districts	280,370
Guji	Malnutrition	6 Districts	248,421
	Malaria	6 Districts	248,421
	AWD	6 Districts	248,421
	Measles	6 Districts	248,421
	Meningitis	6 Districts	248,421

7.1.6. Recommendations

- Emergency drugs and supplies, mainly for malaria and AWD should maintained adequately.
- To solve nutritional problems of many districts, awareness should be given for communities on good feeding habit.
- Zonal offices should mobilize and work with NGOs and UN agencies those are working around there on nutrition, family health, water sanitation and hygiene and other health and health related activities.
- Training is needed for health professionals mainly at district level on cold chain system management.
- Even though water treatments were supplied for communities, they are drinking without treating the water. So that, awareness rising of communities on utilizing of these treatments should be critical job of respective bodies.
- LLINs distribution and maximizing its utilization and Indoor Residual Spray should conducted in malarias/endemic areas

- Multi-sectorial PHEM coordination forum and Rapid Response Team established at all level should work regularly. In addition, this team should have emergency preparedness and response plan and supported by fund.
- Enhancing routine surveillance activities should be an area of priority in detecting and management of possible outbreaks
- Inventory should be conducted on standardized latrine and its utilization

7.1.7. Acknowledgement

I would like to thank Borena and Guji zones task force members for their great cooperation and facilitation of this assessment. Also my gratitude goes to Miss Tume Ali, Borena zone health office PHEM focal person and Mr. Nusredin Ahmed Guji zone health office PHEM focal person for their support during the assessment. I appreciate visited districts PHEM focal persons for their support in providing relevant data to the belg assessment.

Finally but not least, I would like to thank Addis Ababa University, Oromiya Regional Health Bureau and Ethiopian Public Health Association for their technical and financial support during this assessment.

7.1.8. References

1. Office for coordination of humanitarian affairs, weekly humanitarian highlights in Ethiopia, May 21, 2012

2. UNDP, Emergency Unit for Ethiopia, Field assessment report, August, 2000

Annex 7.1.1: Regional/Zonal level Questionnaire for Belg assessment

Interviewer name_____		Institution:	
Interview Date: (dd) ____/(mm)___/___		Region:_____ Zone:_____	
Main contact at this location:	Name:-	Position:	Tel:_____ _

1. COORDINATION

A.	Is there a functional multisectoral coordination forum for the health sector?	Yes□	No□
B.	Are all relevant government, NGOs and UN agencies represented?	Yes□	No□
C.	Frequency of regular meeting? (Weekly, Every 2 weeks, monthly…..)_____		

2. Outbreak?

Was there any outbreak in the last 3 months? Yes□ No□

If yes, specify the name of disease outbreak

Disease outbreak :-_____ # of cases : _____ Deaths :-_____ (time period) _____

Disease outbreak _____# of cases : _____Deaths _____ (time period)_____

Disease outbreak _____# of cases : _____Deaths _____(time period)_____

3. Mention anticipated epidemics _____

If yes please indicate Zone/Woreda at risk and risk population per anticipated risk: *(Use the back side)*

4. Public Health emergency Management

A.	Is there a Public Health Emergency Preparedness and Response plan?	Yes□	No□
	If yes, is the plan budgeted/ funded?	Yes□	No□
B.	Is there a trained staff on PHEM (Regional/Zonal/Woreda/HFs)	Yes□	No□

If yes specify number of trained personnel per level:

Region: Female _____Male _**Zone:** Female____Male_____**Woreda**: Female_____Male_____

C.	Is there a Regional trained Rapid Response team (RRT)?	Yes□	No□
D.	Are there trained staff on Minimum Initial Service Package for RH	Yes□	No□

If yes specify number of trained personnel per level:

Region: Female _____Male_____**Zone:** Female_____Male_____**Woreda**: Female_____Male_____

Drugs and medical supplies		Total requirement	Available	Gap
i. Meningitis vaccine				
ii. Drugs:	Coartem			
	Artesunate (rectal)			
	Artesunate (Inj)			
	Artemether IM			
	Quinine (PO)			
	Quinine (IV)			
	Chloroquine			
	Ceftriaxione			
	Oily CAF			

		Doxcycline			
		Ringer lactate			
		ORS			
		Vit A.			
	iii. Lab supplies	RDT (Malaria)			
		Pastorex (Meningitis)			
		LP set			
		TI bottle			
	CTC Kit (AWD)				
	Medical Supplies	Gloves,			
		Syringe			
		PPE			
	Clinical Delivery Assistance kit PART A: Reusable Equipment				
	Clinical Delivery Assistance kit PART B: Drugs & Disposable Equip.				
	Mgt. of Complications of Abortion kit (Manual Vacuum Asp. Set)				

Summary: Requirements/Needs/ 2013

Region	Zone	Woreda at Risk	Type of Risk	At risk Population

Region/Zone	Type of Health emergency	Total estimated Beneficiaries	Required finance
	Emergency Reproductive Health needs	Please refer the footnote	Please refer the attached matrix

Comments:_____

_____

_____

N.B. Total estimated beneficiaries for Emergency Reproductive Health are Women of Reproductive Age and their number is calculated at 23% of the total of at risk population.

Annex 7.1.2: Woreda level Questionnaire for Belg assessment

Interviewer name _____ Interview Date: (dd)____/(mm)____/____

Region:_____ Zone:_____Woreda_____

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

SECTION I: SOCIO- DEMOGRAPHIC PROFILE				
1.1. Woreda total population:	M:_____F:_____		Under 5_____	Total:____
	No. of women of reproductive age (age 15-49 yrs.):_____			
	No. of pregnant women :_____			
	No. of lactating women:_____			
	Total no. of PLW :_____			
1.2. Special Population *(if any):*	Pastorals____	Refugees____	IDPs____	Migrant Workers___

SECTION II: HEALTH PROFILE	
2.1. Coordination	
Is there a functional 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□
Is there fund allocated for Preparedness activities	Yes□ No□

2.2. Morbidity (List top 5 causes of Morbidity) in the year 2005 EC (Meskerem to Megabit) (2012-2013 GC)

a. Morbidity below 5 years	Morbidity above 5 years
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

2.3. List number of cases/deaths from Tir 2005 to Ginbot 2005 (Jan–May 2013)

Month	AWD		Malaria		Measles		Meningitis		Other(specify)	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Jan 2013										
Feb 2013										
Mar 2013										
April 2013										
May 2013										

NB: Number of cases and deaths of the specific disease could be total case reported by the routine surveillance system during the period and not necessarily outbreak report	
2.4. Outbreak?	
Was there any outbreak in the last 3 months? (August- October)	Yes□ No□
If yes, specify the disease:	
Disease outbreak _____# of cases : _____ ___Deaths _____(time period DD/MM/YY))_____	
Disease outbreak _____# of cases : _____Deaths _____(time period DD/MM/YY)_____	
Is there any ongoing outbreak of any disease?	**Yes□ No□**
Disease outbreak _____# of cases : _____Deaths _____(Start date)_____	
Disease outbreak _____# of cases : _____Deaths _____(Start date)_____	
Disease outbreak _____# of cases : _____Deaths _____(Start date)_____	
2.5. Preparedness: Is there emergency drugs and supplies enough for 1 month? Or easily accessible on need? *(NB: Use the stock matrix to calculate this)*	
Ringer Lactate (to treat AWD cases)	Yes□ No□
ORS (to treat AWD cases):	Yes□ No□
Doxycycline *(to treat AWD cases)*:	Yes□ No□
Consumables : Syringes, Gloves *(for AWD management):*	Yes□ No□
Amoxil susp (measles)	Yes□ No□
Tetracycline ointment (measles)	Yes□ No□
Vit A (measles)	Yes□ No□
Coartem for Malaria	Yes□ No□
Artesunate (rectal) for Malaria	Yes□ No□
Artesunate (Injection) for Malaria	Yes□ No□
Artemether IM for Malaria	Yes□ No□
Quinine (PO) for Malaria	Yes□ No□
Quinine (IV) for Malaria	Yes□ No□
Chloroquine for Malaria	Yes□ No□
Ceftriaxione (Meningitis)	Yes□ No□
Lab supply: RDT for Malaria	Yes□ No□
Lab supply: RDT (pastorex) for M eningitis	Yes□ No□
LP set	Yes□ No□
Number of CTC kit available: (for AWD)	Yes□ No□
Clinical Delivery Assistance kit PART A: Reusable Equipment	Yes□ No□
Clinical Delivery Assistance kit PART B: Drugs & Disposable Equip.	Yes□ No□
Mgt. of Complications of Abortion kit (Manual Vaccum Asp. Set)	Yes□ No□
Main shortage (if any): Specify	
Is budget allocated for emergency Rapid response by the woreda Health office?	Yes□ No□
Is PHEM guideline distributed to all Health institutions	Yes□ No□

Is there a trained woreda Rapid Response Team?				Yes□ No□
Are there staffs trained on Minimum Initial Service Package for Reproductive Health?				Yes□ No□
If " Yes" please state the number of trained personnel : Male : _____ Female : _____ Total : _____				
Weekly Timeliness and Completeness (%) of Surveillance report for August – October				
Month	T/C (%)	T/C (%)	T/C (%)	T/C (%)
August 2012				
September 2012				
October -2012				

SECTION III: RISK FACTORS

Diseases	**Risk factors for epidemics to occur**	
Malaria	Malaria endemic area	Yes□ No□
	Presence of malaria breeding site	Yes□ No□
	Interrupted or potentially interrupting rivers	Yes□ No□
	Unprotected irrigation in the area	Yes□ No□
	LLINs coverage <80%	Yes□ No□
	Indicate the coverage of IRS 2005_____	
	Depleted prevention and control activities	Yes□ No□
	Malaria Guideline (new)distributed to all Health facilities	Yes□ No□
	Health workers trained on the new Malaria guideline	Yes□ No□
	Number of malarious kebeles and total population in these Kebeles	Keb _____ Pop(F)_____(M)_____
Meningitis	Was there Meningitis epidemic in the last 3 years (If yes specify year)_____	
	Has vaccination been conducted in the past 3 years	Yes□ No□
	If yes : Indicate the date and number of people vaccinated	Date____ No_____
	Is there Meningitis outbreak control Guideline	Yes□ No□
	Are health workers trained on Meningitis outbreak management	Yes□ No□
AWD	Was there AWD epidemic in the last three years (If yes specify date)_____	Yes□ No□
	Latrine coverage	
	Latrine utilization	
	Safe water coverage	
	Is Cholera outbreak control Guideline distributed to all HFs	Yes□ No□
Measles	Is there ongoing measles outbreak	Yes□ No□
	What is the measles vaccination coverage of 2004, less than one year (Hamle 2003-Sene 2004)	
	Is Measles Guideline distributed to all Health facilities?	Yes□ No□
	Are health workers trained on Measles	Yes□ No□
	Has SIA been conducted in 2004 EFY	Yes□ No□
	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 January to May 2013

Month	Total new 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 Y/N			Children Discharged from TFP referred to SFP Y/N
						RUTF	F100	F75	
Jan									
Feb									
Mar									
April									
May									

Therapeutic Supplies enough for the next 1 month: YES_____; NO_____

Any comment

_____

_____

_____

_____

_____

_____

_____

Chapter – VIII: Protocol/Proposal for Epidemiologic Research Project

8.1. Assessment of Magnitude and Factors Affecting Childhood Vaccination Status in Dawe Kachen Woreda, Bale Zone, Oromiya Region.

Executive Summary

Background: Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert 2 to 3 million deaths each year worldwide. The Expanded Programme on Immunization started in 1974. Vaccine preventable diseases are a major contributor to high African child mortality rates. In Ethiopia, incomplete immunization is a major reason for recent outbreaks of vaccine-preventable diseases. According to the 2011 Ethiopian Demographic and Health Survey (EDHS), only 24% of children age 12-23 months were fully vaccinated.

Objective: To assess magnitude and factors affecting vaccination status of 12-23 months age children in Dawe Kachen woreda, Bale zone, Oromiya region, Ethiopia.

Method: Descriptive Cross-sectional study study will be conducted at community level from October to November 2014 in Dawe Kachen woreda, Bale zone Oromiya region. Multi-stage cluster sampling technique will be used. A total of 720 systematically selected mothers/caretakers will be enrolled in the study from randomly selected five kebeles of the woreda. Structured checklist adopted from EDHS and other studies will be used during data collection. Data will be entered and analysed by Microsoft Excel, Epi info 7 and STATA 12. Bivariate and multivariate analysis will be done to determine the association between dependent and independent variables.

Work plan: Data collection will be started on first week of September 2014 and the overall work of the study is planned to finalize until end of November 2014.

Budget: Estimated cost to undertake the study is 65,698 ETH Birr.

8.1.1. Introduction

Immunization provides protection from infectious diseases, including some potentially life-threatening diseases such as measles, whooping cough and tetanus, and crippling diseases such as poliomyelitis. The Expanded Programme on Immunization started in 1974 and widened the range of vaccines routinely provided, from smallpox, Bacilli Calmette-Guerin (BCG) and diphtheria, tetanus and pertussis (DTP) to include polio and measles [1]. The word "expanded" refers to two important aspects of the initiative: increasing the number of vaccine antigens, from one or two antigens routinely offered to six antigens, and increasing coverage, from less than five percent to universal child immunization (80%). Since then immunization has saved the lives of millions of children in the three decades. The 1980s did indeed see a huge increase in coverage. Thanks to sustained efforts to promote immunization, deaths from measles decreased by 39% between 1999 and 2003; compared to levels in 1980, measles mortality has declined by 80%. Efforts continue to increase coverage and widen the range of vaccines provided. In Ethiopia, the Expanded Program on Immunization started in 1980 with anti-six vaccines (BCG, OPV, DPT and Measles). The Ethiopian Health Policy emphasizes prevention and control of major communicable diseases [2]. Strengthening the Extended Program on Immunization (EPI) is therefore one of the core activities in the recent Health Sector Development Program (HSDP) to reduce child mortality. The goal of EPI in Ethiopia, when launched, was to increase immunization coverage by 10% annually and achieve 100% DPT3 coverage by 1990 (Universal Child immunization). In the first five years it targeted all children under the age of two years, which was later in 1986 revised to focus on children under one year of age in order to decrease the child exposure time to natural infection. Now a day there are about 10 vaccines that include recently launched vaccines, Pentavalent, PCV and Rota Virus administer in for under 1 year children in Ethiopia. The EPI program in Ethiopia is administered by the Ministry of Health with technical support from the WHO and other organizations (Sullivan et al., 2009). The history of immunization services in Ethiopia prior to 1980 has not been documented very well although the smallpox eradication activities have left some legendary memories. Following the recommended immunization schedule is not only makes children less susceptible invasive and fatal diseases, it also reduces health care costs. A child is said to be fully vaccinated if all eight vaccinations have been received.

Table 8.1.1: Schedule of Routine EPI Immunization in Ethiopia

S.N	Vaccine	Disease	Doses	Age
1	BCG	Tuberculosis	1	At Birth
2	OPV	Polio	4	At Birth, 6, 10 and 14 Weeks
3	Penta	Diphtheria, Pertussis, Tetanus, Haemophilus Influenza type B, Hepatitis B	3	6, 10 and 14 Weeks
4	PCV	Pneumonia	3	6, 10 and 14 Weeks
5	Rota Virus	Diarrhoea	2	10 and 14 Weeks
6	Measles	Measles	1	At 9 Months

8.1.1.1. Statement of the Problem

Immunization is a proven tool for controlling and eliminating life-threatening infectious diseases and is estimated to avert 2 to 3 million deaths each year worldwide. However, over 24,000 children die of vaccine-preventable diseases every day around the world. This is equivalent to 1 child dying every 3.6 seconds, 16-17 children dying every minute, and just about 9 million children dying every year [19]. The under-five mortality rate has decreased by 26% from 91 deaths per 1000 live births in 1990 to 67 deaths per 1000 live births in 2007 globally; while in sub-Saharan Africa the rate has fallen by only 20%, from 181 to 145 over the same period. Africa has the highest under-five mortality rate of all the world's continents, with 40% of all global deaths in under five year olds occurring in African countries located south of the Sahara desert [11,12]. Vaccine efficacy tends to be lower in low-income countries than in higher-income countries [3, 4]. Vaccine preventable diseases are a major contributor to high African child mortality rates, partly because of the limited introduction of new vaccines and low uptake of existing vaccines. In 2010, more than six million children in sub-Saharan Africa did not receive the full series of three doses of the Pentavalent vaccine by one year of age [1]. A cross-sectional study conducted in a rural district of the northern part of Ethiopia in 2000 has shown that the fully valid immunization coverage for age assessed by card plus history was 51% and BCG to measles defaulter rate was 23.9% [5]. According to the 2011 Ethiopian Demographic and Health Survey (EDHS), only 24% of children age 12-23 months were fully vaccinated.

Studies have shown that the cost to treat a vaccine-preventable disease is 30 times more than the cost of the vaccine. Identifying differences in vaccination coverage among subgroups of the population is useful for programme planning and targeting resources to areas most in need [8]. Study conducted in Gedo zone of SNNP region shown that the child immunization completion rate was lower (29.4%) in the zone and Wonago district (35.2%) in in particular [10]. Epidemiological investigations of recent outbreaks of vaccine-preventable diseases have indicated incomplete immunization as a major reason for the incidence of these diseases in Ethiopia [5]. Study was not conducted so far in Dawe Kachen woreda on factors influencing childhood immunization. So that, this assessment is planned to describe magnitude of childhood vaccination status and identify factors associated with vaccine intake in this woreda.

8.1.1.2. Literature Review

Studies have shown that five categories of maternal factors are associated with vaccine utilization: low motivation, socioeconomic constraints, perceived accessibility of services, fears about health or social consequences, and knowledge and folk beliefs related to vaccines [6, 7].

At individual level assessment on vaccine uptake in Sub-Saharan African countries identified that children from poorest households, uneducated parents, mothers with no access to media, and mothers with low health seeking behaviours were more likely to be unimmunised [11]. Low socioeconomic status, sometimes resulting in counteractive practical circumstances such as lack of transport, may play a role in preventing the completion of the full set of immunizations [18].

Qualitative cross-sectional study conducted in Southern Ethiopia showed knowledge regarding benefits and side effects of the vaccine were decisive for vaccination. Maternal education and use of antenatal care services are consistently associated with completion of childhood vaccinations [12, 13, and 14]. Similarly, EDHS in 2011 show that children whose mothers have secondary education are more likely to be fully immunised than those born to mothers with none education (57% and 20%, respectively).

In a community where education is not well attained traditional views and attitudes could directly affect the health status and utilization of health services [6]. A research conducted in South-Western rural of Ethiopia on childhood vaccination with demographic factors and

women's autonomy exhibited that women's participation in household decision making, maternal education and use of antenatal care during pregnancy were significantly associated with full vaccination status [15].

Some studies exhibited that place of delivery is identified as determinant factor for childhood immunization. For example, study conducted in Rural Mozambique shows home delivered children have a 2.27 times higher risk of not completing their vaccination program than delivered at health institutions [24].

Similarly, study conducted in Uganda on factors influencing childhood immunization documented that maternal education and access to media have been highlighted as an important predictor of full childhood immunization and receiving individual vaccines [19]

A qualitative study conducted in rural China found that mothers who had been informed regarding the benefit of vaccination were willing to vaccinate their children [13].

The 2011 EDHS also showed that urban children were more than two times as likely as rural children to have all basic vaccinations.

. According to study conducted by Marston and Cleland that used DHS data of five developing countries, unintended pregnancy was associated with incomplete childhood vaccination [16]. A study of child immunization uptake in the UK found that children in larger families were more likely to have incomplete immunization [20].

A cross sectional study done in Sudan showed that walking time to the nearest place of vaccination strongly influenced the correct vaccination status of the child. Children of mothers who have better access to vaccine services (less than 30 minutes walking time to the nearest place of vaccination) were 3.4 times more likely to have had the correct vaccinations than were children of mothers who have to walk 30 minutes or longer [21].

Study in Bangladesh showed that programmatic factors such as lack of information about schedule of session and non-holding of session according to schedules were commonly identified reasons for dropouts of vaccination. Additionally, the study documented no idea about doses by mothers/caretakers; vaccinator did not inform about subsequent doses, refusal by health professionals due to lost card or vaccine exhausted were contributed factors for absence of fully immunized [22].

Birth order has a close relationship with vaccination coverage. According to the EDHS 2005 vaccination coverage generally decreases as birth order increases, 27% of first-born children have been fully immunized, compared with 18% of children of birth order six and above [23].

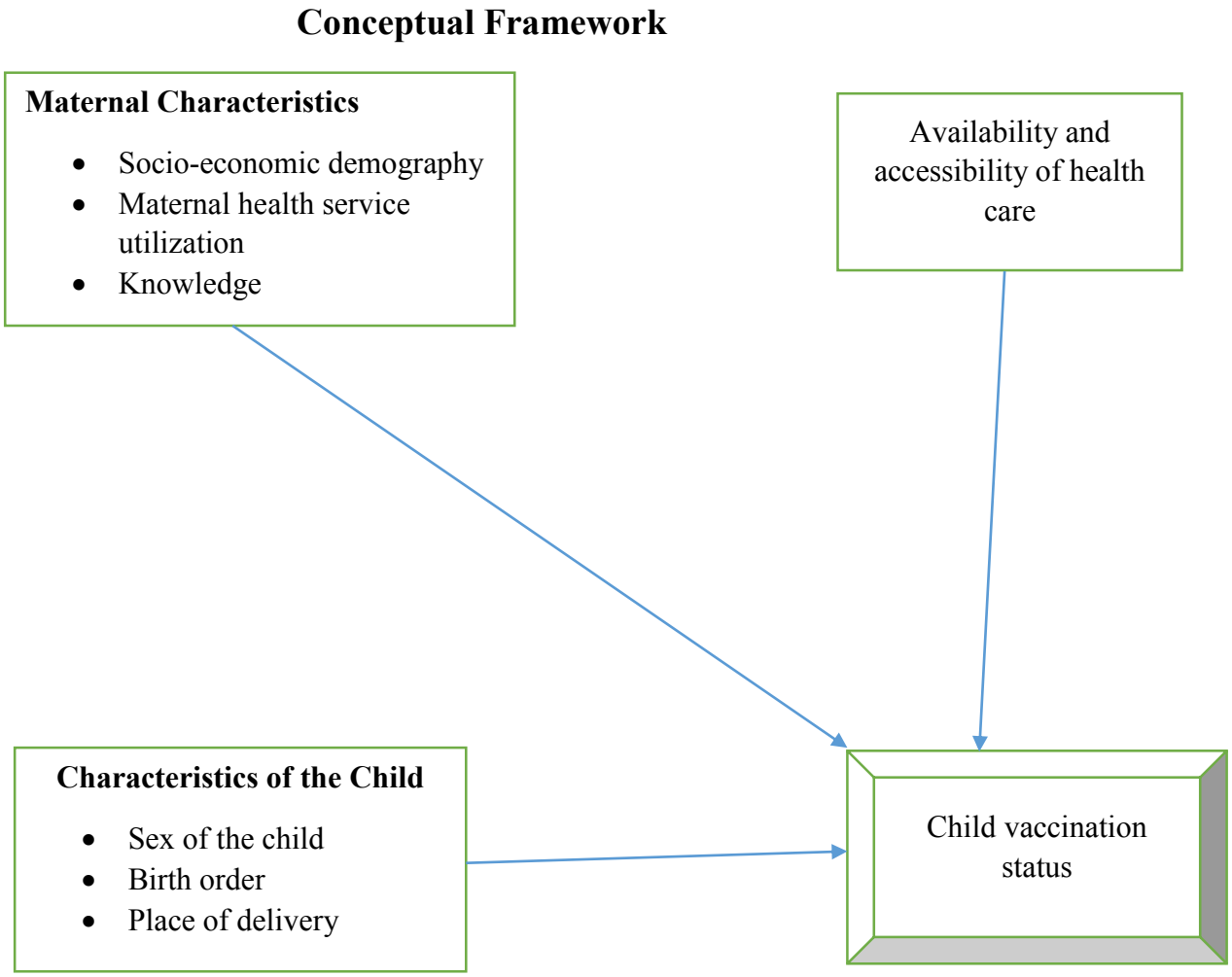


Figure 8.1.1: Conceptual Framework for factors affecting childhood vaccination status in Dawe Kachen woreda, Bale zone, Oromiya region, Ethiopia.

8.1.1.3. Significance of the Study

Despite many efforts towards control of vaccine-preventable diseases, occurrence of significant under five children morbidity and mortality is associated with these communicable diseases. Poor intake of child vaccine is a major attributed factor for magnitude of vaccine-preventable communicable diseases. Published and unpublished researches in Ethiopia documented that occurrence of measles outbreak in many areas of the country is significantly

associated with low measles vaccination coverage and improper management of cold chain system. With the recent scenario, there was a plenty of measles outbreak in Oromiya region, Ethiopia. According to Ethiopian Demographic and Health Survey in 2011 at any time before the survey, measles vaccination coverage of the Oromiya region was 46%. Similarly, measles outbreak in Harena Buluk and Dawe Serer woredas of Bale zone, Oromiya region in 2011 was due to low measles vaccination coverage and poor vaccine cold storage of the area [17]. The same unpublished study on measles outbreak investigation and response in Dawe Kachen woreda (study area) of Bale zone in 2014 shown that poor vaccine utilization was contributed for the outbreak. The Dawe Kachen woreda health office report show that the average measles vaccination coverage for the last consecutive five years was 74% which is under recommended level (85%) for immunity development against the disease. All these situations had trigger us to assess magnitude and factors associated with child vaccine utilization in Dawe Kachen woreda.

8.1.2. Objectives

8.1.2.1. General Objective

To assess magnitude and factors affecting childhood vaccination status in Dawe Kachen woreda, Bale zone, Oromiya region, Ethiopia.

8.1.2.2. Specific Objectives

- To describe magnitude of children vaccination status in Dawe Kachen woreda.
- To assess demographic and socio economic factors affecting childhood immunization.
- To assess the knowledge of mothers/caretakers on immunization service and vaccine-preventable diseases.
- To identify health service related factors that may influence childhood vaccine intake in the woreda.

8.1.3. Method and Materials

8.1.3.1. Study Area

Dawe Kachen is one of 20 woredas of Bale zone Oromiya region. According to population projection from 2007 census, the woreda has a total population of 42,862 of which 18,408 are males and 18,780 are females. One town and 13 rural kebeles are found in the woreda. There are two health centers in this woreda and the woreda town Mio is found 565 kilometres from Addis Ababa. The woreda has a surface area of 2,291 kilometres square. Among total land of the woreda, 78% is flat and the rest 22 is mountainous, valley and sloppy nature. Of the total population of the woreda, 31% are farmers and the rest 69 are agro-pastoralists. The woreda is bounded by Rayitu and Ginir woredas to the North, by Gura Dhamole woreda to the south, by Goro woreda to the west and by Dawe Serer woreda and Somali region to the east. Totally, the weather condition of the woreda is dry.

8.1.3.2. Study Design

Descriptive cross-sectional study will be used during collection of data at community level.

8.1.3.3. Source Population

All households with 12-23 months children in Dawe Kachen woreda will be the source population

8.1.3.4. Study Population

All mothers/caretakers with 12-23 months age children in randomly selected 5 kebeles of the woreda will be study population.

8.1.3.5. Sample Population

A total of 720 mothers/caretakers with at least one child of 12-23 months age selected by systematic random sampling methods from randomly selected 5 kebeles with 15 clusters will be study participants.

8.1.3.6. Sample Size Determination

The sample size will be calculated using Ethiopian Demographic Health Survey (EDHS) 2011 estimation for fully vaccinated children. Following this, the proportion of fully immunized children of 12-23 months for Oromiya region in 2011 was 15.6% with 95% confidence interval

and absolute precision of 4%. The design effect will be 2 as common for immunization cluster survey.

Number of Sample Size = $\frac{(1.96)^2 \text{ X P (1-P) X}}{d^2}$ Design Effect = **662**

Where: - d = Absolute precision = 4%

P = Estimated prevalence = 15.6%

In addition, 8.8% of the calculated sample size for non-respondents will be added, i.e. a total of **720** mothers/caretakers will be study participants.

8.1.3.7. Sampling Procedure

Multi-stage cluster design with three stage will be used. Firstly, all 13 rural kebeles and 1 town of the woreda will be divided in to five based on their location within the woreda (North, South, East, West, and Center). According to this, each four strata will contains three kebeles and the central strata will have two kebeles. Then, one kebele will be selected by lottery method from each strata. After that, each selected kebeles will be classified in to three **"Zones/Got".** By having this now we will have 15 clusters from selected five kebeles. Finally, 48 households with children under five years old will be selected by systematic sampling methods from each cluster in every k^{th}. The first household will be selected by lottery method sampling. Additionally, if the selected household is identified with no child of 12-23 months age, the nearest household with 12-23 months children will be selected (exclusion criteria).

8.1.3.8. Data Collection Procedure

The questionnaire is developed in English and will be translated to local language (Afan Oromo). Also the Afan Oromo version will be translated back to assess consistency of the questionnaire. The questionnaire includes, vaccination histories of children (12-23 months), information on socio-demographic characteristics of mothers, economic status of the family/caretakers, sex of the child, ANC follow up, child place of delivery, maternal immunization, accessibility and availability of vaccination service, family size and knowledge of mothers or immediate caretakers on immunization. During data collection, child vaccination history will be filled based on child vaccination card or mothers/caretakers recall in the absence of the card. Data on vaccination histories and sex category of all 12-23 months age children found in selected household will be collected. Selected 15 health professionals for data

collection will be trained on the designed questionnaire for two days. The training will include overall content of the questionnaire, how to select households to be interviewed and other related issues. The questionnaire will be pre-tested in 30 households of selected clusters for its applicability, completeness, desirability and updates.

8.1.3.9. Operational Definitions

Vaccination: - The administration of a vaccine to stimulate a protective immune response that will prevent disease in the vaccinated person if contact with the corresponding infectious agent occurs subsequently.

Immunization: - If vaccination is successful, it results in immunization: the vaccinated person has been immunized.

Fully Vaccinated:- A child between 12-23 months old who received one BCG, at least three doses of Pentavalent, three doses of OPV, three doses of PCV, two doses of Rota Virus and a measles vaccine**.**

Partially Vaccinated: - a child who misses at least one doses of the ten vaccines.

Unvaccinated: - a child who does not receive any dose of the ten vaccines.

Immunization Coverage: - proportion of children took vaccination.

Immunization Status: - being fully/partially vaccinated or unvaccinated

Immunization Service: - Activities delivered to mothers and children that contain full package of vaccination at health facilities or outreach sites.

Availability of Immunization Service: - The presence or absence of immunization services in studied area.

Accessibility of Immunization Services: - Opportunity to get immunization services with in short radius (less than 5 kilometres for health center).

Coverage by Card Only: - Coverage calculated with numerator based only on documented dose, excluding from the numerator those vaccinated by history.

Coverage by Card plus History: - Coverage calculated with numerator based on card and mother's report.

8.1.3.10. Inclusion Criteria

All households with at least one 12-23 months child will be included in the study.

8.1.3.11. Exclusion Criteria

This study will not include households with no child who aged 12-23 months.

8.1.3.12. Variables of the Study

8.1.3.12.1. Dependent Variables

- Childhood vaccination status.

8.1.3.12.2. Independent Variables

- Socio demographic characteristics of mothers/caretakers
- Knowledge of mothers/caretakers
- Tetanus toxoid vaccination status of mothers/caretakers
- ANC follow up of mothers/caretakers
- Place of delivery
- Family size
- Family income
- Autonomy of mothers/caretakers
- Number of 12-23 months children in the home
- Sex of children
- Vaccination history of the children
- Birth order of the children
- Time of travel to reach the nearest health facility

8.1.3.13. Data Entry and Analysis Procedures

Data will be entered and analyzed by Microsoft Excel, Epi info version 7.1 and Stata 12 after having encoded each data per respondent. Magnitude of childhood vaccination status will be described by percentage and number for different independent variables. Binary logistic regression will be undertaken to determine the odds ratio for both multivariate and bivariate analysis. Bivariate analysis will be done to determine factors associated with childhood vaccination status. The findings of the study will be presented by tables and charts.

8.1.3.14. Data Quality Management

The questionnaire that will be used for the study is adopted from Ethiopian Demographic and Health Survey (EDHS) and other studies conducted in different countries on assessment of

factors associated with childhood vaccination status. During data collection every questionnaire filled by data collectors will be checked by field supervisors for their completeness and if responses filled correctly in daily basis. Unfilled questions on the questionnaire will be completed by revisiting those households. Data collectors will be supposed to fill information on child vaccination history based on vaccination card (if available) and give a time for mothers/caretakers to bring this card. Additionally, the principal investigator will check filled questionnaire and give feedback for field supervisors every day prior to data entry.

8.1.3.15. Ethical Clearance

Ethical clearance of the study will be obtained from Addis Ababa University School of Public Health Institutional Review Board. Upon approval of this project proposal, support letter will be written for respective Oromiya Regional Health Bureau. Then, we will obtain support to conduct the study and participate in the study from the Region, Bale Zone and Dawe Kachen woreda. The willingness of all study participants will be asked to be a part of the study by using prepared consent form. Nobody forced to participate in the study without his/her interest. The English version of participant consent form that will be translated to Afan Oromo is annexed to this document.

8.1.3.16. Dissemination of Findings

The result of this study will be disseminated for Addis Ababa University School of Public Health - Ethiopian Field Epidemiology Training Program, Ethiopian Public Health Institute and Oromiya Regional Health Bureau. Also Bale zone and Dawe Kachen woreda health offices will be the recipients of the study result. Additionally, findings of the study will be presented on different seminars, workshops and conferences held at National and International level. Similarly training will be conducted for Regional, Zonal and Woreda health staffs to discuss on findings. Efforts will be made to publish the findings on different journals.

8.1.3.17. Expected Outcomes

This study will able to document child vaccination coverage of Dawe Kachen woreda and identify factors affecting childhood vaccination status that could help towards improvement of immunization service in the area and through the region as well.

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Annex 8.1. 1: Implementation period of the project, Dawe Kachen, Oromiya, Ethiopia, 2014.

S. N	Activities	Tentative Schedule											
		September 20114				October 2014				November 2014			
		Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4
1	Finalizing the project tools • Translate consent form and questionnaire to the local language (Afan Oromo)												
2	Obtain ethical clearance from AAU, Oromiya Regional Health Bureau and others Administrative levels												
3	Select data collectors and field supervisors												
4	Conduct training for data collectors and field supervisors												
5	Pre-test of the questionnaire												
6	Data collection												
7	Data cleaning and entry												
8	Data analysis and report writing												
9	Dissemination of results												

Annex 8.1.2: Budget breakdown for research project, Dawe Kachen, Oromiya, 2014

S.N	Description of activity	Unit description	Quantity	Unit Cost	Total Cost
Stationery Cost					
1	Duplication Paper	Pack	15	200 Birr	3000 Birr
2	Duplication of formats	Page	5100	50 Cents	2250 Birr
3	Pen	Piece	50	3 Birr	150 Birr
4	Pencil	Piece	30	1.5 Birr	45 Birr
5	Sharper	Piece	30	10 Birr	300 Birr
7	Binder	Piece	40	30 Birr	1200 Birr
8	Flip Chart	Piece	3	75 Birr	225 Birr
9	Marker	Pack	2	100 Birr	200 Birr
Sub –Total					
Training Cost					
10	Principal Investigator	Day	3 days	500 Birr	1500 Birr
11	Supervisors	Day	3 days	200 Birr	600 Birr
12	Data Collectors	Day	3 days	100 Birr	300 Birr
13	Data Clerk	Day	3 days	100 Birr	300 Birr
Sub-Total					
Transportation Cost					
14	Car Rent (For 1 car)	Day	15 days	2000 Birr	30,000 Birr
15	Fuel	Litre	500 litre	20 Birr	10,000 Birr
Perdium Cost					
16	Principal Investigator	Day	15 days	500 Birr	7500 Birr
17	Field Supervisor	Day	15 days	200 Birr	3000 Birr
18	Data Collectors	Day	10 days	100 Birr	1000 Birr
19	Data Clerk	Day	10 days	100	1000 Birr
Total					**62,570 Birr**
Contingency (5%)					**3128 Birr**
Grand Total					**65,698 Birr**

Annex 8.1.3: Consent Format for Assessment of Magnitude and Factors Affecting Childhood Vaccination, Dawe Kachen, Bale, Oromiya.

1. Consent Form

How are you doing? My name is _____. I am working in _____. We want to conduct study on assessment of magnitude and factors affecting childhood vaccination status in your district. The aim of this study are to describe magnitude of childhood vaccination status and factors associated with vaccine utilization. I will ask you about you and your children those age 12-24 months vaccination status. The interview may take 30 minutes. By having participate in the study, there is no any influence on you and health services that you are gaining. However, your responses will help to improve health care services mainly immunization program. The interview may take 30 minutes. You are not obligated to participate in the study and you can quit from the interview whenever you need. Additionally, you can skip some questions if you don't want to answer it. By considering these, would you volunteer to participate in the study and respond to the following questions? Yes ____ No _____

Formed Consent

I have been briefly told about the study and I understood the objectives of the study. So that, I agreed to participate in the study and approve by signature below.

Signature _____. Date _____.

Signature of the Interviewer _____. Date _____.

Signature of The supervisor _____. Date _____.

Annex 8.1. 4: Questionnaire for Assessment of Magnitude and Factors Affecting Childhood Vaccination, Dawe Kachen, Bale, Oromiya.

Characters	Responses
I. Socio-economic demography of caretaker and identifying information of children	
1. Name of the child/ren ***N.B.*** In the case of polygamy or more than one mothers/caretakers with 12-24 months age child in selected household, please randomly select one mothers/caretakers and ask history for her/his children	1._____ 2. _____ 3. _____ If more, state below; _____ _____
2. Sex of children	1. Male/Female 2. Male/Female 3. Male/Female
3. Birth Date of Children (E.C)	1. _____//___//_____ (D/ M/ Y) 2. _____//___//_____ (D/ M/ Y) 3. _____//___//_____ (D/ M/ Y) 4. Don't Know
4. Birth Order of the Children	1. 1st, 2nd, 3rd (if other, specify _____) 2. 1st, 2nd, 3rd (if other, specify _____) 3. 1st, 2nd, 3rd (if other, specify _____)
5. Who is Primary caretaker for children?	A. Mother B. Father C. Relative D. If other, specify_____
6. Age of the Primary caretaker	1. ___ years 2. Don't know
7. Religion of the primary caretaker	1. Muslim 2. Orthodox 3. Protestant 4. Catholic 5. Wakefeta 6. If other, specify _____
8. Occupation of the primary caretaker	1. Farmer 5. Daily Labour 2. Pastoralist 6. House Wife 3. Agro-pastoralist 7. Student 4. Merchant 8. If other, specify _____

9. Educational status of the primary caretaker	1. Illiterate 2. Read and Write 3. Primary 4. Secondary and Above 5. If other, specify _____
10. Family monthly income	_____

II. Child Immunization

1. Is there vaccination card or family folder?	1. Yes/No 2. Yes/No 3. Don't know
1.1. **If yes,** may I see?	1. Yes, I have seen 2. Yes, but I haven't seen 3. No Card
1.2. **If no**, did you ever received a card?	1. Yes 2. No 3. Don't know

2. Fill the following vaccination history based on data recorded on the card or family planning **(ONLY** from card or family folder**)**	**Date of Immunization (E.C)** Day/Month/Year			
	Child 1	**Child 2**	**Child 3**	
1. Date of Birth as recorded	__/__/____	__/__/____	__/__/____	
2. BCG	__/__/____	__/__/____	__/__/____	
3. Polio at Birth	__/__/____	__/__/____	__/__/____	
4. OPV 1	__/__/____	__/__/____	__/__/____	
5. OPV 2	__/__/____	__/__/____	__/__/____	
6. OPV 3	__/__/____	__/__/____	__/__/____	
7. Penta 1	__/__/____	__/__/____	__/__/____	
8. Penta 2	__/__/____	__/__/____	__/__/____	
9. Penta 3	__/__/____	__/__/____	__/__/____	
10. PCV 1	__/__/____	__/__/____	__/__/____	
11. PCV 2	__/__/____	__/__/____	__/__/____	
12. PCV 3	__/__/____	__/__/____	__/__/____	
13. Rota Virus 1	__/__/____	__/__/____	__/__/____	
14. Rota Virus 2	__/__/____	__/__/____	__/__/____	
15. Vitamin A	__/__/____	__/__/____	__/__/____	

3. Number of doses received by the child those did not recorded (during routine Immunization or Campaign)	**Child 1**	**Child 2**	**Child 3**	
	BCG___ Penta __ PCV___ Rota___ Meas.__ Vit. A___	BCG___ Penta __ PCV___ Rota___ Meas.__ Vit. A___	BCG___ Penta __ PCV___ Rota___ Meas.___ Vit. A___	

4. Record number of doses and date for those children who did not have **CARD** (based on caretaker recall). Tell the caretaker site of injection and others remembering issues for each antigen.		Record **2**, if child did not take the vaccine; Record **3**, if caretaker did not know whether the child take vaccine or not in each row.			
		Child 1	**Child 2**	**Child 3**	
1. BCG	Date received	__/__/___	__/__/___	__/__/___	
2. OPV	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
3. Penta	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
4. PCV	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
5. Rota Virus	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
6. Measles	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
7. Vitamin A	# of doses	_____	_____	_____	
	Date (1st dose)	___/__/__	___/__/__	___/__/__	
	Date (Last dose)	__/___/___	__/___/_	__/___/___	
5. Where did the child received his/her last routine immunization		**Child 1**	**Child 2**	**Child 3**	
		1. Health centre 2. Health post 3. Private clinic 4. Outreach 5. Other, ____ 6. Don't know	1. Health centre 2. Health post 3. Private clinic 4. Outreach 5. Other, ____ 6. Don't know	1. Health centre 2. Health post 3. Private clinic 4. Outreach 5. Other, ____ 6. Don't know	

II. The following questions refer to your experience getting immunization services for this child during the past two years	
1. Have you ever been at health facility for any purpose rather than vaccination?	2. Yes 3. No 4. Don't know
2. How long time will take to the nearest health facility?	1. Less than 10 minutes 2. 10-30 minutes 3. 31-50 minutes 4. More than 50 minutes 5. Don't know
3. Sometimes vaccinations are given for children when they go to health facility for other purposes rather than vaccination. Have your children ever vaccinated in this situation so far?	1. Yes 2. No 3. Don't know
3.1. **If yes**, how many of your children vaccinated?	_____
4. Have you ever decided **NOT** to take your children to get vaccination?	1. Yes 2. No 3. Don't know
4.1. If yes, why did you not to take the child to vaccination? (Circle all responses)	A. Child Ill, B. Not Important C. Too Busy D. No one to take child E. Did not know where to take child F. Did not know when to take child G. Fear side-effects H. Place too far I. Time of visit was inconvenient J. Others (Specify)_____ K. Do not know
5. Were there any child you taken to a health facility for vaccination but not vaccinated then?	1. Yes 2. No 3. 3. Don't remember
5.1.If yes, why was the child not vaccinated? (Circle all responses)	A. No vaccine B. No vaccinator (not closed) C. Health Facility closed when I went D. Vaccinator refused to vaccinate child E. Vaccinator refused because not able to (e.g. too busy, NOT no vaccine)

	F. The visit was not in the vaccination day G. The caretaker refused the vaccination H. Others (Specify) _____ I. Do not know
5.2. Have you ever refused vaccination for this child?	1. Yes 2. No 3. Don't remember
5.2.1. If you refused then, why? (Circle all responses)	1. Too many shots at visit 2. Child Ill 3. Wait too long, so left 4. Other, specify _____ 5. Don't know

V. Now I want to ask you about what and where you have heard about vaccination.

1. From where have ever heard message about vaccination? (Circle all responses)	A. Community members B. Health workers C. Health workers at home visit D. Radio E. TV F. Newspaper G. Kebele administrator H. Other, specify I. I don't remember
2. What messages have you heard about immunizations? (Circle all responses)	A. About campaigns (date, target group) **About Routine EPI** B. Importance of routine vaccination C. Where to get routine vaccination D. Age to get vaccination E. Return date to get the next doses of vaccination F. About new vaccines (Pneumococcal/Rota virus) G. Others, specify _____ H. Don't know

VI. Now I wanted to ask you some questions about what you do with your child if they are sick (or if they have been sick, on your experience)

1. When your child is seek, where would you take the child? (Circle all responses)	A. Health facility B. Holly water C. Traditional healer D. Prayer place E. Other, specify _____

	F. Don't know
2. Usually, where do you prefer more to take your child when they sick?	A. Health facility B. Holly water C. Traditional healer D. Prayer place E. Other, specify _____ F. Don't know

VII. Some information on maternal health offered

1. Do you ever see anyone for pregnancy care during your pregnancy?	1. Yes 2. No 3. I don't remember
1.1. If yes, whom do you seen? (Circle all responses)	1. Doctor 2. Health Officer 3. Nurse/Midwife 4. Health Extension Worker 5. Traditional Birth Attendant 6. Community Health Worker 7. Other, specify_____ 8. Don't Remember
2. Were you offered tetanus tetanus vaccination during the visit? (injection in the left upper arm)	1. Yes 2. Not 3. I don't remember
3. Where did you deliver your last child?	A. Home B. Relative/Neighbor's home C. Health Post D. Health Centre (Gov.) E. Hospital (Gov.) F. Private or NGO Facility G. Other, specify
4. Who attend the delivery of your last child? (Circle all responses)	A. Doctor B. Health Officer C. Nurse D. Midwife E. Health Extension Worker F. Traditional Attendant G. Community Health Worker H. Relative/Friend I. Other, specify _____ J. Don't Remember

Chapter – IX: Other Additional Output Reports

9.1. Narrative Summary Report of Training Given to Zonal and Woreda PHEM Focal Persons from East Hararghe, North Shewa, Finfinne Special Zone Surrounding Finfinne, South West Shewa, West Hararghe, West Shewa zones and Sebeta, Burayyu, Gelan, Dukem, Sululta and Lega Tafo Towns

9.1.1. Introduction

Public health Emergency management system is continually challenged by recurrent and unexpected disease outbreaks and is facing the challenge of managing health consequences of natural and human made disasters, emergencies, crisis, and conflicts. Investigations of diseases are now more complex in nature than they were in the past because of a variety of new pathogens, risk factors and outbreaks. The best strategy for strengthening prevention & control of occurrence of outbreak, emergence of new infectious and re-emerging of communicable which provides evidence based decision on public health interventions. Active case searches are undertaking at many districts of the region. However, through supportive supervision and review meetings it was able to identify gaps on weak active case search, poor data collection and compiling and unable to report timely which may resulted from absence of continuous and strong need based trainings. So that, we have to strengthen PHEM focal persons on general PHEM activities and related works to achieve effective disease surveillance system and improve case management in our region.

The topics planned to deliver for participants includes; PHEM overview, Early warning system, Public health emergency preparedness, Emergency response, Recovery, Surveillance and case-management of selected diseases (Measles, NNT, AFP, Meningitis, AWD and Malaria). This training was a part of these measures conducted for PHEM focal persons from different zones and towns of the region.

9.1.2. Objectives

9.1.2.1. General Objective

- To strengthen knowledge and skills of PHEM focal persons on the surveillance of priority diseases and overall PHEM activities.

9.1.2.2. Specific Objectives

- To familiarize participants on PHEM overview.
- To enable participant to have skill on early warning system.
- To enable participants to have knowledge and develop skills on preparedness planning of priority diseases.
- To enable participants to have knowledge and develop the skills on public health emergency response.
- To enable participants to develop the skills on public health rehabilitation.
- To improve the health workers' ability on data recording and reporting system

9.1.2. Methods and Materials

- ✓ The training was conducted at Adama town, Oromiya region.
- ✓ The training was organized by Oromiya Regional Health Bureau-PHEM Core Process.
- ✓ The expected number of trainees were 52.
- ✓ The training period was from 9/04/2014-13/03/2014
- ✓ Participants were from East Hararghe, Finfinne Special Zone Surrounding Finfinne, North Shewa, South West Shewa, West Hararghe, West Shewa zones and Sebeta, Gelan, Dukem, Burayyu, Sululta and Lega Tafo towns.
- ✓ Pre and post-tests were given to the participants to assess their previous knowledge and analyze improvements after the training.

Teaching Methods

- ✓ Lectures (detail presentation on each topic)
- ✓ Group discussion(small and large)
- ✓ Brainstorming
- ✓ Recapping
- ✓ Exercises followed by group presentation
- ✓ Demonstration
- ✓ Preparing pre and post-test and post the test results
- ✓ Questions and answers
- ✓ General discussion

Teaching Aid

- ➢ LCD projector
- ➢ Lap Top
- ➢ Flip Chart
- ➢ Marker

Resource Persons

- Oromiya Regional Health Bureau = **6 persons**
- FETP Residents = **4 persons**
- WHO = **2 Persons**
- Adama Town Health Office = **2 persons**

9.1.4. Results

A total of 52 woreda PHEM persons were planned and 52 (100%) have attended the training. Of the total trainees 7 (13%) were males and 45 (87%) females. The mean score for pre-test and post-test were 73 and 84 respectively. The mean difference between pre-test and post-test was 11.

Topics covered during the training were:-

- Public Health Emergency Management
- Early Warning System
- Public Health Emergency Preparedness
- Public Health Emergency Response
- Public Health Emergency Recovery
- Epidemiology of Malaria
- Surveillance of AFP
- Measles Surveillance
- Neonatal Tetanus Surveillance
- Surveillance of Meningitis
- Epidemiology and Case Management of AWD
- Hygiene and CTC Establishment and Water Treatment

Table 9.1.1: Statistical description of pre and post-test results, Zonal and Woreda PHEM Focal Person Training, Adama, Oromia, April 2014

Test	# of Participant	Mean	Std. Dev	Minimum	25%	Median	75%	Maximum	Mode
Pre-Test	52	73	14	40	66	76	84	96	76
Post-Test	52	84	11	52	80	88	92	100	92

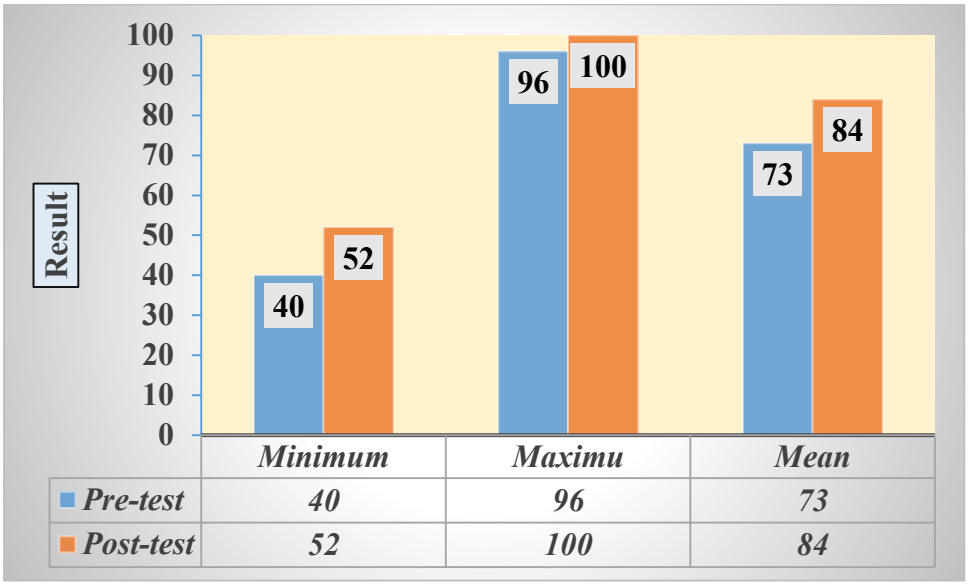

Figure 9.1.1: Comparison of pre and post test results by minimum, maximum and mean value, PHEM Focal Persons Training, Adama, Oromiya, Ethiopia April 2014

Table 9.1.2: Results of Pre-test and post-test by score category, PHEM Focal Persons Training, Adama, Oromia, April 20144

Score Category	Pre-test n (%)	Post-test n (%)
< 50	5 (9.6%)	0 (0%)
50 - 71	13 (25.0%)	6 (11.5%)
71 - 100	34 (65.4%)	46 (88.5%)
Total	**52 (100%)**	**52 (100%)**

9.1.5. Discussion

Effective message from the region and zone was contributed for 100% achievement of participation from all woredas and zones. All topics planned were delivered for participants according to their time table. Significant improvements was identified among participants after the training. This this could explained by that the number of participants who scored 71 and above was increased by 12 (35%) after the training compared to before the training. Additionally, there were no participants those scored below 50 in the post-test even though there were 5 (10%) participants scored below 50 in pre-test.

9.1.6. Conclusion

The training was successful since all expected participants were attended. Also, the analysis of post-test documented that there were significant improvement among participants after the training.

9.1.7. Recommendation

- Such capacity building training should be kept regularly for regional, zonal, woreda and town PHEM staff.
- Post-training follow up should conducted for all participants.
- The PHEM activities may be more effective if this training also given to health professionals at health facility level either by trained personal or regional/zonal health department.

9.1.8. Acknowledgement

I would like to thank EPHA for their financial support to conduct the training. Additionally, Oromiya Regional Health Bureau – PHEM Core Process staff for their support through facilitating the training to be able accomplish the training without any problems.

9.2. Weekly Bulletin of PHEM Report for WHO Epidemiologic Week 5/2014, Oromiya Regional Health Bureau.

HIGH LIGHTS OF THE WEEK

- *Suspected measles cases were kept increasing.*
- *Malaria cases were increased consecutively for the last three weeks.*

I. Introduction

In our Region measles and malaria have been the main public health concern as compared with others. This bulletin is prepared for week 5, 2014. The bulletin consists of weekly report completeness, trend of malaria and measles cases, surveillance and response activities.

II. Weekly surveillance Report

The surveillance report completeness of the region is 83% in this week and same with previous week. The government and private health facilities report completeness was 92% and 65% respectively. Except Gelan town, all zones and towns have sent this week report. The reporting completeness of thirteen zones and eleven towns were 80% and above for this week. The report completeness of zones and towns those scored 80% and above is indicated below (figure. 1).

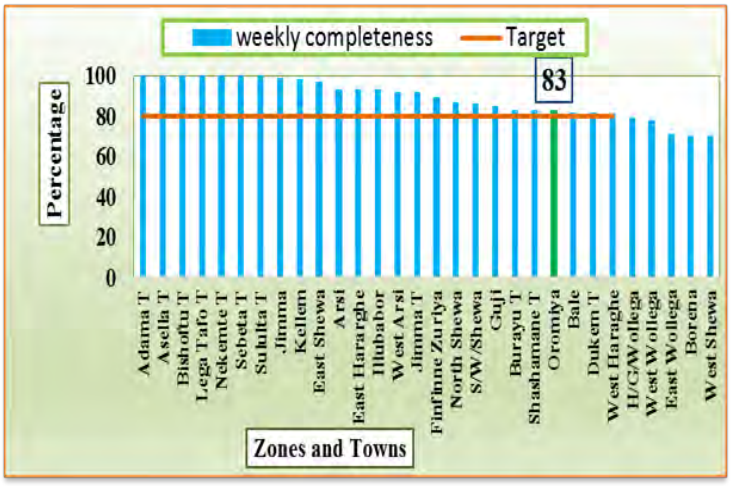

Figure 9.2.1: Completeness of weekly report by zones and towns, week 5, 2014, Oromia.

From nine consecutive weeks (49/2013-5/2014), the lowest (71%) weekly report completeness was in WHO week 49 and the highest (83%) completeness was identified in week 3 & 4 of 2014 (figure. 2).

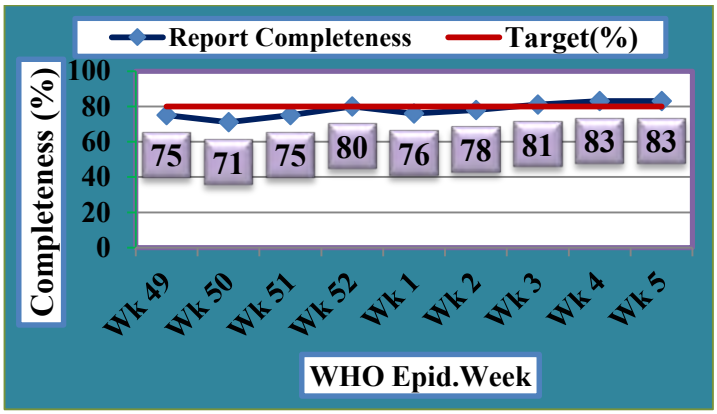

Figure 9.2.2: Regional surveillnace report completeness from week 49/ 2013 - 5/2014, Oromia.

III. Diseases

1. Malaria

In this week, a total of 4,683 confirmed malaria cases were reported and exceeded last week by 181 (4%). Among confirmed malaria cases, 2,377 (50.8%) were positive for P. Falciparum and 2,306 (49.2%) were P. Vivax. Trends of confirmed malaria cases from week 46/2013 to 5/2014 is showed below in figure 3.

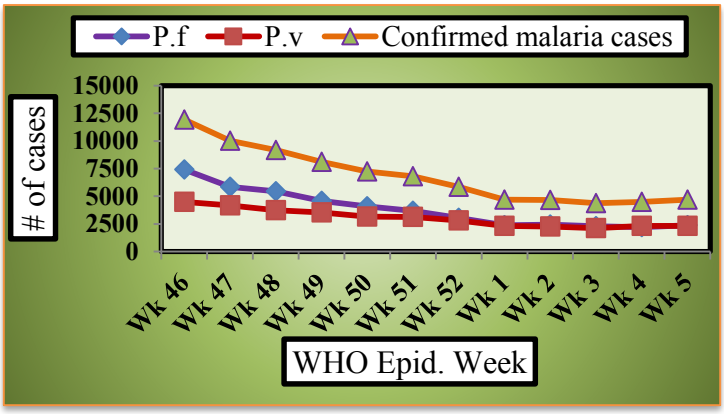

Figure 9.2.3: Regional confirmed malaria cases trend with P.f and P.v species from week 46/2013 to 5/2014, Oromia.

During this week, the highest number of confirmed malaria cases were reported from East Shewa zone, 648 (13.8%) and followed by Jimma, 618 (13.2%), West Shewa, 598 (12.8%), South West Shewa, 401 (8.6%) and East Wollega, 341 (7.3%) zones. Trend of confirmed malaria cases for the last three consecutive WHO weeks (3/2013-5/2014) by selected zones is shown below.

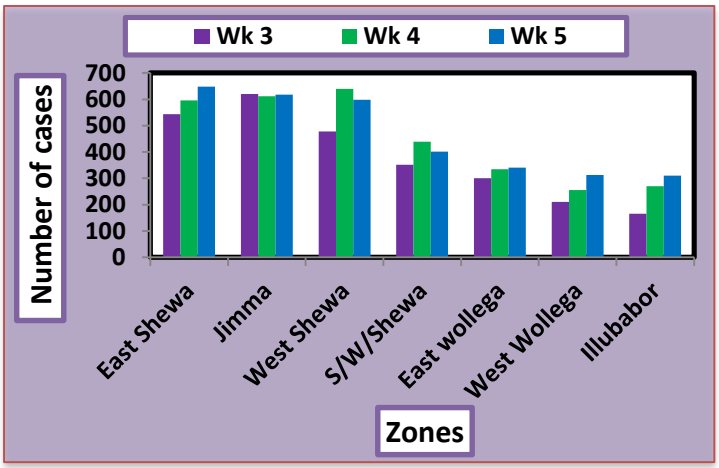

Figure 9.2.4: Magnitude of confirmed malaria by selected zones, from week 3/2013 to 5/2014, Oromia.

2. Meningitis

In week 5, a total of 4 suspected meningitis cases were reported. Among the total cases, 2 of them were reported from Horro Guduru Wollega zone and the rest each case was from Arsi and Bale zones.

3. Dysentery (Diarrhea with Blood)

A total of 1,526 dysentery cases were reported during this week. It was increased by 83 (5.7%) compared to last week. From the previous consecutive twelve WHO weeks (46/2013-5/2014), the highest numbers of cases (1,526) were reported in this week (5/2014), and the lowest cases (1,050) were reported in week 52, 2013 (Figure 5).

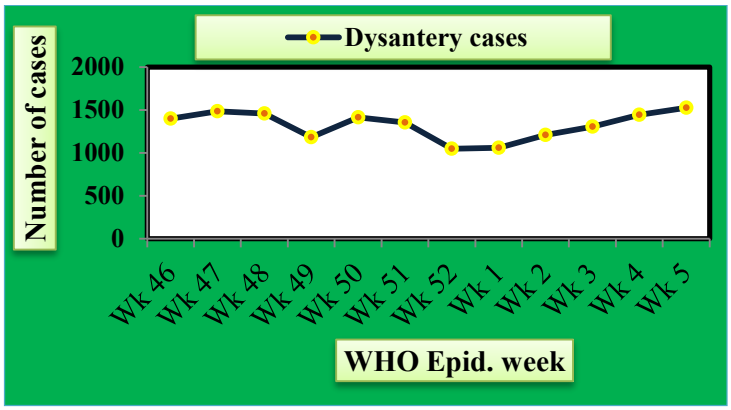

Figure 9.2.5: Trend of dysentery cases from week 46/2013 to 5/2014, Oromia.

4. Measles

In this week, a total of 144 suspected measles cases were reported regionally. The cases were increased by 48 (50%) when compared with week 4. Majority of the cases were reported from Horro Guduru Wollega, 47 (32.6%), West Hararghe, 23 (15.9%) and Bale, 21 (14.6%) zones. The previous consecutive thirteen WHO weeks (45/2013-5/2014) suspected measles cases trend is indicated below.

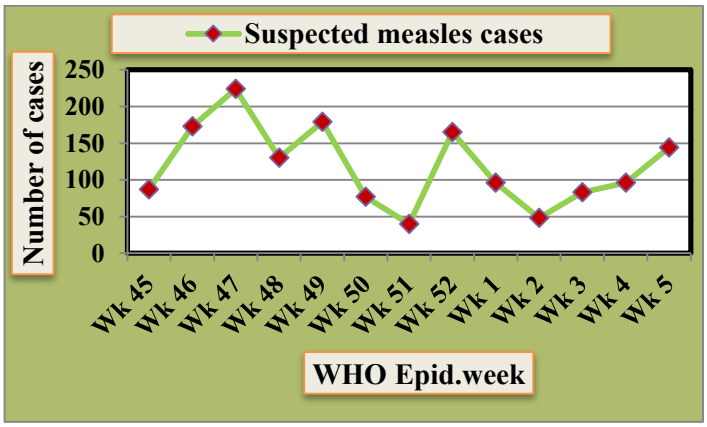

Figure 9.2.6: Trends of suspected measles cases from week 45/2013 – 5/2014, Oromia.

5. Polio

A total of 6 suspected polio/AFP cases were reported this week. However, no cases were reported during last week. Of the total of this week report, each case was reported from Bale, East Wollega, Horro Guduru Wollega, West Shewa, West Wollega zones and Jimma town.

6. Malnutrition

Totally 1,312 new severe acute malnutrition (SAM) cases were reported this week and exceeded last week by 74 (5.9%). Among total cases, 1097(83.6%) and 215 (16.6%0 were treated at OTP and SC respectively. The highest number of cases were reported from East Hararghe zone, 315 (24%) followed by West Arsi, 225 (17.1%), West Hararghe, 160 (12.2%) and Bale, 134 (10.2%) zones. This week, 2 deaths of SAM each from West Arsi and West Hararghe zones were reported.

7. Dog Bite/Suspected Rabies

In week 5 of 2014, a total of 4 dog bite/suspected rabies cases were reported as a region from Bale zone.

IV. Response activities

- Strengthened active case management and routine EPI.
- Strengthened active surveillance.
- Strengthened completeness of report through providing routine feedback.